Territory of American Samoa

MULTI-HAZARD MITIGATION PLAN

Reducing the risk of all natural hazards to the Territory, thus alleviating the loss of life and property to insure the well being of the people of American Samoa.

April 2015

Multi-Hazard Mitigation Plan
Territory of American Samoa

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Acknowledgements

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Record of Changes

The Hazard Mitigation Council will review this plan on an annual basis, and following any major disasters. All updates and revisions to the plan will be tracked and recorded in the following table. This process will ensure the most recent version of the plan is disseminated and implemented by the Territory.

Date of Change	Entered By	Summary of Changes

LOLO L. M. MOLIGA
Governor

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LEMANU P. MAUGA
Lieutenant Governor

EXECUTIVE ORDER NO. ___002_ – 2015

AN ORDER ADOPTING THE AMERICAN SAMOA REVISION AND UPDATE OF THE TERRITORY MULTI-HAZARD MITIGATION PLAN.

Section 1: Authority

This Executive Order is issued under the authority granted to the Governor in Article IV, Section 6 and 7 of the Revised Constitution of American Samoa, and Sections 4.0111 and 26.0105, American Samoa Code Annotated.

Section 2: Preamble

WHEREAS, American Samoa has suffered substantial losses of life and property from natural disasters. The flash flood of 2003, Hurricane Heta in 2004, Hurricane Olaf in 2005, the Tsunami in December 2009, the Flood in July 2014, constant heavy rain during hurricane season, and severe landslides have caused considerable human suffering and damage to homes, businesses and government buildings, and infrastructure. Population growth and development continue to increase the vulnerability of American Samoa to natural disasters and unless steps are taken to reduce the risk, disaster losses will continue to increase in the future; and

WHEREAS, American Samoa has taken steps to mitigate the risk of disaster losses. Strides in building codes and standards, land use procedures and protective outreach mitigation awareness programs have been considerable factors in alleviating the impact of disasters. New construction projects face stringent regulations, in Special Hazard Flood Areas (SHFA) prone to flooding, tsunamis, high surf, landslides and other hazards; and

WHEREAS, the United States Congress adopted the Disaster Mitigation Act (DMA) of 2000, commonly known as the 2000 Stafford Act, amended on October 10, 2000. On October 30, 2000, the President signed the bill into law, creating Public Law 106-390. The purpose of the DMA is to amend the Stafford Act, which establishes a national program for Pre-Disaster Mitigation (PDM). The PDM provides funds for mitigation planning and mitigation projects to communities. The law also requires local and Tribal governments to develop and submit mitigation plans to FEMA for approval in order to qualify for future funding. The law also stipulates Hazard Mitigation Grant Program (HMPG) funds for planning purposes, and increases HMGP, from 7.5% to 20% for states meeting enhanced planning criteria. The Plan outlines the requirement for the Flood Mitigation Assistance (FMA) for flood planning and small projects; and

WHEREAS, in 2002, the American Samoa Hazard Mitigation Council was established to assist the Territorial Emergency Management Coordination Office (TEMCO) in the development of the American Samoa Hazard Mitigation Plan. TEMCO was assisted also by the Pacific Disaster Center/East-West Center and the University of Hawaii's Social Research Institute to facilitate development of a draft plan. The Hazard Mitigation Council and its sub-committees met several times to review building codes and standards, land use regulations, and infrastructure standards and flooding. The Hazard Mitigation Council also met to formulate and identify mitigation projects and prioritize the projects accordingly. The product of this combined effort is contained in the American Samoa Hazard Mitigation Plan; and

WHEREAS, in 2007 the American Samoa Hazard Mitigation Plan matured to the state three year updated plan requirement as mandated by the Disaster Mitigation Act of 2000; and

WHEREAS, in 2011 the American Samoa Hazard Mitigation Plan was revised, updated and adopted by Executive Order; and

WHEREAS, the American Samoa Hazard Mitigation Council has recommended the adoption of the 2015 American Samoa Hazard Mitigation Plan.

Section 3: Order

The American Samoa Revision and Update of the Territory Multi-Hazard Mitigation Plan, dated January 31, 2015 is hereby adopted pursuant to ASCA Title 26, Chapter 01, the Stafford Act, and 44 CFR 201.4(c) (6).

Section 4: Effective Date

This order shall take effect immediately.

Dated: March 24, 2015

Lolo M. Moliga

LOLO M. MOLIGA
Governor

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Introduction

The significance of the *American Samoa Hazard Mitigation Plan* is that it provides American Samoa with a comprehensive mitigation strategy for prioritizing projects, programs, and activities that will save lives and reduce losses from the impacts of natural disasters. This plan defines responsibilities and analyzes local capacities and capabilities to manage mitigation projects. It also fulfills the Federal Emergency Management Agency's requirement for a mitigation planning process that first, ensures federal assistance to the people of American Samoa following future significant disasters and second, allows the American Samoa Government to compete for federal mitigation project assistance annually. This Mitigation Plan defines risks and vulnerability in a systematic manner, and analyzes the vulnerability of critical structures with respect to mapped known natural hazard areas. It also provides a framework for informed decision-making regarding prioritization of mitigation projects that will insure both the protection of life and property and cost-effective use of taxpayers' funds.

American Samoa is required to revise and update its current Hazard Mitigation Plan every five years to be eligible for non-emergency public assistance from FEMA, Pre-Disaster Mitigation project grants, Hazard Mitigation Grant Program funding and Flood Management Assistance Grants. The first plan was approved in 2003. Eligible mitigation projects include emergency debris removal and emergency protective measures and for repair and restoration of roads and bridges, water control facilities, buildings and equipment, utilities, and parks and recreation. This updated plan has identified new mitigation projects to minimize the disruption and damages due to the prevalent identified natural hazards affecting American Samoa. In addition, the 2011 mitigation plan projects were reviewed; some have been completed, and some are no longer priority. The top forty-one projects are listed in priority order in Table 1.

The American Samoa Territorial Hazard Mitigation Council has been active since the mitigation planning process in 2003. This Council has worked to assure that the updated plan has met the requirements of FEMA and the American Samoa Government. The plan makes sustainable development a priority, helping to ensure safer future development. The planning process encouraged inter-departmental and inter-agency coordination on the islands regarding mitigation planning and emergency management.

The Plan was updated with cost-effective mitigation recommendations that maintain or enhance the current natural and built environment, maintain or enhance the current quality of life on the American Samoa Islands, foster local resiliency to disasters, and identify and respond to local concerns and issues. The updated Hazard Mitigation Plan recognizes the unique qualities and characteristics of American Samoa's environment, economy, and culture. It focuses on the previously identified natural hazards including tropical cyclones, landslides, earthquakes, droughts, floods and tsunamis, climate change, hazardous materials, wildfire and volcano. Five hazards were added to this list they are sea level rise combined with climate change, lightening strike, coastal erosion, high surf and soil hazards. Hazard and risk information was updated. Meetings were held with the Territorial Hazard Mitigation Council, the Governor's Authorized Representative and the directors and technical staff of each relevant department and organization to gather their input regarding the updated plan goal, objectives and mitigation strategies. The plan meets the requirements of the Disaster Mitigation Act of 2000 and guidelines provided by FEMA's Multi-hazard Mitigation Planning Blue Book, November 2006. The Plan prioritizes the top thirty-eight most important and cost-beneficial mitigation projects for future funding. The Plan also reviews past mitigation projects and accomplishments as well as documents American Samoa's stewardship of financial and project management of mitigation projects completed over the past eleven years.

2015 Mitigation Strategy

The hazard mitigation strategy is the culmination of work presented in the planning area profile, risk assessment and capability assessment. It is also the result of multiple meetings and public outreach. The Hazard Mitigation Council reviewed the goal and objectives from the 2011 plan. They deemed they should remain consistent for this updated plan. The Goal of the 2015 American Samoa Hazard Mitigation Plan, endorsed by the Territorial Hazard Mitigation Council, is to:

Reduce the risk of all natural hazards (identified and unidentified) to the Territory, thus alleviating loss of life and property to insure the well being of the people of American Samoa.

The Objectives of the Plan are to:

1. Promote effective land use planning and regulation, as well as public awareness, in order to reduce damage from natural hazards.

2. Improve infrastructure development standards with special attention to mitigating the increasing flood hazard.

3. Develop and implement hazard mitigation projects aimed at reducing the risk of damage and destruction of existing assets and infrastructure from the full range of natural disasters threatening the Territory.

4. Improve building codes and standards, as well as training programs, in order to reduce disaster damage from strong winds, earthquakes and tsunamis.

5. Develop public information and education programs in order to reduce disaster damage from strong winds, earthquakes and tsunamis.

6. Fund related planning projects to strengthen mitigation standards, research, education, and outreach efforts.

2015 Mitigation Actions

The following table represents the mitigation actions approved by the Hazard Mitigation Council for this plan. They are listed in priority order. However, the Hazard Mitigation Council recognizes that funding may not come in this order. The bullets below describe the abbreviations for the departments referenced.

- ASPA – American Samoa Power Authority
- ASTCA – American Samoa Telecommunications Authority
- DHS – American Samoa Department of Homeland Security
- DOC – American Samoa Department of Commerce
- DPR – American Samoa Department of Parks and Recreation
- DPW – American Samoa Department of Public Works
- EPA – American Samoa Environmental Protection Agency
- HC – American Samoa High Court
- OPI –American Samoa Office of Public Information
- PORT – American Samoa Port Authority

Table 1 2015 Mitigation Projects in Priority Order

Ranking	Agency	Project Title
1	Port	Fuel Farm Relocation
2	ASPA	Water Wells Mitigation
3	ASPA	Water Tanks Mitigation
4	ASPA	Fagatogo Reservoir Mitigation
5	Port	Runway Shoreline Protection
6	DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)
7	DPW	Ottoville Drainage Flood Mitigation
8	DPW	Fagaima Road Flood Mitigation
9	DPW	Fatuoaiga Drainage Flood Mitigation
10	DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools
11	ASPA	Tafuna Wastewater Treatment Plant
12	DPW	#6 Pava'ia'I Elementary
13	ASPA	Faga'alu Booster Station
14	ASPA	Pago Water Booster Station Mitigation
15	ASPA	Utumoa River Flood Mitigation
16	ASTCA	Leone to Poloa U/G Communications Lines [1]
17	ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines
18	ASTCA	Amouli to Aoa U/G Communications Lines
19	ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines
20	DOC	Mapping Project

1 This project was funded in June 2014. Fili Sagapolutele. Samoa News. (6/30/2014). Retrieved September 30, 2014 from http://www.samoanews.com/content/en/blast-project-passes-federal-audit-flying-colors-according-ceo

Ranking	Agency	Project Title
21	ASPA	Weather Proof Sewage Lift Stations
22	ASTCA	Lauli'I/Breaker's Point Tower Replacement Parts
23	EPA	Landslide Early Warning System - Faga'alu Pilot Project
24	ASTCA	Aunu'u Tower Replacement Parts
25	ASTCA	Manu'a Islands U/G Comm. Lines
26	OPI	Office Of Public Information Building
27	DPW	#5 Happy Valley Road Drainage
28	DPR	Vaipito Stream Revetment
29	DHS	Wind Shutters EOC Project (currently under further review by FEMA)
30	DPW	Ili'ili Drainage Flood Mitigation
31	DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)
32	ASPA	Nuuuli To Mesepa U/G Lines
33	DPW	Permanent Landslide Repair Route 005
34	ASPA	Poloa To Fagamalo U/G Lines
35	HC	High Court And District Court Building Relocation - Change to Elevation Project
36	DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a
37	DPW	Afono Culvert Improvement
38	DPW	Vaitele Stream Flood Mitigation (Name Correction Passed By Council)
39	DPW	#4 Leone Village Road
40	DPW	#8 Ugrading of DPW-M&O Building
41	DPW	Permanent Landslide Repair Route 11

Authority and Assurances

American Samoa will continue to comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11c, and will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).[2]

In acknowledgement of all the stakeholders involved in the mitigation planning process, the strengths and accomplishments of the plan development process have been numerous. The American Samoa Government has endorsed the 2015 American Samoa Hazard Mitigation Plan with an Executive Order signed by the Governor. The Governor, Governor's Authorized Representative (GAR), State Hazard Mitigation Officer, and the Territorial Hazard Mitigation Council has provided strong leadership and advocacy throughout the Territory, ensuring a continuous mitigation planning process. Adequate funding and technical guidance from the Federal Emergency Management Agency for mitigation planning projects, coupled with annual funding incentives for competitive mitigation grants, have continued to drive the mitigation planning process.

2 Federal Register 1 Vol. 67, No. 38 /Tuesday, February 26, 2002 / Rules and Regulations §201.4(c)(7).

Accomplishments of this planning project include the American Samoa Hazard Mitigation Council (Hazard Mitigation Council) leadership, American Samoa Government agency support and commitment, public participation, hazard and loss estimation research, geographic information system mapping of critical facilities and hazards, project development, and analysis of mitigation issues through the planning process.

And finally, this Hazard Mitigation Plan builds on a growing record of mitigation successes in American Samoa and technical expertise involved in composing the American Samoa Hazard Mitigation Plan 2003, 2008 and 2011.

CHAPTER II

Planning Area Profile for Hazard Mitigation Analysis

A U.S. Territory since 1900, American Samoa is located in the central South Pacific Ocean, 2,300 miles south-southwest of Hawaii and 1,600 miles east-northeast of New Zealand. American Samoa has a total land area of approximately 76 square miles and consists of a group of five volcanic islands and two atolls (Rose Atoll and Swains Island). The five volcanic islands, Tutuila, Aunu'u, Ofu, Olosega, and Ta'u, are the major inhabited islands. Tutuila is the largest island and the center of government. Ofu, Olosega, and Ta'u, collectively are referred to as the Manu'a Islands. Figure 1 Base Map of American Samoa depicts all of the islands of American Samoa.

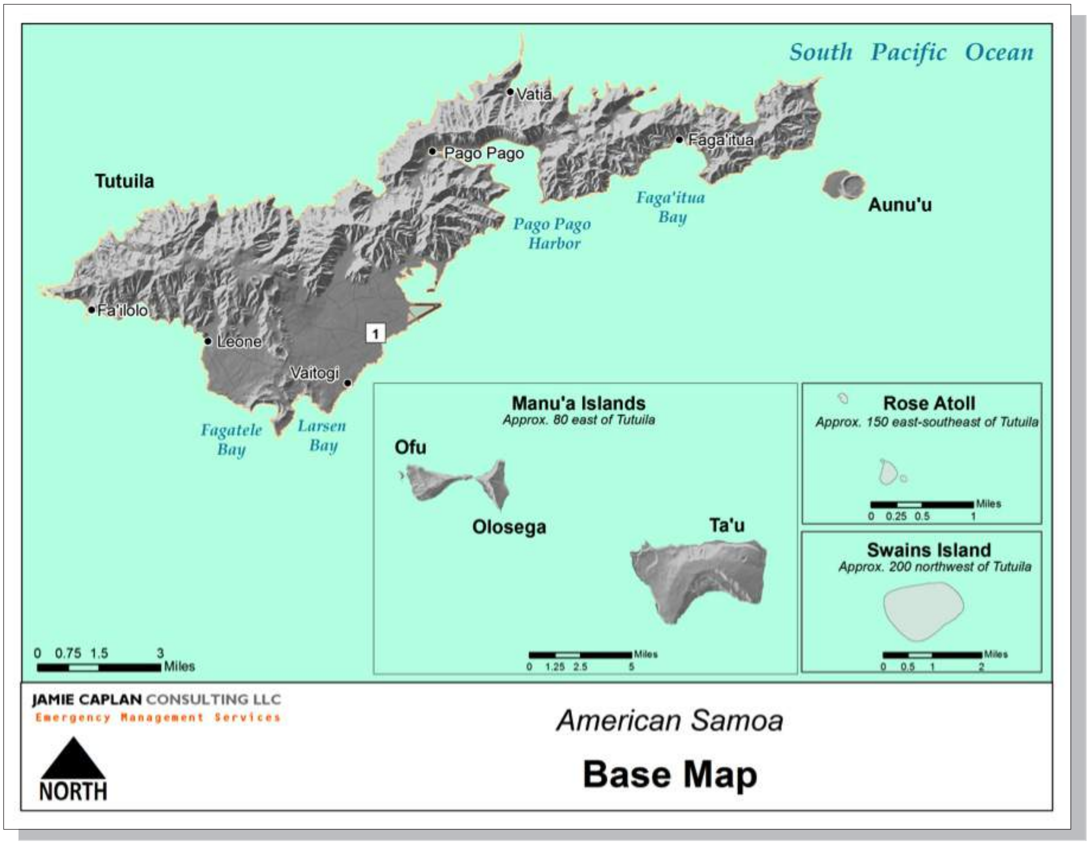

Figure 1. Base Map of American Samoa. The five volcanic islands, Tutuila, Aunu'u, Ofu, Olosega, and Ta'u, are the inhabited islands.

At 53 square miles, Tutuila is the largest and oldest of the islands, and is the center of government and business. It is a long, narrow island lying SW-NE, is just over 20 miles in length, and ranges from 1 to 2 miles wide in the eastern half, and from 2 to 5 miles wide in the western half. Home to 95 percent of the territory's 55,000 residents, Tutuila is the historic capitol (Pago Pago), the seat of American Samoa's legislature and judiciary (Fagatogo), as well as the office of the Governor. Tutuila is often divided into 3 regions: the eastern district, the western district and Manu'a district. There are nine counties and 65 villages on Tutuila. Figure 2 Village and County Base Map for Tutuila and Aunu'u Islands below shows these counties and village boundaries.

It is recognized that American Samoa traditionally refers to areas of the islands as villages and districts (East District, West District, and Manu'a District), as opposed to county geographies. However, the best available data for mapping and analysis boundaries was U.S. 2010 Census data, so the county geography was utilized. It is also recognized that the 2010 Census data did not include FoFo County, which is included as part of Lealatua County in this version of the plan (including the Village of Leone). Future revisions of this plan should move towards aligning the traditional American Samoan areas of reference with the best available data.

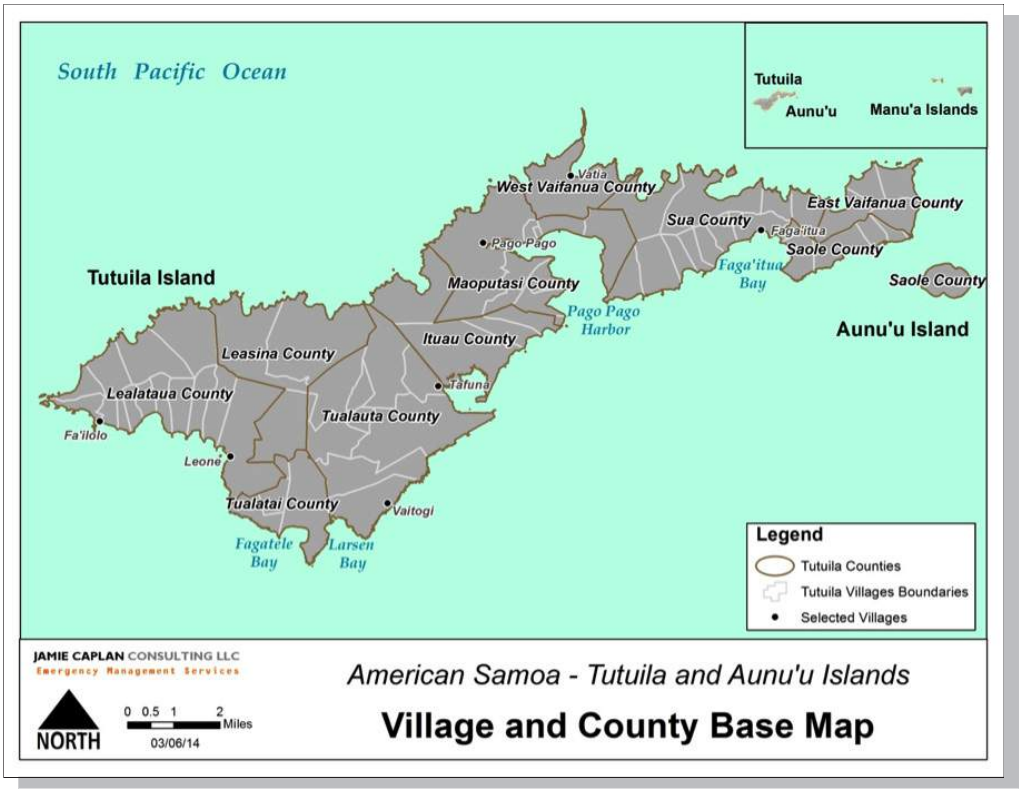

Figure 2. Village and County Base Map for Tutuila and Aunu'u Islands

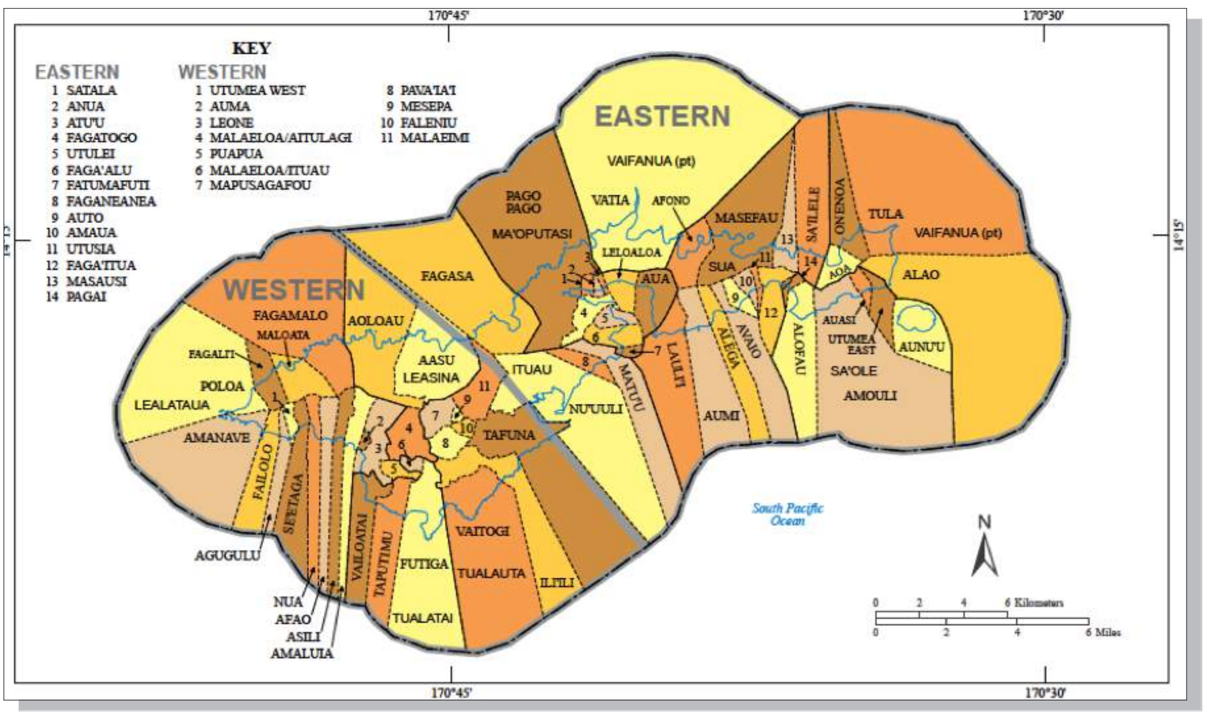

Figure 3 Western and Eastern Districts of Tutuila [1]

The tiny island of Aunu'u, approximately 375 acres in size (.59 square miles), lies 1 mile off the southeastern coast of Tutuila. According to the 2010 census fewer than 450 people live on the island. Aunu'u Island is included in Saole County that also has villages on Tutuila Island. Given the close proximity, there are regular commuter boats to and from the island.

1 2010 Census American Samoa Demographic Profile Summary File (2010). U.S. Census Bureau. p. 255.

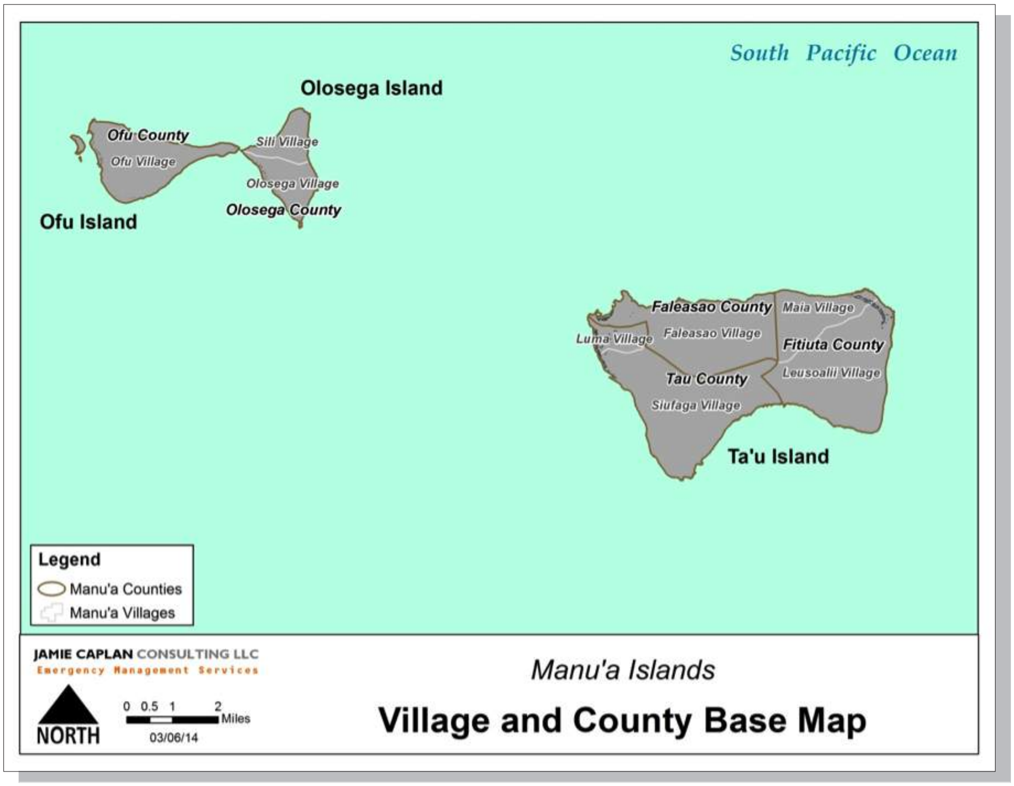

Figure 4. Village and County Base Map for Manu'a Islands

The three islands of Ofu, Olosega and Ta'u, collectively referred to as the Manu'a islands, lie 70 miles east of Tutuila with a population of about 1,100. Ta'u is the largest of the three islands at 6.5-mile square miles followed by Ofu (2.8 square miles) and Olosega (2.0 square miles). Access is made by boat or plane. Figure 4 Village and County Base Map for Manu'a Islands depicts the counties in the Manu'a islands.

Swains Island, with a population of approximately 17 lies 240 miles north of Tutuila, and the uninhabited Rose Atoll is a National Wildlife Sanctuary 180 miles to the east.

The Manu'a Islands can be considered an underserved community. The current government is making a big effort to build up the Manu'a Islands via the current American Samoa's Comprehensive Economic Development Strategy. Below is a news summary of these economic efforts, with footnoted reference:

Revival Planned for American Samoa's Manu'a Islands [2]
Updated at 4:46 pm on 15 August 2012

A review of American Samoa's Comprehensive Economic Development Strategy will include recommendations on possible business ventures for Manu'a, not only to create jobs but attract Manuans back to the islands.

Businessman Lewis Wolman is contracted with economist Malcolm McPhee to update the Strategy.
Mr. Wolman says tourism, fishing, agriculture and the broadband link, called BLAST, all hold promise of greater economic activity in Manu'a.

> "None of those will happen overnight but between transportation, fisheries, agriculture, the internet connection from the BLAST project and of course tourism, I believe that the conditions

2 Revival planned for American Samoa's Manu'a Islands (2012). Radio New Zealand. Retrieved August 8, 2014 from http://www.radionz.co.nz/international/pacific-news/206584/revival-planned-for-american-samoa's-manu'a-islands

will be good that everybody pulls together there is a brighter future for Manu'a than we have seen in the last 20 years." Stated by, American Samoa businessman, Lewis Wolman.

"Rose Atoll, known to Samoans as Muliāva, is approximately 150 miles (240 km) east-southeast of Tutuila Island's Pago Pago Harbor. It is the easternmost Samoan island, the southernmost point of the United States, the only atoll in the Samoan archipelago, and one of the smallest atolls in the world.

The Muliāva sanctuary area encompasses 13,507.8 square miles (34,985.04 square km) of marine waters of the Rose Atoll Marine National Monument and waters surrounding the Vailulu'u Seamount, the only hydrothermally active seamount within the EEZ. The inner sanctuary boundary is adjacent to the seaward boundary of the Rose Atoll National Wildlife Refuge. Hence, the sanctuary does not include the land or lagoon waters that make up the refuge.

The atoll is home to 270 species of reef fish as well unique plant life and bird life only found on this atoll. Access to Rose Atoll is only for scientific and research purposes and permission must be sought from the US Fish & Wildlife Service." [3]

Demographic and it's Impact on Risk

According to the 2010 U.S. Census, the total population in American Samoa was 55,519 persons including 52,928 persons on Tutuila and 1,143 in Manu'a (176 persons on Ofu, 177 persons on Olosega, and 790 persons on Ta'u).[4] Table 1, Population Distributions for Villages, is shown below. In Tutuila, the population is heavily concentrated in the Tafuna Plain, in the Western District, since this is the largest area of flat or gently sloping terrain. The village with the highest population is Tafuna at nearly 8,000 persons. Nu'uuli is the second largest village (approximately 4,000 persons) and Pago Pago is the third largest village (approximately 3,600 persons). The village with the lowest reported population is Maloata (approximately 8 persons), which is located on the northwestern side of Tutuila. In Manu'a, the eight villages range in population from five to 183, with an average of 143. The most populated village is Luma, on the island of Tau. Figure 5 2010 U.S. Census Village Population below shows the population distribution across American Samoa.

Table 1. Population Distribution for Villages

County (District)	Villages within	Approx. Size (sq. mi.)	2010 Population
TUTUILA ISLAND			
East Vaifanua (East District)	Alao Aoa Onenoa Tula Utumea East	2.31	1,953
Ituau (East District)	Faganeanea Fagasa Matuu Nuuuli	5.52	5,335

3 National Marine Sanctuary of American Samoa. (2014). American Samoa Government Department of Commerce. Retrieved August 8, 2014, from http://doc.as.gov/resource-management/nmsas/
4 Note: remaining population, 1,448 reside on outlying islands.

County (District)	Villages within	Approx. Size (sq. mi.)	2010 Population
Lealataua (West District)	Afao Agugulu Amaluia Amanave Asili Fagalii Fagamalo Failolo Leone Maloata Nua Poloa Seetaga Utumea West	9.22	3,884
Leasina (West District)	Aasu Aoloau Malaeloa Aitulagi	6.51	1,807
Maoputasi (East District)	Anua Atuu Aua Fagaalu Fagatogo Leloaloa Pago Pago Utulei	6.65	9,889
Saole (East District)	Alofau Amouli Auasi Aunu'u Island Pagai Utumea East	2.27	2,281
Sua (East District)	Afono Alega Amaua Aumi Auto Avaio Fagaitua Laulii Masausi Masefau Sailele	3.00	3,223

County (District)	Villages within	Approx. Size (sq. mi.)	2010 Population
Tualatai (West District)	Futiga Malaeloa Ituau Taputimu Vailoatai	2.53	3,561
Tualata (West District)	Faleniu Iiiili Malaeimi Mapusagafou Mesepa Nuuuli Pavaiai Tafuna Vaitogi	9.25	20,290
West Vaifanua (East District)	Vatia	9.25	640
AUNU'U ISLAND			
Saole (East District)[5]	Aunu'u	0.59	436
MANU'A ISLAND			
Ta'u Island			
Faleasao (Manu'a District)	Faleasao	4.59	162
Fitiuta (Manu'a District)	Leusoalii Maia	6.73	270
Ta'u (Manu'a District)	Luma Siufaga	188.56	176
Ofu Island			
Ofu (Manu'a District)	Ofu	2.84	176
Olosega Island			
Olosega (Manu'a District)	Olosega Sili	2.03	177
Rose Atoll[6]		0.08	0
Swains Island[7]		0.58	17

Until the 2010 Census, the Territory's population had been increasing each decade with double-digit percent change growth (Table 2 Population Change 1970-2010). The population growth in American Samoa has been attributed to a combination of high fertility rates and immigration.[8] The 2010 U.S. Census shows the population declined slightly from 2000 to 2010. (Figure 6 American Samoa - 2010 Census Results and Figure 7 American Samoa - 2010 Census Results % Change show specific changes and highlights from 2000 to 2010.) The population

5 Size and population totals included in Saole County estimate for Tutuila above.
6 No population so not included in the risk assessment or future parts of plan
7 Ibid.
8 Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Samoa Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/as3092011.pdf

more than doubled between 1970 and 2000 from approximately 25,000 persons to over 55,000 persons. In addition, it is suspected that persons live undocumented on the island and thus are not reported in the U.S. Census estimates. This increased population and density is impacting its environment and resources.

"The population density (average number of persons per square kilometer) in 2010 was 331. This number could be a lot higher given the ruggedness and steep mountainous landscaping of the islands. People move to other places because of economic reasons, availability of land resources, and socio-political stability. The Manu'a Island residents continued to relocate to the main island of Tutuila looking for better economic opportunities or attending schools. Tutuila's population shifted from the Eastern District to the Western District in the past decades. In the 2010 Census, there were 31,329 people living in the Western District while 23,030 people live in the Eastern District."[9]

Table 2 Population Change 1970-2010

Year	American Samoa Population	Population Change from the previous decade	Percent Change (growth/decline)
1970	25,065	--	--
1980	30,538	+5,473	22%
1990	45,043	+14,505	47%
2000	55,885	+10,842	24%
2010	55,419	-366	-1%

Tutuila has experienced much of the Territory's population growth. The population density on Tutuila has reached an alarming 1.6 people per acre (or 1,047 persons per square mile). Nearly 90% of the Territory's population resides on this island, primarily on the Tafuna Plain and around Pago Pago Harbor. High population densities in those areas have impacted many aspects of life, including significantly straining the existing infrastructure (roads, water supply, wastewater, etc.), causing increased waste streams, surface runoff increases, leading to chronic flooding along roads and properties and increasing vulnerability to natural hazards. This last point was highlighted during the September 2009 tsunami, which caused 34 deaths and destroyed nearly 250 homes and another 2,750 dwellings."[10] The increased population near the ocean certainly contributed to the catastrophic nature of this event.

Demographic trends reflect the growing population through a substantial young population and young median age. The 2010 Demographic Profile for American Samoa indicates that the median age is 22.4 and the highest population is those under five years of age (11.9 percent).[11] Those aged 0 to 19 make up 46.3 percent of the population, indicating a strong and growing youth population. Just 5.6 percent of the population is aged 62 or older emphasizing the population boom in recent decades. Average household size is 5.6 persons. Median household income (2009 dollars) was $23,892.

Regarding education, 11.2 percent of the population is enrolled in college and most, 47.9 percent, are in elementary school. Eighty-two percent of the population is a high school graduate or higher. Just 3.9 percent of the population speaks English only at home. Samoan is the primary language spoken at home (88.6 percent). Table 3 Summarizes the demographic data from the 2010 Census for the people of American Samoa.

9 American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf

10 Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Samoa Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/as3092011.pdf

11 The 2010 Demographic Profile for American Samoa. (2010). U.S. Census Bureau. Retrieved August 8, 2014 from http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t#non

Table 3. Summary of Demographic Category, 2010 data

Demographic Category, 2010 Data		Demographic Value
1	Median Age	22.4
2	Population under 5 years old	11.9%
3	Population under 19 years old	46.3%
4	Population older than 62 years old	5.6%
5	Average household size	5.6 persons
6	Median household income	$23,892
7	College enrollment	11.2
8	Elementary school enrollment	47.0
9	Graduated from High School	82%
10	English speakers at home	3.9%
11	Samoan speakers at home	88.6

There are 18,300 individuals in the civilian labor forces (over 16 years of age, employed or seeking work; not in armed forces). Of these, 16,616 are employed and 1,684 (9 percent) are unemployed.

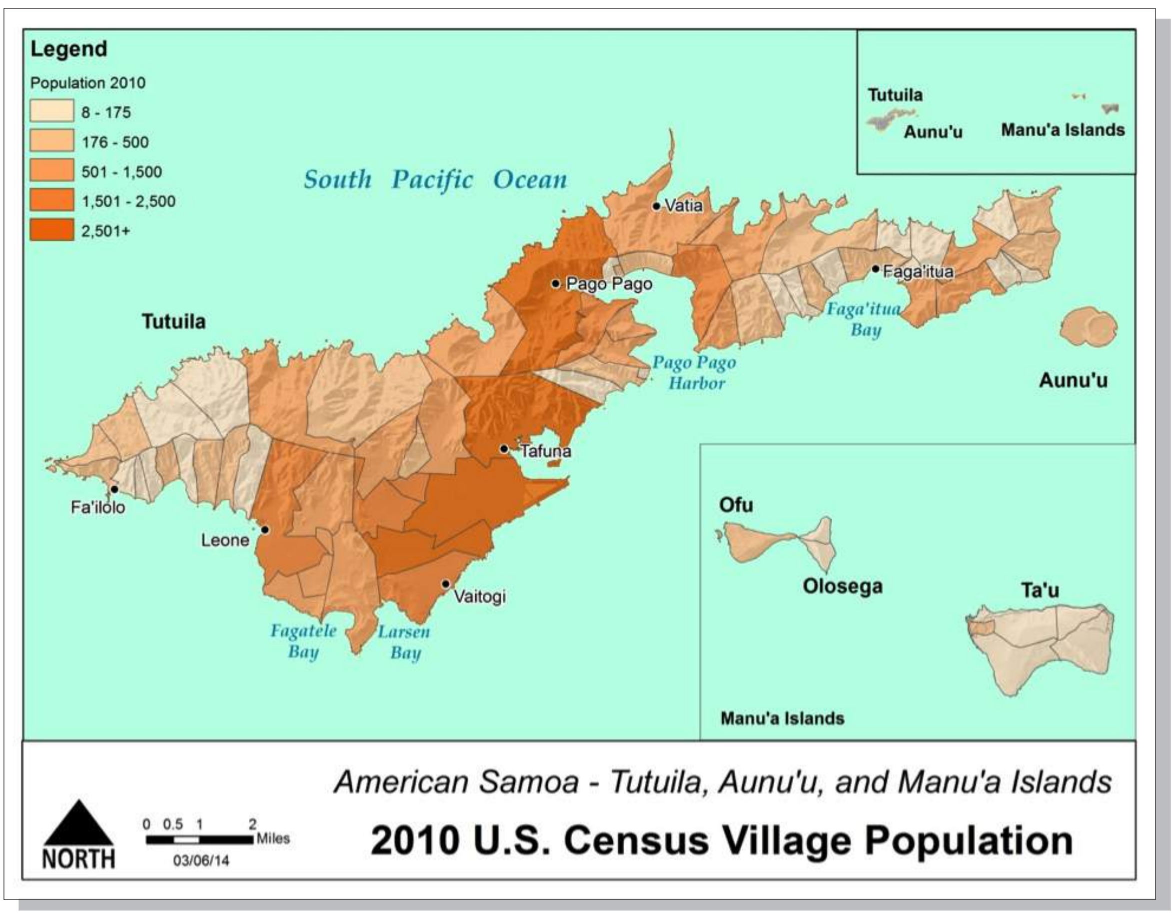

Figure 5. 2010 U.S. Census Village Population

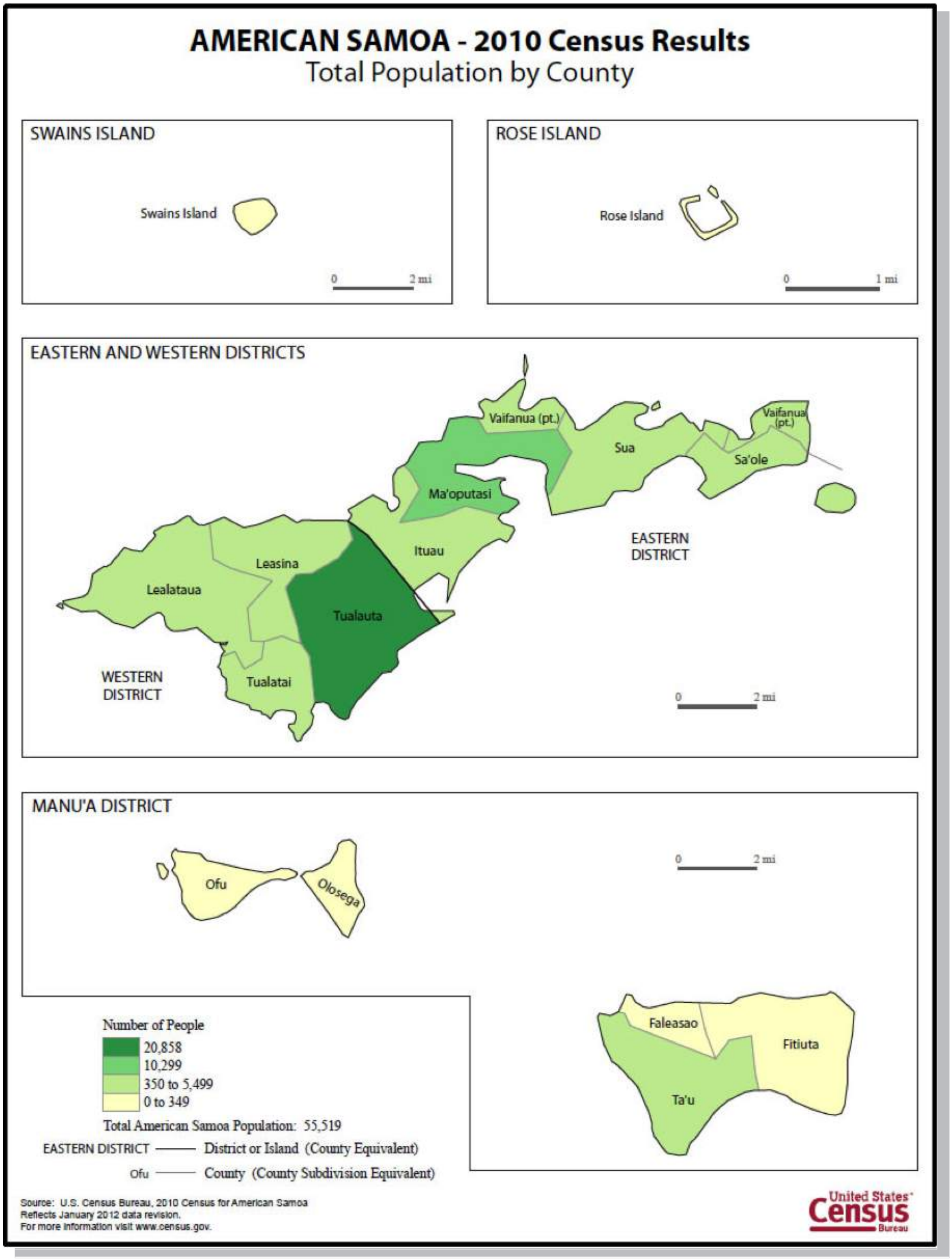

Figure 6. American Samoa - 2010 Census Results [12]

12 2010 Census Island Areas: American Samoa (2010). U.S. Census 2010. Retrieved August 8, 2014 from http://www.census.gov/2010census/news/press-kits/island-areas/island-areas.html

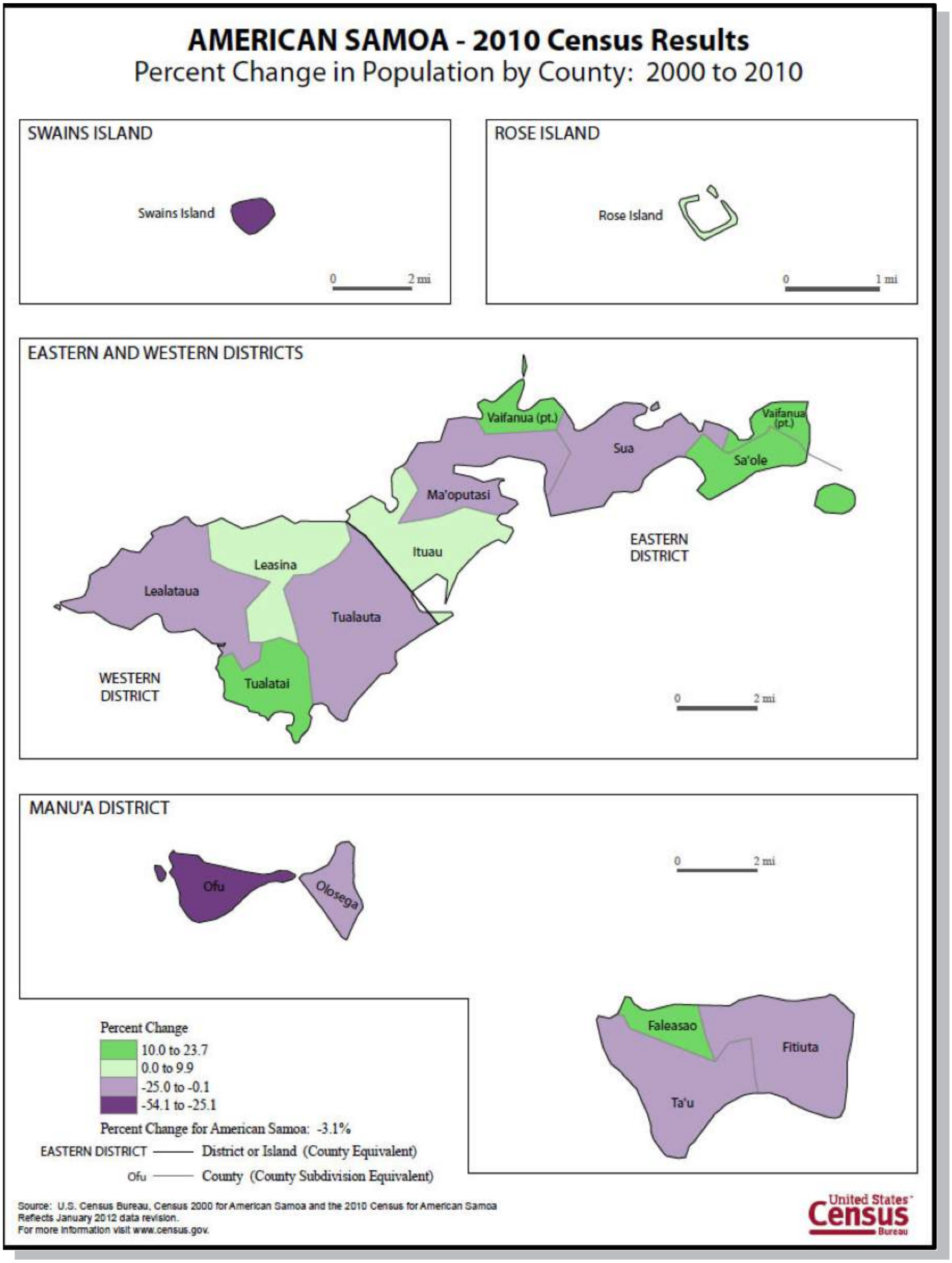

Figure 7. American Samoa - 2010 Census Results % Change[13]

13 2010 Census Island Areas: American Samoa (2010). U.S. Census 2010. Retrieved August 8, 2014 from http://www.census.gov/2010census/news/press-kits/island-areas/island-areas.html

Building Permits and Growth

Land ownership is unique in American Samoa. According to American Samoa Department of Commerce (ASDOC), there are five categories of ownership: freehold, government-owned, church-owned, individually owned, or communal/native owned. Communal land ownership is the traditional land tenure system and under the direct authority of the Samoan chiefs known as "matais." Within this system, traditional land cannot be purchased or sold and the current reigning chief from within the family unit has final say over the disposition of a family's holdings. This system ensures the passage of assets to future generations and serves to preserve the Samoan culture and the Samoan land value system.[14]

The table below shows how land ownership is divided by ownership type among 7,875 acres. This information comes from the ASDOC 2012 Statistical Yearbook.[15] It should be noted that there are about 48,767 acres of land but nearly two-thirds of that land is unbuildable due to steep slope. However, some of the undevelopable land is registered annually (including 12 new acres in 2012).

Table 4. Acreage Aggregated by Ownership Type

Land Ownership Type							
		Freehold	Government	Church	Individual	Communal	Total
Acres/Year	2012	1,072	1,651	1,030	2,027	2,095	7,875
	2011	1,072	1,651	1,030	2,016	2,094	7,873
	2010	1,072	1,651	1,030	2,015	2,093	7,862
	2009	1,018	1,651	1,028	2,006	2,091	7,794
	2008	1,018	1,651	1,018	1,971	2,088	7,746
	2007	1,018	1,651	1,013	1,962	2,061	7,705
	2006	1,018	1,651	1,013	1,955	2,056	7,693
	2005	1,018	1,651	1,013	1,942	2,046	7,670
	2004	1,019	1,651	1,005	1,935	2,039	7,649
	2003	1,019	1,651	1,004	1,903	2,034	7,611
	2002	1,014	1,651	1,003	1,899	1,991	7,558

Information from the Statistical Yearbook indicates that of 9,688 structures on-island built between pre-1939 and March 2010, a majority of structures (5,121) were built between 1990 and 2008. An additional 2,117 structures were built between 1980 and 1989. Of the total structures built, a majority of buildings were built in Tualauta County (3,063 new structures) and Ma'oputasi County (1,160 new structures). However, these statistics likely do not account for the rebuilding that occurred in 2009-2010 due to the devastating tsunami in September 2009.

To address potential rebuilding from the tsunami, the statistical Yearbook also lists "number of building permits issued" (Table 5 Building Permits Issued (2002-2012), including those for new structures, between 2002 and 2012. Note the spike in 2010 is likely due to tsunami repairs and rebuilding. A spike is also evident in 2003 and 2004. There were federal disaster declarations in each of these years – flooding and landslides in 2003 and Tropical Cyclone Heta in 2004. Unfortunately, information about where these structures were built was not provided. This information was researched but not available.

14 American Samoa Government (2003). Retrieved August 8, 2014 from http://www.asg-gov.com/islandinfo.htm.

15 American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf

Table 5. Building Permits Issued (2002-2012)

Building Permits Issued (2002-2012)			
	New Structure Permits	Other Permits (repairs etc.)	Total Permits Issued
2002	126	470	596
2003	139	812	951
2004	238	1,098	1,336
2005	183	625	808
2006	158	534	692
2007	118	460	578
2008	111	540	651
2009	133	705	838
2010	243	798	1,041
2011	132	579	711
2012	135	557	692

With the exception of hurricane construction, approximately 200 residential homes are built annually. Villages continue to grow in size and limited agricultural land is fast being converted to residential lands to accommodate such expansion. As population increases, greater numbers of people become potentially at risk from natural hazards. Assessing risk becomes a significant factor in planning and policy making for future development and hazard mitigation.

Specific information on potential areas for new growth was researched but no information was available. As the most suitable land is developed, pressure moves to develop on steeper, unstable slopes or in floodplains. As new development is likely to face some risk of future hazards due to lack of buildable area, more focus on hazard mitigation must be placed on strengthening the Permit Notification and Review System (PNRS) to quickly and accurately identify vulnerable land development requests and scenarios. For the Tualauta County and other population centers, flood control is an important mitigation solution, while landslide identification, mapping, education and control of building in landslide-prone areas in a preferred mitigation solution.

Economy: Limited Economic Base

Economic activity in American Samoa is strongly linked to the United States mainland, with which American Samoa conducts the great bulk of its trade. Similar to many south pacific economies, fish-related industry is a major portion of the economy. Tuna fishing and canning plants are the backbone of the private sector, with canned tuna being the primary export. Transfers from the United States government add substantially to American Samoa's economic wellbeing. Attempts by the government to develop a larger and broader economy are constrained by American Samoa's remote location, its limited transportation, and limited land that is not prone to flooding, landslide, and tsunami hazards.

The Fiscal year is 1 October - 30 September, and the US dollar is the local currency. For the 2012 year (latest available), the Territory recorded a "trade surplus of $151.3 million. Imports include government purchases, value of fish brought in for processing for the canneries, and value of commercial merchandise brought in for resale. Trade data is still considered incomplete because of the absence of the Post Exchange (PX) data from the import series. The value of exports is made up primarily of canned tuna and by-products." [16] This is an increase from 2010 and 2011 but still down from years prior to that, likely a result in recession impacts. Table 6 Balance of Trade – 2007-2012.

Table 6. Balance of Trade - 2007-2012 [17]

Exports ($)				Imports	Trade Balance
Annually	Domestic	Re-exports	Total	Imports CIF	Surplus (+) / Deficit (-)
2012	418,047,313	2,876,129	420,923,442	269,614,159	151,309,283
2011	278,288,152	2,825,627	281,113,779	207,387,800	73,725,979
2010	315,570,103	3,342,454	318,912,557	239,163,212	79,749,345
2009	491,239,242	2,748,124	493,987,366	311,374,752	182,612,614
2008	592,466,782	3,101,098	595,567,880	331,623,182	263,944,698
2007	463,120,592	2,940,532	466,061,124	232,201,560	233,859,564

In 2012, $269.6 million dollars in imports were reported, an increase from the previous fiscal year. The top three principal imports (by percentage) include live animals (38%), vehicles, aircraft and associated transport equipment (18%), and prepared foods including spirits, beverages and tobacco (8%). Canned tuna, by far, leads the export market, accounting for $415 million out of $420 million in total exports. Exports totaled $446 million (2004) and are largely canned tuna (93%) and fresh produce.

American Samoa's annual Gross Domestics Product (GDP) was $648 million in 2011 and $725 million in 2012. GDP last peaked at $725 million in 2009 and has been in decline until 2012, likely a result of the recession.

Figure 8. Charlie the Tuna, Mascot for Starkist, displayed outside the Tuna Cannery

The American Samoa Balance of Trade in fiscal year 2012 recorded a surplus of $151.3 million. Imports include government purchases, value of fish brought in for processing for the canneries, and value of commercial merchandise brought in for resale. Trade data is still considered incomplete because of the absence of the Post Exchange (PX) data from the import series. The value of exports is made up primarily of canned tuna and by-products.

"Imports brought in through Customs Regulations for commercial use and resale are valued at $269.6 million, which is an increase from FY2011 reported value. The United States continued to be American Samoa's leading trade partner, followed by Fiji, New Zealand, Korea and Taiwan."[18]

The American Samoa Statistical Yearbook, 2012 notes that major improvements are needed at the Customs Office for the collection of trade statistics, especially in regards to the right Country of Origin and the correct value of imported goods. Any and all goods crossing American Samoa border should be accounted for regardless of purpose or user.

16 American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf
17 Ibid., p.187.
18 Ibid., p.187.

Valuation of goods (FOB and CIF) must be applied. Automation and standard commodity classification of all goods should be adopted. Differentiation between intermediate goods and final consumption goods need major improvements."[19]

Since the last update of this plan in 2010, the Section 309 Assessment and Strategy for the American Samoa Coastal Management Program February 2011 notes the following relevant economic situation transpired in American Samoa, "Economic activity in American Samoa for the past two decades has been based primarily on two major components, U.S. federal government expenditures and the tuna canneries, and to a lesser extent, retail and commercial sectors. Total employment in American Samoa in 2008 was estimated at 16,990, with the government providing 6,035 jobs and the canneries providing 4,861. Two tuna canneries were previously operating in Pago Pago Harbor; however, due to changes in minimum wage laws requiring incremental annual wage increases to eventually meet U.S. wage levels, one of the two canneries closed its doors in September 2009 and the other is expected to reduce its operations by approximately two-thirds during the fall of 2010. Over 2,000 jobs were lost with the first cannery closure, and an additional 600 to 800 jobs may be cut in the downsizing of the second cannery.

The economic impacts of the decrease in cannery activities will be widespread throughout the territory, requiring short-term assistance to help support unemployed workers and vulnerable families, as well as a long-term action plan to help rebuild economic activity in the territory. In anticipation of the decline in cannery activities, the American Samoa Government (ASG) has begun considering possible alternative sources of economic activity including light manufacturing, internet-based businesses including information and communications, tourism, agriculture, and aquaculture. In early October 2010, Tri Marine announced that it was planning on reopening the Chicken of the Sea cannery under its own operations. While this is a positive step in maintaining economic opportunities in American Samoa, the time frame for such a reopening has not yet been disclosed." [20]

Geography and Related Flood and Landslipe Impacts

Emerging from the ocean floor two to three miles below the ocean's surface, American Samoa formed as a result of volcanic activity over a hot spot in the Pacific Plate. Tectonic uplifts and volcanic activity during the early formation period of the islands have led to steep inclines and sharp cliffs being the dominant geographical features of the main islands. Peak elevations reach 3,100 feet on Ta'u Island (Lata Mountain), and 2,142 feet on Tutuila Island (Matafao Peak). Only 34 percent or 16,695 acres of the land in American Samoa has a slope of 30 percent or less. Deep valleys radiating from the summit of each distinct volcanic cone provide natural drainage. Streams discharging at the heads of small embayment's have developed small coastal plains. This topography causes flooding and landslide hazards. Tutuila's natural deep-water harbor has given the islands their strategic value during the past two centuries. Narrow sand and coral rubble beaches rim approximately 25 percent of the coastline wherever fringing reefs exist. Such reefs are primarily on the calmer south shore of the islands and on average extend out to sea 200 feet. Exposed to severe marine erosion, the north shore coasts of the islands are primarily steep volcanic cliffs.

19 American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf

20 Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Samoa Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/as3092011.pdf

The rugged terrain and salty environment make for limited suitable development and additional factors to consider with building materials. As noted above, the terrain includes very steep slopes and floodplain areas in flatter places. As population pressures increase, building in less suitable areas, such as on steep slopes, excavated landslide areas, and near floodplains is becoming more common. However, development in higher risk areas has resulted in past landslides (2003) and puts population at risk. In addition to building location, the marine environment creates a need for suitable building materials. Proximity to the reef and salt spray exposure creates a highly corrosive marine environment, which has caused the construction industry to seriously reevaluate building materials. For instance, the expected useful life of standard metal guardrails is reduced by 50 percent as a result of the salt air.[21] Corrosion-resistant materials are encouraged such as concrete, plastics and stainless steel. The appropriate material will depend on the item being constructed and determined by professional guidance.

Figure 9. Image of Mountains and Pago Pago Harbor

Climate

Located within the Tropic of Capricorn and 14 degrees south of the equator, American Samoa has a maritime climate with copious rainfall and warm humid days and nights. Temperatures in the islands range between 73 and 93 degrees Fahrenheit and relative humidity ranges between 73 and 84 percent throughout the year. As a result, vegetation is moderately dense, with many coconut, banana, and other tropical fruit trees, grasses, and low-growing brush. Depending on topography, precipitation ranges from 125 inches in some areas, to approximately 250 inches in others. The village of Pago Pago, including a major international port, less than 4 miles north of the airport and open to the prevailing wind, receives nearly 200 inches of rain per year. The crest of the mountain range receives well above 250 inches. In recent years, the airport weather station has recorded at least trace amounts of rain about 300 days per year, with nearly 175 days receiving rainfall of 0.10 inch or more.

The drier months are June through September (southern winter) and the wettest, December through March (southern summer). However, the seasonal rainfall may vary widely in individual years, and heavy showers and long rainy periods can occur in any month. Thunderstorms are less frequent than might be expected, considering the moisture and instability of the tropical air mass that usually overlies the Samoa Islands. Flooding rains are common, and although some of these are associated with hurricanes and tropical storms, they can occur at other times as well.

21 American Samoa Government (2003). Retrieved August 8, 2014 from http://www.asg-gov.com/islandinfo.htm.

June, July and August are the coolest months and January, February, and March, are the warmest. Afternoon temperatures reach the upper-80s (F˚) in summer, and mid 80s (F˚) in the winter, while nighttime temperatures fall to the mid-70s (F˚) in summer, and low-70s (F˚) in winter. The highest recorded temperatures at the airport were in the low-90s (F˚), and the lowest near 60 (F˚).

Easterly trade winds prevail throughout the year, and tend to be easterly December through March, but are predominantly from the ESE and SE during the rest of the year. The trade winds are less prevalent in summer than in winter, often interrupted by the proximity of small tropical storms, bands of converging winds, or one of the low pressure systems higher in the atmosphere, all of which help make summer the rainy season.

At other times, the absence of the trade winds is marked by periods of light and variable westerly to northerly winds and by land and sea breezes. Although strong at times, these winds are often quite light, and may reflect the nighttime drainage of cooled air from the mountains west and north of the airport.

Water, Electricity and Petroleum

"American Samoa does not produce or refine petroleum. Petroleum products are imported in tankers, which unload at a terminal and tank farm adjacent to the main harbor at Pago Pago. The territory imports distillates, mainly low-sulfur diesel fuel, high-sulfur marine fuel, jet fuel, and motor gasoline. Except for a period following the 2009 tsunami, American Samoans typically consume about one-tenth more petroleum per capita than the U.S. average."[22]

The territory lacks conventional energy resources and depends on imported petroleum products to meet most energy needs. High petroleum product prices are a major concern for the islands' economy, which typically has been more than twice as energy-intensive as that of the United States, though per capita energy consumption runs about one-half of the U.S. average. Energy consumption dropped sharply after 2009, when an earthquake and tsunami devastated the island just as one of two canneries was closing, throwing one in five island employees out of work. Since then, the economy and energy consumption have been slowly recovering. [23]

"There are two principal importers (suppliers) of petroleum products: 1) Pacific Energy Marketing, the marketing arm of PE that manages the terminal, also acts as a fuel wholesaler and retailer; and 2) the American Samoa Power Authority (ASPA) which imports the diesel fuel it consumes in its electricity generators and which also sells fuel to companies such as Clipper and Sunrise. These two companies, as well as PE, in turn sell fuels to gasoline stations or other purchasers (i.e. private contractors). There are 11 retail gasoline stations on Tutuila. Most have 5,000-gallon tanks while the largest gasoline station on the island in Utulei has 50,000 gallons of gasoline storage capacity." [24]

22 American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/analysis.cfm?sid=AQ

23 Ibid.

24 Energy Assurance Plan. (2014) American Samoa Power Authority. Retrieved August 8, 2014 from http://www.aspower.com/aspaweb/Downloads/ASREC/DRAFT%20Energy%20Assurance%20Plan.pdf

American Samoa Power Authority (ASPA)

"Nearly all of American Samoa's electricity is supplied by generators consuming No. 2 diesel fuel. The American Samoa Power Authority (ASPA), a government corporation, owns and operates two generating plants and the electric grid on Tutuila and two other small generating plants and grids serving the Manu'a group. Total generating capacity is about 40 megawatts, most of it from the Tafuna and Satala plants on Tutuila. ASPA also provides drinking water and wastewater treatment. Pumping, treating, distributing, and collecting water consume a significant share of ASPA's electricity generation. In September 2009, an earthquake and tsunami destroyed the Satala generating plant." [25] That halved the electricity-generating capacity on Tutuila. Generators burning ultra-low-sulfur diesel replaced those destroyed in 2009, which had used high-sulfur diesel fuel. This temporary generating capacity still continues today without a second power plant since the September 2009 tsunami.

Figure 10. ASPA Generators

"The residential sector is the largest electricity consumer, using nearly one-third of all power. It is closely followed by the commercial sector. The government consumes nearly one-fifth of electricity generated on the islands. Per capita consumption is only about one-fourth of U.S. per capita consumption. Electricity cost varies with a fuel surcharge linked to world oil prices. In early 2012, that surcharge brought the average electricity price in American Samoa to about five times the average U.S. price."[26]

Utulei Tank Farm

The Utulei Tank Farm is located in Pago Pago Harbor along the main raid in the village of Utulei. Due to the location of the Tank Farm it is vulnerable to storm surge, sea level rise and tsunami flood waters. The current operator, BP Southwest Pacific Ltd. stores oil & operates the tank farm terminal. This facility started to store oil in 1941 and has been upgraded several times. Currently, the oldest tanks were installed in the 1980's.
The facility is primarily engaged in the wholesale distribution of petroleum products from bulk liquid storage terminals.

25 American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/analysis.cfm?sid=AQ
26 Ibid.

The main office and primary storage are located in the village of Utulei, on the west side of Pago Pago Harbor. It is owned by the American Samoa Government and operated by BP South West Pacific Limited. The fuel dock is located south of the Commercial Container pier, adjacent to the Rainmaker Hotel, on the west rim of Pago Pago Harbor. The Airport Tank Farm Satellite is located on the west end of the Pago Pago International Airport parking lot.

Figure 11. Utulei Tank Farm

The petroleum storage area at the Utulei Tank Farm contains 10 above ground storage tanks with a total storage capacity of 29,512 barrels. The Airport Tank Farm contains 6 horizontal bullet tanks with a total storage capacity of 3,048 barrels. All of the tanks are contained within dike (secondary containment) areas. The Utulei Tank Farm was further protected using Hazard Mitigation Grant Program funds as on of the Territory's first projects in the early 1990s. The wall built around the Tank Farm in 2001 was designed to contain an oil spill and to withstand 135 mph winds and an 8.4 magnitude earthquake, however it is not designed to withstand the outer force from a major tsunami, storm surge or sea level rise event. [27] The fuel dock is connected to the storage area by three petroleum pipelines.

<u>American Samoa Renewable Energy Committee (ASREC)</u>

The American Samoa Renewable Energy Committee (ASREC) established by executive order, adopted a charter outlining the purpose, mission, organization, staffing, directive, and duration. Succinctly, ASREC must develop a long-term strategic energy plan that creates a sustainable energy future for American Samoa with input from various sectors and stakeholders. [28]

ASREC's Mission is to "enhance the well-being of our citizenry, ensure energy and economic security through energy independence and diversification, and improve environmental quality. Educate all stakeholders on the importance of our vision by embracing conservation, energy efficiency and alternative energy. The ASREC is a forum for considering options and offering guidance related to the achievement of its energy goals through policy, projects and programs.[29]

27 Energy Assurance Plan. (2014) American Samoa Power Authority. Retrieved August 8, 2014 from http://www.aspower.com/aspaweb/Downloads/ASREC/DRAFT%20Energy%20Assurance%20Plan.pdf
28 American Samoa Renewable Energy Committee. (2014). Retrieved August 8, 2014 from http://www.asrec.net
29 Ibid.

"With American Samoa's high cost of electricity and geographic isolation, the government has established a Renewable Energy Committee to work with federal experts to bring sustainable renewable energy to the islands. Potential renewable energy resources include solar, wind, and biomass. In 2008, American Samoa adopted a net metering law that allows owners of small solar or wind facilities installed primarily for the consumer's use to receive credit for excess power sent to the grid. More than 20 government and commercial customers use net metering and account for more than 0.5 megawatt of total load.

American Samoa's renewable energy program includes a 1.75-megawatt solar photovoltaic (PV) array near the Tafuna power station, 24 smaller arrays on rooftops of government buildings, and solar hot water heating for Tutuila's LBJ Tropical Medical Center. Assistance for residential weatherization is also being offered. Because it is near the equator, American Samoa has substantial potential to expand both solar hot water heating and solar PV applications.

No commercial-scale wind turbines have been installed in American Samoa, but ASPA has set up measuring stations around the islands to assess wind speeds. Earlier measurements indicated limited wind resources around the main island of Tutuila but more potential in the Manu'a islands. Challenges for wind energy include typhoons, social acceptance, and grid stability. To ensure reliability on its small island grids, ASPA is limiting renewable power to 20% of peak demand capacity. American Samoa's communal land ownership structure also makes long-term leasing for larger scale projects a potential hurdle for development.

ASPA is using organic Rankine cycle technology to generate additional electricity from waste heat emitted by diesel generators at its Tafuna plant. Preliminary studies indicate potential for generating electricity with municipal solid waste on Tutuila and for displacing petroleum-based diesel fuel with biodiesel, although the mountainous terrain limits land available for raising biodiesel feedstocks." [30]

See Appendix K for two articles related to solar installations.

30 American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/analysis.cfm?sid=AQ

CHAPTER III

The Planning Process and Outreach Strategy

The hazard mitigation planning process in American Samoa has followed the guidance and requirements provided by the Federal Emergency Management Agency (FEMA). The guidance standardizes the overall process but allows flexibility in determining how the planning process would best be adapted to each planning area. In American Samoa, traditional leaders and chiefs retain authority and respect along with the territorial government. Any planning process must respect the Samoan culture or "fa'asamoa" - the Samoan way of life. It is recommended that the fa'asamoa concept be nurtured into the planning framework. Unlike the 50 states, the Territory of American Samoa maintains an unyielding cultural dominion that dates back to some 3,500 years of chieftain hierarchy.

The hazard mitigation planning process for American Samoa will continue to be guided by federal requirements and by the people and government of American Samoa. This chapter describes the planning process for developing the 2015 Territory of American Samoa Multi-Hazard Mitigation Plan. Figure 1 Planning Process Update Schedule below shows the approximate timeline followed for completing this plan update. This chart shows the last eight months of intensive planning, however, the Territory of American Samoa has been working on implementing mitigation projects since the 2011 Mitigation Plan was adopted. Quarterly summary reports were provided to FEMA over the last three years.

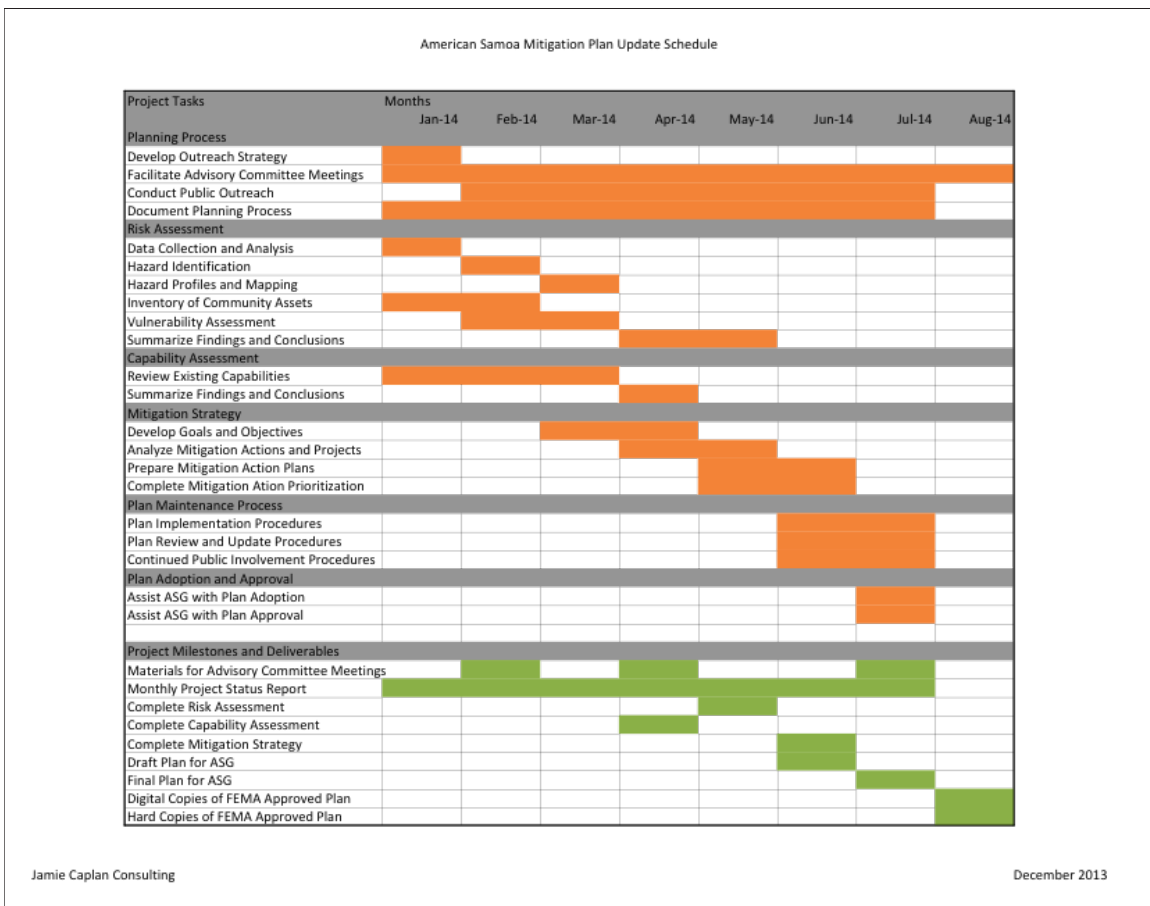

Figure 1 Planning Process Update Schedule

2015 Planning Team

The Governor and the American Samoa Territorial Hazard Mitigation Council has provided strong leadership and advocacy throughout the Territory, ensuring a continuous mitigation planning process. Lima Fiatoa, State Hazard Mitigation Office (SHMO), works at Office of Disaster Assistance and Petroleum Management (ODAPM), has been the hands-on leader for mitigation in the Territory since 2008. Steve Maga, Hazard Mitigation Officer supports Ms. Fiatoa at ODAPM.

Jamie Caplan Consulting LLC assembled an experienced Project Team that facilitated this 2015-updated mitigation plan as well as the plans in 2008 and 2011. The Project Team was similar to the Team in 2008 and 2011, which led to a lot of consistency in the planning effort. For the 2015 Plan, Jamie Caplan was the Project Leader. Jim Buika was the Project Advisor and Stakeholder Liaison. Caroline Cunningham, Louis Berger Group, Inc. came on board this year as the GIS Leader and Project Associate. Gale Foss was the GIS Professional who collaborated with Caroline Cunningham. Figure 2 Planning Team Hierarchy is depicted below.

Figure 2 Planning Team Hierarchy

Figure 3 Lima Fiatoa and Steve Maga

The consulting team worked closely with Lima Fiatoa and Steve Maga both from the Office of Disaster Assistance and Petroleum Management (ODAPM). Ms. Fiatoa is the primary point of contact with FEMA for mitigation planning and implementation of mitigation projects. Ms. Fiatoa as the SHMO reports to the Governor's Authorized Representative (GAR), who is the chairman of the American Samoa Territorial Hazard Mitigation Council. The SHMO reports to the Hazard Mitigation Council on the maintenance activities of the Plan as well as the implementation of mitigation projects.

Ms. Fiatoa and Mr. Maga streamlined the information flow from the Hazard Mitigation Council and the American Samoa Government departments to the consulting team. In addition, they facilitated meetings for the consulting team with government departments and the Hazard Mitigation Council as well as other island stakeholders and dignitaries.

The Project Team respects the Samoan culture or "fa'asamoa" and has worked with respect to "fa'asamoa". In addition, the project focused on FEMA's requirements. Ms. Fiatoa and Ms. Caplan were in direct and regular contact with FEMA Region IX throughout the planning process.

American Samoa Territorial Hazard Mitigation Council

The American Samoa Territorial Hazard Mitigation Council, appointed by the Governor, insures that policies and projects are implemented which are adequate to mitigate the risk to life and property from natural hazards. The Hazard Mitigation Council identifies and prioritizes hazard mitigation projects and oversees the implementation of the Multi-Hazard Mitigation Plan and subsequent plans adopted by the Hazard Mitigation Council. The key government organizations responsible for mitigation have a seat on the Hazard Mitigation Council. Table 1 shows the list of Hazard Mitigation Council representatives. Hazard Mitigation Council members serve for a two-year term and meet on an ad-hoc basis, called by the GAR, and have been meeting, at a minimum of two times per year since 2003.

Figure 4 Chairperson, Lemanu Peleti Mauga, GAR

Table 1 Territorial Hazard Mitigation Council

Position	Name of Representative
Chairperson	Lemanu Peleti Mauga, Governor's Authorized Representative (GAR)
FONO, American Samoa Legislature	Gafa Afalava, Representative
American Samoa Department of Commerce (DOC)	Keniseli Lafaele, Director
American Samoa Department of Health Services (ASDHS)	Iuniasolua Savusa, Director
American Samoa Department of Port Authority (DOP)	Claire Poumele, Director

Position	Name of Representative
American Samoa Environmental Protection Agency (ASEPA)	Ameko Pato, Director
American Samoa Historic Preservation Office (ASHPO)	David J. Herdrich, Historic Preservation Officer
American Samoa Power Authority (ASPA)	Utu Abe Malae, CEO
American Samoa Telecommunications Authority (ASTCA)	Bill Emmsley, CEO
Chamber of Commerce	Lewis Wolman, Chariman
Department of Public Works (DPW)	Faleosina Voigt, Director
Samoan Affairs	Poa Vae
State Hazard Mitigation Officer (SHMO)	Lima Fiatoa, SHMO

New hazard mitigation council appointed

Sun, 10/27/2013

By Fili Sagapolutele
fili@samoanews.com
A new Territorial Hazard Mitigation Council (THMC) is in place after being appointed by Gov. Lolo Matalasi Moliga, who says the board "is responsible for overseeing and monitoring all mitigation activities for the territory."

Among its many duties and responsibilities as cited by Lolo, is for the Council to assist the governor and ASG in identifying mitigation issues and opportunities facing American Samoa "for the purpose of developing a comprehensive hazard mitigation strategy".

Additionally, the board is to prepare strategies, policies and reports on hazard mitigation issues including policy recommendations to the governor, Fono and key territorial agencies involved in mitigation related areas.

Moreover, they are to ensure that territorial agencies collaborate and cooperate fully to develop and execute sustainable hazard mitigation actions that will reduce the risk posed by all hazards to the territory; and coordinate with and support territorial agencies' efforts in obtaining and administering federal and other grants including post-disaster mitigation available through the federal Robert T. Stafford Disaster and Emergency Assistance Act, for the purpose of promoting hazard mitigation opportunities within the territory.

The eleven members of the Council are: the Governor's Authorized Representative (GAR); two legislative members — each appointed by the Senate President and House Speaker; Samoan Affairs Secretary or designee; Commerce director, Port Administration director, Public Works director, ASEPA executive director; head of the local Historical Preservation Office; executive director of ASPA; ASTCA's executive director; Chamber of Commerce chairman; and director of the local Homeland Security Department.

The term for each member is 2-years, according to the memorandum, which further states that the Council is the authority for the American Samoa Hazard Mitigation Plan, mandated by the federal Disaster Mitigation Act of 2000 and the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

The new Council comes at a time when lawmakers have called for the new Lolo Administration to provide an update of the territory's hazard mitigation plan to address several hazard mitigation areas territory-wide, especially in Tualauta County.

- See more at: http://www.samoanews.com/node/78572?quicktabs_3=0#sthash.loELNoek.dpuf

Figure 5 Samoa News Hazard Mitigation Council Article

The Samoa News article, dated October 27, 2013 (Figure 3 above) describes the most recent appointment of the Territorial Hazard Mitigation Council by the Governor. The Hazard Mitigation Council maintains a set of by-laws that guides their work on the Council. The by-laws were developed by Hazard Mitigation Council members throughout the planning process and were formally adopted on July 10, 2014. The Hazard Mitigation Council By-Laws are in Appendix C.

The agencies and organizations represented on the Hazard Mitigation Council were responsible for all relevant planning, regulatory, and disaster management functions in the Territory of American Samoa, as summarized in the Territorial Capability Assessment. The Hazard Mitigation Council may invite representatives of other agencies and organizations to the meetings to contribute to the mitigation risks of the hazards in American Samoa.

According to the by-laws, "the American Samoa Territorial Hazard Mitigation Council will:

- Assist the Governor's Office and the Government of American Samoa in identifying hazard mitigation issues and opportunities facing the Territory of American Samoa for the purpose of developing a comprehensive hazard mitigation strategy.
- Prepare strategies, policies, and reports on hazard mitigation issues, including hazard mitigation policy recommendations to the Governor, the Fono, and key Territorial agencies involved in mitigation related areas within their normal agency missions.
- Ensure that territorial agencies collaborate and cooperate fully to develop and execute sustainable hazard mitigation policy actions that will reduce the risk posed by all hazards to the Territory, in addition to voluntary collaboration and cooperation involving private sector companies and non-governmental organizations which are engaged in work relevant to hazard mitigation.
- Coordinate with and support Territorial agencies' efforts in obtaining and administering federal and other grants, including post-disaster mitigation grants available pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, for the purposes of promoting hazard mitigation opportunities within the Territory.
- Identify and prioritize mitigation activities, on an annual basis, for funding under the Pre-Disaster Mitigation Program, Hazard Mitigation Grant Program, Flood Mitigation Assistance, Public Assistance, Repetitive Flood Claims, Severe Repetitive Loss, and other funds that become available.
- Encourage and support the solicitation of grant support through other territorial agencies for hazard mitigation activities.
- Term of office for Hazard Mitigation Council Members shall be staggered two-year terms, and explicitly allow for members to be reappointed."

FEMA Recommendations from 2011 Crosswalk

When FEMA reviewed the 2011 Hazard Mitigation Plan they provided several comments on the crosswalk document. These comments are reflected in Table 2 FEMA 2011 PDM Crosswalk Comments shown below. Also reflected in this table are the 2015 Planning Team's actions based on FEMA's recommendations.

Table 2 FEMA 2011 PDM Crosswalk Comments

Element	Reviewer's Comments	2015 Planning Team Response
Planning Process		
Does the plan provide a narrative description of how the new or updated plan was prepared?	The plan did a nice job of addressing the FEMA review comments from the 2008 Plan.	Addressed 2011 FEMA review comments.
Does the updated plan document how the planning team reviewed and analyzed each section of the plan?	Evaluation of the previous plan and planning process was very useful to understand decision-making and priorities.	Continued similar evaluation process to highlight decision-making and priorities.
Does the updated plan indicate for each section whether or not it was revised as part of the update process?	Plan structure was useful for long-term recovery needs.	Made only minor changes to the plan structure.
Risk Assessment		
Does the new or updated plan provide a description of the type of all natural hazards that can affect the State? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the State, this part of the plan cannot receive a Satisfactory score.	The public was involved in the identification and prioritization of hazards.	A review of comparable geographic area mitigation plans (Guam and Hawaii) was completed for potential additional hazards. New hazards added to the 2015 mitigation plan include: • Coastal Erosion • High Surf • Lightening Strike • Sea Level Rise (Expanded Profile) • Soil Hazards

Element	Reviewer's Comments	2015 Planning Team Response
Does the new or updated plan describe the State's vulnerability based on estimates provided in local risk assessments as well as the State risk assessment?	Recommended Revisions: Provide additional information the local risk assessments and how they impacted local land use decisions.	There are no local risk assessments to incorporate. However, efforts were made to identify risk by island (or county) as data permits. Regarding land use, GIS files from ASG were obtained. These areas were mapped to identify the type of development in each area. In addition to land use soil classification was considered. This also plays into the "changes in development" element below. If we are able to capture where new development is occurring, we can assess this with land uses as well.
Does the updated plan reflect changes in development for jurisdictions in hazard prone areas?	The 2014 update will need to provide additional analysis on development in high hazard areas.	GIS intersect analysis was utilized to determine the number of buildings in high hazard areas. Population data was also analyzed.
Mitigation Strategy		
Does the new or updated plan include an evaluation of the State's pre-disaster hazard management policies, programs, and capabilities?	Recommended Revisions: Provide additional information on how the mitigation function of the HMC, the general plan, CHAMP and the Chamber of Commerce work together on mitigation issues.	Held additional stakeholder meetings during this planning process and gathered additional information regarding how these organizations impact mitigation issues. This information is documented later in this chapter, in the Capability Assessment and in the Mitigation Strategy.

Element	Reviewer's Comments	2015 Planning Team Response
Does the new or updated plan include an evaluation of the State's policies related to development in hazard prone areas?	Recommended Revision: Provide additional description of how the territorial capabilities have changed or are anticipated to change due to the tsunami.	The 2009 Tsunami had a tremendous impact on American Samoa. The Capability Assessment details some of the additional capabilities in the Territory including the Tsunami Ready designation.
Does the new or updated plan identify cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering?	Excellent focus on land use and building codes even if finding solutions will be difficult, the plan identifies this is one of the most critical needs especially in light of increasing populations in high hazard areas. Good spectrum of actions for each hazard. Recommended Revision: Consider more adaptive capacity and 'small' – decentralized solutions as an alternative to large, less nimble solutions.	Finding small and more nimble mitigation actions continues to challenge the Hazard Mitigation Council and the Planning Team. The Council requests projects from all potential stakeholders and most of the projects they receive are large scale. However, the Planning Team has included a section in the Mitigation Strategy regarding projects that were not specifically identified by the Council or stakeholders.
Plan Maintenance Process		
Does the updated plan include an analysis of whether the previously approved plan's method and schedule worked, and what elements or processes, if any, were changed?	Recommended Revisions: 1. Evaluate the value of having more discussion at the government and family levels specific to: a. The implementation of the mitigation strategy, b. The impact implementation has had on risk and opportunities for integrating mitigation into existing planning mechanisms 2. Provide additional information and detail about the consideration of future conditions in terms of the risk assessment and mitigation strategy	

Element	Reviewer's Comments	2015 Planning Team Response
Does the new or updated plan identify a system for reviewing progress on achieving goals in the Mitigation Strategy?	Recommended Revision: Provide additional description of the criteria used for evaluating progress on achieving the goals of the mitigation strategy.	A new mitigation strategy ranking criteria was developed and used by the Hazard Mitigation Council. It relates directly to identifying the level to which each strategy achieves the goal of the plan.
Does the updated plan discuss if mitigation actions were implemented as planned?	Excellent discussion on tsunami best practices and how 'mitigation works'	Continued to illustrate the tremendous benefit mitigation has had on saving lives and property in American Samoa.

2011 and 2015 Plan Chapter Comparison

The 2011 Mitigation Plan was effectively implemented and actively consulted by many stakeholders in the region. In fact, Alefa Afalava, Department of Homeland Security, keeps a copy of the plan with her and consulted it regularly through the planning process. Table 3 shows the slight changes made to the plan outline for 2015.

Table 3 2011 vs 2015 Mitigation Plan Chapters

2011 Mitigation Plan Chapters	2015 Mitigation Plan Chapter Revisions
Chapter 1. Introduction	Chapter 1. Introduction The Executive Summary has been removed and incorporated into Chapter 1 and the introduction.
	Chapter 2. Planning Area Profile The planning area profile has been removed from the first few pages of the risk assessment and become a stand-alone chapter.
Chapter 2. The Hazard Mitigation Planning Process	Chapter 3. The Planning Process and Outreach Strategy This chapter remains fairly similar in content to the 2011 Chapter; however, additional stakeholder meetings were held in 2014. Also, some of the content from the stakeholder meetings has been incorporated into the Capability Assessment.

2011 Mitigation Plan Chapters	2015 Mitigation Plan Chapter Revisions
Chapter 3. Risk and Vulnerability Assessment	Chapter 4. Hazard Risk Assessment The risk assessment has been completely redone with the "best available" data. It has been expanded to include several new hazards and more detailed analysis on land development and local risk.
Chapter 4. Capability Assessment	Chapter 5. Capability Assessment This chapter has been redone to reflect the current capabilities in American Samoa. The chapter has been reorganized to reflect the American Samoa government structure of offices, agencies, authorities and departments.
Chapter 5. Hazard Mitigation Strategy	Chapter 6. Mitigation Strategy The most significant change in this chapter is the strategy ranking criteria used by the Hazard Mitigation Council.
Chapter 6. Plan Maintenance Process	Chapter 7. Plan Monitoring, Maintenance, Evaluation and Revision This chapter is similar to the one in 2011.
Chapter 7. List of Acronyms	Appendices The appendix now includes a list of acronyms, resources and planning process support materials, and critical facility analysis.
Chapter 8. Resources	
Appendices A. Planning Process Supporting Material 2010 B. Planning Process Support Material 2011 C. Mitigation Projects D. Critical Facilities E. GIS Data	

Council Meetings

The Hazard Mitigation Council has been active since its inception in 2003 and the Government of American Samoa is focused on implementing hazard mitigation projects. The Hazard Mitigation Council met several times between August 2011 and August 2014. The meetings focused on the update of this plan and are outlined below. Supporting materials such as sign-in sheets, agendas and PowerPoint presentations are in Appendix C.

Figure 6 Hazard Mitigation Council Members completing The Natural Hazards Preparedness Survey

January 14, 2014
Ms. Lima Fiatoa gave a presentation at the January 14, 2014 meeting titled, "Hazard Mitigation Program Overview." She detailed for meeting participants the definition of mitigation; the types of mitigation grant programs, and the responsibility of the Hazard Mitigation Council. Several Hazard Mitigation Council members were new at this time to the mitigation plan planning process. Ms. Fiatoa also answered a number of questions regarding project funding. There was some confusion in the past about funding not being received in the order of priority assigned each project.

February 11, 2014
The February 11, 2014 meeting picked-up were the last meeting ended with a discussion of project prioritization and funding. Ms. Fiatoa recommended that the Hazard Mitigation Council generalize their project listing to types of projects such as undergrounding utilities, hardening or retrofitting buildings so when funding does become available the Hazard Mitigation Council could do a call of projects for that specific hazard. In the past a rock fall mitigation project was not included, however it did become necessary. Ms. Fiatoa detailed the types of mitigation program funding, Pre-Disaster Mitigation (PDM) and Hazard Mitigation Program (HMGP). Department directors expressed an interest in more time to prepare grant applications and more guidance in how to prepare those applications.

April 23, 2014
Jamie Caplan and Caroline Cunningham were on-island for the April 23, 2014 Hazard Mitigation Council Meeting. Ms. Fiatoa introduced Ms. Caplan and Ms. Cunningham who then gave a presentation that focused on public outreach strategies and risk assessment updates. In terms of public outreach, the Planning Team mentioned the opportunity for stakeholder meetings, the Town Hall Meeting and the Preparedness Survey. The presentation also focused on introducing the new members of the Hazard Mitigation Council to the mitigation planning process and emphasized their role in that process.

Figure 7 Alefa Afalava, ASDHS presenting proposed mitigation projects

May 22, 2014

The May 22, 2014 Hazard Mitigation Council Meeting included an update since the consulting team was on-island in April. Specific items of discussion included a call for mitigation projects and the Public Preparedness Survey.

June 19, 2014

Jim Buika from the consulting team was on-island for the June 19, 2014 Hazard Mitigation Council meeting. Government agencies presented potential mitigation projects to the Hazard Mitigation Council. The list of these projects is in Figure 4 below. Each agency completed a Project Worksheet for each of their projects and most of the agencies presented their project with an accompanying PowerPoint presentation.

#	AGENCY	TITLE	EST. PROJ. COST	POC	CONTACT #	EMAIL
1	ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines	916,546	James Taylor	733-9054	jtaylor@samoatelco.com
2	ASTCA	Amouli to Aoa U/G Communications Lines	1,208,042	James Taylor	733-9054	jtaylor@samoatelco.com
3	ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines	2,149,564	James Taylor	733-9054	jtaylor@samoatelco.com
4	ASTCA	Leone to Poloa U/G Communications Lines	3,270,351	James Taylor	733-9054	jtaylor@samoatelco.com
5	DHS	Wind Shutters EOC Project	43,496	Alefa Afalava	699-0411	a.afalava@asdhs.as.gov
6	DOC	Mapping Project	50,000	Sandra Lutu	633-5155	sandra.lutu@doc.as
7	DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	2,400,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
8	DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataiv	4,000,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
9	DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a	300,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
10	DPW	#4 Leone Village Road	2,200,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
11	DPW	#5 Happy Valley Road Drainage	220,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
12	DPW	#6 Pava'ia'I Elementary	310,000	Don McMullin	699-9921	djmcmullin@hotmail.com
13	DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Scho	1,635,000	Don McMullin	699-9921	djmcmullin@hotmail.com
14	DPW	#8 Upgrading of DPW-M&O Building	400,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
15	EPA	Landslide Early Warning System - Faga'alu Pilot Project	278,000	Timothy Bodell	252-7700	tbodell@gmail.com
16	Port	Fuel Farm Relocation	5,500,000	Chris Soti	733-4548	chrissoti@yahoo.com
17	Port	Runway Shoreline Protection	5,000,000	Chris Soti	733-4548	chrissoti@yahoo.com
18	ASPA	Faga'alu Booster Station	200,000	Will Spitzenburg	699-7430	williams@aspower.com
19	ASPA	Pago Water Booster Station Mitigation	200,000	Will Spitzenburg	699-7430	williams@aspower.com
20	ASPA	Weather Proof Sewage Lift Stations	300,000	Steve Branz	699-1462	steveb@aspower.com
21	ASPA	Tafuna Wastewater Treatment Plant	450,000	Steve Branz	699-1462	steveb@aspower.com
22	ASPA	Water Wells Mitigation	1,000,000	Will Spitzenburg	699-7430	williams@aspower.com
23	ASPA	Water Tanks Mitigation	10,000,000	Will Spitzenburg	699-7430	williams@aspower.com

Figure 8 Mitigation Projects presented to council

July 10, 2014

The purpose of the July 10, 2014 Hazard Mitigation Council meeting was to formally adopt the Council by-laws and rank the proposed mitigation projects in order of priority. The results of the project ranking are in Chapter 6: Mitigation Strategy.

Public Outreach Strategy

The public outreach strategy for this update included a Town Hall Meeting, multiple stakeholder meetings, a call for projects, and a public preparedness survey. The American Samoa Department of Home Security (ASDHS) Director mentioned in the February 2014 Hazard Mitigation Council Meeting that his department had undergone a big public outreach effort by going to villages, churches and schools. Figure 5 Public Outreach in the News below is a copy of the press release sent to Samoa News regarding the outreach activities taking place the week of April 21, 2014.

American Samoa Hazard Mitigation Council Hosts Hazard Mitigation Meetings

April 21-25, 2014

American Samoa Hazard Mitigation Plan

The American Samoa Hazard Mitigation Council is hosting a **Town Hall Meeting** on Friday, April 25, 2014 from 8am to 11am at the Department of Public Works 2nd floor conference room to discuss American Samoa's Hazard Mitigation Plan for reducing risk to natural hazards such as earthquake, landslides and tsunami. The public is encouraged to attend this Town Hall Meeting and to speak-up regarding their interests and concerns for strategies that could reduce risk in American Samoa. Mitigation strategies include planning, policy and regulation changes, educational programs, and infrastructure projects among others.

Members of the public, business owners, and government employees are also encouraged to take the **American Samoa Hazard Mitigation Public Opinion Survey**. This survey provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future disasters. Participation in this survey is voluntary and none of the information you provide will be attributed to you directly.

The survey is located online at this web address:
https://www.surveymonkey.com/s/American_Samoa_Hazard_Mitigation_2014.
Hard copies of the survey will also be available at the Town Hall Meeting and in TOFR's offices throughout the week.

The Territory of American Samoa led by the Hazard Mitigation Council is working to prepare an **Updated Hazard Mitigation Plan.** The purpose of this plan is to identify and assess American Samoa's natural hazard risks (such as earthquake, landslides and tsunami) and determine how to best minimize or manage those risks. Upon completion, this plan will be presented to the Governor's Authorized Representative for review and adoption and then submitted to the Federal Emergency Management Agency (FEMA) for review and approval.

The Territory of American Samoa's "FEMA approved" mitigation plan enabled over $18 million for hazard mitigation funding following the 2009 tsunami disaster. FEMA provides funds for mitigation work before and after a disaster if an approved mitigation plan is in place. Keeping the plan current protects the Territory. Projects identified in the plan receive priority as funding becomes available.

Projects such flood control projects in Fagatogo, Faga'alu and Matu'u. The hardening of government infrastructures such as the conversion of aerial utility lines into underground conduits as well as roof hardening projects to address wind hazards.

Public participation is an important part of the mitigation planning process. Residents, business owners and government officials are encouraged to participate in the Town Hall Meeting and the Public Opinion Survey. If you are interested in learning more or have questions please contact the Hazard Mitigation Program Coordinator Mr. Steve Maga at the TOFR office, 684-699-1330 or steve.maga@tofr.as.gov.

Figure 9 Public outreach in the news

Public Preparedness Survey

The Public Preparedness Survey was designed on SurveyMonkey.com and distributed electronically and via hard copy. It included 17 questions. One hundred and sixty-eight people participated in the survey and results were collected between March and May 2014. The survey was distributed at Hazard Mitigation Council meetings, the Town Hall Meeting, and stakeholder meetings. A link to the online version was distributed via e-mail, Facebook (Figure 6 Facebook request to participate in the Public Preparedness Survey), and press release.

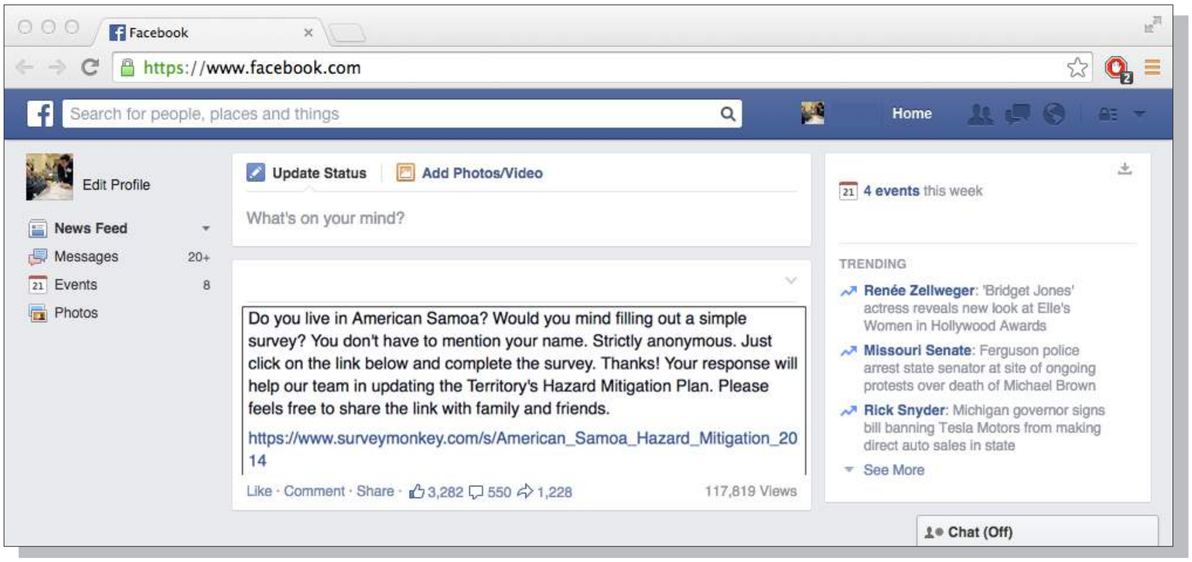

Figure 10 Facebook request to participate in the public preparedness survey

Ninety-three percent of people who participated in the survey report having experienced a natural disaster. Hurricanes, earthquakes, tsunami, tropical cyclones, and floods were the hazards identified by most participants as ones they have experienced. Tsunami ranked as the biggest concern among a list of sixteen hazards. Protecting the hospital and then schools were ranked as the most important community assets. It is important to make the connection between public interest and proposed mitigation actions. The Hazard Mitigation Council, risk assessment and stakeholder meetings all identified the need for mitigating risk to the hospital. It sits just below a steep hill, reservoir and river.

Eighty percent of respondents reported that they do not have flood insurance and nearly fifty percent reported they never considered obtaining the coverage. Overall the National Flood Insurance Program (NFIP) is under utilized in the Territory. The Director of the Department of Commerce (DOC) expressed interest in learning about the NFIP at the stakeholder meeting held in April 2014.

The DHS has done a tremendous job educating the community regarding disaster preparedness. This was particularly evident by results in the survey. Eighty-nine percent of survey respondents reported their home is at risk to hurricanes and tropical storms. Ninety-eight percent responded that they know what to do in the event of hurricane or tropical storm.

Participants had the opportunity to comment on hazard mitigation and disaster preparedness. These comments and full survey results are included in Appendix C.

Town Hall Mitigation Workshop

The planning team hosted a Town Hall Meeting/Mitigation Workshop on April 25, 2014 in the Department of Public Works (DPW) Conference Room. The purpose of the meeting was to convey the importance of mitigation planning, to gather local knowledge regarding mitigation opportunities and hazards and to answer questions regarding the planning process. Approximately twenty-five people attended the meeting; the sign-in sheet is included in Appendix C. The meeting began with a brief group exercise designed to gain understanding about hazard mitigation. The following three questions were asked:

1. What buildings, organizations and infrastructure do the people here rely on?
2. What weather related hazards impact these people and/or the buildings, organizations and infrastructure?
3. What can be done to lessen the impact of these hazards and to protect people and property?

Answering the questions as a group worked well toward beginning a conversation about mitigation planning. Participants were shown a slide presentation that included examples of successful mitigation projects on the island. Participants were each given a copy of the Preparedness Survey and encouraged to attend stakeholder meetings.

Someone in attendance mentioned the lack of a Master Plan for building on the island of Tutuila. In concert with this, it was mentioned that new buildings are going up too fast and are often in high hazard areas. Also mentioned was the need for "build" and "no build" zones instead of just building codes. Frustration with the implementation of the already funded Tualauta Flood project was mentioned. Participants also pinpointed areas prone to flooding such as the road near Cost-U-Less and critical facilities such as the Government Building.

Figure 11 Flooding near Cost-U-Less from rain

Call for Projects

The Planning Team distributed several announcements calling for mitigation projects. Copies of these announcements in the Samoa News are in Appendix C. The project worksheet was distributed electronically and via hard copy at all Council and stakeholder meetings. Stakeholders submitted projects to the Planning Team for a preliminary review and then presented them at the Hazard Mitigation Council Meeting in June 2014. At the July 2014 Hazard Mitigation Council meeting the projects were ranked into high, medium and low priority categories based on their relationship to the highest risk hazards and the goal of the mitigation plan.

Involvement of Additional Stakeholders

The Hazard Mitigation Council and the Planning Team encouraged all stakeholders to review the current mitigation plan, to participate in the plan update, to review the current hazard mitigation project list and to submit additional mitigation projects.

The consulting team was on-island for two weeks during the planning process, once in April 2014 and again in June 2014. During each of these weeks multiple stakeholder meetings were held. The purpose of each meeting was to gather information regarding current stakeholder capabilities and to collect best-available local data. In addition, information was gathered regarding implemented and potential mitigation projects.

Stakeholder Meetings

A brief write-up about each stakeholder meeting is listed below. Additional information regarding each organization is captured in Chapter 5: Capability Assessment.

April 21 – 24, 2014

Throughout the week in April the Planning Team tried to access a critical facility list for the Territory. Each department consulted seemed to think a different department had a list. It would be beneficial for mitigation planning as well as emergency management in general if there was one agreed upon list of facilities. The focus of all stakeholder meetings was to gather additional data toward the updated risk and vulnerability assessment and to gather an updated list of capabilities for each organization.

- American Samoa Department of Commerce (ASDOC)
    - The ASDOC has a grant to map villages for the purpose of coastal resiliency, preparedness and high hazard areas. The possibility of coordinating with the ASDOC on this project and future mapping projects for the purpose of increased hazard data was discussed.
    - It became evident in this meeting that the department does not have a good understanding of the National Flood Insurance Program (NFIP) and it is not widely used in the Territory.
    - No one at the meeting was aware of a Flood Mitigation Plan, which was mentioned, in previous versions of this plan.
    - The Director mentioned a need for controls regarding development and zoning. He mentioned a lack of Master Plan.
    - ASDOC does not have a critical facility list.
- American Samoa Department of Homeland Security (ASDHS)
    - The Director of ASDHS mentioned his dedication to mitigation. Alefa Afalava, ASDHS, accompanied the Planning Team to all stakeholder meetings during this week.
    - The road to Mt. Alava was discussed during this meeting. It is considered dangerous to travel. Communication antennae and television equipment are at the top of the mountain. He also mentioned the need to protect schools with shutters and to protect the Emergency Operation Center with shutters (this became a mitigation project).
    - ASDHS does not have a critical facility list.
- American Samoa Environmental Protection Agency (ASEPA)
    - The ASEPA is housed in a LEED Platinum building that has a green roof with solar panels.

- ASEPA maintains the only laboratory in American Samoa.
  - Emphasized in this meeting was a need for improved land use regulations that would limit landslides and control increased population density in high hazard areas.
  - ASEPA has extensive GIS capabilities but they do not have a critical facility list.
- American Samoa Power Authority (ASPA)
  - The American Samoa Power Authority has the goal of undergrounding as many power lines as possible.
  - Mentioned the need to access the top of Mt. Alava and the poor condition of the road. They would like to put a generator on the top of the mountain.
  - Concerned with storm water management, specifically around the harbor and water tank locations.
- American Samoa Telecommunication Authority (ASTCA)
  - Collaborate with DPW to bury telecommunication lines while they do road projects.
  - Competitive with Blue Sky.
  - Buildings do have a main and a back up generator.
- Office of Disaster Assistance and Petroleum Management (ODAPM) (Previously named American Samoa Territory Office of Fiscal Reform (TOFR)) and Planning Team
  - The ODAPM conference room became the home base for the Planning Team during this week. The ODAPM staff coordinated all stakeholder meetings as well as the Town Hall Meeting and the Hazard Mitigation Council meeting. Ms. Fiatoa led these efforts with support from Steve Maga and other staff members. ODAPM does maintain a list of government buildings for insurances purposes.
- Blue Sky
  - ASTCA and Blue Sky co-own a submarine cable through a consortium called ASH. This cable is vulnerable to disasters and it provides the only communication to resources off island.
  - Their facility is hardened for wind and earthquake. It is located on the edge of the tsunami flood zone.
- Department of Public Safety (DPS) and Fire Chief
  - Met with the Fire Chief who gave a good overview of first responders and their role on Tutuila.
  - Highlighted the need for additional staff and equipment. They have four fire stations but only staff three.
  - Concerned with lack of regulation and control of propane storage. Tanks are frequently stored in front of stores and not secured well.
- Department of Public Works (DPW)
  - The Department of Public Works intends to adopt the 2006 International Building Code (IBC), however, at the present time they are using a skeletal version of the code and are unable to enforce it.
  - They do a thorough building permit review that includes multiple stakeholders such as Project Notification and Review System (PNRS), ASEPA and ASPA.

June 17-20, 2014

Jim Buika was on-island for a week in June and held a Hazard Mitigation Council meeting as well as multiple stakeholder meetings, which are detailed below. The descriptions below are brief with additional details in Chapter 5. Capability Assessment. At this point in the planning process the focus was mitigation project identification.

- American Samoa Department of Commerce (ASDOC)
  - The ASDOC team maintains GIS data for the Territory through the GIS Team that is covered in greater detail in Chapter 5. Capability Assessment. The ASDOC GIS portal is connected to the ASEPA server so GIS data is accessible to multiple organizations.
  - ASDOC would like $50,000 to develop tools for the PNRS board to aid in their land use decision-making process.

- American Samoa Department of Homeland Security (ASDHS)
  - o ASDHS would like to put shutters on their building and can do this for under $100,000. This shutter project would be the first in American Samoa and hopefully a showcase project.
  - o Mt. Alava road repairs were discussed. The Park Service would like to let the road deteriorate and become a natural trail. ASDHS would like to see the road repaired and a trail maintained alongside it. Also discussed moving the generator at the top of the mountain to the bottom so it could more easily be maintained.
  - o Shipping goods and services to American Samoa takes time and costs a tremendous amount. This is an island specific issue. In a April 29, 2014 Pacific Preparedness Partnership Meeting, Craig Fugate, FEMA seemed aware of this island specific issue of time and distance.
  - o In terms of a critical facility list, Ms. Fiatoa has a list of government buildings for insurance purposes and recommended that the list be cross-referenced with the ASDHS critical facility list.
- American Samoa Environmental Protection Agency (ASEPA)
  - o Watershed Protection Plan is a work in progress.
  - o Landslide issues need mitigation attention. Currently 1800 buildings in high-risk landslide zones according to latest LIDAR data.
  - o Working toward goal of 100% sustainable energy for outer islands.
  - o Faga'alu Quarry Landslide Hospital Mitigation Project proposed. The quarry is located behind the hospital and the slope it is on is unsupported. A reservoir is located upstream. This presents a risk to the watershed. Recommend monitoring landslide potential with rain gauges and sensors.
  - o Water quality is a huge concern, 70% of wells are contaminated and there is a boil water requirement in place.
- American Samoa Power Authority (ASPA)
  - o The American Samoa Power Authority came to this meeting with a handout and five new mitigation projects to discuss.
  - o Weatherproof Wastewater Lift Stations
  - o High Priority Water Tanks
  - o Water Wells, 56 Wells
  - o 2 projects to underground power lines
- Office of Disaster Assistance and Petroleum Management (ODAPM) and Planning Team
  - o The ODAPM conference room became the home base for the Planning Team during this week. The ODAPM staff coordinated all stakeholder meetings as well as the Town Hall Meeting and the Hazard Mitigation Council meeting. Ms. Fiatoa led these efforts with support from Steve Maga and other staff members.
- Department of Public Works (DPW)
  - o Discussion at this meeting focused on the Tualauta Flood Control Project. This project has been funded but the benefit cost analysis (BCA) is approximately .6 and needs to be above 1.0 for funding to be released.
  - o In addition, DPW mentioned concern over Mt. Alava. They need a variance to pave the road. Key stakeholders for this project include ASDOC, KTVA (TV Station), ASTCA, ASPA, NPS and FEMA.
- Jerome Ierome, Administrator, Governor's Office
  - o Mr. Ierome is interested in the FAA Fuel Tanks at the airport being moved to a safer location. Mr. Ierome was invited to participate in future Hazard Mitigation Council Meetings.
- John Goeke
  - o John Goeke worked on the mitigation plan in the past. He has a keen sense of what is needed in terms of mitigation. He is particularly interested in the FAA Fuel Tank Farm relocation project and is willing to assist with documenting the project for the plan.

Site Visits

- o Jamie Caplan and Caroline Cunningham toured the entire island of Tutuila during their week on island.
- o Jim Buika toured the island of Tutuila during his week on island.
- o Afono Landslide and Rockfall: Approximately 1000' rockfall straight above the Afono Village. Mr. Buika visited this location with many members of the Hazard Mitigation Council.

History of the Planning Process

The Hazard Mitigation Council has facilitated an effective mitigation planning process since 2003. The turnover of Council members has created a bit of a challenge but the consistency of Lima Fiatoa, State Hazard Mitigation Officer and Planning Team Leader and Alefa Afalava; DHS has made a tremendous difference. Their dedication to maintaining this plan and implementing mitigation projects has kept mitigation at the forefront of government activities for the last decade. In addition, many stakeholders have held their positions for multiple years and understand the role of mitigation and the process of seeking grant funding. Jim Buika has participated in the planning process since 2003, and Jamie Caplan Consulting LLC has been the lead planning consultant since 2008, these consistencies have helped maintain an efficient planning process. Mitigation is a difficult concept and applying for mitigation funding is a challenging process, having a consistent group of individuals representing mitigation in American Samoa has contributed positively toward its success.

Development of 2003 Multi-Hazard Mitigation Plan

Below is a summary of the 2003 Hazard Mitigation Planning Process to develop the 2003 Multi-Hazard Mitigation Plan:

- The Lieutenant Governor convened the American Samoa Territorial Hazard Mitigation Council with support from the Territorial Emergency Management Coordinating Office (TEMCO).
- TEMCO contracted a consulting team from the Pacific Disaster Center/East-West Center and PPG Consulting to conduct the Risk and Vulnerability Assessment and facilitate the planning process. In this section, this team is subsequently referred to as the Project Team.
- The Mitigation Council agreed on 1) the general goals and objectives for the Mitigation Plan; 2) an approach to the planning process; and 3) the formation of subcommittees to address building codes and standards; land use management and regulations; infrastructure standards; flood issues; and data needs and analysis.
- The Project Team worked with American Samoa Government Agencies and the Geographic Information Systems User Group to compile digital maps and other data and conducted a risk and vulnerability assessment.
- Results of the risk and vulnerability assessment, including maps, were presented to the Hazard Mitigation Council and the general public and input was solicited on the risk and vulnerability assessment and mitigation options.
- Hazard Mitigation Council subcommittees met to assess the adequacy of 1) building codes and standards, 2) the Project Notification and Review System and other land use planning and management initiatives, and 3) infrastructure standards and the American Samoa Flood Mitigation Plan.
- TEMCO issued a request for proposals for hazard mitigation projects to be included in the plan, and a fifth subcommittee was appointed to screen projects proposed by American Samoan Government agencies for inclusion in the plan.

- The Hazard Mitigation Council met to review the recommendations of the subcommittees, consider and adopt recommendations of the subcommittees, and make final decisions on the mitigation projects to be included in the plan.
- An Executive Order was drafted to appoint the American Samoa Territorial Hazard Mitigation Council as the standing body to coordinate mitigation planning and implementation, as well as formally adopt the plan.

Development of the 2008 Mitigation Plan Update

Jim Buika was on the island gathering data for the 2008 Mitigation Plan the week of June 4, 2007. Mr. Buika conducted meetings in American Samoa, with the purpose of conducting two Territorial Hazard Mitigation Council meetings, assisting key ASG departments to finalize development of previously submitted hazard mitigation projects, conducting a mitigation project tour, and interviewing department personnel in order to gather information and data required to augment and update the existing plan. Data collection was based on the Plan Update Gap Analysis Matrix. Jim Buika represented the 2008 Project Team to facilitate the FEMA required update of the American Samoa Hazard Mitigation Plan.

Development of the 2011 Mitigation Plan Update

The Hazard Mitigation Council met a total of five times since September 29, 2009 disaster. Due to the DR-1859 Tsunami, Flood and Earthquake disaster, the Governor appointed a new Governor Authorized Representative, Evelyn V. Langford to head the Territorial Hazard Mitigation Council. Council meetings were conducted on the following dates:

- February 9, 2010 to discuss HM Council's goals and objectives as well as projects currently prioritized on the project listing. The Council felt that opportunities should be given for agencies to resubmit their project proposals for consideration of funding under DR-1859.
- March 9, 2010 to review project proposals/presentations and rank priority of projects according to ranking criteria
- June 15, 2011 to initiate new members that were appointed by the Governor, discuss revisions to the plan for July 2011 update and "Call of Projects"
- June 20, 2011 to review new project proposals / presentations in preparations of updating priority listing as well as update HM Councils goals and objectives
- June 27, 2011 to prioritize projects in accordance of ranking criteria as set forth by the HM Council and HM Plan

For meetings where new project / presentations are mentioned above, a "Call of Projects" noticed was issued through advertisement in the local newspaper as well as the letters distributed to all government agencies, departments and private not for profit organizations. The departments/agencies were asked to develop a preliminary project proposal that followed five minimum criteria:

- Conform to and be included in the State Plan.
- Be both engineering and technically feasible.
- Conform to environmental laws and regulations.
- Solve a problem independently or constitute a functional portion of a solution, and
- Be cost effective.

Integration with Other Plans in the Territory

The Hazard Mitigation Council informs its members, leaders from the majority of government agencies and several private companies, about the contents of the mitigation plan. They work to ensure that all members understand the scope of risk and the potential to mitigate that risk.

The Directors of DPW, ASPA, and ASTCA all sit on the Hazard Mitigation Council. They work with their technical engineers to develop projects and provide input to the hazard mitigation plan. They also use this information in projects and plans in their respective agencies. Undergrounding utilities is a priority of this plan and each of these agencies. They coordinate undergrounding projects so utility rights of way are being excavated and accessed only one time to improve, water, sewer, communications, and power, to improve the benefits and minimize the costs.

The Project Notification and Review System (PNRS) have insured on-going integration of new projects with existing territorial plans and regulations. The Hazard Mitigation Council's endorsement of land-use management improvements proposed by Department of Commerce provided additional integration with planning activities in the Territory.

The Hazard Mitigation Council identified the Tualauta Flood Control project as Territory's number one priority in 2011. This project has been funded and is waiting Benefit Cost Analysis review to proceed.

Integration with FEMA mitigation programs
ODAPM works with the Hazard Mitigation Council to submit mitigation projects to FEMA for funding. The Hazard Mitigation Council includes representatives from public and private agencies in the Territory with a stake in hazard mitigation. Many of these agencies, such as ASTCA, ASPA and DPW collaborate on projects to increase efficiency and the benefit-cost ratio. Agencies in the Territory have a difficult time documenting project applications. They tend not to maintain records or data regarding damage during disasters. This lack of information makes a favorable benefit-cost analysis difficult to achieve. The SHMO works closely with FEMA and stays current on all FEMA mitigation programs.

Changes in Coordination Between Agencies since 2011
The planning process for this 2015 mitigation plan was similar to the 2011 planning process. Many of the Planning Team members were the same and the consistency of Lima Fiatoa, SHMO and Alefa Afalava; DHS paved the way in the Territory. The Hazard Mitigation Council led by the GAR maintained authority to call for projects and rank them in order of priority. The Planning Team consultants spent two weeks on-island instead of one, which made it easier to gather information, visit potential mitigation project locations and meet with identified stakeholders. The risk assessment for this plan is completely revamped with additional data sets and more extensive hazard descriptions.

Plan Adoption

The Hazard Mitigation Council reviewed this plan for several weeks in January 2015. They communicated their appreciation and approval of the plan to Ms. Lima Fiatoa. Ms. Fiatoa then took the plan to the Governor's Office for official adoption. The Governor, Lolo M. Moliga signed an Executive Order formally adopting the plan on March 24, 2015.

The Federal Emergency Management Agency reviewed a draft of the plan in March 2015. They required a couple of revisions and communicated those to Ms. Fiatoa and the consulting team on a conference call as well as by way of the Standard State Hazard Mitigation Plan Review Crosswalk. The consulting team made the recommended changes and Ms. Fiatoa returned the document to FEMA for their review and approval in April

CHAPTER IV

Risk Assessment and Vulnerability Assessment

Assessing risks is the second step in the four-step mitigation plan process. The risk assessment step has four parts: identify hazards, profile hazard events, inventory assets and estimate losses (Figure 1). Conducting a risk assessment is a way of asking and answering "what if…" questions. For instance, what if the Territory receives several days of heavy rain?

The risk assessment answers questions regarding history, probability and impact. These answers are then used in the third step of mitigation planning, developing a mitigation plan. They provide essential data to determine mitigation strategies and to define specific prioritized mitigation projects.
The development of a comprehensive natural hazard risk and vulnerability assessment is necessary to gain an understanding of the risks of natural disasters to the people of American Samoa. The Project Team, in collaboration with American Samoa Government (ASG) representatives, examined the vulnerability of current and future populations and structures (including critical facilities and infrastructure) to various natural hazards. The risk assessment provides a compilation of information and available data sets to American Samoa government officials for comprehensive planning purposes to save lives and reduce property losses in future disasters.

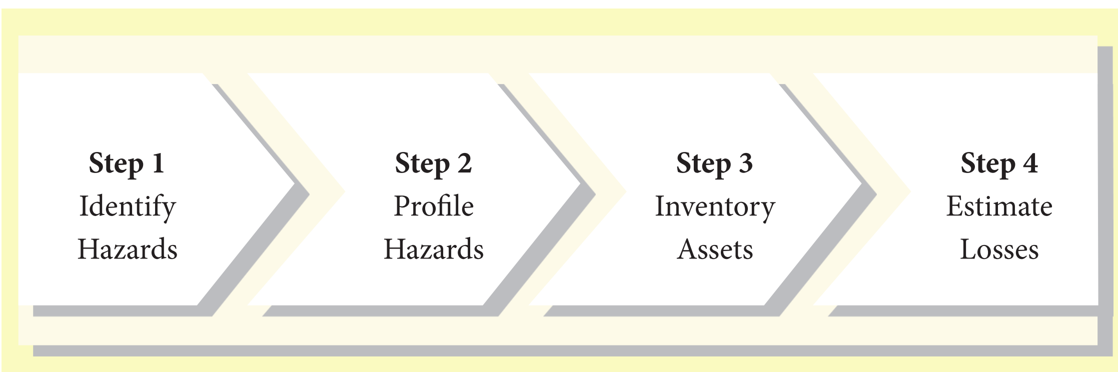

Figure 1 Risk Assessment Process

The risk assessment is formatted to meet the Federal Emergency Management Agency's state-level hazard mitigation planning regulations as found in C.F.R. 44 201. FEMA requires American Samoa to profile each possible natural hazard event, to assess vulnerability and estimate potential losses by jurisdiction. Using data compiled on historical natural hazard events between approximately 1960 and 2014, the risk assessment discusses thirteen main natural hazards as follows: climate change (including sea level rise), coastal erosion, drought, earthquake, flood, high surf, landslide, lightning, soil hazards (including sinkholes, subsidence and expansion) tropical cyclones (including storm surge and high wind storms), tsunamis, volcano (including vog), wildfire and one man-made hazard, hazardous materials. Storm surge is treated as an associated hazard to tropical cyclones. New hazards for the 2015 update are coastal erosion, high surf, lightning strike, and soil hazards. Hazards profiles, including a description of the hazard, historical occurrences, extent (or magnitude), location and vulnerability, beginning on page 64 with the climate change hazard. Hazard profiles are presented in alphabetical order.

Extensive information regarding the history, economy, population and islands that make up American Samoa can be found in Chapter 2. Major areas of population include the villages of Tafuna, Nu'uuli, Pago Pago, Iliili, and Pavaiai. It is advisable to review Chapter 2 prior to reading the Risk Assessment to best understand the layout and villages of the Territory.

GIS Date for Buildings

Data was requested and collected through American Samoa agencies, federal agencies, state sources, non-profits, and Internet sources. Baseline building and critical data is as follows:

- Tutuila/Aunu'u Buildings: 2010 dataset. This dataset incudes includes 16,351 structures. There is no associated building value information. However, 94 of these structures were listed as demolished or destroyed as a result of the tsunami. These structures were not included in the hazard zones estimates.
    - Tutuila/Aunu'u Critical Facilities: 2007 dataset. The 2007 dataset includes type, name, and value estimation. New critical facility information was requested. Although a new critical facility layer was not available, new information was added to the list through the planning process. This included 2 fire stations, a hospital in eastern Tutuila, and the new court building. However, values were not provided for the new facilities. This brings the total up to 240 critical facility structures. In addition, several additional holdings were mentioned and also included separated including ASTCA infrastructure, tsunami sirens, and safe zones. In appendix D, the complete list of critical facilities is available included which critical facilities are new for the 2015 plan update.
- Ta'u Buildings: 2003 data set. Limited information on type was provided and no building values were provided.
    - Ta'u Critical Facilities: 2003 dataset. Name and type was provided. No building values were provided. However, some of the new critical facility data (primarily tsunami sirens) are available for the Manu'a Islands.
- Ofu-Olosega Buildings: 2011 dataset. No information on type, name or building value was provided.
    - Ofu-Olosega Critical Facilities: no data provided. However, some of the new data (primarily tsunami sirens) are available for the Manu'a Islands.
- Swains Island: No information was provided on buildings. Only 17 people live on the island according to the 2010 U.S. Census.
- Rose Atoll: Uninhabited

Hazard Identification

Hazard identification is the process of identifying the kinds of natural hazards that can affect the mitigation plan study area – in this instance the Territory of American Samoa. For the purpose of this plan, five hazards were added to the list from 2011. These are sea level rise (combined with climate change), lightning strike, coastal erosion, high surf and soil hazards (expansion, subsidence and sinkhole). In all, fourteen hazards were studied: they are climate change (including sea level rise), coastal erosion, drought, earthquake, flood, hazardous materials, high surf, landslides, lightning strike, soil hazards (including expansion, subsidence and sinkholes), tropical cyclones, tsunami, volcano and wildfire. Table 1 indicates each hazard studied and the justification for inclusion in the mitigation plan.

Table 1 Hazards Included in the Plan

Hazard	Justification for Inclusion
Climate Change (sea level rise)	Climate Change directly impacts American Samoa by increasing the impacts of hazard events such as flooding, drought and tsunamis. In addition, climate change may be a possible cause of sea level rise. Sea level rise will threaten areas further inland with flooding.
Coastal Erosion	Much of the development is located in the relatively narrow coastal plain making this a hazard of major concern. The reef flat, which extends up to 200 feet on the south shore of Tutuila, provides some shoreline protection, although steep volcanic cliffs generally characterize the north shore coasts. Shoreline analysis identified about 10 percent of critical facilities within critical erosion areas, potentially many of these structures at risk to future erosion.[1]
Drought	Drought occurs in American Samoa and has resulted in economic impacts and water shortages. There is evidence that severe drought events may follow a strong El Niño period. Drought can result in water shortage and impact economic activities on the island.
Earthquake	The primary earthquake source for American Samoa is the northernmost section of the Tonga Trench (or Tonga-Kermadec Trench), more than 100 miles southwest of the Samoan island chain. The Tonga Trench is a seafloor geographic and tectonic feature created by the collision of the Pacific Plate that subducts westward beneath the Australian Plate. The Pacific-Australian subduction zone is considered an area of high seismic activity, and the collision of these two plates is a source of large but distant earthquakes felt in American Samoa. Earthquakes over 7.0M have been recorded. Further, earthquakes can be a precursor for a tsunami.
Flood	Flooding is a regular occurrence in American Samoa due to rainfall, thunderstorm rain, tropical cyclones, and tsunami. Several disaster declarations resulted from flood impacts. Flood has resulted in substantial damages and often is a precursor for landslides.
Hazardous Materials	American Samoa stores extensive hazardous materials on island. Further, many extremely dangerous (and illegal) hazardous materials, such as fertilizer, are being imported. Often times, the most dangerous hazardous materials are being abandoned or not stored properly, creating a safety and health issue to nearby dwellings and to the environment.[2]
High Surf	This hazard has resulted in road damage and debris, and it may impact economic activity.
Landslides	Previous landslides have resulted in substantial damage and even death on island. Given the natural topography and history of landslides on Tutuila, future landslides are a certain occurrence. Landslides are less frequent on the Manu'a islands but still possible given the steep slope in some areas.
Lightning Strike	Lightning strikes are not frequent occurrences but have reportedly caused a death, an injury and electronic damage in American Samoa. Future events can result in death, injury, power outage, wildfire or structure fires.

1 Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Samoa Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/as3092011.pdf, p. 20

2 Only natural hazards are required in the hazard mitigation plan. However, given the concern and potential impact by a natural hazard, hazardous materials on the island are discussed.

Hazard	Justification for Inclusion
Soil Hazards (including expansion, subsidence and sinkholes)	These are low probability hazards. They were included because they are possible on the islands, particularly subsidence. Each of these hazards may result in property damage
Tropical Cyclones and High Wind Storms	All the major tropical cyclones affecting American Samoa during the past 50+ years have been classified between Categories 1 and 3 on the Saffir-Simpson Hurricane Scale. Historical records give no indication of any Category 4 or 5 hurricanes impacting this area though it is possible. It appears that due to the relatively close proximity to the equator, 840 miles south of the 0 degree latitude line, the most intense tropical cyclones in the vicinity of American Samoa are rare. However, even less severe storms can wreak havoc on the islands including death and damage due to flooding, high wind, and high surf.
Tsunami	The entire coastline of American Samoa is at risk to tsunamis. Wave heights along the shoreline would be directly related to the energy of the wave and direction in which it was generated. The pocket coves and bays of the island are at higher risk of damage due to shallow bathymetry and the amplifying effect of the wave energy as it nears the shore. Tsunamis range from relatively weak, just generating larger than normal waves, to catastrophic, similar to the 2009 tsunami event that severely impacted the territory.
Volcano	American Samoa formed as a result of volcanic activity over a hot spot in the Pacific Plate. Tectonic uplifts and volcanic activity during the early formation period of the islands have led to steep inclines and sharp cliffs being the dominant geographical features of the main islands. The most recent volcanic eruptions were in 1866 and an active hotspot remains. In addition, volcanoes are active on the neighboring islands of Samoa in Apia. An associated hazard to volcano and possible impact to American Samoa is vog, a type of air pollution. It is the haze caused by a combination of volcanic activity and weather which becomes thicker or lighter depending upon the amount of emissions from the volcano, the direction and amount of wind, and other weather conditions. Other respiratory illnesses may also rise during a volcano eruption.
Wildfire	Wildfire is possible and does occur in American Samoa. However, the fires are rarely large enough to cause significant damage. A fire suppression plan does exist for the islands.

Hazard information collection and assessment was conducted for all hazards under consideration. Information sources used in the risk and vulnerability assessment included hazard mitigation plans, reports and studies conducted in the region, Internet resources, local newspapers, and personal interviews conducted with government agency representatives, professional experts, and residents of American Samoa. These sources are referenced in the Appendices.

In addition, reviewing previous disaster declarations provides insight to known hazards that impact the islands. Table 2 shows a list of FEMA declared disasters since 1966.

Year	Date	Disaster Types	Disaster Number
2014	09/10	Severe Storms, Flooding and Landslides	4192
2009	09/29	Earthquake, Tsunami and Flooding	1859
2005	02/18	Tropical Cyclone Olaf, including high winds, high surf, and heavy rainfall	1582
2004	01/13	High winds, high surf and heavy rainfall associated with Tropical Cyclone Heta	1506
2003	06/06	Heavy rainfall, flooding, landslides, and mudslides	1473
1991	12/13	Hurricane Val	927
1990	02/09	Hurricane Ofa	855
1987	01/24	Hurricane Tusi	785
1981	03/24	Typhoon Esau	637
1979	11/09	Flooding, mudslides, landslides	610
1974	09/30	Drought	449
1966	02/10	Typhoon, high tides	213

Table 2 FEMA Declared Disasters [3]

Hazard Profiles

Each hazard mentioned above is profiled separately to describe the hazard and potential impacts on the islands of American Samoa. The islands of Tutuila, Ofu-Olosega, and Ta'u are included. Where data exists, additional information on location (such as district, county, or village) will also be included. The profile for each hazard includes:

- **Description:** A scientific explanation of the hazard including potential magnitude (or severity) and impacts;
- **Location:** Geographical extent of the hazard;
- **Previous occurrences:** The number of previous impacts from the hazard on American Samoa in the past;
- **Extent** (or magnitude): The severity of the hazard in the past and potentially severity in the future. Measures may include wind speed, wave height, or property damage, for example;
- **Probability of future events:** The likelihood of future events impacting the islands. Given that an exact probability is often difficult to quantify, this characteristic is categorized into ranges to be used in hazard profiles:
    - o Unlikely: Less than 1% annual probability
    - o Possible: Between 1% and 10% annual probability
    - o Likely: Between 10+% and 90% annual probability
    - o Highly Likely: Greater than 90% annual probability
- **Vulnerability Assessment:** The vulnerability assessment will address conditions that may increase or decrease vulnerability such as topography, soil type, land use, and development trends will also be included.
- **Potential Losses:** Estimated losses will be calculated using available data and resources. Methods utilized include GIS analysis and hazard modeling where tools are available. Information such as number of structures at risk and critical facilities at risk will be analyzed.

3 Disaster State (2014). Federal Emergency Management Agency. Retrieved February 28, 2014 from http://www.fema.gov/news/disasters_state.fema?id=60

It is recognized that American Samoa traditionally refers to areas of the islands as villages and districts (East District, West District, and Manu'a District), as opposed to county geographies. However, the best available data for mapping and analysis boundaries was U.S. 2010 Census data, so the county geography was utilized. It is also recognized that the 2010 Census data did not include FoFo County, which is included as part of Lealatua County in this version of the plan (including the Village of Leone). Future revisions of this plan should move towards aligning the traditional American Samoan areas of reference with the best available data.

Priority Risk Index (PRI) Index

The prioritization and categorization of identified hazards for American Samoa is based principally on the Priority Risk Index (PRI), a tool used to measure the degree of risk for identified hazards in a particular planning area. The PRI was used to assist the American Samoa Hazard Mitigation Planning Council in gaining consensus on the identification of those hazards that pose the most significant threat to the islands based on a variety of factors including location extent, impact, probability, warning time, and duration. The PRI results are presented below. Combined with the inventory of ASG assets and critical facilities, the hazard profiles generated through the use of the PRI allows for the prioritization of hazard

The PRI results provide a numerical value for each hazard that allows hazards to be ranked against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time and duration). Each degree of risk has been assigned a value (1 to 4) and an agreed upon weighting factor.

To calculate the PRI value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the example equation below:

PRI VALUE = (PROBABILITY x .30) + (IMPACT x .30) + (SPATIAL EXTENT x .20) +
(WARNING TIME x .10) + (DURATION x .10)

According to the weighting scheme applied for American Samoa, the highest possible PRI value is 4.0. Table 3 shows the weighting schemes for each category. By determining a value for each hazard that can be relatively compared to other hazards threatening the planning area, hazards can be ranked with greater ease. Many of the PRI categories are described within the hazard profiles. The final PRI results, including the calculated values for each hazard in American Samoa, are found at the end of this section in the "Summary of Hazard Risk," beginning on page 205.

Table 3 Priority Risk Index Criteria for American Samoa Hazard Mitigation Plan

PRI Category	DEGREE OF RISK			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	30%
	Possible	Between 1 and 10% annual probability	2	
	Likely	Between 10 and 90% annual probability	3	
	Highly Likely	90%+ annual probability	4	
Impact	Minor	Only minor property damage and minimal disruption to government functions and services. No shutdown of critical facilities.	1	30%
	Limited	Minor injuries are possible. More than 10% of buildings damaged or destroyed. Temporary shutdown of critical facilities (less than one week).	2	
	Critical	Multiple deaths/injuries possible. More than 25% of buildings damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of buildings damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Limited to one specific area	1	20%
	Small	Small areas affected	2	
	Moderate	Large areas affected / multiple campuses affected	3	
	Large	All areas affected / all campuses affected	4	
Warning Time	More than 24 hours	Self-explanatory	1	10%
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
Duration	Less than 6 hours	Self-explanatory	1	10%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	

Climate Change

Description

Climate change was added to the list of hazards warranting study in 2008 because it directly impacts American Samoa by potentially increasing flooding or increasing drought to the islands. It was expanded in the 2015 update to include sea level rise.

Climate change is defined by the U.S. Environmental Protection Agency (EPA) as "any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer."[4]

The exact cause of climate change is still being researched. There are thought to be several contributing factors or potential causes including: orbital variations (changes to the amount and location of sunlight reaching the earth's surface); solar output (the amount of energy from the sun input to earth); magnetic field strength (evidence that an increased magnetic field leads to increased rain fall, particularly in the tropics), volcanism (eruptions release gas into the air that may raise the global temperature or particles that may decrease it); plate tectonics (impacts ocean circulation causes ocean temperature to rise or fall); and human causes (primarily conducting activities that release large amounts of carbon dioxide and other greenhouse gases into the atmosphere; these gases trap energy in the earth's atmosphere, causing the temperature rise).

Typically the impacts of climate change are slow-onset, meaning they occur gradually over time. Climate change is assumed to be a contributing factor for weather patterns and rising sea levels, which carry subsequent impact. Two major weather patterns impacting American Samoa are El Niño and La Niña. In addition, sea level rise, an associated hazard, is described below.

Description of El Niño

El Niño is characterized by unusually warm ocean temperatures in the equatorial Pacific. El Niño is a disruption of the ocean-atmosphere system in the Tropical Pacific having important consequences for weather and climate around the globe. It may cause increases in sea level, increased flooding, and changes in natural resources available to American Samoa.[5]

El Niño is normally accompanied by a change in atmospheric circulation (the location of the jet stream) called the Southern Oscillation. Together, the ENSO (El Niño-Southern Oscillation) phenomenon is one of the main sources of inter-annual variability in weather and climate around the world. El Niño events tend to alternate about every three to seven years. However, the time from one event to the next can vary from one to ten years. The event typically lasts between twelve and eighteen months. El Niño is forecasted to develop during the 2014 season, after a four year absence.

4 Glossary of Climate Change Terms. (2013). U.S. Environmental Protection Agency. Retrieved August 8, 2014 from http://www.epa.gov/climatechange/glossary.html#C

5 National Assessment: Overview Islands. U.S. Global Change Research Program. Retrieved August 8. 2014 from http://www.usgcrp.gov/usgcrp/Library/nationalassessment/overviewislands.htm

Description of La Niña [6]

La Niña is characterized by unusually cold ocean temperatures in the equatorial Pacific. Typically, a La Niña is preceded by a buildup of cooler-than-normal subsurface waters in the tropical Pacific. Eastward-moving atmospheric and oceanic waves help bring the cold water to the surface through a complex series of events still being studied. In time, the easterly trade winds strengthen, cold upwelling off Peru and Ecuador intensifies, and sea-surface temperatures (SSTs) drop below normal. During the 1988- 89 El Niño, SSTs fell to as much as 4 degrees Celsius (7 degrees Fahrenheit) below normal. Both La Niña and El Niña tend to peak during the Northern Hemisphere winter. The interval between La Niña events is about two to seven years and it may follow a La Niña event (but not always). La Niña conditions typically last approximately 9-12 months. Some episodes may persist for as long as two years. La Niña conditions may increase the intensity of hurricanes, cause drought, or limit natural resources available in American Samoa.[7]

Description of Sea Level Rise

Sea level rise is generally defined as the mean rise in sea level. It is a slow-onset hazard; meaning that it occurs gradually and its impacts may not be felt immediately. Sea level rise is caused by two main factors: warming oceans (the tendency of warm water to take up more space than cooler water) and melting glaciers resulting in a greater amount of water in the oceans. Further, according to NOAA, "ocean warming contributes to global mean sea level rise by reducing the density of seawater, thus increasing its volume."[8] The increased volume of water results in more land being inundated by water. Regardless of the cause, rising oceans means that greater areas of coastal shorelines can be inundated by water. Research affirms that global sea level is rising, but is not conclusive on the extent to which it will impact specific areas.

A 2007 Intergovernmental Panel on Climate Change (IPCC) found that global sea level rose by approximately seven inches during the 20th century.[9] Sea level rise is occurring globally but not in a uniform manner. Some areas are experiencing a faster rise in water levels than other areas. In areas where the land is sinking (subsidence) sea level rise conditions may be higher, for example. Low-lying coastal areas are particularly vulnerable. This is a particular concern in American Samoa since a large portion of the population resides near coastal areas. In neighboring Samoa, nearly one in four homes are below four meters elevation according to Swiss Re. similar conditions are likely in American Samoa though this could not be verified.[10])

The potential impacts of sea level rise in American Samoa are pronounced. It may exacerbate the effects of hazard events such as coastal flooding, a tsunami or a hurricane. When these hazards are combined with sea level rise, more water will inundate the land further inland. Salinization, when salt water encroaches into fresh groundwater aquifers, is also a concern. This may contaminate drinking water supplies. Shoreline erosion and loss of developable land are also potential impacts of sea level rise in American Samoa. Environmental impacts from sea level include loss of mangroves, which help to protect the shoreline and filter unwanted pollutants from the water and coral dye-offs.

6 La Niña FAQ. (1998). National Oceanic and Atmospheric Administration. Retrieved August 8, 2014 from http://www.elnino.noaa.gov/lanina_new_faq.html

7 Suplee, Curt. "El Niño/La Niña: Nature's Vicious Cycle." National Geographic. Retrieved August 8, 2014 from http://www.nationalgeographic.com/elnino/mainpage3.html

8 Johnson, G.C., and S.E. Wijffels. (2011). Ocean density change contributions to sea level rise. Oceanography 24(2):112–121, doi:10.5670/oceanog.2011.31f Retrieved April 2, 2014 from: http://oceans.pmel.noaa.gov/Papers/gcj_3x.pdf

9 Climate Impacts on Coastal Areas. (2014). U.S. Environmnetal Protection Agency. Retrieved August 8, 2014 from http://www.epa.gov/climatechange/impacts-adaptation/coasts.html#adapt

10 Samoa, South Pacific: Facing the risks of rising sea levels. (2014). Swiss Re. Retrieved August 8, 2014 from http://www.swissre.com/rethinking/climate_and_natural_disaster_risk/Samoa_South_Pacific_Facing_the_risks_of_rising_sea_levels.html

Several Pacific island states are threatened with total disappearance due to sea level rise. New York Times author Jonathan Adams wrote an article titled "Rising Sea Levels Threaten Small Pacific Island Nations" on May 3, 2007.[11] He states in his article:

> Dire climate change predictions may seem like science fiction in many parts of the world. But in the tiny, sea-swept Pacific nation of Tuvalu, the crisis has already arrived. Tuvalu consists of nine low-lying atolls totaling just 26 square kilometers, or 10 square miles, and in the past few years the "king tides" that peak in February have been rising higher than ever. Waves have washed over the island's main roads; coconut trees stand partly submerged; and small patches of cropland have been rendered unusable because of encroaching saltwater. The government and many experts already assume the worst: Sometime in the next 50 years, if rising sea-level predictions prove accurate, the entire 11,800-strong population will have to be evacuated. The ocean could swallow Tuvalu whole, making it the first country to be wiped off the map by global warming.

In addition, two uninhabited islands in the Kiribati chain (roughly between Hawaii and American Samoa) have already disappeared due to sea level rise. The people of Funafti in Tuvalu and on Kiribati Island are lobbying to find new homes; salt-water intrusion has made groundwater undrinkable, and these islands are suffering increasing impacts from hurricanes and heavy seas.

In neighboring independent Western Samoa, some villagers of Saoluafata have noticed that their coastline has retreated by as much as 50 meters in the last decade. Many of these people have had to move further inland as a result.

Location

Climate change is a global phenomenon that is impacting the world. In American Samoa, impacts due to new or more severe weather patterns will cover the entire planning area. Coastal areas are at greatest risk and will be impacted by more severe and more frequent flooding. However, its secondary impacts, such as more frequent and stronger storms, increased flooding and potential contamination of drinking water may impact the entire American Samoa island chain.

NOAA has created a hypothetical sea level rise viewer, the Digital Coast, which can be used at: http://csc.noaa.gov/slr/viewer/. Static maps from the Digital Coast are below; they show water encroachment due to hypothetical sea level rise scenarios at the 1 foot, 3 foot and 6 foot levels for Tutuila, Aunu'u and Manu'a Islands. However, given subtle changes, the maps are most practical when using the digital viewer. The figures are presented as follows:

- Figure 2 Tutuila Island Hypothetical Sea Level Rise Areas
- Figure 3 Pago Pago (Tutuila Island) Hypothetical Sea Level Rise Areas
- Figure 4 Tafuna Plain East (Tutuila Island) Hypothetical Sea Level Rise Areas
- Figure 5 Tafuna Plain West (Tutuila Island) Hypothetical Sea Level Rise Areas
- Figure 6 Ofu and Olosega Islands (Manu'a Group) Hypothetical Sea Level Rise Areas
- Figure 7 Ta'u Island (Manu'a Group) Hypothetical Sea Level Rise Areas

11 Adams, Jonathan. (2007). "Rising Sea Levels Threaten Small Pacific Island Nations". New York Times. Retrieved August 8, 2014 from http://www.nytimes.com/2007/05/03/world/asia/03iht-pacific.2.5548184.html?pagewanted=all

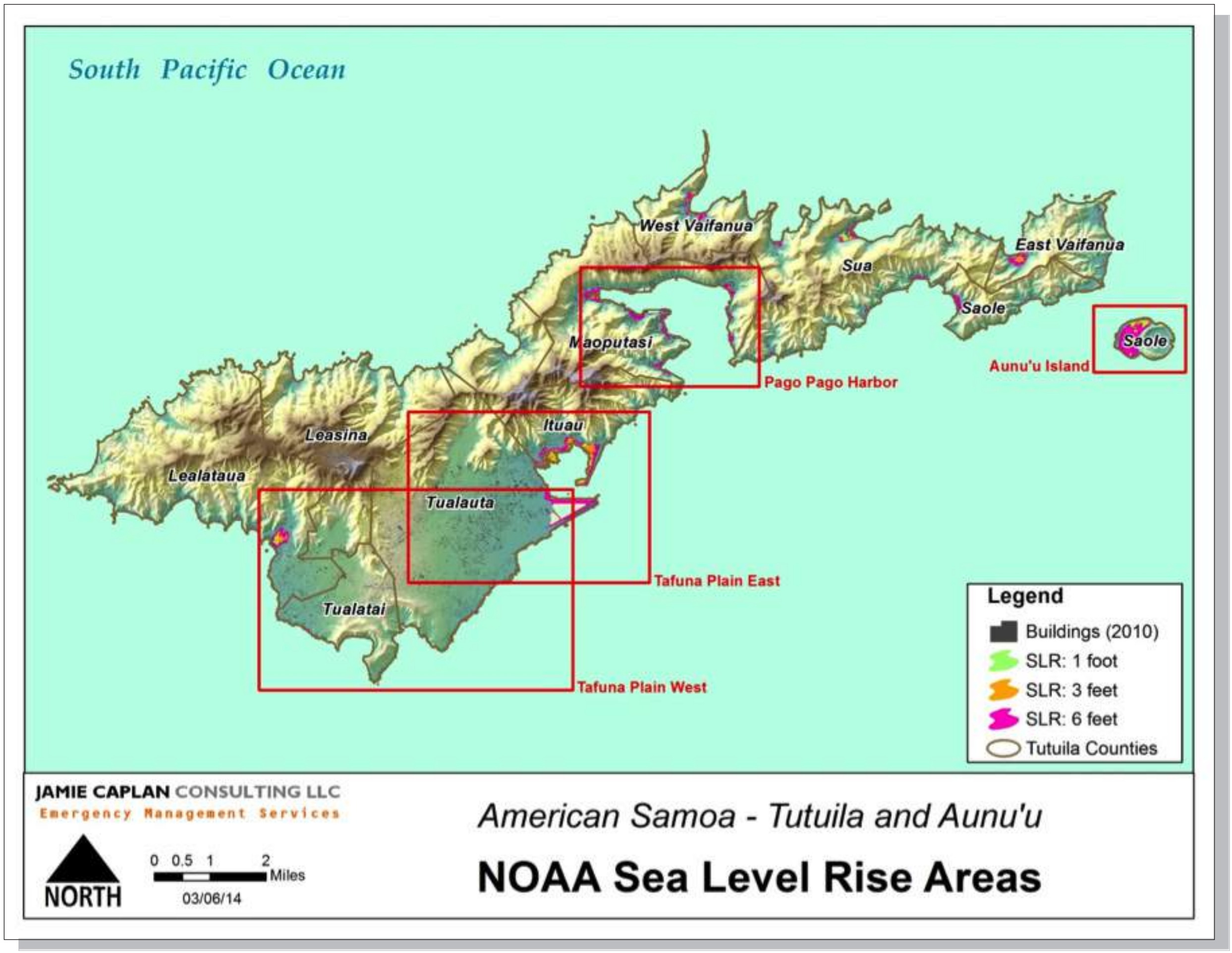

Figure 2 Tutuila Island Hypothetical Sea Level Rise Areas

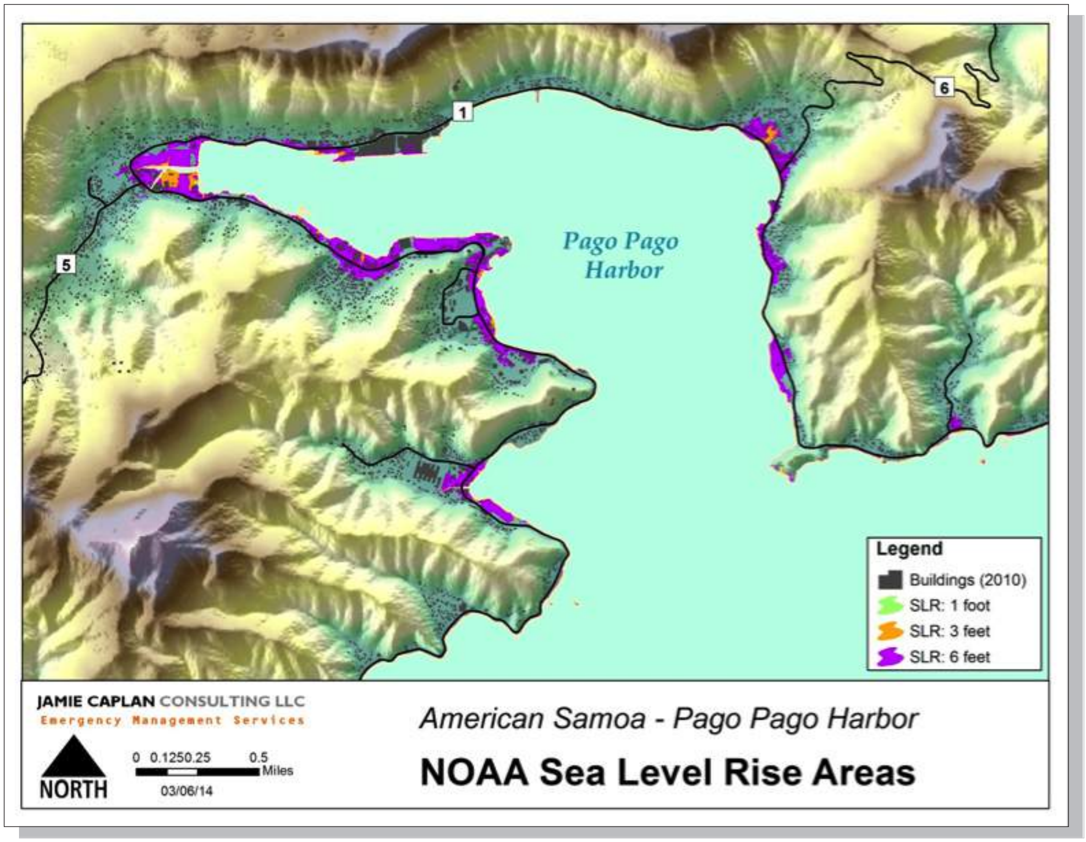

Figure 3 Pago Pago (Tutuila Island) Hypothetical Sea Level Rise Areas

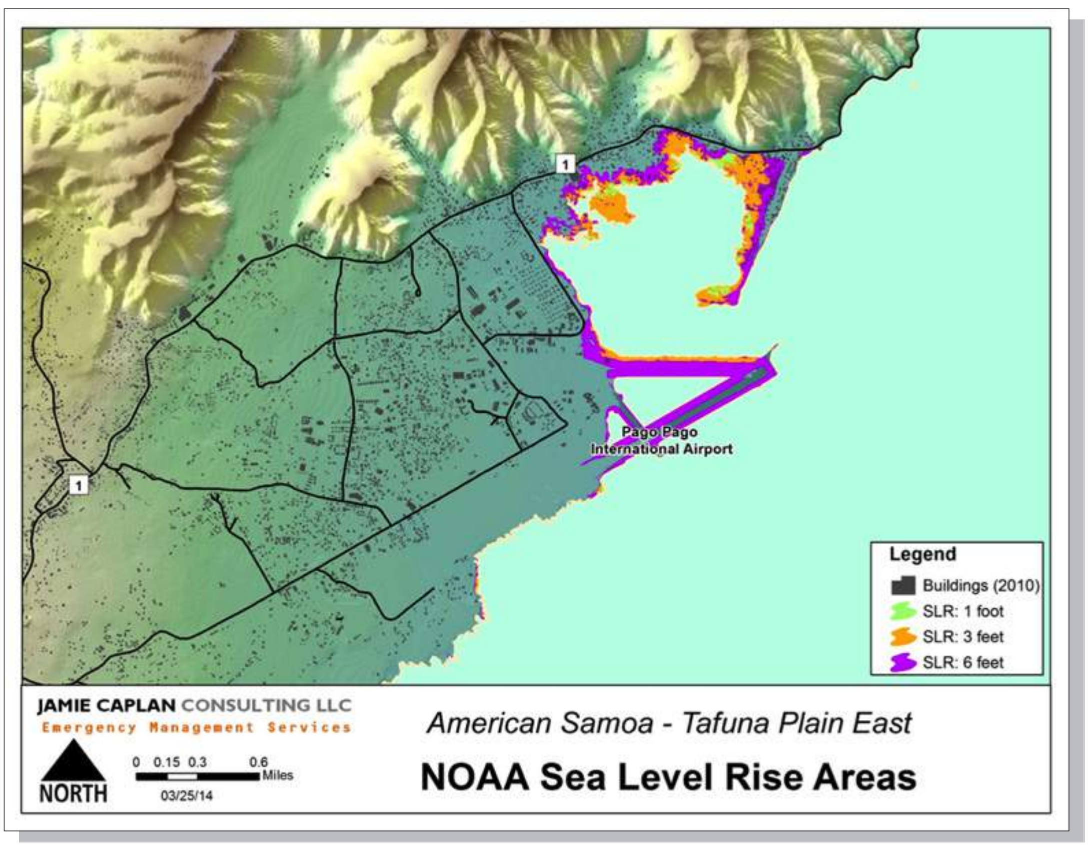

Figure 4 Tafuna Plain East (Tutuila Island) Hypothetical Sea Level Rise Areas

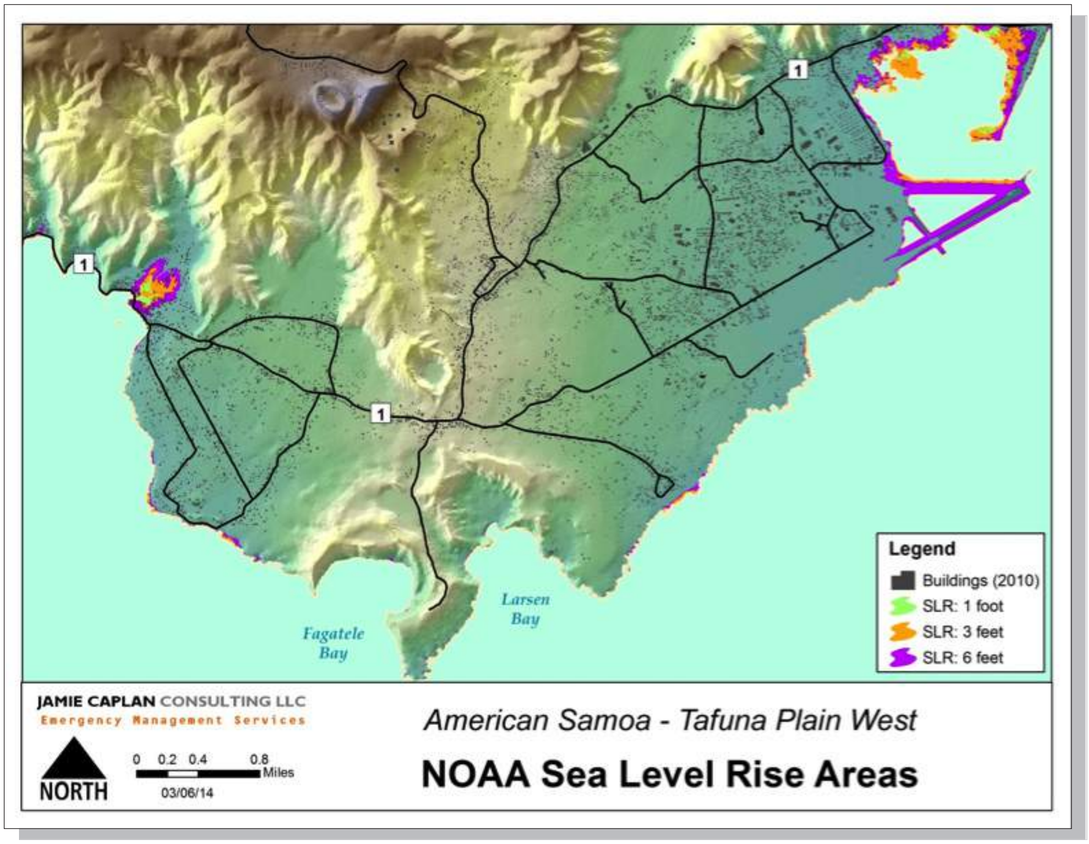

Figure 5 Tafuna Plain West (Tutuila Island) Hypothetical Sea Level Rise Areas

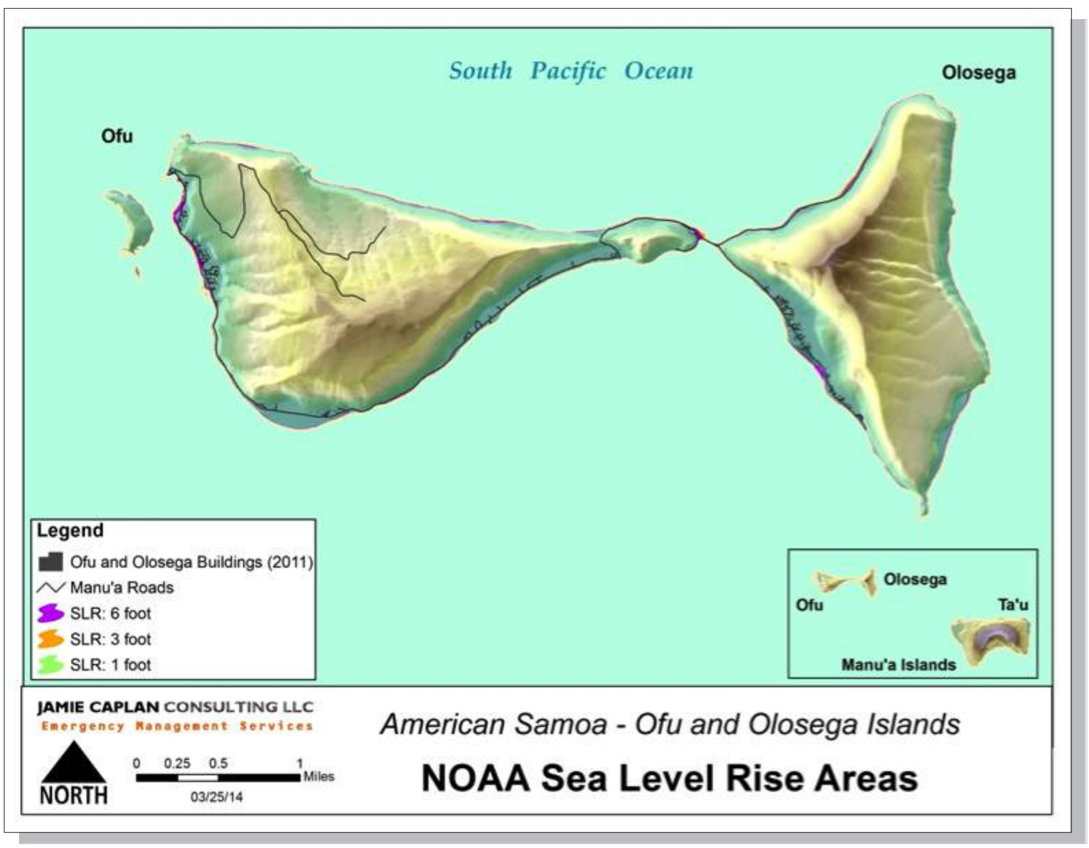

Figure 6 Ofu and Olosega Islands (Manu'a Group) Hypothetical Sea Level Rise Areas

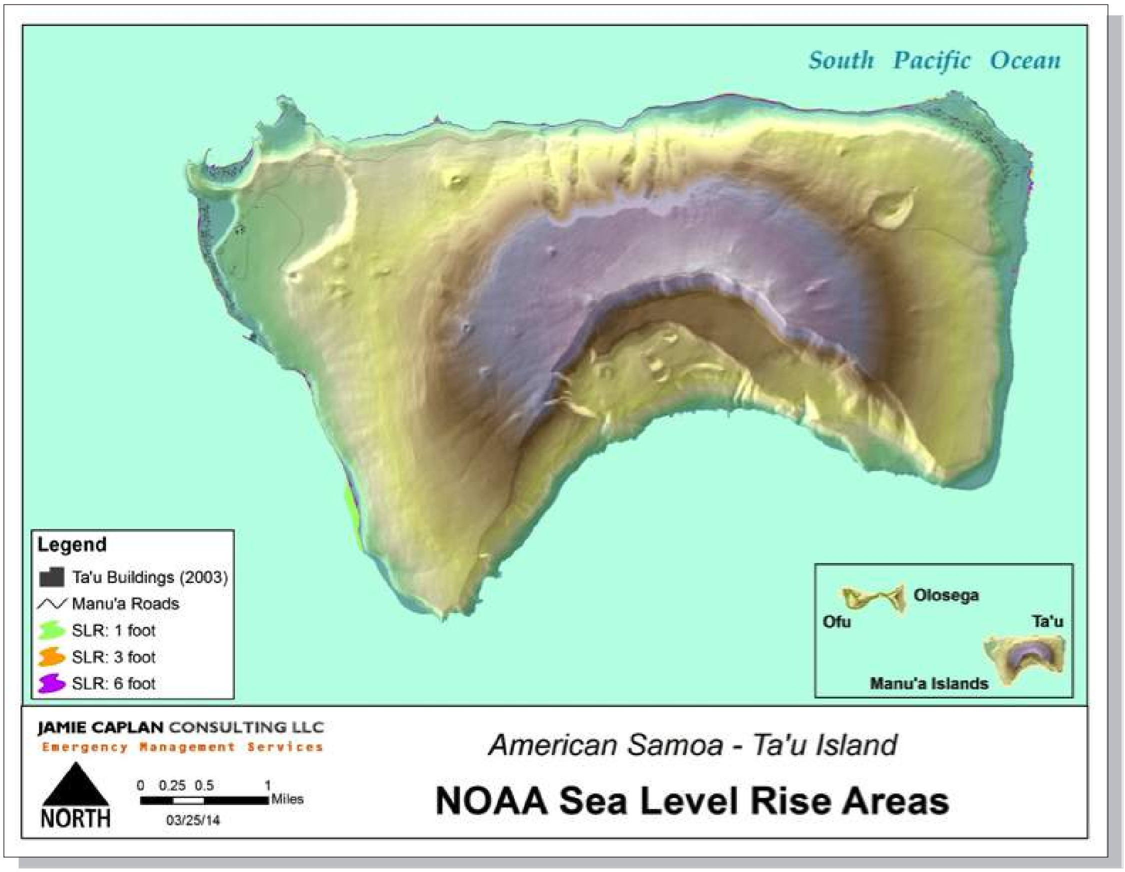

Figure 7 Ta'u Island (Manu'a Group) Hypothetical Sea Level Rise Areas

Previous Occurrences

Given that climate change is a relatively new phenomenon, limited data exists. However, the United States Geological Survey (USGS), National Ocean and Atmospheric Administration (NOAA), National Integrated Drought Information System (NIDIS) and ENSO cycle trends provide evidence of climate change in American Samoa.

The USGS conducted an assessment on sea level rise. Its data indicated a rate of sea level rise of 1.48 millimeters per year, which is equivalent to 0.49 feet in 100 years.[12] It found that the National Park of American Samoa falls within the very low vulnerability category based on the water elevation alone. However, a more detailed assessment by USGS, called the Coastal Vulnerability Index (CVI), shows varied risk along the shoreline of the National Park of American Samoa. The CVI combines wave, tide, and sea level rise estimates to provide insight into the relative potential of coastal change due to future sea level rise. Areas of vulnerability as a result of the CVI are shown in the vulnerability assessment.

12 Physical Process Variables: Coastal Vulnerability Assessment of National Park of American Samoa to Sea-Level Rise. (2005). USGS Science for a Changing World. Retrieved August 8, 2014 from http://pubs.usgs.gov/of/2005/1055/html/ppvariables.htm

NOAA has collected sea level rise data at the Pago Pago station since 1948. Data indicates that mean sea level is rising. NOAA estimates a trend of 2.07 millimeters per year (beginning in 1948), which is equivalent to 0.68 feet (0.21 meters) in 100 years.[13] A sharp increase was observed after 2010 perhaps due to the strong La Niña in 2010-2011. The rise has since declined but is still above the mean sea level rising trend line as shown in Figure 8.

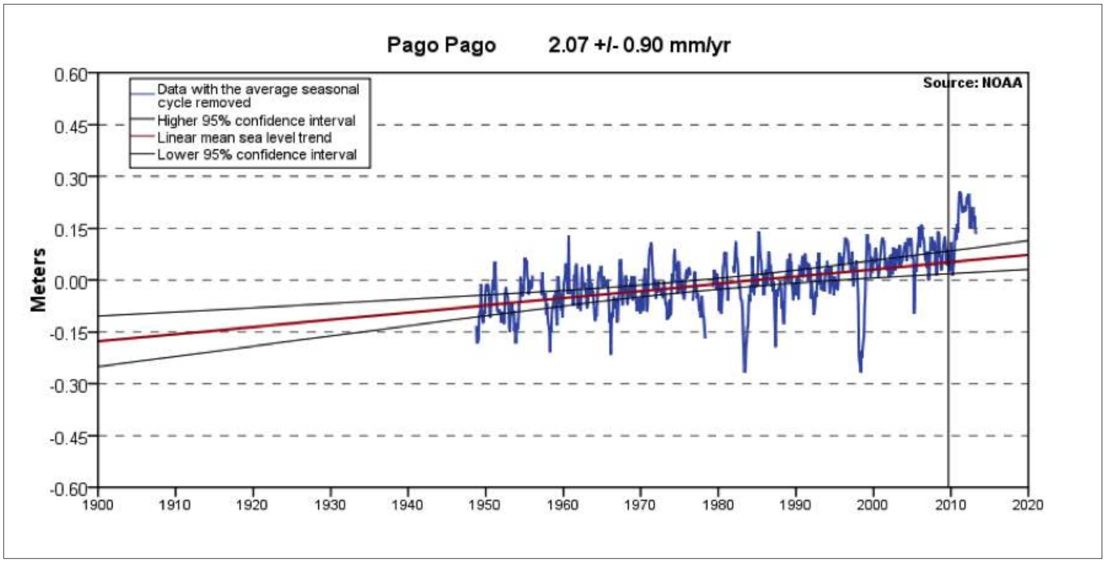

Figure 8 NOAA Annual Sea Level Rise Records

NIDIS began reporting sea level rise information in the Pacific Region, including American Samoa, in 2013. This does not show a complete assessment but may be a useful tool moving forward with mitigation plan updates. Available information from NIDIS is provided in Table 4 below.[14]

Table 4 NIDIS Sea Level Rise Information

Year	Quarter	American Samoa Reports
2013	1	Currently, all stations are 2 - 6 inches higher than normal.
2013	2	Information not available
2013	3	The monthly mean sea level in the 3rd quarter continued to show higher anomalies in most of the USAPI stations; all stations were 4 - 8 inches higher than normal. Persistently higher than average mean sea level continues to be observed across FSM and American Samoa. No significant impacts were noted
2013	4	The monthly mean sea level in the 4th quarter continued to show higher anomalies in most of the USAPI stations; all stations were 4 - 6 inches higher than normal.
2014	1	No significant impacts were reported this quarter for American Samoa.

As noted above, research is still emerging on the sea level rise hazard since it is relatively new. Although the information presented above from USGS, NOAA, and NIDIS differ in their estimated value, they all show a rising trend in mean sea level in American Samoa. In addition, climate change may also be linked to the El Niño and La Niña weather events.

13 Mean Sea Level Trend. NOAA Tides and Currents. Retrieved August 8, 2014 from http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=1770000

14 Climate Impacts and Outlooks. (2013). Hawaii and U.S. Pacific Island Regions. Retrieved August 8, 2014 from http://www.drought.gov/media/pgfiles/Pacific%20Region%20Q2%202013%20Climate%20Impacts%20and%20Outlook.pdf

El Niño

Sea level in American Samoa did not vary significantly from July, August, and September to October, November and December during the strong and moderate El Niño years.[15] The strong years (increase in temperatures over 1.5 degrees for at least 3 months) are: 1957, 1965, 1972, 1982, 1997, and 2009. The moderate years (temperature increase of 1-1.4 degrees for at least 3 months) are: 1951, 1963, 1968, 1986, 1987, 1991, 1994, 2002, and 2009. During July, August and September, these reverse and strong trade winds cause water to pile up in South America. As a result, the sea level in South Pacific Islands (e.g., American Samoa) remains unchanged. By January, February and March, the westerly winds strengthen and move to the center to south central region.

Due to the shift of trade winds, American Samoa experiences a sea level drop with a time lag of 3-6 months. Previous El Niño events in American Samoa have led to precipitation averages about 10 percent above normal.[16] During years that follow a strong El Niño, American Samoa typically experiences a period of prolonged dryness.

La Niña

Nearly all El Niño events are associated with a persistently negative (Southern Oscillation Index) SOI near -1.0 or lower. During La Niña, the SOI is persistently positive, near +1.0 or higher. Previous events have led to precipitation amounts that average close to 10 percent below normal. La Niña events are more likely to cause a decrease in sea levels. The strong 2010-2011 season caused a mean sea level drop of 5 millimeters.[17] Strong events (decrease in temperate over 1.5 degrees for over 3 months) were 1973, 1975, 1988, 1999, and 2010. Moderate years were 1955, 1970, 1998, and 2007.

Records from 1900 to 2014 indicate 32 El Niño events and 23 La Niña events as shown in Table 5 below.

Table 5 Previous El Niño and La Niña Years [18]

El Niño	La Niña
1900-1901	--
1902-1903	1903-1904
1905-1906	1906-1907
--	1908-1909
1911-1912	--
1914-1915	1916-1917
1918-1919	1920-1921
1923-1924	1924-1925
1925-1926	1928-1929
1930-1931	1931-1932
1932-1933	1938-1939
1940-1941	--
1941-1942	1942-1943

15 i) Weier, John. (2010). "Reverberations of the Pacific Warm Pool". Intute. Retrieved August 8, 2014 from http://www.intute.ac.uk/sciences/worldguide/html/805_articles.html
ii) Special Section: ENSO and Sea-Leavel Variability: Physical Mechanism. (2004). Pacific ENSO Update: Vol. 10, No. 4. Retrieved August 8, 2014 from http://www.soest.hawaii.edu/MET/Enso/peu/2004_4th/special_section.htm
iii) El Niño theme page. Retrieved August 8, 2014 from http://www.pmel.noaa.gov/tao/elnino/nino-home.html#

16 Rainfall Variations During ENSO. NOAA National Weather Service. Retrieved August 8, 2014 from http://www.prh.noaa.gov/peac/rain/am_samoa.php

17 La Niña caused global sea level drop. (2012). Phys Org. Retrieved August 8, 2014 from http://phys.org/news/2012-10-la-nina-global-sea.html

18 El Niño and La Niña. (2014). Storm Fax. Retrieved August 8, 2014 from http://www.stormfax.com/elnino.htm

El Niño	La Niña
1946-1947	1949-1950
1951-1952	--
1953-1954	1954-1955
1957-1958	--
1963-1964	1964-1965
1965-1966	--
1969-1970	1970-1971
1972-1973	1973-1974
--	1975-1976
1976-1977	--
1977-1978	--
1982-1983	--
1986-1987	1988-1989
1991-1992	--
1992-1993	--
1994-1995	1995-1996
1997-1998	1998-1999
--	2000-2001
2002-2003	--
2004-2005	--
--	Early 2006
2006-2007	--
--	2007-2008
2009	--
--	Late 2010 - early 2011

Extent

Extent of climate change can be measured in terms of level of sea level rise change per year. USGS and NOAA sources indicate between 1.48 and 2.07 millimeters (0.06 – 0.08 inches) per year, respectively. In addition, 2 out of 4 NIDIS reports in 2013 reported an increase in mean sea level rise at 2 to 6 inches above normal. Lastly, climate change extent can be measured in terms of strong El Niño or La Niña events, which occur when temperatures are 1.5 degrees higher or lower for three consecutive months, respectively.

Probability of Future Events

El Niño and La Niña typically occur about every 2 to 7 years. Sea level changes are occurring annually. The mean trend is increasing though in some years sea level in American Samoa has decreased. Based on information from the USGS and NOAA, sea level rise is estimated to be between 1.48 and 2.07 millimeters per year, respectively as measured over time. This is an estimated average of 0.59 feet (about 6 inches) per 100 years. An accurate statistical probably is difficult to quantify for climate change but can be quantified as likely, occurring between 10% and 90% annually.

Vulnerability Assessment

The American Samoa Government passed an executive order in 2007 to address climate change. Executive Order (EO) 0101A-2007 notes several impacts of climate change to American Samoa[19]:

- A loss of landmass and shoreline from an increase in sea level;
- An increase in food costs and dependence upon off-island food sources because of a projected decreases in local agricultural production due to the increase in temperature, loss of land mass and higher rate of pest infestation;
- Potential need for the relocation of the our population and the resulting loss of spiritual connection to the land our families have occupied for centuries;
- Coral reef loss due to increases in water temperature and depth; and
- An increase in mortality and economic losses from an increase in the number and strength of tropical storms and lack of reef protection.

In addition, the EO outlines several strategies to reduce the impact through direct actions. These include transitioning to hybrid vehicles to be purchased, using incandescent light bulbs, installing vapor recovery nozzles at fuel stations, purchasing energy star appliances, and banning importation of high phosphorous (11%+) detergents.

Impacts from climate changes are also anticipated in terms of greater severity and occurrence as follows:

- Greater severity:
    - o As water moves further inland due to sea level rise, more structures are at risk to flooding and impacts.
    - o Stakeholders describe rain events as much heavier in recent years.
- Increased hazard occurrence:
    - o Meetings with stakeholders indicated that hazards are occurring more frequently such as drought, tsunami, and cyclones.
    - o In addition, stakeholders noted a change in rain events. Previous rain events would cover the entire island. Now it is common for a rain event to occur in small areas.

In addition, the USGS indicates areas of vulnerability via the Relative Coastal Vulnerability Assessment shown in Figure 9. It is specific to areas around the American Samoa National Park. The Coastal Vulnerability Index provides insight into the relative potential of coastal change due to future sea-level rise. The maps can be viewed as an indication of where physical changes are most likely to occur as sea level rises.

19 Executive Order No.010A. (2007). Office of the Governor: Pago Pago, American Samoa. Retrieved August 8, 2014 from http://www.epa.as.gov/sites/default/files/documents/climate_change/2007climatechangeeo.pdf

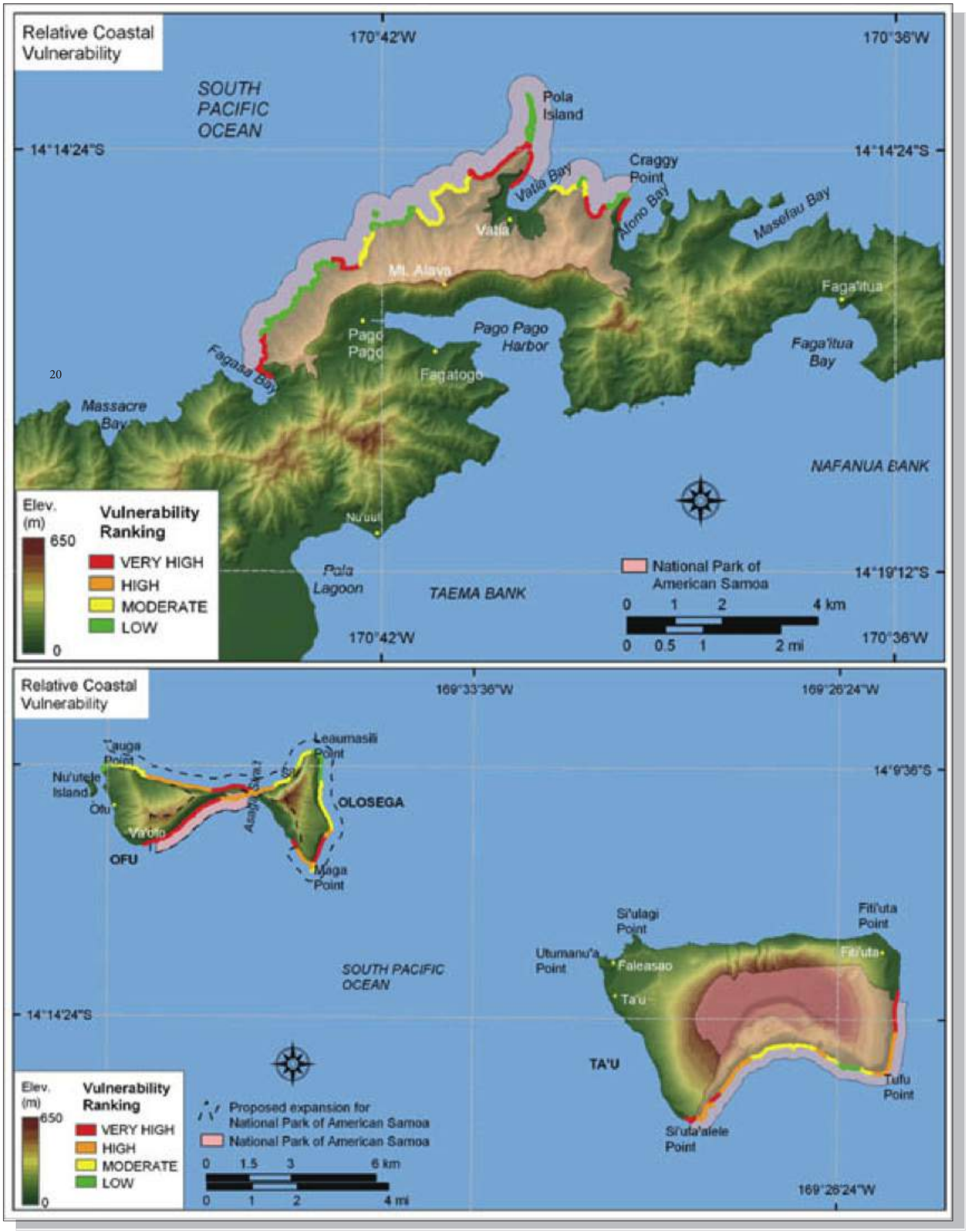

Figure 9 NOAA CVI Future Sea Level Rise Vulnerability [20]

20 Pendleton, Elizabeth, Robert Thieler, and Jeffress Williams. (2005). "Relative Coastal Vulnerability Assessment of National Park of American Samoa (NPSA) to Sea-Level Rise. Retrieved August 8, 2014 from http://woodshole.er.usgs.gov/project-pages/nps-cvi/parks/npsa.htm

Potential Losses

There is an inherent risk of building in or near floodplains. Continued flooding is likely and sea level rise will flood areas further inland. In order to better define risk in American Samoa, areas of hypothetical sea level rise (SLR) data were also investigated using GIS intersect analysis to determine the number and type of building at risk to sea level rise. This analysis was also used for critical facilities. Sea Level Rise areas of 1-foot and 3-feet were used with data provided by NOAA. The results are summarized in Table 6 below.

Table 6 Buildings Potentially At Risk to Sea Level Rise

Country (District)	Total Number of Buildings	Total Number of Buildings in the 1-foot SI.R area	Type	Total of Buildings in the 3-feet SLR area	Type
TUTUILA ISLAND					
East Vaifanua (East District)	497	0	--	6	6 residential
Ituau (East District)	1,075	3	1 commercial	61	1,402
Lealataua (East District)	2,026	3	3 residential	36	36 residential
Leasina (West District)	474	0	--	0	--
Maoputasi (East District)	2,246	0	--	0	--
Saole (East District)	543	0	--	2	2 residential
Sua (East District)	938	0	-	0	--
Tualatai (West District)	903	0	--	0	--
Tualata (West District)	7,441	0	--	1	1 residential
West Vaifanua (East District)	172	0	--	5	5 residential
Tutuila Island Total	16,315	16	--	141	--
AUNU'U ISLAND					
Saole (East District)	179	0	--	0	--
Aunu'u Island Total	179	0	--	0	--
MANU'A ISLANDS					
TA'U					
Faleasao (Manu'a District)	18	0	--	0	--
Fitiuta (Manu'a District)	180	0	--	0	--
Tau (Manu'a District)	208	0	--	1	1 fale
Ta'u Island Total	469	0	--	1	--

OFU ISLAND					
Ofu (Manu'a District)	133	1	unknown	2	unknown
Ofu Island Total	133	1	--	2	--
OLOSEGA ISLAND					
Olosega (Manu'a District)	101	--	--	--	--
Olosega Island Total	101	--	--	--	--
TOTAL	**17,018**	**16**	**--**	**141**	**--**

The analysis indicates that Maoputasi County has the greatest number of buildings at risk to sea level rise. The county is densely developed along the coast and Pago Pago resides here, adding to the vulnerability.
A critical facility analysis was also performed using available data. The results indicated that one critical facility, the KKHJ Radio Station, is potentially in the 1-foot SLR risk area in Tutuila. In addition, five critical facilities were reported as in the 3-feet SLR area in Tutuila: Masefau Elementary School (3 structures valued at a combined $675,000), District Court Building ($54,000) and the KKHJ Radio Station. These structures have an approximate combined value of $730,000. No critical facilities were determined to be in the 1-foot or 3-feet SRL area in Ta'u. These structures are highlighted in Table 7, Figure 10, and Figure 11. In addition, assembly areas, safe zones, tsunami sirens, and ASTCA communication infrastructure were analyzed for vulnerability. The results are reported below.

Table 7 Number of Critical Facilities (CFs) in the SLR Hazard Area

Location	Total Number of Buildings	Total Number of CF in the 1-foot SLR area	Value	Total Number of Buildings in the 3-feet SLR area	Value
Tutuila Island CFs	240	1	N/A	5	$730,000
Ta'u Island CFs	42	0	--	0	--

- Assembly areas
  - No assembly areas were found to intersect the 1-foot or 3-feet SLR areas.

- Safe Zones
  - All four safe zone areas in Tutuila intersect with the 1-foot and 3-feet SLR areas.

- Tsunami Sirens
  - Two sirens were located in the 3 -feet SRL area: number 4 (Maoputasi County) and number 19 (Sua County). These structures, mostly new and made of metal, are largely fortified from flood. However, frequent flooding may compromise their foundation.

- ASTCA Infrastructure
  - No ASTCA infrastructure was found to be located in the SLR areas.

A complete listing of critical facilities and associated information (such as assembly areas, safe zones, and tsunami sirens) can be found in Appendix D.

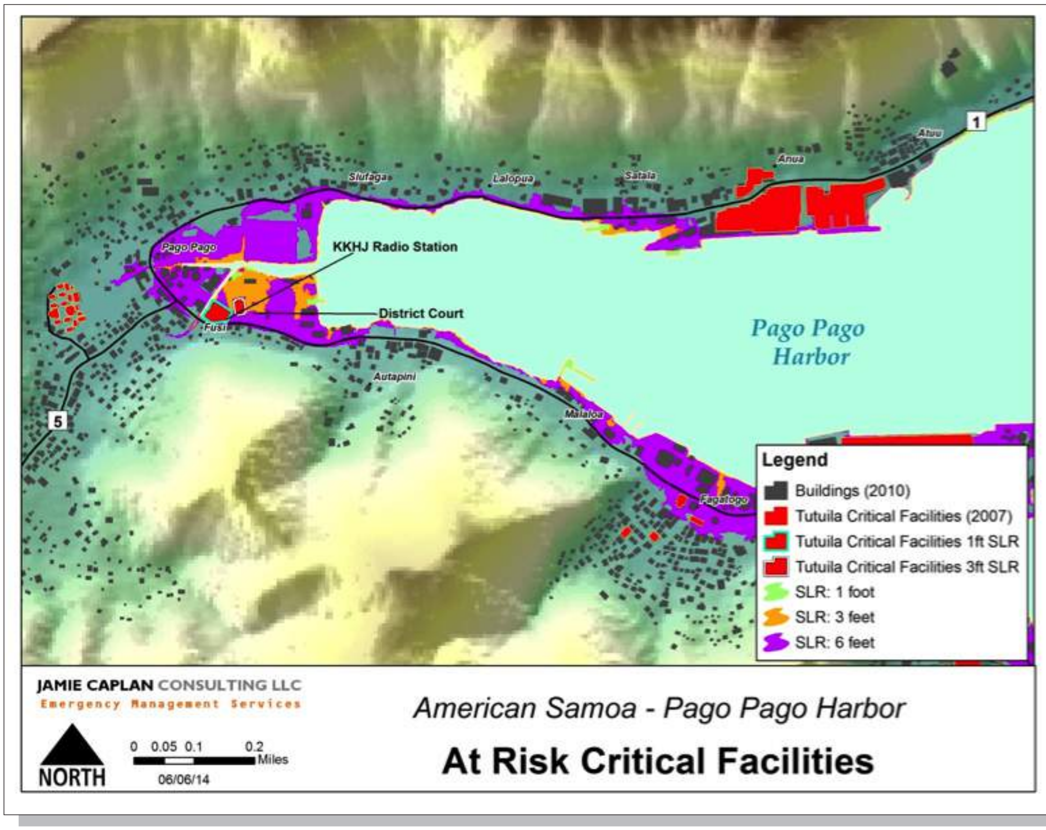

Figure 10 Critical Facilities Potentially at Risk to Sea Level Rise (Greater Pago Pago)

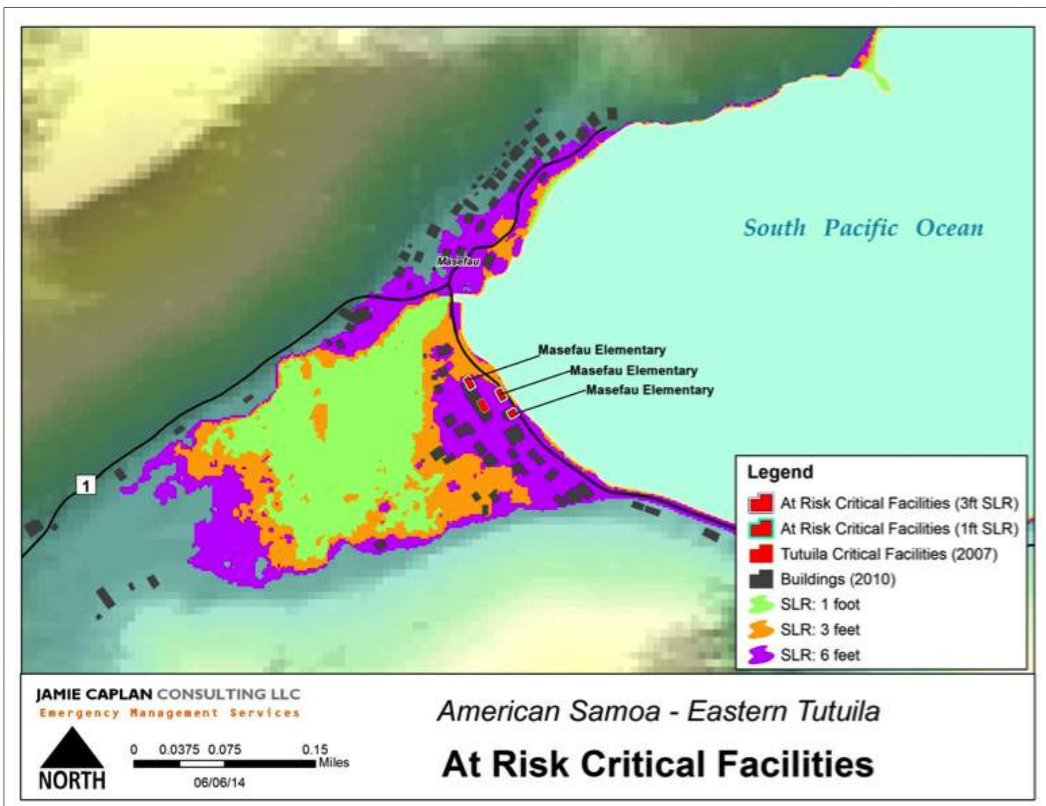

Figure 11 Critical Facilities Potentially At Risk to Sea Level Rise (Eastern Tutuila)

Coastal Erosion

Description

According to the USGS, erosion is the process whereby materials of the earth's crust are loosened, dissolved, or worn away and simultaneously moved from one place to another. Waves, wind and currents all work to erode coastlines. Further, erosion can be exacerbated by human activity such as development that may cause premature degradation of shoreline, disruption of vegetative materials holding the soils in place, or excessive runoff, which washes the shore away. This is evident in American Samoa, which does not have many wide beaches. Opposite to erosion, a natural accretion process occurs, when deposits of sediment are added to the shoreline. When the erosion process exceeds the accretion process, beaches shrink horizontally. Given these two competing processes, the amount of erosion varies over time.

Coastal erosion is a slow onset hazard, meaning that very small changes occur over time and impacts may not be felt immediately. In other words, erosion today may not be creating any damages to structures. However, as erosion becomes severe enough to impact properties, it may be too late to mitigate the issue.

Often, however, mitigation measures can be put in place to lessen the impact and speed of erosion. For example, an interlocking concrete system known as "Samoa Stone" was used in the village of Vatia on the northern coast of Tutuila. The interlocking mechanism makes it very stable against wave action. In addition, coral reef serves as a natural barrier to erosion by softening the intensity of wave actions and run-up. American Samoa's Crown-of-thorns starfish (COTS) outbreaks, hurricanes, and mass coral bleaching episodes had caused declines in hard coral cover, but coral reefs now show good recovery.

Figure 12 Samoa Stone in Vatia [21]

21 Photo by Rommel S. Dorado. Google Maps Imagery.

Shoreline erosion is of particular concern in American Samoa and has been since at least since World War II. There is limited flat land, and most of that is in the form of narrow coastal plains at the base of steep mountains. As a result, almost all villages are built along the coast, close to, or impinging upon, the shoreline. While this is common throughout the islands, Figure 13 below shows imagery of Vatia Village along the coast. The connecting roads parallel the shoreline, often at the seaward edge of the backshore berm.

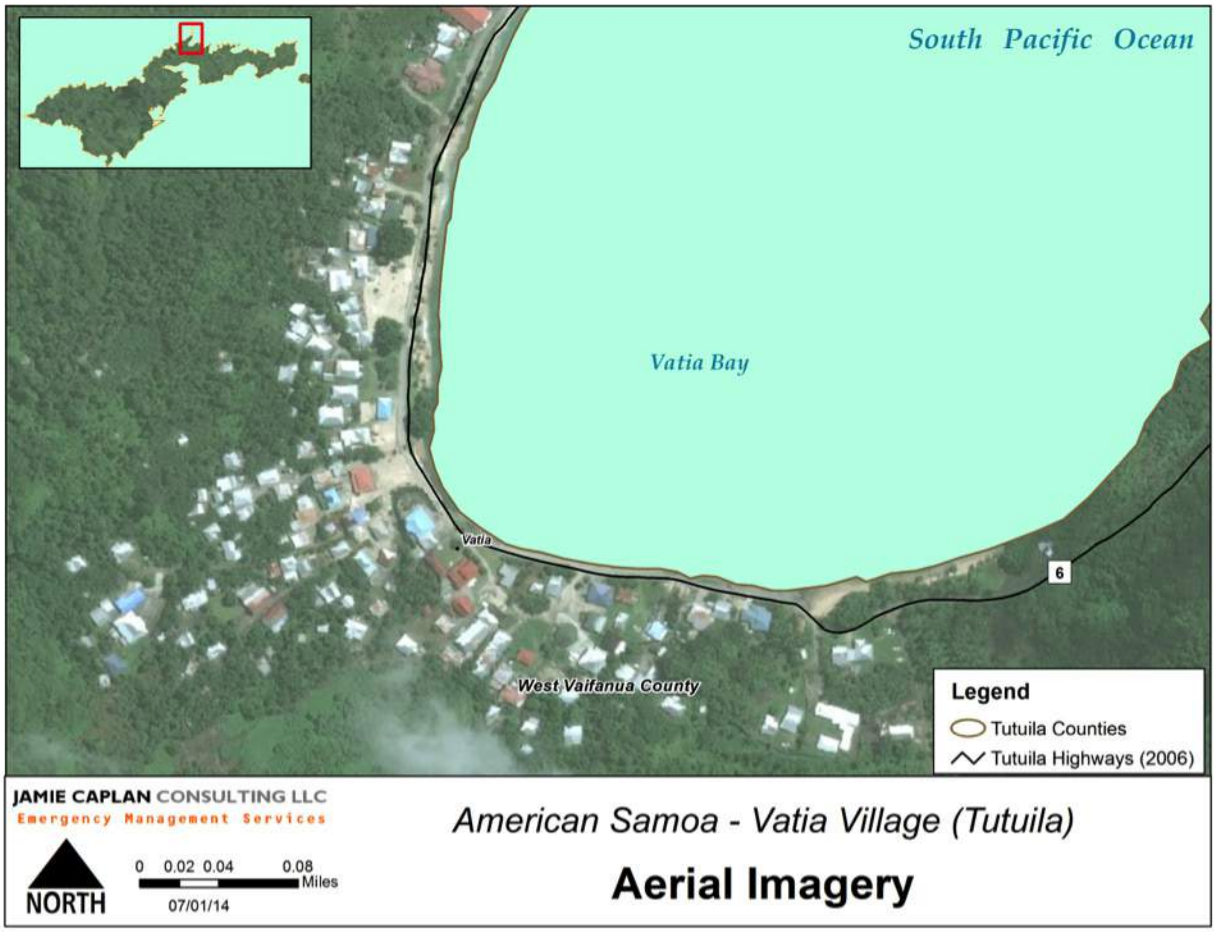

Figure 13 Typical Building Proximity to the Coast (Vatia Village)

Until recently, limited regulatory practices were in place to control sediment and erosion. In 2011, "The American Samoa Erosion and Sediment Control Field Guide was developed for contractors and site inspectors." A consultant prepared it for the American Samoa Environmental Protection Agency (ASEPA) and the American Samoa Coastal Zone Management Program. This guide ensures compliance with the USEPA National Pollutant Discharge Eliminations System (under the Clean Water Act), the American Samoa Water Quality Standards (ASAC 24.02), and the American Samoa Coastal Management Program (ASAC 26.02). This guidance helps to limit erosion from man-made causes.

Location

There are approximately 120 miles of shorelines across the 7 islands of American Samoa. All coastal areas in American Samoa are subject to coastal erosion. Although erosion is a natural process, severe weather events, such as storm surge and hurricanes, as well as human development, may exacerbate the process.
In 2004, the Coastal Engineers of the U.S. Army Corps of Engineers, Honolulu District, conducted a shoreline study for Tutuila and Aunu'u Islands. It classified American Samoa shorelines into several erosion and shoreline protection categories:

Shoreline Erosion Status
- Critical: Highly susceptible to erosion
- Potentially Critical: Moderately susceptible to erosion
- Non-critical: Low susceptibility to erosion

Shoreline Protection Type
- Engineered: Professionally installed seawall or other man-made protection
- Marginal: Slight modification but not professionally constructed
- None: No protection

Table 8 below indicates the amount of critical areas in American Samoa on Tutuila and Aunu'u Islands. The following maps (Figure 14 through Figure 17) show shoreline erosion and protection areas. Unfortunately this data was not available for the Manu'a Group or atolls. The shorelines with the greatest need of protection would be the Critical (red) and Potentially Critical (orange) with no protection (white). As noted above, it is common for development to be in very close proximity to the shorelines (as depicted in Figure 13 on page 29). This makes areas of critical shoreline of particular concern. In many cases, development is just a few meters from the coast. Therefore, minimal erosion could lead to great losses for coastal villages in American Samoa.

Table 8 Amount of Critical Shoreline on Tutuila and Aunu'u Islands

County	Approx. Measured Shoreline (miles)[22]	Critical Shoreline (miles)	Percent Critical Shoreline
TUTUILA ISLAND			
East Vaifanua (East District)	3.39	0.20	6%
Ituau (East District)	3.42	0.78	23%
Lealataua (West District)	5.69	0.92	16%
Leasina (West District)	N/A	N/A	N/A
Maoputasi (East District)	7.42	0.65	9%
Saole* (East District)	4.40	0.63	14%
Sua (East District)	6.70	1.99	30%
Tualatai (West District)	1.29	0.11	9%
Tualata** (West District)	1.35	0	0%
West Vaifanua (East District)	1.40	0.19	14%
TOTAL	**31.23**	**8.94**	**29%**

**No areas of critical shoreline reported in Aunu'u*

***Tualauta County includes the area around the Pago Pago Airport, which is an area of non-critical erosion status.*

22 Total shoreline value was not available. The total shoreline was not measured for each county in the USACE study.

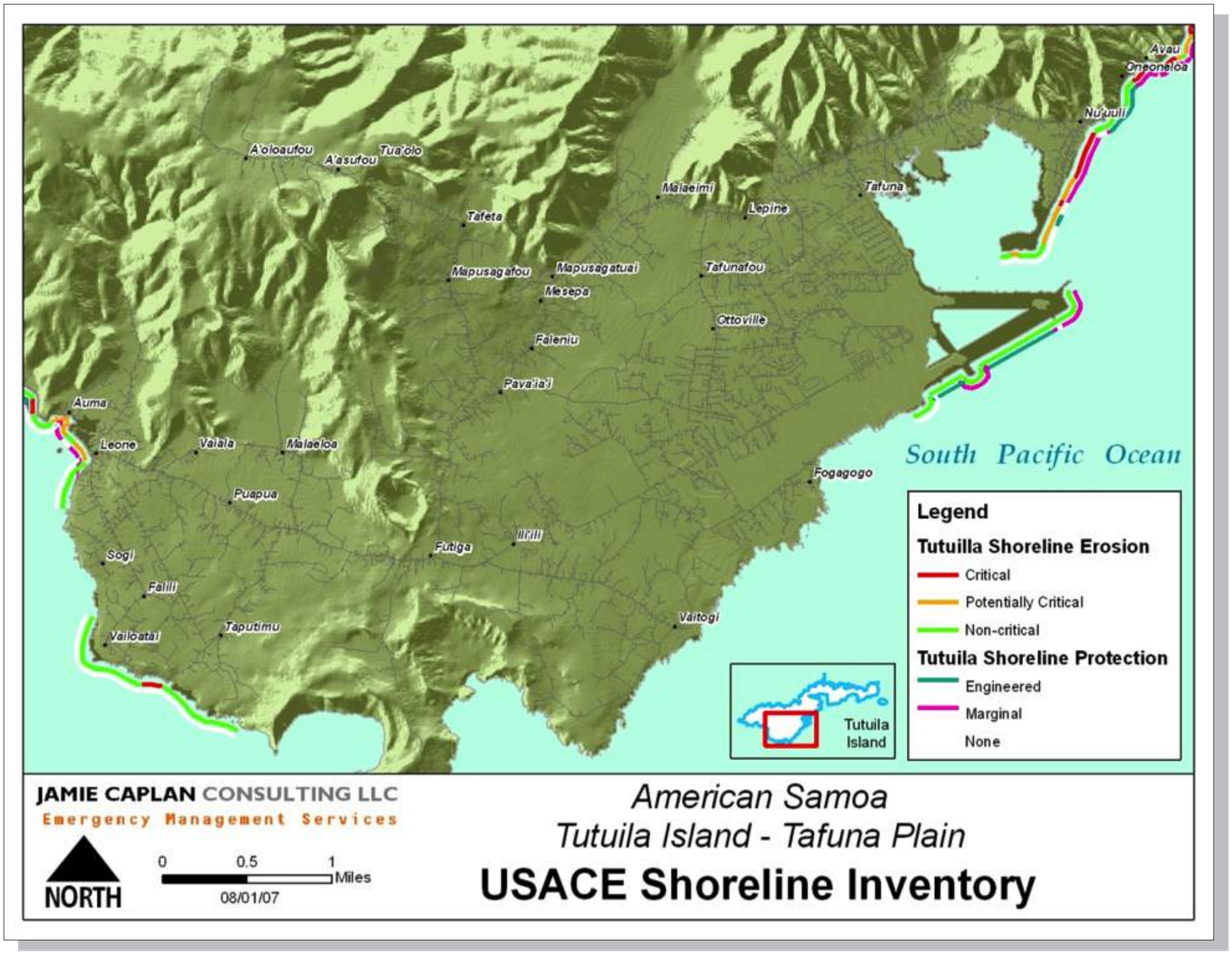

Figure 14 Tutuila Island – Tafuna Plain, USACE Shoreline Inventory

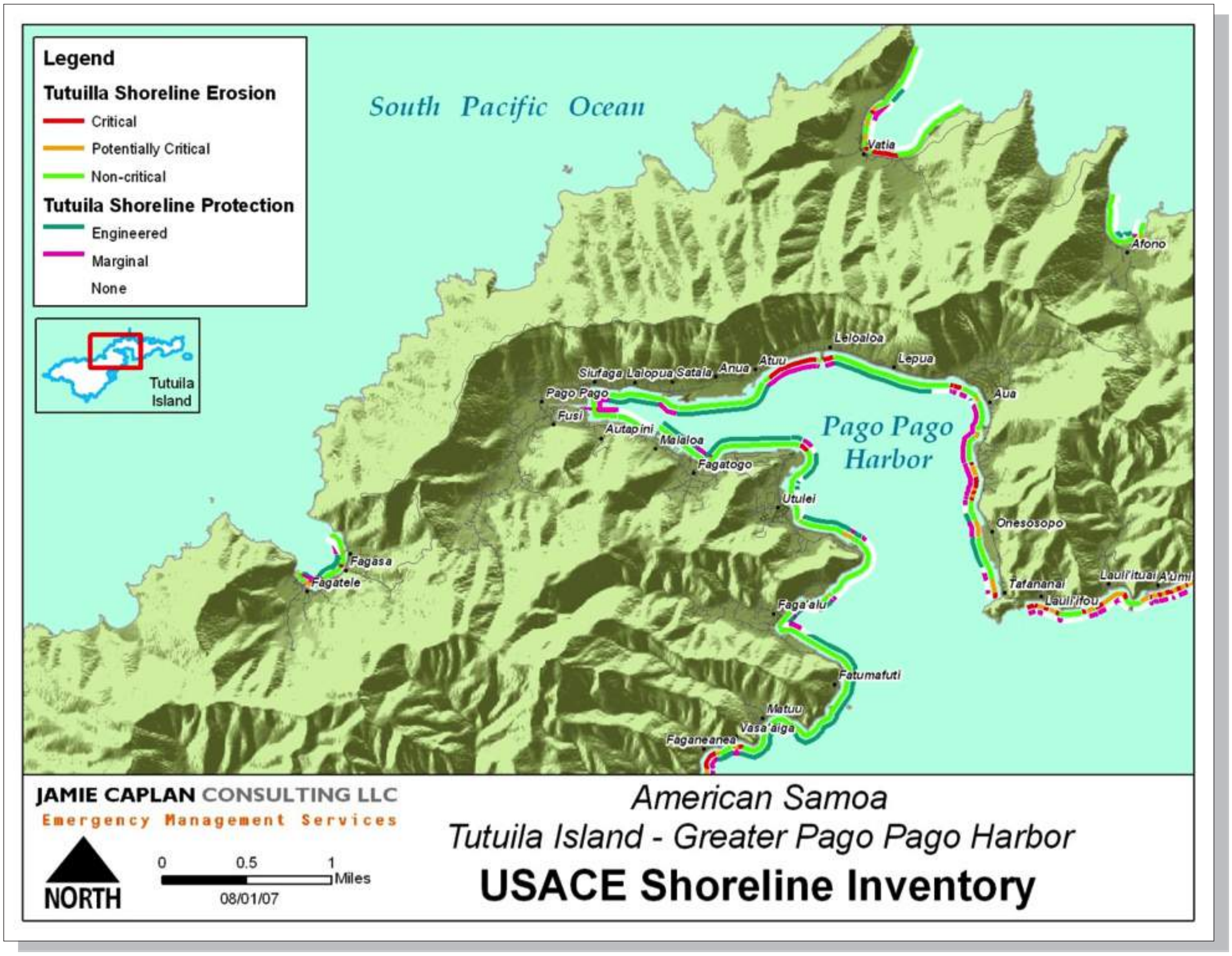

Figure 15 Tutuila Island – Greater Pago Pago Harbor, USACE Shoreline Inventory

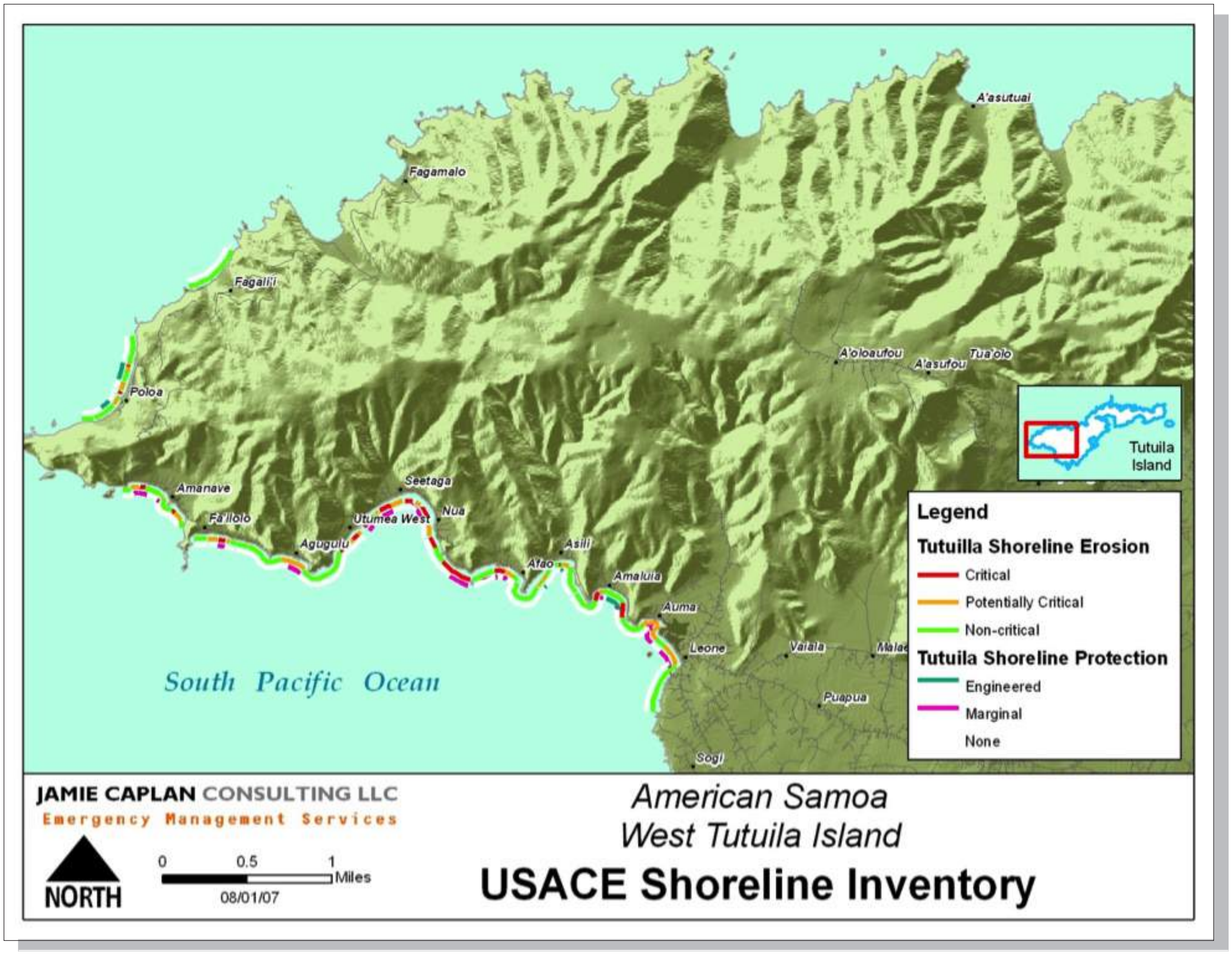

Figure 16 West Tutuila Island, USACE Shoreline Inventory

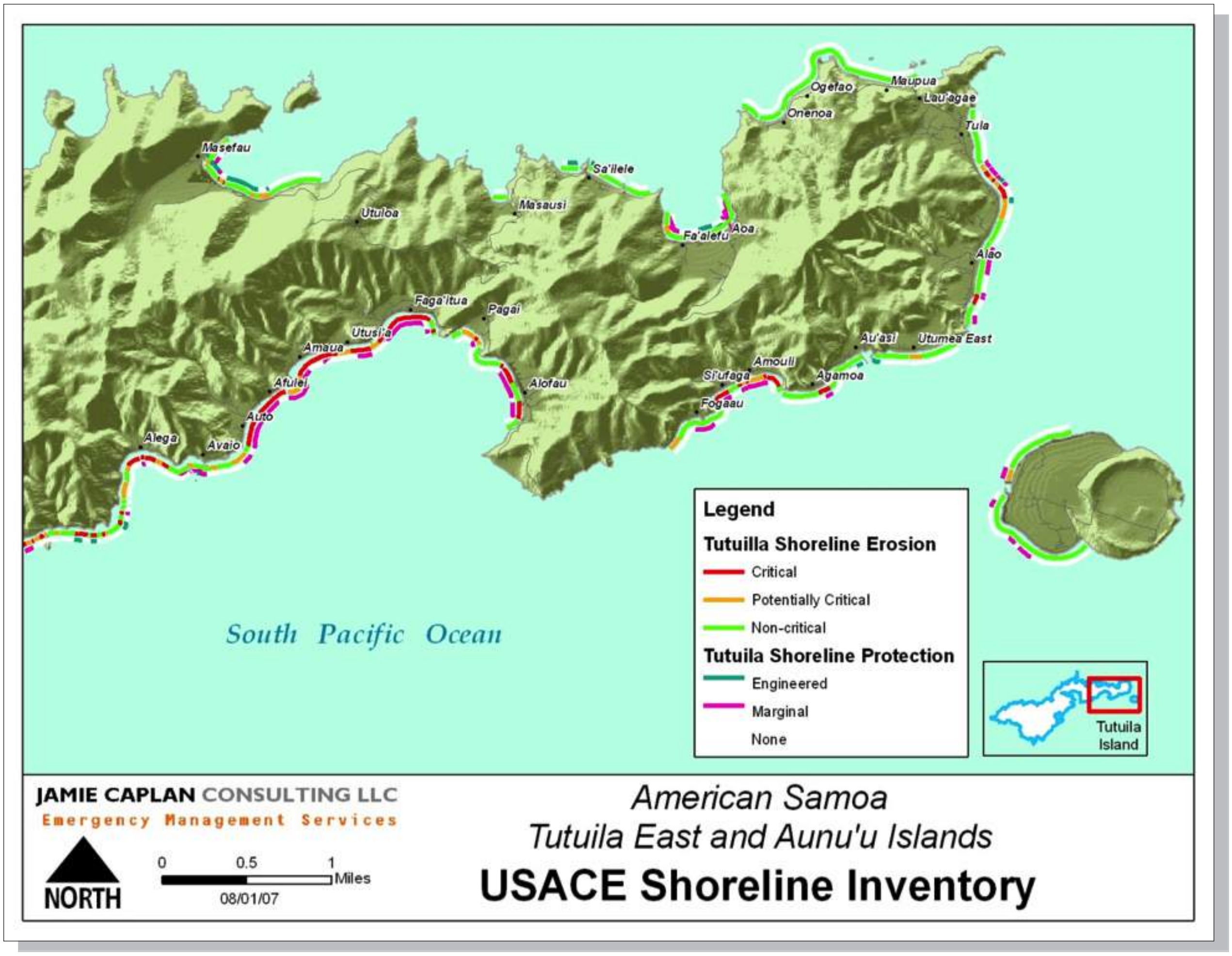

Figure 17 Tutuila East and Aunu'u Island, USACE Shoreline Inventory

Previous Occurrences

NOAA's National Climatic Data Center reported one erosion event in May 2000: A high surf event combined with high tide led to beach erosion in low lying areas along the main road. Washed up debris, sand and rocks resulted in roadblocks. Estimated damage was $100,000.

In addition, the 2009 tsunami caused extension erosion damage. Information was gathered from the Geer Association.[23] Figure 18 below shows wave induced bluff erosion from the Tsunami in Aufaga. Beach erosion and sediment displacement were observed in Alao, Poloa, Amanave, Asili, and Leone. Along with the erosion from the tsunami, also came the uprooting of vegetation. Vegetation helps to stabilize the coast, so loss of vegetation can further exacerbate erosion.

Despite just one found reported event, Coastal erosion in American Samoa is a regular occurrence given the volcanic composition of the island. Coastal erosion is a slow onset hazard, meaning that very small changes over time may eventually result in large problems.

Figure 18 Bluff Erosion in American Samoa

Extent

Using the USACE study and terminology, critical areas (those highly susceptible to erosion) can be used to represent greatest extent. Such areas are currently present including at least nine miles on Tutuila Island. The entire shoreline could be subject to this status of erosion. Erosion does occur gradually and varies over time. Erosion put all current and future structures along the coast at risk to falling into the ocean. In addition, the beaches themselves are at risk to decreasing in horizontal area, reducing the width of the beach (sandy or rocky areas separating the water from inland areas).

23 Geo-Hazards. (2009). Geotechnical Extreme Events Reconnaissance. Retrieved August 8, 2014 from http://www.geerassociation.org/GEER_Post%20EQ%20Reports/American%20Samoa_2009/AmSamoa09_Ch05.html

Probability of Future Events

Given the limited reported erosion occurrences, a numerical statistical probability is difficult to calculate. However, the volcanic composition of the island and location in the South Pacific Ocean make regular and future erosion a certain occurrence. Therefore, the future probability was indicated as highly likely, greater than 90 percent annual probability.

Vulnerability Assessment

As erosion continues along the shoreline, impacts to structures and beaches can be expected.
Figure 19 below shows an actual example of coastal erosion in American Samoa (photo taken on 2014 site visit; structure likely impacted by tsunami).

Figure 19 Severely Eroded Shoreline in the Village of Leone (Tutuila Island)

Potential Losses

Areas of critical erosion were analyzed to determine the vulnerability of existing structures using GIS intersect analysis to determine the number and type of building at risk to erosion. Initially, no buildings or critical facilities or associated structures were found to be in an area of critical erosion. This is because the data only portrays critical areas along a narrow shoreline. In order to demonstrate buildings of greatest risk, a 0.1 mile buffer was applied to critical shorelines. As a result, the areas in the buffer zone can be considered most at risk to erosion. However, it should be noted that other areas at risk to erosion and may be experiencing erosion as shown by potentially critical areas in the maps above. Further, other areas, such as Leone (figure 19) may be experiencing coastal erosion due to recent coastal storms.[24]

Continued erosion and associated sea level rise are likely to threaten many buildings along the coastline.
A GIS intersect analysis was used to determine the number and types of buildings most at risk to coastal erosion. The results are summarized in Table 9.

24 The USACE Erosion data is current as of 2004. This was the best and most current data available for the planning area.

Table 9 Buildings Potentially At Risk to Coastal Erosion

County (District)	Total Number of Buildings	Total Number of Buildings in Critical Erosion Areas	Percent of Buildings at risk	Type
TUTUILA ISLAND				
East Vaifanua (East District)	497	31	6%	31 residential
Ituau (East District)	1,075	125	12%	1 business 1 commercial 123 residential
Lealataua (West District)	2,026	297	15%	4 church 293 residential
Leasina (West District)	474	0	--	--
Maoputasi (East District)	2,246	154	7%	1 Tedi 2 commercial 5 government 146 residential
Saole* (East District)	364	130	24%	1 business 129 residential
Sua (East District)	938	285	30%	2 business 2 commercial 4 church 15 residential
Tualatai (West District)	903	2	0%	2 residential
Tualata (West District)	7,441	0	--	--
West Vaifanua (East District)	172	87	51%	87 residential
TOTAL	**16,136**	**1,111**	**7&**	--

**All at risk buildings located on Tutuila Island. There are no areas of critical erosion identified on Aunu'u Island (Saole County). There is no data available for the Manu'a District.*

The analysis indicates Sua County has the highest percentage of buildings at risk. Sua is located in eastern Tutuila and has coastline on the north and south coastlines of the island. Given the exposure to the ocean on both sides, it is understandable why there is a high risk to coastal erosion. The analysis also indicates that Lealataua, Sua and Saole have the highest number of buildings at risk. All of these counties have significant shoreline and development along them.

A critical facility analysis was also performed using available data. The results indicated 25 critical facilities were located in the areas most at risk to coastal erosion. These structures have an approximate combined value of $13.7 million. These structures are highlighted in Table 10 and Figure 20. In addition, assembly areas, safe zones, tsunami sirens, and ASTCA communication infrastructure were analyzed for vulnerability. The results are reported below.

Table 10 Number of Critical Facilities (CFs) at Risk to Coastal Erosion

Location	Total Number of CFs	Total Number of CFs Most at Risk Coastal Erosion	Value
Tutuila Island CFs	240	25	$13,724,000
Ta'u Island CFs	42	N/A	--

Assembly areas

o Five assembly areas were found to intersect the areas at greatest risk to coastal erosion.

Safe Zones

o No safe zone areas in Tutuila intersect with the areas at greatest risk to coastal erosion.

Tsunami Sirens

o Fifteen sirens were found to intersect the areas at greatest risk to coastal erosion. These structures, mostly new and made of metal, are largely fortified from flood. However, frequent flooding may compromise their foundation.

ASTCA Infrastructure

o Five ASTCA infrastructure sites were found to be located in the areas at greatest risk to coastal erosion.

In addition to analyzed structures, there are several World War II Pill Boxes along the shorelines. There was no associated GIS data for their location, however. They are made of concrete so are somewhat resistant to erosion forces but often seem to have shifted from their original placement. Since many are several feet into the water and appear to be shifting due to erosion, these structures should be considered at risk to future erosion impacts.

A complete listing of critical facilities and associated information (such as assembly areas, safe zones, and tsunami sirens) can be found in Appendix D.

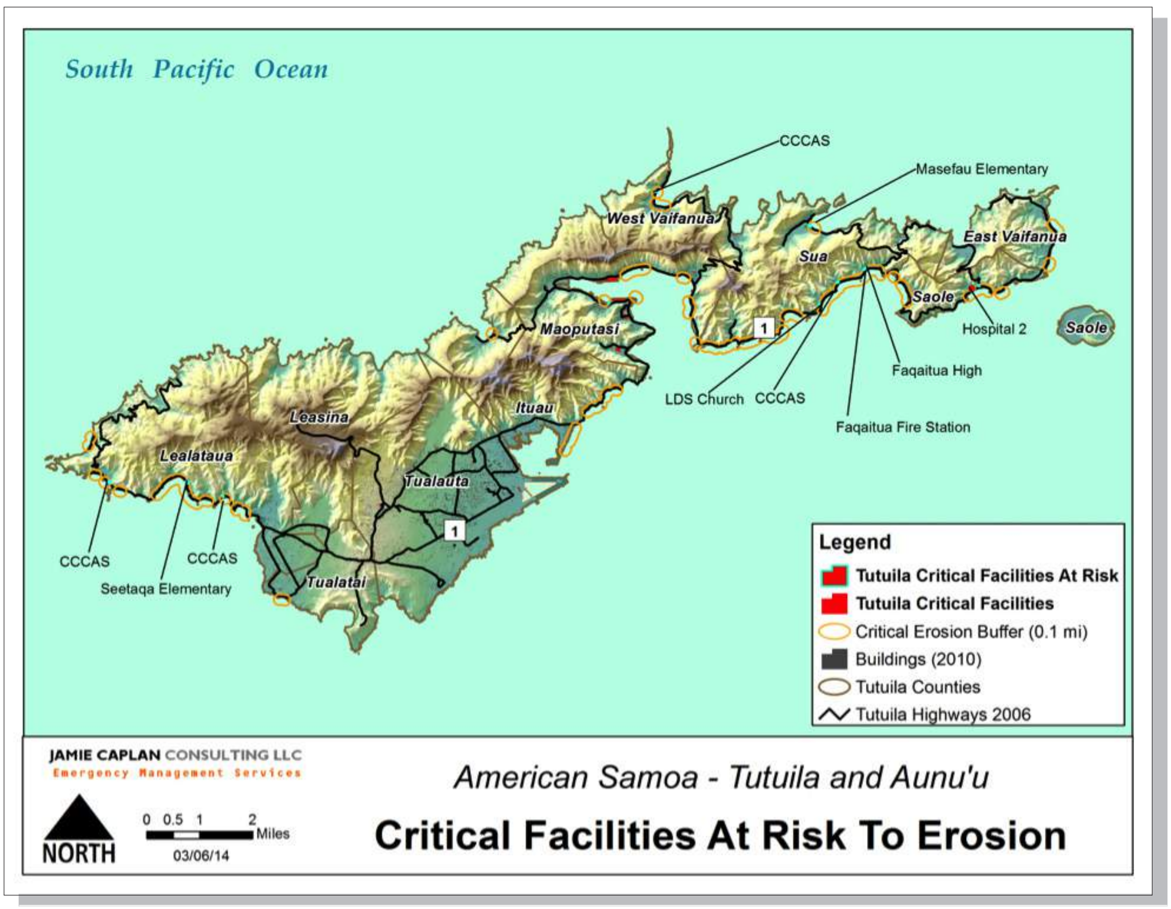

Figure 20 Critical Facilities at Greatest Risk to Coastal Erosion

Drought

Description

Although sometimes considered a rare and random event, drought is a normal, recurrent feature of climate. Drought is a temporary aberration and differs from aridity, as the latter is restricted to low rainfall regions and is a permanent feature of climate. Other climatic factors such as high temperatures, high wind, and low relative humidity are often associated with drought in many regions, including the Pacific Basin. Drought occurs in virtually all-climatic zones, varying significantly from one region to another, and can be defined according to meteorological, hydrological, or agricultural criteria. Drought is typically categorized in three types as shown in Table 11 below:

Table 11 Drought Types

Drought Type	Description
Meteorological Drought	Meteorological drought is usually based on long-term precipitation departures from normal, but there is no consensus regarding the threshold of the deficit or the minimum duration of the lack of precipitation that makes a dry spell an official drought.
Hydrological Drought	Hydrological drought refers to deficiencies in surface and subsurface water supplies. It is measured as stream flow, and as lake, reservoir, and ground water levels.
Agricultural Drought	Agricultural drought occurs when there is insufficient soil moisture to meet the needs of a particular crop at a particular time. A deficit of rainfall over cropped areas during critical periods of the growth cycle can result in destroyed or underdeveloped crops with greatly depleted yields. Agricultural drought is typically evident after meteorological drought but before a hydrological drought.

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event and the demand people place on water supply. Recent droughts in both developing and developed countries, and the resulting economic and environmental impacts and personal hardships, have underscored the vulnerability of all societies to this "natural" hazard. Human activities often exacerbate the impact of drought. For example, water use can deplete ground water supply.

According to NOAA, precipitation totals below eight inches of the normal median amount are considered a critical threshold in the Pacific Islands.[25] The U.S. Drought Monitor, also records drought in the U.S. and categorizes drought into five categories as shown in Table 12. Although the U.S. Drought Monitor does not monitor drought in American Samoa, the descriptions of severity are a good measure in which to relate drought events throughout the world.

25 National Drought. (2014). National Climatic Data Center: Issue 14. Retrieved August 8, 2014 from https://www.ncdc.noaa.gov/sotc/drought/2014/1#det-reg-pacis

D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Table 12 Five dought categatories categorized by U.S. Drought Monitor

Location

A drought is a regional event that is not confined to geographic or political boundaries; it can affect several areas at once. However, it can range in severity across those areas. All of American Samoa is at risk to drought occurrence.

Previous Occurrences

In order to understand the conditions of past drought, it can be helpful to understand the normal precipitation received each year. American Samoa is a tropical rain forest climate and typically receives over 120 inches of rainfall annually. NOAA reports the following as normal monthly precipitation levels as shown in Figure 21.

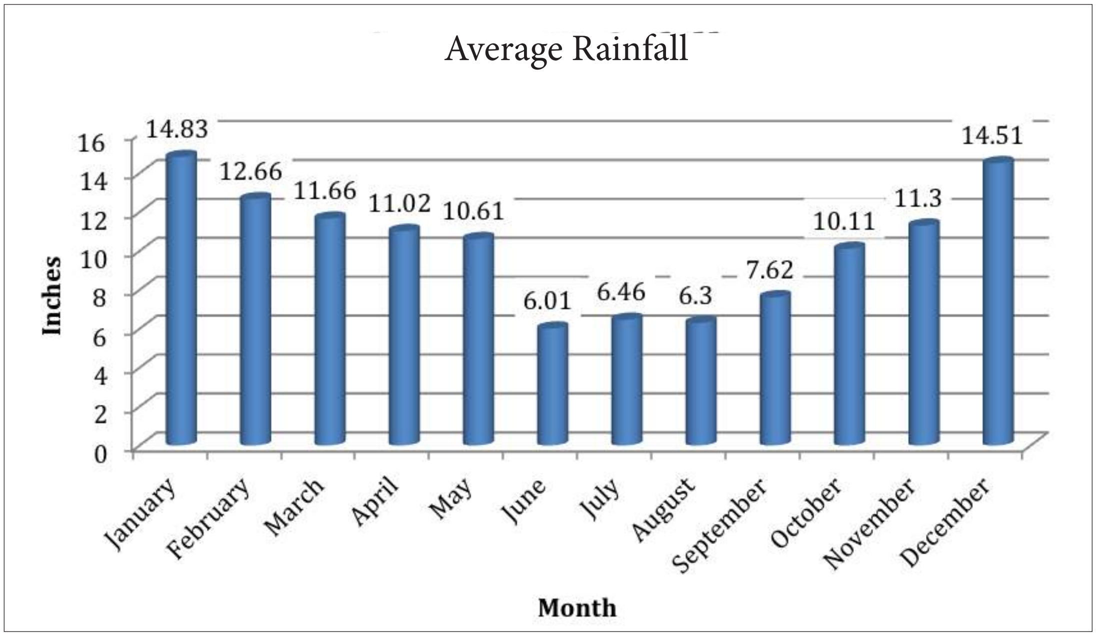

Figure 21 Average Rainfall in American Samoa (NOAA, Pago Pago Station)

Table 13 Summary of significant doughts

Average monthly rainfall amounts of less than three inches per month for three consecutive months are indicative of potential drought in American Samoa, as was the case in 1974 and 1983. [26] The 1998 drought was declared after nine consecutive months of less than half the average monthly rainfall. The effects of drought tend to be long lasting throughout the Territory, as impact on agricultural crops is often devastating, and recovery time can be one or more growing seasons in length. Extended drought periods also present a fire hazard. Table 13 below shows a summary of significant droughts.

The USGS has indicated that as long as the Territory receives steady rainfall, at least 16 million gallons of water seeps into the fresh water zone per day. In 1998, water usage per day averaged about 8 million gallons, with 2 million gallons utilized by the local canneries, 2 million gallons for residential use, 1 million gallons to other businesses, and 1 million lost through leaks.[27] The old underground pipes of Pago Pago and Fagatogo areas were notorious for leaks before recent mitigation efforts.

Event Type, Date	Location	Severity	Impacts
Drought, 1974 - 1975	All Islands	Significant impact.	Dried up underground water sources. Sediment made water undrinkable. Vegetation dried up, many crops damaged, causing food shortages. Drought broke with several days of heavy rainfall that caused devastating landslides. Water rationing, closure of schools, curtailment of fish cannery operations, reduction of work hours for government employees. Territory-wide recession.
Drought, 1983 - 1984	All Islands	Greatest impact.	Water rationing, school closure for 1 week. Cannery closed for 6 months, concurrent with renovations. Reduction of work hours for government employees. Territory-wide recession.
Drought, 1998	All Islands	Most severe, but less impacts due to improved capacity.	Wells in Tualauta District started to taste salty as groundwater levels were depleted. Only 10.11 inches of rain recorded by the weather bureau at Tutuila's airport from April to August. Several wells and rivers dried up, the Aunu'u natural spring evaporated, and the catchment area at Malaeloa completely dried up.
Drought, September 2011	All Islands	3 consecutive months of less than normal rainfall (between 26% 60%)	This event was less severe than previous occurrences and was quenched by rainfall the following month. However, it did prompt a U.S. Coast Guard/New Zealand team to send a ship with a desalination plant on board.

Drought Event (1974-1975)

According to some sources, the 1974 drought was considered the most devastating in American Samoa during the past 50 years with major impacts to the islands resulting in water rationing, and closure of schools.[28] Four to five months without rain during the Territory's usually drier wintertime depleted underground water sources.

26 "American Samoa Governor Declares State of Emergency." (1998). The Samoa News.
27 "Water Department Officials Take Water Conservation to the Schools." (1998). The Samoa News.
28 Ibid.

From April to August, only 24.28 inches of rainfall was recorded at the airport weather station in Tutuila. Above ground water was unavailable, and sediment in ground water sources made water undrinkable in places. Vegetation dried up throughout the island, and many crops were damaged. Vegetable crops failed. Taro and banana, staples in the local diet, were drastically impacted, causing food shortages. Impacts were felt even after rainfall returned. Taro fields had to be replanted, and it was eight months before the crop was harvestable. Bananas were quicker to come back. The drought finally broke with several days of heavy rainfall that caused devastating landslides.

Drought Event (1983-1984)

According to the National Weather Service office on Tutuila, the 1983 drought lasted for 6 months, with major impacts on the Territory, causing water rationing and closure of schools for 1 week. One cannery closed for 6 months, coincident with renovations. American Samoa's Governor arranged for Department of the Interior funds to support employees during this time. Both the 1974 and 1983 droughts resulted in the curtailment of fish cannery operations, reduction of work hours for government employees, and a general territorial-wide recession.[29]

Drought Event (1998)

A Samoa News article dated September 17, 1998 quoted the Executive Director of American Samoa Power Authority (ASPA), saying that the 1998 drought was "the worst one American Samoa has ever experienced."[30] ASPA is in charge of water operations in the territory. Wells in Tualauta District started to taste salty from the lack of rain as groundwater levels were depleted. Only 10.11 inches of rain were recorded by the weather bureau at Tutuila's airport from April to August. The previous record low rainfall for the same 5-month period was 18.52 inches in 1983. In contrast, another major drought year in 1974 recorded 24.28 inches during the same 5-month time period. Public response to the lack of rainfall in terms of subsequent reduced consumption on the part of the general public and the tuna canneries was particularly helpful. In another Samoa News article dated May 18, 1998, the acting Governor initiated a Water Conservation Campaign, urging ASG employees to "exercise the utmost discretion in the use of our public water resources."[31] Less than an inch of rain had been recorded in the first 3 weeks of the month of May. American Samoa received $267,000 from U.S. Office of Insular Affairs in drought mitigation funds during this drought, much of which went to the outer islands.

The NOAA Weather Service in Tafuna reported that September through December of 1997 received 50% less rainfall than the same 4-month period in 1996, and that January through April 1998 rainfall had decreased by almost 60% compared to the same period in 1997.[32] The month of May 1998 received less than 2 inches compared to 10 inches the previous year.

After an announcement of a possible drought in May 1998, ASPA launched a massive conservation campaign which included educational talks, visiting families with water consumption over 50,000 gallons, and repair of leaky pipes. ASPA noted that several wells and rivers had dried up, the Aunu'u natural spring had evaporated into nothing, and the catchment area at Malaeloa was completely dried up and more water outlets were predicted to follow suit.

29 "American Samoa Governor Declares State of Emergency." (1998). The Samoa News.
30 "ASPA Director Says This is American Samoa's Worst Drought." (1998). The Samoa News.
31 "Drought Conditions Remain in American Samoa." (1998). The Samoa News.
32 Ibid.

By early June, Governor Tauese Sunia declared American Samoa in a Territory of Emergency, charging ASPA with the responsibility to continue conservation efforts, and to take additional actions to: procure water production equipment, inventory all water systems, extend transmission and distribution lines to residents not served by the ASG water system, and build new water storage facilities.

By August, water losses had been reduced by 21 percent, largely through a water-recycling project at the tuna canneries and the massive campaign to locate and repair leaks in the water delivery piping system, made possible through mitigation funding.

In October, American Samoa's drinking water sources remained in critical condition, and federal assistance legislation was in progress to purchase water purification equipment. Even with the return of regular rainfall, it takes years for the Territory to replenish its aquifer.

While certainly the most severe drought experienced in American Samoa over the period discussed in this assessment, the 1998 drought did not have the greatest impact due to the islands' increased capacity to manage this type of event. Mitigation measures such as repair of leaking pipes, an increase in the number of ground wells, and greater catchment and reservoir capacity were implemented with good results. American Samoa now has a reserve capacity of 800,000 to 1 million gallons per day. Water loss due to leaky pipes is now a mere 18 to 20%. While "normal" usage stands at 8 million gallons per day, this usage can be successfully reduced to 5 million gallons during periods of drought.

The March 1998 Pacific ENSO Update, a bulletin issued by the Pacific El Niño-Southern Oscillation Applications Center, called the 1997/98 El Niño event "the most intense on record." [33] American Samoa was not the only Pacific island to experience very dry conditions that year. Record droughts had been forecasted for Guam, CNMI, Micronesia, the Marshall Islands, and Palau as well.

American Samoa lies in a region between the most extreme influences of the El Niño/Southern Oscillation (ENSO) cycle on rainfall in the Pacific. ENSO is an oceanic and atmospheric phenomenon typified by increased sea-surface temperatures and lower than normal atmospheric pressure in the eastern Pacific and the high negative values of the Southern Oscillation Index. Warm events generally cause wet conditions to occur north and east of the islands, and dry conditions to the south and west, with a somewhat variable impact on rainfall in American Samoa. Nevertheless, American Samoa's normally abundant rainfall can be affected by El Niño conditions, as the 1974, 1983, and 1998 droughts illustrated. The National Drought Mitigation Center website offers a detailed description of the ENSO cycle and its relationship to drought in Understanding ENSO and Forecasting Drought, http://www.drought.unl.edu/whatis/elNiño.htm.

Figure 22 compares annual rainfall amounts for the village of Pago Pago over a 30-year period, from 1970 to 2000, collected by NOAA's Tafuna Weather Station,[34] and identifies American Samoa's significant drought events. The various phases of the ENSO cycle were also identified that suggest a tendency for the Territory to experience prolonged dry periods in the years following intense El Niño events.

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33 Update to Newsletter Issued 1st Quarter 1998: Pacific ENSO Update – Special Bulletin. (1998). University of Guam Water and Energy Research Institute, Pacific El Niño-Southern Oscillation Applications Center. National Oceanic and Atmospheric Administration Office of Global Programs: Vol. 4 No. 1.

34 National Oceanic and Atmospheric Administration, Local Climatological Data Annual Summary with Comparative Data. (1985). NOAA Tafuna Weather Station.

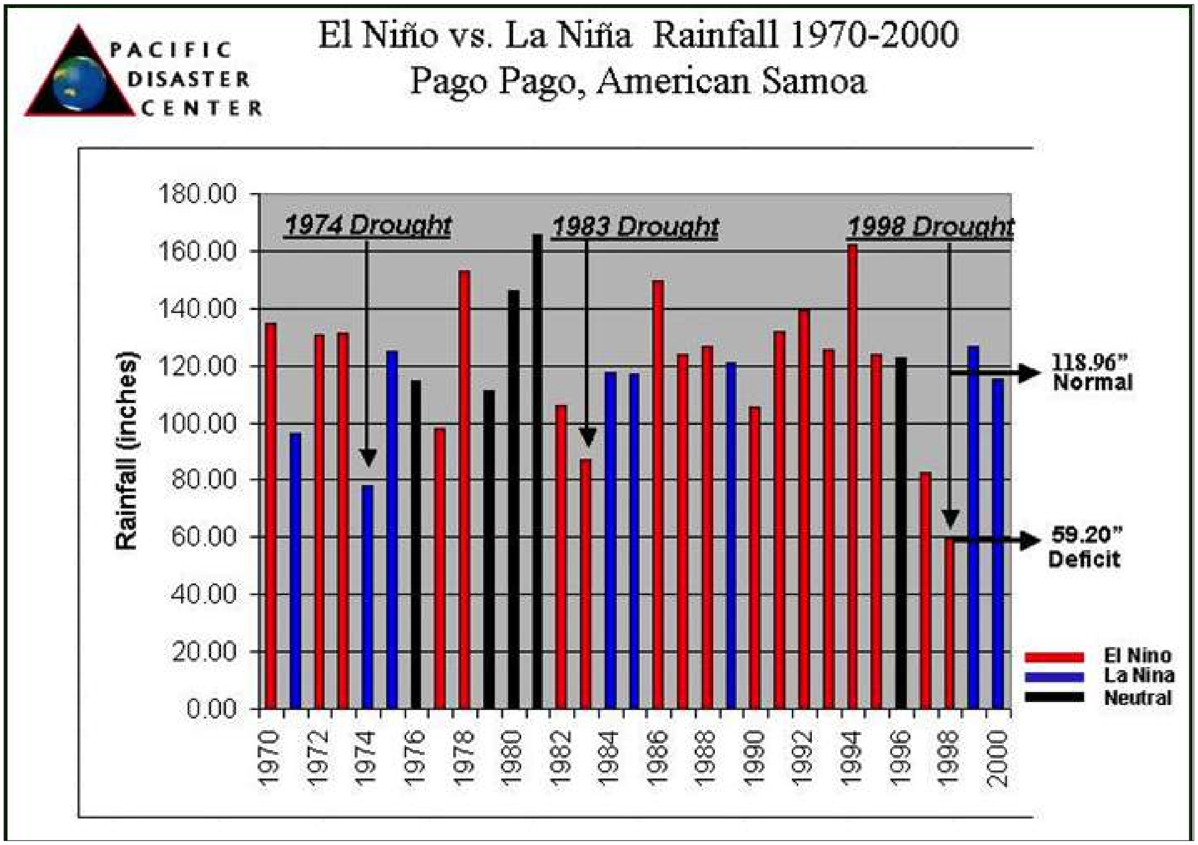


Figure 22
Comparison of Rainfall Amounts, Drought Occurrence and ENSO

Extent

While the U.S. Drought Monitor does not categorize reported drought events in American Samoa, conditions of past events can be used to approximate severity based upon it. The U.S. Drought Monitor characterizes the most severe drought conditions as exceptional: widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies." Exceptional drought conditions are possible in American Samoa. All U.S. Drought Monitor categories are defined in Categories Table.

In addition, average monthly rainfall amounts of less than three inches per month for three consecutive months are indicative of potential drought in American Samoa. Consecutive months where 50-80 percent of normal rainfall is received can also trigger severe drought. The 1998 drought was severe when just 10.11 inches of rainfall was received between April and August. Average rainfall would typically be over 40 inches during this period and would have exceeded 10 inches in April alone (as depicted in Figure 21).
Drought extent may also be classified in terms of the impacts caused. Any drought occurrence that prompts water conservation measures, impacts water supply or damages agricultural should be considered severe. Drought conditions and impacts may last for a few months but have the potential to last for several years. Drought severity may be impacted by:

- Inadequate catchment, reservoir capacity, and wells relative to population
- Leaky water pipes
- Strong to very strong El Niño episodes

Probability of Future Events

American Samoa, given its maritime location in the southwest Pacific and regular rainfall events, infrequently experiences severe drought conditions. When drought conditions do occur, local thunderstorms temper less serious droughts in the Territory, but do little to ease a major drought. Available data suggests that El Niño occurrences with strong to very strong classifications increase the chances for serious drought conditions. The strength and duration of El Niño periods increased during the 1990's, as compared with the previous two decades, perhaps coincident with climate change.

Research of historical rainfall totals, drought occurrences and revisit periods, and analysis of ENSO events contributed to the determination of probable occurrence for drought in American Samoa. Three significant droughts have affected American Samoa during the past 30 years, all directly following or at the tail end of a moderate to strong or very strong El Niño occurrence. This trend, however, has not manifested with the moderate El Niño conditions experienced in 2002-2003.

A moderately strong El Niño episode preceded the 1974-75 droughts, while the 1983-84 and 1998 droughts occurred at the tail end of strong to very strong El Niño periods. While not all El Niño events during the 43-year period of study led to drought conditions, there appears to be a connection between El Niño events and drought in American Samoa. It can be inferred that when the first signs of a moderate to strong or very strong El Niño event is forecast several months in advance, American Samoa should prepare for what could become severe drought conditions. In turn, this implies that during neutral or La Niña phases of ENSO, there is little probability of drought conditions in these islands.

In addition to events that followed ENSO trends, a fourth, less severe drought was reported in 2011. Stakeholder meetings also indicated that droughts are becoming more common, though they are not also long-lasting or exceptionally severe, prompting water conservation.

Using available historical data reporting from 1976 to 2014, four events were reported of which 3 were severe in nature. Based on this information, the probability of drought occurrence is between 7 and 11 percent annually. Focusing on events that may results in widespread impacts or water conservations measures, the annual probability can be summarized as possible, between 1% and 10% annually.

Vulnerability Assessment

The atmospheric nature of drought and lack of specific boundaries make it more conducive to a qualitative assessment as opposed to a quantitative analysis, such as GIS analysis. The entire planning area, including current and future buildings and populations, is at risk to drought. Drought may impact water supply, prompt water conservation measures and damage agricultural crops. Previous droughts have damaged banana and taro crops, resulting in local food shortages. While food can be imported, this it is much more expensive.

Droughts most devastating impacts may be to the local economy. If businesses, including the canneries, are forced to slow or stop production, this can impact supply (a top export) and employment. The canneries require approximately 1,200 gallons per minutes which can have localized impacts on water supply. In times of drought or water short, this impact is more severe. Historical droughts have resulted in fewer hours for government employees. This can have a ripple effect through the economy since workers may earn fewer wages if the canneries are forced to temporarily close.

Several measures are already in place to lessen the vulnerability of drought. There is a water conservation program that can be implemented and ongoing efforts to fix leaky pipes. The following lists historical impacts of droughts in American Samoa:

- Water conservation and rationing
- Agricultural crop damage
- Local food shortage
- Hindered cannery operations
- Decreased working hours
- School closures
- Water contamination (salinization)

In addition, it should be noted that extended drought, followed by heavy rainfall can be impetus for landslides. This occurred following the 1974/1975 drought. Landslides can have devastating impacts on the people and property throughout American Samoa. Please see the Landslide hazard section for additional information on hazard area.

Potential Losses

As noted above, the atmospheric nature of drought makes the hazard more conducive to a qualitative assessment. Losses are difficult to quantify since they are more associated with economic impacts and agricultural losses as opposed to structural losses. Previous events have led to fewer working hours and even a territory wide recession following the 1983 drought.

All counties and villages have equal vulnerability to drought hazard.

Earthquake

Description

The earth is made up four major layers and several sub layers (Figure 23): a solid inner core, a liquid outer core, a semi-molten mantle, and the rocky crust (the thin outermost layer of the earth). The upper portion of the mantle combined with the crust forms the lithosphere. This area is susceptible to fractures and can be thought of a shell. The lithosphere breaks up into large slabs, known as tectonic plates. It is this area where earthquakes occur.

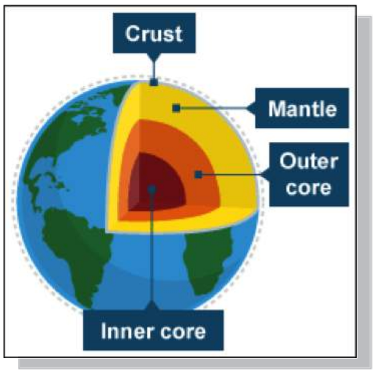


Figure 23 Earth's Sub layers[35]

There are approximately twelve major plates and several dozen more minor plates on the earth's crust, as shown in Figure 24. Plates are regions of the crust that continually move over the mantle. Areas where these plates meet, and either grind past each other, dive under each other, or spread apart, are called plate boundaries. Most earthquakes are caused by the release of stresses accumulated as a result of the sudden displacement of rock in the Earth's crust along opposing plates.

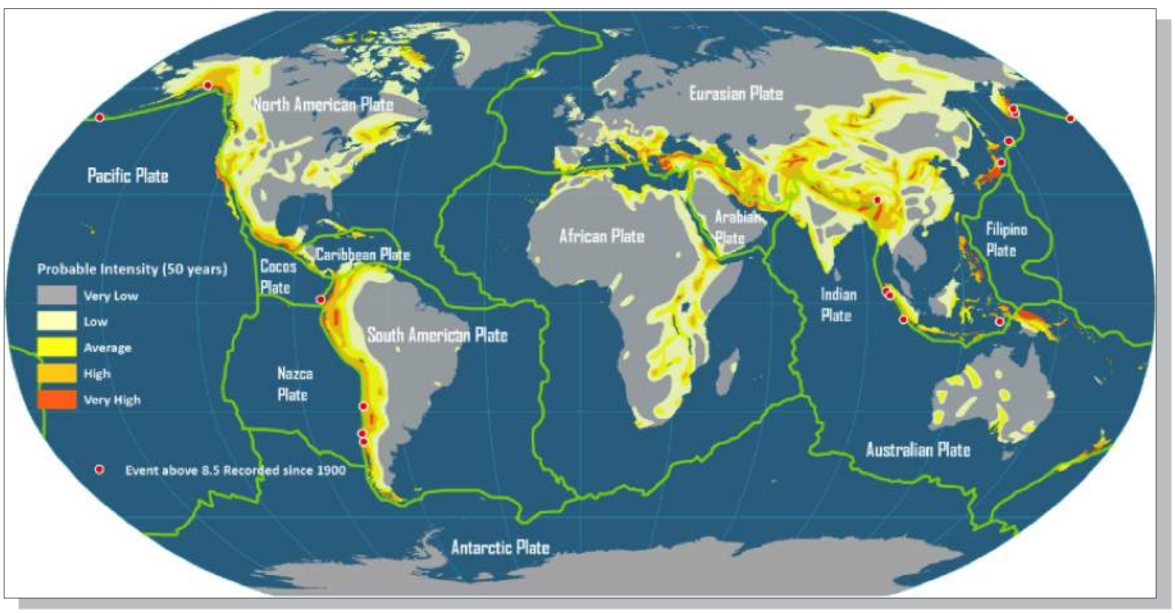


Figure 24 Global Plate Tectonics and Seismic Activity[35]

35 The Earth's structure and plate movement. (2014). BBC. Retrieved August 8, 2014 from http://www.bbc.co.uk/bitesize/ks3/geography/physical_processes/plate_tectonics/revision/2/

The above map depicts plate boundaries and shows a global distribution of earthquake risk for significant earthquakes over the next 50 years, ranging from low probability to a very high probability (more a matter of when than if). The areas bordering the Pacific Plate, also known as the "Pacific Ring of Fire", are at a particularly high risk since most of the largest earthquake events of the last century took place in the region.[36] American Samoa falls within this area.

While earthquakes typically occur along plate boundaries, particularly in the Pacific Ocean, earthquakes may result from crustal strain, volcanism, landslides or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons and disrupt the social and economic functioning of the affected area. Scientifically, earthquakes are defined as the sudden release of strain in the earth's crust, resulting in waves of shaking that radiate outward from the earthquake source. The point where an earthquake starts is termed the focus or hypocenter and may be many miles to several hundred miles deep within the earth. The point at the surface directly above the focus is called the earthquake's epicenter. Earthquakes are measured in terms of their magnitude and intensity.

Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (Table 14 Richter Scale). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, ranging from "I" corresponding to imperceptible (instrumental) events to "XII" for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in Table 15 Modified Mercalli Intensity Scale for Earthquakes.

Table 14 Richter Scale [37]

Richter Magnitudes	Earthquake Effects
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

36 Global Plate Tectonics and Seismic Activity. (2014). The Geography of Transport Systems. Retrieved August 8, 2014 from https://people.hofstra.edu/geotrans/eng/ch9en/conc9en/plate_tectonics.html

37 Federal Emergency Management Agency (FEMA)

Table 15 Modified Mercalli Intensity Scale for Earthquakes[38]

Scale	Intensity	Description Of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	--
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	--
IV	Moderate	Felt by people walking.	--
V	Slight strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very strong	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	--
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Beginning in 2002, the USGS began using Moment Magnitude as the preferred measure of magnitude for all USGS earthquakes greater than magnitude 3.5. This was primarily due to the fact the Richter Scale has an upper bound, so large earthquakes were difficult to measure. Moment Magnitude also has a scale, but no instrument is used to measure it. Instead, factors such as the distance the earthquake travels, the area of the fault, and land that was displaced (also known as "slip") are used to measure moment magnitude. Table 16 Moment Magnitude Scale shows the Moment magnitude scale, and Table 17 shows a few examples of how the Moment Magnitude Scale compares to the Richter Scale.

Table 16 Moment Magnitude Scale

Scale Value	Effect
Less than 3.5	Very weak; unlikely to be felt
3.5 – 5.4	Generally felt; rarely causes damage
6.1-6.9	Will not cause damage to well-designed buildings; will damage poorly designed ones
7.0-7.9	Considered a "major earthquake" that causes a lot of damage
8 or greater	Large and destructive earthquake that can destroy large cities

38 Federal Emergency Management Agency (FEMA)

Table 17 Richter v. Moment Magnitude Values

Earthquake	Richter Scale	Moment Magnitude
New Madrid, MO 1812	8.7	8.1
San Francisco, CA 1906	8.3	7.7
Prince William, AK 1964	8.4	9.2
Northridge, CA 1994	6.4	6.7

Location

Very little information exists about earthquakes generated by local faults near American Samoa. In fact, earthquakes that occur in the sea and islands around it often impact American Samoa. This is evident in the review historic occurrences with many earthquakes occurring in the Tonga Trench, more than 100 miles southwest of the islands (Figure 25 Tonga Trench Location).

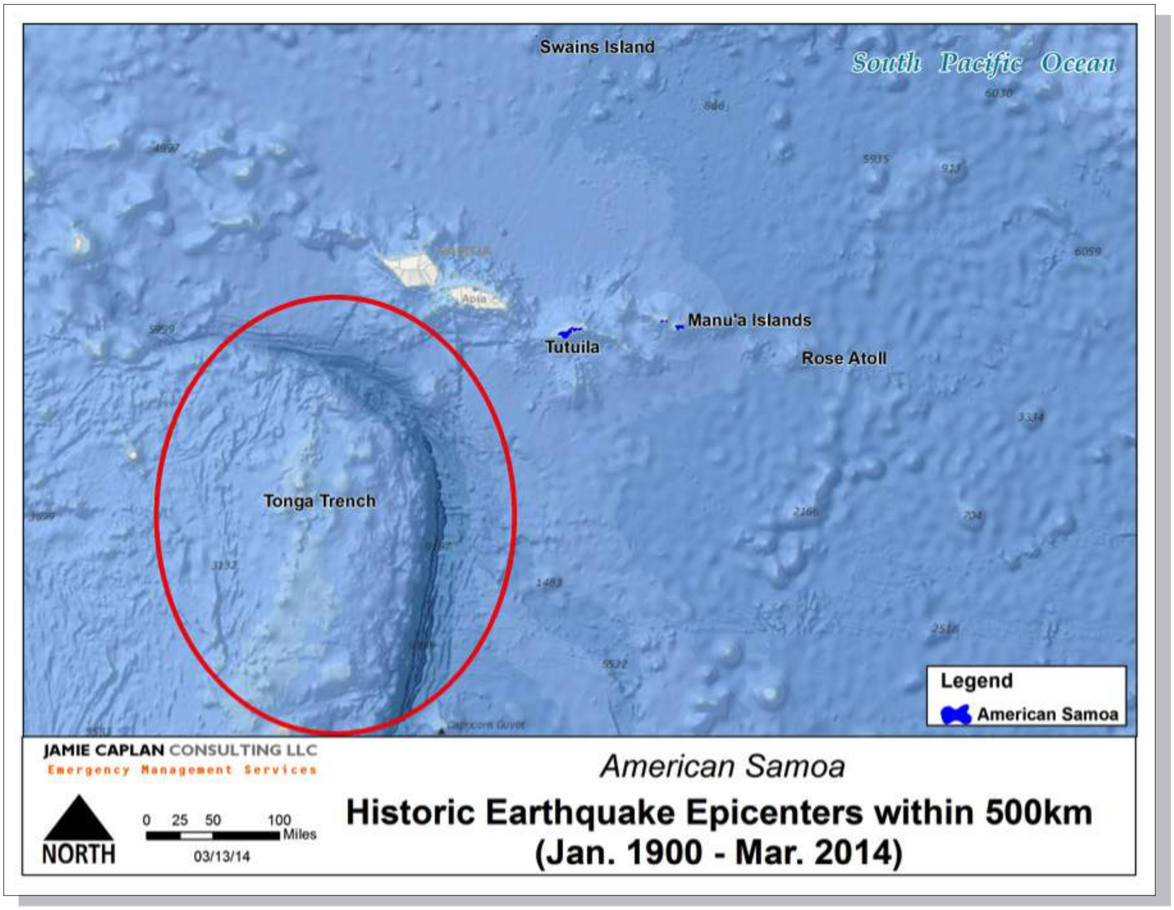


Figure 25 Tonga Trench Location

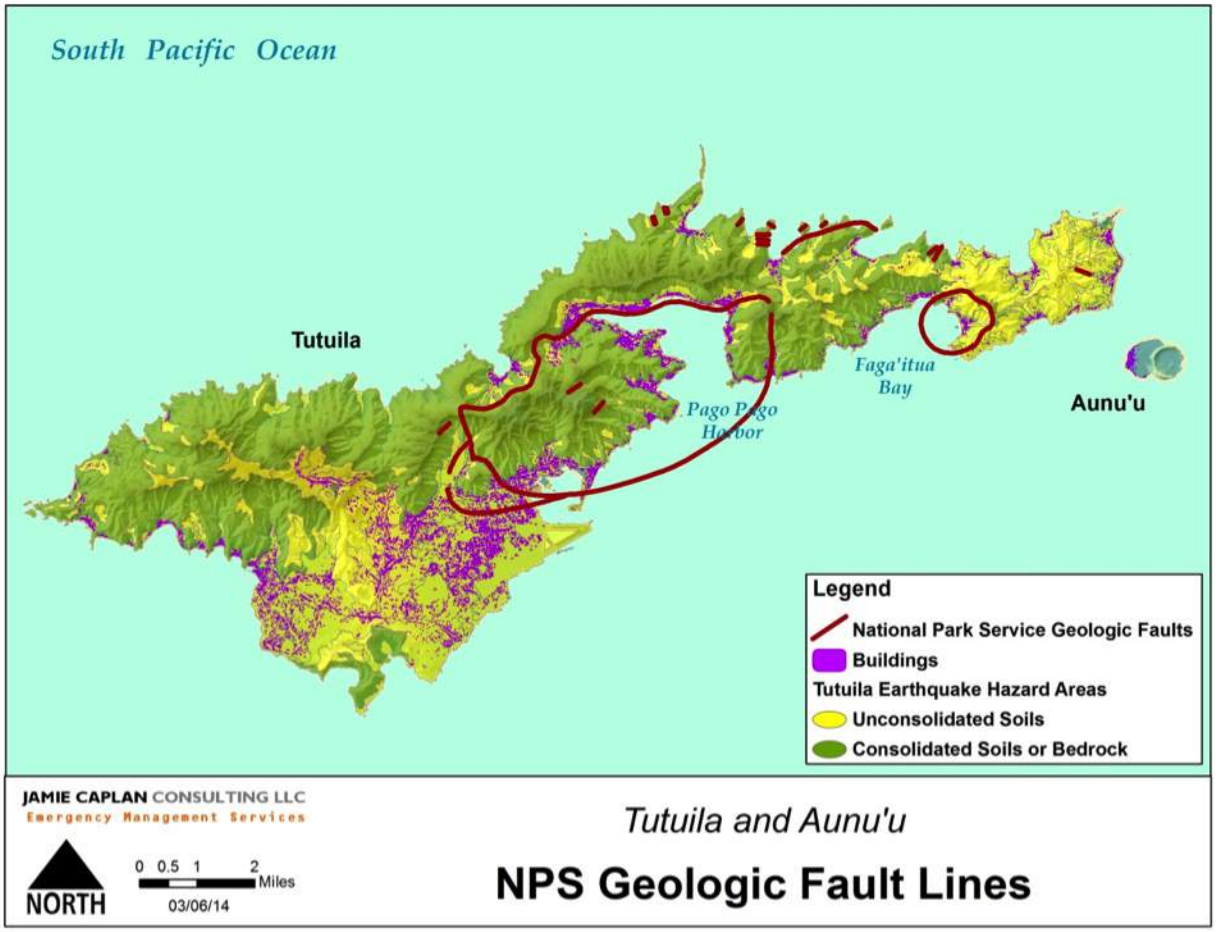


Figure 26 Tutuila Island and Aunu'u Island Earthquake Fault Lines and Hazard Areas

In addition to the Tonga Trench earthquake hotbed, there are several fault lines on the American Samoa islands. Although it should be noted that data does not indicate any recent earthquakes have originated from these areas. Figure 26 and Figure 27 show fault lines on the islands Tutuila/Aunu'u Islands and the Manu'a Islands, respectively. For Tutuila Island and Aunu'u Island (Figure 26), soil data was available to indicate areas of earthquake risk due to unconsolidated soil, shown in yellow. In addition, areas of development are shown in purple. Areas of unconsolidated soil will shake stronger and experience more extensive damage than areas with consolidated soil (harder, typically bed rock). Additional information on vulnerability, including number of buildings and critical facilities at risk, will be discussed in the vulnerability assessment and potential losses sections.

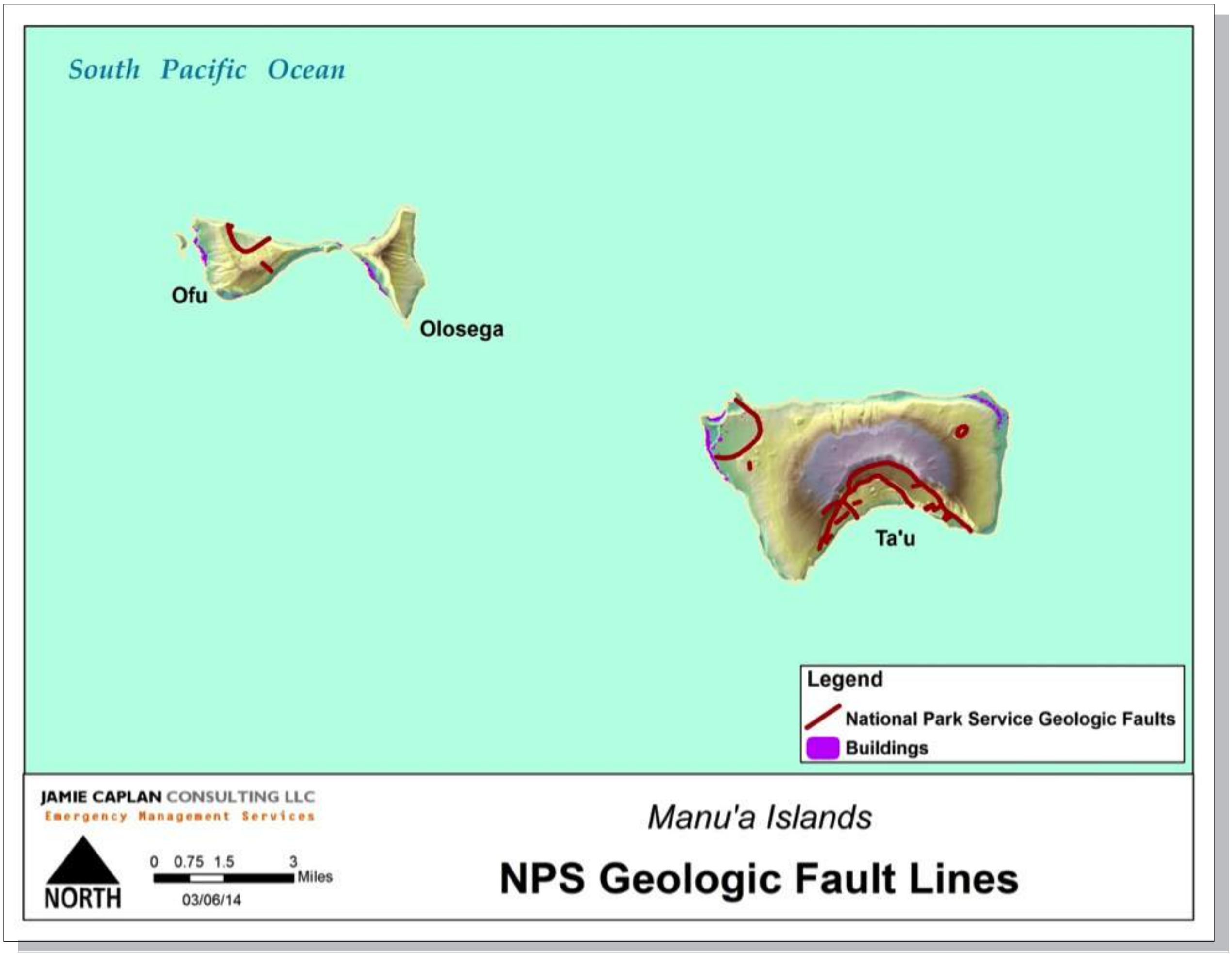


Figure 27 Manu'a Islands Earthquake Fault Lines

Previous Occurrences

Earthquakes occur frequently in the area around American Samoa. However, their impact to American Samoa is limited. A 2012 USGS study noted that "while most of the historical damage has been caused by earthquake-induced tsunamis, ground motions occasionally reach a level that results in building, contents, or infrastructure damage (for example, 2010 M 7.5 Vanuatu earthquake)."[39] Earthquake history to the south and west of American Samoa is well documented for the Tonga Trench.

The northernmost section of the Tonga Trench (or Tonga-Kermadec Trench) is the primary source for earthquakes in American Samoa (Figure 25). The Tonga Trench is a seafloor geographic and tectonic feature created by the collision of the Pacific Plate that subducts westward beneath the Australian Plate (see Figure 24 above for locations of plates). The Pacific-Australian subduction zone is considered an area of high seismic activity, and the collision of these two plates is a source of large but distant earthquakes felt in American Samoa. Because American Samoa is far from Tongan Trench seismic activity, it rarely experiences violent or destructive shaking from earthquakes sourced from this region. Over this distance, the earth filters and diminishes the seismic waves, creating only perceived strong-to-very strong shaking, and not violent shaking. A major exception was the 8.1 magnitude earthquake from this region on September 29, 2009. This was a very significant event and not only caused very strong shaking but also triggered a catastrophic tsunami, which generated the majority of the damage on Tutuila Island.

Historical occurrences were reviewed from NCDC (no events listed), Pacific Disaster Center, and USGS. Figure 28 was updated for the 2015 plan update and shows the Historical Earthquakes near American Samoa as represented by the Pacific Disaster Center, Asia-Pacific Natural Hazards and Vulnerabilities Atlas. American Samoa is shown in green, indicating a low earthquake intensity zone.

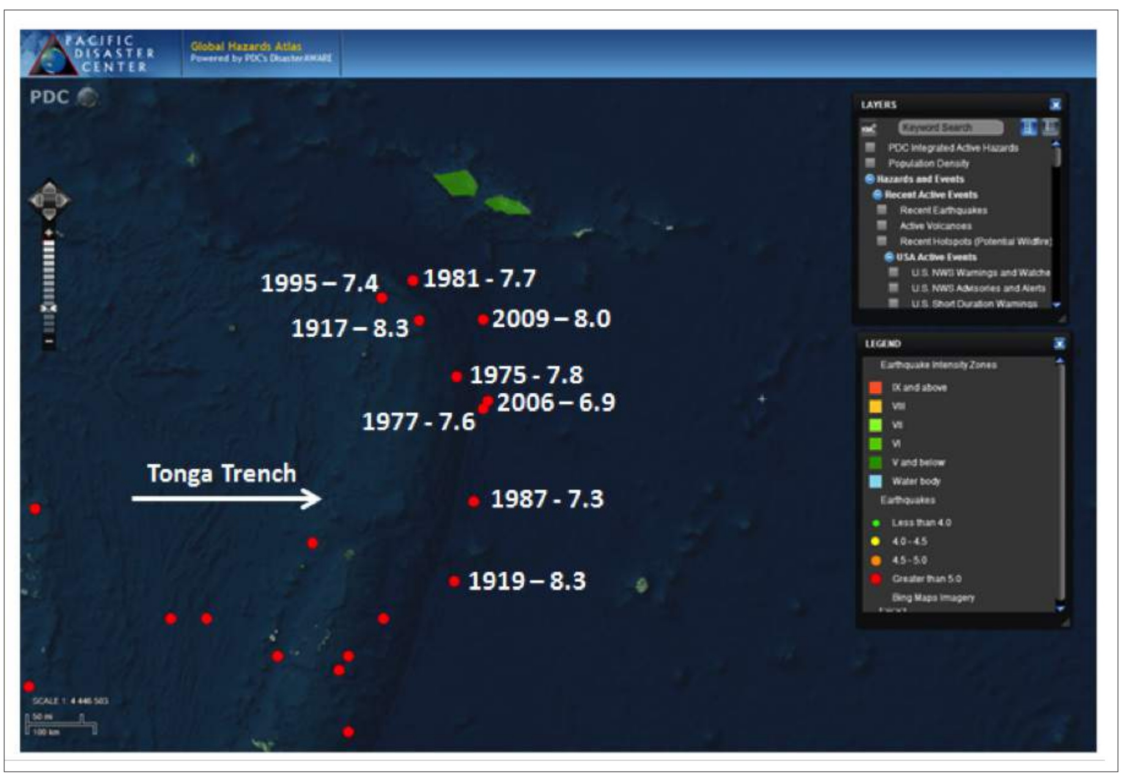


Figure 28 Historic Earthquakes over 7.0 and the Tonga Trench[40]

39 U.S. Geological Survey. Retrieved August 8, 2014 from http://pubs.usgs.gov/of/2012/1087/OF12-1087.pdf
40 Global Hazards Atlas. (2014). Retrieved August 8, 2014 from http://atlas.pdc.org/atlas/

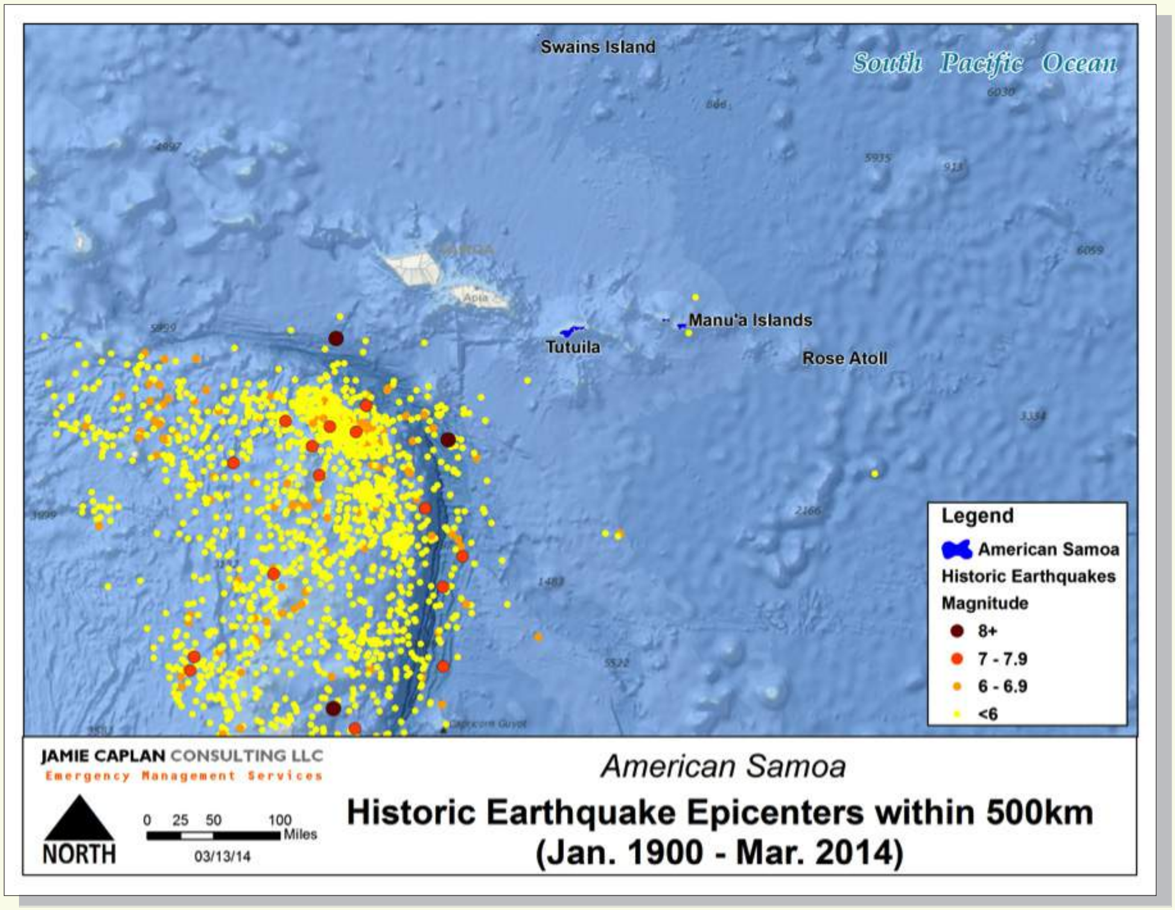


Figure 29 Historic Earthquakes near American Samoa

Figure 29 is an updated version of the previous historic earthquake events. Data was obtained from the United States Geological Survey from the Comprehensive Earthquake Catalog.[41] The map includes earthquakes from January 1900 to March 2014 with a magnitude 5.0 or greater. These are earthquakes that occurred within 500 kilometers of American Samoa and include the Tonga Trench. There were 1,788 earthquakes reported including 22 with a magnitude 7.0 or greater in the area. A total of 371 earthquakes were reported in the Samoa Island region specifically (closest to American Samoa). These include an 8.1 magnitude event (2009) and an 8.0 magnitude event (1917).

41 Earthquake Archive Search. (2014). USGS. Retrieved August 8, 2014 from http://earthquake.usgs.gov/earthquakes/search/

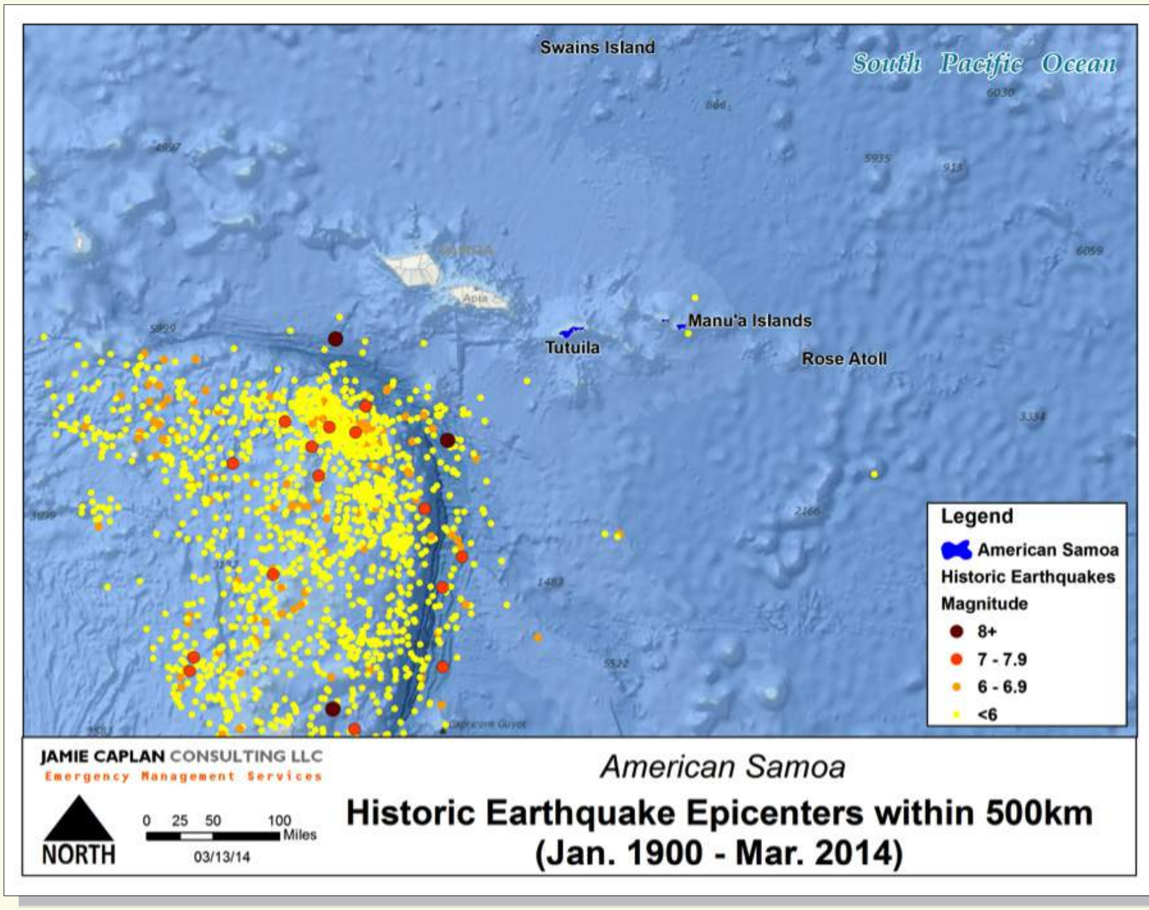


Figure 29 Historic Earthquakes near American Samoa

A secondary source for seismic activity is volcanic activity. The Samoan island chain was created by a 'hot spot' or soft spot in the earth's crust, which allows the escape of magma; creating submarine volcanoes that eventually form islands. The only active volcano in the American Samoa region is the submarine volcano Vanilulu'u. The Ofu-Olosega volcano last erupted in 1866, and the other volcanoes in the region have been silent for thousands of years. In 1995, a shallow earthquake swarm (concentrated events in time and space) was recorded in the region of the Vanilulu'u submarine volcano. These events are precursors to potential volcanic activity and are usually not a threat to the islands in terms of damage. Further, their activity has not been linked to earthquake events.

Fortunately, no deaths or injuries have been associated with historic earthquake activity, and no damage reports were reported for inclusion in this report. While not considered insignificant, earthquakes affecting American Samoa have not achieved the same impact as other hazards mentioned in this report. However, the 2009 Earthquake, Tsunami, and Flood event was significant. The earthquake did cause some significant damage. However, the tsunami that resulted from the earthquake caused catastrophic damage and 32 deaths and multiple injuries throughout the islands.

Extent

The previous occurrences in the section above measure magnitude on the Richter Scale, an indicator of severity or magnitude of earthquakes. These events indicate that earthquakes over 8.0 are possible in the American Samoa region. Earthquakes of this magnitude are near the greatest size on the Richter scale and can cause total destruction. However, the intensity of earthquakes impacting American Samoa is generally much lower since they are generated offshore and dissipate before reaching the islands. Earthquake magnitude can also be measured in terms of ground shaking.

One measure is peak horizontal ground acceleration (PGA). This measure is considered to be the best determinate of damage. It is also used for engineering purposes and for development of building codes. American Samoa is classified by FEMA as Seismic Zone 3, which means the probability of the Territory experiencing earthquake ground shaking of approximately 0.2g peak horizontal acceleration is once in 500 years (or a 10% probability of experiencing at least 0.2g every 50 years), where 1.0 g is equal to the acceleration of gravity. Higher values of g indicate higher shaking.

This level of ground shaking translates to light-to-moderate building damage. A 0.2g horizontal acceleration is similar to the turbulence required to knock a person walking down the aisle of an airplane off his or her feet. This Seismic Zone 3 designation considers all probable earthquake sources affecting American Samoa, local and distant, and translates their effects into different estimates of ground shaking. Seismic zones are also implemented as one of the design criteria in the Uniform Building Code. Seismic design calculations are input as part of the design criteria for construction of important structures to resist seismic forces.

In addition to FEMA, the United States Geological Survey (USGS) calculates and publishes the probabilities of ground shaking hazard for each Territory by conducting an in-depth seismic hazards analysis. This information was not available for previous plan updates but has now been completed and included for the 2015 plan update.

The 2012 USGS study investigated PGA for American Samoa as shown in the map below. PGA is measured in %g, percent of gravity, where a higher value indicates higher shaking. American Samoa resides in an area of 0 to 25 %g (0 -.25g) with a 10 percent probability of exceedance in 50 years. (A 10 percent chance of exceedance means that is there 90% chance that the shaking will NOT exceedance the value, thus indicating probable upper bounds (magnitude) of shaking.[42] Magnitude in terms of %g varies across islands as shown in Table 18 and Figure 30 below. In addition, Table 19 shows the associated damage level by percent acceleration force of gravity (% g).

Table 18 PGA Extent for American Samoa by Island

Island	Approximate Peak Horizontal Acceleration (% g) with 10 percent Probability of Exceedance in 50 years
Ta'u	20-25 (0.2-0.25g)
Olosega	15-25 (.15 -.25g)
Ofu	15-20 (.15 -.25g)
Tutuila	9-15 (.09 -.15g)
Aunu'u	8-10 (.08 -.10g)
Rose Atoll	2-4 (.02 -.04g)
Swains Island	0-1 (0 -.01g)

42 Earthquake Hazards 101 - The Basics. (2014). USGS. Retrieved August 8, 2014 from http://earthquake.usgs.gov/hazards/about/basics.php

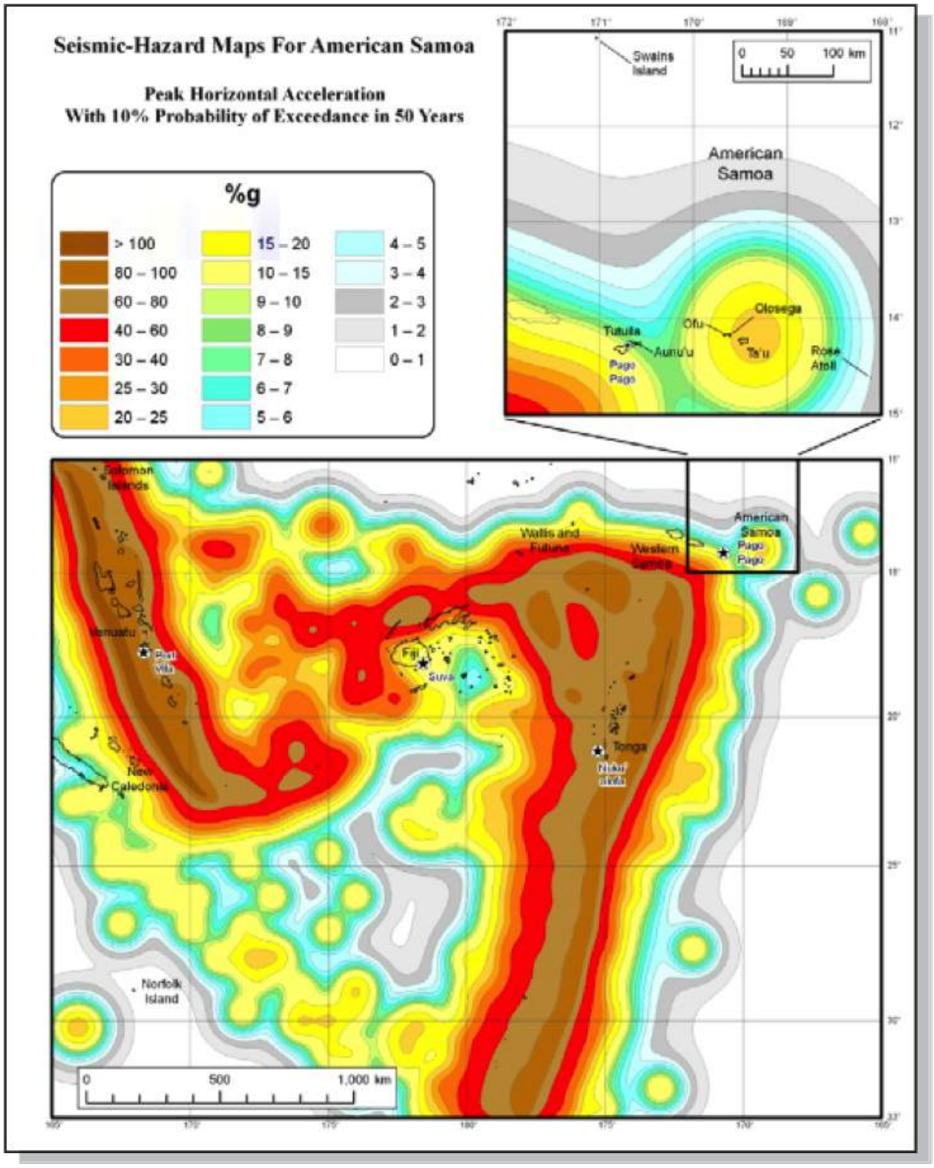


Figure 30 Peak Horizontal Acceleration in American Samoa[43]

Table 19 Damage Levels Associated with %g

Ground Motion Percentage	Explanation of Damages
1-2 % g	Motions are widely felt by people; hanging plants and lamps swing strongly, but damage levels, if any, are usually very low.
Below 10 %g	Usually cause only slight damage, except in unusually vulnerable facilities.
10-20 %g	May cause minor to moderate damage in well-designed buildings, with higher levels of damage in poorly designed buildings. At this level of ground shaking, only unusually poor buildings would be subject to potential collapse.
20-50 %g	May cause significant damage in some modern buildings and very high levels of damage (including collapse) in poorly designed buildings.
50 %g+	May causes higher levels of damage in many buildings, even those designed to resist seismic forces.

43 Peterson, D. Mark et al. (2012). "Seismic Hazard of American Samoa and Neighboring South Pacific Islands - Data, Methods, Parameters, and Results. U.S. Department of the Interior, and U.S. Geological Survey, p. 53. Retrieved August 8, 2014 from http://pubs.usgs.gov/of/2012/1087/OF12-1087.pdf

Using this information, it can be inferred that the Manu'a Islands have the greatest risk to earthquake shaking while the outlying atolls of Rose Atoll and Swains Island have the lowest risk.

Probability of Future Events

There are typically several measures that can be used to determine future probability. However, data and resources are limited for American Samoa. Therefore, research and statistical probability based on historic occurrences were utilized.

Research from the 2012 USGS report for American Samoa noted that "Since 1900, 242 earthquakes with magnitude (M) greater than or equal to 7 have been recorded, or an average rate of more than two large earthquakes per year."[44] This fact is based on previous occurrences from several different sources.

In addition, statistical probability of future occurrences was used for consistency throughout the document. The USGS historic occurrences for earthquakes greater than or equal to 7.0 in the Samoa and Tonga regions were included (used in Figure 29). The data ranges from 1906 to 2014 and includes 22 earthquakes over 7.0. This results in a probability of 0.2 or 20 percent probability each year, a categorization of "likely," (between 10 percent and 90 percent annually). It should be noted, however, that while several earthquakes are felt each year, few earthquakes result in damage.

Vulnerability Assessment

In the extent section, data indicated a range of 0.01-0.2%g with 10 percent probability of exceedance in 50 years. This indicates significant damage is possible in poorly designed buildings and minor damage is possible to buildings with a modern design. Areas that may exceed the peak ground acceleration are likely designated as "other soil types" compiled from the USDA/NRCS Soil Survey Map of American Samoa (1984), and appear in yellow on the Earthquake Hazard Maps (Figure 26) representing possible areas of unconsolidated soils and amplified ground motion.

Most low-lying areas on Tutuila correspond to the unconsolidated soils and may experience amplified ground motion from an earthquake. Another factor that increases seismic risk during an earthquake is the possible liquefaction of soils typically found in landfill areas, such as those surrounding the northwestern portion of Pago Pago Harbor (Figure 31).

Earthquakes in American Samoa have the potential to cause damage to buildings, infrastructure including roads and pipes. While earthquakes are possible and shaking will likely be felt occasionally, the damage is generally minor. However, it should be noted that extremely strong earthquakes are capable of causing widespread damages on the islands, particularly when building reside on unconsolidated soil. In addition, most buildings on the islands are not designed to withstand strong earthquakes. Further, all earthquake occurrences should be an indication to stay alert for possible a tsunami. For these reasons, earthquakes are a moderate hazard for the islands.

44 U.S. Geological Survey. Retrieved August 8, 2014 from http://pubs.usgs.gov/of/2012/1087/OF12-1087.pdf, page 2

Potential Losses

All current and future buildings and populations in American Samoa are at risk to earthquakes. However, some areas and structures may be at greater risk due to unconsolidated soil that may succumb to earthquake impacts. In addition, building design may also impact vulnerability and potential losses. Areas of high earthquake risk based on unconsolidated soil areas were also investigated using GIS intersect analysis to determine the number and type of buildings most at risk to earthquake shaking. This analysis was also used for critical facilities. Data was only available for the main island, Tutuila Island. The results are summarized in Table 20 below and several figures that follow.

Table 20 Buildings Potentially At Risk to Earthquake Hazard

County (District)	Total Number of Buildings	Total Number of Buildings in unconsolidated soil area	Percent	Type
TUTUILA ISLAND				
East Vaifanua (East District)	497	490	99%	4 not listed 486 residential[45]
Ituaa (East District)	1,075	1,008	94%	1,402 2 government 12 churches 32 commercial 959 residential
Lealataua (West District)	2,026	1,589	78%	6 schools 7 commercial 14 churches 37 not listed 1,523 residential
Leasina (West District)	474	460	97%	1 commercial 5 churches 6 government 448 residential
Maoputasi (East District)	2,246	1969	88%	1 school 1 Tedi of Samoa 1 new 6 unlisted 13 churches 32 commercial 68 government 1,847 residential
Saole (East District)	364	363	69%	1 business 2 unknown 260 residential
Sua (East District)	938	823	88%	4 unlisted 4 commercial 3 churches 812 residential

45 Building type listed in Territory GIS data

County (District)	Total Number of Buildings	Total Number of Buildings in unconsolidated soil area	Percent	Type
Tualatai (West District)	903	901	98%	48 not listed 12 churches 5 commercial 856 residential
Tualata (West District)	7,441	7,373	99%	12 not listed 73 churches 107 commercial 88 government 7,092 residential
West Vaifanua (East District)	172	166	97%	166 residential
Tutuila Island Total	16,315	13,858	85%	--
AUNU'U ISLAND				
Saole (East District)	179	N/A	--	--
Aunu'u Island Total	179	--	--	--
TA'U ISLAND				
Faleasoa (Manu'a District)	81	N/A	--	--
Fitiuta (Manu'a District)	180	N/A	--	--
Ta'u (Manu'a District)	208	N/A	--	--
Ta'u Island Total	469	N/A	--	--
OFU ISLAND				
Ofu (Manu'a District)	133	N/A	--	--
Ofu Island Total	133	N/A	--	--
OLOSEGA ISLAND				
Olosega (Manu'a District)	101	N/A	--	--
Olosega Island Total	101	N/A	--	--
TOTAL	**17,018**	**13,858**	--	--

The analysis indicates very high exposure and loss potential for all counties. East Vaifanua and Tualauta both show 99% of their buildings reside in a high earthquake hazard area. This is due to the high amount of unconsolidated soil area in the developed areas. However, losses from earthquakes will be largely dependent on building design and earthquake strength. Given the distance of the island from typical earthquake activity (Tonga Trench), severe shaking is not frequent.

A critical facility analysis was also performed using available data. The results indicated that nearly all critical facilities reside in unconsolidated soil areas, a potential risk to earthquake shaking. These structures are highlighted in Table 21 & Table 22 and Figure 31 through Figure 34 below. In addition, assembly areas, safe zones, tsunami sirens, and ASTCA communication infrastructure were analyzed for vulnerability. The results are reported below and in Appendix D.

Location	Total Number of Buildings	Total Number of CF in the 1 foot SLR area	Value
Tutuila Island CFs	240	235	$1,224,690,003
Ta'u Island CFs	42	N/A	N/A

Given the high number of critical facilities potentially at risk to earthquake, additional information is provided by county in Table 22.

Table 22 Number of Critical Facilities (CFs) Potentially at Risk to Earthquakes by County

County (District)	Total Number of Buildings	Total Number of CFs in unconsolidated soil area	Type	Value
TUTUILA ISLAND				
East Vaifanua (East District)	10	10	10 churches	$5,821,000
Ituaa (East District)	16	16	3 churches 13 schools (all Manulele Elementary)	$14,091,900
Lealataua (West District)	23	21	7 churches 13 schools (Leona High & Seetaga) 1 fire	$4,818,000
Leasina (West District)	7	7	7 churches	$4,818,000
Maoputasi (East District)	77	75	1 commercial 2 processing 39 schools (Aua Elementary, Pago Pago Elementary, Samoana High) 4 hospitals 3 churches 2 commercial (Starkist) 4 communication 2 fire 1 police 2 transportation 15 government (including Lt Gov.'s house)	$365,960,463
Saole (East District)	14	14	10 schools (Alofau Elementary) 3 churches 1 hospital	$9,206,000
Sua (East District)	27	27	6 churches 1 fire 1 police 19 school (Faqaitua High, Laulii Elementary and Elementary)	$23,283,000

County (District)	Total Number of Buildings	Total Number of CFs in unconsolidated soil area	Type	Value
Tualatai (West District)	3	3	3 churches	$2,164,000
Tualata (West District)	62	61	27 schools (Illiili Elementary and Pavaiai Elementary) 9 fuel storage (tank farm) 7 transportation (Pago Pago airport) 10 utility (APSA Tafuna plant) 5 churches 1 communication 1 government 1 fire	$784,361,640
West Vaifanua (East District)	1	1	1 church	$360,000
Tutuila Island Total	239	235	--	$1,213,964,003

Assembly areas

- 9 out of 26 assembly areas were found to intersect unconsolidated soil areas. In the event of an earthquake, these areas may be unsafe to assemble.

Safe Zones

- All 4 safe zone areas in Tutuila intersect unconsolidated soil areas. In the event of an earthquake, these areas may be unsafe.

Tsunami Sirens

- 31 out of 43 sirens were found to intersect unconsolidated soil areas (Figure 34). An earthquake could compromise their foundation and render them ineffective. This is of particular concern as earthquakes often trigger tsunamis.

ASTCA Infrastructure

- 52 out of 75 ASTCA infrastructure holdings were found to intersect unconsolidated soil areas.

A complete listing of critical facilities and associated information (such as assembly areas, safe zones, and tsunami sirens) can be found in Appendix D.

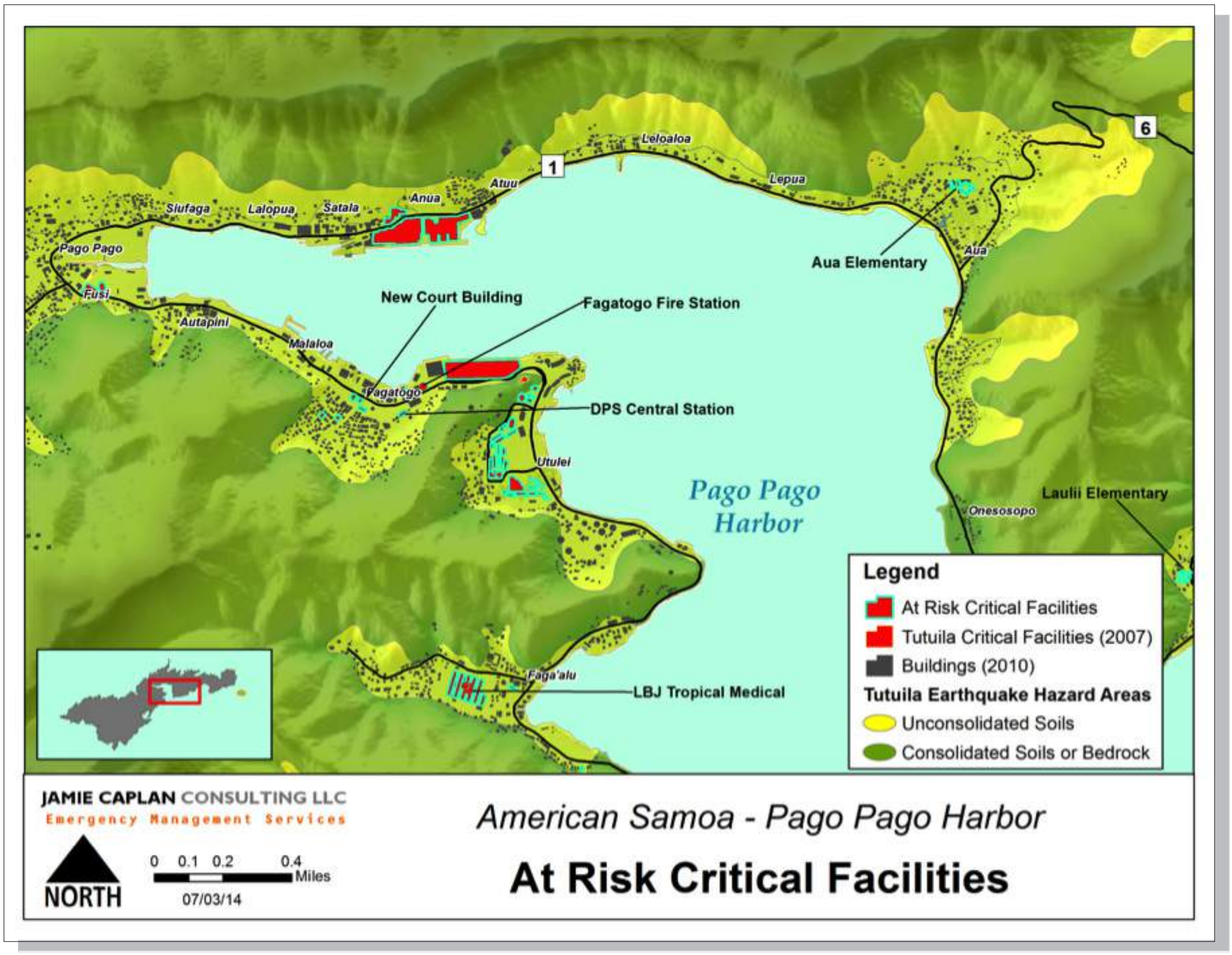


Figure 31 Critical Facilities Potentially At Risk to Earthquake (Pago Pago Area)

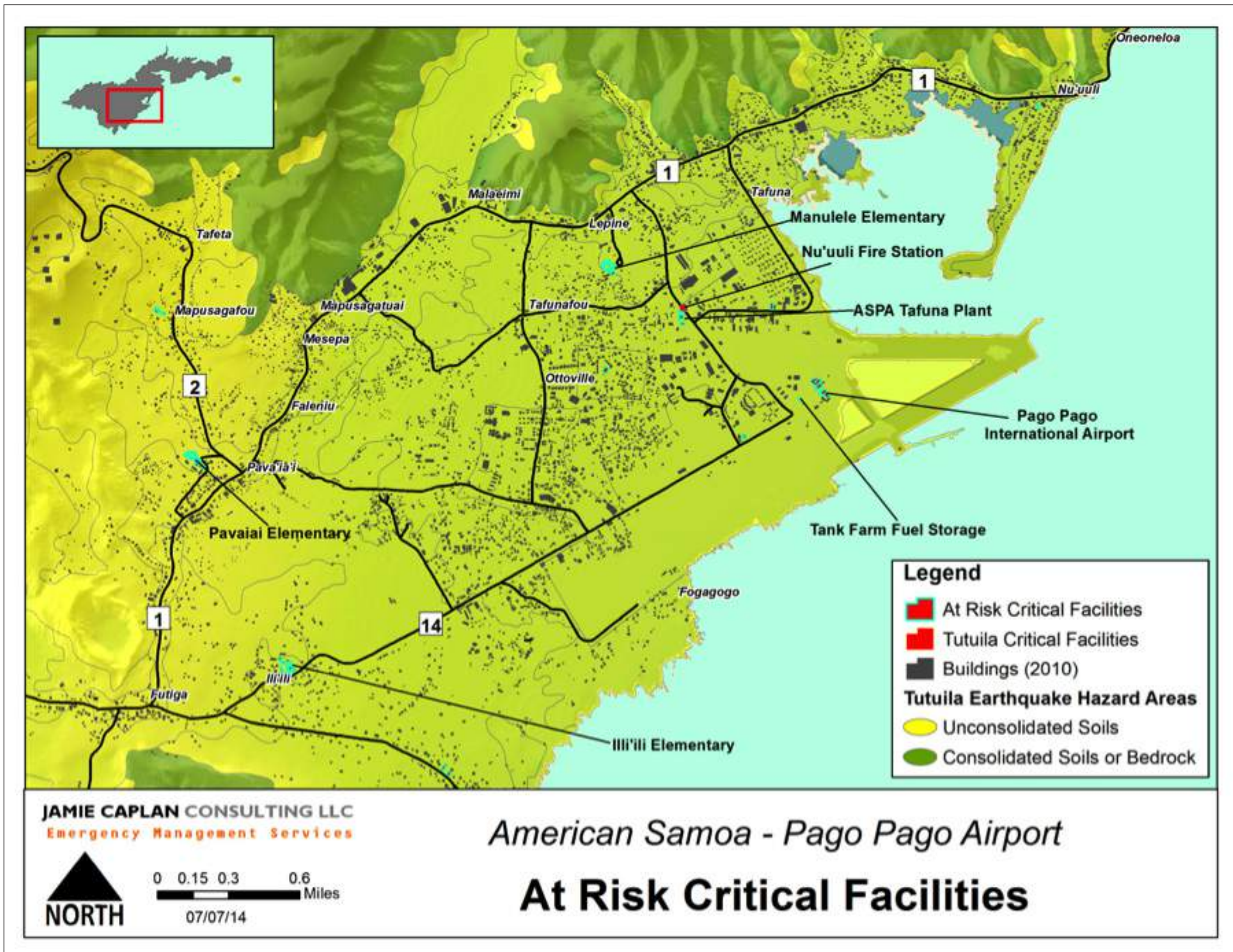
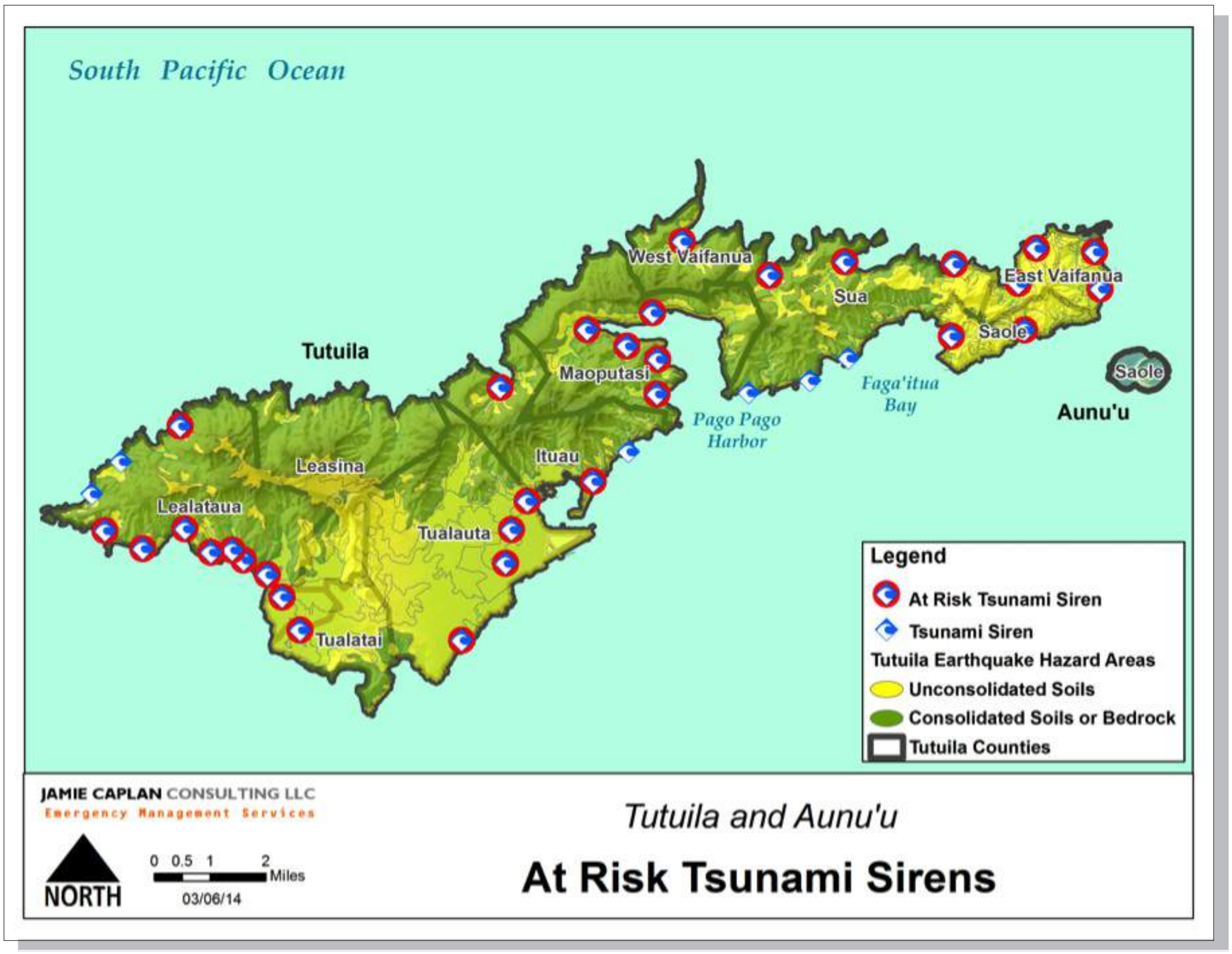


Figure 32 Critical Facilities Potentially At Risk to Earthquake (Tafuna Plain/Pago Pago Airport Area)

Figure 34
Tsunami Sirens in Unconsolidated Soil Areas (sirens at risk)



Flood

Description

Flooding is a very frequent, dangerous and costly hazard. It accounts for 40 percent of all natural disasters. Globally, flooding results in an average of over 6,500 deaths annually.[46] In the U.S. flooding results in an average of 89 deaths annually.[47] Nearly 90 percent of all presidential disaster declarations result from natural events where flooding was a major component. This holds in American Samoa where 11 out of 12 disaster declarations (92%) are assumed to have flood impacts (Table 2, page 8). Fortunately, flooding has not been directly responsible for fatalities on the islands, but has caused death due to associated hazards, such as landslides and tsunamis. Flooding has caused tremendous damage and creates significant debris. Flooding resulted in three out of eleven past disaster declarations in American Samoa. However, when also including cyclone-related disaster declarations, which likely had flooding impacts, the number jumps to ten out of eleven disaster declarations.

Flooding is the most common environmental hazard, due to the widespread geographical distribution of valleys and coastal areas, and the population density in these areas. The severity of a flooding event is typically determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface. Both of these flooding events can be brought on by severe (heavy) rain, which is a frequent occurrence in American Samoa. There are several types of flooding which are possible in American Samoa:

Flash Flooding

Flash floods occur within a few minutes or hours of heavy amounts of rainfall and can destroy buildings, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides and landslides. Most flash flooding is caused by slow-moving thunderstorms or cyclones, repeated thunderstorms in a local area, or by heavy rains from hurricanes and tropical storms. Although flash flooding often occurs in mountainous areas, it is also common in urban centers where much of the ground is covered by impervious surfaces.

Sheet Flooding

Sheet flooding is a condition where storm water runoff forms a sheet of water to a depth of six inches or more. Sheet flooding and ponding are often found in areas where there are no clearly defined channels and the path of flooding is unpredictable. It is also more common in flat areas. Most floodplains are adjacent to streams or oceans, although, almost any area can flood under the right conditions where water may accumulate.

Coastal Flooding

Periodic flooding of land adjacent to the shoreline (known as the floodplain) is a natural occurrence. Coastal flooding brought about by high surf, storm surge associated with tropical cyclone activity, or tsunamis can cause significant damage to beaches and low-lying coastal areas. Storm surge, the rise of the ocean due to atmospheric pressure changes, may overrun barrier islands and push seawater up coastal rivers and inlets, blocking the downstream flow of inland runoff. Escape routes, particularly from barrier islands, may be cut off quickly, stranding residents in flooded areas and hampering rescue efforts.

46 Flood - Data and Statistics. (1980-2008). Prevention Web. Retrieved August 8, 2014 from http://www.preventionweb.net/english/hazards/statistics/?hid=62

47 Weather Facilities. (2013). NOAA National Weather Service. Retrieved August 8, 2014 from http://www.nws.noaa.gov/om/hazstats/resources/weather_fatalities.pdf

Urban Flooding

Urban flooding is usually caused by heavy rain over a short period of time. As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Since sidewalks and roads are non-absorbent, rivers of water flow down streets and into sewers. Roads and buildings generate more runoff than tropical forestland. Fixed drainage channels in urban areas may be unable to contain the runoff that is generated by relatively small but intense rainfall events. Urbanization increases runoff two to six times over what would occur on natural terrain. This high volume of water can turn parking lots into lakes, flooding basements and businesses, and cause lakes to form in roads where drainage is poor or overwhelmed.

Urban flooding occurs where there has been development within stream floodplains. This is partly a result of the use of waterways for transportation purposes in earlier times. Sites adjacent to rivers and coastal inlets provided convenient places to ship and receive commodities. The price of this accessibility has increased flooding in the ensuing urban areas. Urbanization intensifies the magnitude and frequency of floods by increasing impermeable surfaces, amplifying the speed of drainage collection, reducing the carrying capacity of the land and, occasionally, overwhelming sewer systems.

Riverine Flooding

Periodic flooding of lands adjacent to non-tidal rivers and streams is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal watercourse, some of the above-normal stream flows onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of a stream or river. The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplains and Flood Zones

As noted above, the periodic flooding of lands adjacent to rivers, streams and shorelines (land known as floodplain) is a natural process that has some chance of occurrence each year. Floodplains are designated by the frequency (and severity) of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 100-year flood and the 100-year floodplain by the 1,000-year flood. Flood frequencies such as the 100-year flood are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1.0-percent chance of occurring in any given year, and the 500-year flood drops to a 0.2-percent chance of occurring in any given year. Therefore, they are commonly referred to as the 1.0-percent annual chance flood and 0.2-percent annual flood, respectively. It should be noted that flooding is possible every year and even multiple times each year.

The U.S. Army Corps of Engineers and FEMA have a role in defining floodplain. The U.S. Army Corps of Engineers calls a 100-year flood an Intermediate Regional Flood, while a Standard Project flood describes a major flood that could be expected to occur from a combination of severe meteorological and hydrologic conditions. Most dam and flood-related structures have been designed to meet 100-year flood conditions.[48] FEMA develops FIRMS to indicate areas where mandatory flood insurance requirement apply (the 100 year flood). They are also used for planning purposes to identify hazard areas. In May 1991, Flood Insurance Rate Maps (FIRMs) were published by FEMA for American Samoa in support of the National Flood Insurance Program designating zones according to potential risk and impact due to flooding.

48 Flood. (2003). North Carolina Division of Emergency Management. Retrieved August 8, 2014 from http://www.dem.dcc.state.nc.us/mitigation/flood.htm

The FIRM, a paper document, has been digitized to permit mapping. Although an all-inclusive description of FEMA flood zones is not included in this document, brief descriptions of the zones appearing on the FIRMs for the Territory are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations (BFEs) or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone AE and A1-A30

Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 100-year floodplains determined in the Flood Insurance Study by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply. Note: Zone AE is used in place of Zone A1-A30 on new maps.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone, and mandatory flood insurance purchase requirements apply.

Zones B, C, and X

Zones B, C, and X are the flood insurance rate zones that correspond to areas outside the 100-year floodplains, areas of 100-year sheet flow flooding where average depths are less than one foot, areas of 100-year stream flooding where the contributing drainage area is less than one square mile, or areas protected from the 100-year flood by levees. No BFEs or depths are shown within this zone. Note: shade zone X is used in place of Zone B on new maps, and unshaded Zone X is used in place of Zone C on new maps.

It should be noted that flooding is possible outside of any defined flood zone. In fact, areas subject to flash flooding are often not captured on the maps. In addition, the flood event may be more severe than the 100-year or 500-year flood zones. In this case, water would go beyond these anticipated areas. Further, development can also alter where water goes in terms of the amount of drainage capability and where water travels. Areas that have not flood historically should not be considered immune from such an event.

Location

Areas susceptible to flooding (and rain amounts) vary across different islands and even villages. However, flood levels have not been captured well by historical record keeping. For example, it is known that Pago Pago and the areas near it receive a good deal of rain due to their location behind Rainmaker Mountain (Pioa Mountain). Its elevation is 1,716 feet and that height assists in “trapping” rain clouds that bring much rain to Pogo Pago Harbor. In addition, American Samoa topography features a shoreline and then sharp, steep increase in elevation into volcanic plugs (i.e., peaks, such as Rainmaker Mountain). Therefore, rain flows down from the mountainous areas, flooding areas below. In addition, coastal floods inundate the relatively narrow shoreline. The FEMA FIRM and Flood Insurance Study (FIS) can be used to determine the location of floods.[49]

49 The American Samoa FIS is dated as revised July 17, 2006.

Note that only the 100-year flood was modeled for American Samoa. Further, floodplains were not modeled for Rose Atoll or Swains Island. The maps (Map X1-X5) below show floodplain areas for each island at a high scale. Additional maps are provided in the vulnerability assessment section to show specific areas of detail.

Tutuila and Aunu'u

- A narrow band along the entire north shore and much of Tutuila's south shore lie in the 100-year floodplain (Figure 35).
- Pago Pago (Figure 36): The flood maps indicate the entire coast around Pago Pago is susceptible to 100-year flood levels annually. In addition, the villages of Aua, Lauli'ituai, Au'mu, Pago Pago, Fusi and Faga'alu have development inland residing in the 100-year flood zones. Further, areas inland along Route 5 from Fusi are indicated as being in the 100-year floodplain.
- Tafuna Plain East (Figure 37): This area highlights that Pago Pago international airport is surrounded by the 100-year floodplain. In additional to all areas around the coast, several inland villages are subject to the 100-year floodplain areas. Examples include Malaeimi, Tafuna, Lepine, Tafunaufou, and Nu'uuli, among others.
- Tafuna Plain West (Figure 38): Similar to Tafuna Plain East, Tafuna Plain West is subject to 100-year flooding (and greater) along the entire coast. In addition, the floodplain also impacts some inland villages such as Auma, Vaiala, and Malaeloa. There are several streams that are not indicated as being part of the 100-year flood. It should be noted that these areas might be subject to flooding during heavy rain events. However, there is less development along most of these streams as they move further inland.
- Aunu'u (Figure 39): The entire western portion of the island, where all development resides, is located in a 100-year floodplain. Additionally, the coastline around the entire island is in 100-year floodplain.

Manu'a Islands

- Ofu (Figure 40): The entire coast is subject to VE 100-year (wave action/velocity) floodplain. In addition, large areas of Ofu Village are subject to the 100-year floodplain, particularly on the western and northwestern coasts.
- Olosega (Figure 41): The entire coast is subject to VE 100-year (wave action/velocity) floodplain. In addition, limited areas in Olosega Village on the eastern coast are subject to the 100-year floodplain.
- Ta'u (Figure 42): The flood maps for Ta'u Island show limited floodplain area. The entire coast is subject to VE 100-year (wave action/velocity) floodplain. In addition, large areas of Luma Village are in the 100-year floodplain. In addition, a small area on the eastern side of the island near the coast is the in 100-year floodplain.

The FEMA designated floodplain areas are shown on the next page.

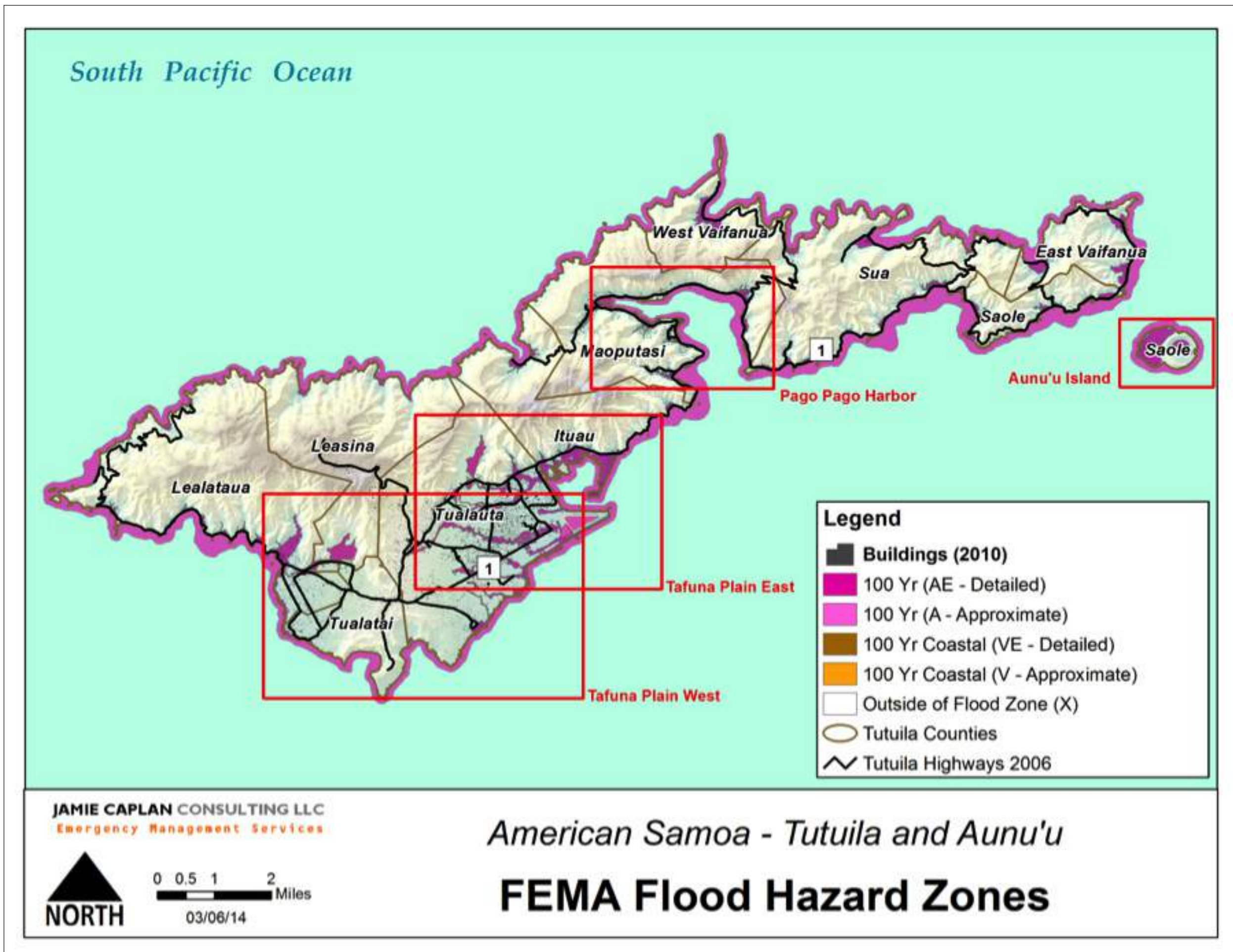


Figure 35 FEMA Flood Hazard Areas for Tutuila and Aunu'u Island

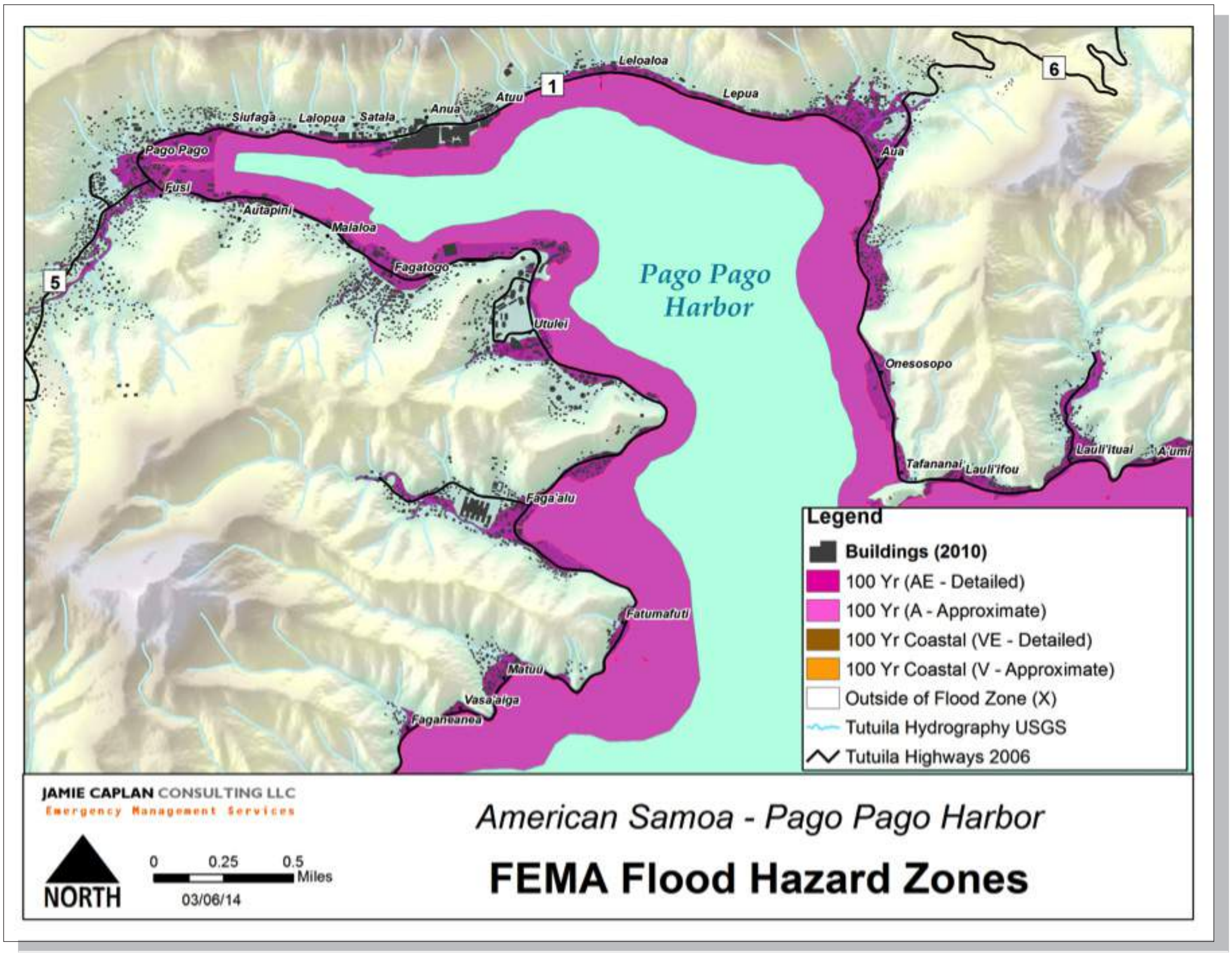


Figure 36 FEMA Flood Hazard Areas for greater Pago Pago

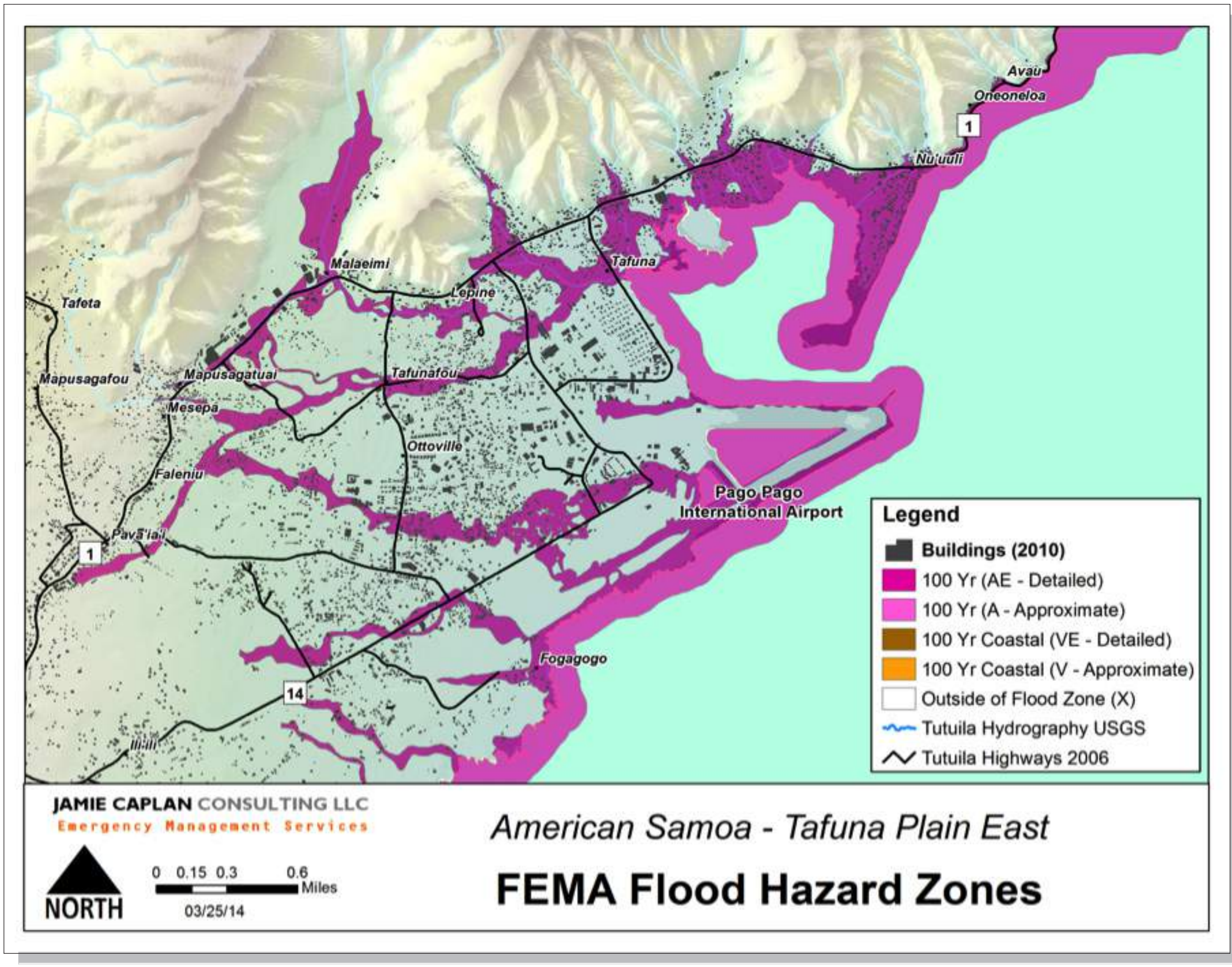


Figure 37 FEMA Flood Hazard Areas for Tafuna Plain East

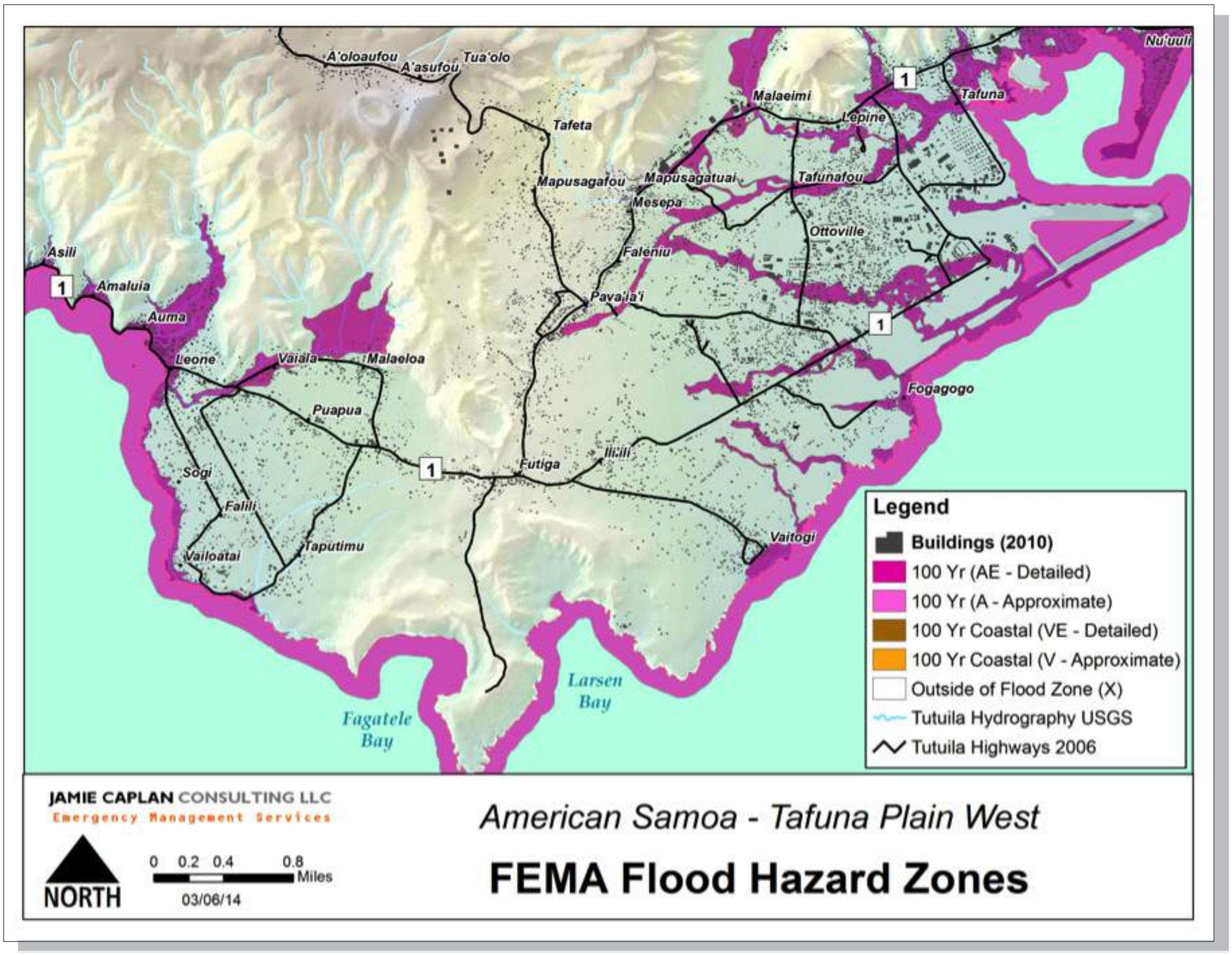


Figure 38 FEMA Flood Hazard Areas for Tafuna Plain West

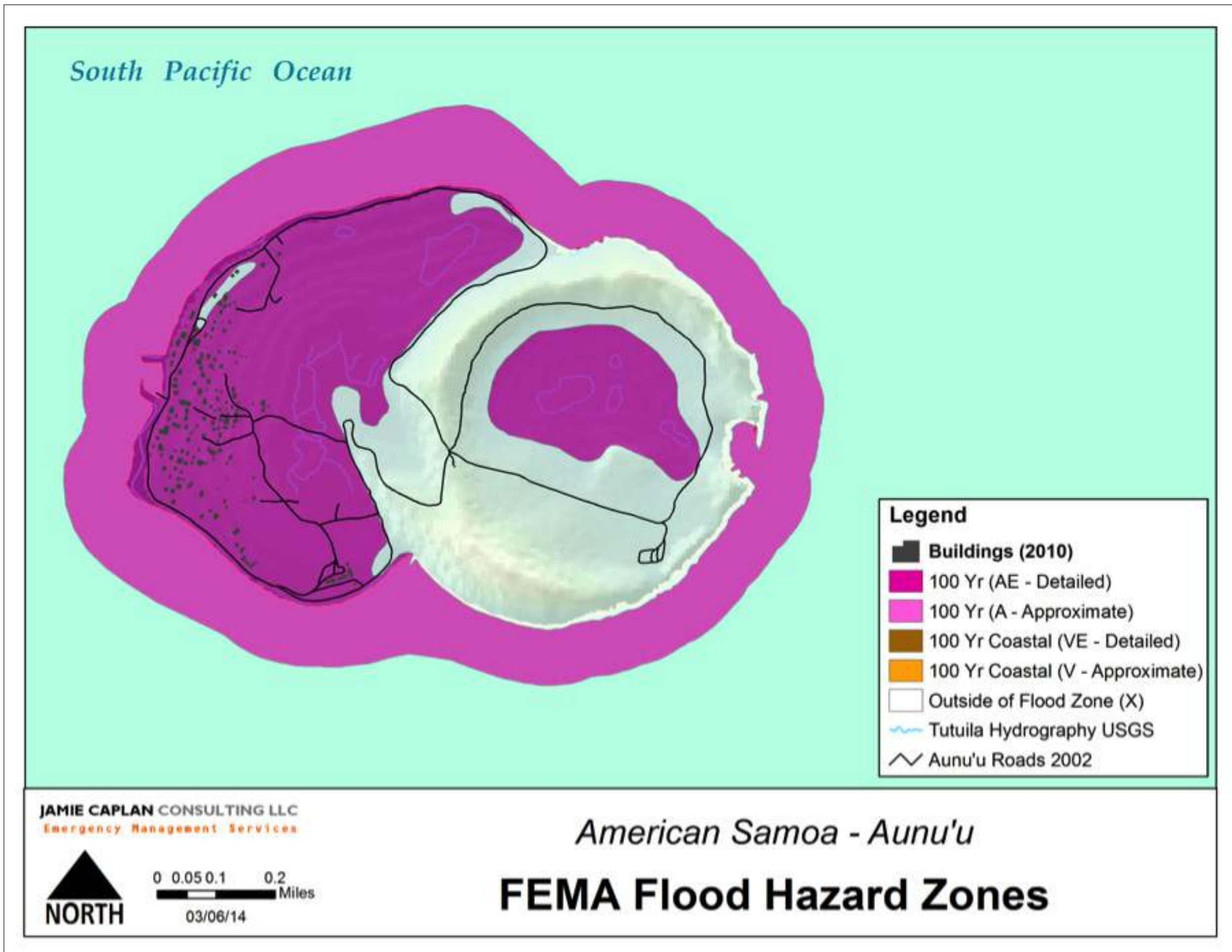


Figure 39 FEMA Flood Hazard Areas for Aunu’u

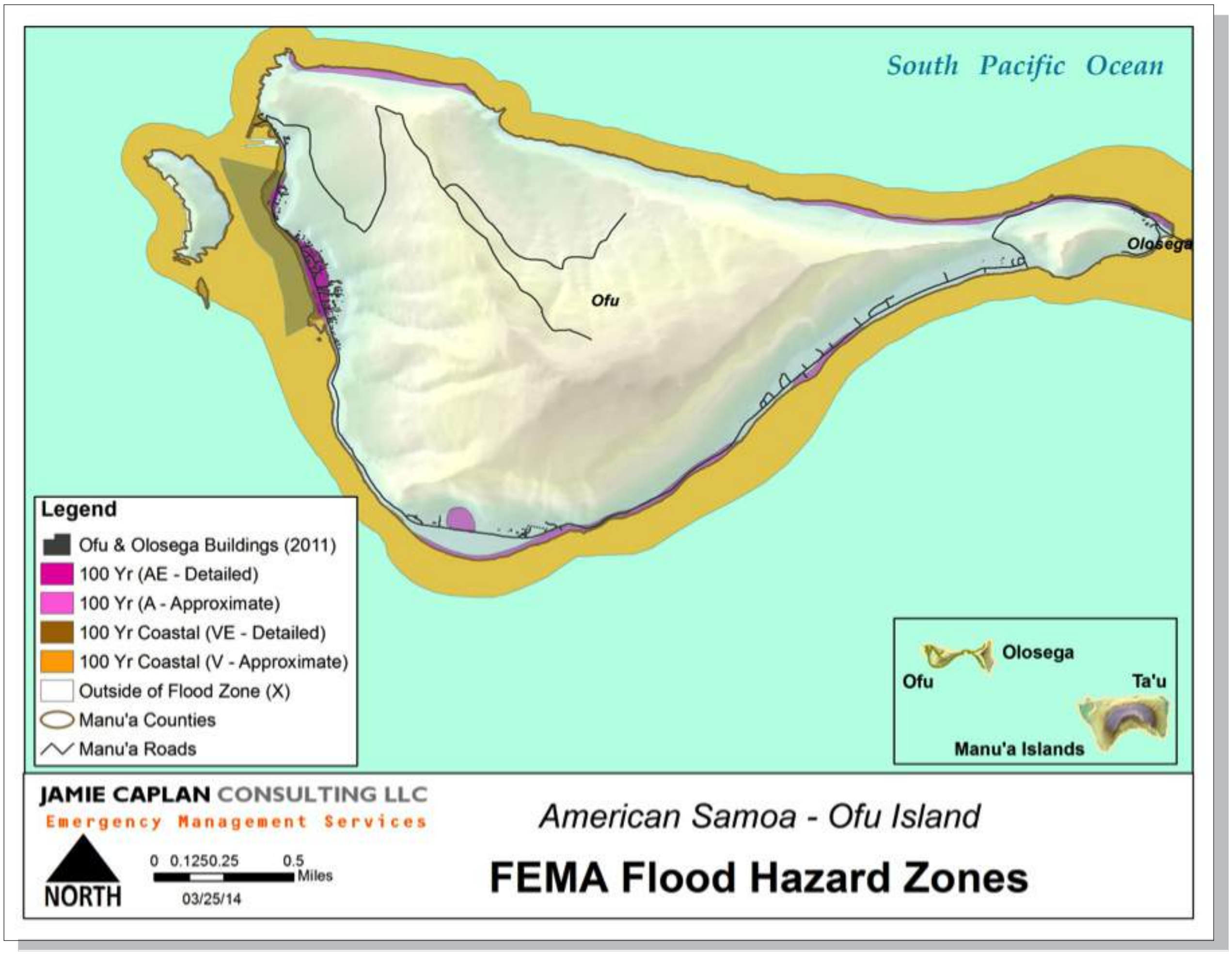


Figure 40 FEMA Flood Hazard Areas for Ofu

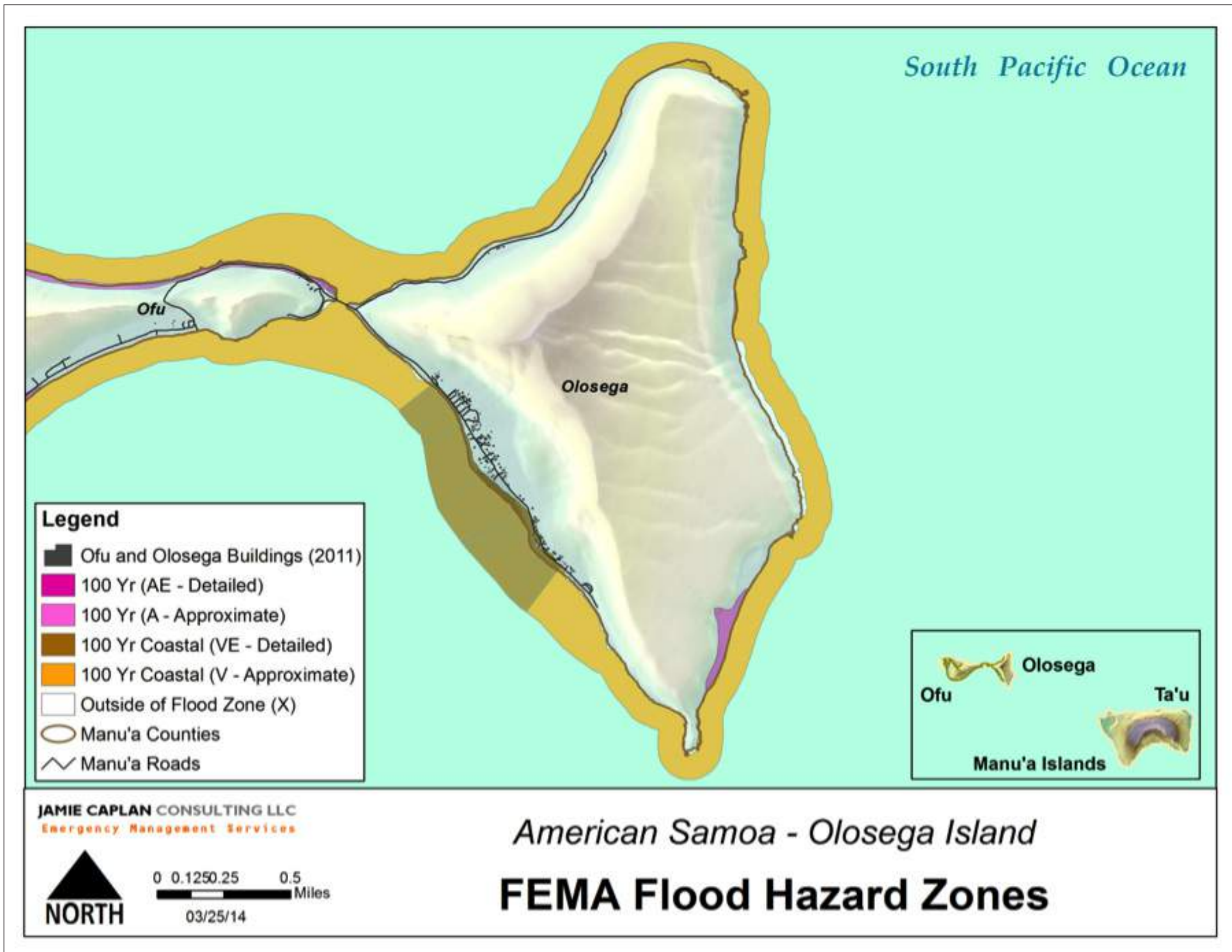


Figure 41 FEMA Flood Hazard Areas for Olosega

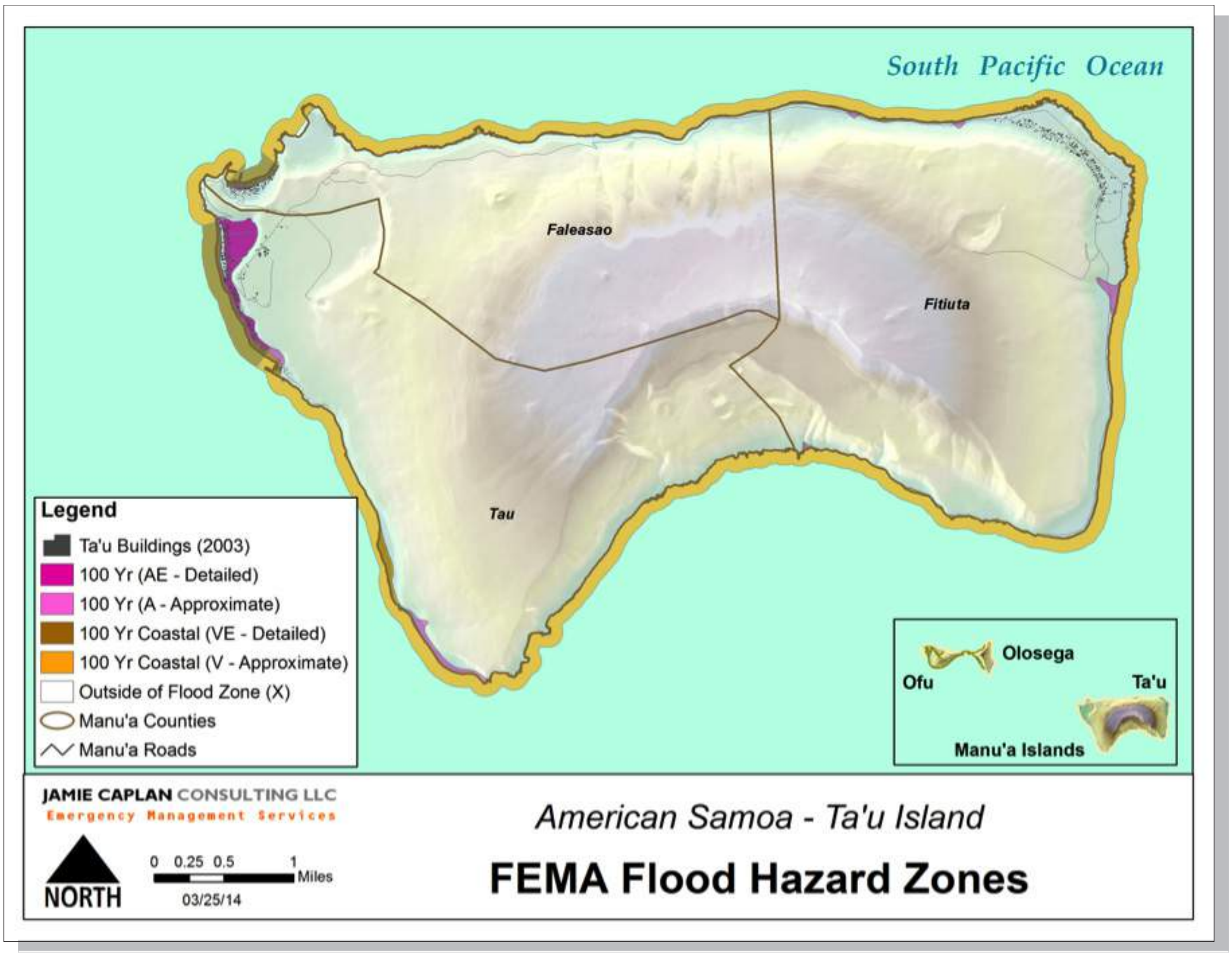


Figure 42 FEMA Flood Hazard Areas for Ta'u

Table 23 Amount of Floodplain by County in American Samoa

County (District)	Size of County (Sq. Mi.)	Size of A, AE Floodplain (Sq. Mi.)	Size of V, VE Floodplain (Sq. Mi.)
TUTUILA ISLAND			
East Vaifanua (East District)	2.13	0.24	0
Ituaa (East District)	4.89	0.44	0
Lealataua (West District)	9.22	0.41	0
Leasina (West District)	6.48	0.24	0
Maoputasi (East District)	6.69	0.44	0
Saole (East District)	1.68	0.16	0
Sua (East District)	6.87	0.33	0
Tualatai (West District)	2.53	0.03	0
Tualauta (West District)	9.91	1.13	0
West Vaifanua (East District)	2.19	0.12	0
Tutuila Island Total	52.59	3.54	0
AUNU'U ISLAND			
"Saole (East District)"	0.59	0.32	0
Aunu'u Island Total	0.59	0.32	0
MANU'A ISLANDS			
TA'U ISLAND			
Faleasoa (Manu'a District)	4.59	0.004	0.05
Fitiuta (Manu'a District)	6.73	0.03	0.04
Ta'u (Manu'a District)	6.23	0.14	1.84
Ta'u Island Total	17.55	0.16	1.93
OFU ISLAND			
Ofu (Manu'a District)	2.83	0.10	1.88
Ofu Total	2.83	0.10	1.88
OLOSEGA ISLAND			
Olosega (Manu'a District)	2.03	0.02	3.79
Olosega Total	2.03	0.02	3.79
TOTAL	**75.59**	**4.144**	7.6

As noted above, flooding is possible outside of designated flood zones. The flood event may be more severe than the depicted flood zones, for example. Additionally, changes in development can impact where water goes or much capacity there is for it to drain. Previous rain events may impact the capacity of natural and man made systems to handle additional water. Flooding is possible along streams and in urban areas.

Previous Occurrences

The most notable weather elements that influence disastrous flooding in the islands of American Samoa include events generally associated with low-pressure systems, such as thunderstorms, tropical cyclones, and tsunamis. These tropical downpours can occur as isolated incidents or in conjunction with tropical cyclones that come close to the islands. These downpours are of fairly short duration, but can release large volumes of water that at times cause flooding in low-lying areas, especially at the base of gulches, and in places where ponding is caused by faulty or inadequate drainage systems in low-lying urban areas.

Inland floods occur regularly in American Samoa, especially during the rainy season of December through March. They are primarily caused by excessive or prolonged rainfall combined with inadequate drainage capacity. As expected, urban flooding on Tutuila is most noticeable around population centers. This type of flooding has become more widespread in recent years due to population increases and associated increase of impervious surfaces.

Tropical cyclones carry immense rain with them and are a source of serious coastal flooding on American Samoa's low-lying shores and inland areas. While tsunamis are a dangerous flood and safety threat but are a less frequent threat to coastal areas. Appendix J: Summary of Significant Flooding Events

Table 24 Summary of Significant Flooding Events shows a summary of flooding events reported in American Samoa by the National Climatic Data Center. This data source begins in 1994. It indicates a total of fourteen flood events in the Manu'a Islands (7 flood, 6 flash flood, 1 heavy rain) and 66 flood events in Tutuila (39 flood, 25 flash flood, 2 heavy rain). These events resulted in over $55 million in damages reported in Tutuila (including a $50 million flood event with associated landslide damage). Additional events collected in other sources are also included. One death was reported due to flooding, and five deaths resulted due to landslides associated with flooding. Bolded events indicate more significant occurrences (such as known associated damages).

Extent

Extent can be measured by reviewing the mapped hazard areas and previous occurrences. The FEMA DFIRMs indicate areas of the 1.0-percent (100-year) annual chance flood areas. In addition, more severe floods, such as the 0.2-percent (500-year) annual chance flood or greater, are possible in the planning area. In these cases, additional land will be submerged and higher water levels are possible. Previous occurrences indicate ponding and flooding levels of a few inches to 3 feet in streets and structures throughout American Samoa. Lastly, it should be noted that future event may be more severe than what has been recorded to date. This is of particular concern given climate change impacts and an increase of severity in all types of hazard events.

Probability of Future Events
The probability of flooding was largely determined using the number of historical occurrences as discussed below. However, it is also relevant to note the potential connection to the ENSO cycle.

During El Niño years, there is an increased chance for flooding when tropical storms or hurricanes come close to, or impact American Samoa. On the other hand, without the tropical cyclone factor, there are less frequent localized flooding events caused by thunderstorm flooding during El Niño years. During the La Niña phase of ENSO, there are fewer tropical cyclones, leading to a lower probability for flooding rainfall. In contrast, there is often more thunderstorm activity during La Niña periods, suggesting an increased flood potential from that source.

The probability of flooding rainfall can be high to very high with the arrival of any tropical cyclone. As previously mentioned, slow-moving storms with high moisture can wreak havoc on the islands, even with lower wind speeds, due to flooding impacts. The likelihood of inland and coastal flooding can be severe during tropical cyclones.

In terms of determining a statistical measure of probability, the FEMA DFIRMs and historic events provide insight. It can be assumed that areas located in the base flood area on the DFIRMs have a one percent annual chance of flood occurrence (a categorization of Possible). However, flooding can occur outside of these areas and often does in American Samoa with heavy rain and tropical cyclone events. For this reason, historic events are also investigated.

According to the National Climatic Data Center, there were sixty-five flood and flash events reported in Tutuila since 1994, a 20-year reported period. There were fourteen events reported since 1944 in the Manu'a Islands. Based on these events, there is 100 percent annual probability of a flood event in Tutuila (highly likely) and a 70 percent annual probability (likely) of a flood event in Manu'a. However, it is important to note that the conclusions presented here are based on reported events and additional flood events may have occurred that were not reported. Further, some areas of the islands may be more susceptible to flooding.

National Flood Insurance Program Participation

American Samoa is a participant in the National Flood Insurance Program (NFIP), however they do not have any active policies at this time. To date, all NFIP policies in American Samoa have expired. Some policies were written following the 2009 Tsunami disaster declaration. However, all lapsed following the eligibility period since they were not renewed. Most policies expired in November 2012. Following the 2009 Tsunami, a total 462 policies were written in the villages as shown in Table 24.

Table 24 NFIP Policies by Village Following the 2009 Tsunami

Village	Number of Policies	Village	Number of Policies
Afao	3	Futiga	1
Afono	21	Laauli'i	4
Alao	28	Leloaloa	1
Alofau	23	Leone	43
Amaluia	15	Maloata	2
Amanave	9	Masausi	1
Amaua	1	Masefau	19
Amouli	3	Matu'u	3
Aoa	2	Nua	5
Asili	12	Nu'uuli	2
Aua	19	Olosega	1
Auasi	1	Onenoa	2
Aunu'u	1	Pagai	3
Auto	14	Pago Pago	48
Fagaalu	8	Poloa	2
Fagaitua	19	Sailele	2
Fagalii	5	Seetaga	25
Fagamalo	2	Tafuna	1
Faganeanea	2	Tula	33
Fagasa	43	Utusia	2
Fagatogo	2	Vaitogi	1
Failolo	1	Vatia	26
Fatumafuti	1	--	--
TOTAL	--	--	462

Vulnerability Assessment

Flooding is an increasingly serious problem in many areas of American Samoa, and a number of factors exacerbate this problem. Steep terrain in some areas results in high velocity stream flow. Shallow or ill-defined stream channels can rapidly overflow leading to overbank flooding, and urban development exaggerates these flooding extremes, since grading of the land can promote changes in drainage direction in streams. Development may also lead to increases in impervious surfaces thus reducing drainage capacity.

In some cases, stream channels have been redirected or moved to accommodate buildings, and this has caused sharp bends in the stream flow. Inadequately sized culverts are unable to accommodate stream flows during intense rainfall, causing a backup of floodwaters. Coastal roads are particularly vulnerable to flooding due to high surf, storm surge associated with tropical cyclones, or tsunamis. Lush vegetation and highly absorbent soil are two conditions that decrease vulnerability to flood hazards in American Samoa.

Previous occurrences indicate several impacts due to flooding including salinization of ground water drinking supply, damaged or structures homes and businesses, flooding of the hospital, mudslides, landslides, debris-blocked roads, flooded streets, traffic congestion, evacuation, sheltering needs and runoff. These impacts often result in costly cleanup and business interruption.

Although the flood hazard does have a defined boundary, all current and future structures and populations should be considered at risk. As noted throughout this section, flooding my not occur in designated areas. Changes in development and climate have increased the severity of this hazard for the islands and flood is considered a high hazard based on the PRI results.

Potential Losses

A GIS analysis of buildings that are potentially at risk to flooding was conducted. This analysis does include any information on building elevation. In other words, if a structure is elevated to withstand flooding, this analysis would not account for that. However, it assumed that most buildings are not elevated given older construction and local knowledge of the islands.

Tutuila has buildings at risk along almost the entire coastline. The northwestern portion of the coast is least impacted, though there is very limited development there. In addition, the greater Pago Pago area has several structures at risk along the coast. The Tafuna Plain, especially Tafuna Plain East has significant risk, including inland areas in Tualauta and Ituau counties. There is also risk in east Tutuila. Aunu'u has risk in the eastern portion of the island, where development is concentrated. Nearly all of the island's structures appear to be at risk to flooding. Maps can Tutuila and Aunu'u can be found on the proceeding pages starting with Figure 43 on page 109 and in the table below.

Buildings are also at risk in Manu'a. On Ofu, building risk is concentrated on the northwestern portion of the island. On Ofu, most development is out of the floodplain. However, a small cluster of buildings resides on the southwestern edge of the island. Maps for Ofu and Olosega buildings at risk can be found in Figure 49 below. On Ta'u, development is concentrated in the northeastern and northwestern portions of the island (Figure 50). However, only the northwestern portion has buildings at risk. This information is reinforced in the table and figures below.

Table 25 below highlights the approximate number of buildings in the A and V flood zones on Tutuila, Aunu'u and Manu'a Group islands.

Table 25 Buildings Potentially At Risk to the A/AE Zones and V/VE Zones

County (District)	Total Number of Buildings	Total Number of Buildings in A, AE zones	Percent of Buildings in A, AE zones	Total Number of Buildings in V, VE zones	Percent of Buildings in V, VE zones	Percent of Buildings flood zones
TUTUILA ISLAND						
East Vaifanua (East District)	497	298	60%	0	0%	60%
Ituau (East District)	1,075	592	55%	0	0%	55%
Lealataua (West District)	2,026	612	30%	0	0%	30%

County (District)	Total Number of Buildings	Total Number of Buildings in A, AE zones	Percent of Buildings in A, AE zones	Total Number of Buildings in V, VE zones	Percent of Buildings in V, VE zones	Percent of Buildings flood zones
Leasina (West District)	474	78	16%	0	0%	16%
Maoputasi (East District)	2,246	756	34%	0	0%	34%
Saole (East District)	543	352	65%	--	0%	65%
Sua (East District)	938	493	53%	0	0%	53%
Tualatai (West District)	903	4	0%	0	0%	0%
Tualata (West District)	7,441	920	12%	0	0%	12%
West Vaifanua (East District)	172	141	82%	0	0%	82%
Tutuila Island Total	16,315	4,246	26%	0	0%	26%
AUNU'U ISLAND						
Saole (East District)	179	175	98%	0	0%	98%
Aunu'u Island Total	179	175	98%	0	0%	98%
MANU'A ISLANDS						
TAU ISLAND						
Faleasoa (Manu'a District)	81	17	21%	3	4%	25%
Fitiuta (Manu'a District)	180	0	0%	0	0%	0%
Ta'u (Manu'a District)	208	124	60%	9	4%	64%
Ta'u Island Total	469	141	30%	12	3%	33%
OFU ISLAND						
Ofu (Manu'a District)	133	40	30%	4	3%	33%
Ofu Total	133	40	30%	4	3%	33%
OLOSEGA ISLAND						
Olosega (Manu'a District)	101	0	0%	7	7%	7%
Olosega Total	101	0	0%	7	7%	7%
TOTAL	17018	4427	26.0%	23	0.1%	26.1%

It is clear from the analysis that all counties are subject to flood risk and potential losses. The analysis indicates that West Vaifanua County has the greatest percent of buildings in the floodplain Maoputasi (Pago Pago Harbor) has the highest number of buildings in the floodplain. This area is highly developed. In addition, NFIP claims following the tsunami were highest in Pago Pago (Maoputasi County), Fagasa (Ituau), Leone (Lealataua), and Tula (East Vaifanua). These counties cover the far eastern county, far western county and Tafuna Plain.

A critical facility analysis was also performed using available data. It should be noted, however, that the GIS analysis performed does not account for building elevation. The buildings identified may be constructed to withstand the 100-year flood or greater flood events. The results indicated that 84 critical facilities, including the new district court building, schools and fire stations, were reported as in the A/AE floodplain in Tutuila. These structures have an approximate combined value of $320,032,311. No additional structures were determined to be located in the V/VE zone on Tutuila. Eighteen critical facilities were reported in Ta'u (no values provided). In Ta'u, several stores and the hospital reside in the floodplain according to the analysis results. As previously discussed, no critical facilities were provided for the Ofu and Olosega Islands. The following table, Table 26, highlights the results. Several figures also note the location of these critical facilities beginning with Figure 51.

Table 26 Number of Critical Facilities (CFs) in the Floodplain hazard Area

Location	Total Number of Buildings	Total Number of CFs in the A, AE Zones Areas	Estimated Value	Total Number of CFs in the V, VE Zones Areas	Value
Tutuila Island CFs	241	85	$320,032,311	0	$0
Ta'u Island CFs	42	18	N/A	6	N/A

Assembly Areas

- One assembly area was found to intersect the A/AE flood zone. It is important to realize that these areas are subject to flooding and would not be a safe assembly locations during flood events.

Safe Zones

- No safe zone areas in Tutuila intersect the A/AE flood zone.

Tsunami Sirens

- Thirty-one sirens are located in the A/AE flood zone, and one siren is located in the V/VE flood zone (on Ta'u). These structures, mostly new and made of metal, are largely fortified from flood. However, frequent flooding may compromise their foundation. The complete list of at risk sirens can be found in Appendix D.

ASTCA Infrastructure

- Eleven ASTCA infrastructure items were including 2 ASTCA stores, 4 cell sites, 2 microwaves towers, 1 cell tower, and 2 DCO buildings. The buildings, in particular, are at risk to flood. The remote cell sites are typically on a pole and could be damaged if the pole is displaced. The towers are less likely to be impacted by flood.

A complete listing of critical facilities and associated information (such as assembly areas, safe zones, and tsunami sirens) can be found in Appendix D.

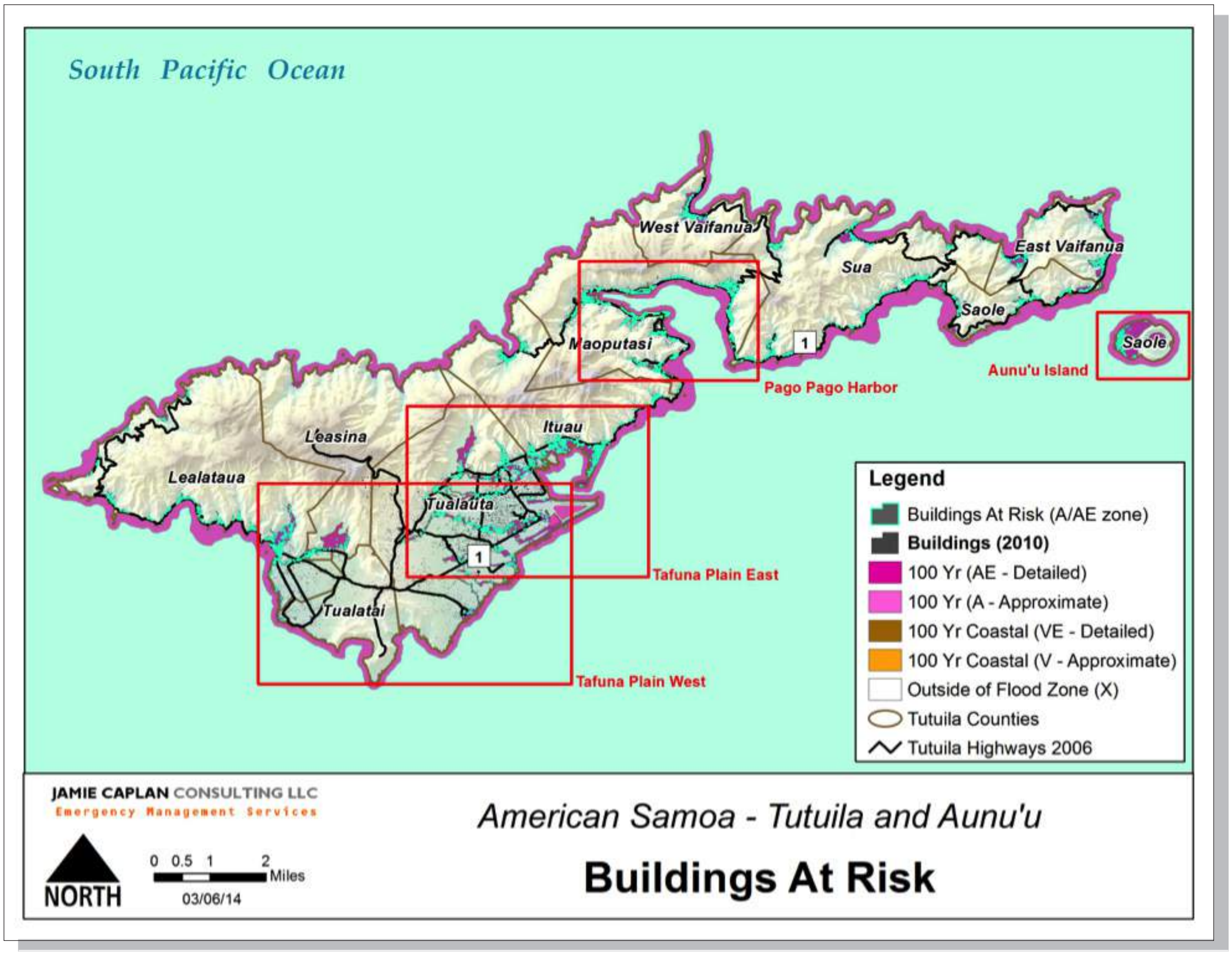


Figure 43 Buildings Potentially At Risk to Flooding on Tutuila and Aunu'u Islands

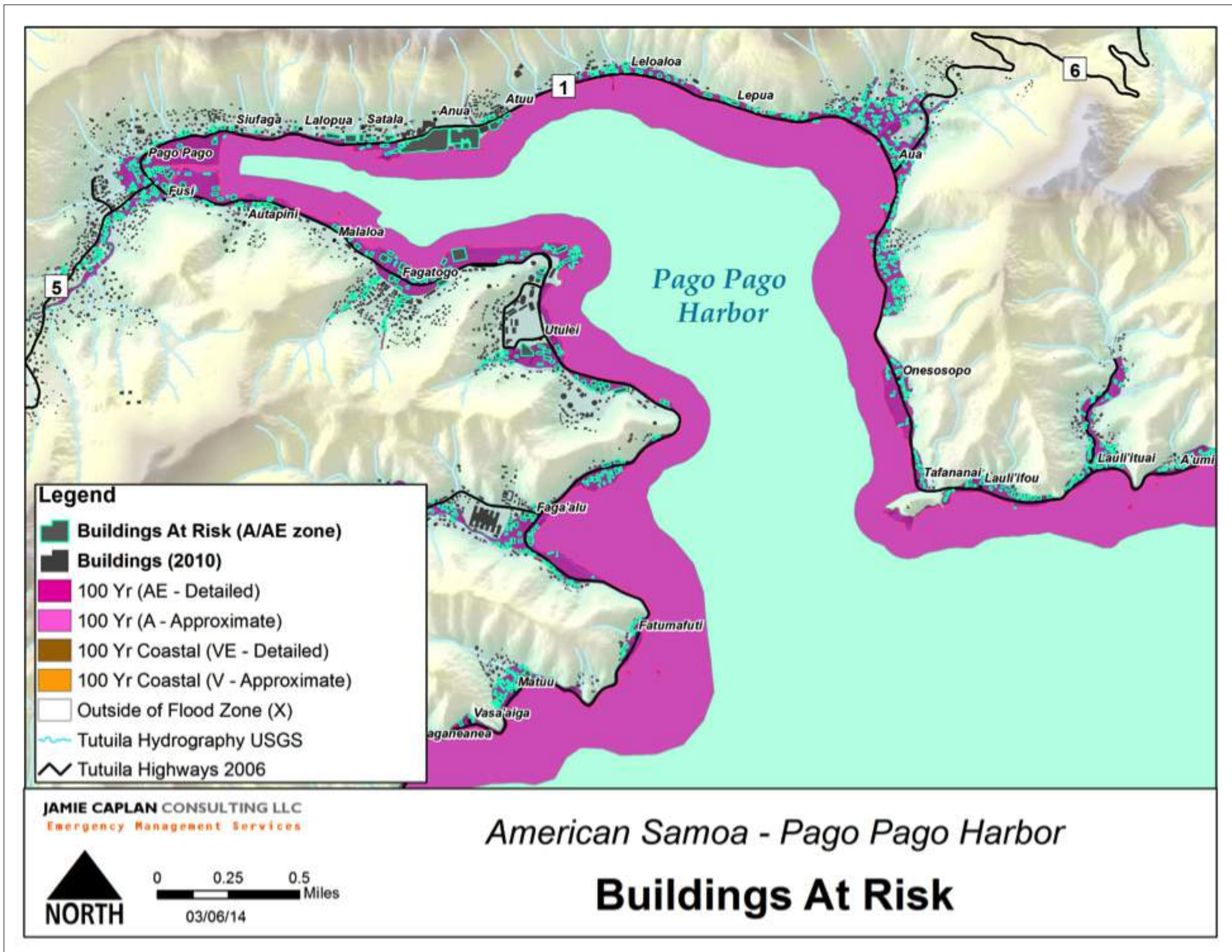


Figure 44 Buildings Potentially At Risk to Flooding in Greater Pago Pago

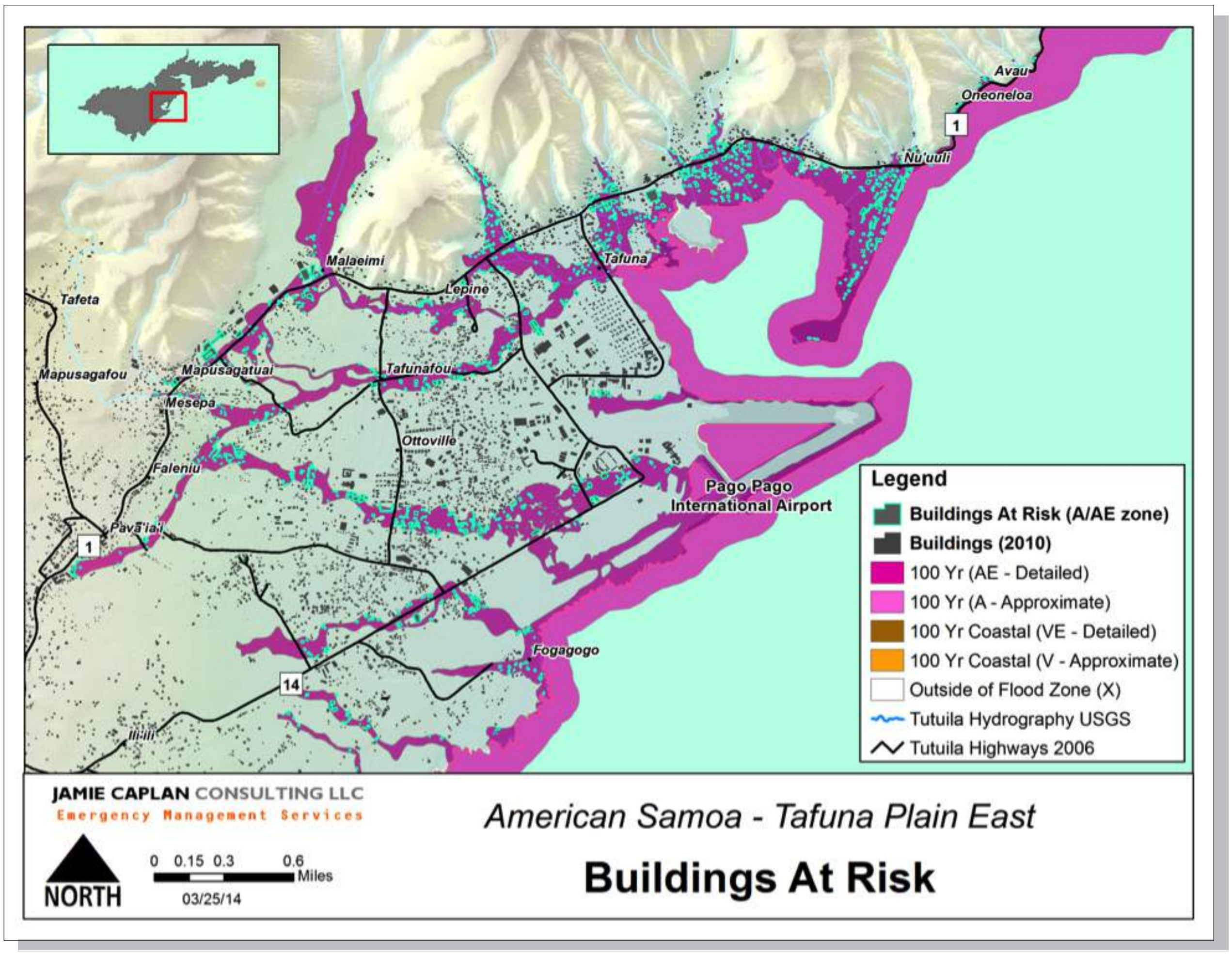


Figure 45 Buildings Potentially At Risk to Flooding in Tafuna Plain East

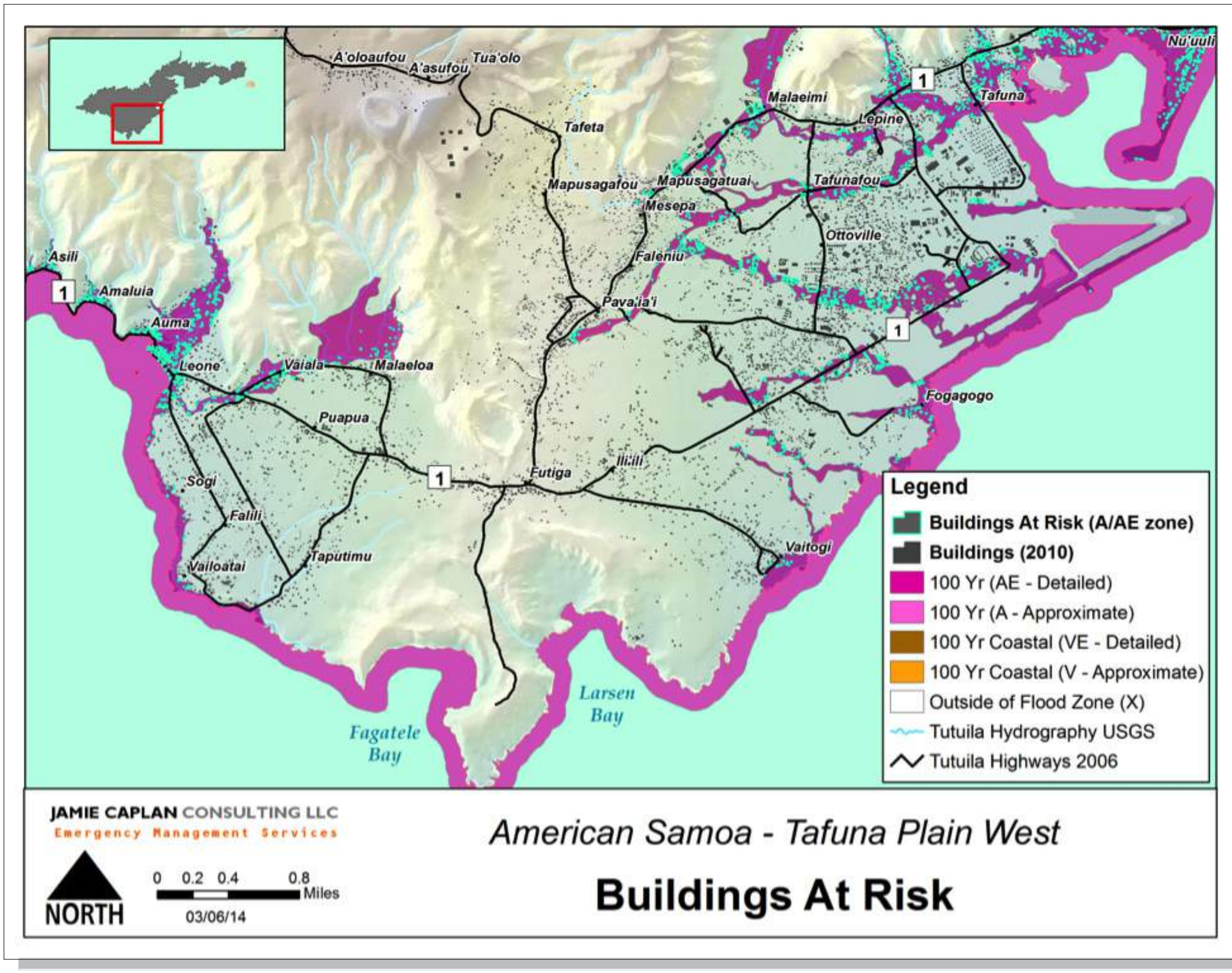


Figure 46 Buildings Potentially At Risk to Flooding in Tafuna Plain West

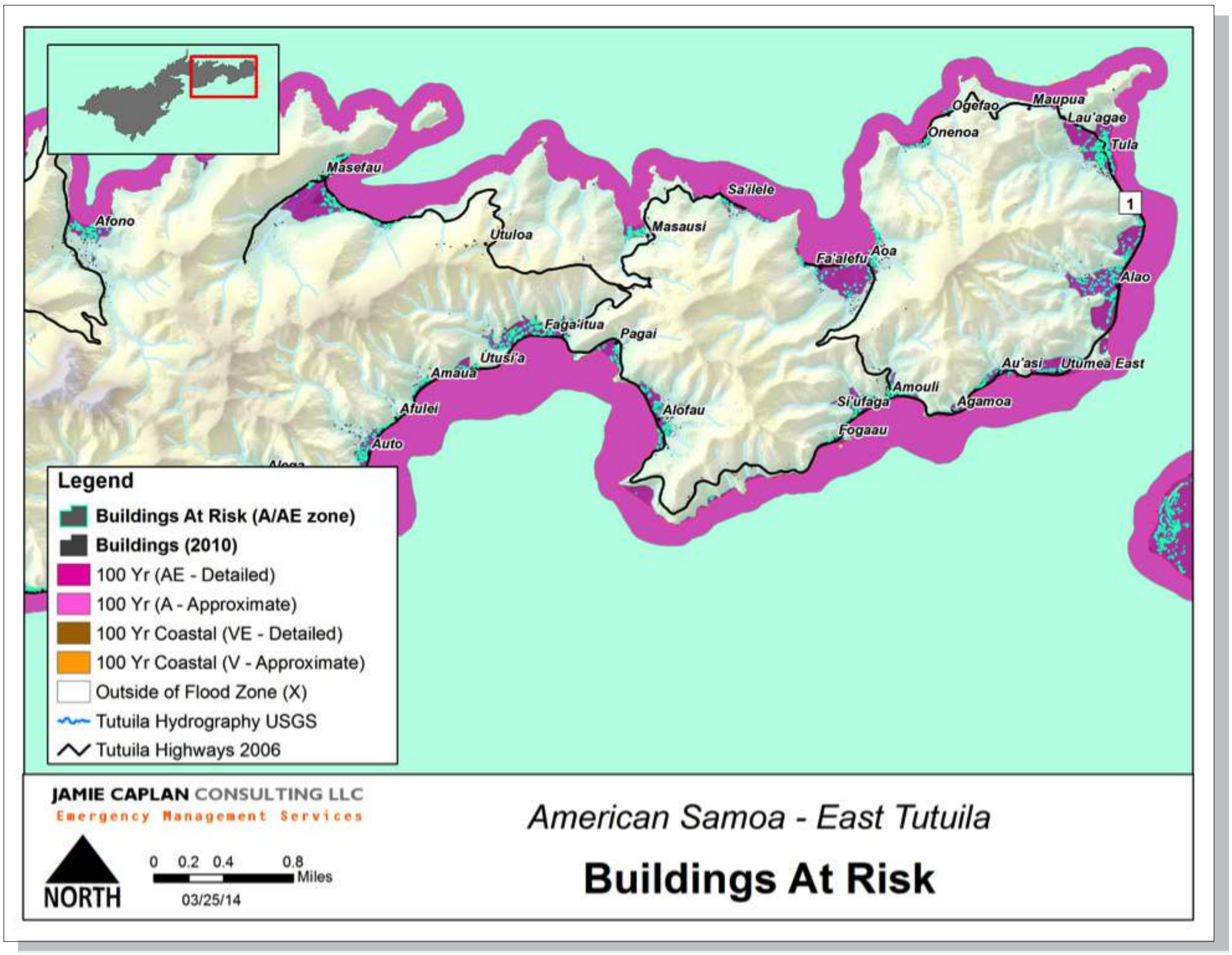


Figure 47 Buildings Potentially At Risk to Flooding in East Tutuila

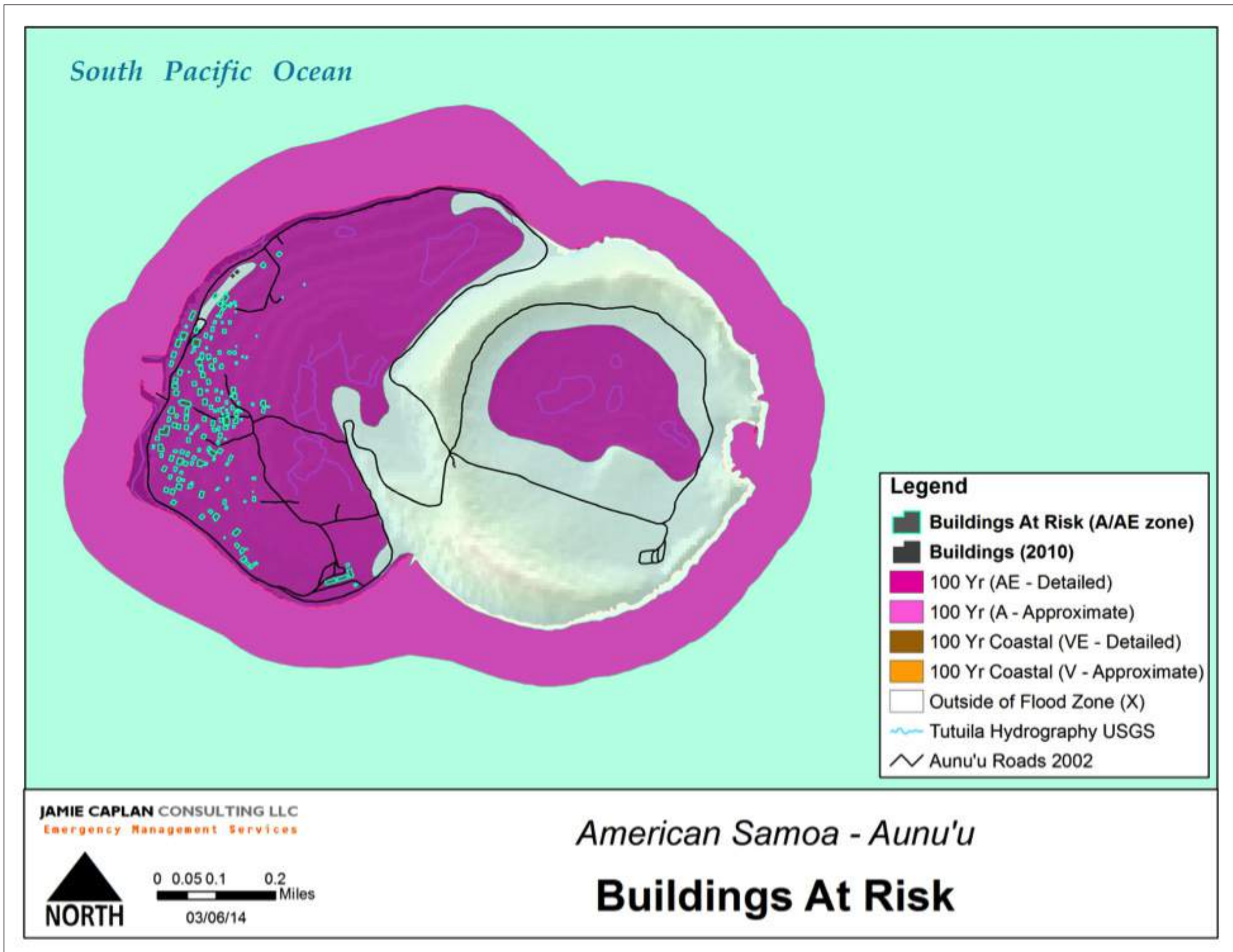


Figure 48 Buildings Potentially At Risk to Flooding on Aunu'u Island

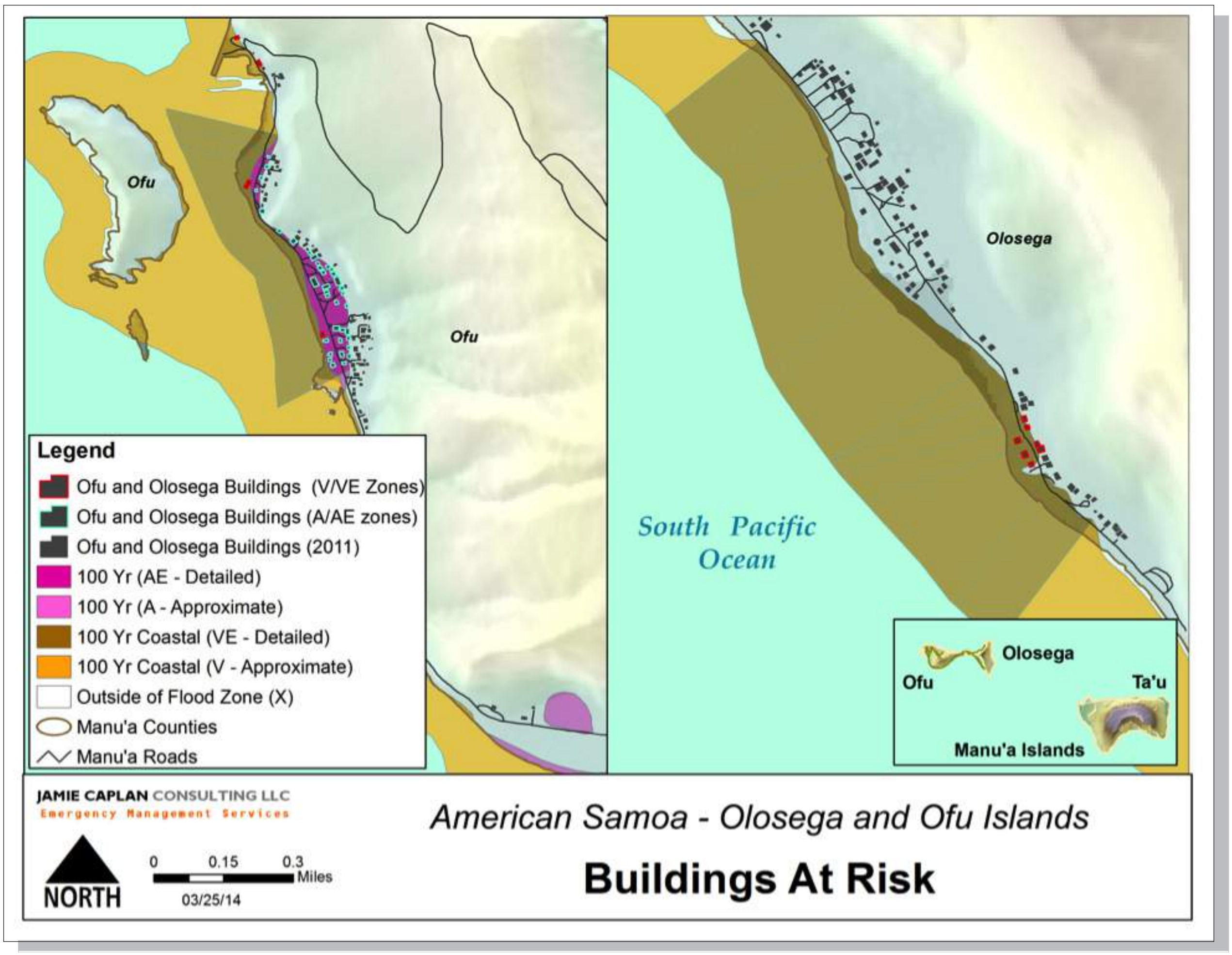


Figure 49 Buildings Potentially At Risk to Flooding on Olosega and Ofu Islands

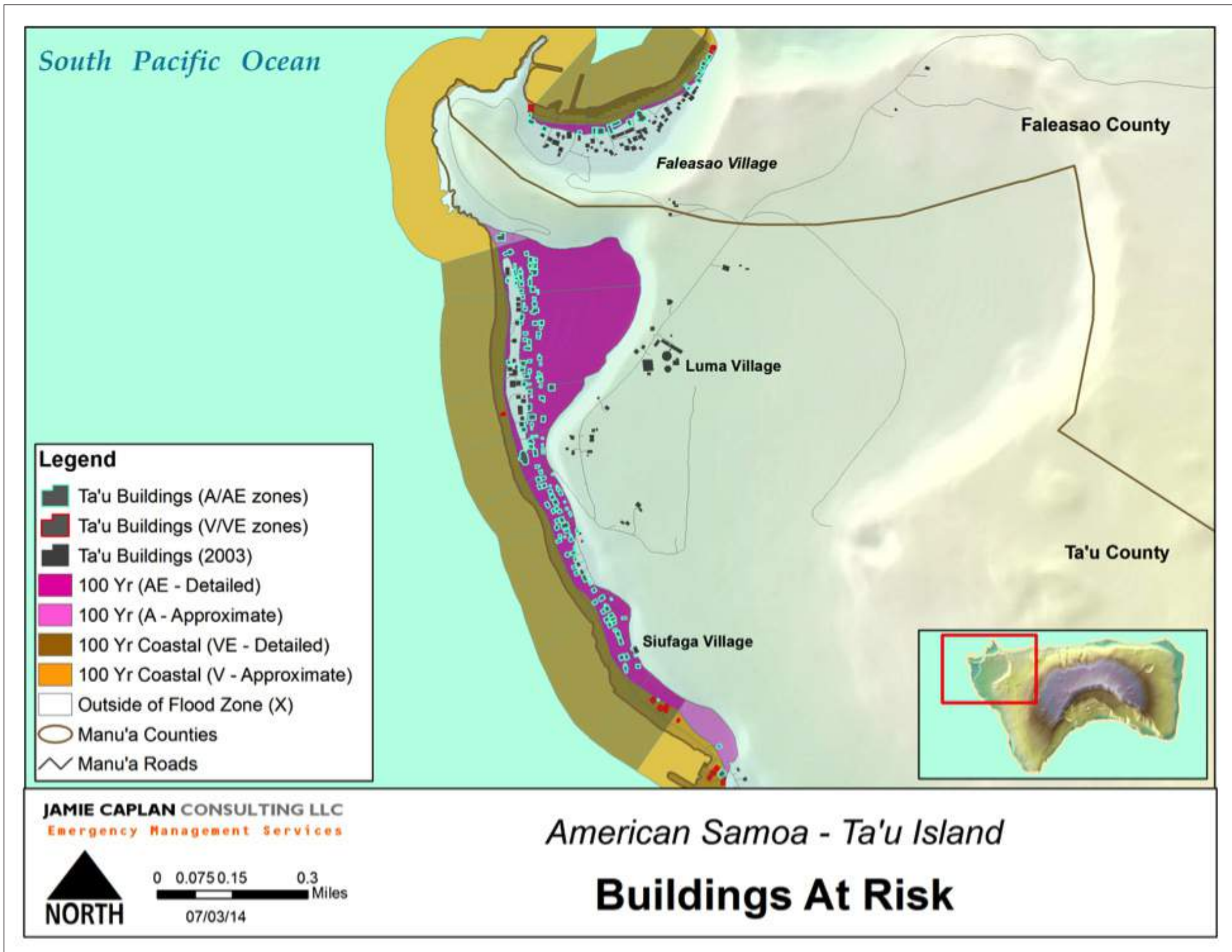


Figure 50 Buildings Potentially At Risk to Flooding on Ta'u Island

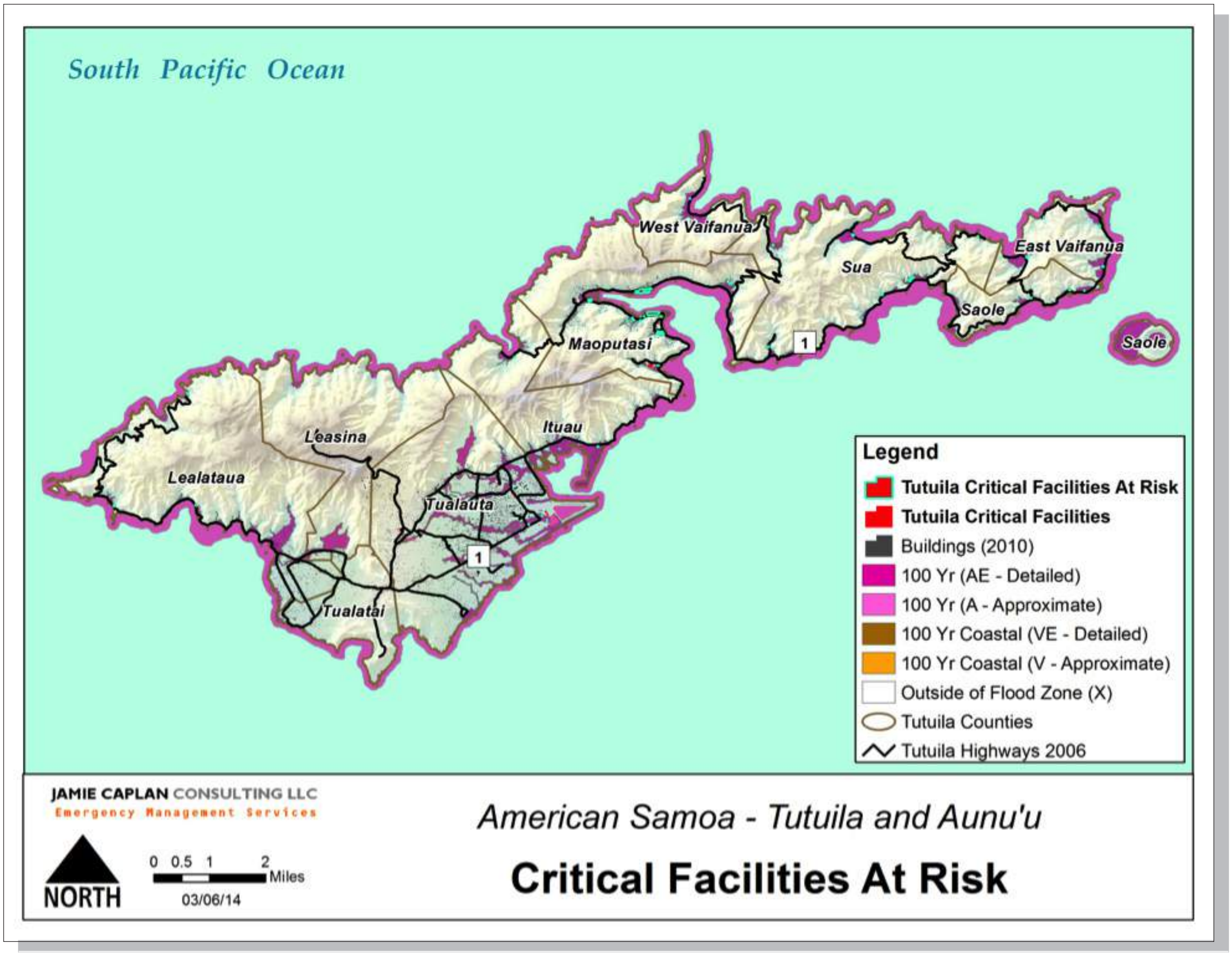


Figure 51 Critical Facilities Potentially At Risk to Flooding in Tutuila

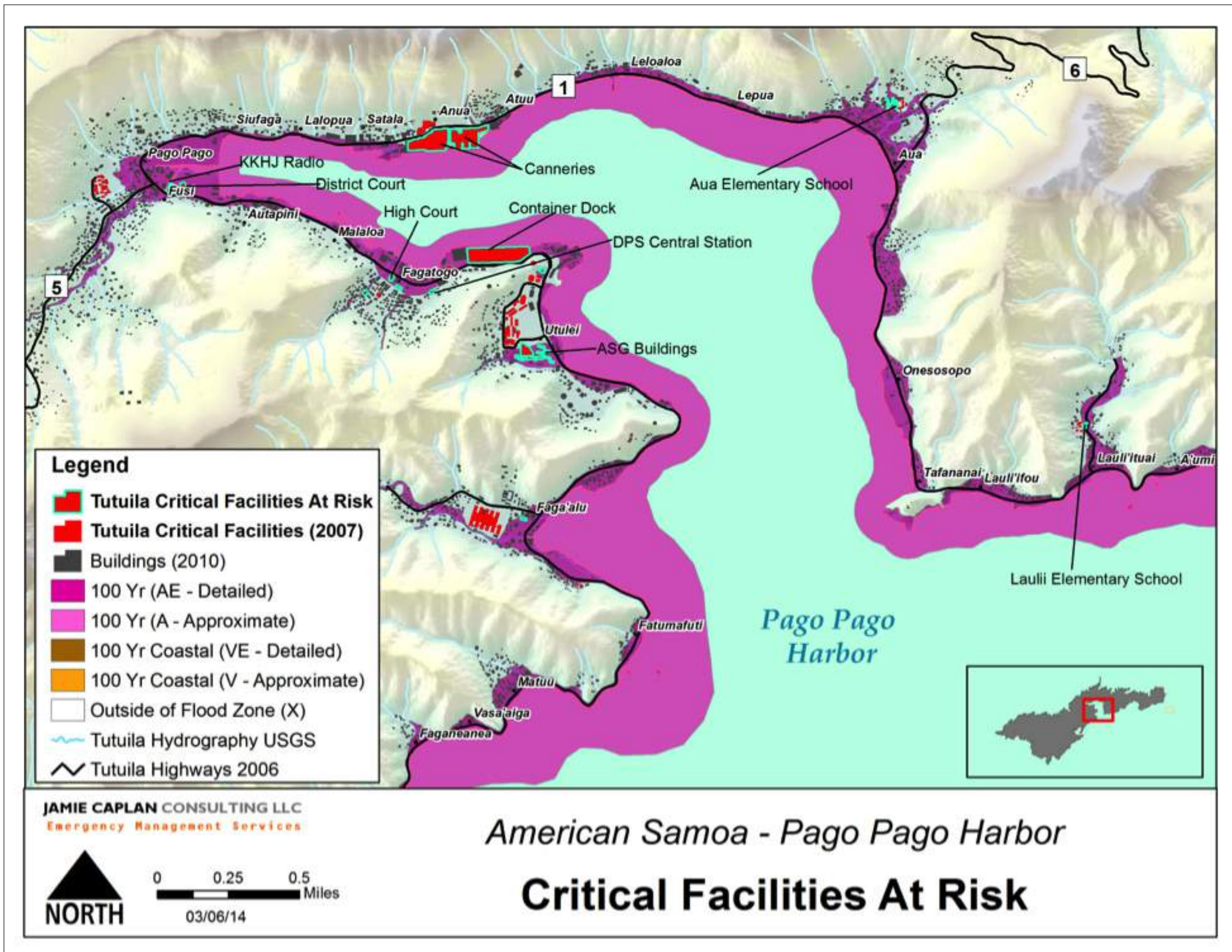


Figure 52 Critical Facilities Potentially At Risk to Flooding in Greater Pago Pago

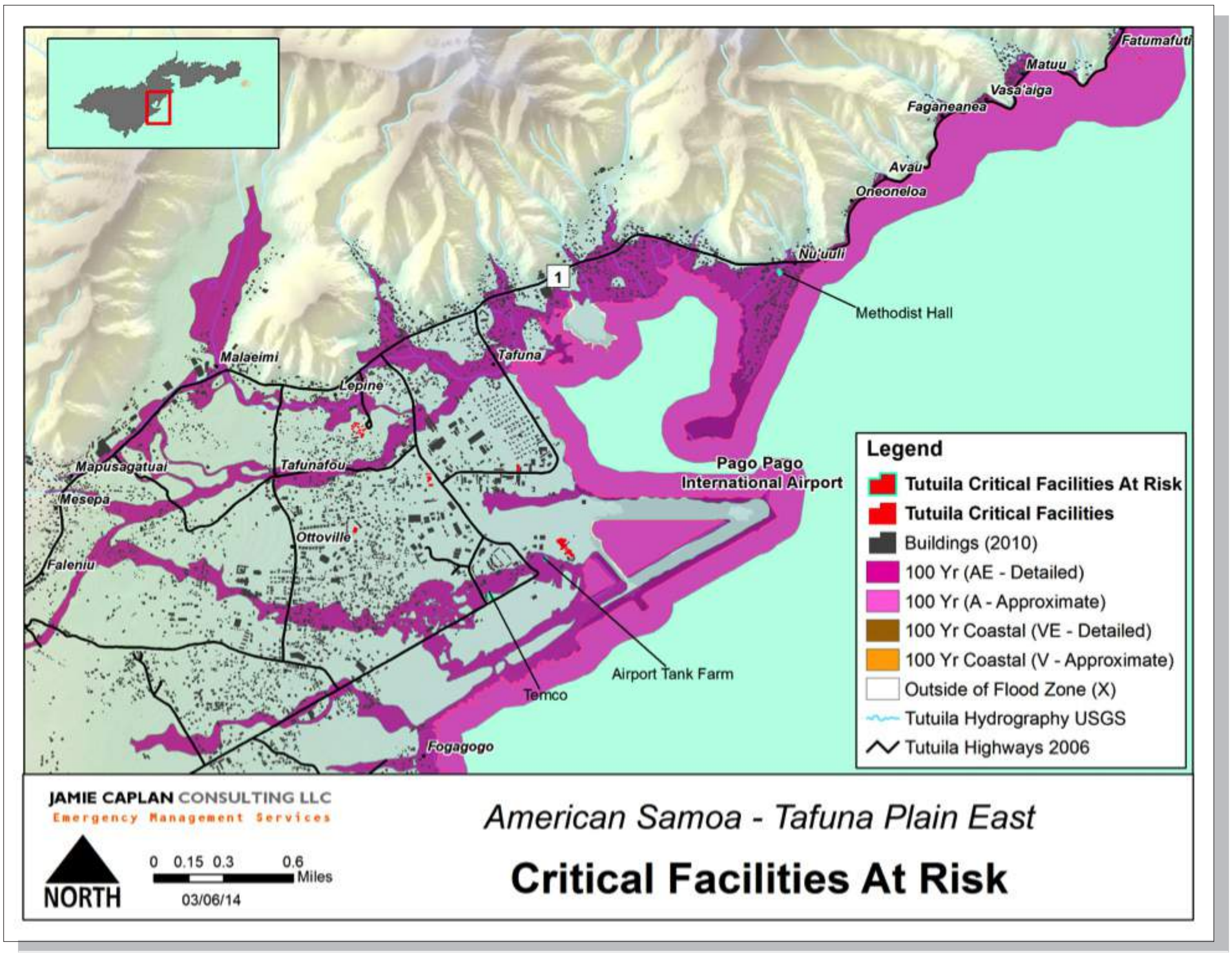


Figure 53 Critical Facilities Potentially At Risk to Flooding in Tafuna Plain East

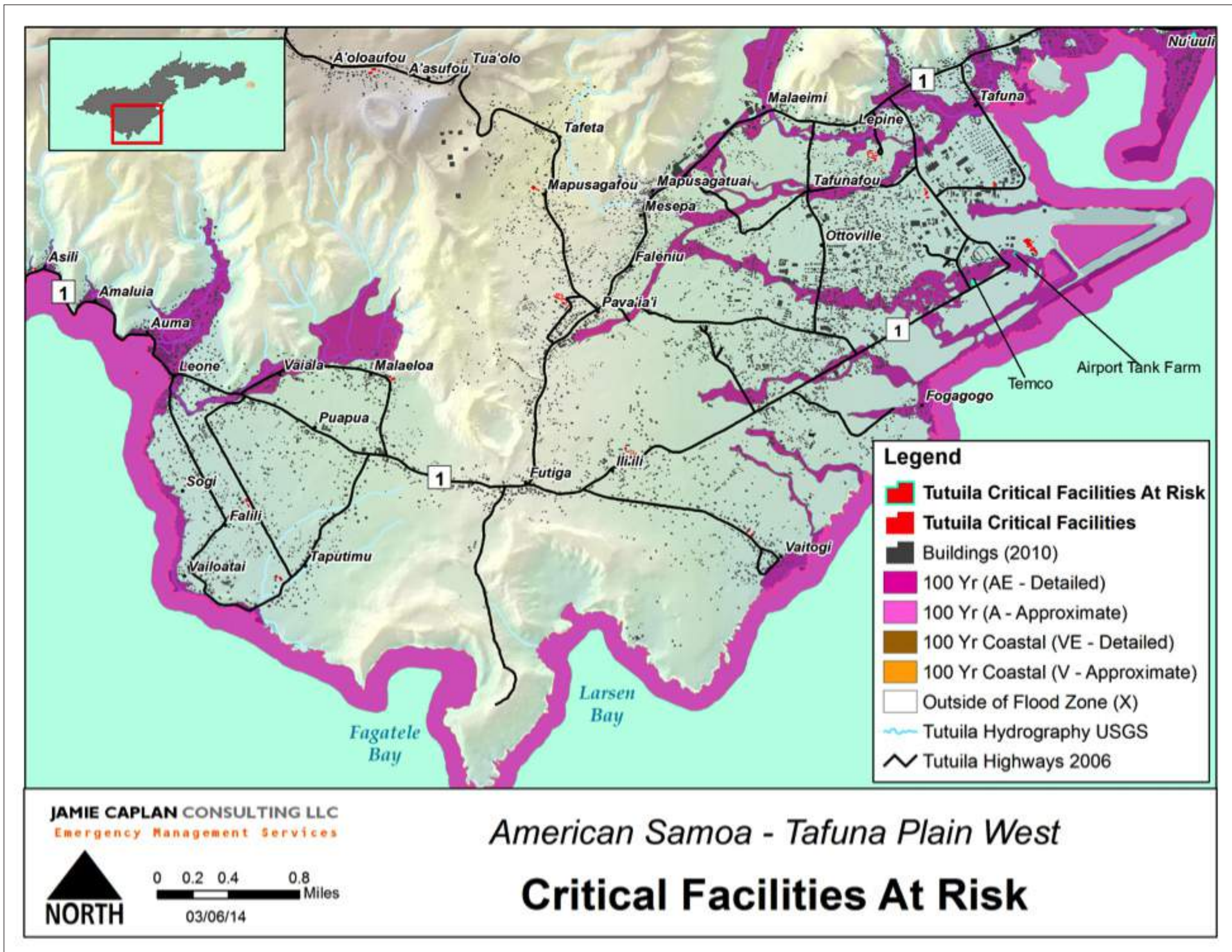


Figure 54 Critical Facilities Potentially At Risk to Flooding in Tafuna Plain West

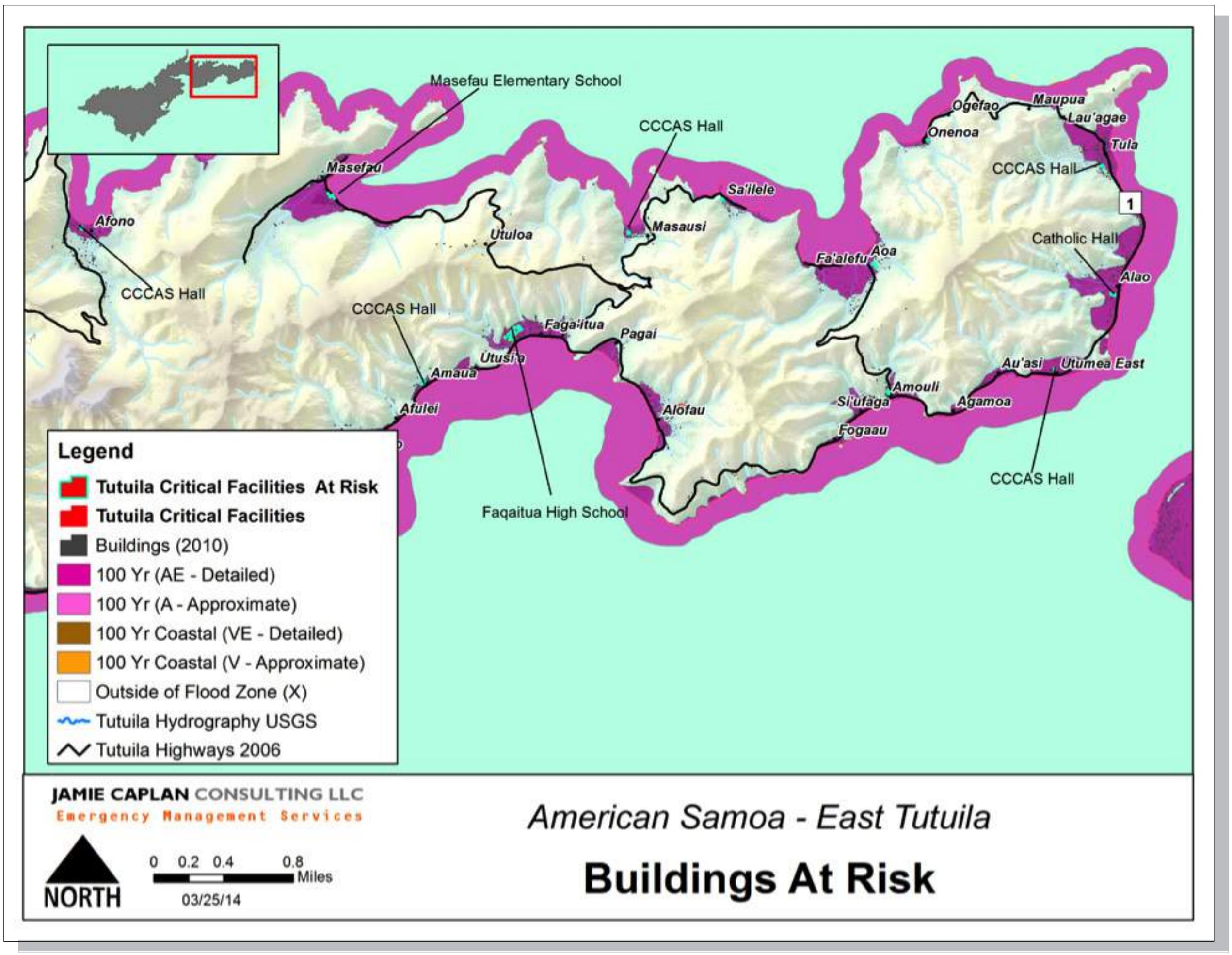


Figure 55 Critical Facilities Potentially at Risk to Flooding in east Tutuila

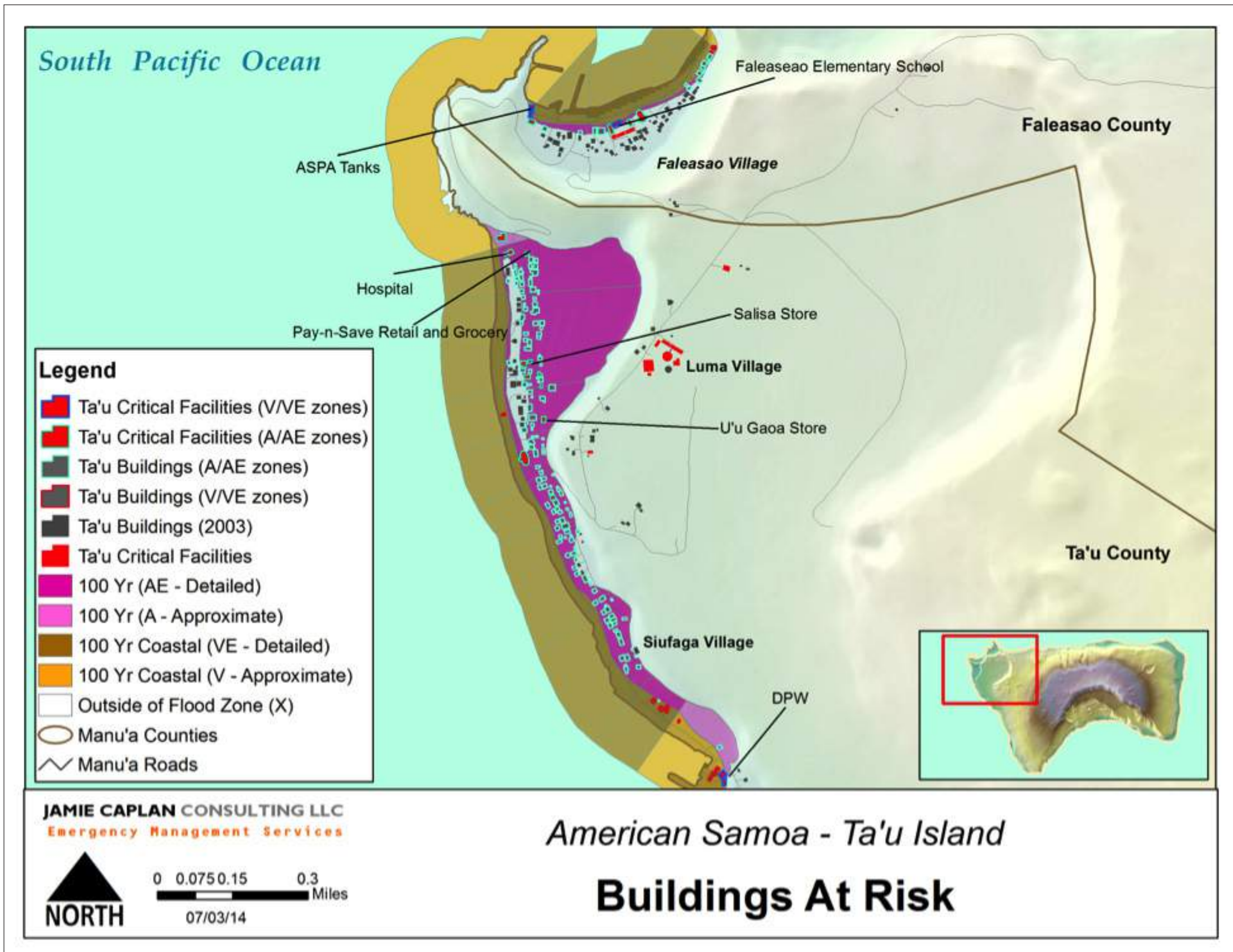


Figure 56 Buildings and Critical Facilities Potentially At Risk to Flooding on Ta'u Island

Hazardous Materials

While the focus and federal requirement of the hazard mitigation plan is for natural hazards, American Samoa does have a notable hazardous materials (HAMZAT) presence on island. For that reason, HAZMAT is briefly discussed in the plan. In the 2011 update, American Samoa noted that it is working to improve their HAZMAT protocols. In fact, American Samoa will soon have a multi-agency HAZMAT team in place. It was noted that American Samoa stores and distributes about 38 million gallons of diesel, jet fuel and gasoline every year. Distribution is by pipeline and road, and the roads are often in poor repair. American Samoa officials train a wide cross section of the community regularly on spill response and mitigation and have been successful at limiting accidental discharges both in transit and in storage. One facility that continues to pose a large risk is the storage facility at the airport. It is located in the middle of the public parking lot and as such presents a risk and a public safety hazard. American Samoa would like to relocate the facility to a safer location in the future.

HAZMAT disposal is also a major issue in American Samoa. Dangerous hazardous materials are being abandoned which creates a safety and health issue to nearby dwellings and to the environment. Abandoned hazardous materials or hazardous waste have the potential to impact public health, streams, coastal waters, can destroy coral reefs, impact groundwater resources, and degrade of the quality of life if they are not applied, handled and stored properly in accordance with the label.

The American Samoa Environmental Protection Agency (ASEPA) often disposes of abandoned hazardous materials/waste by using different types of neutralizing/diluting methods. On some occasions, US EPA has provided assistance as to the proper disposal of some of the lethal hazardous materials/waste that ASEPA was able to identify.

ASEPA is currently working collaboratively with ASPA and Department of Port Administration on proper measures to remove the existing scrap metal site to a new permanent site and to restore the old site by conducting bio-remediation work. This is an on-going effort and until American Samoa can secure a new location for the new scrap metal facility, the old site remains hazardous in the event of a natural disaster. Two schools and a popular fast food restaurant (McDonalds) are located in close proximity to the scrap metal site.

Further, ASEPA is in the process of providing Department of Education compliance assistance on properly managing quantity and volume of purchased laboratory chemicals. In the past 3 to 4 years, ASEPA, with the assistance of US EPA continues to collect old chemicals from high school Laboratories island wide for disposal. Unfortunately, not all chemicals can be disposed on Island and have to be stored properly until other disposal or shipping measures are arranged or established.

According to the Federal Register notice of July 1, 1994, the impact of a complete discharge of the largest tank of 54,293 barrels (2,280,306 gallons) would affect a radius of five (5) miles. This would impact the entire harbor, including all environmentally sensitive and all vulnerable areas. However, this is unlikely since all tanks are held within a diked area. In the event of a spill into the harbor, the actual impact would be highly dependent on currents, tides and the wind. The prevailing wind between 7 and 15 mph from the southeast will tend to push the oil to the western side of the harbor.[50]

50 Non-Transportation Related Facility Response Plan, January 2007 p.36.

High Surf

Description

High Surf is defined by NOAA as large waves breaking on or near the shore resulting from swells spawned by a distant storm. High surf may range from waves a few feet to 20 or more feet above normal. They often result in rip tides and beach erosions. A High Surf Advisory is issued when breaking wave action poses a threat to life and property within the surf zone. High surf criteria vary by region and are issued by NOAA for American Samoa. High surf conditions are possible at any time but are common between May and October in American Samoa.

In addition, American Samoa could see waterspout activity (tornadoes over water), which can be dangerous to small craft, and bring very strong and gusty winds ashore. High surf generated by the approach of a strong to very strong hurricane can cause large breaking waves to arrive several days before the hurricane's center impacts the area. These high surf episodes can start in the 5 to 10-foot range, but can quickly increase in size to 15-20+ feet as the storm gets closer. High surf damage can increase during higher than normal tides, although a barrier reef or a sea wall can mitigate the associated damage to some degree.

Location

High surf is possible along all shorelines of the American Samoa islands. However, given the formation and typical tracks of low pressure and tropical systems from the south and west, the south-facing shorelines receive high surf conditions much more frequently than northern-facing area.

Previous Occurrences

A total of 44 high surf events were reported in American Samoa between 1994 and 2008 as shown in the table below according to NCDC. (It is unknown why events were not reported after 2008. It is known that high surf continues to impact the islands.) Two additional high surf advisories were reported in 2014 (it is likely that high surf advisories were reported in other years but information was not found.) Of the 44 events, 23 were reported across all islands, 18 were reported on Tutuila, and 1 was reported for the Manu'a Islands. All of these occurrences are included in Appendix L: Previous Occurrences of High Surf.

Extent

Previous occurrences of high surf indicate high surf conditions ranging from 3 to 30 feet. Higher surf is possible in American Samoa but would be a rare event as is evident by very few events over 14 feet. A mode and median of approximately twelve feet was calculated.

Probability of Future Events

A total of 44 high surf events were reported in American Samoa between 1994 and 2008, a fourteen-year reporting period. Of the 44 events, 23 were reported across all islands, 18 were reported on Tutuila. This results in an overall annual probability of high surf of 100 percent for all islands and Tutuila alone. However, high surf events where heights above 12 feet (the mean) were less frequent. This resulted in 10 events reported for all islands (an approximate annual probability of 71 percent) and 6 events reported in Tutuila alone (an approximate annual probability of 43 percent). The overall probability of any high surf on American Samoa is highly likely (greater than 90% annual probability), though the probability of strong events (waves greater than 12 feet), is likely (between 10% and **90% annual probability).**

Vulnerability Assessment

The previous occurrence narratives provide insight to the impacts of high surf in American Samoa. High surf does not typically result in property damage but has caused damage to roads and beaches. Impacts reported include washed-up coral debris, coastal flooding, roadblocks and traffic congestions due to washed up debris, rip tides, and coastal erosion. Since there is risk of coastal flooding due to high tide, all existing and future structures and populations residing in coastal areas are considered at risk. Of particular concern, are those in the FEMA V or VE flood zones.

High surf can also have significant impacts on the economy. High surf may prevent fishermen from going out to sea due to rough saves and high waves along the coast. It may also cause waves in Pago Pago Bay, which can hinder port activity and deter beachgoers which can also impact local businesses.

High surf also poses a safety risk. The hazard has resulted in one death to date, when a police officer went to rescue a person in the high seas. It has also resulted in injury to crew abroad fishing vessels when the vessels capsized. Lastly, riptides caused by high surf may injure or kill swimmers or fishermen in the ocean waters.

Potential Losses

All current and future structures and populations along the coast are at risk to high surf. All counties have coastline, which makes them equally vulnerable to high surf impacts and losses. While this hazard has not caused notable damage to date, continued climate changed and increased hazard occurrence may lead to greater impacts in the future.

Landslides

Description

According to the United States Geological Survey, each year landslides cause $5.7 billion (2014 dollars) in damage and between 25 and 50 deaths in the United States.[51] A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, and changes in groundwater levels. Other contributing factors include:

- Erosion by rivers, road construction, or ocean waves that create over-steepened slopes
- Rock and soil slopes weakened through saturation by heavy rains
- Earthquakes that make weak slopes fail
- Earthquakes of magnitude 4.0 and greater have been known to trigger landslides
- Volcanic eruptions produce loose ash deposits
- Excess weight from accumulation of rock or ore, from waste piles, or from man-made structures may stress weak slopes to failure

Slope material that becomes saturated with water may develop a debris or mudflow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries causing flooding along its path.

51 Landslide Hazards – A National Threat. (2005).United States Geological Survey (USGS) - United States Department of the Interior.

There are several types of landslides: rock falls, rock topple, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling of rocks, often from a steep slope. A topple is a section or block of rock that rotates or tilts before falling to the slope below.

Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Landslides are typically associated with periods of heavy rainfall and tend to worsen the effect of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly.

Mudflows, sometimes referred to as mudslides, debris flows, lahars or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as heavy rainfall, changing the soil into a flowing river of mud or "slurry" (a typical debris flow). Debris flows can flow rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. Debris flows can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflow spreads over a broad area where it can accumulate in thick deposits.

Among the most destructive types of debris flows are those that accompany volcanic eruptions. A spectacular example in the United States was a massive debris flow resulting from the 1980 eruptions of Mount St. Helens, Washington. Areas near the bases of many volcanoes in the Cascade Mountain Range of California, Oregon and Washington are at risk from the same types of flows during future volcanic eruptions.

Areas that are generally prone to landslide hazards include previous landslide areas; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes.

Location

Landslides (including rock falls and debris flows) are possible throughout American Samoa. However, areas along or at the base of mountains or steep terrain are particularly susceptible. Many of the steep slopes that rise toward the center of the Tutuila Island are considered high landslide risk, whereas the Tafuna Plain's gentler slope makes it a lower landslide risk. Historical occurrences of landslides are one indicator of future landslide risk. On Tutuila, where data on historic landslides is available, landslides have primarily occurred along the western edge of the island in Lealataua County. There are also recorded occurrences along the southern coast of Ituau County and southwestern Sua County near Faga'itua Bay. The maps for historic landslides can be found in the section below.

In addition to historic landslides, some data exists on landslide risk location. The USDA/NRCS landslide risk map for the island of Tutuila distinguishes between three categories of risk. These areas are described below and shown in Figure 57.

- o Low-risk areas are characterized by gentle slope (20% or less slope) and/or soils that are not slide prone and/or good vegetation cover. Structures in low-risk areas are not immediately down slope of, or built on, steep or moderate slopes. Low risk areas are depicted in green in the maps below.
- o Medium-risk areas include structures that are immediately down slope of, or built on, steep slopes with less slide prone soils or are on/near moderate slopes (20% to 60% slope) with high slide-prone soils. Medium-risk areas are depicted in yellow.
- o High-risk areas are those that include structures immediately down slope of, or built on, steep slopes (60% to 80+% slope). There are approximately 14,125 acres of high-risk landslide area. These areas are shown in red and make up 42% of Tutuila Island.

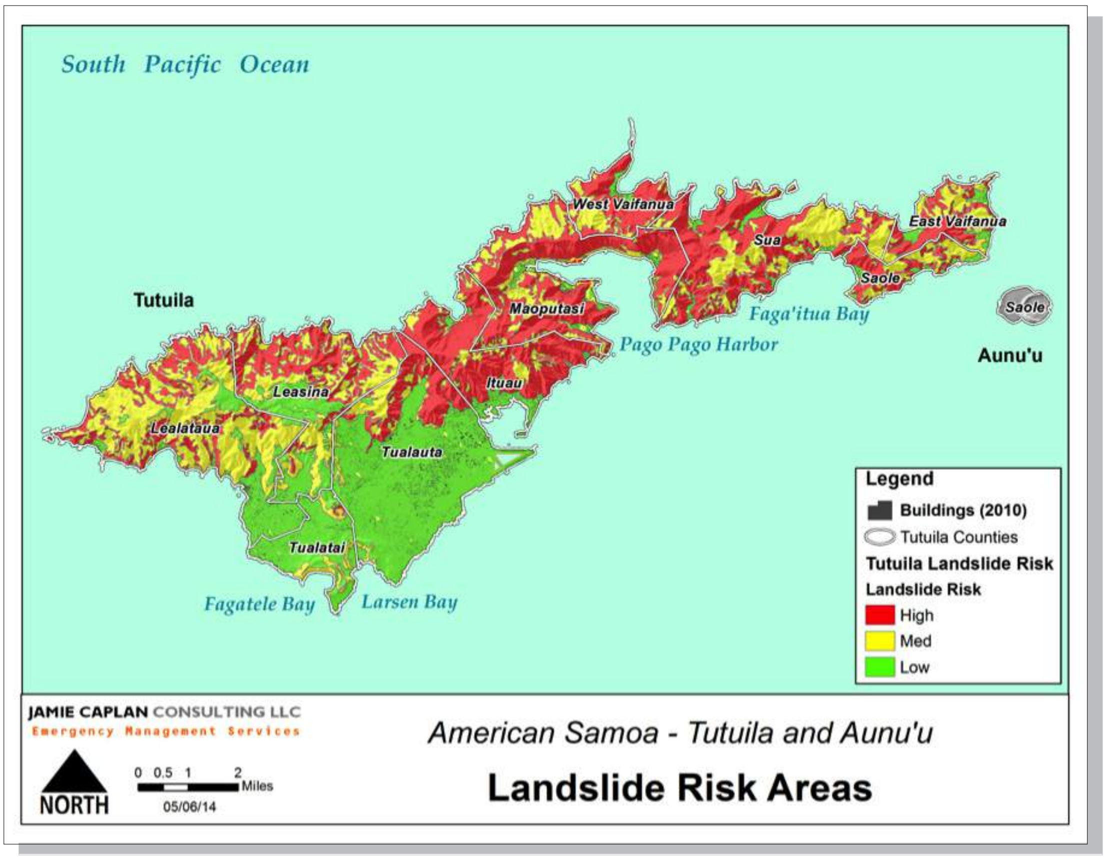


Figure 57 Landslide Risk Areas on Tutuila

The USDA Landslide data was not available for the Manu'a Islands. No additional existing data could be located for the islands. Therefore, an approximate measure of risk was calculated using GIS analysis. A digital elevation model was processed to determine percent rise. A calculated value of 0 percent is a flat surface, while a calculated value of 100 percent is a 45-degree angle of slope. As the surface becomes steeper, the percent rise becomes increasingly larger. The values reached 584 percent in Manu'a. This information was then arbitrarily grouped into low, medium and high-risk ranges based on slope as follows:

- Low: 0 percent to 25% (approximately 20 degree slope)
- Medium: 25%+ to 100 percent (20 degree to 45 degree slope)
- High: greater than 100 percent (greater than 45 degree slope)

On all islands, a majority of the development resides is low risk areas. A narrow band of high-risk area is inland along the southern and northern borders. On Olosega, a band of high-risk area circles the island away from the coast. On Ta'u, a majority of the high-risk areas can be found on the southern portions of the island, though there are portions in the northern parts of the island as well. The following maps, Figure 58 & Figure 59, show slope levels to indicate landslide risk on the Manu'a Islands.

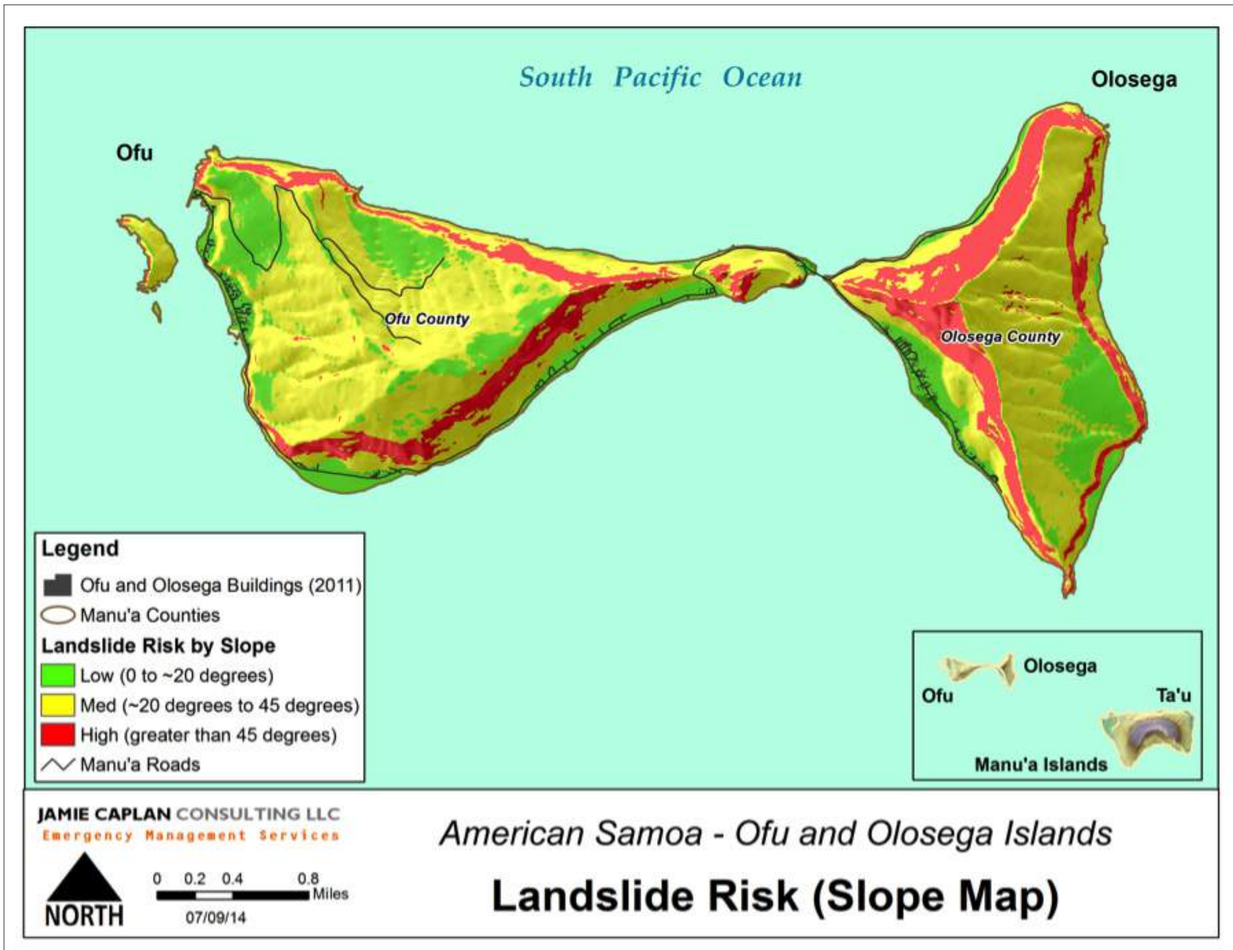


Figure 58 Landslide Risk on Ofu and Olosega Islands

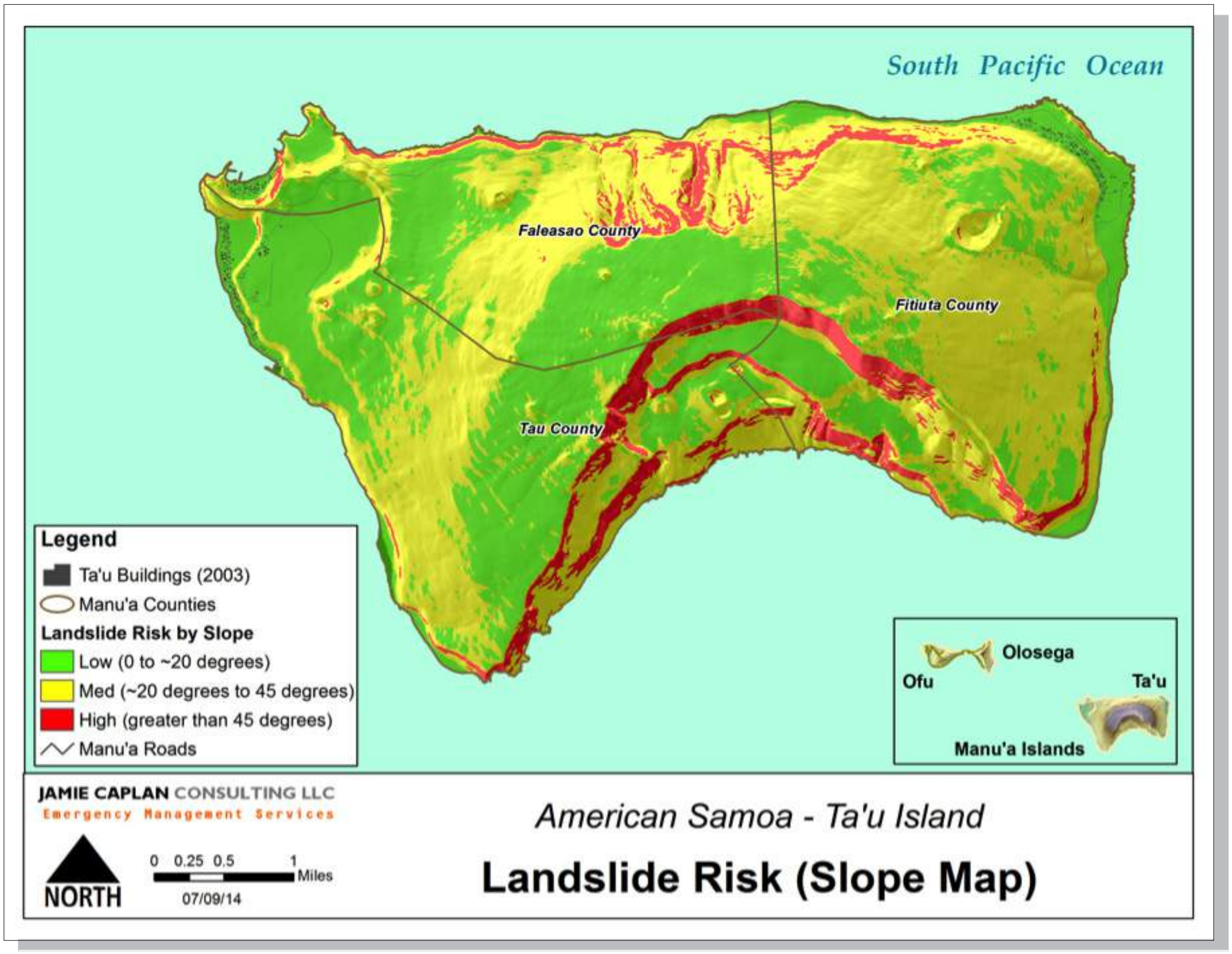


Figure 59 Landslide Risk on Ta'u Island

Previous Occurrences

On the island of Tutuila, landslides tend to be either naturally occurring steep slope failures or steep slope failures associated with slope cuts made for road or building construction. Historically, most landslides occurred during very heavy rains. Table 30 shows a summary of significant landslide events. It should be noted that these events only listed based on available data. Conditions are favorable for landslides and rock falls on the Manu'a Islands as well.

Table 30 Summary of Significant Landslides Events

Event Name, Date	Number of Occurrences	Cause	Geographical Extent	Impacts	Deaths/ Injuries
Landslide, October 28, 1979	60+	Rain storms	Western portion of Tutuila. Se'etaga debris flow	Four people killed in Se'etaga debris flow. Significant structural damage.	4/0
Landslide, 1985	1	Rain storms	Nua, western Tutuila	School building destroyed.	0/0

Event Name, Date	Number of Occurrences	Cause	Geographical Extent	Impacts	Deaths/ Injuries
Landslides, 1989	23	Rain, Water Leak	Fagasa, Aua,	Information drawn from the Pacific Disaster Center GIS Shapefile (limited metadata on source)	0/0
Landslide, February 2-4, 1990	10+	During Hurricane Ofa	Central ridge top, Tutuila	Most occurred along the central ridge top of Tutuila on extremely steep and largely inaccessible slopes. Most likely caused by heavy rain, and contributed to by the toppling of large trees carrying soil as they fell down slope.	0/0
Landslide, Almost yearly	8	Rainfall	Aua-Afono Road, Tutuila	Aua-Afono Road blocked.	0/0
Landslide, May 12, 1999	1+	Flood	Tutuila	Some homes were flooded with the significant rise of water. Broken trees and gravel washed off nearby mountains blocking roads at some villages, like Nu'uuli. Landslides across Tutuila	0/0
Landslide, September 12, 1999	1+	Flood	Poloa and Fagamalo	The heavy showers associated with a stationary trough flooded and overflow many of the streams. Mud and landslides occurred at Poloa and Fagamalo causing temporary blockage of the road.	0/0
Landslide, 2000	1	Rainfall	Nu’uuli-Pago Pago Road	Nu’uuli-Pago Pago Road rock fall.	1/0
Rock fall, February 27, 2000	1+	Flash Flooding	Laauli'i lookout	A man narrowly escaped injury as his car was smashed by a large rock at the Laauli'i lookout because of a landslide, one of the various land and mudslides being reported by TEMCO across the territory.	0/0
Landslides and mudslides, March 23, 2001	1+	Flood	West of Poloa	The police reported mud and landslides west of Poloa.	0/0

Event Name, Date	Number of Occurrences	Cause	Geographical Extent	Impacts	Deaths/ Injuries
Landslides and mudslides, March 27, 2001	1+	Flood	Tutuila	These heavy showers and heavy runoffs has cause flooding of low lying areas and overflow of small streams as well as causing mud and landslides across the Tutuila.	0/0
Landslide, May 26, 2002	1+	Flood	Auauuli, Tau	Residences of Tau reported heavy runoffs and landslide at the Auauuli due to heavy showers.	--
Landslide, May 19-21, 2003	10+	Heavy rainfall	Pago Pago, Fagatogo, Nu'uuli, Fagaalu, & Utulei, Tutuila.	Heavy rainfall caused widespread debris flows, rock falls, and slumps. Deaths were a result of the landslides, while most property damage was flood related.	5/0
Landslides, December 4, 2006	1+	Heavy rainfall	Tutuila	Thunderstorms and heavy rainfall were associated with an active trough near the Islands. The Weather Service Office recorded about 4.72 inches of precipitation for this event; residents reported widespread flooding and landslides across the Island of Tutuila.	0/0
Landslides, November 21, 2011	1+	Heavy rainfall	--	A nearly stationary trough to the southwest of the Samoan Islands has triggered heavy rainfall for a couple of hours. Flash flooding, landslides, and heavy run-off were reported from across the Island of Tutuila. The Weather Service office received 2.56 inches of rainfall for this episode.	0/0
Landslides, July 29 – August 3, 2014	1+	Heavy rain	Utulei and Gataivai	A landslide destroyed at least three homes and damaged the church.	0/0
Landslides	At least annually		Mt. Alava	The road to Mt. Alava is very dangerous and is subject to frequent landslides. There is a main communication tower/ antennae on top, so access is necessary.	--

Landslide (1979)
During the storms of 1979, 4 people were killed by the debris flow/landslide in Se'etaga, Tutuila.

Landslide (1985)
In 1985, a school building was destroyed in Nua, Tutuila. [52]

Landslide (1990)
In September 1990, high winds and very heavy rain from Hurricane Ofa contributed to 10 landslides, although these slides were in mostly uninhabited areas.

In February 1990, some 10 slides were seen following the wind and very heavy rains of Hurricane Ofa. The USDA/NRCS Landslide Hazard Mitigation Study published in October 1990 noted that: "Strong correlations were found between landslides and certain soils, geology, slopes, and vegetation. Slides were concentrated in areas of Fagasa and Aua soils, ash and talus geology, slopes greater than 60%, and where the natural vegetation had been disturbed. Concentrations of water from springs, runoff, or man's activities were often contributing factors to many slides."

Landslide (2000)
In 2000, a motorist was killed by a rock fall on the coastal road between Nu'uuli and Pago Pago. The sheer rock faces along this section of road make it a high-risk area, although some mitigation efforts had been put in place since the 1990 study. The road between Aua and Afono had at least eight separate slides associated with the construction of the road there.

Landslide (2003)
Between May 19-21, 2003, heavy rainfall caused flooding, landslides, and mudslides on the Island of Tutuila near Pago Pago, Fagatogo, Nu'uuli, Fagaalu, and Utulei, prompting the Territory to declare an emergency. Rainfall on May 19 at Pago-Pago totaled 10.68 inches. Widespread debris flows, rock falls, and slumps occurred due to the extremely heavy rains. Five people were killed in landslides, although much of the property damage was flood related.

Landslide (2014)
Landslides and flooding resulted in a disaster declaration. Landslides displaced several residents in are residents of both Utulei and Gataivai, where a landslide destroyed at least three homes and damaged the church.

A map of historical landslides is also included on the following page in Figure 60. However, these landslides are dated 1979, 1989, and 2001. Since the timeframe is so limited, they likely show frequent hot spots for landslide rather than all activity. Unfortunately, no information on historic landslides was located for the Manu'a islands.

52 White, F. David, and Charles E. Stearns. (1990). U.S. Department of Agriculture. Retrieved August 8, 2014 from http://www.botany.hawaii.edu/basch/uhnpscesu/pdfs/sam/White1990AS.pdf

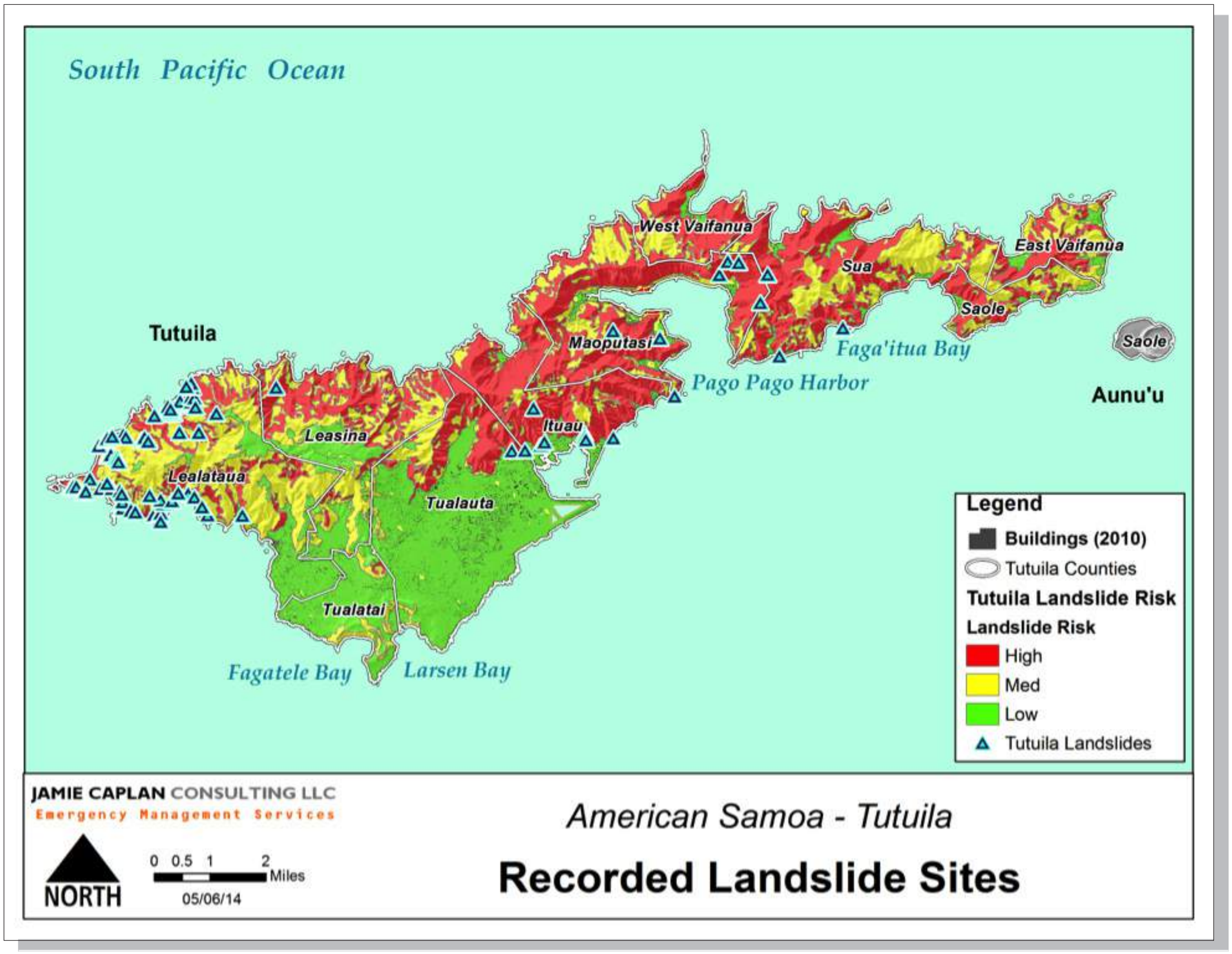


Figure 60 Recorded Landslide Sites in Tutuila

Extent

At this time, there is no known landslide magnitude scale. The most severe landslides are those that result in damage, injury or death. These landslides are more likely to occur in high risk areas identified by the USDA/NRCS landslide study. Forty-two percent of the Tutuila resides in a high-risk area.

Other methods to determine landslide extent include amount of debris produced and size. No information was found regarding debris creation or removal for landslides. However, the previous plan mentions that landslides are typically small, between 50 and 250 feet wide.

Probability of Future Events

Determining a statistical probability for landsliding was challenging given the lack of recorded events and known high frequency. It is known that landslides are a common occurrence in American Samoa on all islands. Rockslides are also common throughout the year and may occur at any time. The frequency increases following heavy rain, cyclones, and flooding. These landslides are likely to occur in the highest risk areas (Figure 57, Figure 58 and Figure 59).

Data created by the Pacific Data Center contains detailed landslide information for the year of 1989 that helps to determine probability. During 1989, 23 landslide events were reported, making the probably 100 percent, highly likely. A probability using information over time from the National Climatic Data Center was also referenced as a crosscheck for a greater time period. Because heavy rains tend to be the main trigger for Tutuila's landslides, the probability of the heaviest rain events were studied in order to determine how often the conditions contributed to landslides in a 13-year period between 1999 and 2013. Based upon the frequency of historical rainfall events reported in NCDC, the probability of occurrence for landslides is 69%, a categorization of likely (between 10% and 90% annually). However, local input indicates that landslides (including rock falls) are quite frequent and be expected on an annual basis. Given the climate and topography, landslides and rock falls are a certain occurrence in the future, so the probability is defined as highly likely.

Vulnerability Assessment

Vulnerability to landslides in American Samoa is high. The frequency of landslides increases following heavy rain, cyclones or flooding. Water makes the soil heavier, resulting in a collapse. In addition, landslides are possible following extended drought for several reasons. The soil following a drought can be brittle and the root systems of stabilizing vegetation may be damaged during drought. Further, when rainfall arrives to alleviate the drought, it can have amplified impacts. The landslides are likely to occur in areas where slopes are very steep as defined in Figure 57 through Figure 60.

Landslides in American Samoa bare several typical characteristics:

- The slides are typically small (50 to 250 feet wide).
- They tend to affect the upslope edges of populated areas where the degree of slope begins to climb to a point of unsuitability for residential development.
- Their affects are not island-wide or particularly widespread at a single time.
- Deaths and property losses are probable as slides usually occur without warning.
- Slides that threaten or temporarily block main roads are probable.

While landslides will continue to occur, there are a number of conditions that increase or decrease the vulnerability of infrastructure, residential, and public buildings to damage from this hazard.

Factors that increase vulnerability to the hazard:

- Clearing established vegetation from steep slopes;
- Cutting rock faces at near vertical angles;
- Excavation of large traditional housing pads on steep grades;
- Excavating for roadways without allowing for adequate drainage;
- Allowing water sources, such as water tanks or leaking water lines, to pool above slopes;
- Rain events;
- Drought events.

To help reduce vulnerability and mitigate risk:

- Do not develop in the steepest of areas, such as those identified as high risk for landslides in the 1990 USDA report and supporting maps. Many of these areas are currently unpopulated and undeveloped, so frequent slides cause little damage;
- Do not build below previous landslides or on their recent deposits;
- Leave locally occurring vegetation in places. Slides are relatively uncommon in areas that have not been cleared in some manner;
- Treat near vertical cut rock faces with screens, concrete guardrails, and so forth;
- Provide for the non-eroding drainage of house pads and roadways.

Potential Losses

Areas of high landslide risk were also investigated using GIS intersect analysis to determine the number and type of buildings most at risk to landsliding in the planning area. This analysis was also used for critical facilities. The results are summarized below. This information should be used to determine areas where the greatest vulnerability occurs.

Table 31 Buildings Located in High Risk Landslide Areas

County (District)	Total Number of Buildings	Total Number of Buildings in High Risk Landslide Areas	Percent of Buildings	Type
TUTUILA ISLAND				
East Vaifanua (East District)	497	138	28%	2 not listed 135 residential
Ituaa (East District)	1,075	297	28%	1 church 1 government 7 commercial 288 residential
Lealataua (West District)	2,026	135	7%	1 church 3 schools 131 residential
Leasina (West District)	474	1	0%	1 residential
Maoputasi (East District)	2,246	879	39%	2 not listed 4 churches 6 commercial 16 government 851 residential
Saole (East District)	364	81	22%	2 unknown 79 residential
Sua (East District)	938	336	36%	3 church 4 not listed 329 residential
Tualatai (West District)	903	0	0%	-
Tualata (West District)	7,441	166	2%	1 church 1 commercial 1 government 163 residential
West Vaifanua (East District)	172	13	8%	13 residential
Tutuila Island Total	16,315	2,046	12%	--
AUNU'U ISLAND*				
Saole* (East District)	179	N/A	--	--
Aunu'u Island Total	179	N/A	--	--
TA'U ISLAND				
Faleasoa** (Manu'a District)	81	2	2%	unknown

County (District)	Total Number of Buildings	Total Number of Buildings in High Risk Landslide Areas	Percent of Buildings	Type
Fitiuta (Manu'a District)	180	0	--	0
Ta'u (Manu'a District)	208	0	--	1
Ta'u Island Total	469	0	--	1
OFU ISLAND				
Ofu (Manu'a District)	133	0	--	2
Ofu Island Total	133	0	--	2
OLOSEGA ISLAND				
Olosega (Manu'a District)	101	--	--	--
Olosega Island Total	101	--	--	--
TOTAL	**17,018**	**2,048**	12%	--

**No data was available for Aunu'u Island (Saole County).*

***Although just 2 buildings are in the high hazard area, several building in the village of Faleasao or just below a high risk area*

It is clear from the analysis that many counties are subject to landslide risk and potential losses. The analysis indicates that Maoputasi and Sua Counties have the greatest percent and number of buildings in the high risk landslide areas. The map also indicates a concentration in the center Tutuila Island from east Tualauta County to east Sua County. In addition, the northern coast of Tutuila has significant high hazard areas.

A critical facility analysis was also performed using available data. The results indicated that 20 critical facilities including schools, the Governor's House, and Star Kist reside in high-risk landslide areas. These structures have an approximate combined value of over $48 million as indicated in Table 32. Specific buildings are also highlighted in Figure 61. No critical facilities were determined to be located on the Manu'a islands.

Table 32 Number of Critical Facilities (CFs) in High Risk Landslide Areas

Location	Total Number of Buildings	Total Number of CF in High Risk Landslide Areas	Value
Tutuila Island CFs	241	20	$48,298,740
Ta'u Island CFs	42	0	--

Assembly areas

- Sixteen out of 26 assembly areas were found to intersect the high-risk landslide areas.

Safe Zones

- All four safe zone areas in Tutuila intersect with high-risk landslide areas.

Tsunami Sirens

- Three sirens are located in high-risk landslide areas.

ASTCA Infrastructure

- Eleven ASTCA sites and towers were determined to be located in high-risk landslide areas including 6 cell sites, 2 towers, 1 DCO, and 1 generator building.

A complete listing of critical facilities and associated information (such as assembly areas, safe zones, and tsunami sirens) can be found in Appendix D.

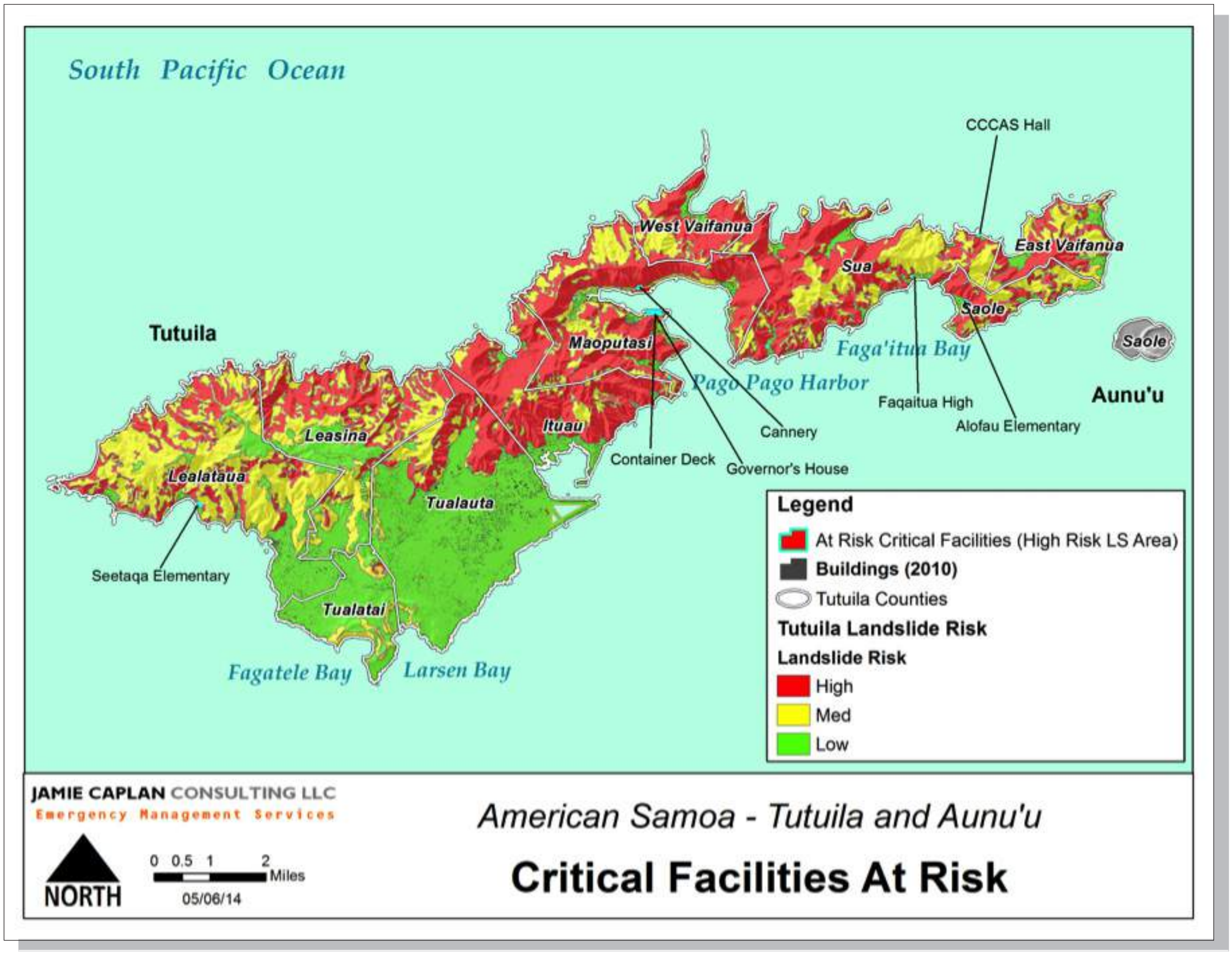


Figure 61 Critical Facilities Located in High Risk (higher likelihood) Landslide Areas

Lightning

Description

Lightning, a hazard typically associated with thunderstorm, was added to this update of the mitigation plan. According to NIAA, lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder, which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall.

Location

Lightning strikes can happen anywhere so all areas are assumed to be at risk. However, areas over water are less susceptible to frequent strikes. Figure 62 below, which show both extent and location of previous occurrences of lightning strikes globally, exemplifying this point.

Previous Occurrences

Previous occurrences were researched through a variety of mechanisms including local news sources and online weather reports. Only two reported strikes were found. According to the National Climatic Data Center, two lightning strikes were reported between 1996 and 2013. A lightning strike on April 4, 2006 that caused a death and an injury. The second event reported by NCDC caused damage to electronics. All reported events are reported in Table 33 below. It is likely that additional events have occurred but were not reported.

County (District)	Village	Date	Deaths	Injuries	Property Damage (2014)
Tualauta (West District)	Vaitogi	4/4/2006	1	1	0.00K
Maoputasi (East District)	Pago Pago	3/27/2010	0	0	$40,753

Table 33 Reported Lightning Occurrences in American Samoa [53]

April 4, 2006:

Two teenagers, a 15 year-old girl and a 14 year-old boy, were at home lowering blinds of their guesthouse when they were both struck by lightning. The boy survived, but his sister died from this incident. An area of showers and isolated thunderstorms moved over Tutuila during the late afternoon through evening hours.

March 27, 2010:

Numerous thunderstorms and lightning damaged several phone lines, cables and Internet on Tutuila, including the WSO NOAA Weather Radio transmitter and the MicroArt Radiosonde computer and equipment. Several televisions and electronic appliances were electronically damaged during this event. No injuries or fatalities were reported.

53 National Climatic Data Center

Extent

Figure 62 below was compiled with NASA data from 1998 to 2012 to show the frequency of lightning strikes per square kilometer per year.[54] This can be used to measure extent. American Samoa appears to receive approximately 1 lightning strike per year (though additional lightning flashes that do not strike are likely). The low frequency of occurrence is an added level of risk for this hazard since there is likely limited public awareness.

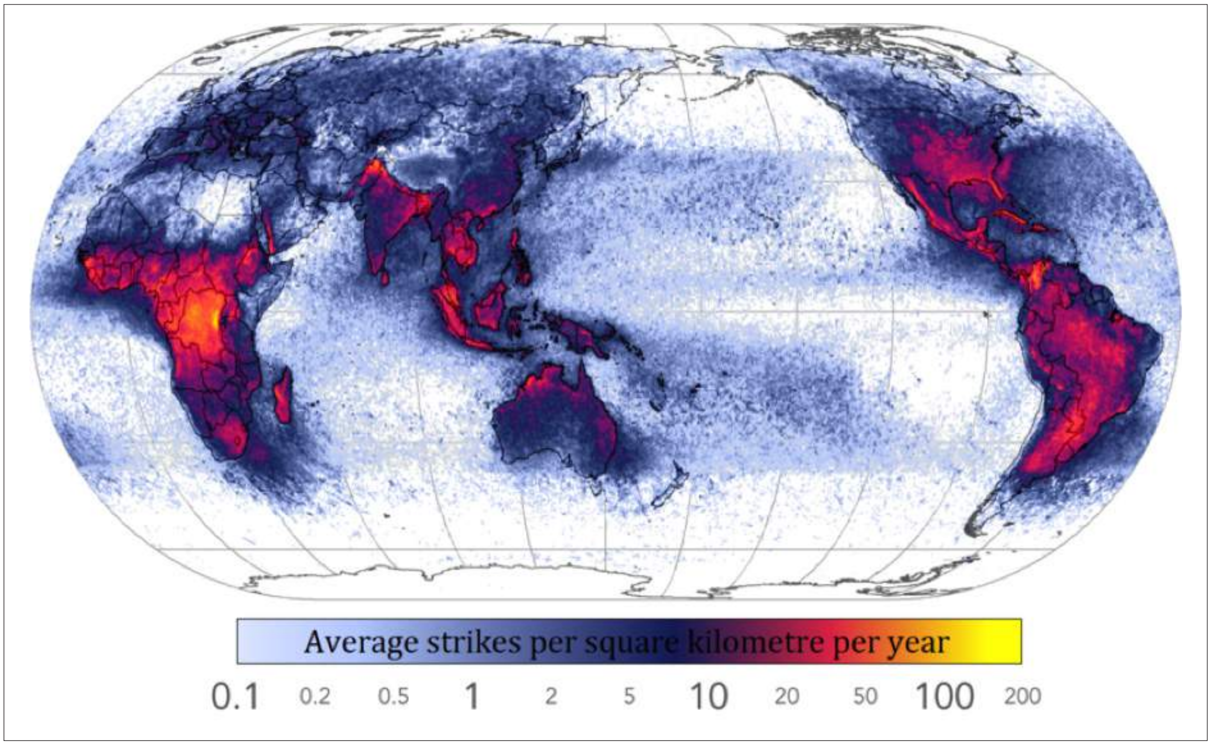


Figure 62 Average Lightning Strikes per square kilometer per year (1998-2012) [55]

Probability of Future Events

Based on two events reported between 1996 and 2014, there is a 11% annual probability of a lightning strike. This results in a probability categorization of likely (between 10% and 90% annually).

Vulnerability Assessment

This atmospheric hazard has the potential to impact the entire planning area including all islands. Therefore, all current and future buildings and populations are at risk to these hazards. Since lightning is not a frequent occurrence in American Samoa, the vulnerability for it can be even greater since there is likely limited public awareness on how to react to it. Previous occurrences have resulted in death, severe injury and electrical damage in American Samoa. In addition, lightning strikes may spark a structural or wildfire. Critical facilities are particularly susceptible to electrical damage or fire due to a lightning strike. All critical facilities are at risk.

Potential Losses

Since there is no boundary for this hazard, determining specific structures and associated values at risk is not feasible. As noted above, all current and future structures and populations should be considered at risk. Losses will typically be to individual structures rather than multiple buildings from a single lightning strike. However, it is possible for the strike to result in a fire that destroys several buildings.

54 Global Lighting Strikes. (2008). Wikipedia. Retrieved August 8, 2014 from http://en.wikipedia.org/wiki/File:Global_lightning_strikes.png, Citynoise

55 NASA (data), Citynoise (map)

Soil Hazards (Expansion, Subsidence and Sinkholes)

Description

Soils hazards are defined here as soil expansion, land subsidence, and sinkholes. It should be noted that these are considered low hazards in the territory though they are possible. Very limited information on these hazards exists at this time. As additional information becomes available, research on this hazard will be expanded.

Soil expansion occurs when soils expand due to added water and shrink when they dry out. This continuous change in soil volume can cause homes built on this soil to move unevenly or result in foundation cracks. The shrink-swell process could change the volume of soil by up to 30 percent.

According to the USGS, "land subsidence occurs when large amounts of groundwater have been withdrawn from certain types of rocks, such as fine-grained sediments. The rock compacts because the water is partly responsible for holding the ground up. When the water is withdrawn, the rock falls in on itself.[56]" Essentially, it is lowering of land-surface elevation. It occurs gradually, and goes overlooked until the problem is severe. It is common in coastal areas. Land subsidence often occurs due to man-made activities, such as pumping groundwater, oil or gas.

According to the USGS, sinkholes are common with limestones; carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them. They typically occur when karst terrain is present (bedrock that is easily dissolved). The movement of water through the rock eventually creates a hole, which may ultimately result in the surface collapsing. Typically sinkholes form gradually. In American Samoa, given the volcanic soils composition, sinkholes may be formed due to man-made activities such as leaky pipes, eroding soil or removal of subsurface groundwater or material.

Location

Soil expansion is possible throughout American Samoa where soil is present.

Land subsidence is a threat in American Samoa, particularly in coastal areas, according to the territory's Coastal Management Plan.[57] Sinkholes are possible throughout American Samoa. As noted above, they are most likely to be formed due to leaky pipes and other human causes.

Previous Occurrences

No information on previous soil hazards was found. As additional information becomes available, this hazard will be updated.

56 Land Subsidence. (2000). USGS. Retrieved August 8, 2014 from http://water.usgs.gov/edu/earthgwlandsubside.html

57 Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/as3092011.pdf

Extent

Soil expansion

The combination of the shallow depth of soil and the soil composition in American Samoa limit the severity of this hazard. There are a few inches of partially clay soil on top of volcanic rock in most areas. This hazard will be of greatest concern in times of drought. Expansion may result in soils expanding/contracting up to 30 percent of their original composition. Given the limited documentation of this hazard, extent is assumed to be limited.

Land Subsidence

This is noted as a low hazard in the Coastal Management Plan for American Samoa. Little research has been conducted and no communities are mapped. Subsidence may be less than one inch to several feet. Given the limited information documented in territory, subsidence impacts are assumed to be limited (less than a few inches of subsidence).

Sinkholes

Sinkhole surface collapse areas may range from a few feet to hundreds of feet in diameter. The depth of sinkholes also varies tremendously. Given limited documentation of the sinkholes in the territory, extent is assumed to be fairly small (less than 10 feet wide and 10 feet deep and likely a result of human activities.

Probability of Future Events

Given the limited information on these hazards, probability is assumed to be unlikely (less than 1 percent annual chance).

Vulnerability Assessment

Since no known mapping has been completed and limited information on previous occurrences is available, only general conclusions on vulnerability can be made about this hazard. All current and future buildings and populations are considered at risk to these hazards. Possible impacts are described below.

Soil expansion

- Foundation cracking
- "Flatwork" cracking (paved areas such as patios, sidewalks, roads)
- Structure shifting

Land subsidence

- Displaced foundation
- Lowered elevation may increase flooding probability

Sinkholes

- Injury or damage to anything that falls into a sinkhole (people, structures, livestock, vehicles, etc.)

Potential Losses

Although a low probability exists, all current and future buildings and populations should be considered at risk to soil hazards. All counties have equal vulnerability to losses. These hazards are unlikely to result in death or injury but may cause extensive structure damage to buildings in American Samoa. It can be concluded that soil hazards are a low risk, low probability hazard.

Tropical Cyclone

Description

Over the past 20 years, coastal and low-lying areas in small island nations have been devastated by hurricane related hazards, costing the world economy billions of dollars (U.S.), and resulting in a significant loss of life. A hurricane, cyclone and typhoon are generally the same phenomenon but located in different places throughout the world.[58] Cyclones and typhoons are the term used in the South Pacific (though hurricane is sometimes used as well). By definition, tropical cyclones are any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The South Pacific hurricane season is from November 1st to April 30th, but events are possible throughout the year. Each season, the South Pacific experiences about nine typical cyclones and about half are Category 3 or higher in intensity.[59] The most predominant and destructive hazards associated with hurricanes include high winds, heavy rain, and storm surge.

High Winds

Hurricane winds can reach speeds up to 155 miles per hour in the eye-wall of the hurricane, with gusts exceeding 224 miles per hour. The destructive power of these winds increases by the square of its speed; thus, a tripling of wind speed increases destructive power by a factor of nine. Consequently, these winds can devastate agricultural crops, uproot large trees, and flatten entire forests. Man-made structures are also vulnerable, with buildings shaking or even collapsing. In addition, the drastic barometric pressure differences in a hurricane can cause windowless structures to explode, uplift rooftops and even entire buildings. However, the primary wind related cause of death, destruction, and injury is flying debris.

Heavy Rain

The rain that accompanies hurricanes is extremely variable and difficult to predict. The speed of a hurricane also impacts rain – slow-moving storms with lots of moisture may saturate an area, fast moving systems may not cause substantial flooding. Intense rainfall can cause different types of destruction. Seepage of water into buildings can cause structural damage and if the rain is steady and persistent, the structures may simply collapse from the weight of the absorbed water. Inland flooding means that building structures and critical transportation facilities, such as roads and bridges in valleys and low-lying areas, are at risk. In addition, heavy rain often triggers landslides, typical in areas with medium to steep slopes that have become over-saturated.

58 What is the difference between a hurricane, a cyclone, and a typhoon? (2014). NOAA. Retrieved August 8, 2014 from http://oceanservice.noaa.gov/facts/cyclone.html

59 South Pacific Tropical Cyclone Season - 2014 - 2015. (2014). U.S. Passports & International Travel. Retrieved August 8, 2014 from http://travel.state.gov/content/passports/english/alertswarnings/south-pacific-cyclone-season.html

Storm Surge

Storm surge is the rise of the ocean due to atmospheric pressure changes. It is a great dome of water often 50 miles wide that comes sweeping across the coastline near the area where the eye of the hurricane makes landfall, and can inundate low-lying areas up to several miles inland. Aided by the hammering effects of breaking waves, surge acts like a giant bulldozer, sweeping everything in its path. The stronger the hurricane, the higher the storm surge will be. If heavy rain accompanies the storm surge and landfall occurs at a peak high tide, the consequences can be catastrophic. The excess water from the heavy rains inland can cause an increase in sea level heights and riverine flooding, thus blocking the seaward flow of rivers and effectively leaving nowhere for the water to go. Sea level rise can also exacerbate storm surge as more water inundates more land. In sum, storm surge is unquestionably the most dangerous part of a hurricane, accounting for 90% of all hurricane related fatalities.

Areas at risk to storm surge are identical to tsunami risk areas and mapped according to FEMA's velocity wave hazard, or VE zones.

For the purposes of this assessment, flooding due to heavy rains associated with tropical cyclones is discussed under the "flood hazard." This section primarily covers the impacts of high wind and storm surge commonly accompanying all categories of hurricanes. Tropical cyclones are also classified by strength, most notably wind.

Tropical cyclones are measured in several ways. The main forecasting center for American Samoa is the Joint Typhoon Warning Center (through the Pacific Disaster Center), which covers all U.S. holdings in the South Pacific. However, given their proximately to Australia/New Zealand, information comes from their weather agencies as well. Also, since American Samoa is a U.S. Territory, NOAA and National Hurricane Center monitor and record information. Each of these agencies has a different way of classifying typhoons. The National Hurricane center utilized the Saffir-Simpson Hurricane Scale. The National Hurricane Center and Joint Tropical Warning Center utilize 1-minute sustain winds for classification while others use 10-minute sustained winds. These are shown in Table 34.

Table 34 Cross-comparison of Tropical Cyclone Categories [60]

<table>
<tr><th>1-minute sustained winds</th><th>10-minute sustained winds</th><th>National Hurricane Center/Saffir-Simpson Scale (Atlantic Ocean, USA)</th><th>Joint Tropical Warning Center (U.S. holdings)</th><th>Japan Meteorology Association</th><th>Indian Meteorology Association (N Indian Ocean)</th><th>France Meteorology Association (SW Indian Ocean)</th><th>Bureau of Meteorology /Fiji Meteorology Service (Australia and South Pacific)</th></tr>
<tr><td><32 knots (37 mph; 59 km/h)</td><td><28 knots (32 mph; 52 km/h)</td><td rowspan="2">Tropical Depression</td><td rowspan="2">Tropical Depression</td><td rowspan="3">Tropical Depression</td><td>Depression</td><td>Zone of Disturbed Weather</td><td rowspan="3">Tropical Disturbance Tropical Depression Tropical Low</td></tr>
<tr><td>33 knots (38 mph; 61 km/h)</td><td>28–29 knots (32–33 mph; 52–54 km/h)</td><td rowspan="2">Deep Depression</td><td>Tropical Disturbance</td></tr>
<tr><td>34–37 knots (39–43 mph; 63–69 km/h)</td><td>30–33 knots (35–38 mph; 56–61 km/h)</td><td rowspan="3">Tropical Storm</td><td rowspan="3">Tropical Storm</td><td>Deep Depression</td></tr>
<tr><td>38–54 knots (44–62 mph; 70–100 km/h)</td><td>34–47 knots (39–54 mph; 63–87 km/h)</td><td>Tropical Storm</td><td>Cyclonic Storm</td><td>Moderate Tropical Storm</td><td>Category 1 tropical cyclone</td></tr>
<tr><td>55–63 knots (63–72 mph; 102–117 km/h)</td><td>48–55 knots (55–63 mph; 89–102 km/h)</td><td>Severe Tropical Storm</td><td>Severe Cyclonic Storm</td><td>Severe Tropical Storm</td><td>Category 2 tropical cyclone</td></tr>
</table>

60 Tropical cyclone. (2014). Wikipedia. Retrieved August 8, 2014 from http://en.wikipedia.org/wiki/Tropical_cyclones

<table>
<tr><th>1-minute sustained winds</th><th>10-minute sustained winds</th><th>National Hurricane Center/Saffir-Simpson Scale (Atlantic Ocean, USA)</th><th>Joint Tropical Warning Center (U.S. holdings)</th><th>Japan Meteorology Association</th><th>Indian Meteorology Association (N Indian Ocean)</th><th>France Meteorology Association (SW Indian Ocean)</th><th>Bureau of Meteorology /Fiji Meteorology Service (Australia and South Pacific)</th></tr>
<tr><td>64–71 knots (74–82 mph; 119–131 km/h)</td><td>56–63 knots (64–72 mph; 104–117 km/h)</td><td rowspan="2">Category 1 hurricane</td><td rowspan="6">Typhoon</td><td>Severe Tropical Storm</td><td>Severe Cyclonic Storm</td><td>Severe Tropical Storm</td><td>Category 2 tropical cyclone</td></tr>
<tr><td>72–82 knots (83–94 mph; 133–152 km/h)</td><td>64–72 knots (74–83 mph; 119–133 km/h)</td><td rowspan="5">Typhoon</td><td rowspan="5">Very Severe Cyclonic Storm</td><td rowspan="3">Tropical Cyclone</td><td rowspan="3">Category 3 severe tropical cyclone</td></tr>
<tr><td>83–95 knots (96–109 mph; 154–176 km/h)</td><td>73–83 knots (84–96 mph; 135–154 km/h)</td><td>Category 2 hurricane</td></tr>
<tr><td>96–97 knots (110–112 mph; 178–180 km/h)</td><td>84–85 knots (97–98 mph; 156–157 km/h)</td><td rowspan="2">Category 3 Hurricane</td></tr>
<tr><td>98–112 knots (113–129 mph; 181–207 km/h)</td><td>86–98 knots (99–113 mph; 159–181 km/h)</td><td rowspan="2">Intense Tropical Cyclone</td><td rowspan="2">Category 4 severe tropical cyclone</td></tr>
<tr><td>113–122 knots (130–140 mph; 209–226 km/h)</td><td>99–107 knots (114–123 mph; 183–198 km/h)</td><td>Category 4 Hurricane</td></tr>
</table>

<table>
<tr><th>1-minute sustained winds</th><th>10-minute sustained winds</th><th>National Hurricane Center/Saffir-Simpson Scale (Atlantic Ocean, USA)</th><th>Joint Tropical Warning Center (U.S. holdings)</th><th>Japan Meteorology Association</th><th>Indian Meteorology Association (N Indian Ocean)</th><th>France Meteorology Association (SW Indian Ocean)</th><th>Bureau of Meteorology /Fiji Meteorology Service (Australia and South Pacific)</th></tr>
<tr><td>123–129 knots (142–148 mph; 228–239 km/h)</td><td>108–113 knots (124–130 mph; 200–209 km/h)</td><td rowspan="2">Category 4 Hurricane</td><td>Typhoon</td><td rowspan="3">Typhoon</td><td>Very Severe Cyclonic Storm</td><td>Intense Tropical Cyclone</td><td rowspan="3">Category 5 severe tropical cyclone</td></tr>
<tr><td>130–136 knots (150–157 mph; 241–252 km/h)</td><td>114–119 knots (131–137 mph; 211–220 km/h)</td><td rowspan="2">Super Typhoon</td><td rowspan="2">Super Cyclonic Storm</td><td rowspan="2">Very Intense Tropical Cyclone</td></tr>
<tr><td>>137 knots (158 mph; 254 km/h)</td><td>>120 knots (140 mph; 220 km/h)</td><td>Category 5 hurricane</td></tr>
</table>

A “Super-typhoon” is a term utilized by the U.S. Joint Typhoon Warning Center for typhoons that reach maximum sustained 1-minute surface winds of at least 65 m/s (130 kt., 150 mph). This is the equivalent of a strong Saffir-Simpson category 4 or category 5 hurricane in the Atlantic basin or a category 5 severe tropical cyclone in the Australian basin.[61]

Table 34 & Table 35 show the damages expected from the Saffir-Simpson scale and the Australian Cyclone Severity Scale, respectively.

61 FAQ: What is a super-typhoon?. (2014). Hurricane Research Division. Retrieved on August 8, 2014 from http://www.aoml.noaa.gov/hrd/tcfaq/A3.html

Table 35
Hurricane Damage Classification on the Saffir-Simpson Scale[62]

Storm Category (Sustained Winds - MPH)	Damage Level	Description of Damages	Photo Example
1 (74-95)	MINIMAL Very dangerous winds will produce some damage	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage. An example of a Category 1 hurricane is Hurricane Dolly (2008).	
2 (96-110)	MODERATE Extremely dangerous winds will cause extensive damage	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings. An example of a Category 2 hurricane is Hurricane Francis in 2004.	
3 (111-129)	EXTENSIVE Devastating damage will occur	Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland. An example of a Category 3 hurricane is Hurricane Ivan (2004).	
4 (130-156)	EXTREME Catastrophic damage will occur	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland. An example of a Category 4 hurricane is Hurricane Charley (2004).	
5 (157+)	Catastrophic	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required. An example of a Category 5 hurricane is Hurricane Andrew (1992).	

62 National Hurricane Center, FEMA

Category	Strongest Gusts (km/h)	Averaged Wind Speeds (km/h)	Typical effects (Indicative only)	Examples
Category 1	90 - 125	63-88	Negligible house damage. Damage to some crops, trees and caravans. Craft may drag moorings.	Cyclone Olga 2010
Category 2	125 - 164	89 - 117	Minor house damage. Significant damage to signs, trees and caravans. Heavy damage to some crops. Risk of power failure. Small craft may break moorings.	Cyclone Anthony 2011
Category 3	165 - 224	118 - 159	Some roof and structural damage. Some caravans destroyed. Power failure likely.	Cyclone Magda 2010
Category 4	225 - 279	160 - 199	Significant roofing loss and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failure.	Cyclone Tracy 1974 & Cyclone Larry 2006
Category 5	> 279	> 200	Extremely dangerous with widespread destruction.	Cyclone Yasi 2011

Note: Average wind speed is for 10-minute average. 1 km/h ~ .54 kt. or .63 mph

Table 36 Australian Cyclone Severity Scale [63]

Location

A tropical cyclone has the potential to impact all islands and areas of American Samoa. Therefore, it is assumed the entire American Samoa planning area is susceptible to a tropical cyclone event. All existing and future buildings and populations, including critical facilities, are at risk to this hazard. However, the impact and extent will vary based on storm track and location.

Previous Occurrences

American Samoa lies outside of the most active tropical cyclone belt in the southwest Pacific Ocean. Although many years can pass between major hurricanes, when they do impact American Samoa, the effects are devastating.

Figure 63 depicts all storm tracks between 1945 and 2012 that have occurred within approximately 200 miles of Tutuila (encompassing all of the American Samoan Islands). Typhoon (hurricane) tracks are illustrated in pink, tropical storms are yellow, and tropical depressions are green. Of these events, three had center tracks that passed directly through American Samoa.

63 Tropical Cyclones FAQ. (2014). NOAA. Retrieved August 8, 2014 from http://www.aoml.noaa.gov/hrd/tcfaq/D2.html

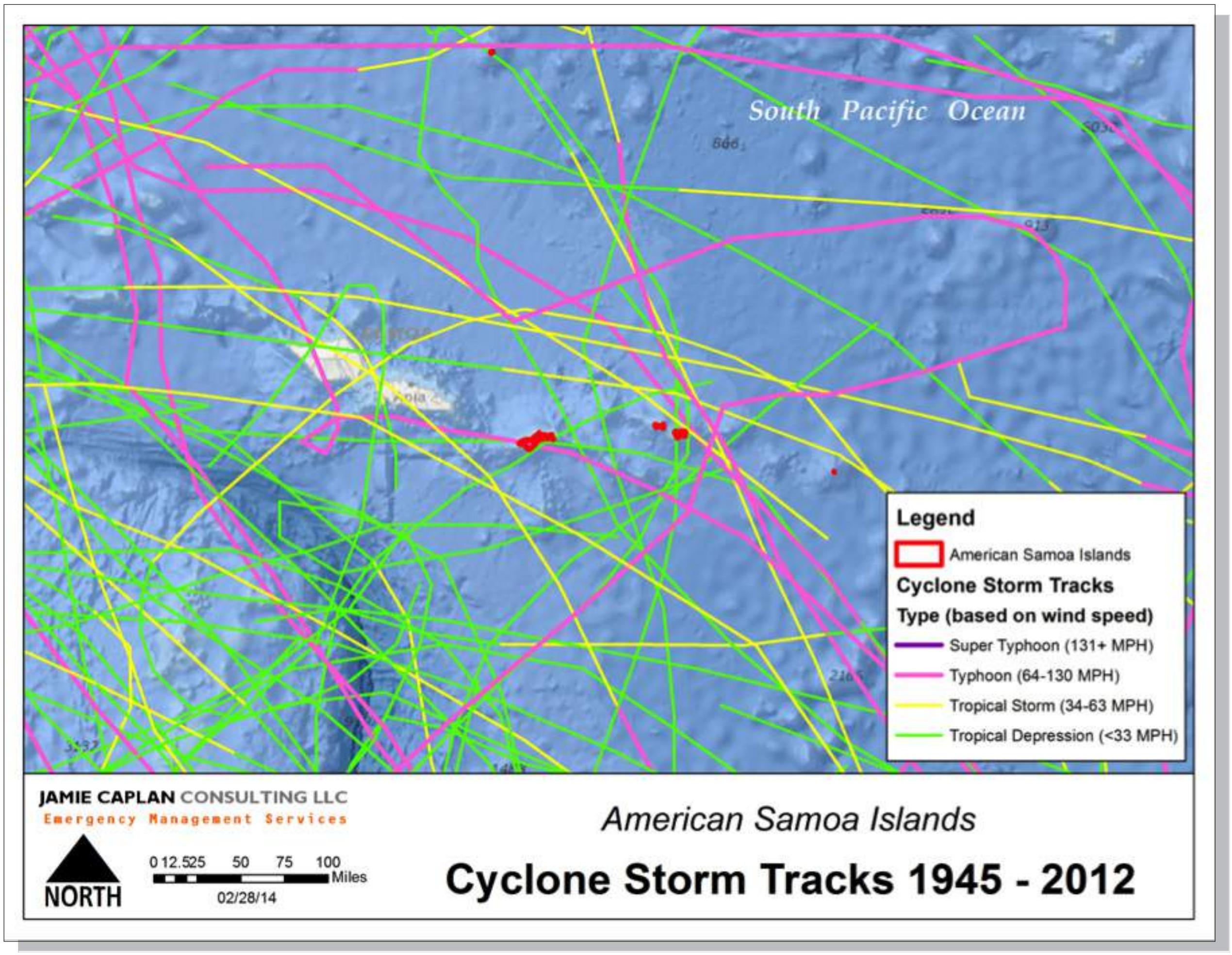


Figure 63 Historic Hurricane Tracks

An additional 27 storms were reported within 75 miles of the islands. This is the area where tropical cyclone tend to impact. However, extremely large events may impact the islands from even greater distances so those were included if known impacts occurred. An example is 2005 Category 5 Heta, which was 150 miles away. Conversely, not all storms within the 75-mile range caused damage. For that reason, significant events are described in Table 37.

Table 37 Hurricane Tracks with 75 miles of American Samoa (1945 and 2012)

Date	Name	Wind Speed	Type (max within 75 miles of American Samoa based on Saffir-Simpson Scale)	Islands Traversed
Direct Hits				
1/24/1966	Unnamed	Not reported	Tropical Depression	Tutuila
2/3/1957	Unnamed	Not reported	Cyclone	Ta'u
12/10/1991	Unnamed	103	Tropical Depression	Tutuila
Within 75 miles of American Samoa Islands				
2/9/1959	Unnamed	Not reported	Tropical Depression	-
2/22/1959	Unnamed	Not reported	Tropical Depression	-
3/17/1960	Unnamed	Not reported	Tropical Depression	-
1/20/1964	Unnamed	Not reported	Tropical Depression	-
12/14/1967	Unnamed	Not reported	Tropical Depression	-
2/13/1978	Charles	74	Tropical Storm	-
3/1/1981	Unnamed	57	Tropical Storm	-
2/28/1982	Isaac	Not reported	Tropical Depression	-
1/15/1987	Tusi	115	Category 3 Cyclone	-
3/1/1987	Unnamed	51	Tropical Storm	-
4/24/1987	Zuman	63	Tropical Storm	-
2/3/1990	Ofa (100 west of Pago Pago)	100	Category 4 Cyclone	-
12/9/1991	Val	115	Category 4 Cyclone	-
3/15/1992	Fran	34	Tropical Depression	-
2/4/1993	Unnamed	28	Tropical Depression	-
1/13/1997	Drena	74	Tropical Storm	-
1/3/1998	Susan	74	Tropical Storm	-
1/27/1998	Tui	28	Tropical Depression	-
2/1/1998	Veli	40	Tropical Depression	-
1/13/2004	Heta (150 miles away)	160	Category 5 Cyclone	-
2/18/2005	Olaf	166	Category 5 Cyclone	-
2/27/2005	Percy	126	Category 3 Cyclone	-
1/4/2006	Tam	35	Tropical Storm	-
1/28/2010	Nisha	67	Tropical Storm	-
2/1/2010	Oli	Not reported	Tropical Storm	-
2/9/2010	Rene	Not reported	Category 1 Cyclone	-
3/9/2010	Thomas	Not reported	Not reported	-

During the last 50+ years, eight major hurricanes have impacted American Samoa. They have been fairly uniform in frequency and more or less evenly distributed during this period. Details regarding storm severity, affected geographical areas, damages, and estimated losses for previous significant tropical cyclones are listed in Table 38.

Table 38 Previous significant tropical cyclones

Event Name, Date	Geographical Extent	Severity (Category)	Impacts	Deaths/ Injuries	Estimated Losses ($)
Unnamed hurricane January 29-30, 1966	Throughout American Samoa, Tutuila, Aunu'u, Swains Island	Category 2, 100+ mph gusts	Substantial structural damage, beach erosion and flooding. Over 50,000 lost their homes. This event was prior to any hurricane structural building or retrofitting.	90/0	$4.3 million
Hurricane Tusi January 16-20, 1987	Manu'a Islands	Category 3, Max sustained winds 110 mph, gusts to 120 mph	Tusi destroyed: 100% of structures in the villages of Faleasao, Fitiuta, and Sili; 90% of the structures in Ta'u and Ofu; 50% of those on Olosega. It left 98% of the 2,000 people in the islands homeless. Plantations were totally devastated, and the islands were denuded of forests and coconut palms. Stripped vegetation took five years to recover. There was severe storm surge on the north shores. FEMA disaster declaration.	0/0	$5 – 10 million

Event Name, Date	Geographical Extent	Severity (Category)	Impacts	Deaths/ Injuries	Estimated Losses ($)
Hurricane Ofa February 2-4, 1990	Islands of Tutuila, Aunu'u, Ofu, Olosega, Ta'u, and Swains	Category 2, Max sustained winds 90 mph, gusts to 100 mph, 20+ inches of rain, high surf, storm surge, 10+ landslides	Ofa caused coastal damage due to storm surge and high surf plus high tides heaviest along north shores of Ta'u and Olosega and some coastal villages on north shore of Tutuila. NW facing villages sustained the greatest damage. Fagasau roads were wiped out, and the road was destroyed at Poloa. Poloa and Amanave evacuated. Sailele lost 750 feet of road, cutting off the village. Extensive wind damage to airport buildings. Office of Procurement warehouse incurred structural damage. Dept. of Agriculture building lost. Four schools badly damaged in Poloa, Aoa, Masafau, Faleasau (at Ta'u). Tafuna high school gym collapsed. Special Ed. Building in Utulei a total loss. 95% of water supply lost due to loss of power at water-well pumping stations. 10+ large landslides on Tutuila.	10/0	$10 million (PPG); Public losses $28,761,983 (FEMA); Damage to roads $4,400,000 (FEMA); $200,000 (ReIns:Swiss)
Hurricane Val December 6-10, 1991	Tutuila and Manu'a Islands	Category 3, Max sustained winds of 100 mph, gusts to 123 mph, high surf, storm surge, 20+ inches of rain	Severe damage to structures (40% of housing), and utility lines. High surf and wave action washed away several sections of coastal roads on Tutuila, and the Manu'a Islands. Damage caused by high winds closed down harbor operations for a week. Containers strewn about the port, crane broken, 5-7 luxury yachts were destroyed, along with 11 long-line fishing vessels causing major impacts on the fishing industry. Cannery and airport heavily impacted by storm surge affecting the southern shore of Tutuila.	15/0	$13 million (PPG); Public losses $80,473,533 (FEMA); $50-80 million overall damage to seaport, $11 million to seaport infrastructure (AS Dir. Port Authority); $167,700 (ReIns:Swiss)

Event Name, Date	Geographical Extent	Severity (Category)	Impacts	Deaths/ Injuries	Estimated Losses ($)
Tropical Cyclone Heta – FEMA DR #:1506 1/13/04	High Winds, High Surf and Heavy Rainfall	Category 5	10% of inhabitants are now homeless, destroyed valuable crops	0/20	$50-$150 million
Tropical Cyclone Olaf – FEMA DR #: 1582 2/18/05	Tropical Cyclone Olaf, including High Winds, High Surf, and Heavy Rainfall	Category 5	Wiped out almost all homes on Manu'a Islands	0/0	$723,000
Tropical Cyclone Tam 1/12/2006	Tutuila, Manu'a Islands	Tropical Cyclone (Saffir-Simpson)	Destroyed 70 percent of local crops; some roof tops lost; 30-35 mph sustained winds; landslides; flooding; power outages	0/0	$10,000 - $26,000
Tropical Cyclone Nisha 1/26/2010	Tutuila, Manu'a Islands	Tropical storm (Saffir-Simpson)	4.66 inches of rainfall reported at the weather service office; gust of 67 mph reported from the Island of Manu'a; Several homes were flooded between Pago Pago and Fagaitua villages on the Island of Tutuila. Mudslides; broken tree branches and debris; high surf of 14-16 feet	0/0	--

Unnamed hurricane (1966)

An unnamed hurricane struck Tutuila on January 29-30, 1966 killing 90 people and causing an estimated $4.3 million in damage. Winds of over 100 miles per hour and rainfall amounts of 6 to 14 inches caused flooding and substantial structural damages.

Tropical Cyclone Tusi (1987)

Tropical cyclone Tusi, a Category 3 hurricane, passed to the northeast of the Manu'a Islands between January 16 and 20 1987, causing an estimated $5 to $10 million in damage and destroying virtually 100% of the structures in the villages of Faleasao and Fiti'uta on the island of Ta'u, and Sili village on the island of Olosega.[64] In Ta'u and Ofu, 90% of the structures were destroyed, as were 50% of those in Olosega. High winds stripped most of the vegetation from the island of Ofu, which took five years to grow back. Storm surge heavily impacted the north shores of the islands. Tusi is considered by many local residents to be the worst storm to affect American Samoa in recorded history.

64 American Samoa Government. American Samoa. (2003). Retrieved August 8, 2014 from http://www.asg-gov.com/island-info.htm

Tropical Cyclone Ofa (1990)
In February 1990, American Samoa suffered the most severe storm in more than 160 years. Winds gusted up to 100 mph. severe forest damage occurred with only 1% of the primary forest surviving. Hurricane Ofa hit the Samoan Islands on Friday, February 2, finally passing to the south on Sunday, February 4, 1990. It left a path of destruction that obliterated whole villages in Western Samoa and destroyed or damaged almost every building in American Samoa. Although the center never got closer than 180 miles to the islands, American Samoa was directly in its path until the hurricane veered south. Even so, the winds were stronger and the storm bigger in diameter by the time it passed by, so the Territory received the brunt of the storm.
One eyewitness account reported, "Winds were clocked at the airport at 107 miles per hour… Power was lost on Saturday the 3rd, along with all communications…Trees went down everywhere, along with power poles, and sheet metal roofing flew off like playing cards to litter yards and roads. Some villages in low-lying areas were totaled from the wind and waves. In unprotected harbors, small boats and ships alike were driven up on the reefs."[65]

Tropical Cyclone Val (1991)
After passing through Western Samoa, tropical cyclone Val, a Category 3 hurricane, tracked across the southwestern portion of Tutuila on December 9, 1991 with maximum sustained winds of 100 mph and gusts to 123 mph. After 12 hours of battering winds, heavy rain, and destructive high surf, Val then continued a southeastern track, passing about 30 miles to the south of, and impacting the Manu'a Islands the next day. Fifteen people died in the storm.

High winds caused severe damage to housing, electric power distribution systems, and water and sewage systems. High surf washed away several sections of the coastal road between Faga'alu and Nu'uuli on Tutuila Island, as well as roads on the Manu'a Islands. However, traffic was apparently interrupted more due to downed utility poles than problems associated with the roadbed. More than 20 inches of rain fell during the storm, and high winds defoliated over 90% of primary forest. One report estimated damage at $13 million.[66]

FEMA's Hazard Mitigation Strategies document for Hurricane Val reported severe damage to the electric power system, primarily to the distribution feeder and transmission lines. Switching gears were also damaged. Damage to the power system left water and sewer systems non-functional and downed power lines rendered intra-island communication non-existent. Local anecdote stated that the island lost power for three to six months. However, communication off the island and cellular use was largely unaffected.[67]

Hurricane Val affected 40% of the housing in American Samoa. The Office of Development Planning reported that low-income households were the most severely impacted group due to the type of home construction. However, homes constructed by FEMA following hurricanes Tusi and Ofa, and those constructed under the office of Emergency Preparedness received very little damage.

65 Webb, L. Robert. (2003). "Hurricane Ofa – American Samoa". Retrieved August 8, 2014 from http//www.motivation-tools.com/hunky-dory/feb27-90.htm
66 "American Samoa Flood Mitigation Plan." (2003). PPG Consultants.
67 Hurricane Val. DR-927-AS. FEMA. (1991). Federal Emergency Management Agency, Hazard Mitigation Strategies.

The Director of the Port Authority on Tutuila described hurricane Val as the most destructive hurricane to affect the islands. High winds caused $50-80 million of damage to the overall port, including vessels, with $11 million in damage to seaport infrastructure that closed down operations for a week. Containers stacked four high were strewn about the port, a crane was broken, five to seven luxury yachts were destroyed, as were 11 long-line fishing vessels, which had a major impact on the fishing industry. [68]

Both the cannery and the airport were heavily impacted by storm surge on the southern shore of the island. Neither of these facilities has backup power, making both particularly vulnerable.

Tropical Cyclone Heta

January 13, 2004 FEMA declared American Samoa a disaster area due to Tropical Cyclone Heta (FEMA DR #1506). The damage Heta caused on Tonga, Niue, and American Samoa was estimated at $150 million dollars (2004 USD), with most of the damage occurring in American Samoa; the cyclone was also responsible for two deaths (not in American Samoa). Heta precipitated a massive relief and clean-up operation that lasted throughout 2004.

It reached a maximum intensity of 160 mph and exerted an estimated pressure of 915 millibars before dissipating on January 11, 2004. The high winds destroyed over 600 homes and damaged 4,000 others. Offshore, the storm brought waves up to 44 feet high along the north and western part of the island. The combination of rough surf and storm surge damaged or destroyed many boats near Swains Island. Although no deaths were reported, the storm injured 20 people. Power was lost but only for a few days in certain parts of the island. It was not as severe as Hurricane Val (1991) as a result of mitigation projects. Several utilities lines were moved underground and utility supply structures were hardened.

The damage from the cyclone caused an evacuation of 140 residents to relief shelters, thirteen of which were opened after the storm. In addition, the Small Business Administration (SBA) offered $40,000-$200,000 (2004 USD) in repair loans for residents and $1.5 million (2004 USD) in repair loans for businesses. The federal government offered $22 million (2004 USD) in relief aid through FEMA. The United Church of Christ also provided $5,000 in relief aid.[69]

More than 9,100 American Samoa residents and business owners registered with FEMA to apply for aid. FEMA has issued approximately $11.4 million in temporary disaster housing grants to people whose homes were severely damaged and to those repairing their primary residences to make them safe, sanitary and functional. The agency has provided more than $13.6 million for other serious needs directly related to Heta. The bulk of funding went towards the cost of restoring and repairing utilities (specifically, electrical power and telephone lines) as well as replacing and repairing public buildings.

Tropical Cyclone Olaf

February 18, 2005 FEMA declared American Samoa a disaster area due to Tropical Cyclone Olaf. Olaf had wind gusts up to 190 mph, making it a Category 5 storm, the most intense. The weather service said the storm generated destructive waves of 30 to 40 feet on the shores of all islands. The cyclone passed 50 miles to the north of Samoa, officials said. Prior to its change of track, the storm was heading directly toward the small nation, prompting it to declare a state of emergency. The islands suffered some damage from winds, heavy rain and pounding seas and 15 people were treated for minor injuries. There were no reports of deaths from the

68 Pago Pago Harbor. Personal Interview. (2003). Seugogo Ben Schirmer, Director of the Port Authority. Pago Pago, American Samoa.

69 Cyclone Heta. (2014). Wikipedia. Retrieved August 8, 2014 from http://en.wikipedia.org/wiki/Cyclone_Heta

islands, home to some 2,000 people, but many houses were seriously damaged, officials said. Olaf damaged several water stations in the Manu'a Islands causing a water shortage. The cyclone caused telephone service interruption to the Manu'a Islands of Ta'u, Ofu and Olosega.

Direct Federal Assistance was authorized to American Samoa under DR #1582. This allowed for Public Assistance for the repair or replacement of disaster-damaged facilities and debris removal and emergency protective measures

Under the declaration, federal funds will be provided for the territory and affected local governments and certain private nonprofit organizations to pay 75 percent of the eligible costs for debris removal and emergency services related to the storm that began on February 15. The funding also covers the cost of requested emergency work undertaken by the federal government.

Tropical Cyclone Tam

Tropical Cyclone Tam was the first storm of the 2005-2006 season. Tam, a weak tropical storm, was not a severe wind issue but did bring heavy rain causing flooding and mudslides.[70] Weather Service Office recorded sustained winds of 30 to 35 mph peaking to 59 mph for this episode. Unsecured rooftops were lost in Tutuila. Unfavorable conditions and high winds caused landslides in other areas for the Island of Tutuila. No injury reported.

Tropical Cyclone Nisha

On January 26, 2010 Tropical Cyclone Nisha was centered at its closest point to American Samoa, about 175 miles southeast of Tutuila.[71] The storm was not a major cyclone but was of significance because many people were still sheltering in tents following the 2009 tsunami.[72] It largely spared Tutuila and Aunu'u as it formed but did result in minor damage over the Manu'a Islands. Heavy rainfall and strong gale force winds were reported across the Samoan Islands, with the highest wind gust of 67 mph reported from the Island of Manu'a. The weather service office received 4.66 inches of rainfall during this event. Several homes were flooded between Pago Pago and Fagaitua villages on the Island of Tutuila. Mudslides, broken tree branches and debris were found on the main road. Hazardous surf of 14 to 16 feet impacted east and south facing reefs on all Islands.

Extent

As the previous occurrences show, powerful Category 5 cyclones, such as Hurricane Olaf and Hurricane Heta, are possible in American Samoa. However, it appears that due to American Samoa's close proximity to the equator (840 miles south of the 0 degree latitude line), the most intense tropical cyclones in the vicinity of American Samoa are rare.

Probability of Future Events

The previous occurrences indicated 30 events within 75 miles of the planning area over a 67-year reporting period. Of these events, three made direct impact with the islands. Based on these occurrences, tropical cyclones have an approximate annual probability of about 47 percent, a categorization of likely. However, when we investigate these based on major cyclones (category 3/111 mile per hour winds or greater), just five events apply. This results in an approximate annual probability of seven percent, a categorization of possible (between 1% and 10% annually) for category 3 or above events.

70 National Climatic Data Center

71 Ibid.

72 Cyclone Nisha buffets American Samoa. (2010). Radio New Zealand. Retrieved August 8, 2014 from http://www.radionz.co.nz/international/pacific-news/188421/cyclone-nisha-buffets-american-samoa

The ENSO cycle appears to have bearing on the probability of occurrence. The following list illustrates the phase of the ENSO cycle active during storms between 1966 and 1998:

- Unnamed hurricane 1966 – Weak El Niño
- Tropical Storm 1973 – Moderate El Niño
- Tropical Storm Esau 1981 – Neutral
- Hurricane Tusi 1987 – Weak El Niño
- Tropical Storm Gina 1989 – La Niña/Neutral
- Hurricane Ofa 1990 – Weak El Niño
- Hurricane Val 1991 – Moderate/Strong El Niño
- Tropical Storm Tui 1998 – Strong/Very strong El Niño
- Tropical Cyclone Heta, Dec 2003-2004-El Niño
- Tropical Cyclone Olaf, Feb 2005-Nuetral
- Tropical Cyclone Tam, 2006-El Niño
- Tropical Cyclone Nisha, 2010-La Niña

ENSO

As Figure 64 illustrates, over a 25-year period, four highly destructive (Category 2-3) hurricanes occurred in 1966, 1987, 1990, and 1991 (All El Niño years). Heta (2004) occurred during a phase that was El Niño. Olaf (2005) occurred during a phase that was neither El Niño nor La Niña, which is known as El Niño Neutral.

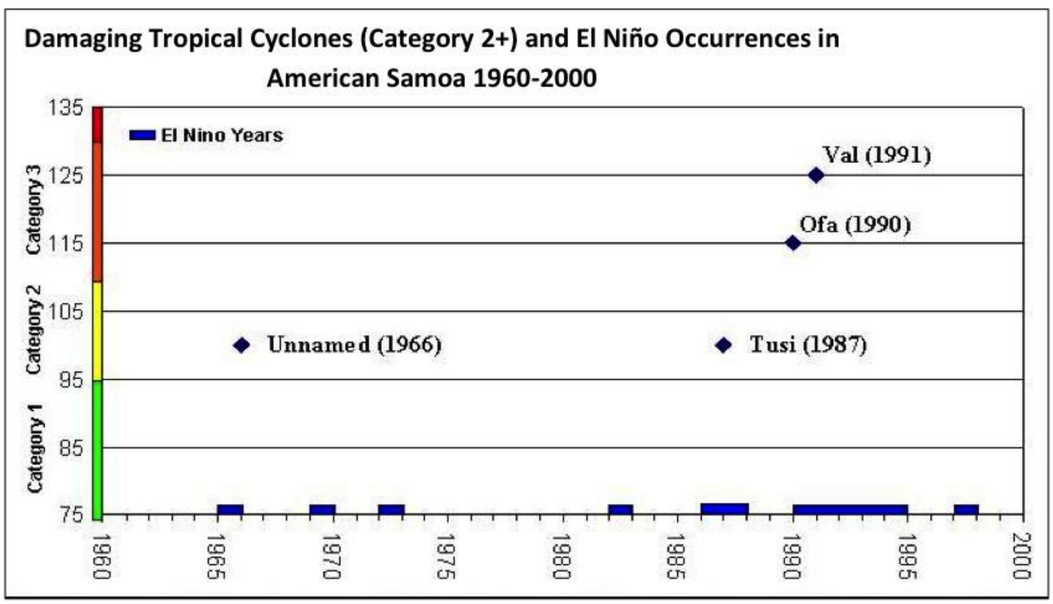


Figure 64 Tropical Cyclone Concurrence with El Niño

Vulnerability Assessment

Cyclones typically approach the islands from a west, northwest, or northerly direction. This characteristic approach affords some protection to the opposite sides of the islands with respect to incoming seawater as waves. Storm surge would typically accompany a hurricane center's landfall, which could most frequently be expected to impact the west through northern exposures of the Territory. This typically spares Pago Pago Harbor from the worst of the storm surge flooding and battering effects.

However, there have been exceptions to this, such as Category 3 Hurricane Val, which resulted in severe damage to buildings in the harbor and closure of harbor operations for a week.

Hurricanes carry sustained wind speeds between 74 mph and 155+ mph. The array of associated hazards with strong to very strong hurricanes affecting American Samoa include winds of damaging force, heavy rainfall of flooding proportions, and high surf that can cause extensive structural damage, as well as coastal flooding along exposed shorelines.

Historical information regarding past tropical cyclone hazards is limited, and specific locations of concentrated or extreme damage due to high winds are unavailable and therefore not mappable. It is possible, however, to indicate areas that are likely to be affected by storm surge. These areas are designated as VE zones on FEMA's Flood Insurance Rate Maps, coincident with areas vulnerable to wave action resulting from tsunamis. However, all impacts would likely be territory-wide. Development and population surge in hazard prone areas increases the vulnerability to tropical cyclones.

Tropical cyclones are considered territory-wide events, to which all islands of American Samoa are vulnerable. Category 2 and 3 hurricane winds, waves and rainfall would certainly be felt island-wide, with Category 1 hurricanes felt to a lesser degree. Depending upon storm severity the direction of approach, and the effects of high winds, high surf and storm surge would vary. Terrain features play a role in increasing or decreasing wind speeds, but given that the highest mountains on Tutuila are nearly 2,000 feet, little protection from the wind is afforded from one side of the island to the other. Some amplification, however, could be expected in places, as winds could be accelerated over ridges and through valleys. The island of Ta'u is about 1,000 feet higher than Tutuila, which gives the leeward side somewhat more protection. However, there are wind and rain amplification factors that arise with the associated terrain features.

Previous occurrences have reported the following impacts from hurricanes:
- Structural damage from wind
- Structural damage from flooding
- Ship/yacht damage
- Beach erosion
- Flooding and storm surge
- Storm surge (north surge)
- Tree and agricultural crop loss
- Vegetative debris
- Road washout
- Water supply impacts
- Landslides (Ofa)
- Evacuations
- Injury, death
- Downed utility lines
- Harbor closure

Potential Losses
All current and future structures and populations are considered at risk to the tropical cyclone hazard. All counties and villages within have equal vulnerability to this hazard. This includes all critical facilities and infrastructure.

Tsunami

Description

In the last several years there have been significant tsunamis worldwide. The 2004 Indian Ocean Tsunami (Sumatra) caused over 200,000 deaths. The 2011 Chile earthquake and tsunami caused approximately 1,000 deaths. The 2011 Japan tsunami caused approximately 20,000 deaths. In 2009, American Samoa was impacted by the South Pacific Tsunami, which caused widespread destruction and over 100 deaths. The islands are still recovering and implementing mitigation measures due to this event. Due to the probability of a tsunami and its potential for death and destruction, attention is warranted for this hazard.

Tsunami (soo-NAH-mee) is a Japanese word, which translates in English as "harbor wave," and is now used internationally to describe a series of waves traveling across the ocean of extremely long wavelength (10-500 kilometers) and long period between waves (up to an hour). They are generated by a sudden displacement in the sea floor due to landslides, earthquakes, or volcanic activity, which is described further below.[73] The displacement causes a huge release of energy that allows tsunami waves to travel for hundreds or even thousands of miles. Tsunami waves involve the movement on the entire water column, from the surface to the ocean floor, as opposed to normal waves, which just involve surface movement. In deep water, tsunami waves can travel at 700 kilometers/hour, the speed of a jet plane, though the waves may only be a few inches high. [74] However, as the waves reach shallow water, the topography and water depth slows them. The slower speed results in a higher wave height. Further, waves from behind are traveling faster than those in the front, thus creating a piling effect and a wall of water. In some cases, the waves may measure 30 meters (90 feet) high.

As tsunamis approach the shoreline, the sea floor is often exposed. According to National Geographic, "A tsunami's trough, the low point beneath the wave's crest, often reaches shore first. When it does, it produces a vacuum effect that sucks coastal water seaward and exposes harbor and sea floors. This retreating of sea water is an important warning sign of a tsunami, because the wave's crest and its enormous volume of water typically hit shore five minutes or so later."[75] Observing this phenomenon is a clear indication to go to higher ground away from the shoreline.

Another characteristic of tsunamis is that they "surround" islands with waves. The waves bend around islands in what is coined the wrap-around effect. During the wrap-around effect, the energy of the tsunami often decreases resulting in smaller wave heights. Conversely, tsunami waves may reflect off of a landmass instead of bending around, thus increasing wave height of the approaching wave.[76]

Tsunamis are shallow-water waves, but are different from the wind-generated waves many have seen from the beach. Wind-generated waves usually have a period (the time between two successive waves) of 5 to 20 seconds and a wavelength (the distance between two successive waves) of about 330 to 660 feet (100 to 200 meters). Tsunamis in deep water can have a wavelength greater than 300 miles (482 kilometers) and a period of about an hour. This is very different from the normal California-type tube wave, which generally has a wavelength of about 330 feet (100 meters) and a period of about 10 seconds.

73 Tsunami. (2014). NOAA. Retrieved August 8, 2014 from http://www.tsunami.noaa.gov/

74 Tsunami Facts and Information. (2014). Australian Government Bureau of Meteorology. Retrieved August 8, 2014 from http://www.bom.gov.au/tsunami/info/index.shtml

75 Tsunamis - Killer Waves. (2014). National Geographic. Retrieved August 8, 2014 from http://environment.nationalgeographic.com/environment/natural-disasters/tsunami-profile/

76 Tsunami FAQ. (2009). NOAA Pacific Tsunami Warning Center. Retrieved August 8, 2014 from http://ptwc.weather.gov/faq.php

Since tsunamis are shallow-water waves, the ratio between water depth and wavelength is very small. The deeper the water, the faster and shorter the wave travels because shallow-water waves move at a speed equal to the square root of the product of the acceleration of gravity and the water depth. Tsunami waves have a very long reach, and may transport destructive energy from the initial source location to coastlines thousands of miles or kilometers away.

As noted above, tsunamis are caused by any disturbance that displaces a large volume of water. In the case of earthquake-generated tsunamis, the earthquake causes the sea floor to abruptly uplift or subside, disturbing the equilibrium of the overlaying water column and resulting in a tsunami. Submarine landslides, which often accompany large earthquakes, can also generate tsunamis due to the sudden down slope movement and redistribution of sediment and rocks across the sea floor. Similarly, a violent submarine volcanic eruption can create an impulsive force uplifting the water column from its equilibrium and generating a tsunami. In 1883, Indonesia's Mt. Krakatoa erupted violently, generating a tsunami that killed more than 30,000 people.

Conversely, super marine (above water) landslides and space born impacts can disturb the water column by the transfer of momentum from falling debris to the water into which the debris falls. In 1958, a huge landslide generated a 1,722-foot (525 meter) tsunami in Lituya Bay, Alaska. In general, tsunamis generated by these non-seismic mechanisms dissipate quickly and rarely affect coastlines far from the source area.
It should be noted that there are many misnomers about tsunamis. Some refer to tsunamis as "tidal waves," which is misleading. Although a tsunami's impact on a coastline is dependent upon the tidal level at the time of impact, tsunamis are unrelated to the tides. Tides result from the gravitational influences of the moon, sun, and planets on the earth's oceans. The scientific community once referred to tsunamis as "seismic sea waves," which is also misleading. "Seismic" implies an earthquake-related generation mechanism, and a non-seismic event, such as a landslide, meteorite impact, or sub-marine volcanic eruption can also generate a tsunami.[77]

Location
The entire coastline of American Samoa would be affected in the event of a tsunami. Wave heights along the shoreline would be directly related to the energy of the wave and direction in which it was generated. The majority of the coastline of Tutuila is relatively protected by basalt cliffs and high seawalls; however the pocket coves and bays of the island would be at higher risk of damage due to shallow bathymetry and the amplifying effect of the wave energy as it nears the shore.

The 2009 tsunami inundation areas are shown in Figure 65. While this was a catastrophic event, future tsunamis may impact areas beyond those impacted in 2009. Tsunamis are often associated with wave action making the FEMA maps one tool of identifying areas A/AE and V/VE along the coast can be considered at risk. However, there are no areas of V/VE identified on Tutuila from the FEMA maps. Figure 66 shows the flood zones and corresponding 2009 tsunami inundation areas. Areas around Leone (Lealataua County), Tula (East Vaifanua County) and Masefau (Sua County) experienced tsunami inundation well beyond the designated floodplain areas.

77 Tsunami Facts and Information. (2014). Australian Government Bureau of Meteorology. Retrieved August 8, 2014 from http://www.bom.gov.au/tsunami/info/index.shtml

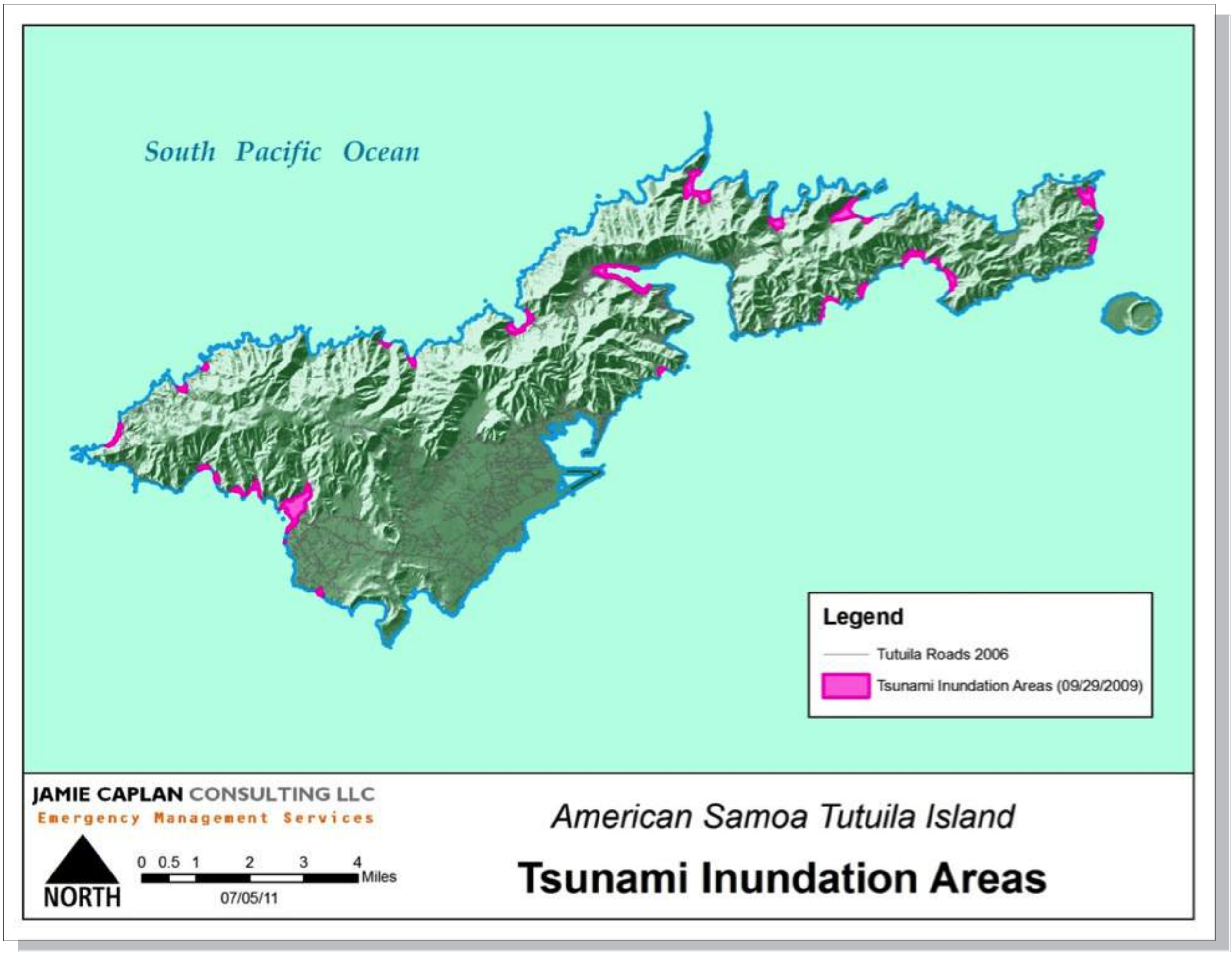


Figure 65 2009 Tsunami Inundation Levels

Bays typically experience greater damage due to the amplification effects of the tsunami. Pago Pago Harbor could sustain the worst damage due to amplification and narrowing of the channel. Additional threats would include the severe erosion of the coastline due to resonance of waves inside the narrow northwestern tip of the harbor as the sea surface returns to equilibrium. A significant number of buildings and critical facilities lie within tsunami risk area, including fire stations, communications, government buildings, and transportation buildings.

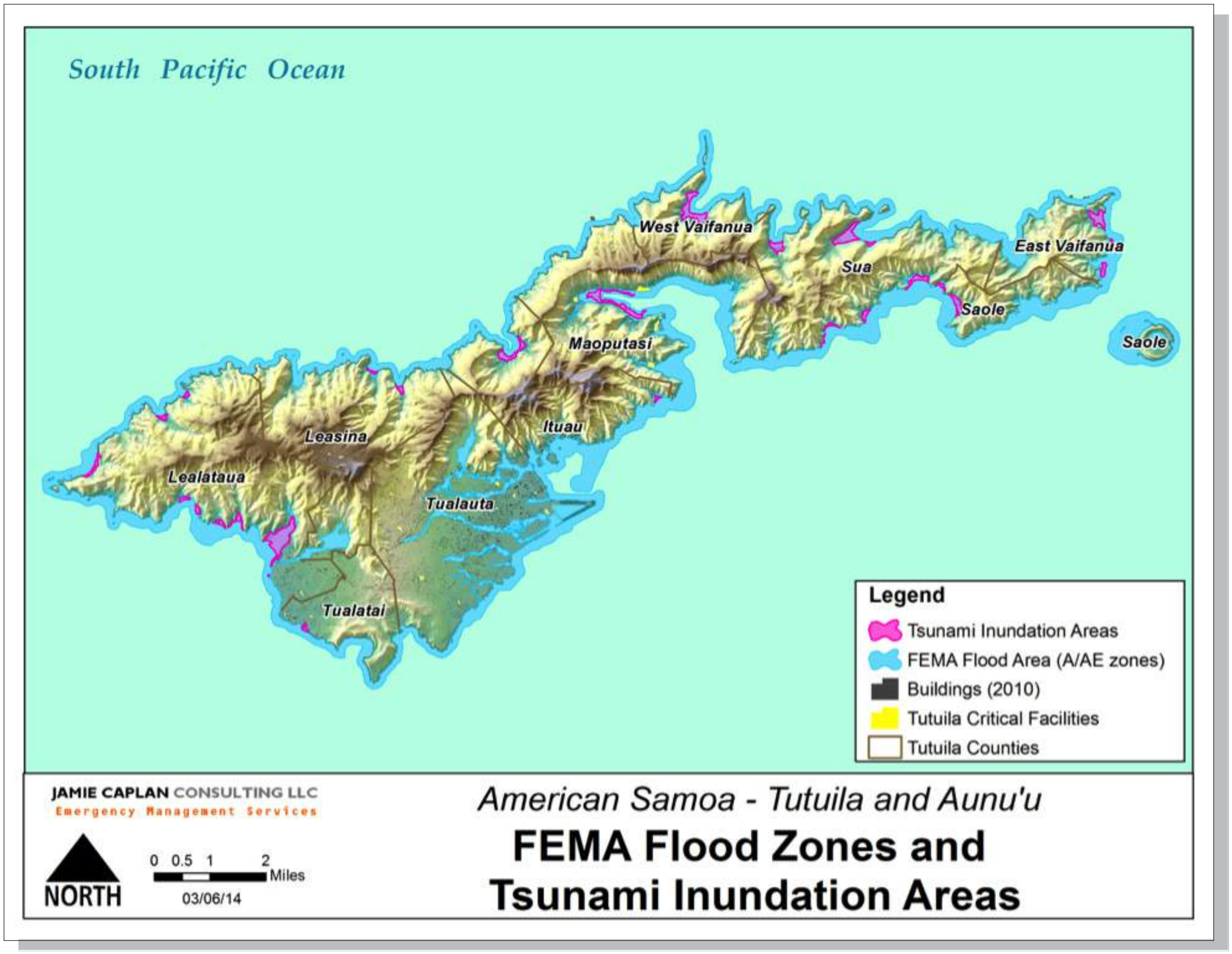


Figure 66 FEMA Flood Zones and 2009 Tsunami Inundation Areas Comparison

Previous Occurrence

Between 1837 and February 2013, there were 98 tsunami events reported for American Samoa from NOAA's National Geophysical Data Center (NGDC) Historical Tsunami Database.[78] However, many of these events were part of the same event that impacted different locations. One additional event was reported in April 2014 due to the Chilean earthquake; however waves were less than 1 foot.[79] When viewing each tsunami as an event, there were 78 separate tsunami events between 1837 and 2013 recorded. Run-up (water height) ranged from 0.3 feet (0.1 meters) to 39.4 feet (12 meters) with 23 unreported events. A minimum run-up of 1.5 feet (0.5 meter) is required to cause significant damage. Of the historical listings, 24 reports met this threshold totaling 11 separate tsunamis. Table 39 lists the eleven tsunami events with max wave height over 0.5 meters. Damage reports for the events were scarce and inconclusive in most cases but details are included when possible. For events from 1937 to 1980, details and impacts were provided from the "Catalog of Tsunamis in the Samoan Islands." [80]

78 National Geophysical Data Center. Retrieved August 8, 2014 from http://www.ngdc.noaa.gov/nndc/struts/form?t=101650&s=167&d=166

79 Strong 7.6-Magnitude Aftershock Jolts Chile. (2014). Accuweather. Retrieved August 8, 2014 from http://www.accuweather.com/en/weather-news/breaking-magnitude-80-quake-st/25144298

80 Pararas-Carayannis, George, and Bonnie Dong. (1980). International Tsunami Information Center. Retrieved August 8, 2014 from http://www.drgeorgepc.com/TsunamiSamoaIslandsCatalog.pdf

Table 39 Summary of Significant Tsunami Events

Event Name, Date	Geographical Extent	Details	Severity (Run-up, Max Water Height	Impacts
November 11, 1837	Pago Pago	A Chilean earthquake occurred.	1.9 feet (0.6 meter)	Unknown
February 2, 1915	Manu'a Islands	Said to be a hurricane, earthquake and tidal wave. However, not information could be found to support seismic activity. Since it only impacts Manu'a, there is possibility it was indeed a tidal wave and not a tsunami; unprecedented damage; American gunboat Princeton provided food, clothing, assistance	7.9 feet (2.4 meters)	3 deaths, entire villages swept away, ¾ of cocoa palms destroyed, shipped damaged; 3,000 without shelter;
Local tsunami (Tonga Trench) June 26, 1917	Pago Pago Harbor, Tutuila Locations in	A magnitude 8.5 earthquake occurred 150 miles SW of Apia	7.9 feet (2.4 meters) (Anecdotal reports say 8- 40 feet high)	Many houses destroyed, 2 church damaged (one in Pago Pago and one in Leone; harbor water retreated (up to 6 feet in Pago Pago)
April 30, 1919	Pago Pago	Earthquake followed by waves	7.9 feet (2.4 meters)	Harbor water receded 6 feet below the low water mark. It return 6-8 feet above the high water mark
November 11, 1922	Pago Pago	None reported	3.0 feet (0.9 meters)	Slight damage indicated but not reported in news sources
Aleutian tsunami April 1, 1946	Pago Pago Harbor	None reported	2.6 feet (0.8 meter)	Pacific-wide impacts. Several huts washed away in Pago Pago; accounts of harbor water receded 5 feet.
Kamchatka, Russia tsunami November 4, 1952	Pago Pago Harbor	None reported	2.7 feet (0.9 meter)	Pacific-wide tsunami. No documented damage.

Event Name, Date	Number of Occurrences	Cause	Geographical Extent	Impacts
Aleutian tsunami March 9, 1957	Pago Pago Harbor, Fagasa	None reported	4 feet (1.2 meters) 4.9 feet (1.5 meters)	Road flooded that was 4 feet above mean tide. In water Pago Pago, the water receded before advancing; water oscillated for hours; Fagasa observers said water advanced and had waves of 5 feet above high tide.
Chilean tsunami May 22, 1960	Pago Pago Harbor, Tutuila Faga'alu	None reported	4.5 feet (1.4 meters) at harbor entrance, 10.7 feet (3.3 meters) at the inner end of harbor (PPG), 15.5 feet Pago Pago Village 16 feet (4.9 meters) Tutuila, 8 feet (2.4 meters) Pago Pago (NGDC website) 2.6 feet (0.8 meters) in Faga'alu	$50,000 reported in Pago Pago village (west portion of Pago Pago Harbor), one house was reportedly moved 10 feet inland and other washed out to sea; a school constructed on concrete piers was rotated a foot
South Pacific Tsunami September 29, 2009	Pago Pago Harbor, Tutuila	A 7.9 earthquake that occurred about 120 miles southwest of Pago Pago. The wave took 15 minutes to reach the Samoan islands. The wave went inland as far as 1 mile.	Run up 10.35 feet (314 cm); waves ranged from 15 feet at Pago Pago harbor to 40 feet at Poloa village on the Tutuila (NCDC)	Extensive damage, 32 deaths and many injuries. Widespread damage to infrastructure from flooding. Power plant, schools, business damaged. Approximately $81 million in damages
February 27, 2010*	All Islands	An 8.5 magnitude earthquake on Chile generated a 3 to 5 feet tsunami on the Island of Tutuila. The tsunami reached half a mile inland on the village of Pago Pago	3 to 5 feet (NCDC)	--

Event Name, Date	Number of Occurrences	Cause	Geographical Extent	Impacts
March 11, 2011*	All Islands	A 9.1 magnitude earthquake near Japan generated tsunami waves across the Pacific.	peaked near 3.5 feet (NCDC)	

*NCDC source for details.

Tsunami September 29, 2009

Figure 67 Location of Earthquake Epicenter in Relation to American Samoa[81]

On September 29, 2009, American Samoa was struck by and 8.3 magnitude earthquake. The earthquake generated a tsunami with waves reaching 5.1 feet in Pago Pago, the territory's capital, causing flooding on portions of the island. More than 30 people were killed and hundreds were injured. The combinations of the earthquake, tsunami, and flooding resulted in a devastating amount of damage on the island of Tutuila. A local power plant was disabled, 241 homes were destroyed, 308 homes had major damage another 2,750 dwellings reported some damage, one school was destroyed and four others sustained substantial damage. The tsunami rather than the earthquake caused most of the damage.[81]

An unusual type of earthquake that occurs near ocean trenches generated the September 2009 Samoa tsunami. Unlike typical tsunamigenic earthquakes that occur on the thrust fault that separates tectonic plates

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in a subduction zone (termed the inter-plate thrust), outer-rise earthquakes, as they are called, occur within the subducting plate before it enters the subduction zone (Figure 67). There have only been a few verified instances of tsunamis generated by outer-rise earthquakes, but those that have occurred have been devastating. The 1933 Sanriku tsunami generated from a magnitude 8.6 outer-rise earthquake resulted in over 3,000 deaths in Japan and significant damage on the Island of Hawaii. The 1977 Sumba magnitude 8.2-8.3 outer-rise earthquake resulted in 189 deaths in Indonesia. The 2009 Samoa outer-rise earthquake could have resulted in comparable fatalities and was the fourth largest outer-rise earthquake that has been instrumentally recorded since 1900.[82]

FEMA's Post Tsumani Disaster Assistance[83]

Within 24 hours of the earthquake and tsunami, the President issued a federal disaster declaration. The declaration authorized funds for Individual Assistance (IA), such as temporary housing; Public Assistance (PA), such as debris removal and emergency protective measures; Hazard Mitigation; and other forms of assistance. Two amendments were made to the original disaster declaration.

Figure 68 Tsunami Damage from 2009

These amendments provided for:

- 90% federal cost share for permanent repairs, and
- 100% federal cost share for debris removal and emergency protective measures for the first 30 days following the disaster.

Public Assistance

Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 100-707) (Stafford Act), FEMA can provide multiple forms of assistance to disaster-affected areas. The Public Assistance grant program provides assistance to state, local, and tribal governments, as well as certain nonprofit organizations, so that communities can quickly respond to and recover from major disasters or emergencies. Grants may be used for debris removal; emergency protective measures; the repair, replacement, or restoration of publicly owned facilities such as utilities, schools, and hospitals damaged in the disaster; and road and bridge repair. The Individual Assistance grant program provides assistance, including temporary housing or rental assistance, to individuals affected by a disaster or emergency. Mission assignments allow FEMA to engage other federal agencies to carry out specific tasks, such as debris removal and power restoration.

82 Preliminary Analysis of the September 29, 2009 Samoa Tsunami, Southwest Pacific Ocean. (2009). USGS. Retrieved August 8, 2014 from http://walrus.wr.usgs.gov/tsunami/samoa09/index.html

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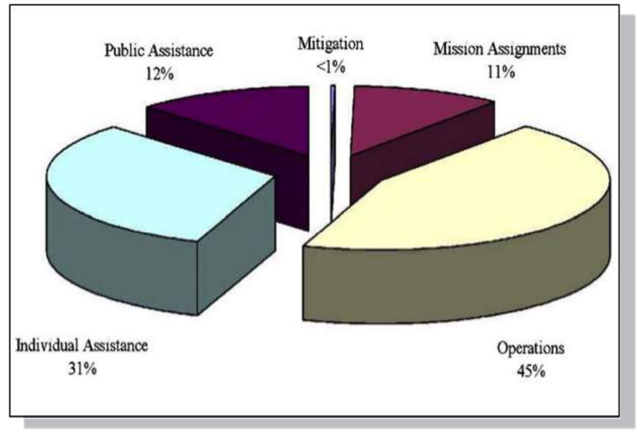
Since the disaster declaration, federal assistance to American Samoa, including FEMA's operation expenses, has exceeded $125.5 million, and an additional $4.3 million is planned for distribution. As of September 21, 2010:

- More than $37.4 million in disaster assistance was granted for housing and disaster related needs;
- 321 individuals received assistance grants of $30,300 each;
- More than $102.8 million was requested for debris removal, emergency protective measures, and the repair or rebuilding public buildings and other infrastructures;
- Temporary housing and sheltering was provided to those whose homes were destroyed or left uninhabitable; and
- Funds were allocated for the construction of approximately 45 permanent homes.



FEMA and its federal partners project that more than $18.6 million will be used to reduce or eliminate long-term hazard risk to the people and their property in American Samoa.

Although the relief aid efforts were well received by the American Samoan people, FEMA faced a number of challenges in providing assistance. Samoan culture has strong indigenous customs and traditions that revolve around the extended family (the aiga) and the communal land system. In Samoa, a matai (chief), controls the family's communally owned land for the common good of all family members. Family members are expected to help the matai by providing the resources and financial contributions needed for special occasions and events, such as church building dedications, weddings and funerals. Ultimately, the matai decides who can live or build on the communally owned land as well as what type of resources and contributions are needed from family members. FEMA acknowledged this custom, and worked with the people to come to an agreement on the distribution and ownership of the homes to be built.

Extent

A 6-point, Sieberg-Ambraseys Tsunami Intensity Scale, was devised in 1927 but it is rarely used according to NOAA. In addition, a new 12-point scale was proposed in 2001 but does not seem to be used in current practice. According to NOAA, tsunamis are most often characterized by heights at the shore and run up on land.
The 2009 tsunami brought run up of 10.35 feet and wave height of 15-40 feet. Inundation areas are nearly a half to 1 mile in some areas such as Leone and Masefau villages. While this is the most severe tsunami recorded in American Samoa to date, more severe events are possible.

Probability of Future Events

Between 1837 to 2014, a 177-year period, a total of 78 events were reported. This results in an approximate annual probability of 44 percent, a categorization of likely (between 10% and 90% annually). It should be noted, that a majority of these events did not result in damage. The 2009 tsunami was by far the most destructive tsunami experienced on island. The information for American Samoa suggests a probability of a potentially destructive tsunami occurring 2 to 3 times every 50 years (4% to 6% annual chance).

Vulnerability Assessment

Areas along the coast are most vulnerable to the impacts of tsunami. It is likely that tsunamis bringing a run-up of 2.6 feet (0.8 meter) or greater in American Samoa will cause significant damage. Damage will be particularly severe in terms of economic loss and property damage since the majority of commercial and residential buildings reside along the low-lying coastal regions and are rarely protected by barriers such as sea walls. The areas at highest risk of damage are the bays of Tutuila, particularly Pago Pago Harbor, due to the amplification of the wave energy as it approaches the shore. Bays and harbors experience more damage due to their shape. The impacts are concentrated and slosh back and forth.[84]

Since the 2009 tsunami, several sirens have been installed and public awareness is high. In addition, several tsunami evacuation areas have been identified, and signs have been installed to direct people to these areas. These factors will help to lessen the chance of loss of lives. However, future building decisions should also consider the possibility of future tsunamis. While major events are not a regular occurrence, they should still be planned for. Additional measures such as installing more seismic sensors to detect for locally generated tsunamis are encouraged.

Potential Losses

In order to estimate losses due a tsunami, a .25-mile buffer (inland from the shoreline) was applied using GIS analysis to the FEMA designated floodplain area. This buffer includes all of the 2009 tsunami inundation areas as well as land further inland. It is likely an overestimate since all floodplain areas (including that inland such as that around Tafuna Plain) is included in the buffer (Figure 69). However, it does provide a potential estimate for an event even more devastating than the 2009 tsunami event.

84 Tsunami fact-ite. Geofacts and Activities for the classroom. Retrieved August 8, 2014 from http://www.gsa.org.au/resources/factites/factitesTsunami.pdf

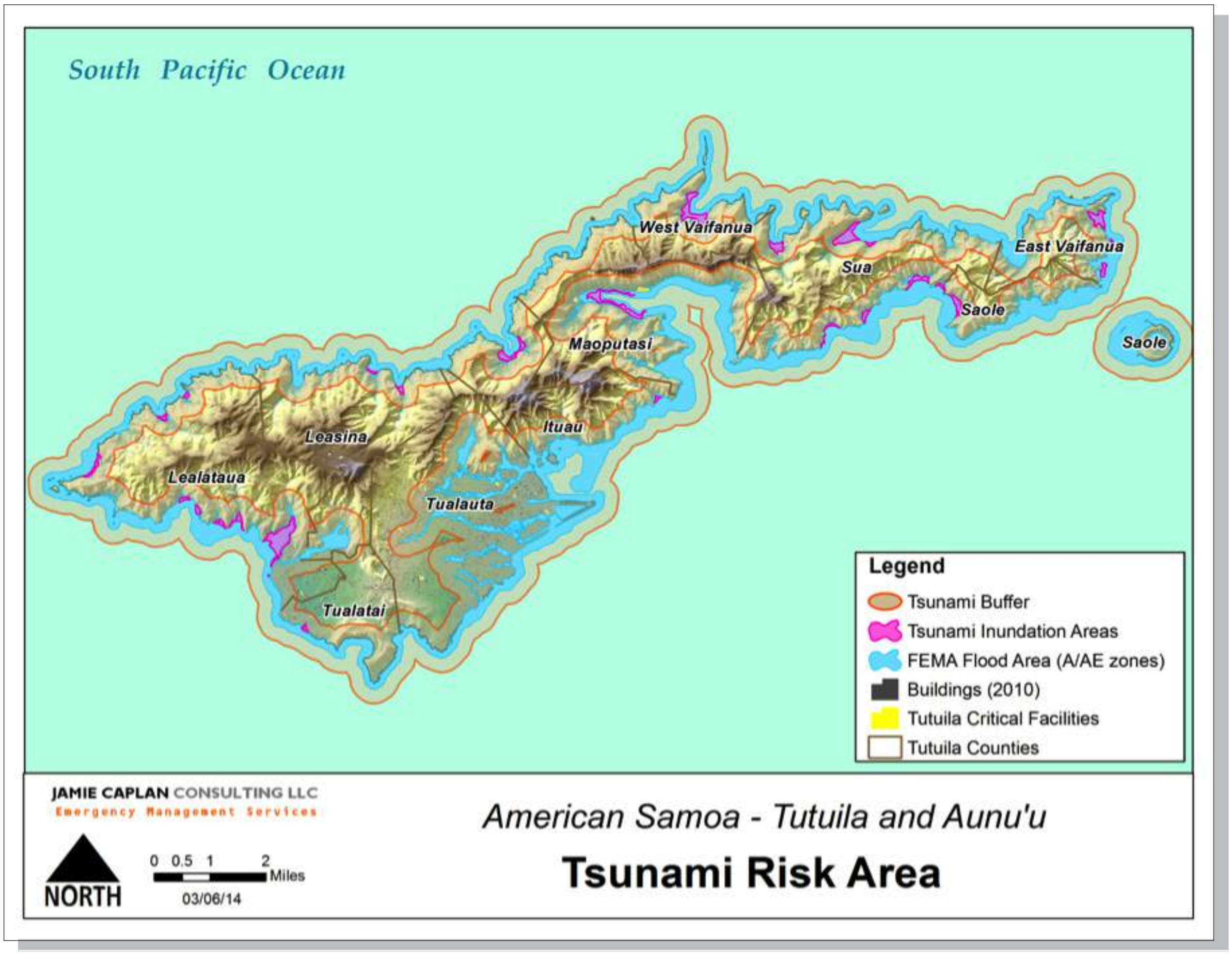


Figure 69 Tsunami Risk Area Based on Calculated Buffer

Table 40 Buildings Potentially At Risk to Tsunami Based on Buffer Area

County (District)	Total Number of Buildings	Total Number of Buildings in Tsunami Buffer Zone	Percent of Buildings in Tsunami Buffer Zone	Type of Buildings
TUTUILA ISLAND				
East Vaifanua (East District)	497	436	88%	491 residential 1 church 4 unknown
Ituaa (East District)	1,075	1,075	100%	1,402 2 government 12 church 32 commercial 1,028 residential
Lealataua (West District)	2,026	1,473	73%	13 churches 22 unknown 4 commercial 6 schools 1,432 residential
Leasina (West District)	474	161	34%	1 church 160 residential
Maoputasi (East District)	2,246	2185	97%	1 community hall 1 new 1 school 1 Tedi 6 unknown 13 churches 33 commercial 77 government 2,058 residential
Saole (East District)	364	360	99%	1 business 359 residential
Sua (East District)	938	902	96%	4 churches 4 commercial 5 unknown 889 residential
Tualatai (West District)	903	467	52%	2 commercial 7 churches 28 unknown 430 residential
Tualata (West District)	7,441	6,082	82%	1,832 12 unknown 68 church 87 government 95 commercial 5,819 residential

County (District)	Total Number of Buildings	Total Number of Buildings in Tsunami Buffer Zone	Percent of Buildings in Tsunami Buffer Zone	Type of Buildings
West Vaifanua (East District)	172	167	97%	172 residential
Tutuila Island Total	16,136	13,308	82%	--
AUNU'U ISLAND				
Saole (East District)	179	179	100%	178 residential
Aunu'u Island Total	179	179	100%	
MANU'A ISLANDS				
TA'U ISLAND				
Faleasoa (Manu'a District)	81	80	99%	-
Fitiuta (Manu'a District)	180	180	100%	-
Ta'u (Manu'a District)	208	191	92%	-
Ta'u Island Total	469	451	96%	-
OFU ISLAND				
Ofu (Manu'a District)	133	133	30%	4
Ofu Island Total	133	133	30%	4
OLOSEGA ISLAND				
Olosega (Manu'a District)	101	101	0%	7
Olosega Island Total	101	101	0%	7
TOTAL	17,018	13,721	81%	-

It is clear from the analysis that all counties are subject to tsunami impacts. It can be assumed that the greater the amount of coastal development, the greater the loss potential. Loss potential is extremely high in Ituau, Matupasi, West Vaifunua, Saole, and Sua Counties on Tutuila. In addition, all counties in Manu'a have a high vulnerability to loss.

A critical facility analysis was also performed using available data. It should be noted, however, that the GIS analysis performed does not account for building elevation. If buildings are elevated, they may be able to withstand some of the flooding brought on by the tsunami. However, regardless of elevation, the velocity of the tsunami may still impact buildings. As previously discussed, no critical facilities were provided for the Ofu and Olosega Islands. Table 41 highlights the results. Several figures also note the location of these critical facilities beginning with Figure 70 on 186.

Table 41 Number of Critical Facilities (CFs) in the Tsunami Buffer Zone

Location	Total Number of Critical Facilities	Total Number of Critical Facilities in Tsunami Buffer Zone	Value
Tutuila Island CFs	241	215	$1,198,572,003
Ta'u Island CFs	42	34	N/A

Assembly areas

- All 26 assembly areas were found to intersect the tsunami buffer zone. It is important to be aware that these areas are subject to inundation and are potentially not a safe assembly location during tsunami events.

Safe Zones

- All safe zone areas in Tutuila intersect the tsunami buffer area. It is important to be aware that these areas are subject to inundation and are potentially not a safe assembly location during tsunami events.

Tsunami Sirens

- 40 sirens are located in the tsunami buffer zone. These structures, mostly new and made of metal, are largely fortified from tsunami. Ideally, they would serve their purpose and sound prior to the tsunami impact.

ASTCA Infrastructure

- 60 out of 75 ASTCA infrastructure items were noted as being in the tsunami buffer area. The buildings, in particular, are at risk to flood and velocity impacts from the tsunami. The remote cell sites are typically on a pole and could be damaged if the pole is displaced. The towers are less likely to be impacted by tsunami.

A complete listing of critical facilities and associated information (such as assembly areas, safe zones, and tsunami sirens) can be found in Appendix D.

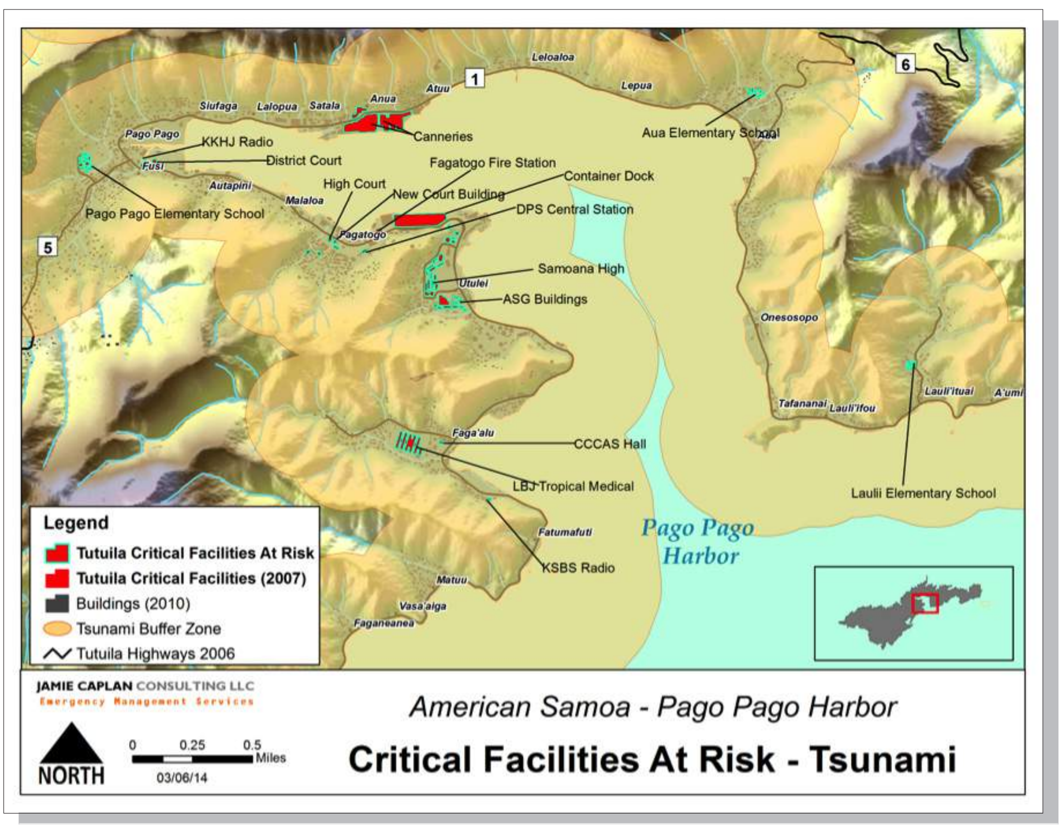


Figure 70 Critical Facilities Potentially At Risk To Tsunami– Greater Pago Pago Harbor

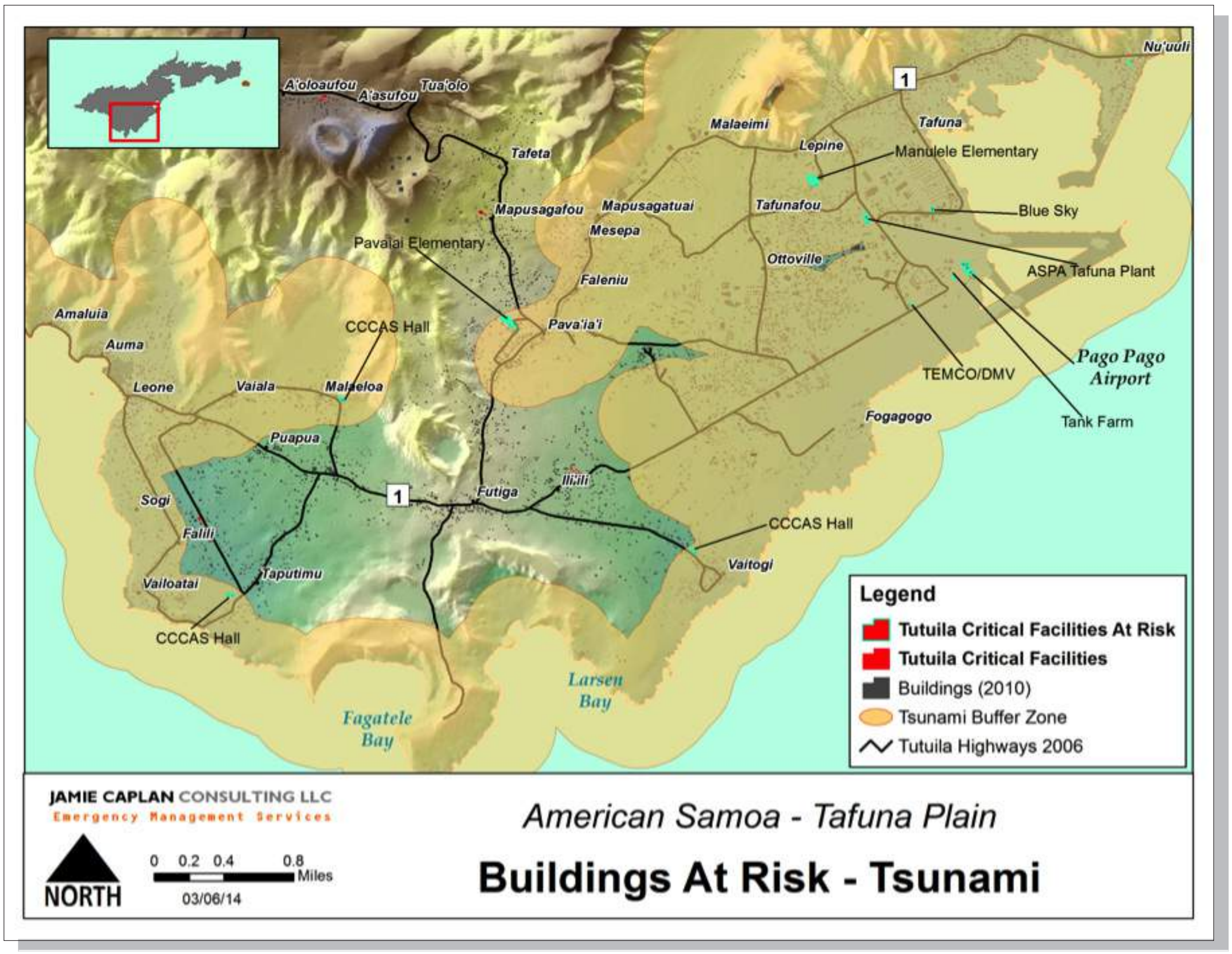


Figure 71 Critical Facilities Potentially At Risk To Tsunami–Tafuna Plain

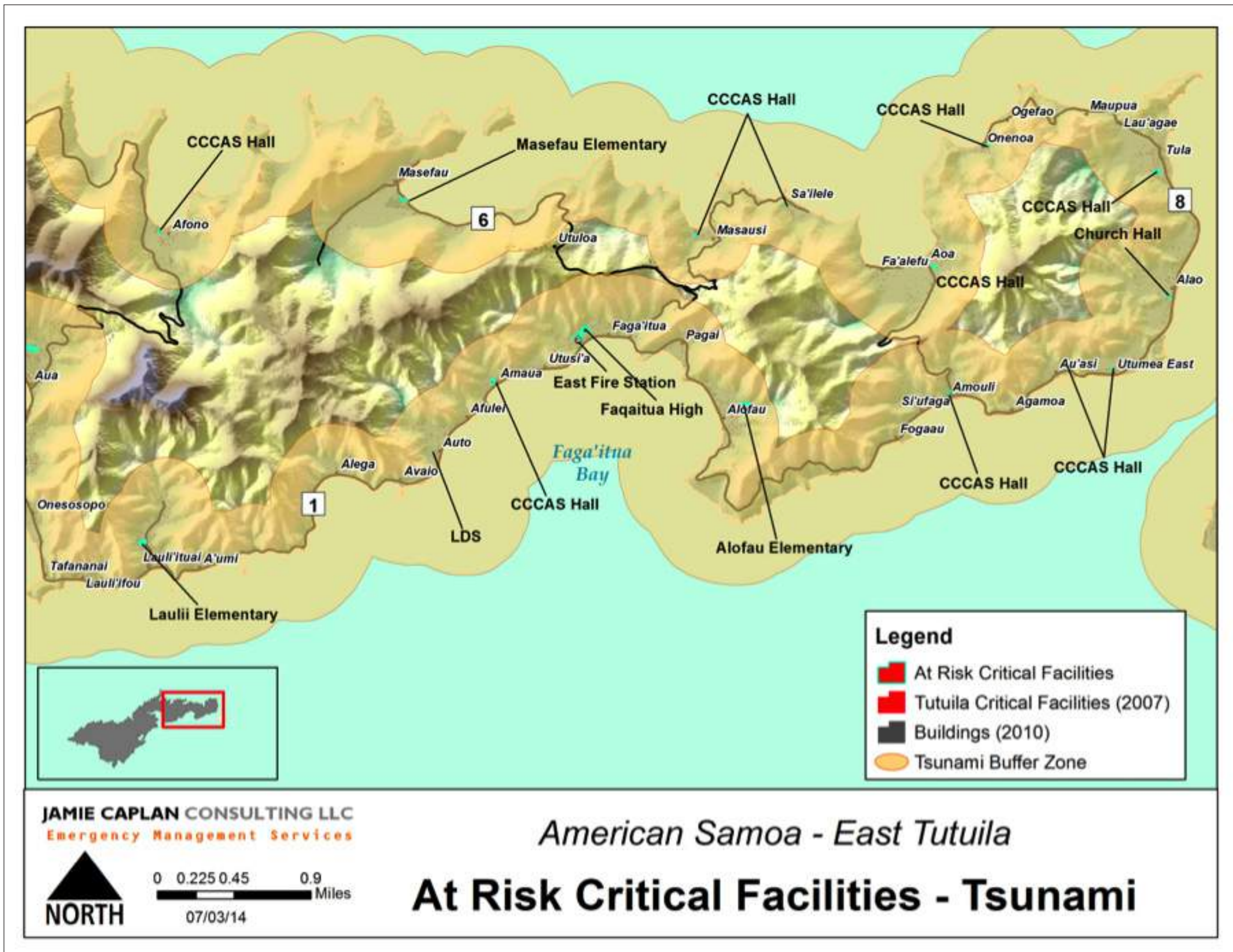


Figure 72 Critical Facilities Potentially At Risk To Tsunami– East Tutuila

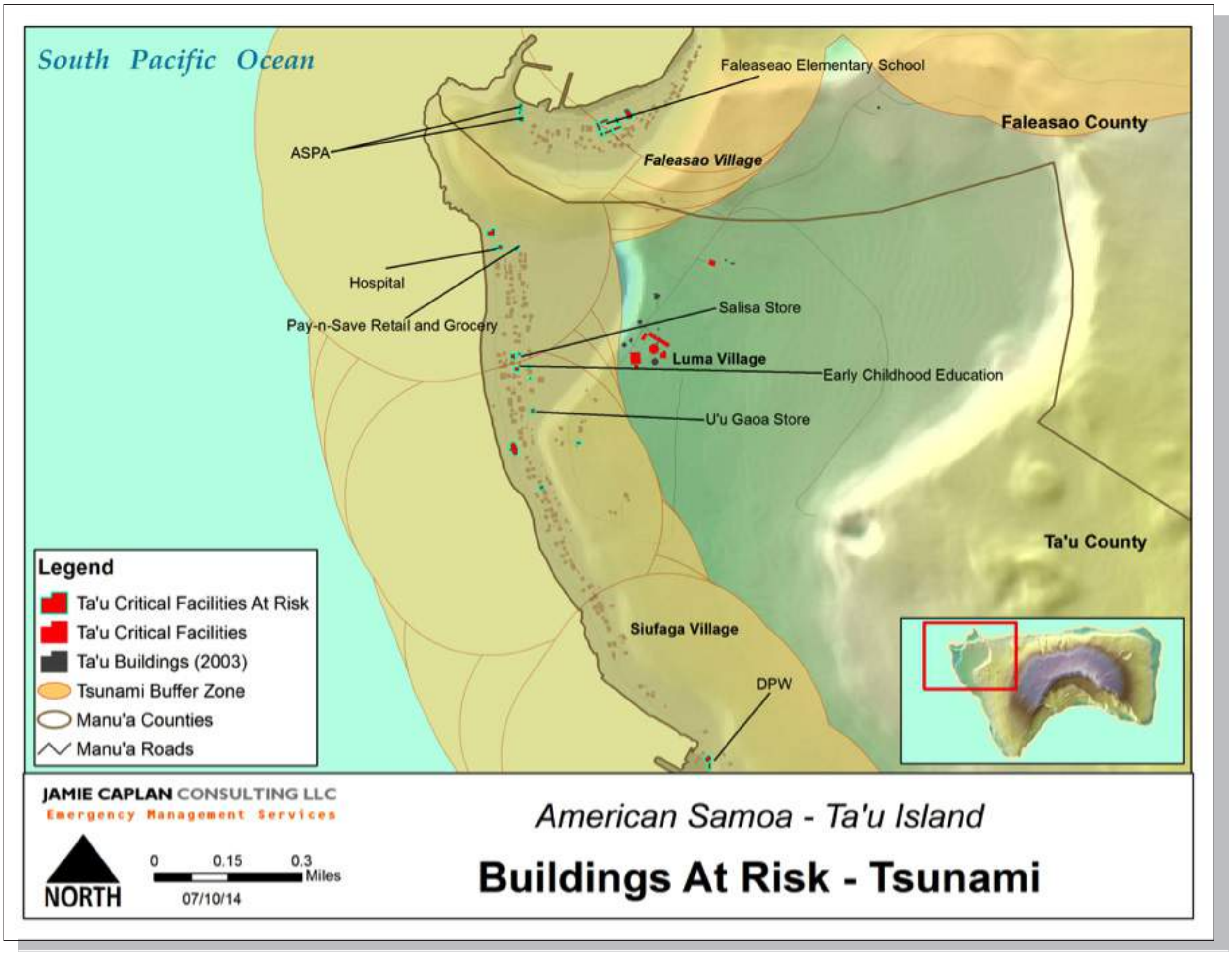


Figure 73 Ta'u Critical Facilities Potentially At Risk to Tsunami

Volcano

Description

Volcanic eruptions are one of Earth's most dramatic and violent agents of change. Not only can powerful explosive eruptions drastically alter land and water for tens of kilometers around a volcano, but tiny liquid droplets of sulfuric acid erupted into the stratosphere can change our planet's climate temporarily. Eruptions often force people living near volcanoes to abandon their land and homes, sometimes forever. Those living farther away are likely to avoid complete destruction, but their cities and towns, crops, industrial plants, transportation systems, and electrical grids can still be damaged by tephra, ash, lahars, and flooding.

Fortunately, volcanoes exhibit precursory unrest that if detected and analyzed in time allows eruptions to be anticipated and communities at risk to be forewarned with reliable information in sufficient time to implement response plans and mitigation measures.[85]

There are three main types of volcanoes as described below. Volcanoes may be visible above the surface or submarine on the ocean floor[86]:

Shield

They are built almost entirely of fluid lava flows. Flow after flow pours out in all directions from a central summit vent, or group of vents, building a broad, gently sloping cone of flat, domical shape, with a profile much like that of a warrior's shield. They are built up slowly by the accretion of thousands of highly fluid lava flows called basalt lava that spread widely over great distances, and then cool as thin, gently dipping sheets.

Stratovaolcanoes – (also called composite volcanoes)

They are typically steep-sided, symmetrical cones of large dimension built of alternating layers of lava flows, volcanic ash, cinders, blocks, and bombs and may rise as much as 8,000 feet above their bases.

Cinder cones

They are built from particles and blobs of congealed lava ejected from a single vent. As the gas-charged lava is blown violently into the air, it breaks into small fragments that solidify and fall as cinders around the vent to form a circular or oval cone. Most cinder cones have a bowl-shaped crater at the summit and rarely rise more than a thousand feet or so above their surroundings.

Eruptions occur with magma rises from the below the earth's crust (the mantle). The mantle rock melts, becoming liquid magna. It has a temperature of 700-1300 Celsius. The magma rises from the crust and surfaces through a volcanic vent. Once it reaches the surface, it is called lava. Lava, like magna, is molten rock. Eruptions are typically categorized as effuse (outpouring of lava onto the ground) or explosive (violent, high volume of debris into the sky). Volcano eruptions vary tremendously in their magnitude. A scale known as the Volcanic Explosivity Index (VEI) shows a measurement of volcano eruptions as shown in Table 42.

85 USGS Volcano Hazards Program

86 Principal Types of Volcanoes. (2011). USGS. Retrieved August 8, 2014 from http://pubs.usgs.gov/gip/volc/types.html

Table 42 Volcanic Explosivity Index (VEI) (based on global observations) [87]

VEI	Description	Plume Height	Volume	Classification	How often	Example
0	non-explosive	< 100 m	1000s m3	Hawaiian	daily	Kilauea
1	gentle	100-1000 m	10,000s m3	Haw/Strombolian	daily	Stromboli
2	explosive	1-5 km	1,000,000s m3	Strom/Vulcanian	weekly	Galeras, 1992
3	severe	3-15 km	10,000,000s m3	Vulcanian	yearly	Ruiz, 1985
4	cataclysmic	10-25 km	100,000,000s m3	Vulc/Plinian	10's of years	Galunggung, 1982
5	paroxysmal	>25 km	1 km3	Plinian	100's of years	St. Helens, 1980
6	colossal	>25 km	10s km3	Plin/Ultra-Plinian	100's of years	Krakatau, 1883
7	super-colossal	>25 km	100s km3	Ultra-Plinian	1000's of years	Tambora, 1815
8	mega-colossal	>25 km	1,000s km3	Ultra-Plinian	10,000's of years	Yellowstone, 2

Volcanoes can also erupt underwater. An area where magma rises upward from the earth's mantle until it erupts on the sea floor is called a "hot spot."[88] Underwater eruptions may create algae plumes on the ocean's surface. Algae plumes form as a result of pumice, hot water, acid and nutrients that rise to surface. The algae can be detected via satellite so that is one method used to track submarine eruptions. While most submarine eruptions remain underwater, pumice and smoke plumes may crest above the surface. New islands are also formed in this manner: magma erupts from the earth's mantle layer and cools as lava. Eventually, the lava builds up above the sea level and forms an island, such as the Samoa and Hawaii Island chains. Strong submarine eruptions may result in earthquakes or tsunamis. It takes about 100 years to go from lava to garden. Cooled lava, the earth's surface is broken down by the wind to become soil. Spores traveling through the air land on the island, which are then nurtured by the abundant tropical sun, and rain. Eventually, the island will be abundant with flora and fauna.

Vog (volcanic smog) is a hazard associated with volcanic eruptions. Vog forms when volcanic gases (such as sulfur dioxide and hydrogen sulfide) mix with oxygen, moisture and sunlight in the atmosphere to form particles. Vog creates a haze across the impacted area. The impacted areas change based on the direction of the wind and volume of gases being released.

Unfortunately, the particles are small enough to be absorbed by the lungs, and it is assumed the impacts may be similar to pollution and smog. According to the USGS, limited studies have been completed on vog and its long-term health effects.[89] However, the Hawaii State Department of Health developed a VOG index based on EPA standards for sulfur dioxide. Advisory levels range from good to hazardous. While there are no reported historical events of vog impacting American Samoa, it is possible.

87 Volcano World. (2014). Retrieved August 8, 2014 from http://volcano.oregonstate.edu/education/eruption_scale.html
88 How did the Hawaiian Islands form? (2014). NOAA. Retrieved August 8, 2014 from http://oceanservice.noaa.gov/facts/hawaii.html
89 Vog: A Volcanic Hazard. (1996). USGS - Hawaiian Volcano Observatory. Retrieved August 8, 2014 from http://hvo.wr.usgs.gov/volcanowatch/archive/1996/96_05_29.html

This index could be used for American Samoa for future volcano eruptions. The sulfur dioxide index can be found here: http://www.hiso2index.info/assets/FinalSO2Exposurelevels.pdf.

Volcanic ash clouds are another associated hazard. They pose an economic hazard as they disrupt air traffic, as well as a safety risk to air travelers. The ash contains tiny rocks that can remove the plane's protective film or enter the plane's engine. The heat from the plane engines melts particles, causing them to stick to turbine blades. This can cause engine failure.

Given American Samoa's low frequency of eruptions, both vog and ash clouds are not considered major threats. However, volcanic eruptions are possible from the active submarine volcano east of Manu'a. Locations are described below.

Location

Figure 74 below identifies the location of the four major volcano areas in American Samoa. The proceeding graphic, Figure 75, shows a geomorphologic interpretation of major volcanic structures within American Samoa and their associated rift zones.[90] The proceeding text describes each location. Just one volcano in American Samoa is active today. It is known as Vailulu'u and is located east of the Manu'a Group. However, it should be noted that there is a semi-active volcano in Western Samoa (Savai'i) that last erupted in 1911.

90 Wright, Dawn. Oregon State University.

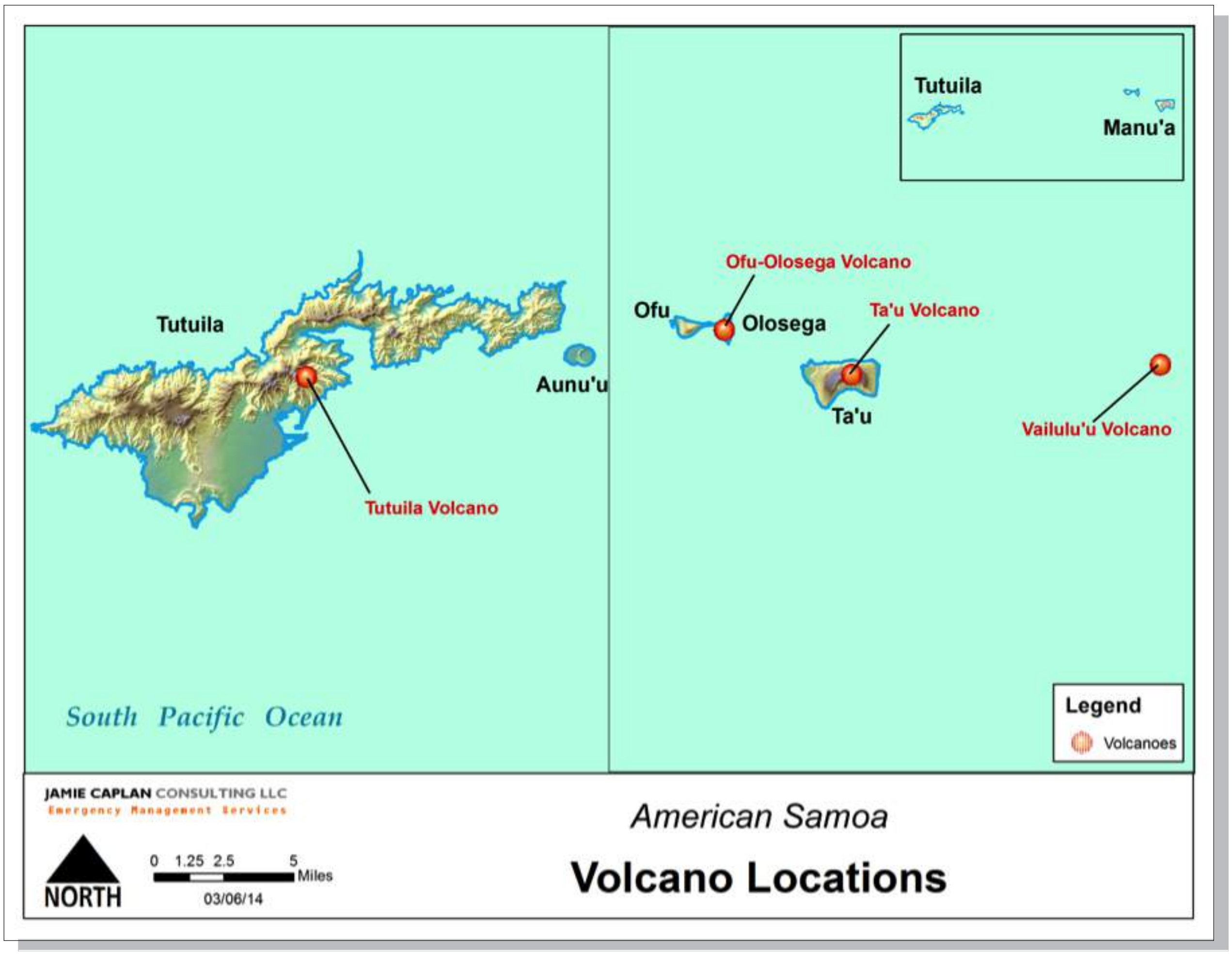


Figure 74 Volcano locations in American Samoa

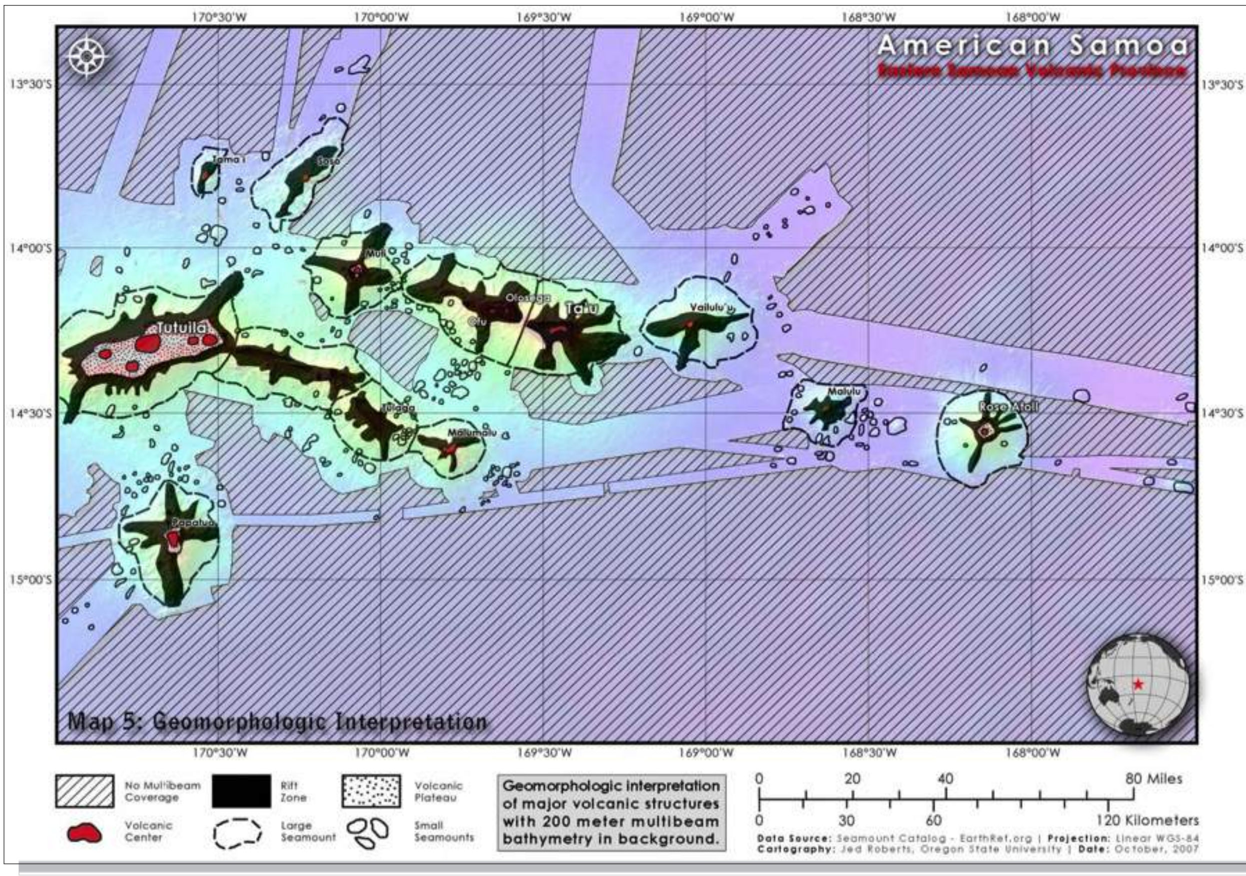


Figure 75 Volcanos and Rift Zones

Vailulu'u

A massive volcanic seamount, not discovered until 1975, rises 4200m from the sea floor to a depth of 590m about one-third of the way between Ta'u and Rose islands at the eastern end of the American Samoa. The basaltic seamount, named Vailulu'u, is considered to mark the current location of the Samoan hotspot. The summit of Vailulu'u contains a 2-km-wide, 400-m-deep oval-shaped caldera. Two principal rift zones extend east and west from the summit, parallel to the trend of the Samoan hotspot, and a third less prominent rift extends southeast of the summit. The rift zones and escarpments produced by mass wasting phenomena give the seamount a star-shaped pattern. On July 10, 1973, explosions from Vailulu'u were recorded by SOFAR (hydrophone records of underwater acoustic signals). An earthquake swarm in 1995 may have been related to an eruption from the seamount. Additional activity was reported in 2003.[91] Turbid (muddy) water above the summit shows evidence of ongoing hydrothermal plume activity.[92] In 2005, researchers discovered a submarine 300-meter tall volcano cone growing in the summit crater of Vailulu'u, since named Nafanua. The formulation is growing so quickly that it may surface within decades.[93] Vailulu'u is considered to be a very active underwater volcano. Figure 76 shows a cross section and location orientation figure of the hotspot.

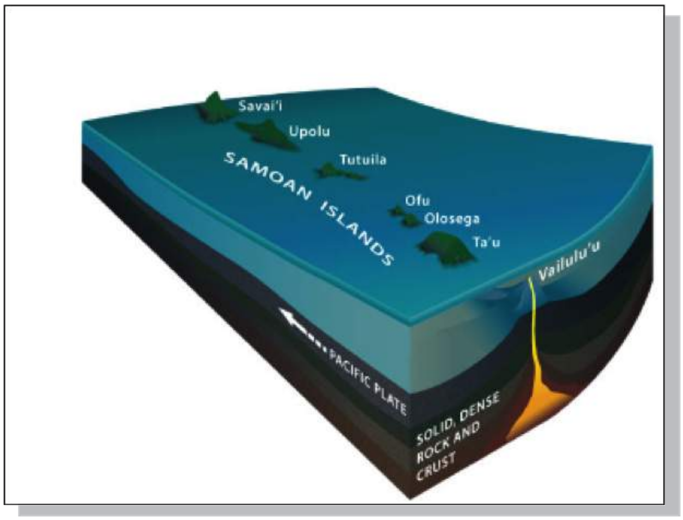


Figure 76 Illustration of Vailulu'u Samoan Hotspot[94]

Ta'u

The large, 6 x 10 km sea cliffs ring, which is Ta'u Island, located at the eastern end of the Samoan islands. The 931-m-high island is the emergent portion of the large Lata shield volcano. Collapse and landsliding of the southern portion of the basaltic shield volcano have left an arcuate, south-facing embayment with a steep headwall overlooking several flat benches today. Two smaller shields were constructed along two rift zones at the northwestern and northeastern tips of the island. A tuff-cone complex that draped sea cliffs and ejected large dunite xenoliths and coral blocks extends the northwest corner of the island. Numerous Holocene post-caldera-aged (11,700 years ago to present) cones occur at the summit and flanks of the Lata shield volcano.[95] No eruptions have been recorded at this location and it is considered to be extinct.

Ofu-Olosega

A narrow strait separates the two triangle-shaped islands of Ofu and Olosega in eastern Samoa, with a combined length of 6 km. The islands are formed by two eroded, coalescing basaltic shield volcanoes whose slopes dip to the east and west. Steep cliffs up to 600-m high truncate the northern and southern sides of the islands. The

91 Lee, Siebert, Tom Simkin, Paul Kimberly. (2010). Volcanoes of the World: p.74. University of California Press.
92 Most Recent Bulletin Report. (2005). Smithsonian Institution National Museum of Natural History. Retrieved August 8, 2014 from http://www.volcano.si.edu/world/volcano.cfm?vnum=0404-00-
93 Staudigel, Hubert et al. (2006). "Vailulu'u Seamount, Samoa: Life and death on an active submarine volcano." Proceedings of the National Academy of Sciences of the U.S.A.: Vol. 103. no. 17. Retrieved August 8, 2014 from http://www.pnas.org/content/103/17/6448.full
94 Doucette, Jayne. (2005) Woods Hole Oceanographic Institution.
95 Ta'u. (2013). Smithsonian Institution National Museum of National History. Retrieved August 8, 2014 from http://www.volcano.si.edu/world/volcano.cfm?vnum=0404-001

narrow, steep-sided ridge forming the eastern tip of Ofu Island consists of a dike complex. The shield volcano on Ofu is cut on the north by the A'ofa caldera; bathymetry suggests that a caldera may also exist on the Sili shield volcano of Olosega.

The Nu'utele tuff cone, forming a small crescent-shaped island immediately off the west end of Ofu Island, is Holocene in age (11,700 years ago to present). A series of submarine eruptions took place in September and November of 1866 at the opposite end of the two islands, 3 kilometers southeast of Olosega, along the ridge connecting Olosega with Ta'u Island.[96]

Tutuila

The elongated, extensively eroded Tutuila Island in the center of the Samoan Islands consists of five Pliocene-to-Pleistocene (~2.5 million years ago) volcanoes constructed along two or three rifts trending south-southwest and north-northeast. The Pago basaltic-to-andesitic shield volcano in the center of the 32-km-long island is truncated by an eroded, 9-km-wide caldera that encloses Pago Pago harbor on its west side. The caldera is now partially filled by cinder cones and trachytic lava domes. Following a lengthy period of erosion, submergence, and the development of a barrier reef, the Leone volcanoes erupted during the Holocene (12,000 years ago) (Stearns, 1944), forming a group of initially submarine tuff cones and subsequent subaerial cinder cones that produced fresh-looking pahoehoe lava flows.[97] No recent eruptions have been recorded at this location and it is considered dormant.

Previous Occurrences

As mentioned above, Vailulu'u is most active volcano in American Samoa today. The Ofu-Olosega volcano also had reported activity in 1866. In addition, there is a semi-active volcano in Western Samoa. The Savai'i has documented evidence of three historic eruptions (1760; 1902; 1905-1911).[98] Eruptions from this volcano could impact air quality in American Samoa. Table 43 below shows the known eruptions for volcanos on American Samoa.

Table 43 Recorded Eruptions on American Samoa's Islands [99]

Volcano Name	Primary Volcano Type	Last Eruption Year	Total Reported Eruptions	Elevation	Population within 5km	Population within 10km	Population within 30km
Ofu-Olosega	Shield(s)	1866	1	639	220	384	1387
Ta'u	Shield	Unknown	0	931	95	1154	1538
Tutuila	Tuff cone(s)	Unknown	0	653	16653	49763	56239
Vailulu'u	Submarine	2003	3 (2003, 1995, 1973)	-592	0	0	0

96 Ofu-Olosega. (2013). Smithsonian Institution National Museum of National History. Retrieved August 8, 2014 http://www.volcano.si.edu/world/volcano.cfm?vnum=0404-01=

97 Tutuila. (2013). Smithsonian Institution National Museum of National History. Retrieved August 8, 2014 http://www.volcano.si.edu/world/volcano.cfm?vnum=0404-02-, http://www.volcanodiscovery.com/tutuila.html

98 Taylor, Paul, and Lameko Talia. (1999). "Volcanic Hazards Assessment of Savai'i, Samoa. Australian Volcanological Investigations Apia Observatory, Samoa. Retrieved August 8, 2014 from http://ict.sopac.org/VirLib/TR0295.pdf

99 Database Search. (2013). Smithsonian Institution National Museum of National History. Retrieved August 8, 2014 http://www.volcano.si.edu/search_volcano_results.cfm

Extent

One way to measure volcano extent is through the Volcanic Explosivity Index (VEI), which was described in the hazard description section above. The Savai'i Volcano eruptions during the early 1900s were categorized as "0," non-explosive.[100] Known eruptions from the Vailulu'u volcano were also non-explosive.[101] However, it should be noted that this scale does not account for the amount of sulfur dioxide that is released. The release of this gas could have very devastating impact on American Samoan air quality.

These volcanoes are not likely to be catastrophic for American Samoa if they erupt in the future. The Savai'i volcano is characterized by lava flows, release of volcanic gases, tephra falls (airborne debris), and volcanic earthquakes. Similarly, eruptions could result in vog, ash clouds, or algae outbreaks for submarine areas. It should also be noted that if the wall of a volcano were to collapse (edifice collapse), tsunami formation is possible. This could also impact American Samoa.

Probability of Future Events

The probability of future volcanic eruptions is low. None of the volcanoes on American Samoa are thought to be active. Limited information on probability, historic events, and monitoring could be found, making it difficult to quantify a probably. However, data does suggest that the Savai'i volcano has increased its frequency of eruptions throughout history, and it may be most active now. Similarly, the submarine volcano is thought to be very active.

The available data suggests that

- The Savai'i volcano has erupted 3 times over a 254 year period (0.01 percent annual chance)
- The Vailulu'u volcano has erupted 3 times over a 41 year period (7 percent annual chance)
- The Ofu-Olosega volcano has eruption 1 time over a 148 year period (0.6 percent annual chance)

Combining these known eruptions over a 254-year period yields a 1 percent annual chance. The estimated probably of an eruption is unlikely, less than a 1 percent chance per year.

Vulnerability Assessment

All existing and future building and populations are considered to be at risk to future volcanic eruptions in American Samoa. Given that there are no active volcanoes on island, vulnerability should be measured in terms of active surrounding volcanoes. This includes the submarine volcano east of Manu'a (Vailulu'u), the submarine Ofu-Olosega Volcano, and the volcano in Western Samoa (Savai'i).

Nearby eruptions may impact air quality through ash clouds, vog, and sulfur dioxide. The associated hazards can have impacts on short-term and long-term health efforts Submarine eruptions may result in algae plums and fish die-off.

In addition, nearby eruptions may result in pyroclasts (airborne fragments from eruptions), tephra (fragments of volcanic debris that has fallen to the ground) or ash may damage crops, industrial plants, transportation (particularly air travel) systems, and electrical grids.

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100 The Savai'i Volcanic Eruption. (2014). Retrieved August 8, 2014 from http://volcanic-eruptions.findthebest.com/l/348/Savai-i

101 Vailulu'u. (2013). Smithsonian Institution National Museum of National History. Retrieved August 8, 2014 from http://www.volcano.si.edu/volcano.cfm?vn=244000

Potential Losses
As noted above, all existing and future buildings and populations are considered to be at risk to future volcanic eruptions in American Samoa. Potential losses, even with a catastrophic eruption of a nearby earthquake, are expected to be minimal, although some damage is possible from falling ash, for example. All jurisdictions are assumed equally vulnerable. Greater issues will be ensuring the health of people and marine life in the area.

Wildfires

Description
A wildfire is an unplanned fire that requires measures of control. This uncontrolled burning can occur in vegetation, structures and other improvements. Dry conditions at various times of the year increase the potential for wildfires. Common causes include lightning, human carelessness, arson, volcano eruption, and pyroclastic cloud from active volcano. Heat waves, droughts, and cyclical climate changes such as El Niño can also have a dramatic effect on the risk of wildfires. The evaporation of water in plants is balanced by water absorbed from the soil. Below this threshold, the plants dry out and under stress release the flammable gas ethylene. A consequence of a long hot and dry period is therefore that the air contains flammable essences and plants are drier and highly flammable.

American Samoa has a low chance of wildfire according to Peter Craig, American Samoa National Park Biologist. For that reason, American Samoa has a limited response plan. However, several rangers on staff are expert wild fire fighters and form part of a team of seventeen American Samoans who go to the United States every fire season to help. They have been written up several times as an excellent crew and are in demand. Wildfire has not occurred with any significance on American Samoa.

Additional information will be added to the wildfire profile as it becomes available. At this time, limited information exists. Several sources were investigated from historical information and geo-spatial data.

- National Fire and Aviation Management – none reported (http://fam.nwcg.gov/fam-web/weatherfirecd/index.htm)
- United States Department of Agriculture – Forest Service (http://www.fs.usda.gov/rds/archive/Product/RDS-2013-0009)
- Pacific Wildland Fire Sciences Lab
- Pacific Disaster Center
- American Samoa Department of Public Safety
- National Interagency Fire Center (http://www.nifc.gov/fireInfo/fireInfo_statistics.html)
- American Samoa Government website
- ArcGIS online
- Landfire
- NOAA

Location
Wildfires are possible anywhere on the island given the amount of vegetation. Intentionally set brush fires occasionally get out of control. According to information from American Samoa fire officials, the western district of American Samoa is more populated and that results in more fires.

Previous Occurrences

No wildfire events were reported by the National Climatic Data Center. Several sources were investigated for wildfire data. Unfortunately, very few tracking mechanisms seem to be in place. A stakeholder meeting with fire officials yielded good information about fire events, however. Brush fires in American Samoa are common practice, especially on agricultural lands. However, at times these brush fires get out of control and become wildfires. According to the island fire officials:

- Typically there are 5 per brush fires per month (that require fire response). However, in times of drought, there are more like 10 fires per day (that require assistance).
    - o Most fires are small and burn around ¼ acre.
- There was a very large fire in Vaitogi Village approximately 50 years ago. Each year, between September 15 and September 16 the village goes under a 24-hour curfew to observe and remember the fire. Little information about this fire could be found. It is assumed that it may have been started as a brushfire but ultimately destroyed several structures.

In addition, the 2011-2015 American Samoa Forest Assessment and Resource Strategy (June 2010) summarize the findings from the 2007 American Samoa Community Wildfire Protection Plan (produced by the American Samoa Department of Public Safety). It states that in 2007, there were a total of 98 structure fires and 45 brush/wildfires. Most fires are caused by arson or human activities such as burning rubbish or clearing weeds. As additional information is tracked and provided, it will be included into the plan.

Extent

Most wildfires in American Samoa are small (around ¼ acre) are best described as brush fires. However, they have the potential to grow much larger in size and even impact properties.

Probability of Future Events

Given information provided by fire officials and studies, it is appropriate to assume that wildfire is an annual occurrence in the territory (5 brush fires per month in typical conditions). However, it is apparent that few wildfires have posed a risk to American Samoa people or structures. Probability can be categorized as highly likely (greater than 90 percent annual chance) for small brush fires or unlikely (less than 1 percent annual chance) for large, damaging fires.

Vulnerability Assessment

Brush fires do occur on island and have the potential to grow out of control. A wildland fire risk assessment in 2008 referenced in the American Samoa Forest Assessment and Resource Strategy Plan concluded that American Samoa as a whole fell into the high-risk range due to the ignitability of the many wood-sided structures, volume of fuels close to these structures, and fire history. The plan's principle recommendations in order of priority were reduction of fuels along roads, empty lots, and common areas; prevention education and outreach; and improvement of community egress and firefighter ingress. No spatial analysis was included in the plan."[102]

The Forest Assessment and Resource Strategy also noted "areas of Aoloaufou, Leone, and Tafuna villages are being targeted for fuel load reduction and improvement of egress and access by reducing vegetation along roadsides and empty lots, in common areas and areas near homes. Green waste pick-up and creation of fuel breaks will also occur in these areas. ASCC CNR has obtained a chipper, which is made available to clients with yard wastes. The chipped material is used for composting pig manure from area piggeries. The Department of

102 American Samoa: Forest Assessment and Resource Strategy (2011-2015). Forestry Program Division of Community and Natural Resources American Samoa Community College. Retrieved August 8, 2014 form http://www.wflccenter.org/islandforestry/americansamoa.pdf

Public Safety Fire Division will partner with ASCC CNR to educate the public in fire prevention, focusing on proper, safe burning of rubbish, yard and farm wastes. Educational materials, including TV and radio spots, posters, and handouts, will be developed and distributed." There are additional several factors that impact vulnerability in American Samoa.

Drought Conditions

Wildfire probability and vulnerability is greater in times of drought. American Samoa fire officials stated that recent years, perhaps due to climate change, have had more drought occurrences. In addition to drier land during drought conditions, fire may spread faster and water conservation measures may be in effect. Limited water overall means less capability to combat wildfire (and structural fires).

Location

In remote areas of the island, there are no hydrants, which may increase vulnerability of wildfires caused by brush fires getting out of control. When hydrants cannot be accessed, the fire is fought with water available from the trucks. This is a limited amount.

Areas in the urban/wildland fringe are also at increased to damage from wildfire.

In addition, buildings are not numbered (unless government owned) which makes locating a fire area particularly difficult. In the past, the island population was small and everyone knew each other. It was easy to spread the word and explain by landmarks. Growth in the previous decades has hindered this method. According to fire officials, response time should be around 3 minutes, but it is much longer.

Truck size

Many of the larger fire trucks have a difficult time navigating through narrow streets and traffic. This puts people at greater risk due to increased response time.

Regulations

Currently, there are no regulations that determine where and when people can burn on their land. This creates increased risk during drought and makes determining where fires may occur less controlled. In addition, people frequently build without permits and use extension cords to connect power from other sources. This creates a very high fire probability.

Outreach and training

American Samoa fire officials are aware that burning brush often turns into fires. Therefore, they have an outreach program to teach people (grades K-12) about how to burn brush properly. In addition, dispatchers are trained to take calls and help locate buildings given that there are no numbers.
In conclusion, while wildfires are typically small events, they have the potential to turn into larger events that place people and property in danger.

Figure 77 Debris Burning in American Samoa

Potential Losses
All current and future buildings and populations should be considered at risk. All jurisdictions are considered equally at risk. However, developed areas that abut rural areas may have greater vulnerability. In general, wildfire losses are not expected to be severe. In most cases, they will be contained to agricultural lands or a few structures.

Summary of Hazard Risk

Summary of Risk
Table 44 below provides a brief overall of the hazards that impact American Samoa. The table lists impacts, number of occurrences and associated timeframe, spatial extent, probability and estimated of losses to date. In addition, it highlights whether or not critical facilities may be at risk.

The estimations of accumulated losses have been based upon historical loss information, which varies greatly, and is in many cases non-existent. The loss figures represent sums of the largest amounts recorded per event for each hazard type.

Table 44 Summary of Hazards in American Samoa

Hazard Type	Potential Impacts	Count	Time Period (years)	Spatial Extent	Probability	Estimation of Accumulated Losses ($)	Critical Facilities At Risk?
Climate Change (including SLR)	Flooding; increased hazard occurrence; increased floodplain	N/A	N/A	Territory-wide; coast	Likely	N/A	YES
Coastal Erosion	Loss of beach area; Loss of structures along coast/cliffs	N/A	N/A	Coast	Highly Likely	N/A	YES
Droughts	Water rationing; Food shortage; Cannery closures; School closures; Groundwater depletion; Depletion of wells and catchment; Economic recession;	4	38	Territory-wide	Possible	Losses to agriculture crops and economy	NO
Earthquakes	Damage to infrastructure and buildings; Injuries, loss of life;	22 over 7.0M	108	Territory-wide	Likely	Reported damage but not the amount	YES

Hazard Type	Potential Impacts	Count	Time Period (years)	Spatial Extent	Probability	Estimation of Accumulated Losses ($)	Critical Facilities At Risk?
Floods	Damage to roads, homes, businesses; Loss of access to emergency services; Inundation of urban and low-lying areas Erosion; Landslides; Power failures; Death/injury	66	20	Territory-wide	Highly Likely	$55+ million	YES
Hazardous Materials	Water contamination; Fire	N/A	N/A	Territory-wide	Low	None reported	YES
High Surf	Debris; Road washout; Hindered fishing efforts; Death, injuries	44	14	Coastal areas	Likely	$4.1 Million	NO
Landslides	Injuries, loss of life; Loss of access to emergency services; Property loss; Blocked or damaged roads, buildings; Liquefaction of fill soil types; Amplified ground shaking of unconsolidated soils.	1+ annually	35	Territory-wide	Highly Likely	Damage reported but not exact amount; loss of structures including homes, schools, churches	YES
Lightning	Electrical damage; Electrical fire; Death, injury	2	18	Territory-wide	Likely	$41,000	YES
Soil Hazards	Cracked foundation; Loss of structural integrity	0	N/A	Territory-wide	Unlikely	None reported	YES
Tropical Cyclones (including storm surge) and High Wind Storms	Flooding rainfall; High wind damage to infrastructure and buildings; High surf, storm surge, coastal erosion; Death, injury	30	67	Territory-wide	Likely	$150+ million	YES

Hazard Type	Potential Impacts	Count	Time Period (years)	Spatial Extent	Probability	Estimation of Accumulated Losses ($)	Critical Facilities At Risk?
Tsunamis	Inundation of low-lying areas; Injuries, loss of life; Damage to buildings and infrastructure; Coastal erosion	78	177	Territory-wide	Possible	Over $100 million	YES
Volcano	Volcanic eruptions are possible but not likely. Impacts from neighboring islands include Respiratory issues; fish kills, coral impacts, vog, smoke	0	N/A	N/A	Unlikely	None reported	NO
Wildfire	Loss of natural and manmade resources; Structure fire	Annual brushfires	N/A	Territory-wide	Unlikely	None reported	YES

PRI Results and Hazard Ranking

The process of completing the hazard profiles above informed the PRI input. Table 45 shows the PRI results for American Samoa. These values were then arbitrary categorized into high, moderate and low risk categories based on available information. The ranking of hazards can be found below in Table 46.

Table 45 Summary of PRI Results for American Samoa

Hazard	Category/Degree of Risk					PRI Score
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Climate Change	Highly Likely	Minor	Moderate	More than 24 hours	More than one week	2.6
Coastal Erosion	Highly Likely	Minor	Moderate	More than 24 hours	More than one week	2.6
Droughts	Possible	Limited	Large	More than 24 hours	More than one week	2.5
Earthquakes	Likely	Limited	Large	Less than 6 hours	Less than 6 hours	2.8
Floods	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	3
Hazardous Materials	Possible	Critical	Small	Less than 6 hours	Less than 24 hours	2.7
High Surf	Highly Likely	Minor	Moderate	Less than 24 hours	Less than 24 hours	2.5
Landslides	Highly Likely	Critical	Moderate	Less than 6 hours	Less than 6 hours	3.2

Hazard	Category/Degree of Risk					PRI Score
	Probability	Impact	Spatial Extent	Warning Time	Duration	
Lightning	Likely	Limited	Negligible	Less than 6 hours	Less than 6 hours	2.2
Soil Hazards	Unlikely	Minor	Small	More than 24 hours	More than one week	1.5
Tropical Cyclones	Likely	Catastrophic	Large	More than 24 hours	Less than 24 hours	3.0
Tsunamis	Possible	Catastrophic	Large	Less than 6 hours	Less than 6 hours	3.1
Volcano	Unlikely	Limited	Negligible	Less than 24 hours	Less than 1 week hours	1.6
Wildfire	Unlikely	Minor	Small	Less than 24 hours	Less than 1 week	1.7

Landslides, tsunamis, floods, and tropical cyclones emerge as the greatest hazard risks to the islands. Landslides, while not island-wide at a single time, can be deadly. They also occur without warning and can occur is many parts of the island, particularly where steep slopes exist. Tsunamis can be catastrophic in nature and result in multiple fatalities. The 2009 tsunami was such an example of this. There impacts will be largely along the coast. It is possible for them to occur without warning but, in general, some advanced warning is known reducing the loss of lives. Flood impact the islands frequently. Damage may be limited to catastrophic based on the amount and previous rainfall. Floods may also trigger landslides. Tropical cyclones often result in territory-wide impacts and devastating associated hazards such as high winds, storm surge, and flooding rainfall.

Ranking	Primary Volcano Type
High	Landslides Tsunami Flood Tropical Cyclone
Moderate	Earthquake HAZMAT Climate Change (including SLR) Coastal Erosion Drought High Surf
Low	Lightning Wildfire Volcano Soil Hazards

Table 46 Ranking of American Hazards

CHAPTER V

Capability Assessment

The purpose of conducting the capability assessment is to identify the strengths and weaknesses of the Territory in terms of mitigating risks. The capability assessment serves as a critical component to designing an effective hazard mitigation strategy. It not only helps establish the goals and objectives for the Territory of American Samoa Multi-Hazard Mitigation Plan but it ensures that those goals and objectives are realistically achievable under given local conditions.

The capability assessment looks at government departments, agencies, offices and authorities as well as several private organizations that are directly involved in hazard mitigation. With the isolation of American Samoa, its dependency on outside resources, and its repeated history and experience with natural disasters, many systems are in place to create a resilient island community, including community and hazard mitigation planning and implementation. Through this plan and support for hazard mitigation projects since 1988, American Samoa has mitigated threats to life and property and has built government capabilities and capacities.

This chapter is organized by how the American Samoa Government categorizes its offices, agencies, authorities and departments. Each of these offices is represented on the Hazard Mitigation Council. The description of each office includes its mission and its disaster management capabilities.

American Samoa Government - Offices of the Governor

The Lieutenant Governor serves as the Governor's Authorized Representative (GAR) and heads the American Samoa Hazard Mitigation Council, which meets and has authorities according to formal by-laws. These by-laws are included in Appendix C: Planning Process Supporting Materials.

Historic Preservation Office (ASHPO)
The Historic Preservation Office was "established in response to the National Historic Preservation Act of 1966, the American Samoa Historic Preservation Office (ASHPO) identifies, evaluates, registers, interprets and protects American Samoa's historic and cultural properties, from star mounds to shipwrecked vessels. The ASHPO provides communities and preservation organizations with a variety of services, and maintains an inventory of historic properties. It also reviews nominations to the National Register of Historic Places and oversees sites on that register. Under Section 106 of the National Historic Preservation Act, the ASHPO reviews all Federal undertakings for impacts on historic properties." [1]

The mission statement for ASHPO is "it is the responsibility of the American Samoa Historic Preservation Officer to administer the Territorial Historic Preservation Program. American Samoa's strong indigenous culture and traditional system of communal land ownership impose special conditions of cultural sensitivity upon such an endeavor. A primary concern of the ASHPO is to fulfill its responsibilities in a manner that recognizes and honors these inherent cultural conditions."[2]

1 American Samoa Historic Preservation Office. (2014) Retrieved September 30, 2014 from http://ashpo.org
2 Ibid.

ASHPO has multiple areas of responsibility. These include maintaining a list of historic properties, nominating these properties to the National Register of Historic Places, assisting other American Samoa Government agencies with carrying out their historic preservation responsibilities, they make sure historic properties are considered during all levels of planning and development and finally they provide public education and training regarding historic preservation. [3]

Figure 1 WWII Installation

ASHPO is a member of the Territorial Hazard Mitigation Council. Mr. Steve Maga contacted David J. Herdrich, Director/Historic Preservation Officer regarding access to a list of historical WWII installations and other cultural artifacts in the Territory. ASHPO is in the process of putting this list together and it may be included in the update to this plan. Figure 1 shows one of the WWII installations in American Samoa.

Office of Disaster Assistance and Petroleum Management (ODAPM)

The Office of Disaster Assistance and Petroleum Management (ODAPM) was formerly known as the Territorial Office of Fiscal Reform (TOFR). According to an executive order dated September 8, 2014, TOFR has achieved its original goals and its responsibilities have shifted to warrant renaming of the agency.

The leaders of the Planning Team, Lima Fiatoa and Steve Maga work at ODAPM. Ms. Fiatoa has led the mitigation planning process since 2008. She also solicits and manages all mitigation grant-funding activities. The ODAPM staff managed all of the Hazard Mitigation Council Meetings and stakeholder meetings. ODAPM also manages updates to and applications of the Territorial Hazard Mitigation Plan.

ODAPM manages the Pre-Disaster Mitigation Grant Program, administered by the Federal Emergency Management Agency (FEMA) as well and the post-disaster Hazard Mitigation Grant Program. ODAPM remains the focal point for these two funding programs.

TOFR existence extended, renamed a mouthful[4]
9/11/14 By Fili Sagapolutele
fili@samoanews.com

In an executive order, dated Monday, Sept. 8, 2014, Gov. Lolo Matalasi Moliga extended the existence of the Territorial Office of Fiscal Reform (TOFR) and renamed it the Office of Disaster Assistance and Petroleum Management (ODAPM).

Extending the existence of TOFR comes amid concerns by lawmakers, who threatened not to act on TOFR's budget for fiscal year 2015 until there was an official written document from the administration showing the legal existence of this office.

3 American Samoa Historic Preservation Office. (2014). Retrieved September 30, 2014 from http://ashpo.org
4 Sagapolutele, Fili. (2014). Samoa News; 9-10-2014. Retrieved September 30, 2014 from http://www.samoanews.com/content/en/tofr-existence-extended-renamed-mouthful

It was learned during the current budget hearings that the executive order which last extended TOFR's existence expired in 2011.

In his letter to the Fono, which included the new executive order, the governor said with "regards to your request during the TOFR budget hearing that brought to light the necessary and overdue" amendments outlined in the new executive order regarding TOFR.

In the executive order's preamble, Lolo said responsibilities of TOFR have evolved significantly from its original focus on fiscal reform, general fund debt management, financial reviews and audits, along with administering the tobacco settlement loan.

Most, if not all, of the initial objectives and functions of TOFR since its inception in the year 2000 have either been fulfilled or transferred to ASG Treasury Department. Further, TOFR's current functions and responsibilities include among other things, management of the American Samoa Disaster Recovery Office (ASDRO), administration of FEMA grants, FAA airport improvement, and the remaining American Recovery and Reinvestment Act.

Therefore, Lolo says it's necessary and appropriate to extend the existence of this office, to change its name and update its functions, responsibilities, and authority to reflect its current duties and services to ASG and the people of American Samoa.

He said TOFR is changed to ODAPM, and any and all legal rights, property, entitlements and obligations previously held by and under the name TOFR shall be retained, accepted and honored by ODAPM.

Additionally all services and functions being provided by ODAPM — formerly TOFR — will continue without interruption and all ASG departments and vendors, and private entities are asked to assist in making this transition as seamless and as smooth as possible.

Functions and Responsibilities

- ASG FEMA public assistance and hazard mitigation — Assist ASG and the community in the recruitment, administration and implementation of FEMA Public Assistance and Hazard Mitigation, FAA Airport improvement funds, American Recovery and Reinvestment Act and other special programs and projects.
- ASG Disaster Property Insurance Program — administer and manage in cooperation with the ASG Property Insurance Committee of Treasury, Procurement, ASTCA, LBJ hospital and ASCC the solicitation and maintenance of qualified, cost-effective property insurance for insuring ASG fixed assets, structures and contents funded and required by FEMA.
- Office of Petroleum Management — administer and manage, in cooperation with the American Samoa Petroleum Cooperative, the ASG fuel storage and distribution facility including the Fuel Dock, Tank Farm in Gataivai and the Tafuna Airport fuel depot to ensure American Samoa maintains an adequate and reliable supply of uniformly high quality petroleum products at reasonable and competitive prices.

Budget and Personnel
According to the governor, ODAPM shall maintain and retain its current fiscal year 2014 budget and FY 2015 budget, including any and all accounts and personnel as established and submitted under TOFR.

ODAPM is to also remain as part of the Governor's Office and be managed by an executive director, who reports directly to the governor. Its current executive director is Alfonso Pete Galeai, who has been at the helm of TOFR since last year.

American Samoa Government - Executive Branch, Agencies

American Samoa Department of Disaster Recovery (ASDRO)
The ASDRO executive order has expired. It was established by way of Executive Order No. 10-1997, an order to amend Executive Order No. 09-95; the American Samoa Disaster Recovery Office (ASDRO) was established as an agency of the Executive Branch of the American Samoa Government (ASG). The Office was managed under the direction of the Governor's Authorized Representative (GAR) or otherwise directed by the Governor to carry out functions pertaining to response and recovery programs.

The Hazard Mitigation Council, the Office of Disaster Assistance and Petroleum Management (ODAPM) and the Department of Homeland Security are now responsible for administering the funds and facilitating the implementation of the mitigation projects.

American Samoa Environmental Protection Agency (ASEPA)
The mission of ASEPA is to "provide regulatory services to promote clean air, safe and clean drinking water and land free of pollutants in order to protect the environment and safeguard the quality of natural resources upon which life on our islands depends."[5]

"The ASEPA is one hundred percent funded by the U.S. EPA Region 9 through a EPA Consolidated Environmental Program Grant awarded on a fiscal year budget period. At present, the Consolidated Grant consists of the following categorical grant funding: Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Resource Conservation and Recovery Act (RCRA), Clean Air Act (CAA), Federal Fungicide, Insecticide and Rodenticide Act (FFIRA), and the Beach Grant Act."[6]

The ASEPA building (shown in Figure 2) was awarded the LEED Platinum Green Building Certification.[7] The LEED rating system, developed by the U.S. Green Building Council (USGBC), is the foremost program for buildings, homes and communities that are designed, constructed, maintained and operated for improved environmental and human health performance. ASEPA's building is the first LEED-certified building in the South Pacific and only the second LEED-certified Platinum project in a U.S. Territory.

5 American Samoa Environmental Protection Agency. (2014). Retrieved September 30, 2014 from http://www.epa.as.gov/about-asepa
6 Ibid.
7 American Samoa Environmental Protection Agency. (2014) Retrieved September 30, 2014 from http://www.epa.as.gov/leed-platinum-certified-green-building

ASEPA programs related to emergency management, health, and safety are shown in the list below:

- AS-EPA Laboratory
- Piggeries
- Water quality
- Drinking water
- Climate Change
- Land Use Permitting
- Hazardous Materials

Figure 2 ASEPA building building

The Water Quality Branch actively monitors surface runoff and contamination of streams and coastal beaches. The Drinking Water Branch seeks to protect the groundwater in American Samoa. The Climate Change Branch looks at sea level rise and other impacts to fresh water and the Territory's ecosystem. ASEPA holds a seat on the Project Notification and Review System (PNRS) Board. ASEPA's role here is to review potential building projects in terms of their impact to the environment. The Hazardous Materials Board regulates the importation, storage and disposal of hazardous materials in the Territory.

ASEPA is an active member in the mitigation planning process through the PNRS and the Hazard Mitigation Council. The Planning Team met with ASEPA representatives in April and June 2014. Additionally, ASEPA has in-house expertise and services to place additional emphasis and active participation in understanding and mitigating the ubiquitous landslide hazard throughout American Samoa due to its steep terrain. ASEPA is actively reviewing new LIDAR coverage for the entire island, available to map in detail the landslide areas that need mitigation. Some landslides are natural and some are created when the toe of stable landslides is cut to build houses and businesses.

ASEPA is working on a sustainable drinking water system. ASEPA manages an omnibus grant from EPA for water, wastewater, and energy, as well as water quality, clean drinking water grants and engineering to make drinking water more manageable.

ASEPA is a working member on the Governor's Renewable Energy Committee. ASEPA's goal is 100% sustainable energy for outer islands, and they are working with Stanford University and University of Hawaii geoscientists on ground water issues. Renewable energy will bring sustainability to these outer islands.

ASEPA has identified multiple areas that if improved would reduce the impact of hazards to the Territory of American Samoa. ASEPA is developing a new geological base map for the Territory since the previous map was developed in the 1940's. Below is a list of several other areas that need improvement, they all relate to landslides.

Figure 3 Alefa Afalava, Department of Homeland Security and Faamao Asalele, ASEPA on the green roof of the ASEPA building

- Faga'alu Quarry Landslide Hospital Mitigation Project is proposed due to its threat to the valley with hospital. There is a cut slope 150 feet long and 30-40 feet high – it is an unsupported slope with a major reservoir upstream. This is an identified significant risk for the watershed.

- Update existing landslide risk maps, which are based on 1970 technology. Now LIDAR is available and in hand for landslide mapping. The ASEPA is working with University of Hilo volcanologists and groundwater experts (Dr. Don Johnson, UH Hilo). One thousand eight hundred buildings are in the high-risk landslide zones as shown on new LIDAR data.
- The Afono rockfall/landslide has occurred three times over the past year and is a major hazard.
- Lawsuit for the "crystal burger death", 2003 flooding, several buildings involved. A house was built in a landslide area and the house collapsed during a landslide resulting in the death of a child.
- Up until 2008, the US Geological Survey monitored streams. There are now no rain gauges on Manua islands and on Tutuila.
- The article below discusses the impacts to American Samoa as related to the surface water runoff in the Tualauta plain that could be mitigated through the Tualauta Flood Control Hazard Mitigation Grant Project.

No relief for Tualauta; Boil Water Notice remains [8]
ASPA responds to one resident's idea for new reservoir
4/23/14 By Joyetter Feagaimaalii-Luamanu
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"The original plan to manifold the Fagaima wells is no longer feasible, due to land issues, and the majority of the wells have now been classified by the Environmental Protection Agency as GUDI (Groundwater Under the Direct Influence) of surface water," said Reno Vivao, ASPA's Chief Operation Office.

Vivao was responding to concerns raised by Tualauta faipule Larry Sanitoa, who inquired on the status of ASPA & EPA's plan to address the Boil Water notice still in affect in Tualauta county. Sanitoa pointed out that when the Fono was in session they were told that new wells will be drilled in the Tafuna and Iliili areas. He also pointed out a suggestion by Tualauta resident, Lawrence French, who has advocated for years that in the bush area between Kokoland and the main highway, ASG should purchase about six acres of land.

In an e-mail sent to Sanitoa, French explained, "you dig a hole about 30+ feet deep and make a lined reservoir. All of the water coming from the two major streams by the ASCC would be diverted to that reservoir. The water would be filtered and treated and pumped into the mains as needed."

"The reservoir of that size would hold 24.5 Million gallons. You could make it another 10 deep and have a 30 million gallon water reservoir. You would get about 100,000 cu yd of stone to make highways with. That equates to about the amount of aggregate for 15+ miles of road." In a response letter to both French and Sanitoa, Vivao said the reservoir proposal is a good alternative but it would be costly, and the land issues would most likely be an uphill battle.

8 Feagaimaalii-Luamanu, Joyetter. (2014). Samoa News; 4-23-2014. Retrieved September 30, 2014 from http://www.samoanews.com/content/en/no-relief-tualauta-boil-water-notice-remains#sthash.nEw8zwR7.dpuf

"Such an undertaking will require the collective efforts of the land owners, all government agencies that will be involved and the community," said Vivao. He further pointed out that ASPA's current plan is to drill new wells in the Tafuna and Malaeloa areas to replace seven of the nine wells in Fagaima that have been tested to be GUDI wells.

"The new wells are estimated to produce about 1,000 gpm and production is estimated to be sufficient to replace 50% of the current production of the Fagaima GUDI wells. Other well sites have been identified and will be drilled as funding sources become available.

ASPA's goal is to remove the Boil Water Notice in the next two years, he said, adding that ASPA has in place plans to drill new wells and set targets to reduce the water losses. Also, "ASPA will be re-commissioning the Fagatogo micro filtration plant," he said, adding that ASPA has submitted the National Environment Policy Act (NEPA) application and funding request to the United States-Environmental Protection Agency (USEPA) to drill new wells in the area and are awaiting their approval. We are planning on drilling these new wells this year and completing connection of these new wells to the system in the next couple of years."

Samoa News notes the Water Boil Notice has been in effect for several years now, and continues to be one of the hot button issues of many Tualauta residents, including the flooding that occurs whenever it rains in certain Tualauta areas.

ASPA did lift the boil water ban on parts of Tutuila from Pago Pago to Atu'u in August 2014.[9] ASPA is drilling new groundwater wells, which should enable them to remove the Boil Water Notice (BWN) in the future. "Based on the yield from these new wells and the reduction in water losses, we will be able to remove the GUDI wells, which will result in the lifting of the BWN in these areas." [10]

Department of Port Authority (DOP)

The Department of Port Authority (DOP) is represented on the Hazard Mitigation Committee. Their mission states, "in partnership with the port users Port shall provide excellent service to its customers and the community and in doing so raise the standard of living of the Territory to that of a developed country in a manner that protects our environment and maintains the best of our "Faa-samoa". [11]

The DOP actively participated in the hazard mitigation planning process by attending all meetings and assisting with the distribution of the public preparedness survey.

9 Feagaimaalii-Luamanu, Joyetter. (2014). Samoa News; 8-25-2014. Retrieved September 30, 2014 from http://www.samoanews.com/content/en/aspa-lifts-boil-water-notice-parts-eastern-district

10 Ibid.

11 Port Administration. (2014). American Samoa Government. Retrieved September 30, 2014 from http://americansamoa.gov/index.php/2012-04-25-19-44-32/2012-04-25-19-52-04/agencies/port-administration

American Samoa Government - Executive Branch, Authorities

American Samoa Power Authority (ASPA)

The American Samoa Power Authority is an "entity of the American Samoa Government, which since 1981 has provided quality, safe, economical and sustainable utility services to the residents of American Samoa."[12] According to the ASPA website they are a "development-oriented public utility providing electricity, water, wastewater and solid waste service to over 60,000 residents of American Samoa. We install, operate and maintain American Samoa's public utility infrastructure and offer our customers the highest quality services at affordable rates."[13]

"ASPA is both mandated by law and motivated by ideals of community service to operate as a viable and successful business entity of American Samoa Government. ASPA is directed by a five-member board of directors, and administered by a Chief Executive Officer. Members are nominated to the board by American Samoa's Governor and confirmed by the Legislature of American Samoa Government."[14]

ASPA's Anemometer Project/Wind Study is working to determine wind resources available on Tutuila. They have twelve anemometers, wind vanes and data loggers on the island. This is one example of how ASPA is working toward sustainability in the Territory.

ASPA actively supports mitigation planning in American Samoa by participating on the Hazard Mitigation Council and collaborating with multiple organizations on projects related to undergrounding utilities. The mitigation planning team met with ASPA in April and June 2014. Since 2011 their mitigation capabilities have increased. ASPA has expanded their radio ability, they are developing a Green Operations Building for water and wastewater, their staff is more proactive at seeking funding and they are using solar energy. ASPA representatives mentioned that the canneries put a huge drain on the water system because they pull water directly from the main line. It would help to build a storage tank for them to pull water from so island residents are not impacted by poor water pressure. They mentioned four new mitigation projects:

1. Weatherproof Wastewater Lift Stations
2. Water Tank Corrosion Repair
3. Generators for Water Wells
4. Undergrounding Power Lines

They also mentioned concern for the road up Mt. Alava because they maintain several transformers that at the top of the mountain.

12 American Samoa Power Authority. (2014). Retrieved September 30, 2014 from http://www.aspower.com
13 Ibid.
14 Ibid.

American Samoa Telecommunication Authority (ASTCA)

The U.S. Navy and the U.S. Department of Interior, originally built the local communications network in American Samoa."[15] The American Samoa Government gave the responsibility of operations to ASTCA, when it inherited this network.[16] "Because of American Samoa's remote location, limited economy, and small population base, tier one-telephone companies have not been interested in providing local telecommunication services or originating long distance services in the Territory to date. To date, ASTCA remains the only telecommunications service provider with service covering all the inhabited islands of American Samoa, including the islands of Tutuila and Aunu'u, and the islands of Manu'a." [17]

ASTCA has continued to actively participate in the mitigation planning process by working the Department of Public Works and ASPA to underground vulnerable main telephone communications lines along common roadways with electric lines. Over 50% of all communications lines are now underground, significantly lessoning damage during hurricanes and providing critical communications links for response and recovery.

When the Planning Team met with ASTCA in April 2014 they mentioned the need to re-dig some buried cables and put in conduits for fiber optic cable. However, there are multiple types of rock on the island and they are not well mapped or planned for by off-island contractors.

ASTCA buildings are built to withstand hurricane winds and earthquakes. They would like to further harden these buildings by adding shutters to windows. They maintain two generators at each facility and rotate them weekly. ASTCA actively participates in the Hazard Mitigation Council.

American Samoa Government - Executive Branch, Departments

Department of Commerce (DOC)

The mission of the Department of Commerce (DOC) is "to improve the quality of life for individuals and communities through economic development and sustainable resource management."[18] The Department of Commerce houses the American Samoa Coastal Management Program, Project Notification and Review System, National Marine Sanctuary of American Samoa and the Geographic Information System User Group. Each of these divisions plays a role in disaster mitigation. The Department of Commerce, with its planning role, grants role, GIS role, permit review role, and coastal zone management role is a key player in the mitigation planning process for American Samoa. The Department of Commerce actively participates in the Hazard Mitigation Council and contributed data and other resources to this plan.

American Samoa Coastal Management Program

"The American Samoa Coastal Management Program (ASCMP) provides effective resource management for the protection, maintenance, enhancement, and restoration of natural and cultural resources for the Territory. Additionally, ASCMP is tasked with monitoring development within the framework of comprehensive land and resource use planning while simultaneously protecting the territory's natural resources." [19]

15 American Samoa Telecommunications Authority. (2014). Retrieved September 30, 2014 from http://astca.net/about-us
16 Ibid.
17 Ibid.
18 American Samoa Government Department of Commerce. (2014). Retrieved September 30, 2014 from http://doc.as.gov
19 American Samoa Government Department of Commerce. (2014). Retrieved September 30, 2014 from http://doc.as.gov/resource-management/ascmp/

"ASCMP plays a central role in promoting development while safeguarding the Territory's natural resources. ASCMP is engaged at an inter-agency and inter-governmental level. ASCMP also works closely with members of the private sector and community to build stewardship and awareness in the territory. ASCMP Sections include Project Notification and Review System, Wetlands, Ocean Resources Management and Geographic Information Systems/IT" [20]

Tutuila Hazard Assessment Tool (T-HAT)
The Tutuila Hazard Assessment Tool is part of the Department of Commerce, American Samoa Coastal Management Program. ASCMP personnel can display the T-HAT tool and procedures for applicants proposing an activity in an area. They can check vulnerability of land use after site inspections and guide development away from hazard prone areas.

Geographic Information System (GIS)
The Geographic Information Systems (GIS) and IT branch of the Department of Commerce provides in-house technical support along with GIS data, maps, and expertise for the Department of Commerce and for other government agencies. They maintain Digital Orthoimagery (DOI) and Land Use and Marine web portals. Both provide essential data and mapping for government users.

The GIS Branch leads the American Samoa GIS (Geographic Information System) Users group. This group was "first convened in February of 2001 as an informal grassroots effort among both public and private entities that have an interest in GIS development in the territory. The primary tenet for the group's formation was the establishment of a forum for disseminating GIS information for collaboration and funding and decreasing data duplication. The group recognized that in order to make GIS development sustainable in American Samoa, local institutional capacity would need to be strengthened through training and education in Geographic Information Science." [21]

"The American Samoa GIS Users Group has a memorandum of understanding among their member agencies. The member agencies are "mutually interested in cooperative activities aimed at the development of the American Samoa Spatial Data Infrastructure," which includes provisions for a territorial GIS dataset, metadata creation, and projection/datum scheme.[22]

Member agencies include:

- American Samoa Department of Commerce,
- American Samoa Historic Preservation Office,
- American Samoa Community College,
- Department of Marine and Wildlife Resources,
- American Samoa Power Authority,
- National Park of American Samoa,
- Oregon State University – Davey Jones Locker Lab,
- USDA Forest Service, Forest Health Protection,
- Fagatele Bay National Marine Sanctuary,
- American Samoa Department of Public Works,
- American Samoa Telecommunications Authority,

20 American Samoa Government Department of Commerce. (2014). Retrieved September 30, 2014 from http://doc.as.gov/resource-management/ascmp/
21 American Samoa GIS Users Group Memorandum of Understanding
22 Ibid.

- American Samoa EPA, and the
- Development Bank of American Samoa.

The Department of Commerce maintains additional plans and resources for the Territory. Including the Territorial General Plan and the Community Development Block Grant.

Territorial General Plan and the Territorial Planning Commission

The Territorial Planning Commission "serves as an oversight body, on behalf of the Governor, to review and approve government plans in relation to the overall goals of the government. Plans cover agencies providing a comprehensive range of services and regulatory controls."[23]

The Territorial Planning Commission was statutorily created for the purpose of establishing a public review body that authorizes the territorial general plan program for American Samoa. This Commission is responsible to promote the general welfare of the territory's citizens and create an orderly, healthy, and viable economic and living environment.

The Territorial General Plan may be concerned particularly with industrial, commercial or agricultural development; with education, social services, housing, essential fire, water and electric utilities services, and with transportation, communications, recreation, conservation, and cultural services and with other relevant aspects of life in American Samoa.

The Territorial General Plan is an indicative policy agenda for the economic and social development of the Territory of American Samoa. The purpose of the plan is to promote a better quality of life for the Territory's residents, protect the natural environment and preserve the Territory's resources for the sustainable development of the islands.

Where master and comprehensive plans exist, e.g. the Port Master Plan of 1999, the Territorial General Plan endorses these plans and builds in policy to support their agenda and functions. In essence, the Territorial General Plan provides the overall policy agenda and serves as the umbrella under which future government development and functional or action plans will be formulated.

Goals of the Territorial General Plan

- Create clear vision of the future
- Focus on issues of primary concern
- Create cooperative coordinated system of development
- Identify strategic path & best use of funds
- Create capacity to implement programs
- Show how government directs/gauges progress

23 American Samoa Government Department of Commerce. (2014). Retrieved September 30, 2014 from http://doc.as.gov/planning_grants/

Community Development Block Grant
The American Samoa Government (ASG) Community Development Block Grant (CDBG) is one of three Community Planning and Development (CPD) programs funded by the U.S. Department of Housing and Urban Development (HUD). While the Office of the Governor oversees all CPD programs, the Department of Commerce (DOC) administers CDBG. The CDBG was designed to merge eight categorical grant programs, authorized by the Housing and Community Act of 1974. Since its inception, CDBG funds awarded to American Samoa have produced life-changing developments for numerous families and have provided various upgrades within the island community.

The CDBG program supports American Samoa's economic growth. Its primary principle is to develop feasible urban communities by creating employment opportunities, provide decent housing and form suitable living environments. In reaching the main purpose, projects must be eligible, cannot be a prohibited activity, and must meet a National Objective. Plans must adhere to federal and local laws and regulations.

Department of Homeland Security (DHS)
The Department of Homeland Security authorities and legal references include:

- Work with agencies of the American Samoa Government and the U.S. Department of Homeland Security and other federal agencies, to prevent terrorist attacks within American Samoa, reduce the vulnerability of American Samoa to terrorism, and minimize the damage, and assist in the recovery, from terrorist attacks that do occur with American Samoa;
- Act as the Single State Agency (SSA) of the American Samoa Government designated to provide the overall coordination and administration of efforts to be funded by the U.S. Department of Homeland Security;
- Be the lead agency in all efforts for the preparation of the Territory against natural or man-made disasters, and shall coordinate with federal agencies to secure and receive federal assistance in order to prepare for, or to recover from natural or man-made disasters;
- Develop a Territorial Homeland Security Operations Plan. This plan is to identify security and response weaknesses and prioritize specific homeland security projects and programs to address shortfalls and security lapses;
- Work with front-line first responders, government agencies, private sector and local communities in American Samoa to enhance security and the overall state of readiness in the territory;
- Identify and negotiate federal, state and community resources (human, financial, equipment) for the implementation of homeland security projects and programs;
- Ensure the appropriate expenditure of federal and local resources for the purposes of homeland security, drug and human trafficking enforcement and prevention;
- Monitor the implementation of homeland security programs and projects and reporting on the territorial state readiness to the Governor and the U.S. Department of Homeland Security;
- Record and store all vital records and statistics of the Territory of American Samoa to assure their safe keeping, accuracy and authenticity upon their proper issuance;
- Coordinate, consolidate and collaborate the efforts of its component agencies into a cogent whole that supports the overall purposes of all-hazard preparedness, response, detection, deterrence, prevention and enforcement;
- Carry out those functions and responsibilities as stated in Section 26.0106, A.S.C.A.;
- Execute the duties and responsibilities necessary to fulfill the American Samoa Government's obligations and commitments to the: South Pacific Islands Criminal Intelligence Network (SPICIN), International Criminal Police Organization (INTERPOL), Federal Bureau of Investigation's National Crime Information Center (FBI-NCIC), El Paso Intelligence Center (EPIC), National Law Enforcement Telecommunications

System (NLETS), and other regional and international law enforcement programs;
- Gather intelligence information regarding drug trafficking and elements of organized crime and other illegal or suspect activities in the Territory and share the same with other law enforcement agencies in the Territory;
- Coordinate the flow of information between involved agencies on major criminal investigations involving narcotics, white collar crime, and corruption in government operations; and
- Coordinate information collection and sharing on drug and human trafficking and white collar crimes with federal, state, territorial and local law enforcement agencies which have similarly provided for the coordination of enhanced intelligence sharing, investigative efforts, training, and the increased competence and proficiency of law enforcement officers.[24]

Agencies under this department include:
- Office of Vital Statistics,
- Territorial Emergency Management Coordination Office (TEMCO),
- Territorial Office of Homeland Security (TOHS), and
- Office of Territorial and International Criminal Intelligence and Drug Enforcement (OTICIDE).

The agencies shall keep their functions as they have been established by executive order, regulations, or existing law and shall be maintained as distinct entities within the department. For the purposes of this plan TEMCO and TOHS are covered in detail.

American Samoa DHS plays a crucial role in mitigation planning and implementation in American Samoa. Alefa Afalava, ASDHS, participated in multiple planning team meetings and the Director of ASDHS is an active participant on the Hazard Mitigation Council. The Planning Team met with ASDHS in April and June 2014. The priority of the Director is protection of the Territory. He mentioned the lack of customs and immigration regulation in Manu'a as well as the tremendous challenge of monitoring the ocean waters. He also expressed concern over the poor condition of the road up Mt. Alava. It is dangerous to travel however multiple government communication assets are on the top of the mountain. ASDHS does not maintain a list of critical facilities.

Territorial Emergency Management Coordinating Office (TEMCO)

The Territorial Emergency Management Coordinating Office (TEMCO) operates under the general supervision of the Director of the American Samoa Department of Homeland Security (ASDHS). The Disaster Assistance Coordinator (TEMCO Manager) reports to the Director of ASDHS. TEMCO is created under the American Samoa Code Annotated (ASCA) Section 26.0106 as a coordinating agency. Their purpose is to coordinate assistance, resource management, and emergency response and recovery efforts.

TEMCO is responsible for the development and revision of territory wide disaster plans. It is also responsible for the development, coordination, and updating the Disaster Assistance Plan (DAP), currently known as the Territorial Emergency Operations Plan (TEOP) with the American Samoa Government agencies and private sector. The office is responsible for the primary Emergency Operations Center (EOC), which serves as the central communications and command center for reporting emergencies and coordinating Territorial response activities. The office also operates and mans the 24/7 Center; a territory emergency communication center staffed 24 hours each day. They also review the TEOP and make necessary revisions annually. [25]

24 American Samoa Department of Homeland Security. (2014). Retrieved September 30, 2014 from http://asdhs.org/sample-page/
25 Ibid.

TEMCO administers and implements all Emergency Management Programs: Hazard Mitigation, Preparedness and Prevention, Response, and Recovery programs. TEMCO also manages the Emergency Management Performance Grant (EMPG), National Tsunami Hazard Mitigation Programs (NTHMP), Hazardous Materials Emergency Preparedness Grant (HMEGP) Program, and Disaster Assistance programs. The Disaster Assistance programs include the Great American Samoa Shakeout, National Preparedness Month, and the National Cyber Security Month.

As stated in the Executive Order adopting the 2011 American Samoa Hazard Mitigation Plan, the Territory Hazard Mitigation Officer in collaboration with the Territorial Emergency Management Coordinating Office (TEMCO), through the approval of the American Samoa Territorial Hazard Mitigation Council, has been responsible for administering the funds and facilitating the implementation of the mitigation projects identified and supported by the Pre-Disaster Mitigation (PDM) Grant Program, (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL) as approved by FEMA.

The Public Assistance programs are under Office of Disaster Assistance and Petroleum Management (ODAPM). They are responsible for disbursing hazard mitigation disaster funds.

Emergency Shelter GIS Data Layer

TEMCO maintains the territorial emergency shelter layer of the GIS database. This will dovetail with the PDM Shelter upgrade project to identify and record shelter parameters including roof wind ratings, accessibility, and power and water supply security and capacity. As TEMCO develops the in-house expertise required to manage the GIS database, other layers will be added to this maintenance task. The goal for TEMCO has been to become an active partner in the GIS users group and to help generate and manage critical spatial data for emergency management purposes.

Territorial Office of Homeland Security (TOHS)

The Territorial Office of Homeland Security works to develop and update a Territorial Homeland Security Strategic Plan. The Plan states the goals, objectives and activities of projects and programs. The strategy is reviewed annually. This office is tasked with monitoring the progress of program and project management activities in accordance with the Territorial Homeland Security Strategy to gauge territorial-wide progress toward strategy implementation required for on-line reporting to the U.S. Department of Homeland Security (DHS) and Federal Emergency Management Agency (FEMA). [26]

ASDHS is interested in competing for a Pre-disaster Mitigation project application to add hurricane shutters for ASDHS building, which is a critical facility. The project total is more than $100,000. The project facility is less than 10 years old. There are no shutter projects in American Samoa – this will be the first and represents a showcase project that needs to be seen by DOE for schools to strengthen them as shelters. ASDHS recommends that DOE should add shutters as part of construction specifications for new schools. Past costs include extensive manpower costs to board up TEMCO, ASDHS and EOC – three facilities, plus materials. The building has served in past during tsunami event as the Joint Field Office (JFO). Generators are in the parking lot.

26 American Samoa Department of Homeland Security. (2014). Retrieved September 30, 2014 from http://asdhs.org/programs/grants-management/

ASDHS is also interested in a project to make road repairs up Mt. Alava. The road up Mt. Alava is in disrepair making travel dangerous. Many government assets are on the top of the mountain. These include, radio towers that first responders rely upon, television facilities, and generators. Transformers on the mountaintop have not been secured. A cable system used to hoist things up the mountain is damaged and operations to the mountaintop have not been restored. Fixing the road presents a problem because the National Park Service wants to preserve the mountain as a natural resource and use the road as a hiking trail. A cable car could be built as a secondary option to the road. An engineer from Hawaii looked at the situation and recommends moving the generators to the bottom of the mountain, so they can be repaired without the long drive/hike up mountain. Road repair could be part of a Capital Improvement Program in five to ten years. A win-win is to fix the road and still have a hiking trail.

The ASDHS Director's priority is protection, he lacks access to assist with border protection, and he wants an unmanned aircraft (UAD) to protect ocean water. Another issue is that there are no customs or immigration offices in Manu'a.

Figure 4 Tsunami warning bell

Emergency Alert System

The original Territory emergency alert system is a bell hanging from a tree, as shown in Figure 4. These can be seen in all of the villages and near many churches. The Territory has worked consistently to upgrade this system to more advanced warning systems, as shown in Figure 5.

The National Weather Service (NWS) has worked with TEMCO and DHS on all alert protocol and agency activation coordination. The NWS receives tsunami alerts from Pacific Tsunami Warning Center, Honolulu. There is an early alert system in place for the islands, including Manu'a, via NOAA Weather Radio (NWR).The NWS Office activates the NWR alarm for watches and warnings including tsunamis, hurricanes, flash flooding, etc. as well has a provision for Civil Emergency Messages such as Hazardous Spills. The NWS Office is operational 24/7. Alerts are also broadcast over the Emergency Alert System, which becomes activated via KKHJ radio station as the Local Primary Broadcast system. The NWR System has been funded by a DHS grant of $250,000. Four hundred NOAA radios have been purchased and distributed. The EAS system does weekly testing of the system as required by the FCC. The NWS is committed to maintaining the NWR system. The NWR program also includes observations, forecasts, and climate and outreach information such as hurricane preparedness activities. Radios are available for purchase in stores.

Figure 5 Tsunami warning siren

The alert system was successfully tested during the May 2007 Pacific Wave Tsunami Exercise. The EAS system did a second alert test with all the schools. Every school and every village mayor has an NWR. Although some of the Manu'a Islands do have a strong signal, not all villages do. The NWS has identified weak signals and is working to improve them. The signal is good on the North Shore of Tutuila in pockets. There is movement to put a tower on Mount Olotele at 1617 feet. Also, the NWS may put a repeater on Manu'a depending upon coverage from the Olotele site. This could happen in 2007 during the next several months.

This radio alert system is a low cost, practical alternative to a multimillion-dollar siren system, which would deteriorate from salt air. In addition, sirens indicate you should go to your radios and television for warnings anyway.

Department of Public Safety (DPS)

The Department of Public Safety (DPS) has the responsibility to maintain law enforcement, fire and corrections on all levels in the Territory. Their mission is simply, "to serve and protect."[27] The Fire Department maintains four fire stations throughout Tutuila. They have sixty-four full-time firefighters who work on three shifts. They have 469 fire hydrants that are color-coded by pressure level. The department has three fire trucks so they only staff three of their fire stations. They respond to all disasters on island and are accompanied by DHS and Emergency Medical Services. They also actively participate in Shakeout drills and the Tsunami Ready program. They do outreach in each of the schools, which has helped to limit the number of kids playing with matches and causing fires. The majority of fires happen in the Western District due to the population density.

Hazardous materials on Tutuila present a problem to the Fire Department. Stockpiling propane tanks at "mom and pop" convenience stores presents a danger. These tanks should be stored away from buildings and in limited quantities.

They mentioned in the meeting with the Planning Team that the Federal Aviation Administration (FAA) has a fire suppression system at the airport. DPS does assist the FAA as needed but a formal Memorandum of Understanding (MOU) is not in place between the agencies.

The Planning Team met with the Fire Chief and Captain in April 2014 to discuss their capabilities. Limits of equipment and staff hinders their ability to respond quickly to all areas of Tutuila. An additional fire truck, and smaller agile fire trucks as well as a boat would help them respond faster and to more areas of the island. All roads and homes are not named or numbered which limits response time but the dispatchers are adept at guiding the fire department to the scene of an emergency. The Planning Team mentioned the possibility of developing a CERT team but American Samoans are not quick to join volunteer organizations like this.

Samoan Affairs

The Department of Local Government, Office of Samoan Affairs is dedicated to promoting peace and harmony within the Territory, and to ensure that the village council's actions are not in conflict with the Laws of the Territory. Most importantly, we remain faithfully in preserving, promoting, and enhancing the Samoan Culture and language.[28]

27 American Samoa Department of Public Safety. (2014). Retrieved September 30, 2014 from http://americansamoa.gov/index.php/2012-04-25-19-44-32/2012-04-25-19-52-04/departments/public-safety

28 American Samoa Government Department of Samoan Affairs. (2014). Retrieved September 30, 2014 from http://americansamoa.gov/index.php/2012-04-25-19-44-32/2012-04-25-19-52-04/departments/samoan-affairs

Samoan Affairs is a member of the Hazard Mitigation Council and involved in all aspects of hazard mitigation planning. They are often consulted regarding adherence to laws of the land and the Samoan way of life.

American Samoa National Park Service

"American Samoa National Park opened in 1988 and is the only US National Park south of the equator. The National Park Service in American Samoa participated in the National Emergency Grant program and was one of the sites documented in the From Tsunami to Renewal project report and documentary video."[29]

National Park of American Samoa Wildland Fire Management Plan[30]

The wildland fire management policies, of the National Park Service (NPS), support the NPS resource management goals. The overriding goals are to provide for firefighter and public safety and protection of natural and cultural resources, and protection of human developments from unwanted wildland fire and to perpetuate and conserve the cultural and natural resources of the NPS.

The Wildland Fire Management Plan program focuses on guiding the decision-making process where safety, social, political, and resource values are evaluated, and appropriate management response strategies are identified for wildland fires. The park has chosen a fire suppression only policy.

The Plan is organized to combine the latest scientific knowledge, including regional and local studies, with policy direction from the National Park Service, the Department of the Interior, the Federal Wildland and Prescribed Fire Management Policy and Program Review (USDI/USDA1995), and other Federal Government level wildland fire policies to accomplish resource and fire management goals and objectives. The intent of the plan is to provide direction for rare wildland fire events.

This Plan is in compliance with the requirements found in the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). These requirements ensure a prudent assessment and balance between a federal action and any potential effects of that action, leading to consensus between fire managers, agency resource specialists, and the public. Any constraints or limitations imposed on the fire management program are also included.

Pago Pago Bay Shoreside Development Plan

According to the Department of Parks and Recreation Pago Pago Bay Shoreside Development Plan, the shoreline revetment between Niuloa Point and Faga'alu Park was completed by the end of 2003. This project is a required portion of the reconstruction of the main highway leading toward the center of Pago Pago harbor. The road has been improved and the revetment installed between Faga'alu village and Breaker's Point. There is no other road construction contemplated for the main highway.

Faga'alu Park requires the installation of revetment along its shoreline to prevent further erosion. The possibility of funding the installation of revetment, which would cost several hundred thousand dollars, is possible.

29 National Emergency Grant American Samoa: From Tsunami to Renewal. (2014). Retrieved September 30, 2014 from http://americansamoarenewal.org/resources

30 National Park of American Samoa Wildland Fire Management Plan (2006).

The June 2010 "NOAA American Samoa Tsunami-generated Marine Debris and Coral Damage Response Report" states in the executive summary, "the tsunami event pointed out areas for improvement in Federal response to future disaster events. It is important to comprehensively respond to and mitigate the impacts of disasters across inland, coastal, and in water environments."

Department of Public Works (DPW)

The primary mission of the Department of Public Works (DPW) is "to provide high quality construction engineering, design, construction management, construction, maintenance, renovation, and repair services for ASG infrastructure, equipment and facilities throughout the Territory. Within this framework, the DPW endeavors to employ environmentally sound, culturally sensitive, socially responsible and cost effective practices in all service areas, programs and projects. In carrying out this mission, the DPW maintains a high level of accountability through fiscal management and planning with emphasis on the development of American Samoa's construction industry and improving construction capacity in the Territory. Employing the latest technology, management concepts, and training techniques, the Department offers reliable and effective civil engineering, architectural, construction, inspection and maintenance services that effectively extend the useful life of public assets and improves overall safety conditions for the general public." [31]

Figure 6 DPW stakeholders meeting April 2014

DPW is an active member of the Hazard Mitigation Council and assists in completing mitigation projects throughout the islands. The Planning Team met with DPW representatives in April and June 2014 (Figure 6 shows several meeting participants). They expressed a need for rock fall and landslide mitigation as well as soil stabilization projects. They adhere to the 2006 International Building Code. The June meeting included a discussion of the Tualauta Flood Control Project. The project has been funded but the Benefit Cost Analysis (BCA) needs to improve for FEMA to release funding. DPW is working on right-of-way modeling and updating the BCA. In terms of Mt. Alava the road needs a variance to be paved. This project includes DOC, KTVA (TV Station), ASTCA, ASPA, FEMA and the National Park Service.

31 http://www.asg-gov.net/PUBLIC%20WORKS.htm

National Oceanic and Atmospheric Administration

National Oceanic and Atmospheric Administration (NOAA) programs provide for environmental management and mitigation programs that compliment the natural hazards mitigation programs, preserving habitats and the Samoan way of life. NOAA maintains several programs in American Samoa including the Coral Reef Information System, the Fagatele Bay National Marine Sanctuary, and the American Samoa Observatory.

The Coral Reef Information System has attributed high population growth to the extensive "coastal disruptions, fishing pressure, loss of wetlands, soil erosion and coastal sedimentation, solid and hazardous waste disposal, and pollution.[32]

Fagatele Bay National Marine Sanctuary (sanctuary) was established by NOAA in 1986, "to protect and preserve an example of a pristine tropical marine habitat and coral reef terrace ecosystem of exceptional biological productivity,"[33] Sanctuary regulations clarify that NOAA has primary responsibility for sanctuary management, and that the American Samoa Economic and Development Planning Office (now known as the American Samoa Department of Commerce or AS DOC) will assist NOAA in the administration of the sanctuary.

"As a territorial partner and co-manager, AS DOC provides a local alliance and support services to address territorial processes and coordination. AS DOC greatly assists sanctuary staff with joint efforts in outreach, constituency building and cooperation in the territory. Through the partnership with AS DOC, sanctuary staff are also able to coordinate efforts to reach out to local communities through the American Samoa Government's Office of Samoan Affairs, whose staff serve as liaisons between the territorial government and local residents. The local alliance with AS DOC is critical since the Office of Natural Marine Sanctuaries (ONMS) and Fagatele Bay sanctuary staff place a high value on partnerships with sanctuary communities and maintain great respect for fa'a-Samoa. Fa'a-Samoa, the traditional Samoan way of life, provides the cultural context for all sanctuary activities and functions. The foundation of Polynesia's oldest culture, which dates back some 3,000 years, fa'a-Samoa places great importance on the dignity and achievements of the group rather than on individual achievements. Sanctuary staff must work in a culturally appropriate manner with local communities, who may serve as sanctuary stewards and whose communally-owned lands adjacent to the sanctuary are managed by local matais (chiefs)."[34]

"As managers of the natural resources at Fagatele Bay, there is little they can do in the face of natural disasters. The September 2009 tsunami that devastated much of the island's shoreline is the latest example of nature's power. However, the sanctuary's role becomes vital in reducing human-caused impacts. Fagatele Bay is protected by regulations from destructive types of fishing including dynamite fishing and the traditional poison fishing (futu or 'ava niukini).

32 American Samoa. (2014). NOAA CoRIS - Regional Portal - Coral Ecosystem Publications. Retrieved September 30, 2014 from http://www.coris.noaa.gov/portals/samoa.html

33 National Marine Sanctuary of American Samoa. (2014). Retrieved September 30, 2014 from http://americansamoa.noaa.gov/management/welcome.html

34 Ibid.

In addition, spearfishing and fixed nets are also prohibited, and all invertebrates-including the crown-of-thorns starfish-are protected. NOAA Office of Law Enforcement and local American Samoa Department of Marine and Wildlife Resources conservation officers share responsibility for enforcing the regulations at the sanctuary. Local landowners are also sanctuary enforcement partners -- they are our eyes and ears at the site. Sanctuary management will continue to blend marine education, research and enforcement into an effective management package that preserves the natural and cultural resources of this special place for the Samoan community, visitors and the American people."[35]

The American Samoa Observatory (SMO)[36] was established in 1974 on a 26.7-acre site. Since its construction, it has survived two major hurricanes, an earthquake, and a tsunami with only minor damage. A staff of three operates the facility year round. This observatory has the distinction of obtaining 30% of its daytime power from solar panels.

Blue Sky

Blue Sky is a private telecommunications company in American Samoa. They compete with ASTCA for telephone and cable customers. Cell towers on the island provide local service and a submarine cable provides off island communication. American Samoa connected to the Internet in 2009 via an undersea cable that connects American Samoa to Hawaii. The fiber optic system allows for consistent service on the islands and an increase in capacity and speed. The submarine cable has been hardened and is supported by satellite back-up services. The LBJ Hospital relies on the cable. All of Blue Sky's cable services are provided via aerial systems. They are interested in undergounding the cables that service banks and ATM machines.

The Blue Sky headquarters building has been hardened for earthquakes and high winds. It is located on the edge of the flood zone. They are working toward making their emergency plan National Incident Management System (NIMS) compliant.

The Planning Team met with Blue Sky representatives in April 2014. They demonstrated how proactive they are regarding mitigating risk to their facility so services are not interrupted to their customers.

American Samoa Chamber of Commerce

The American Samoa Chamber of Commerce is an active member of the Hazard Mitigation Council. They represent multiple small businesses in the Territory. They also participate in the National Emergency Grant Program, From Tsunami to Renewal. The 2009 Tsunami eliminated one in eight jobs in American Samoa.[37] The U.S. Department of Labor awarded American Samoa $25 million to support recovery including job growth.

35 National Marine Sanctuary of American Samoa. (2014). Retrieved September 30, 2014 from http://americansamoa.noaa.gov/management/welcome.html
36 American Samoa Observatory. (2014). NOAA Earth System Research Laboratory – Global Monitoring Division. Retrieved September 30, 2014 from http://www.esrl.noaa.gov/gmd/obop/smo/
37 From Tsunami to Renewal. (2012). National Emergency Grant American Samoa. Retrieved September 30, 2014 from http://americansamoarenewal.org/the_story

Development in Hazard Prone Areas

The legal framework for regulating development in areas subject to natural hazards is Public Law 21-35, the *American Samoa Coastal Management Act* (ASCMP). This law ensures that development is restricted in areas subject to natural hazards. T*he American Samoa Coastal Management Program Administrative Code* gives the Department of Commerce, the agency that now contains the Coastal Management Program, responsibility to restrict development in areas subject to flooding, storm surge, tsunamis, landslides, and coastal erosion in order to minimize losses from these disasters.

The *American Samoa Coastal Management Act* (26.0202) mandates the establishment of a system of environmental review known as the Project Notification and Review System (PNRS). The Act includes development standards, procedures for the designation, planning and management of Special Management Areas, procedures for environmental assessments, and procedures for determination of federal consistency. The land use management system provides a mechanism for regulating unsafe building practices. It also mitigates the risk of natural hazards by monitoring the location of construction and avoiding development in hazardous areas.

Rules establishing and regulating development in Special Management Areas are explicitly aimed at reducing the impact of the natural hazards described in Chapter 4. The rules define and delineate Special Management Areas as:

> "…Areas which, if development were permitted, might be subject to significant hazard due to storms, landslides, floods, erosion, settlement (subsidence), or salt water intrusion…"[38]

The ASCMP Administrative Rules establish an explicit coastal hazards policy to restrict development in hazardous areas. The policy on coastal hazards and shoreline development mandates (1) protection of life and property, (2) denial of projects, uses, or activities in coastal hazardous areas, (3) compliance with the American Samoa Flood Plain Management Regulations. The shoreline development provisions of the regulations restrict development in a 200-foot shoreline setback. The regulations also provide legal backing for Village Mitigation Ordinances established through agreements between the American Samoa Coastal Management Program, eight villages on Tutuila, and one village in the Manu'a Islands.

A soil erosion policy in the Administrative rules explicitly targets restriction of development in areas subject to landslides. It permits projects, uses, or activities in areas with slopes of grades from 0-20%. It allows conditional use permits for development in areas with grades of 20-40% and mandates the denial of permits for projects, uses, or activities on slopes of greater than 40%.

38 Rizer, J. P., Michael P. Hamnett, and Caroline Sinavaiana. (2011). "Section 309 Assessment and Strategy for the American Samoa Coastal Management Program." Pacific Baisn Development Council. Retrived September 30, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/as3092011.pdf

Droughts are serious threats to the wellbeing of the people of American Samoa. Mitigation of the drought risk is addressed indirectly through general planning functions of the Department of Commerce conducted in conjunction with the Coastal Zone Management Act and the Project Notification and Review System. However, drought impacts are mitigated directly through the management of ground water resources by the American Samoa Power Authority; efforts to minimize agricultural losses by the Land Grant College extension program and the Department of Agriculture; and fire suppression efforts. Drought impacts are also mitigated through seasonal to inter-annual climate forecasts issued by the Pacific ENSO Application Center and the U.S. National Weather Service.

Project Notification and Review System [39]

The American Samoa Land Use Permitting Portal "is a compilation of data relating to land use from the Department of Commerce (DOC), Environmental Protection Agency (ASEPA), and the American Samoa Power Authority (ASPA). Board members on the Project Notification and Review System (PNRS) provided all data for this portal to help with permitting. Users are encouraged to use this data to visually verify existing setbacks and hazard zones when looking into possible development locations by clicking on different data layers. This data should be used in conjuncture with the PNRS review process. This is the best available data, but it may not represent all recent changes. The development of the Land Use Permitting Portal was completed by the American Samoa Department of Commerce in partnership with the National Oceanic and Atmospheric Administration (NOAA) Pacific Services Center."[40]

The Department of Commerce, under its statutory responsibility, is responsible for insuring that changes in the planning and land use management systems adopted as part of this plan are implemented. These changes should be coordinated through the Hazard Mitigation Council. The Project Review and Notification System will continue to serve as the primary means for insuring that future development does not increase the vulnerability of American Samoa to natural disasters.

PNRS is the primary land use management and regulation mechanism. It is coupled with other land use planning and permitting functions within the American Samoa Government. The PNRS is, however, the primary mechanism for mitigating the risk of natural hazards by controlling the location of new structures and avoiding development in the hazardous areas. It is also integrated with the administration of the building code and flood plain management regulations.

The PNRS Board meets twice a month and reviews major projects. The PNRS Board conducts site visits to these projects every Tuesday. Major projects usually require the review and approval of technical plans prior to full permit approval. The applicant provides these technical plans, which are reviewed by the agency given jurisdiction (e.g., DPW would review parking and drainage plans). The PNRS Board only reviews Land Use Permits classified as Major projects.

The PNRS Board is composed of representatives from agencies with land use and environmental management responsibilities in the Territory (Table 1). Each agency plays a role in the PNRS review process and votes on projects based on their agency jurisdiction. In general, major development projects must be carefully planned and reviewed for environmental compliance prior to final approval. Technical information provided to the Board by the applicant must be complete.

39 American Samoa Department of Commerce GIS Web Portal. (20140 Retrieved September 30, 2014 from http://portal.gis.doc.as/LandUse/

40 Ibid.

Table 1 Project Notifications and Review Board Membership and Responsibilities

Agency	PNRS Function or Responsibility
American Samoa Coastal Management Program within Department of Commerce (ASCMP/DOC)	Administrative Coordinating Agency for the PNRS process. The goal of the ASCMP is to preserve, protect, develop, and enhance coastal resources. Also lead agency for flood plain management.
The Department of Public Works (DPW)	Infrastructure requirements: traffic flow, parking, drainage, and building design. Reviews plans for major construction activities that involve major earthworks. Responsible for building code administration.
American Samoa Environmental Protection Agency (ASEPA)	Impacts on land, air, and water quality. Projects involving hazardous materials, chemicals, and pesticides must be approved by ASEPA.
American Samoa Historical Territory Office (ASHPO)	Documentation and review of ancient cultural and historic sites throughout American Samoa. Projects receiving federal funds must conduct a Section 106 review of historic findings at the site.
Department of Marine and Wildlife Resources (DMWR)	Protection of plant and animal habitats, especially endangered species. DMWR also reviews projects that may impact reef and fishery resources.
American Samoa Power Authority (ASPA)	Major utility provider. Reviews projects based on water distribution and resources, such as groundwater and wastewater treatment.
Department of Health (DOH)	Public health, including new facilities, such as restaurants or food distribution centers, and pollution from sources that will impact the public.
Department of Parks and Recreation	Park and government owned land, recreation opportunities, and shoreline access.

The PNRS requires the collaboration of the agencies listed in the above table. In order for the agencies to effectively evaluate and issue permits, they must first obtain all of the appropriate information from the applicants. Should the applicant fail to include information, the entire process may be delayed for months. Therefore, the PNRS has developed a substantive packet of instructions for applicants that outline the process. PNRS has proven to be a very effective way to restrict development in hazardous areas, although, as discussed below, improvements are needed in the system.

The building code and its enforcement, the Project Notification and Review System, and the American Samoa Flood Plain Management Regulations are the primary ways in which the American Samoa Government prevents losses from future development. As described below, the three regulatory regimes function as an integrated system to mitigate damage to future development from floods, tropical cyclones including storm surge, landslides, tsunamis, earthquakes, and drought.

The 1997 Uniform Building Code is used by engineering and design professionals in the Territory and by the Department of Public Works (DPW) in administering building and safety code regulation.

An application for a land use permit from the Department of Commerce is required before a building permit application can be provided and issued by the Department of Commerce. Plans are submitted with the building permit and land use permit applications. The Architecture and Engineering Division of the DPW reviews the building permit application. As an example, under the 5% Initiative, ASDRO, with support from DPW, submitted an application for HMGP-1859-DR-AS for compliance with the 1997 Uniform Building

Code. Ten or more separate inspections were required, including special inspections by an engineer, during the course of construction. FEMA Region 9 requested that an engineer and the SHMO provide some additional information for this application.

DPW officials believe that the existing building safety program has done much to reduce the risk of losses to government buildings, commercial structures, community buildings, and homes. However, improvements can be made and those endorsed by the Hazard Mitigation Council are included in a later section of this chapter.

In 1991, the Governor promulgated the Territory of American Samoa Floodplain Management Regulations through Executive Order 02-1991, to meet requirements for participating in the National Flood Insurance Program (NFIP). The Executive Order adopted the 1991 Flood Insurance Rate Maps (FIRMs) and declared that no structure could be constructed, located, extended, converted, or altered without full compliance with the terms of the regulations contained in the Executive Order and other applicable regulations. It also states that violators of these regulations may be subject to sanctions, both civil and criminal, according to Title 24, Chapter 05, and Title 26, Chapters 02 and 10 of the American Samoa Code Annotated. The Executive Order appointed the Office of Economic Development and Planning, now the Department of Commerce, to administer and implement the Floodplain Management Regulations.

As indicated above, the land use permit obtained through the PNRS is the mechanism for insuring compliance with the Floodplain Management Regulations. The Executive Orders that established the Floodplain Management Regulations require that a determination should be made based on whether a structure is in a Special Flood Hazard Area during the preliminary review of the Land Use Permit/Building Permit Application. The Floodplain Administrator determines the Base Flood Elevation for a proposed location and the Survey Branch of the Department of Public Works provides the applicant with a determination of the actual elevation of the construction site. When the applicant has received the Base Flood Elevation Determination and the determination of the actual elevation of the proposed construction site, a final plan may be prepared and submitted to the Floodplain Administrator for review prior to issuance of the Land Use Permit through the PNRS.

It is also the responsibility of the Floodplain Administrator to notify the community and applicable federal agencies prior to any alteration or relocation of a watercourse, to submit evidence of such notification to FEMA, and to require that the flood carrying capacity of the altered or relocated portion of said watercourse be maintained.

Under the floodplain management regulations, variances may be issued for new construction and substantial improvements being erected on a lot of one-half acre or less in size which is contiguous to, and surrounded by, lots with existing structures constructed below the base flood level. As the lot size increases beyond one-half acre, the technical justification required for issuing the variance must increase.

Variances may be issued for the reconstruction, rehabilitation, or restoration of "historic structures" upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure, and that the variance is the minimum necessary to preserve the historic character and design of the structure. Variances may be granted for new construction, substantial improvement, and other proposed new developments necessary for the conduct of a "functionally dependent use" with certain restrictions. The structure or other development must be protected by methods that minimize flood damages during the base flood and create no additional threats to public safety. Variances are not granted within any designated floodway or floodway setback area if any increase in flood levels during the base flood discharge would result.

Funding Sources

Prior to 2014, the Hazard Mitigation Grant Program was managed by the American Samoa Disaster Recovery Office, under the Territorial Office of Fiscal Reform for all disasters since the enactment of the Hazard Mitigation Program in 1998 with the Robert T. Stafford Disaster Relief Act. This included five presidentially declared disasters. The Hazard Mitigation Grant Program has successfully completed all mitigation projects funded for Hurricane Ofa, 1990 and Hurricane Val, 1991. All HMGP projects funded under the Flood DR-1473, Hurricane Heta DR-1508 and Hurricane Olaf DR-1578 were completed or funded.

The Pre-disaster Mitigation Grant Program has completed one of two funded projects successfully. The completed project is the Fagaalu Flood Control Project to protect the LBJ Hospital from repetitive flooding. Figures 7 and 8 show the completed Fagaalu Bridge and stream revetment. The Hazard Mitigation Council, the Office of Disaster Assistance and Petroleum Management (ODAPM) and the Department of Homeland Security are now responsible for administering the funds and facilitating the implementation of the mitigation projects.

(Left) Figure 7 and (Right) Figure 8 Fagaalu bridge a mitigation success

Ongoing mitigation activities undertaken by the Department of Public Works, the Department of Commerce, the American Samoa Power Authority, and other government agencies are funded by the American Samoa Government, the U.S. Department of the Interior, the Department of Housing and Urban Development, and a wide range of other federal agencies. Building Code administration is funded by the American Samoa Government through the Department of Public Works. The U.S. Department of the Interior and the Office of Insular Affairs has provided capital improvement program and operations support, as well as maintenance and improvement program support for the construction of new buildings and infrastructure and hardening of existing buildings and infrastructure.

The American Samoa Power Authority spends its funds on improving and hardening power, water, and waste water systems. FEMA and the U.S. Highways Administration have also provided funding for shoreline protection and road and bridge hardening projects.

The Hazard Mitigation Council has identified funding options for the mitigation measures. American Samoa must match FEMA mitigation grant funds with a 25 percent local match. The Hazard Mitigation Council identified five sources of matching funds that qualify for FEMA grants:

1. Housing and Urban Development funds can be converted to non-federal mitigation fund match.
2. Department of Interior Capital Improvement Project funds have been used in the past to match other federal grants and FEMA grants.
3. American Samoa Power Authority and American Samoa Telecommunications Authority private matching funds.
4. General funds from the American Samoa Government treasury.
5. In-kind labor on all projects.

Past Territorial Mitigation Projects

American Samoa has managed hazard mitigation projects aimed at reducing the risk of losses to existing critical facilities and infrastructure for many years. The Territorial government, American Samoa Power Authority, U.S. Department of Transportation, the U.S. Army Corps of Engineers, the U.S. Department of the Interior, and other federal agencies has funded such efforts. Following Hurricane Ofa and Val, the housing rehabilitation program and the reconstruction of government buildings and infrastructure were planned in ways to reduce the risk of future losses. The American Samoa Government has also participated in the Hazard Mitigation Grant Program since Cyclone Ofa struck American Samoa in 1990. Table 2 lists the Hazard Mitigation Grant Program projects completed following Ofa and Val. It also includes two DR-1859 Tsunami projects.

Table 2 Ofa, Val, Heta and Olaf mitigation projects

Project Name		Total Costs	Federal Share
DR-0855 Ofa			
2	Harden Tank Farm I	$500,000.00	$975,000.00
3	Underground Power Lines II	$1,850,000.00	$925,000.00
4	Underground Communication Lines II	$1,476,064.00	$738,032.00
M01	Territory Management Cost	$120,000.00	$30,000.00
	Ofa subtotal	$3,946,064.00	$2,668,032.00
DR-0927 Val			
15	Harden Fitiuta Water Line	$126,000.00	$126,000.00
16	Harden Sewer Outfalls	$1,071,050.00	$200,000.00
17	Harden Satala Power Plant	$3,204,000.00	$1,602,000.00
18	Underground Power Lines I	$4,074,114.00	$2,037,057.00
19	Harden Tafuna Housing	$250,000.00	$125,000.00
20	Harden Hazmat Storage Areas	$169,877.00	$169,877.00
22	Harden PEACESAT Earth Station	$52,041.00	$52,041.00
23	Harden Public Safety Bldg.	$395,570.00	$197,785.00
25	Harden Ta'u-Faleasao Water Line	$146,958.00	$146,958.00
27	Harden DCI/KVZK Bldg.	$177,709.00	$177,709.00
28	Harden Tula Elementary School	$199,999.00	$199,999.00
29	Harden Procurement Warehouse	$466,918.00	$233,459.00
31	Underground Communication Lines I	$703,625.00	$351,812.00

Project Name		Total Costs	Federal Share
32	Harden Tafuna Power Plant	$97,482.00	$97,482.00
33	Harden LBJ Hospital Windows	$182,650.00	$182,650.00
34	Harden Fagatogo Fire Station	$101,128.00	$101,128.00
35	Harden Vatia Elementary School	$112,600.00	$112,600.00
36	Harden High Court Bldg I	$400,000.00	$200,000.00
37	Harden High Court Bldg II	$198,875.00	$198,875.00
38	Harden Am Samoa Library Bldg	$199,000.00	$199,000.00
41	Harden OMV Bldg	$73,123.00	$73,123.00
42	Harden Tank Farm II	$1,175,000.00	$555,000.00
MO1	Territory Management Cost	$196,000.00	$196,000.00
	Val Subtotal	$13,773,719.00	$7,535,555.00
DR-1473 Flood			
1	ASPA-Underground Lines	$1,027,000.00	$924,300.00
M01	State Management Costs	$55,000.00	$49,500.00
	Flood Subtotal	$1,082,000.00	$973,800.00
DR-1506 Heta			
2	ASTCA-Underground Lines Rte. 1 to LBJ	$59,966.67	$53,970.00
3	ASTCA-Underground for ASPA to Airport	$100,242.22	$90,218.00
4	ASPA-Underground Lines Utulei Loop	$153,112.00	$137,800.80
5	TEMCO-Fagatogo Stream Flood Control	$1,056,720.00	$951,048.00
7	ASPA-Underground Lines Rte. 1 to LBJ	$300,000.00	$270,000.00
8	DOE Hardening Government Buildings	$399,288.89	$359,360.00
9	TEMCO-Fagatogo Stream Flood Control-A&E	$45,000.00	$40,500.00
MO1	State Management Costs	$125,000.00	$112,500.00
	Heta Subtotal	$2,239,329.78	$2,015,396.80
DR-1582			
1	ASTCA Underground Lines Ili'ili	$375,064.44	$337,558.00
2	Hardening Government Buildings Phase II	$288,233.33	$259,410.00
3	State Multi-Hazard Planning Grant	$56,201.11	$50,581.00
M01	State Management Costs	$68,600.00	$61,740.00
	Olaf Subtotal	$788,098.88	$709,288.99
DR-1859			
1	HM Planning Update	$356,600.00	$320,940.00
M01	State Management Costs	$302,101.11	$271,891.00
#03	Futiga Underground	$1,903,281.26	$1,712,953.13
#04	Leone Underground	$1,136,801.39	$1,023,121.25
#05	Matu'u Stream	$929,600.00	$836,640.00
#07	Building Code Upgrade	$297,000.00	$267,300.00
	Tsunami Total	$4,925,383.76	$4,432,845.38
	TOTAL	**$25,672,595.42**	**$18,334,918.17**

Figure 9 Jim Buika, hazard mitigation consultant, standing on beach revetment

Other mitigation projects completed or underway include shoreline protection structures to reduce the risk of damage to coastal roads, the most important of which is the highway linking the main urban and government center in Pago Pago with the International Airport and the Emergency Operations Center in Tafuna. This road protection program is being managed by the U.S. Army Corps of Engineers (USACE) and is funded by the U.S. Highway Administration. An example of shoreline protection is shown in Figure 9.

The USACE, Pacific Ocean Division, Honolulu, completed the field study American Samoa Shoreline Inventory Update II in March 1994. Completed by Sea Engineering, Inc. and Belt Collins Hawaii, both of Honolulu, the study is in hard copy format. It is a shoreline inventory identifying the physical characteristics of the shoreline with emphasis on erosion and protection needs. The engineers developed a rating system that identifies critical and potentially critical erosion in each coastal sector of American Samoa.

The American Samoa Department of Public Works has developed a multi-phased plan to repair and reconstruct a major portion of Route 1. Along the coastal reaches of Route 1, the project also includes mitigation of vulnerable shoreline hazards with the construction of shoreline revetments. The USACE has been involved for some of the design for coastal revetments and shoreline protection methods. To determine the design wave height for USACE projects, numerical models were developed by Sea Engineering, Inc. Three different hurricane scenarios were considered in arriving at the design wave height that was used for the project.

For all Route 1 projects, U. S. Federal Highways funded the Department of Public Works to manage the mitigation projects. The Department of Public Works contracted with the USACE as design and construction agents to complete some of the work and contracted with other companies to complete other projects. Currently, the USACE is constructing a road revetment in Faganeanea, between the hospital and the airport.

<u>Four Disaster Declarations (2003, 2004, 2005, 2009)</u>

Flooding - DR-1473-AS [41]

There was a Presidential declaration of a major disaster for the Territory of American Samoa (FEMA-1473-DR), dated June 6, 2003. The Hazard Mitigation funding amount granted to American Samoa was $890,582.00. "I have determined that the damage in certain areas of the Territory of American Samoa, resulting from heavy rainfall, flooding, landslides, and mudslides on May 19-21, 2003, is of sufficient severity and magnitude to warrant a major disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5206 (the Stafford Act). I, therefore, declare that such a major disaster exists in the Territory of American Samoa."

"The mudslides damaged roads, bridges, buildings, and equipment and burdened municipal resources for response, debris removal and protective measure costs in many communities," Lieutenant Governor Aitofele Sunia said. "Most of these communities would be hard-pressed to cover these costs without the help of federal disaster assistance."[42]

Tropical Cyclone Heta - DR-1506-AS

With high winds in excess of 190 mph, heavy rainfall and high surf, Tropical Cyclone HETA made landfall on January 5, 2004 in American Samoa, as well as other islands of the South Pacific. The impact of the cyclone created widespread power outages, scattered debris, and caused personal property damage, resulting in the displacement of more than 1,200 residents.[43]

The Federal Emergency Management Agency (FEMA) provides this final update of federal disaster recovery assistance and services as a result of Cyclone Heta.[44]

FEMA has issued approximately $11.5 million in temporary disaster housing grants to people whose homes have been severely damaged and to those repairing their primary residences to make them safe, sanitary and functional. The agency has provided more than $13.8 million for other serious needs directly related to Heta. The U.S. Small Business Administration (SBA) has approved approximately $5.6 million in low-interest disaster loans to homeowners, renters and business owners. The loans cover costs for the long-term repair or rebuilding of cyclone-damaged private property. Registered applicants who have already been issued an SBA loan application have until April 1 to submit their application to SBA.

Funding of approximately $1.2 million under FEMA's Public Assistance Program has been approved for the American Samoa Government (ASG). The money is reimbursement for 75% of the costs incurred by the territorial government due to Heta. The final "federal share" is expected to reach several million dollars more, once all eligible projects that ASG has submitted for funding have been approved.

41 President Declares Major Disaster For American Samoa (2003). FEMA. Retrieved September 30, 2014 from http://www.fema.gov/news-release/2003/06/06/president-declares-major-disaster-american-samoa

42 Public Assistance For Local Governments and Villages. (2003). FEMA. Retrieved September 30, 2014 from http://www.fema.gov/news-release/2003/07/11/public-assistance-local-governments-and-villages

43 Tropical Cyclone Heta strikes. (2004). PB Inspections. Retrieved September 30, 2014 from http://www.pbinspections.com/articles/01222004_tropical_cyclone_heta_strikes.asp

44 Ibid.

Tropical Cyclone Olaf - DR-1582-AS

There was a Presidential declaration of a major disaster for the Territory of American Samoa (FEMA-1582-DR), dated February 18, 2005. American Samoa received $722,587.00 in funding. "I have determined that the damage in certain areas of the Territory of American Samoa, resulting from Tropical Cyclone Olaf, including high winds, high surf, and heavy rainfall, beginning on February 15, 2005, and continuing, is of sufficient severity and magnitude to warrant a major disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5206 (the Stafford Act). Therefore, I declare that such a major disaster exists in the Territory of American Samoa."

Magnitude 8.0 Earthquake and Tsunami – DR-1859-AS

On September 29, 2009, American Samoa was struck by an 8.3 magnitude earthquake. The earthquake generated a tsunami with waves reaching 5.1 feet in Pago Pago, the territory's capital, causing flooding in portions of the island. More than 30 people were killed and hundreds were injured. The combination of the earthquake, tsunami, and flooding resulted in a devastating amount of damage on the island of Tutuila. A local power plant was disabled, 241 homes were destroyed, 308 homes had major damage, another 2,750 dwellings reported some damage, one school was destroyed and four others sustained substantial damage. Most of the damage was caused by the tsunami rather than the earthquake.[45] Figure 10 shows a Church completely destroyed by tsunami waves.

Figure 10 Church destroyed by Tsunami waves

National Emergency Grant

To aid in the recovery from the September 29, 2009 tsunami, the U.S. Department of Labor awarded the island a $25 million National Emergency Grant (NEG).

"In the wake of a devastating tsunami that eliminated one in eight jobs in the territory overnight, American Samoa received the largest National Emergency Grant ever awarded by the US Department of Labor – nearly $25M – to support the recovery process. Within weeks, despite severely compromised infrastructure, the Department of Human Resources (DHR) - the agency charged with planning and implementing the NEG initiative - launched a public jobs program. NEG program staff recruited and employed over 2,361 people in cleanup and recovery efforts at 65 work sites between November 2009 and April 2010.

They launched the program without an existing one-stop career center or other key Department of Labor assets common to states on the US mainland and in the context of a village-level community leaders and faith-based organizations with limited prior experience managing employment and recovery efforts on the scale required in the wake of the tsunami."[46]

45 American Samoa 2009 Earthquake and Tsunami After-Action Report. Washington, DC: Department of Homeland Security, Office of Inspector General, October 2010, p.2. Retrieved September 30, 2014 from http://www.oig.dhs.gov/assets/Mgmt/OIG_11-03_Oct10.pdf

46 National Emergency Grant American Samoa: From Tsunami to Renewal. Retrieved September 30, 2014 from http://americansamoarenewal.org/the_story

“In 2010, the NEG Program, following the NEG disaster grant requirements issued by the US Department of Labor, shifted it focus to longer term workforce development including training, education, and helping the over two thousand NEG temporary workers and hundreds of unemployed job-seekers affected by the tsunami transition to new jobs or education and training aimed at helping them build careers.”[47]

“The project’s deliverable include:

- A thirty-five minute video documentary about the tsunami and NEG project called “From Tsunami to Renewal.”
- A report detailing the context, program, lessons, and results to date of the American Samoa National Emergency Grant Program.
- Profiles of three NEG initiatives that demonstrated creative responses to documented need, engaged new partners, and generated excitement among “the public” - people with no direct connection to the NEG program.
- A website and project archive that includes: links and/or downloadable documents or videos cited in the report; “Stories from the Community” - video interviews produced by the story gatherers in which islanders described their experiences during the tsunami; and other relevant documents and resources.”[48]

47 National Emergency Grant American Samoa: From Tsunami to Renewal. Retrieved September 30, 2014 from http://americansamoarenewal.org/the_story
48 Ibid.

HUD announces $1.5 million for community development and affordable housing in American Samoa[49]
Thursday, 23 August 2012

(WASHINGTON, DC: Thursday, August 2, 2012) – U.S. Housing and Urban Development Secretary Shaun Donovan today announced that American Samoa will receive approximately $1.5 million to support community development and produce more affordable housing. HUD's annual funding will also help find homes for individuals and families living on the streets.

This year's block grant funding requires tough choices that we would not have made in better circumstances," Donovan said. "As we work under the challenges of our nation's deficit, we must also understand that these programs are absolutely essential in promoting community development, producing affordable housing, helping our homeless and even supporting long-term disaster recovery."

The funding announced today is for:
- Community Development Block Grant (CDBG) funds;
- HOME Investment Partnerships (HOME) funding;
- Emergency Shelter Grant (ESG)

Since 1974, HUD's ***Community Development Block Grant (CDBG) Program*** has provided approximately $132 billion to state and local governments to target their own community development priorities. The rehabilitation of affordable housing and the improvement of public facilities have traditionally been the largest uses of CDBG although the program is also an important catalyst for job growth and business opportunities. Annual CDBG funds are distributed to communities according to a statutory formula based on a community's population, poverty, and age of its housing stock, and extent of overcrowded housing.

HOME (HOME Investment Partnerships Program is the largest federal block grant to state and local governments designed exclusively to produce affordable housing for low-income families. Since 1992, more than 600 communities have completed nearly 950,000 affordable housing units, including 403,000 for new homebuyers. In addition, 224,000 tenants have received direct rental assistance.

Emergency Shelter Grants (ESG) provides homeless persons with basic shelter and essential supportive services. It can assist with the operational costs of the shelter facility, and for the administration of the grant. ESG also provides short-term homeless prevention assistance to persons at imminent risk of losing their own housing due to eviction, foreclosure, or utility shutoffs.

49 HUD Announces $1.5 Million for Community Development an Affordable Housing in American Samoa. (2012). U.S. Department of Housing and Urban Development. Retrieved September 30, 2014 from http://archives.hud.gov/local/hi/news/pr2012-08-02.cfm

Highlights of OIA Financial Assistance Awards to American Samoa in FY 2011[50]

Prepared for the Senior Plenary Session of the Interagency Group on Insular Areas February 28, 2012. The Office of Insular Affairs provided a substantial amount of financial assistance in fiscal year 2011 to assist American Samoa in a variety of areas ranging from infrastructure improvements to health care services.

- A total of $10.5 million in CIP funding was awarded to American Samoa to address a variety of infrastructure needs including $2.6 million to renovate and expand the Dialysis Unit at the LBJ Tropical Medical Center; $1.6 million to continue building classroom buildings at elementary schools; and $380,000 to complete the Petesa Happy Valley Village Road project.
- The American Samoa Power Authority was awarded $596,000 in Empowering Insular Community funding for energy efficiency and conservation projects including a program to provide florescent bulbs to Manu'a residents and a recycling rebate project.
- $600,000 was awarded to fund the American Samoa Air Transport Market Study through the Technical Assistance Program (TAP). The study will be to quantify and document the market demand for expanded air cargo and passenger transportation services at the territory's Pago Pago International Airport.
- $400,000 was awarded to fund Lyndon B. Johnson Hospital for Practitioner training. The funds will be used to train LBJ practitioners, by 4 board-certified physicians, in order to improve healthcare services.

USDA Rural Development in American Samoa [51]

- Since 2009, USDA Rural Development has assisted over 186 homeowners with over $1.3 million in Home Improvement and Repair Loans and Grant Programs.
- American Samoa's "Communal" land tenure system has prevented Rural Development from utilizing its flagship Direct and Guaranteed Loan Program (502 Loan Program). Rural Development has been working with the Development Bank of American Samoa to develop a Memorandum of Understanding to provide "security" for homeownership loans.
- In 2011, a $110,000 Community Facilities Grant was awarded to the LBJ Hospital for the purchase of much needed microbiology equipment.
- Rural Development is currently working on a $1.5 million Community Facilities loan application received from a faith-based school project.
- Business and Industry (B&I) Guaranteed Loan. In 2010, a $16.7 million B&I Guaranteed Loan was approved with the American Samoa Hawaii Cable, LLC (ASHC) and American Samoa Cable, LLC (ASC) for the purchase of fiber optic cable. In addition, Rural Development is in discussion with Tri-Marine Group,Inc. for a $30 million B&I Guaranteed Loan for a tuna cannery processing facility.
- In 2010, The American Samoa Telecommunication Authority (ASTCA) received an $81 million grant and $10 million loan under the America Recovery and Reinvestment Act. This project is being administered by the USDA Rural Development, Rural Utility Service under the Broadband Initiative Program.
- In 2009 American Samoa Power authority received 2 grants totaling $3.14 million in High Energy Cost Grants provided for rural communities with home energy costs that are over 275 percent of the national average.

50 Summary of Resources Granted to Insular Areas (Including American Samoa) by US Department of Interior. (2012). National Emergency Grant American Samoa. Retrieved September 30, 2014 from http://americansamoarenewal.org/library/summary-resources-granted-insular-areas-including-american-samoa-us-dept-interior

51 Summary of USDA Program and Resources in Insular Areas, Including American Samoa. (2012). National Emergency Grant American Samoa: From Tsunami to Renewal. Retrieved September 30, 2014 from http://americansamoarenewal.org/library/summary-usda-program-and-resources-insular-areas-including-american-samoa

Potential FEMA Funding Sources

"FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs:

- ***Hazard Mitigation Grant Program (HMGP)*** assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.
- ***Pre-Disaster Mitigation (PDM)*** provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on Federal funding from actual disaster declarations.
- ***Flood Mitigation Assistance (FMA)*** provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program (NFIP)."[52]

Table 3 Hazard Mitigation Assistance Mitigation Activity Eligibility [53]

Eligible Activities	HMGP	PDM	FMA
1. Mitigation Projects	√	√	√
Property Acquisition and Structure Demolition	√	√	√
Property Acquisition and Structure Relocation	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction			√
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√
Minor Localized Flood Reduction Projects	√	√	√
Structural Retrofitting of Existing Buildings	√	√	
Non-structural Retrofitting of Existing Buildings and Facilities	√	√	√
Safe Room Construction	√	√	
Wind Retrofit for One- and Two-Family Residences	√	√	
Infrastructure Retrofit	√	√	√
Soil Stabilization	√	√	√
Wildfire Mitigation	√	√	
Post-Disaster Code Enforcement	√		
Generators	√	√	
5 Percent Initiative Projects	√		
Advance Assistance	√		
2. Hazard Mitigation Planning	√	√	√
3. Management Costs	√	√	√

52 Hazard Mitigation Assistance. (2014). FEMA. Retrieved September 30 2014 from http://www.fema.gov/hazard-mitigation-assistance

53 Hazard Mitigation Assistance Mitigation Activity Eligibility. (2014). FEMA. Retrieved September 30 2014 from http://www.fema.gov/hazard-mitigation-assistance-mitigation-activity-eligibility

Capability Assessment Conclusion

Through a series of disasters impacting American Samoa, including the 2009 earthquake and tsunami, this Hazard Mitigation Plan has provided the Territory with a mitigation planning and risk reduction program and process that has been cost effective in reducing losses and impacts to the Territory of American Samoa for 24 years now – since the inception and passage of the FEMA Hazard Mitigation Program.
The following table summarizes the mitigation capabilities of the organizations named above.

Table 4 Mitigation Capability Summary

Organization	Disaster Mitigation Capabilities
American Samoa Government Offices	
Historic Preservation Office (ASHPO)	Active participant in the Hazard Mitigation Council. Developing GIS database of historical artifacts. Exploring possibility of revitalizing hydroelectric power on the islands.
Office of Disaster Assistance and Petroleum Management (ODAPM) formerly the Territorial Office of Fiscal Reform (TOFR)	Manages pre- and post-disaster mitigation funding grants. Responsible for assisting the Hazard Mitigation Council with the development of the Hazard Mitigation Plan.
American Samoa Government Agencies	
American Samoa Environmental Protection Agency (ASEPA)	Responsible for protecting all environmental resources and operates the only laboratory in American Samoa used for environmental testing. Leader in the PNRS. Identifies multiple projects for flood reduction and erosion control. Manages several environmental management programs.
Department of Port Authority (DOP)	Active participant in Hazard Mitigation Council. Responsible for mitigating risks to all ports including Pago Pago Harbor, Port, Marina and Airport facilities.
American Samoa Government Authorities	
American Samoa Power Authority (ASPA)	Active participant in Hazard Mitigation Council. Responsible for mitigating risk to systems for electricity, water, and wastewater and solid waste management. Implementing multiple mitigation projects to underground power. Improving the Satala Power Plant with mitigation dollars. Also responsible for water supply. Interested in quickly implementing the Tualauta Flood Control project.
American Samoa Telecommunications Authority (ASTCA)	Active participant in Hazard Mitigation Council.
American Samoa Government Departments	
Department of Commerce (DOC)	Active participant in Hazard Mitigation Council. Maintains a GIS database actively used for mitigation. Maintain several mitigation programs including a new mapping program. Interested in benefits of NFIP. Also an active PNRS member. Managed Coastal Management Program.

Organization	Disaster Mitigation Capabilities
Department of Homeland Security (DHS)	Active participant in Hazard Mitigation Council. Collaborates closely with TOFR on Mitigation Plan development. Implements disaster preparedness education programs. Assist with implementation of mitigation plan.
Samoan Affairs	Samoan Affairs promotes Samoan culture. The Hazard Mitigation Council consults with Samoan Affairs as needed regarding actions impacting the Territory or specific villages.
American Samoa National Park Service	The National Park of American Samoa works to protect Samoan culture and natural resources. They are involved with preserving the natural habitat on Mt. Alava.
Department of Public Works (DPW)	Active participant in Hazard Mitigation Council. Enforces the building code standards and permitting process. Works on major mitigation projects. Focused on landslide mitigation and undergrounding utilities.
Other Organizations	
National Oceana and Atmospheric Administration (NOAA)	Work on coastal zone management regulations. Collaborate closely with other agencies.
Land Use Planning	Land Use Planning is a critical part of mitigation planning in American Samoa. The strengths and weaknesses of the PNRS system play directly into the resilience of the Territory.
Blue Sky	As a premier telecommunications provider in American Samoa. They collaborate with several government agencies to ensure consistent communications before, during and after a disaster.
American Samoa Chamber of Commerce	Active participant in Hazard Mitigation Council.

Evaluation of the Territory's Pre-Disaster Capabilities

The PNRS has proven to be an effective way to restrict development in hazardous areas. The PNRS Board is composed of representatives from agencies with land use and environmental management responsibilities in the Territory, as listed in the table above. Locating hazard free building space in the Territory is challenging considering the small amount of flat land and the incredibly steep slopes. By improving the PNRS system, American Samoa has taken steps to improve the overall land use system. With a strategic planning process established, these subcommittees have continued to revise and improve the system since 2003.

Hazard Management Capabilities Changed Since 2011

American Samoa's hazard management capability has grown since 2008 through 1) the repeated yearly engagements of the Hazard Mitigation Council, 2) disaster event management experience in 2003-2014, and 3) through the subsequent management of major mitigation projects that have improved life safety and reduced property losses throughout the Territory. Since 2008, the Territory has committed funds and expertise to completing multiple hazard mitigation projects. American Samoa now has over two decades of mitigation accomplishments and has expanded its local technical expertise via projects that have been managed technically, fiscally, and administratively in a competent and prudent manner. The Territory has added tsunami evacuation signs, tsunami sirens, evacuation and mass-care training and is now a Tsunami Ready community as awarded by FEMA.

Evaluation of the Territory's Post-Disaster Capabilities

Yearly Plan updates involved addition of new projects added to the Mitigation Plan and project priorities have been updated. The project priority listing has been updated on an annual basis, during the Hazard Mitigation Council review, dependent upon availability of funds. In 2003, under the DR-1473 Flood, the American Samoa Power Authority received funds through HMGP for hardening infrastructure. In 2004, DR-1506 Hurricane Heta, 9 projects were awarded funds through HMGP. The projects ranged from roof hardening to flood stream control projects. In 2005, DR-1582 Cyclone Olaf, three projects were funded through HMGP as well. Now with the more recent disaster, DR-1859 Tsunami, Flood & Earthquake 8 project applications have been submitted to FEMA Region IX Pacific Area Office for review and consideration through HMGP. The Territory's Post Disaster mitigation grants are monitored and maintained by the American Samoa Disaster Recovery Office. The current State Hazard Mitigation Officer works closely with the standing y established Hazard Mitigation Council as well as the Governor's Authorized Representative. The Hazard Mitigation Council has successfully continued through the new government administration.

Through its past repetitive disaster experience, directed fiscal management, direct engineering project development and monitoring, and additional Federal technical expertise, American Samoa has completed or is in the process of completing numerous mitigation projects successfully since 1990. These projects have been funded through the FEMA Hazard Mitigation Grant Program and the Pre-disaster Mitigation Grant Program. ASPA, ASTCA and the Department of Public Works have become agencies cognizant with the Pre-Disaster Mitigation Program and the Hazard Mitigation Grant Program processes.

The Territorial Hazard Mitigation Council has proven to be an effective review and advisory body for the Hazard Mitigation Plan. The Council has met from one to as many as seven times a year to complete an annual thorough project review and prioritization of projects for funding. Nine departments, organizations and agencies have developed mitigation project worksheets for future funding.

The 2015 Mitigation Plan update process has identified ODAPM as the key administrative office for managing mitigation project funding programs. The Department of Commerce continues to administer and effectively regulate the land use planning system known as the Permit Notification and Review System, the flood mitigation programs, and the Coastal Zone Program. The PNRS review has been enhanced through the instituted Territorial Hazard Assessment Tool risk management system, which utilizes the GIS mapping products. The Department of Commerce maintains a full-time GIS Professional for data collection and analysis.

American Samoa has made strides in several areas of environmental management that contribute to the overall health of the island environment and reduce vulnerability to hazards addressed in this Plan. The American Samoa Government has planned and implemented formal programs, which improve watershed management, reduce pollution and debris, and protect reef ecosystems. Coral reefs provide protection to the islands from storms. Without their protection, damage resulting from storm surge and waves would be far greater. Healthy watersheds can reduce impacts from flooding and erosion. There are efforts underway to improve watershed management with the explicit goal of reducing flooding.

In addition, the ASEPA is placing emphasis on the landslide mitigation problem. With new LIDAR data in hand for the islands and geotechnical resources available, landslide hazards will be further mapped and entered into the PNRS system for review and mitigation during future building.

The following four sections describe ongoing mitigation actions to improve the ecosystem, including a reduction of vessel groundings from storms in coral reef ecosystems, participation in the U.S. All Islands Coral Reef Initiative[54] to protect coral reefs, the watershed protection and non-point pollution plans, and the Coastal Hazard Assessment and Management Program.

Vessel Grounding

During Hurricane Val, nine long-line fishing vessels in Pago Pago Harbor ran aground. Most of these vessels were abandoned. The vessels and their slow oil leaks contributed to harbor pollution and were a potential threat to navigation. They also damaged precious coral reef ecosystems and threatened ciguatera poisoning. After a decade of concentrated effort, American Samoa received assistance from the National Oceanic and Atmospheric Administration (NOAA) and the United Territories Coast Guard (USCG) to remove these vessels and their contaminants.

American Samoa supports activities to protect its coral reef health and to prevent such costly damage from vessel groundings in the future. The U.S. Flag Pacific Islands Vessel Grounding Workshops, held January and February 2002 in Honolulu and Guam for the U.S.-affiliated islands led to specific actions from the U.S. Coral Reef Task Force through NOAA, based on vessel grounding and removal experience in American Samoa.

The experience in Pago Pago Harbor initiated a sequence of events that ultimately led to a draft resolution on grounded vessels by the U.S. Coral Reef Task Force (U.S. CRTF) at their August 2000 meeting in American Samoa. In response to that resolution, NOAA initiated actions to address the issue, including the use of legal mechanisms to remove grounded and abandoned vessels from coral reef ecosystems. For this hazard mitigation strategy, it is important to note that American Samoa has experienced extensive reef damage from storms and from vessel groundings and that the actions taken by the U.S. Coral Reef Task Force will help to minimize the impacts on coral reef ecosystems.

U.S. All Islands Coral Reef Initiative

American Samoa has participated in the U.S. All Islands Coral Reef Initiative since it was first initiated in 1994 to develop strategies for protecting coral reef ecosystems. Efforts in coordination with groups in Hawaii, Guam, Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands came to be known as the "U.S. All Islands Coral Reef Initiative." The Governor of American Samoa established the Coral Reef Advisory Group (CRAG) in 1999 to develop an American Samoa action strategy for the protection of coral reefs and coordination of coral reef protection activities involving federal and Territorial agencies and the private sector. All of the island jurisdictions participating in the U.S. Coral Reef Initiative recognized that coral reef ecosystems provide essential resources, contributing to commercial and subsistence economies, food security, recreation, and storm protection.

Hurricanes and storms have caused damage to the reefs directly by overturning coral heads and scouring reef areas with debris and indirectly by blanketing several reefs with sediments and solid waste from the land. As part of future landslide and debris management plans, it will be important to consider ways to remove marine debris from storms as recommended by FEMA debris management plans that address dealing with the lack of disposal sites and need for emergency landfill sites following a storm.

54 1999 U.S. All Islands Coral Reef Initiative Strategy. (1999). USAICRICC, The Territory of American Samoa. Retrieved September 30, 2014 from http://www.hawaii.edu/ssri/99USAICRI.pdf

Watershed Protection

American Samoa has several initiatives that focus on watershed management and protection that will help reduce flooding:

- *The Watershed Protection Plan o*f 1998 makes 311 recommendations, with the American Samoa Environmental Protection Agency mandated to "facilitate coordinated resource management efforts" within each of the territory's 41 watersheds. Top priority watersheds not meeting EPA environmental standards are Nuuuli, Tafuna, Leone, Pago Pago, and Fagaalu.
- *The Non-Point Source Pollution Control Plan* was developed in 1995 by the American Samoa Coastal Management Program, in association with the American Samoa Environmental Protection Agency, to meet the requirements contained in Section 6217 of the Coastal Zone Amendments Reauthorization Act of 1990. Non-Point Source [NPS] pollution refers to pollution of waters that comes from a broad area rather than a specific location. It generally results from rainwater running off the land and is amplified by hydrologic modification projects, such as stream hardening and channeling. The NPS Control Plan provides management and design guidelines to agencies and private businesses.
- The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) has conducted a number of activities to improve watershed management and assist in the application of appropriate agricultural methods. NRCS previously conducted a landslide risk assessment for American Samoa. They provide farmers with information and identify sources of relief for drought, storms, and other hazards. NRCS is currently working on watershed issues around Pago Pago Harbor by identifying methods to reduce flooding and prevent future devastating landslides.

Village Coastal Hazard Assessment and Mitigation Program

Most of the actual land use decisions that affect people happen in the traditional villages that still value the Samoan way of life. To help the leaders and people in villages better plan their communities in order to prevent impacts from disasters, the Department of Commerce Coastal Management Program developed the Coastal Hazard Assessment and Management Program (CHAMP) at the village level. The program was voluntary and implemented in 11 villages throughout American Samoa. Village risk assessments were conducted, and mitigation plans and regulations were developed for each village. This was done in conjunction with the Territorial regulatory system and enabled people to take action at the community level to reduce the impacts of disasters with the backing of the Territorial government.

CHAPTER VI

Mitigation Strategy

The hazard mitigation strategy is the culmination of work presented in the planning area profile, risk assessment and capability assessment. It is also the result of multiple meetings and public outreach. The work of the Hazard Mitigation Council was essential in creating the following mitigation goal, objectives and individual mitigation actions.

Multi-Hazard Mitigation Goals and Objectives

The Goal of the 2015 American Samoa Hazard Mitigation Plan, endorsed by the Territorial Hazard Mitigation Council, is to:

Reduce the risk of all natural hazards (identified and unidentified) to the Territory, thus alleviating loss of life and property to insure the well being of the people of American Samoa.

The Objectives of the Plan are to:

1. Promote effective land use planning and regulation, as well as public awareness, in order to reduce damage from natural hazards.

2. Improve infrastructure development standards with special attention to mitigating the increasing flood hazard.

3. Develop and implement hazard mitigation projects aimed at reducing the risk of damage and destruction of existing assets and infrastructure from the full range of natural disasters threatening the Territory.

4. Improve building codes and standards, as well as training programs, in order to reduce disaster damage from strong winds, earthquakes and tsunamis.

5. Develop public information and education programs in order to reduce disaster damage from strong winds, earthquakes and tsunamis.

6. Fund related planning projects to strengthen mitigation standards, research, education, and outreach efforts.

Review of Goal Validity

The Hazard Mitigation Council reviewed the validity of the Goal and the Objectives several times during the planning process. They voted to keep the goal and objectives identical to the one's used in 2011 at their July 11, 2014 meeting. Many of the mitigation actions in the plan address chronic and repetitive flooding, power loss, communication issues and transportation problems each of which hinders productivity and livelihoods in the Territory of American Samoa. These problems are exacerbated during repetitive hurricanes and other disasters.

American Samoa has a long history of hazard mitigation going back to pre-European contact times. Samoan houses or fales were designed and constructed to reduce risk of destruction from strong winds and earthquakes—roof framing was lashed together and thatch sheets were sewn on with coconut sennit. During strong windstorms, roofs could be lifted off of house posts and set on the ground to provide shelters. Structures were flexible and could tolerate earthquakes. House platforms were often elevated which made them less subject to flood damage.

In recent years, building codes and standards, land use regulations, and flood mitigation requirements have been developed to reduce the risk of disaster damage. Building codes aim at reducing the impacts of strong winds and earthquakes. Land use regulations restrict construction and development in areas subject to flooding, tsunami, storm surge, high surf, and landsides. Droughts are mitigated through water conservation programs, agricultural practices, and infrastructure repair. Environmental policies that protect the island ecosystems provide additional protection from storms and flooding. American Samoa is still vulnerable to losses from natural hazards. Mitigation strategies are summarized for each category of natural hazard.

Types of Hazard Mitigation Actions

FEMA characterizes mitigation actions into four categories, Local Plans and Regulations, Structure and Infrastructure Projects, Natural Systems Protection and Education and Awareness Programs. The planning team made the Hazard Mitigation Council aware of these categories as a way to help identify possible mitigation actions. The Planning Team emphasized that Education and Awareness Programs are frequently the least expensive of the four categories but may provide a significant return on investment. The following table, taken from the Local Mitigation Planning Handbook, clearly defines each of these mitigation types and provides examples.

Mitigation Action Category	Description of Category	Examples of Mitigation Actions
1 Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	• Comprehensive plans • Land use ordinances • Building codes and enforcement • Capital improvement programs • Open space preservation • Stormwater management regulations and master plans
2 Structure and Infrastructure Projects	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.	• Acquisitions and elevations of structures in flood prone areas • Utility undergrounding • Structural retrofits. • Floodwalls and retaining walls • Detention and retention structures • Culverts • Safe rooms
3 Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	• Sediment and erosion control • Stream corridor restoration • Forest management • Conservation easements
4 Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	• Radio or television spots • Websites with maps and information • Real estate disclosure • Mailings to residents in hazard-prone areas. • StormReady • Firewise Communities

Table 1 Four Mitigation Action Categories[1]

1 Local Mitigation Planning Handbook. (2013). U.S. Dept. of Homeland Security, FEMA. P. 6-4.

Mitigation Strategies Specific to Each Hazard

Table 2 Hazard Mitigation Strategies below represents general mitigation strategies for the natural hazards known in American Samoa.

Table 2 2011 Mitigation Project List

Hazard	Major Concerns	Mitigation Strategies
Climate Change	Sea-level rise and coastal erosion as a result of more frequent and more severe periods of drought and flooding; According to the United Nations Confronting Climate Change report, the significant impacts of climate change to the pacific islands and small island nations is: "inundation of low-lying coral islands as sea level rises; salinization of aquifers; widespread coral bleaching; more powerful typhoons and possible intensification of ENSC extremes." [2]	• Enforcement of the shoreline setback rules of the Coastal Zone Management Act through better risk maps and improved PRNS permitting and inspections; • Education programs to increase awareness and mitigation of impacts of climate change on island environments; • Local monitoring and hazard mapping program; • Continue to implement and expand actions in Executive Order (EO) 0101A-2007, which focuses on reducing climate change impacts.
Coastal Erosion	Loss of beach area and loss of properties near the beach; Erosion acceleration through human activities; Loss of buildable area – limited buildable, flat area on island of which most resides near the coast (making it important to protect for current and future population).	Many coastal erosion remedies have negative consequences and must be studied in detail to determine if they are the best solution. • Submerged breakwaters (decreases wave velocity); • Detached breakwaters (artificial islands offshore); • Beach nourishment programs; Increased local monitoring and data collection to determine areas in greatest need of protection; • Update of USACE shoreline status data and mapping (last updated in 2004); • Continued installation of wave dampening structures (such as Samoa Stone) where appropriate; • Identification of at-risk structure through on-island studies.

2 Confronting Climate Change (2007). Retrieved September 30, 2014 from carboncounted.com.

Hazard	Major Concerns	Mitigation Strategies
Drought	Droughts have historically been related to El Niño-Southern Oscillation (ENSO) events, but managed fairly effectively. A short period without rain may quickly deplete available potable water and harm agriculture and livestock. A major, long-term drought has potential to cripple cannery industry which could have a ripple effect through the economy.	• ASPA Water Resource Management, Agricultural Extension Programs for Farmers; • Wildfire Suppression; • Implement water conservation programs and water restrictions if a drought is predicted to be of significant duration; • Improve the water supply system and storage system; • Continue to eliminate known leaks and damage to the storage containers and distribution lines; • Implement agriculture programs through extension agents to help farmers; • Provide early warning information and forecasts to improve decision making about planting and harvesting, as well as livestock management prior to the onset of drought; • Develop a drought management plan in conjunction with local industry to help address water usage and ability to secure fresh water as needed; • Increase public awareness and education about the risks from drought and preventative measures individuals and businesses can adopt to conserve water.

Hazard	Major Concerns	Mitigation Strategies
Earthquake	Frequent but minor damage historically. Risk not fully understood. Buildings not designed to withstand strong shaking events.	• Design new buildings and infrastructure to minimize levels of seismic risk as determined from historic levels of earthquake activity; • Adopt and enforce a building code to reflect latest building technologies; • Define areas of landfill via a Territorial-wide survey. Earthquake shaking of structures is amplified on unconsolidated sandy soils and areas of known landfill. To understand and define the areas of highest earthquake hazard, complete a study to define known landfill areas in American Samoa; • Request the U. S. Geological Survey (USGS) to conduct a comprehensive Seismic Hazards Probability Analysis. These analyses have been completed throughout the United States. A similar analysis is required to understand the earthquake threat to American Samoa from both local and distant earthquake sources in the South Pacific. This information is required to adequately determine seismic building code requirements for American Samoa; • Request that USGS develop earthquake shake maps for the Territory to assist with planning; • Determine areas of liquefaction vulnerability; • Further investigate critical facilities at risk to determine if mitigation projects or relocation would be cost effective; • Institute a Seismic Monitoring Program for American Samoa. Currently, American Samoa does not have any seismic recording instruments to record ground motions from earthquakes. Deploy an adequate network of seismic recording instruments on Tutuila and the Manua Islands in order to understand the nature of local earthquake fault activity; • Increase public awareness and education about the risks from earthquakes and tsunamis.
Flood	Most chronic hazard—threat to roads, homes, businesses, and critical facilities.	Improvements in Land Use and Flood Plain Management and Regulation; Relocation of Existing Structures; Elevation of Existing Structures; Structural and Non-structural Flood Mitigation Projects.

Hazard	Major Concerns	Mitigation Strategies
Hazardous Materials	Abandoned toxic chemicals without proper storage affecting the environment and populations. Unknown locations and amounts of illegally imported hazardous materials	• Formalize a partnership with U.S. EPA and A.S. EPA for hazard materials subject matter experts and management assistance; • Recognize the dangers posed by hazardous materials; • Identify places where hazardous materials are likely to be encountered; • Understand when a hazard may exist; • Contact the appropriate persons or agencies to give or receive specific hazardous materials information; • Hold an "ask no questions" drive for people to bring hazardous materials to a location for proper disposal by A.S. EPA; • Identify procedures to minimize personal and community exposure to hazardous materials; • Identify and map facilities with hazard materials; • Consider relocating the tank farm.
High Surf	Debris washes onto roads near the coast and can washout parts of the road.	• Construction of barrier to prevent debris from washing onto roadways; • Construction of structures to ease wave impacts and prevent road washout; • Purchase of additional equipment to aid in swift sand and road removal; • Development of a traffic management plan or protocol when roads are blocked by debris; • Map areas subject to frequent over wash; • Public education to emphasize the danger of high tide for swimmers and fishermen.

Hazard	Major Concerns	Mitigation Strategies
Landslides	Serious threat to villages and roads. Limited land use regulation can result in high-risk development.	Improvements in Land Use Management and Regulation (including new building permit approval); • Relocation of Existing Structures; • Village Mitigation Ordinances; • Mitigation of repetitive rock fall hazards to populations; • Consider the landslide hazard map zones for land use decisions, where applicable; • Enforce building setbacks through Permit Notification and Review System for slopes less than 40% grade and no building on slopes 40% or greater; • Build on the least risky areas of the land parcel or leave a buffer between the building and a steep slope (above or below) the property; • Relocate or condemn structures that are at high risk; • Establish village mitigation ordinances that limit use of high-risk areas while allowing villagers to develop alternative parcels of land; • Leave local vegetation in place and replant areas that are barren from development or fire, for example; • Enact regulations to require non-eroding drainage for new development; • Increase public awareness and education about the risks from landslides including when and where occurrence is most likely; • Further investigate critical facilities at risk to determine if mitigation projects or relocation would be cost effective; • Track and map all occurrences and include relevant information such as location, type, size and cause; • For slopes in agricultural areas, prevent grading and clearance. Cultivate and reforest with deeply rooting plants to prevent erosion on slopes.
Lightning Strike	Infrequent hazard that has caused deaths and injury in the past. Limited occurrence may hinder public knowledge	• Public Awareness and Education to ensure the population understand how to react to the hazard; • Install lightning protection devices on critical communication facilities; • Install surge protection where critical; • Track all occurrences locally to determine if there is a season where risk is elevated and if it causes additional issues (such as fire or electrical damage).

Hazard	Major Concerns	Mitigation Strategies
Soil Hazards (Including expansion, subsidence and sinkholes)	Limited knowledge of this hazard locally (presumed to be low given soil composition); some history of subsidence.	• Further assess risk to these hazard to technical studies; • Enact a local monitoring program to monitor severity.
Tropical Cyclones (including storm surge) and High Wind Storms	Most serious threat in terms of economic impact and widespread damage to buildings and utilities. Buildings not designed to withstand high winds	• Harden existing facilities and utilities. For example, install hurricane clips, provide shutters for windows, and anchor roofs; • Harden or strengthen infrastructure with anchor utility poles, use steel or concrete poles, install underground wires and cables, harden bridges, and identify bypass roads; • Increase public education and awareness, motivating people to prepare their homes and communities against disasters; • Consider land use zoning to minimize development in areas of known potential high waves, storm surge, and coastal erosion; • Consider new flooding design standards in the International Building Code (or ASCE 24) to minimize risk in identified and/or mapped zones of high waves, storm surge, and coastal erosion; • Increase public awareness and education about the risks from high waves, storm surge, and coastal erosion; • Locate development away from the shoreline; • Harden bridges and roads and allow proper drainage; • Relocate facilities and houses out of the designated VE zones or away from eroding shorelines; • Public education to anchor loose outdoor items and properly store hazardous chemicals.

Hazard	Major Concerns	Mitigation Strategies
Tsunami	Infrequent occurrence but potentially life threatening. Serious threats to coastal roads and beaches due to increased wave action and storm surge.	• Continued mapping and study of potential events and impacts locally; • Assess risk to fires following tsunami; construct tsunami shelters; • Land use zoning to minimize development in areas of known potential tsunami inundation. This is one of the best mitigation strategies but it is not very practical in American Samoa. The people of American Samoa own their land; • Shoreline Setbacks; • Floodplain Management Enforcement (and participation in NFIP); • Consider new flooding design standards in the International Building Code (or ASCE 24) to minimize risk in tsunami zones; • Review safe zones to ensure safety from flooding and other hazards; • Update hazard mapping to reflect potential risk areas; • Assess risk to fires following tsunami; • Construct tsunami shelters; • Relocate/harden critical facilities; • Develop scenarios to investigate future risk to tsunamis; • Increase public awareness and education about the risks from tsunami; • Continue to conduct island evacuation drills.
Volcano	Risk from neighboring island eruptions that may bring secondary volcano impacts such as vog, decreased air quality impacts, marine life die off; commerce impacts	• Install air quality monitoring station to monitoring air following a nearby event; • Assess worst case scenarios from nearby eruptions to determine potential extent of secondary impacts; • Update hazard mapping for impact areas; • Public education and awareness of volcanic eruptions and impact on island.
Wildfires	Infrequent occurrence but possible due to drought, earthquake or hazardous material incidents.	Implement Firewise Communities program; • Enact regulations regarding open space and open fires; • Maintenance programs for dead or dry underbrush(fuel); • Identification and mapping of high-risk areas; • Continued Public education on burning and associated risks.

Flood Mitigation Strategies

The American Samoa Flood Mitigation Plan written in 2003 is now defunct. The Hazard Mitigation Council recommends that American Samoa consider promoting participation in the National Flood Insurance Program (NFIP) and consider participation in the Community Rating System (CRS) to decrease cost to individuals participating in the NFIP. See Appendix N for 2003 Flood Mitigation Plan Recommendations

Prior to considering a new list of mitigation projects, the Hazard Mitigation Council and the Planning Team took a good look at the current list of projects. Table 3 2011 Mitigation Project List below includes a 2014 Status column. Several projects received funding and several need to remain on the list for future consideration.

Table 3 2011 Mitigation Project List

Project Priority #	Project Title	Agency	Objectives	2014 Status
1	Satala Power Plant Retaining Wall	ASPA	Retaining wall to protect new power plant renovations and preserve island accessibility.	Funded - Remove
2	Vaipito Stream Revetment	DPR	Mitigate stream runoff and ponds toward residential and commercial settlement.	Keep on list
3	Leone to Amanave Underground (U/G) Lines	ASPA	Underground (u/g) power lines, improve overhead lines to non-church and water well locations.	Keep on list
4	Airport to Malaeimi U/G Lines	ASTCA	Convert aerial cables into u/g conduits and protect against high wind speeds.	Remove
5	Maintenance and Operation Building Enhancement	DPW	Upgrade structure for reliability in emergency response.	Keep on list - #8 on DPW priority list
6	Afono Culvert Improvement	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement.	Keep on list
7	Nuuuli to Mesepa U/G Lines	ASPA	U/g power lines, improve overhead lines to non-church and water well locations.	Keep on list
8	Mesepa to Futiga U/G Lines	ASTCA	Convert aerial cables into u/g conduits and protect against high wind speeds.	Remove
9	Poloa to Fagamalo U/G Lines	ASPA	U/g power lines, improve overhead lines to non-church and water well locations.	Keep on list
10	Pavaiai to Aoloau U/G Lines	ASTCA	U/g power lines, improve overhead lines to non-church and water well locations.	Remove

Project Priority #	Project Title	Agency	Objectives	2014 Status
11	Fagaima Road Flood Mitigation	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement.	Keep on list
12	Ottoville Drainage Flood Mitigation	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement	Keep on list
13	Ottoville to Malaeimi U/G Lines	ASPA	U/g power lines, maintain power supply to wells and booster station.	Funded - Remove
14	Faga'alu Shoreline Wave Action Mitigation	DPR	Protect and preserve shoreline from further erosion.	Remove
15	Evacuation and Fagatogo Wave Action Mitigation	DOC	Prevent riverbank erosion from entering raw water reservoir and overflowing damages into the MFP Building.	Remove
16	Permanent Landslide Repair Route 11	DPW	Slope stabilization to resist movement of loose material. Install/construct drainage improvement.	Keep on list
17	Permanent Landslide Repair Route 005	DPW	Slope stabilization to resist movement of loose material. Install/construct drainage improvement.	Keep on list
18	Pago Pago-West Wave Action Mitigation	DPR	Protect and preserve shoreline from further erosion.	Remove
19	Fatuoaiga Drainage Flood Mitigation	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement.	Keep on list
20	Ili'ili Drainage Flood Mitigation	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement.	Keep on list
21	Utulei Shoreline Wave Action Mitigation	DPR	Protect and preserve shoreline from further erosion.	Keep on list
22	Fagatogo Reservoir Mitigation	ASPA	Prevent riverbank erosion from entering raw water reservoir and overflowing damages into the MFP Building.	Keep on list
23	Utumoa River Flood Mitigation	ASPA	Protect from further erosion from mudslides, landslides and high floodwaters.	Keep on list

Project Priority #	Project Title	Agency	Objectives	2014 Status
24	High Court and District Court Building Relocation	HC	Relocation of the high and district court to safer grounds to avoid future damages caused by flooding or storm surge.	Keep on list – project changed to elevation instead of removal
25	Tago Stream Flood Mitigation	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement.	Keep on list
26	ASG-DOE Facilities Electrical Upgrade	DOE	Due to soil erosion through the years, electrical wires are exposed to natural elements and become a liability to the students as well as a fire hazard. Electrical wires installed in the late 1960's were buried in a trench without proper conduits.	Keep on list – now DPW is responsible
27	Office of Public Information Building	OPI	Building is a hazard within itself and has been condemned by DPW. Structure needs to demolished and reconstructed.	Keep on list – now DPW is responsible. See Appendix D: Mitigation Success Stories and Updates for article "Rehab or condemn – that is the question."
28	Generator Sets	ASTCA	Generators to ensure communication lines remain in tact during disaster.	Keep on list
29	Fagaitua High School Drainage Mitigation	DOE	Protect structure and contents from further flooding that is constantly plaguing the classrooms as well as having to relocate student classrooms.	Funded - Remove
30	Tualauta Drainage	DPW	Line stream channel, check structures for velocity reduction and debris/ sediment reduction.	Funded – Remove, awaiting BCA
31	Futiga U/G Lines	ASTCA	Underground and communication lines, copper and fiber optics.	Funded – Remove work is complete
32	Tafuna Power Plant Walls	ASPA	Harden plant walls; install ventilation ducting to help weatherproof generation equipment.	Funded – Remove, work is pending

Project Priority #	Project Title	Agency	Objectives	2014 Status
33	Rockfall Mitigation	DPW	Scale unstable/loose rocks. Install earthen berms, fences, and signs to warn traffic.	Funded – Remove, work is pending
34	Leone U/G Mitigation	ASTCA	Underground communication lines, copper, and fiber optics.	Funded – Remove work is complete
35	Terminal Roofing	DPA	Remove the airport terminal wooden shakes roofing and replace with ultra-trim deck roofing. Include gutters and improved gutter run off drainage.	Funded – Remove work is complete
36	Malaeimi U/G Mitigation	ASPA	U/g main power lines, related pad mount transformers and fiber boxes, concrete vaults, u/g switches, underground service lines to identified facilities.	Funded – Remove, work is pending
37	Matuu Stream	DPW	Mitigate stream runoff and ponds toward residential and commercial settlement.	Funded – Remove, work is in progress
38	Building Code Upgrade	ASDRO	Upgrade building code of 2006 IBC.	Funded – Remove, work is in progress

2011 Mitigation Projects Funded

The following projects from the 2011 Hazard Mitigation Plan have been funded and removed from the master project list. Some of these projects are completed and some are funded but have not yet begun.

- Satala Power Plant
- Ottoville to Malaeimi Underground Power Lines
- Fagaitua High School Drainage Project
- Tualauta Drainage Project
- Futuga Underground Power Lines
- Tafuna Power Plant
- Rockfall Mitigation
- Leone Underground Power Lines
- Terminal Roofing at Airport
- Malaeimi Underground Power Lines
- Matu'u Stream
- Building Code Upgrade

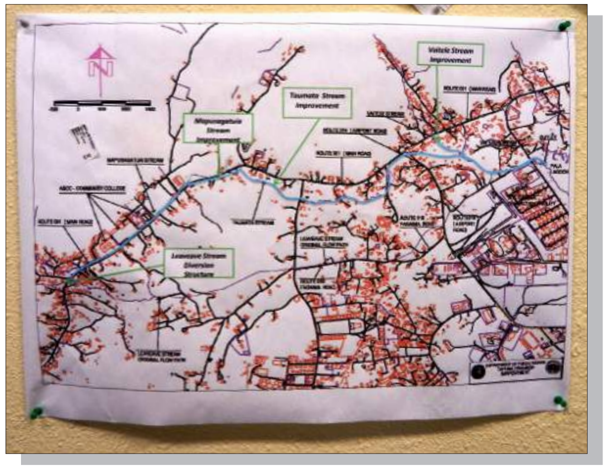


Figure 1 Tafuna Flood Control Project Map

Tualauta Flood Control Project

EPA discussion on Tualauta Flood Control Project: Environmental Impacts

- EPA is 100% behind the Tualauta Flood Control project. EPA has a Boil Water Decree in place for first half of 2014 that continues: The "Entire Island is under Boil Water Decree". Tutuila cannot lift boil water decree until it either filters surface water runoff with a fine filter mesh, according to EPA standards. According to ASPA, 9 of the island's most productive water wells are impacted by the surface runoff in the Tualauta area.
- Additionally, the surface water runoff and sediment disposal into Pala Lagoon, downstream of the Taulauta area, creates a zone of toxic deterioration of lagoon waters with and environmentally detrimental impact.
- EPA supports a storm water management plan, for the Tutuila.
- EPA stated that 80% of water in the Tafuna Acquifer is impacted by surface water runoff due to presence of E. coli bacteria from surface runoff.
- EPA states that the existence of surface water has a very real environmental and economic impact causing secondary health care impacts, mosquitoes and currently an amebiasis outbreak. Amebiasis is a parasitic infection of the intestines caused by entamoeba histolytica. It is common in tropical areas of the world where sanitation is poor, allowing food and water supplies to be exposed to fecal contamination. There is also an incidence of E. coli where surface waters intersect piggeries, which introduce leptospirosis. A direct impact is the loss of school days due to sicknesses. Escherichia coli (E. coli) bacteria normally live in the intestines of healthy people and animals. Most varieties of E. coli are harmless or cause relatively brief diarrhea. But a few particularly nasty strains, such as E. coli O157:H7, can cause severe abdominal cramps, bloody diarrhea and vomiting.[3]

3 Diseases and Conditions E. coli. (2014). Mayo Clinic. Retrieved September 30, 2014 from http://www.mayoclinic.org/diseases-conditions/e-coli/basics/definition/con-20032105

- EPA reports that the USDA funds about 100 mitigated piggeries per year.
- Additional environmental risks include burying the reef in sediment from unmitigated and unretained runoff in the Tafuna Plain area.
- Persons attempt to pick up trash in Tualauta area to prevent it from entering into the Pala Lagoon embayment, which is anecdotally described as "a big brewing cesspool."
- EPA also recognizes the recreational values of Pala Lagoon are reduced by unmitigated surface runoff, resulting in people who swim getting sick.
- EPA also noted the economic value of being able to swim in the Lagoon waters. Without recreational swimming in American Samoa's main lagoon, their quality of life is lowered.

ASPA Tualauta Flood Control Comments and Discussion

- ASPA has commented and agrees that the Tualauta Flood Control Issue is a major issue for the ground water and water resources of the island. The water wells at Fagaima are flooded often by surface water runoff and contaminate the water wells through a process known as Groundwater Under the Direct Influence of surface water (GUDI). Currently, as of July 2014, the entire island is under Boil Water Notice by EPA and will remain so until the problem is eliminated through surface water and flood control in the vicinity of the water wells.
- At present, in order for ASPA to mitigate the Boil Water Decree, ASPA is required to either employ treatment and filtration of all surface runoff and/or drill and develop new wells to offset the tainted wells. Bottom line, the surface water treatment is very costly and the EPA requires treatment of surface water in order to lift the Boil Water Notice.
- ASPA has stated that the wells in the Tualauta area affected by surface runoff are some of the best producing wells, producing over 2000 gallons per minute. ASPA seeks to keep these wells by undertaking the Tualauta Flood Control project aimed to improve the drainage, mitigate the surface runoff, which in turn, protects the water wells.
- ASPA estimates that the cost of well replacement is $100,000 per well to drill only. Transmission lines to water tank are estimated to cost $2/gallon of water. Thus, the cost to replace the wells is $200,000 minimum for a water well. With nine (9) wells impacted by surface water, the additional cost ASPA may be facing is $1.8 million to mitigate the surface water contamination problem. The nine replacement wells will have to be drilled in another area, less prone to surface water runoff and most likely these replacement wells will be less productive than the existing impacted wells. In addition, water transmission costs will rise accordingly.

Mitigation Actions

This section describes specific mitigation projects prioritized by the Hazard Mitigation Council, as well as the project selection process and criteria. As discussed in Chapter 3: The Planning Process and Outreach Strategy, the Hazard Mitigation Council developed an applicable mitigation project identification and selection process. The purpose of the mitigation projects is to protect life and safety and insure the well being of the people of American Samoa through a rapid recovery from future disasters.

The project identification process has evolved since 2003 in American Samoa. The Hazard Mitigation Council is well aware of FEMA's Pre-Disaster Mitigation Grant Program (PDM) requirements and the Hazard Mitigation Grant Program criteria. The Hazard Mitigation Council has used the guidance which states that the national priority is to address repetitive flood loss properties. It states that the following are eligible projects:

- Acquisition or relocation of hazard-prone property for conversion to open space in perpetuity.
- Structural and non-structural retrofitting of existing buildings and facilities, including designs and

feasibility studies when included as part of the construction project, for wildfire, seismic, wind or flood hazards (e.g., elevation, flood-proofing, storm shutters, and hurricane clips).

- Minor structural hazard control or protection projects that may include vegetation management, storm water management (e.g., culverts, floodgates, retention basins), or shoreline/landslide stabilization.
- Localized flood control projects, such as certain ring levees and floodwall systems that are designed specifically to protect critical facilities and that do not constitute a section of a larger flood control system.

Table 4 shows the fifteen projects from the 2011 Mitigation Plan that are still relevant and have been carried forward to this plan.

Table 4 Hazard Mitigation Projects from the 2011 Plan

#	Agency	Title	Est. Proj. Cost	POC
1	ASPA	Nuuuli to Mesepa U/G Power Lines	$1,377,647.00	Will Spitzenburg
2	ASPA	Poloa to Fagamalo U/G Power Lines	$970,523.75	Will Spitzenburg
3	ASPA	Fagatogo Reservoir Mitigation	$300,000.00	Will Spitzenburg
4	ASPA	Utumoa River Flood Mitigation	$257,500.00	Will Spitzenburg
5	DPR	Vaipito Stream Revetment	$448,000.00	Leilani Ripley
6	DPW	Afono Culvert Improvement	$250,000.00	Faleosina Voigt
7	DPW	Fagaima Road Flood Mitigation	$4,500,000.00	Faleosina Voigt
8	DPW	Ottoville Drainage Flood Mitigation	$683,000.00	Faleosina Voigt
9	DPW	Permanent Landslide Repair Route 11 (Masausi, Sailele)	$350,000.00	Faleosina Voigt
10	DPW	Permanent Landslide Repair Route 005 (Fagasa)	$520,000.00	Faleosina Voigt
11	DPW	Fatuaiga Drainage Flood Mitigation		Faleosina Voigt
12	DPW	Ili'ili Drainage Flood Mitigation	$1,310,000.00	Faleosina Voigt
13	DPW	Vaitele Stream Flood Mitigation (name correction passed by Council)	$500,000.00	Faleosina Voigt
14	HC	High Court and District Court Building Elevation (Council approved change to elevation from relocation.)	$2,750,000.00	Sandy Ilaoa
15	OPI	Office of Public Information Building	$4,500,000.00	Jeff Alwin

The following list of 26 mitigation projects was proposed to the 2015 Hazard Mitigation Council. These projects are new to the Hazard Mitigation Council, they were considered along with projects remaining from the 2011 project list. There are a total of 36 projects for this plan. Each project has a Project Worksheet completed by the submitting department. The Project Worksheets are included below in the order they are listed in Table 5 New Hazard Mitigation Projects Proposed in 2014. PowerPoint presentations given at the July 11, 2014 Hazard Mitigation Council meeting, if available, are included in the Appendix E.

The Hazard Mitigation Council put out a Call for Projects several times via press release to the Samoa News and at the Town Hall Meeting on April 25, 2014. The announcement ran in the Samoa News from May 7-9, 2014, and May 12-14, 2014. Copies of the announcement are in Appendix C: Planning Process Supporting Materials.

Table 5 New Hazard Mitigation Projects Proposed in 2014

#	Agency	Title	Est. Proj. Cost	POC
1	ASPA	Faga'alu Booster Station	$200,000.00	Will Spitzenburg
2	ASPA	Pago Water Booster Station Mitigation	$200,000.00	Will Spitzenburg
3	ASPA	Weather Proof Sewage Lift Stations	$300,000.00	Steve Branz
4	ASPA	Tafuna Wastewater Treatment Plant	$450,000.00	Steve Branz
5	ASPA	Water Wells Mitigation	$1,000,000.00	Will Spitzenburg
6	ASPA	Water Tanks Mitigation	$10,000,000.00	Will Spitzenburg
7	ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines	$916,546.40	James Taylor
8	ASTCA	Amouli to Aoa U/G Communications Lines	$1,208,042.00	James Taylor
9	ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines	$2,149,563.68	James Taylor
10	ASTCA	Leone to Poloa U/G Communications Lines[4]	$3,270,350.60	James Taylor
11	ASTCA	Aunu'u Tower Replacement Parts	$44,127.00	James Taylor
12	ASTCA	Lauli'I/Breaker's Point Tower Replacement Parts	$44,127.00	James Taylor
13	ASTCA	Manu'a Islands U/G Comm. Lines	$6,842,532.00	James Taylor
14	DHS	Wind Shutters EOC Project	$43,496.00	Alefa Afalava
15	DOC	Mapping Project	$50,000.00	Sandra Lutu
16	DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	$2,400,000.00	Faleosina Voigt
17	DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a	$300,000.00	Faleosina Voigt
18	DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)	$4,000,000.00	Faleosina Voigt
19	DPW	#4 Leone Village Road	$2,200,000.00	Faleosina Voigt
20	DPW	#5 Happy Valley Road Drainage	$220,000.00	Faleosina Voigt
21	DPW	#6 Pava'ia'I Elementary	$310,000.00	Don McMullin
22	DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	$85,000.00	Faleosina Voigt
23	DPW	#8 Upgrading of DPW-M&O Building	$10,000,000.00	Faleosina Voigt
24	EPA	Landslide Early Warning System - Faga'alu Pilot Project	$278,000.00	Timothy Bodell
25	Port	Fuel Farm Relocation	$5,500,000.00	Chris Soti
26	Port	Runway Shoreline Protection	$5,000,000.00	Chris Soti

4 Sagapolutele, Fili. (2014). "BLAST project passes federal audit "with flying colors" according to CEO". Samoa News: 06-30-2014. Retrieved September 30, 2014 from http://www.samoanews.com/content/en/blast-project-passes-federal-audit-flying-colors-according-ceo

Ameriacn Samoa Power Authority

Water Wells Mitigation	
Project Description:	Install reinforcements for water wells and install weatherproof enclosures to withstand strong winds and the elements.
Project Objectives:	To weatherize/reinforce over 50 water well structures to withstand strong winds during hurricanes and earth movement during earthquake for the continued ability of ASPA to provide adequate water supply to its customers and community of American Samoa.
Estimated Cost:	$1,000,000.00
Project Duration:	5 years

Water Tanks Mitigation	
Project Description:	Install reinforcements for water tanks and install berms and retaining walls so that the water tanks can continue to operate after an earthquake or hurricane.
Project Objectives:	To weatherize/reinforce water tank structures to withstand strong winds during hurricanes and earth movement during earthquakes for the continued ability of ASPA to provide adequate water supply and pressure to the canneries and eastern village customers.
Estimated Cost:	$1,000,000.00
Project Duration:	5 years

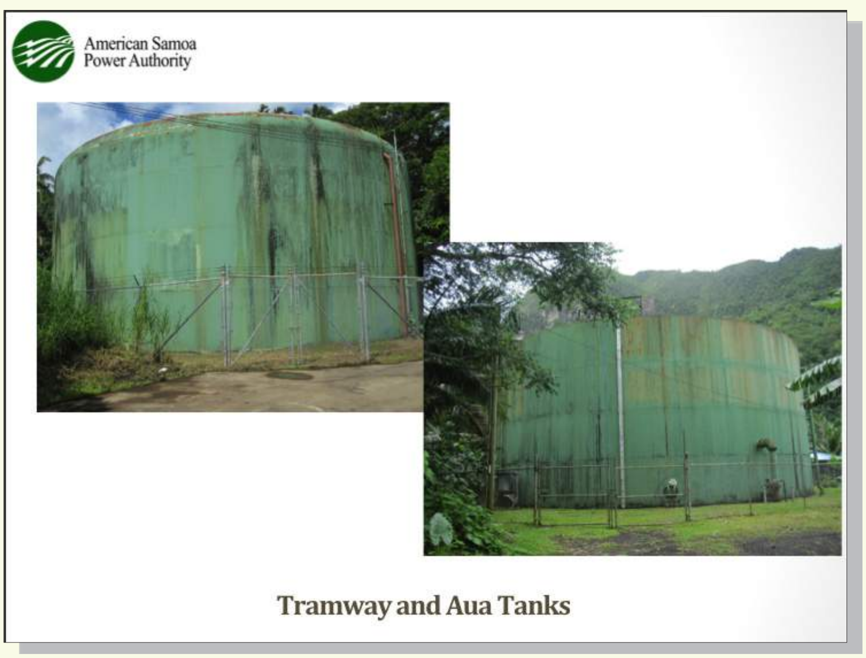


Figure 2 Slide from ASPA PowerPoint Presentation

Fagatogo Reservoir Mitigation	
Project Description:	Slope stabilization and the construction of a 10’ x 120’ reinforced concrete retaining wall on the periphery of the Fagatogo reservoir. Construction of a reinforced concrete retaining wall along the bank of the stream in order to prevent erosion due to high stream flow and stop the river from overflowing into the Microfiltration building and damaging the equipment.
Project Objectives:	• Prevent rocks, soil and other debris from being deposited into the raw water reservoir. • Protect river bank from eroding due to high stream flow and stop the river from overflowing into the MFP building and damaging equipment.
Estimated Cost:	$300,000.00
Project Duration:	18 months

Tafuna Wastewater Treatment Plant	
Project Description:	Install reinforcements for critical columns and structures and install berms and retaining walls so that the wastewater treatment plant can continue to operate after a tsunami.
Project Objectives:	To weatherize/reinforce wastewater treatment plant structures to withstand tsunami for the continued ability of ASPA to treat wastewater
Estimated Cost:	$450,000.00
Project Duration:	24 months

Faga’alu Booster Station	
Project Description:	Install reinforcements for critical columns and structures and install berms and retaining walls so that the booster station can continue to operate after a tsunami.
Project Objectives:	To weatherize/reinforce booster station structures to withstand tsunami for continued ability of ASPA to provide adequate water supply and pressure to the canneries and eastern village customers.
Estimated Cost:	$200,000.00
Project Duration:	24 months

Pago Water Booster Station Mitigation	
Project Description:	Install reinforcements for critical columns and structures and install berms and retaining walls so that the booster station can continue to operate after a tsunami.
Project Objectives:	To weatherize/reinforce booster station structures to withstand tsunami for continued ability of ASPA to provide adequate water supply and pressure to the canneries.
Estimated Cost:	$200,000.00
Project Duration:	24 months

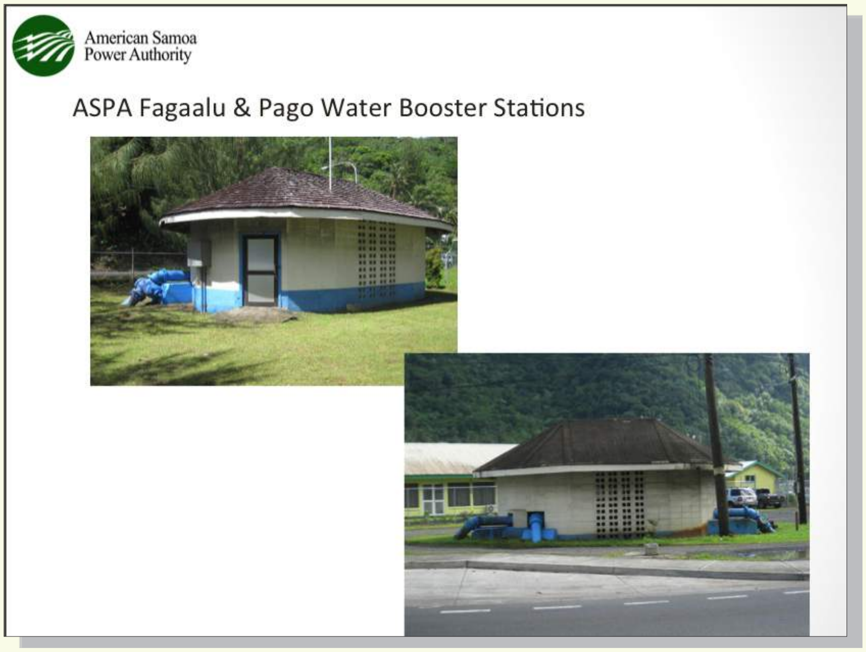


Figure 3 Slide from ASPA PowerPoint Presentation to Hazard Mitigation Council

Utumoa River Flood Mitigation	
Project Description:	Design and construction of rock wall to stabilize riverbank and reinforced concrete spring intake structure from boulders and mud due to landslide.
Project Objectives:	• Protect reinforced concrete spring intake structure from bounders and mud due to landslide and high floodwaters. • Prevent damage to the raw water screen house from erosion of the riverbank during high flow.
Estimated Cost:	$257,500.00
Project Duration:	4 months

Weather Proof Sewage Lift Stations	
Project Description:	Install and raise computerized controls above ground level and install in weatherproof panels rated to weather tsunami.
Project Objectives:	To weatherize computer controls to preclude critical electrical component loss during tsunami.
Estimated Cost:	$300,000.00
Project Duration:	24 months

Nuuuli to Masepa U/G Lines	
Project Description:	Total length of underground is about 1.4 miles. Undergrounding the main primary lines, terminating wires in padmount fiber boxes , padmount transformers and 13 concrete vaults. Padmount switches will also be installed because Feeder 6 can also feed power to the Tafuna well field by closing a parallel switch in Malaeimi. This will all be converted to underground switches. Four 2.5" conduits will be installed for underground wire placement and two spare 2" conduits will be included for future use to install a fiber optic cable. Three Phase and Single Phase Risers will be built to take over existing loads in area. Project will combine with ASTCA telephone cables and crew. ASPA will share trenches with ASTCA for installation of telephone lines underground as well.
Project Objectives:	• Install underground power lines to reduce impact of disasters, namely power restoration. • Maintain reliability of availability of electrical sources to and within ASG and Public Facilities, ASPA Water Wells, ASPA Booster Stations. • Shelters will be more reliable with power availability. • Mitigate damages by Electric poles during high wind speeds, flooding and other types of disasters. • Harden ASPA Power System and increase ASPA's reliability to the community. • Restoration of power to ASPA Wells, Boosters, Private Businesses and Schools will be quick after a major cyclone because many lines are now underground and the amount of overhead lines are limited.
Estimated Cost:	$ 1,377,647.13
Project Duration:	1 year

Poloa To Fagamalu U/G Lines	
Project Description:	Project length 1.6 miles from Poloa to Fagali'i, 1.8 miles from Fagali'i to Moloata, and 1.2 miles from Maloata to Fagamalo. Project involves undergrounding the main primary lines, terminating wires in pad mount fiber boxes, and underground services to churches and water wells. The rest of the customers will be fed off from overhead service lines connected to underground primary lines. Install 3 x 2-1/2 inch conduits for electrical cables; install a single phase to feed present, provide 2 extra conduits on reserve in case we need to convert to phase three in future. ASPA will share trenches with ASTCA for the installation of underground telephone lines.
Project Objectives:	• Install underground power lines to minimize time for power restoration • Maintain reliability of availability of electrical sources to and within ASG & Public Facilities when disaster strikes. • Some of the listed facilities also serve as shelters and are relied on for availability of power to accommodate immediate needs. • Improve location of existing overhead lines set far away from equipment access.
Estimated Cost:	$970,523.75
Project Duration:	19 months

American Samoa Telecommunications Authority

Leone to Poloa U/G Communication Lines [5]	
Project Description:	This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Leone DCO to Poloa. The length of the road project is 29,040 feet. The scope of work includes excavation of a 2' x 3' x 29,040' deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4" dia PVC conduits (schedule 40) side by side, place plastic spacers every 4' apart, imbedded in 3,000 psi concrete, backfill, and compact surface to existing top soil. Construct and install underground vaults every 500' apart of conduits.
Project Objectives:	The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disaster.
Estimated Cost:	$3,270,350.60
Project Duration:	1 year

Afono Pass to Blue Sky Tower U/G Communication Lines	
Project Description:	This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Afono pass to Blue Sky tower. The length of the road project is 7,920 feet. The scope of work includes excavation of a 2' x 3' x 7,920' deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4" dia PVC conduits (schedule 40) side by side, place plastic spacers every 4' apart, imbedded in 3,000 psi concrete, backfill, and compact surface to existing top soil. Construct and install underground vaults every 500' apart of conduits.
Project Objectives:	The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disaster.
Estimated Cost:	$916,546.40
Project Duration:	1 year

5 Sagapolutele, Fili. (2014). "BLAST project passes federal audit "with flying colors" according to CEO". Samoa News: 06-30-2014. Retrieved September 30, 2014 from http://www.samoanews.com/content/en/blast-project-passes-federal-audit-flying-colors-according-ceo

Amouli to Aoa U/G Communication Lines	
Project Description:	This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Leone DCO to Poloa. The length of the road project is 10,560' feet. The scope of work includes excavation of a 2' x 3' x 10,560' deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4" dia PVC conduits (schedule 40) side by side, place plastic spacers every 4' apart, imbedded in 3,000 psi concrete, backfill, and compact surface to existing top soil. Construct and install underground vaults every 500' apart of conduits.
Project Objectives:	The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disaster.
Estimated Cost:	$1,208,042.00
Project Duration:	1 year

Fagaitua, Masefau, Masausi, Sailele U/G Communication Lines	
Project Description:	This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Leone DCO to Poloa. The length of the road project is 19,008 feet. The scope of work includes excavation of a 2' x 3' x 19,008' deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4" dia PVC conduits (schedule 40) side by side, place plastic spacers every 4' apart, imbedded in 3,000 psi concrete, backfill, and compact surface to existing top soil. Construct and install underground vaults every 500' apart of conduits.
Project Objectives:	The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disaster.
Estimated Cost:	$2,149563.68
Project Duration:	1 year

Lauli'I/Breaker's Point Tower Replacement Parts	
Project Description:	This is an ASTCA project to replace parts of the Breakers Point tower due to deteriorating parts from weather conditions.
Project Objectives:	The tower was installed in 1984, and due to environmental deterioration (weather condition), the tower needs replacement parts.
Estimated Cost:	$44,127.00
Project Duration:	1 year

Aunu'u Tower Replacement Parts	
Project Description:	This is an ASTCA project to replace parts of the Aunu'u tower due to deteriorating parts from weather conditions.
Project Objectives:	The tower was installed in 1984, and due to environmental deterioration (weather condition), the tower needs replacement parts.
Estimated Cost:	$44,127.00
Project Duration:	1 year

Manu'a Islands U/G Communication Lines	
Project Description:	This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is for Ta'u and Ofu Manu'a. The length of road is 52,800 feet. The scope of work includes excavation of a 2' x 3' x 52,800' deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4" dia PVC conduits (schedule 40) side by side, place plastic spacers every 4' apart, imbedded in 3,000 psi concrete, backfill, and compact surface to existing top soil. Construct and install underground vaults every 500' apart of conduits.
Project Objectives:	To minimize and maintain uninterrupted communication services at various key facilities in Manu'a: o High Schools o Elementary Schools o Medical Dispensaries o ASG Buildings o ASTCA Digital Exchanges o Private sectors o All residents o Disaster Shelters
Estimated Cost:	$6,842,532.00
Project Duration:	1 year

Wind Shutters EOC Project	
Project Description:	The proposed shutter project will consist of a shutter system that can be manually operated from left to right or meet in the middle. These shutters do not have electronic motors and are dependent on staff to operate.  There is only one American Samoa government recognized EOC and this is housed in this enclosed building with an Importance Factor of 1.5 and Saffir-Simpson Hurricane wind scale of Category 3 (111-129 mph). Its occupancy category is 4. The building structure was built with intention that it can withstand wind force up to 120 mph but its physical location with an open parking lot leave all glass windows and doors unprotected from positive or negative wind pressures of wind speed up to 120 mph. All windows and doors on both ground and top level need protection from wind borne debris when threatened with strong enough winds that can be damaging. This shutter project will decrease the damages to the buildings from strong winds within Category 3 wind speeds and partial damages to winds in higher categories 4 and 5.

Wind Shutters EOC Project	
Project Objectives:	• The shutter system is a proposed mitigation project to safeguard the ASDHS-TEMCO-EOC building. This is an office building belonging to the American Samoa government ASDHS which serves all 55,000 people of this Territory especially during emergencies. This 2010 Census population for the Territory was disputed by former statistician as should've been higher. For the purposes of this application, we will use the number officially recorded by the 2010 Census count. • This building is the new location for the main ASHDS office building centralizing all of its formerly separate office locations. ASDHS-TEMCO is the designated emergency management office that coordinates response efforts in the untimely event of a disaster whether manmade or natural. The building was formerly used as the Joint Field Office (JFO) by FEMA during the 2009 Samoa Earthquake and Tsunami recovery efforts in 2010. The building is also in compliance with the American Disability Act (ADA) with a lift on the side of the building for the physically disabled to walk up to the second floor. • Because this is a huge two story building with 12,800 sq feet for both top and ground level, it can serve as a shelter for employees who live farther away from the EOC. In addition to ASDHS employees, there are also first response liaison members and representatives from the Governor's office that can be on site to offer assistance during EOC activations and use it as a shelter in the meantime. But, currently, the building lacks a shutter system and this does not qualify it or allow it to meet the American Red Cross Standards for hurricane evacuation shelters (ARC 4496).
Estimated Cost:	$43,496.00
Project Duration:	12 months

Mapping Project	
Project Description:	ASCMP is proposing the development of hazard data, online tools and analysis to support the territories Hazard Mitigation Plan and provide a rapid analysis tool for decision makers. The project will achieve this goal through the following three components: Phase (1) Data Assessment and Development ***American Samoa Building Footprint:*** ASCMP will produce a new building footprint GIS layer from a 2012 Aerial Imagery and Light Detection and Ranging (LiDAR). The update of the territories building footprint layer is crucial for hazard analyses in the territory. The building footprint layer currently in use was derived from 2005 imagery and does not include infrastructure changes since 2005. The project will also leverage off island data sources including natural hazard datasets developed by the University of Hawaii and NOAA Coastal Services Center (CSC). These include tsunami impact modeling and sea level rise/ inundation datasets. ASCMP is currently in possession of the sea level rise data and will be seeking permission to include the tsunami data developed at the University of Hawaii. ***Participatory Mapping:*** ASCMP staff has worked closely with NOAA programs to facilitate participatory mapping workshops in the Fagaloa region of Tutuila. These workshops have focused on the collection of coastal and marine data for watershed mapping and analysis. Funding for this project will support future participatory mapping efforts to collect additional data in support of coastal hazard identification. These efforts greatly supplement current hazard data and engage local communities in the data development process. Most importantly, these workshops raise aware of natural hazards and help efforts to foster resilient communities. ***Hazards Geodatabase:*** ASCMP GIS is in possession of a variety of natural hazard GIS layers including landslide, flooding, tsunami and volcanism data. The metadata and sources of these datasets will be revisited and examined to determine the data integrity and applicability to hazard mitigation planning in the territory. A needs assessment of the data will be produce to assist in the planning and development of future datasets. All developed and reviewed GIS layers will be compiled into a centralized geodatabase hosted on ASCMP servers. Final GIS layers will include FGDC metadata and will available in a geodatabase format as outlined in the ASCMP annual data management plan.

Mapping Project	
Project Description:	(2) ArcGIS Online Mapping Hazard Mitigation and Coastal Resiliency Viewer ASCMP will launch and host an online mapping service through ArcGIS Viewer for Flex. The viewer will provide a smart, intuitive framework for looking at and interacting with hazard mitigation data online. The viewer will feature hazard data compiled in Phase one of the project, most notably the 2012 Building Footprint layer. It will include tools, widgets and features to view analyze and disseminate data pertaining to natural hazards relation to infrastructure. The tool would follow similar workflows as developed for the Land Use Web Portal system currently in place on ASDOC servers (http://portal.gis.doc.as/Landuse/) and will include a report generation tool with similar functionality. The report generation tool will prompt users to choose an area of interest such as a single building footprint, a highlighted area of interest (multiple building footprints), and or a selection based up an attribute of a boundary layer e.g., a village or district. Upon selecting the area of interest, the user can then generate a report detailing the proximity of the area of interest to different hazards. The American Samoa Hazard Mitigation and Coastal Resiliency Viewer will be hosted on ASDOC servers and continually updated as data becomes available. The viewer will be hosted on the ASDOCs and ASCMP web portal homepages. (3) Education, Outreach and Training ASCMP will conduct an internal (ASDOC) and external (ASG) training workshops to provide training on use of the American Samoa Hazard Mitigation and Coastal Resiliency Viewer. Training will help promote use and facilitate the use of the tools and data throughout the territory. Additionally, ASCMP distribute the geodatabase throughout the territory through the GIS users' group meetings.
Project Objectives:	• American Samoa Hazards Geodatabase • American Samoa Buildings Footprint layer • American Samoa Hazard Mitigation and Resiliency Online Viewer • Training Sessions for ASDOC and ASG
Estimated Cost:	$50,000.00
Project Duration:	2 years

Department of Parks and Recreation

Vaipito Stream Revetment	
Project Description:	During the 9/29 Tsunami, waves washed out the improved park land causing damages to the shoreline of Fagaalu Park. Community concern after the 9/29 Tsunami was brought forward in regards to Pago Pago village where Vaipito stream is not protected from erosion, flooding, storm surge waves, and tsunami. The stream area to be protected in this project is from the existing rock revetment at the mouth of Vaipito stream to behind Pago Plaza. This project proposal is based on the model for and cost per linear foot at 7ft height and 5ft width. The scope of work consists of the repair work and stabilization of stream embankment, identified under the jurisdiction of the Department of Park and Recreation. Project revetment includes 1280 LF.
Project Objectives:	Complete revetment at Vaipito Stream from 100ft in at mouth to behind Pago Plaza.
Estimated Cost:	$448,000
Project Duration:	180 days

Department of Public Works

#2 Landslide: Rte.6 (Afono, Masefau), Rte. 1 (Matuu, Gataivai)	
Project Description:	The proposed project is a permanent stabilization of higher grounds adjacent to the road by removing the loose rocks and soil that are potentially dangerous to the approaching traffic and reduce the severity of damages in some cases that cannot be avoided. Securing these areas to the slope so it will prevent sliding during heavy-longer rains and sheltering the improvement with earthen berms and fences/nets and installed signs to warn approaching traffic on potential sliding sites.
Project Objectives:	To minimize the danger of approaching traffic due to landslide that occurs during heavy-longer rains on the following sites; o Afono Pass - Afono Village, Route 006 o Masefau Landslide - Masefau Village, Route 006 o Fatu ma Futi - Matu'u Village, Route 001 o Blunt's Point - Gatavai Village, Route 001
Estimated Cost:	$4,000,000.00
Project Duration:	10 months

Landslide Mitigation Project

Ottoville Drainage Flood Mitigation	
Project Description:	Ottoville Drainage Flood Mitigation
Project Objectives:	• Mitigate spread of stream runoff as well as natural runoff. • Minimize risk of damage to government, public and business facilities/assets in the area. • ASTCA and ASPA will collaborate for ease of construction and minimizing costs.
Estimated Cost:	$683,000.00
Project Duration:	5 months

Fagaima Road Flood Mitigation	
Project Description:	To mitigate the spread of stream runoff as well as the natural runoff of the land within the watershed of the village by means of improving and defining a natural waterway that runs from the village of Fagaima. To minimize the risk of damage to government facilities/assets in the area within the Tafuna Flood Plain. Currently, Fagaima undergoes heavy flooding during periods of heavy rain due to blockage or the nonexistence of an outlet. This project will minimize this flooding problem currently experienced within the district, as well as be a means for the protection and safety for residents within the area and more so for the general

Fagaima Road Flood Mitigation	
Project Objectives:	• Mitigate spread of stream runoff as well as natural runoff. • Minimize risk of damage to government, public and business facilities/assets in the area
Estimated Cost:	$4,500,000.00
Project Duration:	2 years

Fatuoaiga Drainage Flood Mitigation	
Project Description:	Fatuoaiga Drainage Flood Mitigation
Project Objectives:	• Mitigate spread of stream runoff as well as natural runoff. • Minimize risk of damage to government, public and business facilities/assets in the area. • ASTCA and ASPA will collaborate for ease of construction and minimizing costs.
Estimated Cost:	$300,000.00
Project Duration:	2 years

#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	
Project Description:	Flash flooding storm water run-off on the campus grounds of ten school locations has contributed to the deterioration of the electrical power distribution systems underground line feeds, affecting the electrical power needs of all facilities tied into the system. The ASDOE have a number of school sites which require a long overdue upgrading of their existing electrical distribution systems. Most specifically are the schools still utilizing the older "Fale" type classroom buildings, which were built in the early 1960's some 50 plus years ago. These schools electrical distribution are still being served from a main panel and power entry at one point (Fale/Kitchen bldg) and distributes to the various other "Fale" and other classroom buildings on site with underground service feed wires running from the main to each individual building. These underground wire feeds are not contained within PVC conduits. They are set directly into the ground. Over the years, most notably during the storm weather seasons erosion of the campus grounds have resulted in exposure of the insulated wire feeds, and signs of deteriorating insulation and exposed wire are common. The load demands of many buildings are exceeding the load capacity of the wire as well.

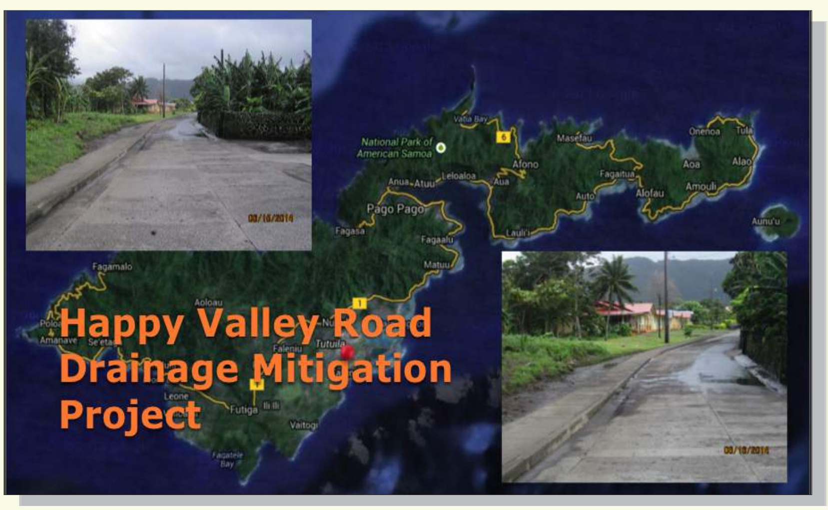
#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	
	We have over the past 10 years been experiencing problems with these schools and have discovered the need to upgrade the distribution system with new properly rated wire in PVC conduit and installed to meet all present day NEIS and IBC Electrical standards, and to ensure the safety of our student and general public.
Project Objectives:	The assessment and Design of a properly approved (NEIS,IBC Electrical Standards) Electrical system for each individual school.
Estimated Cost:	$85,000.00
Project Duration:	12 months for first phase

ASDOE Schools Electrical Common Problems of 10 Schools

#6 Pava'ia'I Elementary	
Project Description:	Propose to upgrade the entire lower campus affected area with a engineered finish ground sloped run-off to redirect the storm water run-off to the designed lanes and upgraded soak pits strategically located to capture the immediate run-off volume, with the sloping graded areas between (3) of the (4) buildings paved via Pervious concrete which should allow for some additional drainage/seepage of the water run-off as it passes over, thereby decreasing the volume of run-off to the soak pits, and spill-over to the outside areas off the campus grounds. Construction of a properly designed Concrete Driveway entry apron at the entrance/exit Gateway with redesigned soak pits at both sides of the driveway to capture run-off water from the high area run. Installation of Rain Gutters on the (4) 2-Story Classroom Buildings to capture run-off from the building roofs and control the fall from the roof to the ground area, to prevent the erosion of the fill material from the base of the buildings and building foundation.

#6 Pava'ia'I Elementary	
Project Objectives:	Alleviate the overflow of accumulating run-off water originating from the fall and run-off of water from the Pavaiai Elementary Upper Campus grounds and (4) 2-Story Classroom Bldg. Structures at the lower Campus, causing major ground erosion to the affected lower campus grounds, washing away the finish top cinder grade and washing out the entire area between the buildings, and running out side of the campus ground to the village back road, Flooding the area with cinder debris and floodwaters washing over from the concrete roadway and pooling at various areas affecting the more immediately located residential structures around this side of the school.
Estimated Cost:	$310,000.00
Project Duration:	12 months

#5 Happy Valley Road Drainage	
Project Description:	The proposed project is to construct approximately 100 ft. L x 15 ft. W x 8 ft. D runoff trap structure at the low point within the area. The proposed runoff trap would mitigate the runoff from adjacent properties to ponds for days on the low point of the road. The proposed structure will also enhance infiltration and recharge to ground.
Project Objectives:	The proposed project objective is to protect property and health of the residents living within the area especially to schoolchildren. The proposed project is to mitigate the direct effect to the health of the school children walking to and from school because the area is natural low and runoff ponds for days during heavy rainfall. The proposed project is to avoid runoff from adjacent properties to sits on this low area of the road and prevent the area to be a mosquito breeding ground with foul smell due to decaying insects and small animals.
Estimated Cost:	$220,000.00
Project Duration:	8 months



Ili'ili Drainage Flood Mitigation	
Project Description:	To mitigate the spread of stream runoff as well as the natural runoff of the land within the watershed of the village by means of improving and defining a natural waterway that runs from the village of Ili'ili. To minimize the risk of damage to government facilities/assets in the area within the Tafuna Flood Plain. Currently, Ili'ili undergoes heavy flooding during periods of heavy rain due to blockage or the nonexistence of an outlet. This project will minimize this flooding problem currently experienced within the district, as well as be a means for the protection and safety for residents within the area and more so for the general
Project Objectives:	• Mitigate spread of stream runoff as well as natural runoff. • Minimize risk of damage to government, public and business facilities/assets in the area
Estimated Cost:	$1,310,000.00
Project Duration:	2 years

#1 Rockfall: Rte. 009 (utumea, Poloa, Amanave)	
Project Description:	The proposed project is a permanent stabilization of higher ground adjacent to the road by removing the loose rocks that are potentially dangerous to the approaching traffic and reduce the severity of damages in some cases that cannot be avoided. Securing these areas to the slope so it will prevent rocks falling to the road during heavy-longer rains and saturates the higher ground. The proposed improvement also includes sheltering the area with earthen berms and fences/nets and installed signs to warn approaching traffic on potential sliding sites.
Project Objectives:	To minimize the danger of approaching traffic due to rockfall that occurs during heavy-longer rains on the following sites; o Utumea Village - Route 009 (between Seetaga and Agugulu Villages) o Boundary of Poloa and Amanave Villages - Route 09
Estimated Cost:	$2,400,000.00
Project Duration:	10 months

Permanent Landslide Repair Route 005	
Project Description:	Slope stabilization, which includes excavation, and benching to resist movement of loose material on the lower part of the slide. Install/construct drainage improvement to control surface and subsurface flow. Place retaining walls or crib walls as deemed necessary to prevent further spread of the slide on the access road.
Project Objectives:	To minimize the effect and damage of landslide during rainy days and to avoid closure of Route 005; Pago Pago-Fagasa Road. This road is an access to the northern part from Fagasa Village to the southern part and to other important government facilities like the hospital, fire station, and the DPS.
Estimated Cost:	$520,000.00
Project Duration:	6 months

#3 Amouli Stream Mitigation Project Ofu, Manu'a	
Project Description:	The proposed project is to improve stream flow capacity to prevent flooding on the residents within the area. The proposed improvement is consist of bankline stabilization to prevent soil erosion that would lower the flow capacity of the stream. The proposed improvement would lower the frequency of stream flow overflowing to the stream banks and floods the residents living adjacent to the stream.
Project Objectives:	The proposed project objective is to protect life and property adjacent to the stream. Residents along the stream always suffered flooding because of the existing stream low capacity.
Estimated Cost:	$300,000.00
Project Duration:	10 months

Afono Culvert Improvement	
Project Description:	Location-Closer to Afono Elementary School on Route 006. Bankline improvement on both sides of the stream using gabion basket for soil stabilization, and improving/replacing the existing culvert crossing to increase hydraulic capacity. Reconstruction of the seawall which will be affected during the construction of the outlet protective structure of the culvert to match to the existing seawall. Sidewalks constructed for safety of the pedestrian particularly to school children living nearby using this culvert to cross to other parts of the village. Improving drainage system would minimize future flooding particularly within the school premises. ***Environmental Concerns:*** Overflowing of stream runoff during heavy downpour on the lower bank always settled on the school ground. A nuisance flooding on the school turns out to be a health hazard to the residents particularly to the school children since stream runoff ponding on the school premises will not subside for at least a day or more and becomes a potential mosquito breeding ground. Minor modification of the existing waterway to increase the hydraulic capacity of the stream and the culvert.
Project Objectives:	Mitigation to prevent Afono Elementary School from flooding during heavy downpour due to overflowing of the stream on the lower bankline adjacent to the school and the insufficient capacity of the existing culvert to convey this stream runoff towards the shore.
Estimated Cost:	$250,000.00
Project Duration:	6 months

Vaitele Stream Flood Mitigation	
Project Description:	Located in the village of Nu'uuli and adjacent to the famous Shoe Tree Commercial Building, reconstruction of the existing damaged flood protection structure on upstream off of the main road (Route 001) and redefining/structural hardening of the stream bankline downstream off the main road. Access driveways will be constructed as necessary in order to continue stream flow without interruption and avoid unsafe condition to the pedestrian during high velocity stream flow which will cross on access driveways. ***Environmental Concerns:*** Stream runoff spreads and ponds on private/communal land which may damage property; Stream runoff ponding on the adjacent areas becomes a health hazard to the residents; Unsafe condition of the residents that will occur during heavy downpour; Property damaging during high rainfall intensity which usually creates high runoff velocity.
Project Objectives:	• Mitigate spread of stream runoff as well as natural runoff. • Minimize risk of damage to government, public and business facilities/assets in the area. • Prevent any further encroachments due to developments by redefining/structurally hardening the stream bankline.
Estimated Cost:	$500,000.00
Project Duration:	6 months

#4 Leone Village Road	
Project Description:	The proposed project is to remove and replace all existing insufficient capacity culverts on this stream and construct drainage structures on the road to convey surface and stream overflow runoff to the outfall including reconstruction of the existing badly damage village road. The improvement will also include stream bank stabilization to selected areas where the existing stream bank is low and became a hazard to the residents due to overbanking of stream runoff. These improvements will enhance the village access road and protect life and properties within the area.

#4 Leone Village Road	
Project Objectives:	The proposed project is to protect life and properties of the people residing along the stream. Village residents suffer flooding every time during heavy rainfall due to stream runoff overflow to the road and residential areas. The insufficient capacity of the existing culverts and the lack of drainage structures on the village road made difficult for the public to access their homes because of the flooding on the road. Due to the insufficient capacity of these existing culverts, low stream bank lines and lack of drainage structures on the road, vehicles including emergency vehicles need to wait to let the flooding subsides before this village road can be accessed.
Estimated Cost:	$2,200,000.00
Project Duration:	10 months

Leone Village Road and Stream Mitigation Project

#8 Upgrading of DPW-M&O Building	
Project Description:	The M&O Building is a 120' x 400' steel portal frame structure and now serves as the main office the Department of Public Work. The intended occupancy and use of the building was altered wherein offices were built-in for the different divisions of DPW. The proposed project will involve repairs of its metal roof and cladding for leaks and damaged from previous tropical cyclone, structural strengthening and upgrading of its windows to withstand 120 miles wind. Install fire sprinkler system to keep the building safe from local fire.

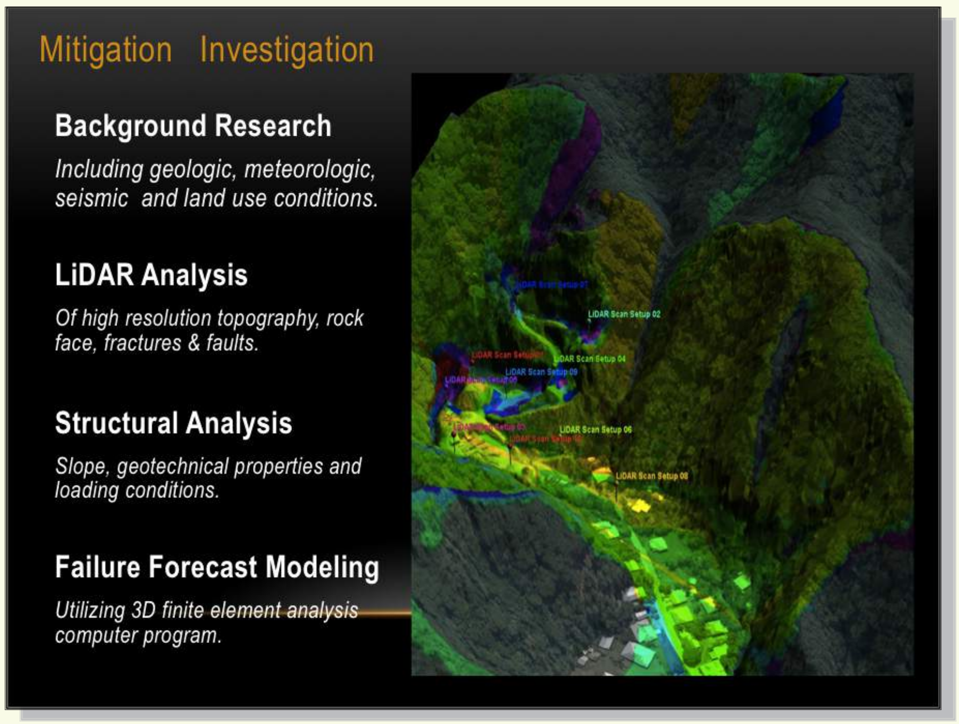
#8 Upgrading of DPW-M&O Building	
Project Objectives:	The proposed activity will reduce and/or eliminate the impact of damages caused by hurricane, tropical cyclones, and other windstorms and local fire by upgrading the building and installation fire protection system. This will allow the building to remain operational, safe and secure. The building serves as DPW base of operation during disaster response.
Estimated Cost:	$400,000.00
Project Duration:	5 months

Permanent Landslide Repair Route 11	
Project Description:	Slope stabilization, which includes excavation, and benching to resist movement of loose material on the lower part of the slide. Install/construct drainage improvement to control surface and subsurface flow. Place retaining walls or crib walls as deemed necessary to prevent further spread of the slide on the access road.
Project Objectives:	To minimize the effect and damage of landslide during rainy days and to avoid closure of Route 11; Masausi Road. This road is an access from the Village of Masausi and Village of Sailele to Fagaitua and to other important government facilities like the hospital and other parts of the island.
Estimated Cost:	$350,000.00
Project Duration:	6 months

American Samoa Environmental Protection Agency

Landslide Early Warning System – Faga'alu Pilot Project	
Project Description:	Due to recent excavation of cut slopes of a primary stabilizing geologic feature a critical risk for landslide hazard above the Faga'alu Quarry in near or long term is apparent. Current technology is available to provide early warning of the conditions precursory to slope failure and save many lives. The proposed project will analyze the Faga'alu Quarry landslide risk conditions, procure specialized equipment, deploy an early warning system and train local specialist to apply the early warning system at critical sites throughout American Samoa. LiDAR and field investigation of the slope above the high-risk quarry cut slope will be performed to current professional standards.

Landslide Early Warning System – Faga'alu Pilot Project	
Project Objectives:	• To perform geotechnical investigation of the landslide risk area to current professional standards. • To research and deploy a state of the art landslide early warning system to protect Faga'alu as a pilot project establishing training and developing local capacity to be used throughout American Samoa.
Estimated Cost:	$486,000.00
Project Duration:	12 months



High Court

High Court Elevation Project (Formerly High Court Relocation Project)	
Project Description:	Elevate High Court. 
Project Objectives:	• Mitigate damages caused by future disasters. • Avoid impairment following disaster. • Preservation of significant legal and historic documents. • Secure a safe and secure structure and location to accommodate the needs and requirements of the High Court and District Court to maintain fair and just services without variance.
Estimated Cost:	$2,750,000.00
Project Duration:	3 years

Office of Public Information

High Court Elevation Project (Formerly High Court Relocation Project)	
Project Description:	Dismantle and uninstall existing television equipment and move to safe storage facility; construct Temporary MCR. Move all contents to temporary location. Repair Building, Harden walls, Restructure interior of building to accommodate. Reinstall all dismantled equipment.
Project Objectives:	• Mitigate damages caused by future disasters. • Avoid impairment following disaster. • Preservation of significant historical contents. • Secure a safe and secure structure and location to accommodate the communication needs to the public.
Estimated Cost:	$4,500,000.00
Project Duration:	4 years

The following article found in the Samoa News describes the condition of the building:

Rehab or condemn— that is the question[6]
By B. Chen
blue@samoanews.com

An assessment of the KVZK-TV building in Utulei is underway to determine if the building, which was recently included on the National Register of Historic Places, is structurally sound and can be renovated or if it needs to be demolished. Local company Designer Plus, owned by Epenesa Jennings, is carrying out the assessment and according to Historic Preservation Officer David Herdrich, recommendations for rehabilitation will be made following the assessment and at that time, his office will look for funding to make it happen.

A look at the way the KVZK-TV building in Utulei stands today. Historic Preservation Officer David Herdrich said the current run-down state of the building is a result of years of neglect. [photo: B. Chen]

Figure 4 Samoa News Article Regarding KVZK TV Building

He said having the local TV station listed as a historic site means his office will step in and conduct renovation and restoration work, if necessary, on the building. KVZK-TV was the first television station in the Pacific Islands outside of Australia and New Zealand during a time when it was hard to recruit qualified teachers to work in the territory. H. Rex Lee, who was governor at the time, brought educational television here and with the support of Ohio Congressman Michael J. Kirwan, KVZK-TV became a reality. (The official name of the KVZK-TV building is the Michael J. Kirwan Educational Television Center). The KVZK-TV building is original except for the roof, which was replaced by FEMA after a hurricane. The building appears run down, both inside and out. Standing at the main entrance, one can look up and see three large window air conditioning units that are rusty and not operational - just dangling from the top. Some of the glass windows are missing and have been sealed off with wood pieces while the main door and exterior are three different shades of blue. Even the yellow paint on the side columns of the main entrance is peeled and cracked. Herdrich said the current state of the TV station is a result of many years of neglect. He said ASHPO can spend money to rehabilitate the building to extend its life, or otherwise, if the building is determined to be structurally unsound and there is just no way to rehabilitate it, then it would have to be condemned. He said in cases where there is no other choice but to tear a building down and erect a new one, a Memorandum of Agreement (MOA) with the American Samoa Historic Preservation Office will need to be signed to mitigate any "adverse effects" that may arise, per Historic Preservation Law. Mitigation in these cases, according to Herdrich, would typically mean that architects and engineers will be hired to document and photograph the building the way it stands today (before it is torn down), so information about it is not lost. "This is how we can preserve the history of the building and remember what it was once like." Herdrich said they are awaiting the assessment results from Designer Plus and from there, they will determine whether the building will need rehabilitation work —or be condemned.

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6 Chen, B. (2014). "Rehab or condemn - that is the question". Samoa News; 11-08-2013. Retrieved September 30, 2014 from http://www.samoanews.com/node/78850#sthash.PDNY54IR.dpuf.

Fuel Farm Relocation	
Project Description:	A new Aviation Fuel Farm will be constructed on the other side of Runway 8-26, further away from the public and airport users thus the Airport terminal and car park. A new fuel pipeline will run from this new site to the fuel pits on the Apron/Ramp area. The existing Aviation Fuel Farm, which is so close to the airport car park and terminal, will be demolished and relocated. This old site will be cleaned up for expansion of the Airport Carpark. 
Project Objectives:	To relocate the existing Aviation Fuel Farm and associated pipelines etc. to the new proposed site near Pala Lagoon inside the Airport Operations Area (AOA). This is to ensure that airport users and the public are safe from the high hazard of the existing location of the existing Aviation Fuel Farm poses when cyclones or natural disasters occur.
Estimated Cost:	$5,500,000.00
Project Duration:	18 months

Runway Shoreline Protection	
Project Description:	Proposed rock seawall/revetment will be designed and constructed along the Airport's shorelines to protect the Runways and Security Perimeter Fence and Road from wave action from cyclones or natural disasters. Total length of the Airport shoreline to be protected is 6350 LF.
Project Objectives:	• To protect the Runways, Security Perimeter Fence and Road from strong wave action, flooding and erosion occurring along the Airport shoreline and coastline. • Allow the Runways and Airport to remain operational, safe and secure after cyclones and storms to allow urgent relief aid and assistance to arrive via air quickly.
Estimated Cost:	$5,000,000.00
Project Duration:	12 months

The Planning Team developed a Project Ranking Worksheet for the Hazard Mitigation Council. The Worksheet gave the council an effective way to consider hazard vulnerability and relationship to the mitigation plan goal. The worksheet included the 26 new mitigation projects proposed to the Council and 26 projects from the previous plan. Figure 1 below is a copy of the directions associated with the Project Ranking Worksheet. The entire worksheet is shown in Appendix C as part of the July 11, 2014 Hazard Mitigation Council Meeting materials.

Mitigation Project Ranking Worksheet
Territory of American Samoa Multi-Hazard Mitigation Plan

Please use the following criteria to assist you in ranking the order of mitigation projects on the following pages.

The first choice in the table beginning on page two is to identify which hazard-ranking category each mitigation project addresses. For instance, undergrounding power lines are most likely to address Tropical Cyclones so it would receive 3 points. If a project addresses multiple hazards please choose the highest hazard ranking number. Hazard Ranking points are in Table 1 below.

Table 1 Hazard Ranking

Points	Hazard Ranking	Hazards
3	High	Landslides Tsunami Flood Tropical Cyclone
2	Moderate	Earthquake HAZMAT Climate Change (including SLR) Coastal Erosion Drought High Surf
1	Low	Lightning Wildfire Volcano Soil Hazards

The second choice on the table will help you identify the beneficial impact of each mitigation project. Again please choose the highest number if a project is relevant to more than one Project Result. Project Result Points are in Table 2 below.

Table 2 Mitigation Project Results

Points	Description of Mitigation Project Result
4	Projects that save lives and protect property from natural hazards.
3	Projects that protect property from natural hazards.
2	Projects that reduce the probability of personal or property damages from natural hazards.
1	Projects that educate people on the subjects of hazard mitigation, hazard research, and disaster preparedness

The highest number in the Total column will be 7 and the lowest will be 2. Multiple projects will have identical project ranking. If a project should receive a "high" score and it ranked medium than please make a note of this. We can make changes to ranking based on decisions made by the Council.

We will reclassify the list below into three categories, high (7 points), medium (4-6 points), and low (2-3 points) for the purposes of the Hazard Mitigation Plan.

July 2014 1

Figure 5 Mitigation Project Ranking Worksheet Directions

The Hazard Mitigation Council utilized the worksheet in their July 11, 2014 meeting. The Hazard Mitigation Council removed all wave action projects at this meeting. They made several other changes to the master list of 2011 projects and proposed 2014 projects. ASPA's #3 project in 2011 is their #4 project on the 2015 list. DPW assumed responsibility for projects #5 and #26 from the 2011 plan. ASTCA received funding for projects #4, 8, 10, and 28 in 2011 so they were removed. Project #25 from 2011 was corrected to say Vaitele Stream instead of Tago Stream. The Hazard Mitigation Council encouraged ASTCA, ASPA and BlueSky Communications to coordinate on all undergrounding projects. The results are shown in Table 6 Mitigation Projects Ranked By Hazard Mitigation Council below. The intent of the Planning Team was for the Hazard Mitigation Council to work as a group to determine values for the worksheet. However, the Hazard Mitigation Council held a group discussion and then each member of the Hazard Mitigation Council completed the worksheet. Therefore, scores were totaled from all participants to determine the values below. The projects are listed in order of points from highest to lowest. To assist with future decision making regarding project implementation, the 41 projects are divided into three categories:

1. Highest Priority Projects (scored 62-75 points)
2. Medium Priority Projects (scored 48-61 points)
3. Lowest Priority Projects (scored 35-47 points)

The project locations are shown in the two Figures following the table below.

Table 6 Mitigation Projects Ranked By Hazard Mitigation Council

Ranking	Agency	Project Title	Hazard Ranking	Mitigation Project Result Points	Total Points
Highest Priority Projects (scored 62-75 points)					
1	Port	Fuel Farm Relocation	33	42	75
2	ASPA	Water Wells Mitigation	30	39	69
3	ASPA	Water Tanks Mitigation	30	39	69
4	ASPA	Fagatogo Reservoir Mitigation	29	37	66
5	Port	Runway Shoreline Protection	30	36	66
6	DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)	27	38	65
7	DPW	Ottoville Drainage Flood Mitigation	30	34	64
8	DPW	Fagaima Road Flood Mitigation	29	34	63
9	DPW	Fatuoaiga Drainage Flood Mitigation	30	33	63
10	DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	27	36	63
Medium Priority Projects (scored 48-61 points)					
11	ASPA	Tafuna Wastewater Treatment Plant	27	34	61
12	DPW	#6 Pava'ia'I Elementary	27	33	60
13	ASPA	Faga'alu Booster Station	26	34	60

Ranking	Agency	Project Title	Hazard Ranking	Mitigation Project Result Points	Total Points
14	ASPA	Pago Water Booster Station Mitigation	26	34	60
15	ASPA	Utumoa River Flood Mitigation	26	33	59
16	ASTCA	Leone to Poloa U/G Communications Lines[7]	26	33	59
17	ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines	26	32	58
18	ASTCA	Amouli to Aoa U/G Communications Lines	26	32	58
19	ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines	26	32	58
20	DOC	Mapping Project	25	33	58
21	ASPA	Weather Proof Sewage Lift Stations	25	33	58
22	ASTCA	Lauli'I/Breaker's Point Tower Replacement Parts	25	32	57
23	EPA	Landslide Early Warning System - Faga'alu Pilot Project	25	31	56
24	ASTCA	Aunu'u Tower Replacement Parts	24	31	55
25	ASTCA	Manu'a Islands U/G Comm. Lines	24	31	55
26	OPI	Office Of Public Information Building	24	29	53
27	DPW	#5 Happy Valley Road Drainage	22	27	49
28	DPR	Vaipito Stream Revetment	23	25	48
29	DHS	Wind Shutters EOC Project	20	28	48
Lowest Priority Projects (scored 35 – 47 points)					
30	DPW	Ili'ili Drainage Flood Mitigation	21	26	47
31	DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	22	25	47
32	ASPA	Nuuuli To Mesepa U/G Lines	19	27	46
33	DPW	Permanent Landslide Repair Route 005	20	23	43
34	ASPA	Poloa To Fagamalo U/G Lines	18	24	42
35	HC	High Court And District Court Building Relocation - Change to Elevation Project	20	22	42
36	DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a	20	22	42

Ranking	Agency	Project Title	Hazard Ranking	Mitigation Project Result Points	Total Points
37	DPW	Afono Culvert Improvement	16	24	40
38	DPW	Tago Vaitele Stream Flood Mitigation (Name Correction Passed By Council)	18	22	40
39	DPW	#4 Leone Village Road	17	22	39
40	DPW	#8 Ugrading of DPW-M&O Building	17	21	38
41	DPW	Permanent Landslide Repair Route 11	16	19	35

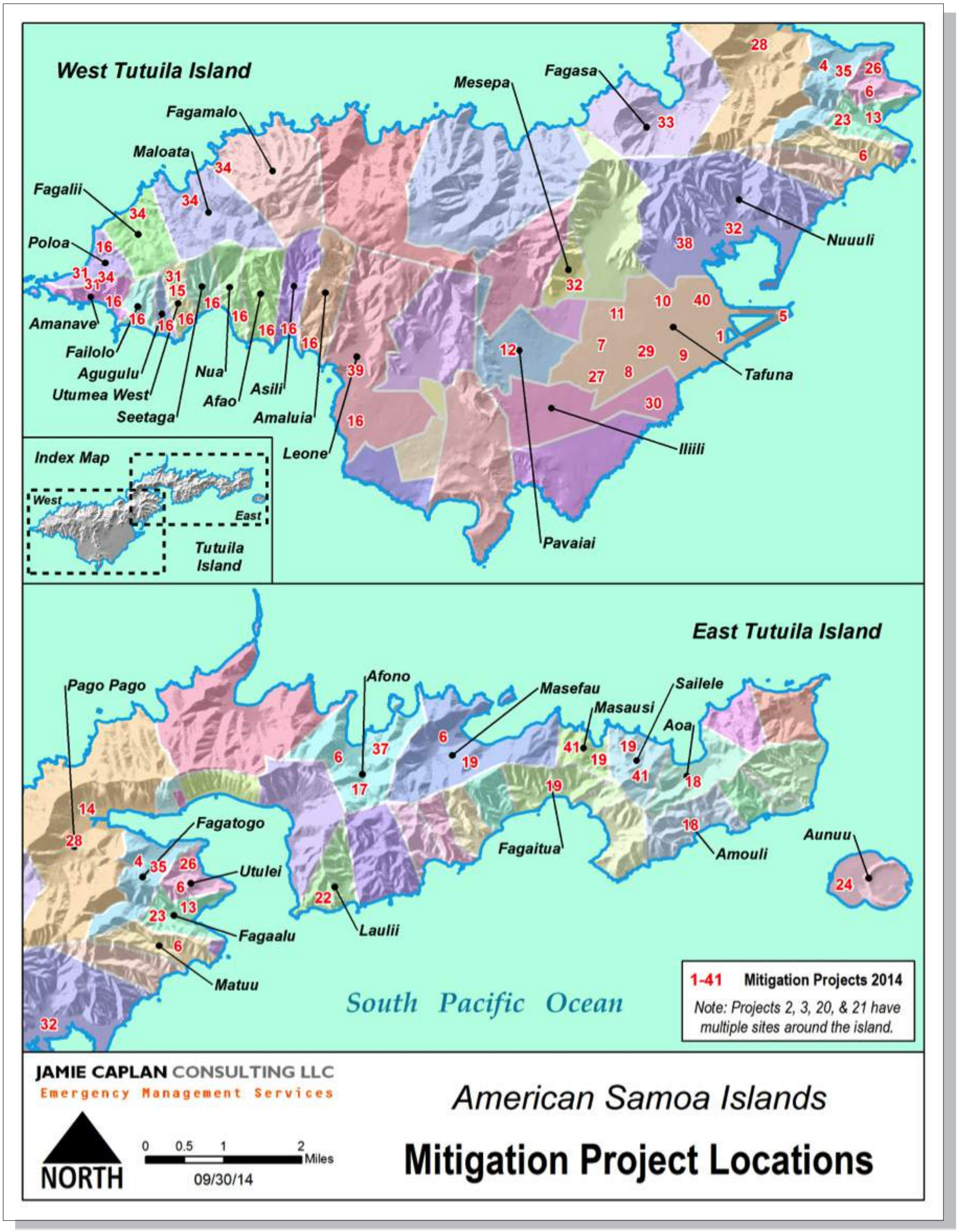

Figure 6 Mitigation Project Locations Map 1

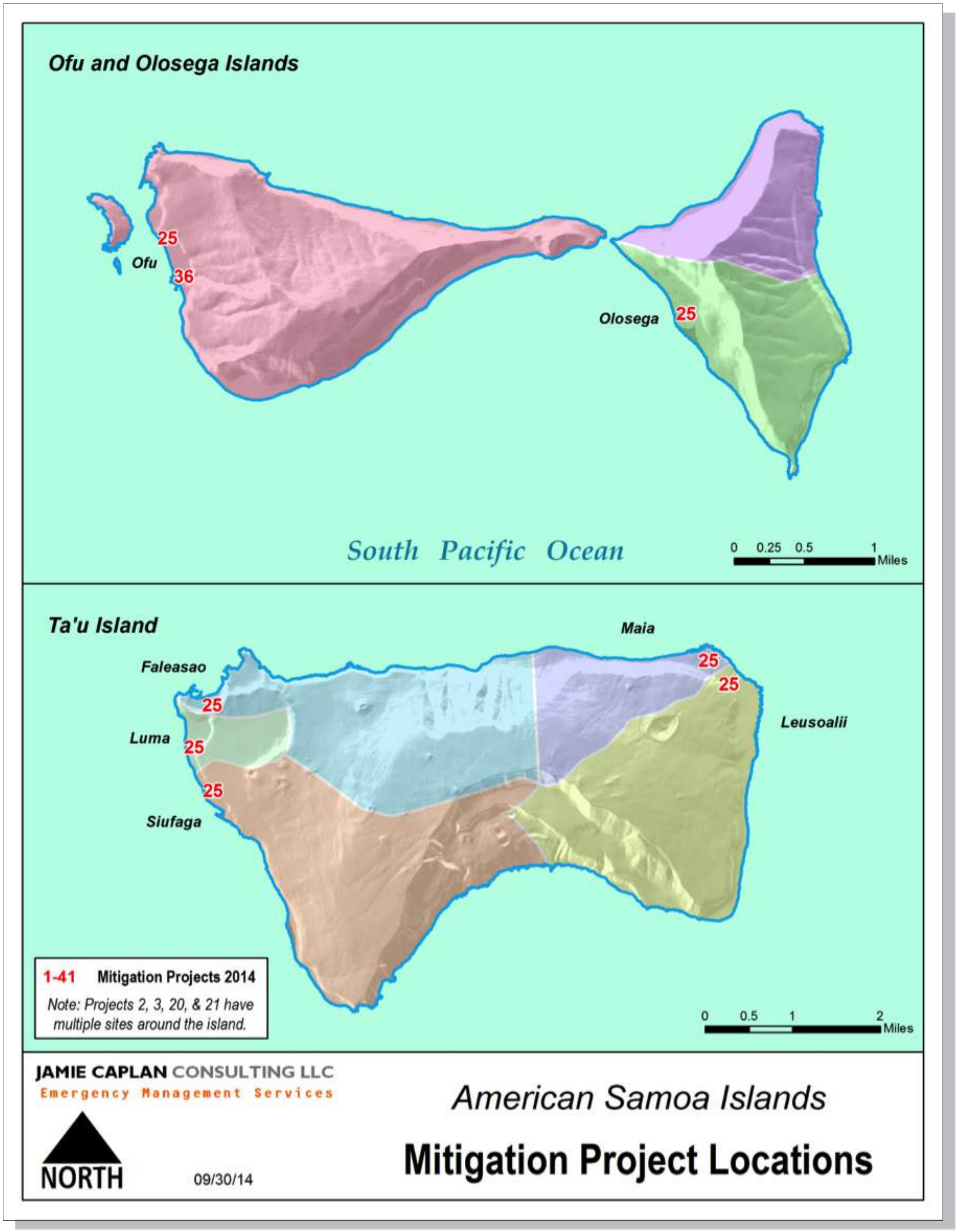

Figure 7 Mitigation Project Locations Map 2

Table 7 Mitigation Projects Sorted by Department

Ten organizations submitted projects to the Hazard Mitigation Council. Table 7 Mitigation Projects Sorted by Department is shown below. The projects are in priority order for each department; the departments are listed in alphabetical order.

Agency	Project Title	Hazard Ranking	Mitigation Project Result Points	Total Points
ASPA				
ASPA	Water Wells Mitigation	30	39	69
ASPA	Water Tanks Mitigation	30	39	69
ASPA	Fagatogo Reservoir Mitigation	29	37	66
ASPA	Tafuna Wastewater Treatment Plant	27	34	61
ASPA	Faga'alu Booster Station	26	34	60
ASPA	Pago Water Booster Station Mitigation	26	34	60
ASPA	Utumoa River Flood Mitigation	26	33	59
ASPA	Weather Proof Sewage Lift Stations	25	33	58
ASPA	Nuuuli To Mesepa U/G Lines	19	27	46
ASPA	Poloa To Fagamalo U/G Lines	18	24	42
ASTCA				
ASTCA	Leone to Poloa U/G Communications Lines	26	33	59
ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines	26	32	58
ASTCA	Amouli to Aoa U/G Communications Lines	26	32	58
ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines	26	32	58
ASTCA	Lauli'I/Breaker's Point Tower Replacement Parts	25	32	57
ASTCA	Aunu'u Tower Replacement Parts	24	31	55
ASTCA	Manu'a Islands U/G Comm. Lines	24	31	55
DHS				
DHS	Wind Shutters EOC Project	20	28	48
DOC				
DOC	Mapping Project	25	33	58
DPR				
DPR	Vaipito Stream Revetment	23	25	48
DPW				
DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)	27	38	65
DPW	Ottoville Drainage Flood Mitigation	30	34	64
DPW	Fagaima Road Flood Mitigation	29	34	63
DPW	Fatuoaiga Drainage Flood Mitigation	30	33	63
DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	27	36	63

Agency	Project Title	Hazard Ranking	Mitigation Project Result Points	Total Points
DPW	#6 Pava'ia'I Elementary	27	33	60
DPW	#5 Happy Valley Road Drainage	22	27	49
DPW	Ili'ili Drainage Flood Mitigation	21	26	47
DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	22	25	47
DPW	Permanent Landslide Repair Route 005	20	23	43
DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a	20	22	42
DPW	Afono Culvert Improvement	16	24	40
DPW	Vaitele Stream Flood Mitigation (Name Correction Passed By Council)	18	22	40
DPW	#4 Leone Village Road	17	22	39
DPW	#8 Ugrading of DPW-M&O Building	17	21	38
DPW	Permanent Landslide Repair Route 11	16	19	35
EPA				
EPA	Landslide Early Warning System - Faga'alu Pilot Project	25	31	56
HC				
HC	High Court And District Court Building Relocation - Change to Elevation Project	20	22	42
OPI				
OPI	Office Of Public Information Building	24	29	53
PORT				
Port	Fuel Farm Relocation	33	42	75
Port	Runway Shoreline Protection	30	36	66

Table 8 Project Benefits and Costs

Table 8 Project Benefits and Costs below shows the projects in priority order based on organization. The environmental impact, historical preservation impact, risk of hazard impact, and protection of life and property are characterized for each project with a ranking of high, medium or low. These rankings were given by the organization submitting the project. The projects are color coded, red, orange, and yellow to indicate their level of priority from high to low.

Priority	Project Name	Environmental Impact	Historical Preservation Impact	Risk of Hazard Impact	Protection of Life and Property	Cost
			ASPA			
2	Water Wells Mitigation	High	Low	Low	High	$1,000,000.00
3	Water Tanks Mitigation	High	Low	High	High	$10,000,000.00
4	Fagatogo Reservoir Mitigation	Medium	Medium	High	High	$300,000.00
11	Tafuna Wastewater Treatment Plant	High	Low	High	High	$450,000.00
13	Faga'alu Booster Station	High	Low	Medium	High	$200,000.00
14	Pago Water Booster Station Mitigation	High	Low	Medium	High	$200,000.00
15	Utumoa River Flood Mitigation	Low	Medium	High	Medium	$257,500.00
21	Weather Proof Sewage Lift Stations	High	Low	High	High	$300,000.00
32	Nuuuli To Mesepa U/G Lines	Low	Low	High	High	$ 1,377,647.13
34	Poloa To Fagamalo U/G Lines	Low	Low	High	High	$970,523.75
			ASTCA			
16	Leone to Poloa U/G Communications Lines	Low	Low	High	High	$3,270,350.60
17	Afono Pass to Blue Sky Tower U/G Communications Lines	Low	Low	High	High	$916,546.40
18	Amouli to Aoa U/G Communications Lines	Low	Low	High	High	$1,208,042.00
19	Fagaitua,Masefau,Masausi,Saile le U/G Comm. Lines	Low	Low	High	High	$2,149,563.68
22	Lauli'I/Breaker's Point Tower Replacement Parts	Low	Low	High	High	$44,127.00
24	Aunu'u Tower Replacement Parts	Low	Low	High	High	$44,127.00
25	Manu'a Islands U/G Comm. Lines	Low	Low	High	High	$6,842,532.00
			DHS			
29	Wind Shutters EOC Project	Low	Low	Medium	Medium	$43,496.00

Priority	Project Name	Environmental Impact	Historical Preservation Impact	Risk of Hazard Impact	Protection of Life and Property	Cost
			DOC			
20	Mapping Project	High	Medium	High	High	$50,000.00
			DPR			
28	Vaipito Stream Revetment	High	High	High	High	$448,000
			DPW			
6	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)	High	Low	High	High	$4,000,000.00
7	Ottoville Drainage Flood Mitigation	High	Medium	High	High	$683,000.00
8	Fagaima Road Flood Mitigation	High	Medium	High	High	$4,500,000.00
9	Fatuoaiga Drainage Flood Mitigation	High	Medium	High	High	$300,000.00
10	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	Low	Low	High	Medium	$85,000.00
12	#6 Pava'ia'I Elementary	High	Medium	High	High	$310,000.00
27	#5 Happy Valley Road Drainage	High	Low	High	High	$220,000.00
30	Ili'ili Drainage Flood Mitigation	Low	Low	High	High	$1,310,000.00
31	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	High	Low	High	High	$2,400,000.00
33	Permanent Landslide Repair Route 005	High	Low	High	High	$520,000.00
36	#3 Amouli Stream Mitigation Project Ofu, Manu'a	High	Low	High	High	$3000,00.00
37	Afono Culvert Improvement	Medium	Low	High	High	$250,000.00
38	Vaitele Stream Flood Mitigation (Name Correction Passed By Council)	High	Low	High	High	$500,000.00
39	#4 Leone Village Road	High	Low	High	High	$2,200,000.00
40	#8 Ugrading of DPW-M&O Building	Medium	Low	High	High	$400,000.00
41	Permanent Landslide Repair Route 11	Medium	Low	High	High	$350,000.00
			EPA			
23	Landslide Early Warning System - Faga'alu Pilot Project	High	High	High	High	$486,000.00

Priority	Project Name	Environmental Impact	Historical Preservation Impact	Risk of Hazard Impact	Protection of Life and Property	Cost
			High Court			
35	High Court and District Court Building Relocation - Change to Elevation Project	High	High	High	High	$2,750,000.00
			OPI			
26	Office of Public Information Building	Medium	High	High	High	$4,500,000.00
			PORT			
1	Fuel Farm Relocation	High	High	High	High	$5,500,000.00
5	Runway Shoreline Protection	High	High	High	High	$5,000,000.00

Table 9 Projects Sorted by Department and Color Coded by Priority show the projects with their associated cost. This table is provided as an easy reference for departments that submitted projects.

Table 9 Projects Sorted by Department and Color Coded by Priority

Priority	Project Name	Cost
	ASPA	
2	Water Wells Mitigation	$1,000,000.00
3	Water Tanks Mitigation	$10,000,000.00
4	Fagatogo Reservoir Mitigation	$300,000.00
11	Tafuna Wastewater Treatment Plant	$450,000.00
13	Faga'alu Booster Station	$200,000.00
14	Pago Water Booster Station Mitigation	$200,000.00
15	Utumoa River Flood Mitigation	$257,500.00
21	Weather Proof Sewage Lift Stations	$300,000.00
32	Nuuuli To Mesepa U/G Lines	$ 1,377,647.13
34	Poloa To Fagamalo U/G Lines	$970,523.75
	ASTCA	
16	Leone to Poloa U/G Communications Lines	$3,270,350.60
17	Afono Pass to Blue Sky Tower U/G Communications Lines	$916,546.40
18	Amouli to Aoa U/G Communications Lines	$1,208,042.00
19	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines	$2,149,563.68
22	Lauli'I/Breaker's Point Tower Replacement Parts	$44,127.00
24	Aunu'u Tower Replacement Parts	$44,127.00

Priority	Project Name	Cost
25	Manu'a Islands U/G Comm. Lines	$6,842,532.00
	DHS	
29	Wind Shutters EOC Project	$43,496.00
	DOC	
20	Mapping Project	$50,000.00
	DPR	
28	Vaipito Stream Revetment	$448,000
	DPW	
6	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)	$4,000,000.00
7	Ottoville Drainage Flood Mitigation	$683,000.00
8	Fagaima Road Flood Mitigation	$4,500,000.00
9	Fatuoaiga Drainage Flood Mitigation	$300,000.00
10	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools	$85,000.00
12	#6 Pava'ia'I Elementary	$310,000.00
27	#5 Happy Valley Road Drainage	$220,000.00
30	Ili'ili Drainage Flood Mitigation	$1,310,000.00
31	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	$2,400,000.00
33	Permanent Landslide Repair Route 005	$520,000.00
36	#3 Amouli Stream Mitigation Project Ofu, Manu'a	$3000,00.00
37	Afono Culvert Improvement	$250,000.00
38	Vaitele Stream Flood Mitigation (Name Correction Passed By Council)	$500,000.00
39	#4 Leone Village Road	$2,200,000.00
40	#8 Ugrading of DPW-M&O Building	$400,000.00
41	Permanent Landslide Repair Route 11	$350,000.00
	EPA	
23	Landslide Early Warning System - Faga'alu Pilot Project	$486,000.00
	High Court	
35	High Court and District Court Building Relocation - Change to Elevation Project	$2,750,000.00
	OPI	
26	Office of Public Information Building	$4,500,000.00
	PORT	
1	Fuel Farm Relocation	$5,500,000.00
5	Runway Shoreline Protection	$5,000,000.00

Mt. Alava

During the stakeholder meetings in April and June multiple organizations mentioned their concern for the road up Mt. Alava and the equipment that is on the top of the mountain. A remedy is not proposed specifically as a mitigation project in the list above; however, the Planning Team deems it necessary to include.

The summit of Mt. Alava has radio towers for the entire first response community (police and Emergency Medical Service) and TV station. The site also has generators on the mountain. Transformers are not secured or protected. The site is currently very inaccessible for repairs and maintenance due to the poor and dangerous road condition leading to the summit of Mt. Alava. The entire first response system is vulnerable due to this situation. The impediment is that the road is in the National Park and the NPS wants to keep the road unimproved. This is really a DHS-to-FEMA issue. The other option is to rebuild the cable car as a secondary access. The National Park Service wants the road to remain natural as a hiking trail. A Hawaii engineer has looked at the situation and recommends moving the generator to the bottom, so it can be repairable without the long drive/hike up mountain. Road repair could be in 5-or-10 year CIP. The best option is to fix the road and still have a hiking trail. The article below from the Samoa News describes the situation on Mt. Alava.

The tragic state of the Mt. Alava Tramway or cable car [7]
Sat, 04/12/2014 - 1:13pm By Rev. Dr. Mose Mose, Jr.

I had been to the island several times, but I had not been a tour guide to some family members from California who had not experienced the many sites on the island of Tutuila. We toured the East and the West, as far as the historic village of Leone to the mystical village of Vaitogi, and to the east where the scenic village of Vatia and equally photogenic village of Aoa, seemed to encompass the overall beautiful Polynesian place call American Samoa.

I was shocked when our tour took us up Mauga o Alii, where the Tramway that crossed over the deep Pago Pago Bay stirred up a deep sense of nostalgia which was a mixture of pleasant memories and a remembrance of a traumatic event that imprinted a powerful sense of loss in my psyche as an eighteen year old senior from Fagaitua High School, who among the many students from elementary and high schools were unaware of the catastrophe that changed the most celebrated event of our government's history—Flag Day-- since it became known as the Territory of American Samoa. The year 1980, on April 17th, marked a sad day among the years since the Flag Day Celebrations on Tutuila and Manu'a islands had commemorated the ceding of the Eastern Samoan islands to the United States. I wanted to remember the Tramway as a place filled with good memories with my grandfather, the late Saofolau Popese Malemo, who had been an engineer for the Tramway. I used to take rides with him from the Mauga o Alii side to the top of Mt. Alava, when I was just nine years old. My grandfather told me that when the Tramway was first built, the cable lines were pulled up with heavy machines at Atu'u village. These cable lines were heavy and any mistake could cause a tragic accident. He recalled how he narrowly escaped being crushed by the heavy machine when one of the cables snapped suddenly while being pulled up to the Mt. Alava, but his close friend and coworker was not so fortunate; his coworker was crushed to death by the heavy machine.

7 Mose Jr., Rev. Dr. Mose. (2014). "The tragic state of the Mt. Alava Tramway or cable car". Samoa News; 04-12-2014.. Retrieved September 30, 2014 from http://www.samoanews.com/content/en/tragic-state-mt-alava-tramway-or-cable-car

It will be thirty-four years ago this April 17, 2014, that another tragic event happened that caused the lives of several Navy personnel and a civilian. That tragic event also destroyed the beautiful and iconic Rainmaker Hotel, the first hotel built in American Samoa. I can clearly remember the many hundreds of elementary and high school students lining up where their own schools were directed for the procession on the sunny morning. Dignitaries from many Island countries and visiting tourists, with the hundreds of locals and neighboring Western Samoans coming to be a part of the celebration.

A new event was scheduled before the procession when it was announced by the Master of Ceremony that some paratroopers would parachute right down the middle of Malae o le Talu as a tribute to those sons and daughters of American Samoa serving in the Armed Forces. Three paratroopers landed away from the Malae o le Talu, landing over some houses above Fagatogo and in the hills. We were concerned and alarmed as we worried about their safety, with some not understanding the danger. But two were able to land on the field with great precision. A great round of applause erupted out of the crowd as these brave men landed safely. And with almost eerie silence, our attention was immediately turned toward the Pago Pago harbor, where from beyond the Pago Pago bay mountain range, the airplane that carried the paratroopers was taking a low flying swoop across the water in between the Mt. Alava height and Mauga o Alii Tramway port. As a slow motion picture of horror, the airplane flew between two cables when the rear fin of the airplane was clipped and snapped off. The realization of the tragedy hit us with sudden panic as the airplane flew briefly towards the ocean before slanting towards the Rainmaker hotel and burst into flames. The crowds in the Malae o le Talu were running in every direction. The applause that filled the Malae o le Talu earlier was now replaced with cries of fear and chaos.

The event of thirty-four years ago during our Flag Day celebration this year must not be forgotten. The rusted condition of the Tramway cable car, the vines growing over the steel platform of the cable car, the missing structure of the platform for the Tramway, the broken cables lying on the side of the road, the memorial dedicated to the lost lives stood filled with moss, and broken down paint, and the dumped trash over the side, sent a powerful message that we have forgotten the memory of what made our history. I wondered about the next generation of elementary and high school students who will be watching the Flag Day celebration of 2014 if they have any idea of the important history being eroded and erased from our memory. The Tramway cable car is an important fixture of history that is hidden from the history books, and the memorial dedicated to those who lost their lives must not be left to rot and forgotten.

If anyone reads this "cry in the wilderness," and stands up to lend your voice to my cry, a great shout will be heard in our land that we do not want to forget the important stories of our people. If the leaders in the Fono hear this call, please stand with me and bring our people to remembrance of the sacrifice that others gave and the values of important sites to our people and to those who come to visit our islands.

What needs to happen are: a) the Tramway car and structure on Mauga o Alii must be preserved as a national treasure; b) the Memorial must be preserved as a national treasure; and c) the Mauga o Alii pathway must be preserved and documented as a tourist attraction. I pray that our people will have a wonderful and safe celebration.

Happy Flag Day! God bless American Samoa.

How the Territory Supports Local Mitigation through Funding and Technical Assistance

Historically, all counties in Tutuila and the Manu'a Islands have received benefits from mitigation projects constructed and completed over the past two decades. All mitigation project-funding decisions are the responsibility of the Hazard Mitigation Council for the benefit of all the citizens through strengthening of critical facilities, flood control projects, and other mitigation projects.

The criteria for which projects receive funding rests with the active, well-informed, and well-educated Hazard Mitigation Council the advisory authority. The Council has demonstrated a history of prioritization on past mitigation projects based on criteria described in this plan. All of the counties in Tutuila and the Manu'a Islands are considered for local funding through the master mitigation project list presented above, in this chapter. The Hazard Mitigation Council understands that funding opportunities may present themselves in an order that is different than the project priority order. For this reason, projects are frequently funded in what appears to be a random order.

An important island-centric issue to mention is the extraordinary time and distance issues related to completing any and all projects in American Samoa and all the Pacific islands: FEMA project timelines are not very flexible and do not consider logistics related to the Pacific Islands. Transportation and logistics of shipping goods and services to the islands can add many months to a typical project. Transport of heavy equipment requires extra costs and time. Director Fugate's Administrative aid noted this issue at an April 29-May 1, 2014 Pacific Preparedness Partnership Meeting; FEMA Director Fugate was there on April 30. American Samoa has also noted that only a few individuals within FEMA are familiar with the islands – turnover at FEMA continues this lack of familiarity and experience with island issues.

The Hazard Mitigation Council and ODAPM will continue to take advantage of the various funding programs available and described herein for the projects that have been developed, scrutinized, prioritized, and described via this Mitigation Plan Update planning process.

CHAPTER VII

Plan Maintenance Process

The Plan Maintenance Process outlines two critical pieces to mitigation planning. The first is maintaining the mitigation plan and the second is monitoring the implementation of mitigation actions and the mitigation strategy. In each section a comparison is made between the 2011 plan and this update. The American Samoa Territorial Hazard Mitigation Council has the primary responsibility to maintain and implement the mitigation plan. They work in collaboration with ODAPM and TEMCO. The American Samoa Government understands the value of this plan and its positive mitigation impact and intends to continue updating this plan and implementing the plan's strategies.

Plan Maintenance

The Territory must formally update and adopt this plan every five years according to FEMA regulations. The five-year update is inadequate to maintain a current and realistic plan. In reality, a process of monitoring, evaluating and updating the plan needs to be in place. During a five-year time period, policies and procedures at the Federal and Territory level may prompt changes to the plan in terms of priorities and/or funding. In addition, a major disaster would prompt review and possible modifications to this plan.

The American Samoa Hazard Mitigation Council will monitor the implementation of this Hazard Mitigation Plan and subsequent plans approved by the Hazard Mitigation Council. ODAPM and TEMCO are responsible for documenting plan monitoring and update activities. Documentation of the Hazard Mitigation Plan updates will occur as frequently as on a quarterly basis and minimally on an annual basis or as the need arises. ODAPM and TEMCO will work with the Council and the other relevant departments to review mitigation priorities and identify projects for funding under the Pre-Disaster Mitigation Competitive Grant Program, the Hazard Mitigation Grant Program, and other sources of support for mitigation activities identified in this plan and subsequent plans. The PDM Grant Program is administered by TEMCO and the Hazard Mitigation Grant Program is administered by ODAPM. The Hazard Mitigation Council, ODAPM, TEMCO and representatives from key government departments will evaluate and update the most recent plan updates and submit them to FEMA for final approval.

Monitoring, Evaluating and Updating the Mitigation Plan

The mitigation plan is the responsibility of the Territory Hazard Mitigation Council, however, multiple agencies are needed to monitor its maintenance, evaluate its relevance and update it for accuracy. The Territory Hazard Mitigation Council recognizes the State Hazard Mitigation Officer (SHMO) as the individual who has the daily responsibility to monitor the hazard mitigation plan and potential mitigation opportunities. The SHMO has support from ODAPM and TEMCO. The table below indicates the activities required to update the mitigation plan annually as well as each year during the next five-years.

Table 1 Mitigation Plan Update Activities

Timeframe	Actions
Annually	• Hazard Mitigation Council meets following any large incidents in the Territory to review mitigation plan and discuss new funding opportunities. • Hazard Mitigation Council meets to discuss implementation of mitigation actions. • Hazard Mitigation Council requests the incorporation of this plan into plans of relevant government agencies. • SHMO works with departments seeking mitigation funding to complete benefit-cost-analysis and grant applications. • Hazard Mitigation Council proceeds with mitigation action implementation. • Quarterly Reports.
Months 1-12	• Hazard Mitigation Council initiates discussion of lessons learned from the development of the 2015 plan. • All annual actions listed above.
Months 13-36	• All annual actions listed above.
Months 37-48	• Hazard Mitigation Council seeks funding for consulting assistance to update this plan. • All annual actions listed above.
Months 49-60	• Hazard Mitigation Council updates this plan according to current FEMA standards. • All annual actions listed above.

The SHMO will initiate documentation of a quarterly report that will: 1) summarize all mitigation and planning activities and actions that have been occurred during the quarter and 2) document the mitigation action status of all actions or projects included in this plan.

Identifying lessons learned from the planning process would be considered the first annual review and would take place during the first year of the plan's life. The SHMO will lead the Hazard Mitigation Council through a discussion aimed at generating lessons learned from the planning process. Steve Maga, ODAPM will support this discussion by documenting thorough notes. The SHMO will ask questions regarding the effectiveness of the public outreach strategy particularly the number of meetings held (both Council and Town Hall), the public preparedness survey, and the communication methods used for interacting with departments. The SHMO will also touch on the system for gathering mitigation actions and ranking their priority level. The meeting will conclude with a plan toward monitoring and updating the plan in the coming years.

In addition, the Hazard Mitigation Council will review this plan following each major disaster and update it to include a narrative of all relevant impacts from the disaster and the affects and damages to critical infrastructure, the government and population. In the past, government departments have had a difficult time generating a positive benefit-cost-analysis for grant applications. This is due in part to the lack of hazard data collected following major and minor disasters. In addition, the Council will review the mitigation plan goal, objectives and actions for priority and relevance.

The quarterly progress reports combined with any disaster write-up will serve as the Plan's annual update. These annual reports will be referenced toward generation of the 2019 plan.

The following four-step process outlines the monitoring plan.

Step 1: Begin Plan Monitoring
The SHMO initiates the plan monitoring process by requesting a meeting of the Hazard Mitigation Council. At this meeting mitigation activity updates will be requested by way of a project update worksheet. Additional mitigation activities will be requested by way of the project worksheet.

Step 2: Maintain Mitigation Action Data
The SHMO will maintain data regarding the implementation of all mitigation actions.

Step 3: Gather New Mitigation Opportunities
The Hazard Mitigation Council will query its membership regarding new mitigation opportunities in each of their respective agencies. In addition, following a major disaster declaration, the SHMO will make the Hazard Mitigation Council aware of current funding opportunities. The SHMO will put out a call for projects through the Samoa News.

Step 4: Gather Updated Planning Documents
The Hazard Mitigation Council will request additional planning documents from all relevant government agencies and departments to include in the update of this plan.

The four-step process above outlines the process of maintaining the list of mitigation actions. This process has not been clearly documented in past mitigation plans. However, it is the process used by the Territory over the last ten years. Ms. Fiatoa has been the SHMO for many years in the Territory of American Samoa. In this position, she has completed grant applications including benefit-cost analysis and tracked the implementation of mitigation projects. Ms. Fiatoa works closely with each agency that has potential mitigation projects. She educates them about potential mitigation funding opportunities and guides them through the grant application process. Ms. Fiatoa collaborates with FEMA on project applications and project closeouts. Her work ethic and consistency over the years has enabled the Territory of American Samoa to access millions of dollars of project funding.

On a quarterly basis, the SHMO will provide a status or project summary for the Quarterly Mitigation Report to the Hazard Mitigation Council. An outline of the minutes from each Hazard Mitigation Council meeting will also be included in the Annual Plan Update. The reports and minutes will serve as a permanent record of the mitigation progress for American Samoa. During the Hazard Mitigation Council meetings, the SHMO may suggest new updates to the Hazard Mitigation Plan, and the Council will provide advice and recommendations.

The mitigation plan will be monitored and updated by the SHMO, ODAPM and TEMCO annually and provide updates as deemed necessary. The Hazard Mitigation Council will review and approve all updates made.

Analysis of 2015 Mitigation Plan Implementation
The Planning Team for 2015 included many of the same individuals from the 2008 and 2011 updates, this consistency made for a smooth planning process. The most challenging part of the planning process was the collaboration of multiple government agencies. During the 2015 planning process the SHMO was able

to encourage the Hazard Mitigation Council to appoint a Vice Chair. The GAR is not always available and on-island which makes planning meetings difficult. It is the GAR's responsibility to call for a Hazard Mitigation Council meeting. Now the Vice Chair can take on this role. The SHMO maintained quarterly reports regarding the implementation of the 2011 plan. These reports informed the Council and the Planning Team on the status of mitigation action implementation. This work is expected to continue over the next five years. FEMA provided guidance to the SHMO and the Planning Team throughout the planning process.

Monitoring, Evaluating and Updating the Mitigation Plan

One of the primary purposes of this plan is to identify mitigation actions the Territory can implement to lessen their risk to natural hazards. Monitoring the implementation of those actions is a good way to measure success of the plan.

On at least an annual basis, beginning at least three months prior to each Grant application deadline, the State Hazard Mitigation Officer (SHMO) will inform the Hazard Mitigation Council of project status as well as requirements for upcoming grant applications. The SHMO will monitor grant application development and ensure review by the Hazard Mitigation Council prior to finalization. The above process and timing will ensure political and community consensus on mitigation requirements and mitigation activities.

Each of the government agencies submitting proposed mitigation actions is responsible for tracking their implementation. Representatives from each agency will submit the following form to the SHMO on a quarterly basis. The SHMO will gather the data and present it to the Hazard Mitigation Council in their quarterly meeting. For simplicity purposes the form may be transferred to an online format using Jotform.com or to a fillable PDF. The SHMO will request direction from the Hazard Mitigation Council regarding the easiest way for each agency to maintain accurate records and submit the following information.

The SHMO will maintain a Mitigation Action Spreadsheet to track the progress of each proposed action. The spreadsheet will include the information below as well as the ranking number established by the Hazard Mitigation Council and indicated in Chapter 6: Mitigation Strategy. The SHMO will update the spreadsheet as funding becomes available for projects or as they are completed, in addition to the quarterly updates.

Mitigation Action Progress Report				
Progress Report Period	From Date		To Date	
Action/Project Title				
Responsible Department				
Contact Name				
Contact Phone/E-mail				
Project Description				
Project Goal				
Project Objective				
Project Cost				
Project Status				
Date of Project Approval	Date of Project Start	Anticipated Date of Completion	Project Canceled	Project Delayed
Explanation of Delay or Cost Overruns				
Project Report Summary				
What was accomplished for this project during this reporting period?				
What obstacles, problems, or delays did the project encounter?				
Plans for next reporting period.				

Figure 1 Mitigation Action Progress Report

System for Reviewing Progress Towards Mitigation Goals
The Goal of the 2015 American Samoa Hazard Mitigation Plan, endorsed by the Territorial Hazard Mitigation Council, is to:

> Reduce the risk of all natural hazards (identified and unidentified) to the Territory, thus alleviating loss of life and property to insure the well being of the people of American Samoa.

Six objectives are attached to this goal:

1. Promote effective land use planning and regulation, as well as public awareness, in order to reduce damage from natural hazards.
2. Improve infrastructure development standards with special attention to mitigating the increasing flood hazard.
3. Develop and implement hazard mitigation projects aimed at reducing the risk of damage and destruction of existing assets and infrastructure from the full range of natural disasters threatening the Territory.
4. Improve building codes and standards, as well as training programs, in order to reduce disaster damage from strong winds, earthquakes and tsunamis.
5. Develop public information and education programs in order to reduce disaster damage from strong winds, earthquakes and tsunamis.
6. Fund related planning projects to strengthen mitigation standards, research, education, and outreach efforts.

This goal and these objectives have remained relevant since 2011 and are expected to remain relevant until 2019 when the plan is updated for FEMA approval.

The implementation of this plan's mitigation actions is the best indication of how well this goal and these objectives are being achieved. However, as actions are implemented and as hazards impact the Territory, it may be necessary to change the order of priority of mitigation actions. As the actions are re-evaluated annually and following each disaster, the Hazard Mitigation Council will review the mitigation goal and objectives for their relevancy. If the Hazard Mitigation Council deems it necessary the goal and objectives will be changed.

System for Reviewing Progress Towards Mitigation Actions
The Territorial Hazard Mitigation Council will review progress of the implementation of mitigation activities during the annual review of mitigation priorities. TEMCO and ODAPM will report on the status of projects funded under the Pre-Disaster Mitigation Grant program, Hazard Mitigation Grant Program and other sources of support for mitigation activities identified in this plan and subsequent plans in order to set priorities for the subsequent year.

The Territorial Hazard Mitigation Council may commission an external review of mitigation plans and mitigation activities carried under such plans. The Hazard Mitigation Plan will be evaluated and updated with the purpose of understanding and documenting changes, additions, and progress in mitigation programs and activities. This will encourage the Territory to solicit additional project funding through available funding sources.

FEMA has provided guidance for funding of the nationally competitive Pre-Disaster Mitigation Grant Program. The Territorial Hazard Mitigation Council is responsible for establishing project priorities for funding under the

Pre-Disaster Mitigation Grant Program to meet annual application deadlines. Following any Presidentially declared disaster in American Samoa; the Territorial Hazard Mitigation Council will reprioritize mitigation projects for the Hazard Mitigation Grant Program as soon as possible following the disaster.

Were 2011 Mitigation Actions Implemented as Planned?
Mitigation strategies have been implemented as planned. Since the Hazard Mitigation Plan acceptance in 2011, through Hazard Mitigation Plan implementation and deliberations by the Hazard Mitigation Council, American Samoa has demonstrated successful implementation of mitigation outreach and training programs to schools, villages, government, and industry. ODAPM has managed substantial funds from the Hazard Mitigation Grant Program for five disaster declarations, including:

- Severe Flooding, DR-1473, 2003
- Hurricane Heta, DR-1506, 2004
- Hurricane Olaf, DR-1582, 2005
- Tsunami, DR-1859, 2009
- Severe Storms, Flooding, Landslides, DR-4192, 2014

The 2011 Plan included thirty-eight hazard mitigation projects. Twelve of these projects have received funding. The funded projects include the Satala Power Plant Retaining Wall, undergrounding power lines, and flood mitigation projects. Details regarding the implementation of the 2011 projects are in Chapter 6: Mitigation Strategy.

Determining a positive benefit-cost analysis for projects is one of the most challenging aspects of mitigation action implementation. The government departments have not kept thorough disaster impact data in the past. The other challenge is gathering application data information from each department interested in funding. Each of these challenges will continue to be addressed by the Hazard Mitigation Council.

Multi-Hazard Mitigation Plan Summary

The Territory of American Samoa Multi-Hazard Mitigation Plan provides guidance for multi-hazard mitigation projects and activities on the islands of American Samoa. This plan has undergone a complete revision from the 2011 plan. This updated plan includes the best-available data for a new multi-hazard risk assessment. The plan fulfills FEMA's requirements for a "state" level mitigation plan according to (44 CFR § 201.4).

The Hazard Mitigation Council and the SHMO are committed to maintaining this plan and implementing the identified mitigation projects. The council knows that implementing these projects will save lives and property in the Territory of American Samoa.

CHAPTER VIII

Appendices

APPENDIX A - List of Acronyms

ASCMP	American Samoa Coastal Management Act
ASDRO	American Samoa Disaster Recovery Office
ASEPA	American Samoa Environmental Protection Agency
ASG	American Samoa Government
ASHPO	American Samoa Historical Preservation Office
ASPA	American Samoa Power Authority
ASTCA	American Samoa Telecommunications Authority
BCA	Benefit-Cost Analysis
BFE	Base Flood Elevations
CHAMP	Coastal Hazard Assessment and Management Program
COO	Chief Operating Officer
CRAG	Coral Reef Advisory Group
CRS	Community Ratings System
DBAS	Development Bank of American Samoa
DHS	Department of Homeland Security
DHSS	Human and Social Services
DMWR	Department of Marine and Wildlife Resources
DOC	Department of Commerce
DOE	Department of Education
DOH	Department of Health
DOJ	Department of Justice
DPA	Department of Port Administration
DPS	Department of Public Safety
DPW	Department of Public Works
DRG	Digital Raster Graphics
EAS	Emergency Alert System
ENSO	El Niño/Southern Oscillation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FMA	Flood Mitigation Assistance
GAR	Governor Appointed Representative
GIS	Geographic Information Systems
GRD	Geologic Resources Division
GRE	Geologic Resources Evaluation
HMGP	Hazard Mitigation Grant Program

HMGP	Hazard Mitigation Grant Program
HMC	Territorial Hazard Mitigation Council
I&M	Inventory and Monitoring Program
IBC	International Building Code
LUPA	Land Use Permit Application
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NPS	Non-Point Source
NRCS	Natural Resources Conservation Service (part of USDA)
NRID	Natural Resources Information Division
NWR	NOAA Weather Radio
NWS	National Weather Service
OP	Office of Procurement
OTICIDE	Officer of Territorial and International Criminal Intelligence and Drug Enforcement
PA	Public Assistance
PDC	Pacific Disaster Center
PDM	Pre-Disaster Mitigation
PNP	Private Non-Profit
PNRS	Project Notifications and Review System
RFC	Repetitive Flood Claims
SBA	Small Business Administration
SHMO	State Hazard Mitigation Officer
SOI	Southern Oscillation Index
SLR	Sea Level Rise
SRL	Severe Repetitive Loss
SSRI	Social Science Research Institute
TAOA	Territorial Administration on Aging
TEMCO	Territorial Emergency Management Coordinating Office
T-HAT	Tutuila Hazard Assessment Tool
TOFR	Territorial Office of Fiscal Reform
U.S.CRTF	United States Coral Reef Task Force
UBC	Uniform Building Code
USACE	United State Army Corps of Engineers

USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USGS	United States Geological Survey
WUIWT	Wildland/Urban Interface Working Team

APPENDIX B - List of Resources

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American Samoa Territorial Hazard Mitigation Council Bylaws

American Samoa Territorial
Hazard Mitigation Council
Bylaws

Article I – Name

I. The name of the organization is the American Samoa Territorial Hazard Mitigation Council (ASTHMC).

Article II- Purpose

II. The ASTHMC shall

i. Assist the office of the Governor and the American Samoa Government in identifying Hazard Mitigation issues and opportunities facing the territory of American Samoa for the purpose of developing a comprehensive hazard mitigation strategy.

ii. Prepare strategies, policies and reports on hazard mitigation issues, including hazard mitigation policy recommendations to the Governor, the Fono and key territorial agencies involved in mitigation related areas within their normal agency missions.

iii. Ensure that territorial agencies collaborate and cooperate fully to develop and execute sustainable hazard mitigation actions that will reduce the risk posed by all hazards to the territory, in addition to voluntary collaboration and cooperation involving private sector companies and non-governmental organizations which are engaged in work relevant to hazard mitigation.

iv. Coordinate with and support territorial agencies' efforts in obtaining and administering federal and other grants, including post-disaster mitigation grants available pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, for the purposes of promoting hazard mitigation opportunities within the territory.

v. Identify and prioritize mitigation activities, on an annual basis, for funding under the Pre-Disaster

Mitigation Program, Hazard Mitigation Grant Program, Flood Mitigation Assistance, Public Assistance and other funds that become available.

vi. Encourage and support the solicitation of grant support through other territorial agencies for hazard mitigation activities.

vii. Term of office for Council Members shall be staggered two-year terms, and to explicitly allow for members to be reappointed.

Article III-Definition

III. For the purpose of these Bylaws, the following definitions are derived from statutory documents which have been accepted as functional by all levels of government involved in emergency management activities or operations:

i. **Hazard Mitigation:** Any action taken to reduce or permanently eliminate the long-term risk to human life and property loss or damage from natural hazards.

ii. **Hazard Mitigation Grant Program (HMGP)**: An ongoing program involving a coordinated effort of State and county agencies and private organizations to reduce risks to people and property from natural hazards. During and after periods of Presidential declared disasters, the Stafford Act makes available Federal funds up to 15 percent of the estimated aggregate amount of grants for emergencies and permanent repairs with respect to a federally declared disaster. The Federal government may contribute up to 75 percent of any cost-effective measure to be implemented while State and county governments and private nonprofit organizations must contribute the remaining 25 percent in this cost-sharing relationship.

iii. **Major Disaster:** Any natural catastrophe (including hurricane, tornado, storm, high water, wind-driven water, tsunami, earthquake, volcanic eruption, landslide, mud slide, flood, or drought), or, regardless of cause, any fire or explosion which, in the determination of the President, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act to supplement the efforts and available resources of State and county governments and disaster relief organizations in alleviating the damage, loss, hardship, or suffering cause thereby.

iv. **Measure/Project:** Any activity proposed to reduce risk of future damage, hardship, loss, or suffering from major disasters. The terms (measure and project) are used interchangeably in Federal regulations.

v. **Stafford Act**: Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, signed into law on November 23, 1988, amended the Disaster Relief Act of 1974, PL 93-288.

vi. **State Hazard Mitigation Officer:** The officer coordinates and monitors all of the Territory's hazard mitigation programs.

vii. **Pre Disaster Mitigation (PDM) grant program:** a Federal Emergency Management Agency grant program that provides funding to States, Territories, Federally recognized Indian tribal, governments, and communities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding plans and projects reduce overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are awarded on a competitive base; the program is subject to annual reauthorization.

Article IV-Membership

IV. The Council shall be composed of minimum of seven members and a maximum of 13 members. The Council shall include two members from the legislative branch: One representative from the House and one from the Senate. The Council shall include one or two members from the non-governmental agencies. Territorial Emergency Management Coordinating Office (TEMCO) and American Samoa Disaster Recovery Office (ASDRO) shall provide members of their personnel to facilitate meetings and other functions required by the council members.

i. Members of the Mitigation Council members shall allow for staggered two-year terms or until council member is replaced.

ii. Council members explicitly allow to be reappointed by the governor based on recommendation from the council.

iii. In the event where there is a transition into a new administration, Deputy Directors will stand in as the members of each perspective agency until the newly appointed Governor is able to appoint new council members.

iv. A recommendation or request to remove a member of council will be made to the governor should a council member fail to attend three consecutive meetings. This does not include if a proxy is sent in place.

v. The Council may elect for a Vice-Chairperson (VC), to be selected by majority vote of members present at a quorum meeting of the Council. The VC shall serve as Chairperson in the absence of the Chair.

vi. The Chair will not cast votes except as needed to break a tie

vii. A Council member shall be a person with experience and interest in mitigation activities such as, but not limited to, the following areas of expertise: Historic Preservation, Environmental Protection, Risk Analysis, Hazard Analysis, Public Awareness, Education, Emergency Management, Structural Engineering, Public Works, Public Utilities, Insurance, Planning, Flood Control, Land Utilization, Waste Management, Sheltering, Energy, Construction, Communications, Building Codes, Architecture, and Coastal Zone Management. A member may be selected from governmental agencies, the private sector, and the public at large, if one of the above qualifications is met.

viii. The opinions of Council members need not represent the views of other organizations in which they have membership.

Article V-Officers

V. The Governor's Authorized Representative is the appointed chairperson for the American Samoa Territorial Hazard Mitigation Council (ASTHMC).

The duties of the Chairperson shall be:

a. Preside at all meetings of the Council;

b. Call for approval of the minutes of the preceding meeting when a council shall be present;
c. Announce the business before the Council Meeting;
d. Receive and submit all matters properly brought before the Council to call for votes upon the same, and to announce the results;
e. Act as spokesperson for the Council;
f. Perform other duties as may be required of such office.

The duties of the Staff Members shall be:

a. Keep accurate and current records of each meeting of the Council, noting all actions taken, whether carried or lost;
b. Call the meeting to order in the absence of the Chairperson and Vice Chairperson and proceed with the election of a temporary Chairperson;
c. Prepare and disseminate correspondence as directed;
d. Send out all notices of meetings;
e. Keep an account of receipts and expenditures.

Article VI-Meetings

VI. For a meeting to convene:

i. A Council must consist a minimum of the majority of the total membership to form a quorum.

ii. If a quorum is present, the act of the majority of the members present is equivalent to the act of the entire Hazard Mitigation Council

iii. Should a Council member be unavailable, they may send a proxy in their place.

iv. Should a Council member be unavailable, a written or email consent notifying the Chairman that a proxy will be sent in his or her stead. Correspondence must stipulate date of meeting he / she will not be in attendance.

v. Regular meetings of the Council shall be held three times per year. The Council may convene special meetings at any other times deemed appropriate.

vi. Special meetings may be called by the officers of the Council.

vii. Any Council member may request a matter be placed on the agenda by notifying the staff member five days before the date of a meeting.

viii. The Council shall be notified of any solicitation of outside party review of Council work. The reviewer shall be notified.

ix. Minutes of all meetings will be prepared by the Staff members and disseminated to all members prior to the next scheduled meeting.

Article VII-Petition for Adoption, Amendment, or Repeal of Bylaws

VII. Any voting Council member may petition the Council requesting adoption, amendment, or repeal of any article of the Bylaws.

i. The By-Laws may be amended at any regular or special meeting of the Hazard Mitigation Council by two-thirds vote of those present, provided that previous notice of the amendment was given to all Council members by the State Hazard Mitigation officer.

ii. Bylaws may be adopted, amended, or repealed by the vote in person of a majority the voting membership of the Council.

Article VIII-Validity

VIII If any section or part of the Bylaws is held to be invalid for any reasons whatsoever, such invalidity shall not affect the validity of the remaining sections of the Bylaws.

Article IX- Effective Date of these Rules

IX These Bylaws shall become effective upon approval of two-thirds or a quorum of the Hazard Mitigation Council.

January 2014 Agenda

American Samoa Hazard Mitigation Council Meeting
January 14, 2014
8:30 am to 9:30 am

Agenda

Welcoming Remarks – 8:30 am

- Lemanu P. Mauga Governor's Authorized Representative

Presentation

- Overview on the various Mitigation Programs

Purpose of Meeting

I. Hazard Mitigation Plan Update - Due July
   i. Propose to remove priority list of project
   ii. Suggest to prioritize the hazards in which the project will address

II. Objectives for the next 3 months
   i. Planning Process
   ii. Risk Assessment
   iii. Capability Assessment
   iv. Mitigation Strategy
   v. Plan Maintenance Process
   vi. Plan Adoption and Approval
   vii. Project Milestones and Deliverables

III. Review By-Laws for council

   i. For recommendation to be made at next meeting

IV. Schedule next meeting

Questions and Concerns

Closing

January 2014 Sign-In Sheet

Meeting: Hazard Mitigation Council

Date: 1/14/14

Time: 8:30am

Name	Title	Office/Agency	Email	Contact Information
Ameko Pato	Director	ASEPA	ameko.pato@epa.as.gov	633-5032
William Sili	Air and land Manager	〃	William.Sili@epa.as.gov	633-2304
Penaia Faalii	FSAN Manager	ASPA	Penaia@aspower.com	699-9890
LEWIS WOLMAN	CHAMBER OF COMMERCE → CHAIRMAN		Lewis.wolman@gmail.com	633-4790
CINTA BROWN	Deputy Director	ASDHS	j.brown@asdhs.as.gov	699-0411/733-2747
Alefa Afalava	EMERGENCY MGMT BRIG SPECIALIST	ASDHS TEMCO	a.afalava@asdhs.as.gov	699-0365/733-2462
G. AFALAVA	REPRESENTATIVE	FONO	gafaafalava@gmail.com	7335512
Noa Vae	Right of Way	Samoan Affairs		254.6453
Alfonso Galeai	Director	TOFR	alfonso.galeai@tofr.as.gov	699-1330
Salu Tuigamala	Deputy Director	TOFR	salu.tuigamala@tofr.as.gov	733-6579
Solia Mutini	SP ASST LT GOV	GO	solia.mutini@go.as.gov	770-9154
Seuifaleniu Tuiletasi	OO mgr.	OFU SO		733-3337
Candie Mutini	Compliance Officer	DPW	candie@asgdpw.org	733 9465
ESTELA RUBIN	CIVIL ENGINEER	DPW	estela@asgdpw.org	699-9924
Utualii I. Savusa	Director	AS DHS		
Luki Tuitasi	Asst. to Director	DPW		
Sina Voigt	Director	DPW		

February 2014 Agenda

American Samoa Hazard Mitigation Council Meeting
February 11, 2014
8:30 am to 9:30 am

Agenda

Welcoming Remarks – 8:30 am

- Lemanu P. Mauga Governor's Authorized Representative

Presentation

- Overview on the various Mitigation Programs

Purpose of Meeting

I. Hazard Mitigation Plan Update - Due July
   i. Propose to remove priority list of project
   ii. Suggest to prioritize the hazards in which the project will address

II. Objectives for the next 3 months
   i. Planning Process
   ii. Risk Assessment
   iii. Capability Assessment
   iv. Mitigation Strategy
   v. Plan Maintenance Process
   vi. Plan Adoption and Approval
   vii. Project Milestones and Deliverables

III. Review By-Laws for council
   i. For recommendation to be made at next meeting

IV. Schedule next meeting
   i. March ….

Questions and Concerns

Closing

February 2014 Sign-In Sheet

CONFERENCE MEETING SIGN IN SHEET

Meeting: HM Council

Date: 2/11/13

Time: 8:30 am

NAME	TITLE	OFFFICE/AGENCY	EMAIL	CONTACT INFO
Luki Tuitasi	Sp Asst/ Dir.	D.P.W	tuitasi.luki@gmail	733-4498
Sualevai DeSualevai	G.Manu'a L.OFF.	Manu'a OFF.	sualevai@go.as.gov	733-9336
Ameko Pato	Director	EPA	ameko.pato@epa.as.gov	731-5032
Iuniasolua T. Savusa	Director	ASDHS	iuni.savusa@gmail.com	699-0365
Jacinta Brown	Dep Director	–	j.brown@asdhs.as.gov	699-0411/733-0747
Moefa'auo B. Emmsley	CEO	ASTCA	bill.emmsley@astca.net	699-1121
Lewis Wolman	Chair.	Chamber of Commerce	lewis.wolman@gmail.com	252-0142
Faleosina Voigt	Director	Dept. of Public Works	faleosina@asgdpw.org	733-2699
Alfonso P. Galea'i	Director	TOFR/OPM	alfonso.galeai@tofr.as.gov	699-1330
Tuimavave T. Laulila	Governor's Special Proj Coordinat	Gov office	tuimavave.laulila@go.as.gov	258-7660
Solomona Aoelua	[illegible]	GO		770-9999

April 2014 Agenda

American Samoa Hazard Mitigation Council Meeting
April 23, 2014
10:30 am to 12:00 pm

Agenda

Welcoming Remarks – 10:30 am

- Lemanu P. Mauga Governor's Authorized Representative

Purpose of Meeting

i. Mitigation Council Meeting Focus and Introductions
ii. Mitigation Council By-Laws
   a. Discussion and Adoption
iii. Public Outreach
   a. Preparedness Survey
   b. Stakeholder Meetings
iv. Risk Assessment Featured Updates
   a. Include Manu'a Islands
   b. Additional Hazards
v. Critical Facilities
   a. Update to reflect building/retrofit on island
vi. Mitigation Actions
   a. Discuss areas of concern
vii. Schedule next meeting

Questions and Concerns

Closing

April 2014 Sign-In Sheet

TOFR SIGN IN SHEET

Meeting: HAZARD MITIGATION COUNCIL

Date: 4/23/14

Time: 10:30

NAME	TITLE	Division	EMAIL	CONTACT INFO
Solia Mutini		GO	solia.mutini@go.as.gov	
Tuimavave Laupola	Special Proj. CIP	GO	tuimavave.laupola@go.as.gov	
Ameko Pato	ASEPA		ameko.pato@epa.as.gov	
Uili Leauanae (for DOC Director K. Lafaele)			uili.leauanae@doc.as	633-5155
Utualii I. Savusa	DIR. ASDHS	ASDHS	i.savusa@asdhs.as.gov	699-0411
Claire Tuia Poumele	D.r	PORT	ctpoumele@gmail.com	733-3076
Faleosina Voigt	DIR. DPW	DPW	faleosina@asgdpw.org	699-9921
Luki Tuitasi	DPW	D.P.W	tuitasi.luki@gmail	733-4498
Candie Mutini	Compliance Officer	DPW	candie@asgdpw.org	699-9921
Faletagoai Tuiteleni	Senator	Fono		770-5479
Gafatasi Afalava	REP.	Fono	gafaafalava@gmail.com	733-9512
Alefa Afalava	Mitigation Coordinator	ASDHS TEMCO	afalava.alefa@yahoo.com	733-2462
Vinnie Atofau	TEMCO Manager	ASDHS/TEMCO	v.atofau@asdhs.as.gov	699-0411
Lewis Wolman	Bluesky / Chamber of Commerce		lwolman@bluesky.as	258-1077
Kirk Aab	IT Tech	DPW	kirk.aab@dpw.as.gov	252-4679
William Sili	Air and land manager	AS-EPA	william.sili@epa.as.gov	653-2304

May 2014 Agenda

American Samoa Hazard Mitigation Council Meeting
May 22, 2014
9:00 am – 11:00 am

Agenda

Welcoming Remarks

- Lemanu P. Mauga Governor's Authorized Representative

Purpose of Meeting

i. Mitigation Council Meeting Focus and Introductions
ii. Mitigation Council By-Laws
    a. Adoption
iii. Update Since April Meeting
    a. Website Created
    b. Preparedness Survey
    c. Stakeholder Meetings
    d. Outstanding Data
iv. Mitigation Plan Goals
    a. Current Goals
    b. Current Objectives
v. Proposed Mitigation Projects
vi. June Plans
    a. Jim Buika on island June 17-20th
        i. Council Meeting
        ii. Stakeholder Meetings

Questions and Concerns

Closing

TOFR SIGN IN SHEET

Meeting: HAZARD MITIGATION COUNCIL

Date: 5/22/14

Time: 9:00 am

NAME	TITLE	Division	EMAIL	CONTACT INFO
Tim Bodell	environ. engineer	AS EPA	tbodell@gmail.com	252-7700
Faamao Asalele	Deputy Director	AS-EPA	faamao.asalele@epa.as.gov	733 6157
G. AFALAVA	~~Fono~~ Rep.	FONO	gafaafalava@gmail.com	733-9512
James R Taylor	OSP MANAGER	ASTCA	SAICALA1009350@yahoo	733 9014
Taotasi Soliai	Itman rep	FONO	asoliai@hotmail.com	258-2770
April Tuufuli	Grants Financial Mgr	ASPA	atuufuli@aspower.com	699-7561
David J. Herdrich	Historic Preservation officer	ASHPO	tavita22@yahoo.com	254-3220
CHRIS KING	DEPUTY DIRECTOR	DPA	king_cjt@hotmail.com	258-5464
LEWIS WOLMAN	CHAMBER OF COMMERCE	CHAIRMAN	lwolman@bluesky.as	258-1077
Lemanu M				633-4116
Alfonso Galeai	Director, TOFR		agalea@tofr.as	699-1330

June 2014 Agenda

American Samoa Hazard Mitigation Council Meeting
June 19, 2014
9:30am – 12:00pm

Agenda

Welcoming Remarks

- Lemanu P. Mauga Governor's Authorized Representative

Purpose of Meeting

i. Mitigation Council Meeting Focus and Introductions

ii. Mitigation Council By-Laws

  a. Adoption

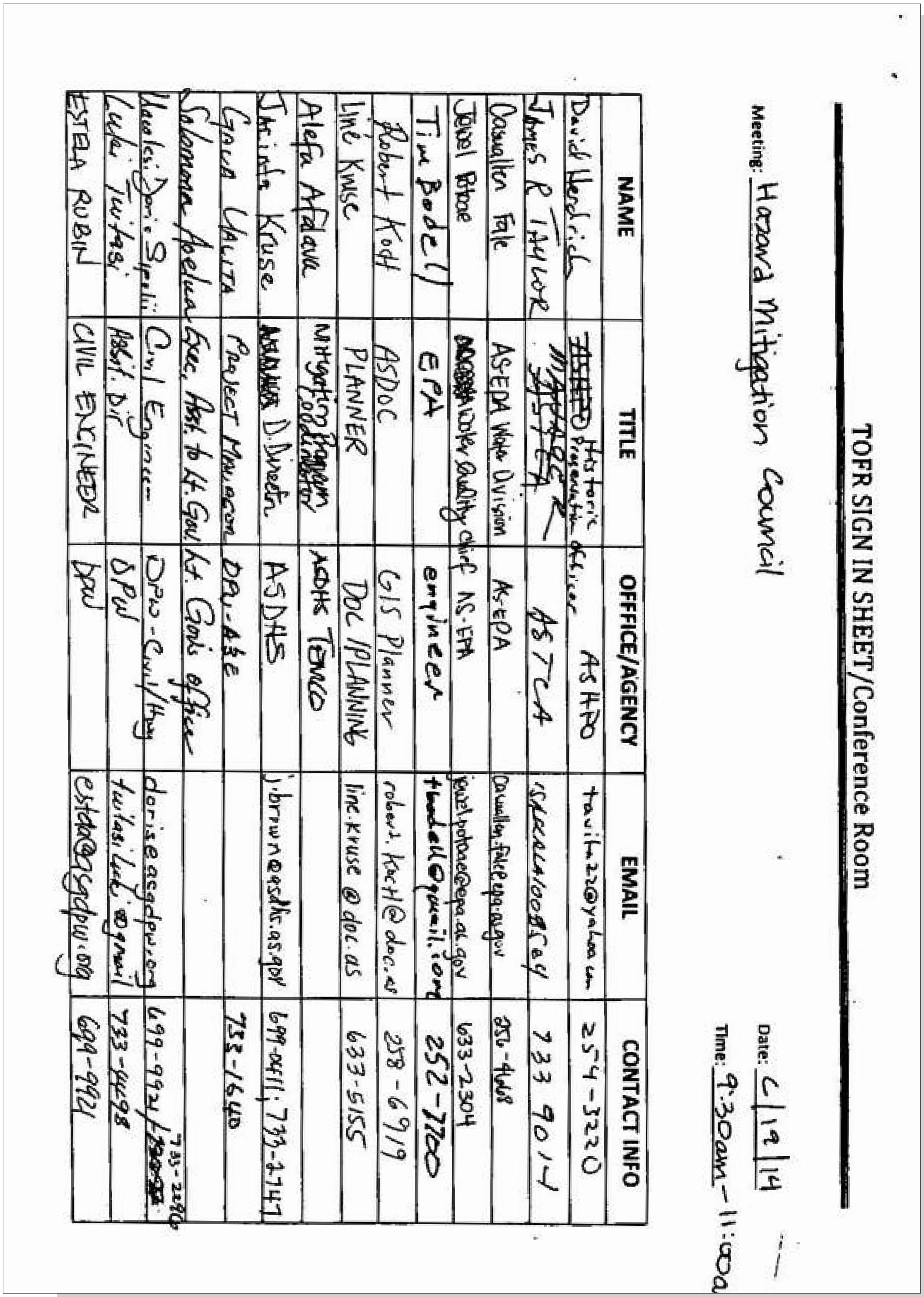
iii. Presentations for Proposed Mitigation Projects

#	AGENCY	TITLE	EST. PROJ. COST	POC	CONTACT #	EMAIL
1	ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines	916,546	James Taylor	733-9054	jtaylor@samoatelco.com
2	ASTCA	Amouli to Aoa U/G Communications Lines	1,208,042	James Taylor	733-9054	jtaylor@samoatelco.com
3	ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines	2,149,564	James Taylor	733-9054	jtaylor@samoatelco.com
4	ASTCA	Leone to Poloa U/G Communications Lines	3,270,351	James Taylor	733-9054	jtaylor@samoatelco.com
5	DHS	Wind Shutters EOC Project	43,496	Alefa Afalava	699-0411	a.afalava@asdhs.as.gov
6	DOC	Mapping Project	50,000	Sandra Lutu	633-5155	sandra.lutu@doc.as
7	DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)	2,400,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
8	DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataiv	4,000,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
9	DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a	300,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
10	DPW	#4 Leone Village Road	2,200,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
11	DPW	#5 Happy Valley Road Drainage	220,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
12	DPW	#6 Pava'ia'I Elementary	310,000	Don McMullin	699-9921	djmcmullin@hotmail.com
13	DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Scho	1,635,000	Don McMullin	699-9921	djmcmullin@hotmail.com
14	DPW	#8 Upgrading of DPW-M&O Building	400,000	Faleosina Voigt	699-9921	faleosina@asgdpw.org
15	EPA	Landslide Early Warning System - Faga'alu Pilot Project	278,000	Timothy Bodell	252-7700	tbodell@gmail.com
16	Port	Fuel Farm Relocation	5,500,000	Chris Soti	733-4548	chrissoti@yahoo.com
17	Port	Runway Shoreline Protection	5,000,000	Chris Soti	733-4548	chrissoti@yahoo.com
18	ASPA	Faga'alu Booster Station	200,000	Will Spitzenburg	699-7430	williams@aspower.com
19	ASPA	Pago Water Booster Station Mitigation	200,000	Will Spitzenburg	699-7430	williams@aspower.com
20	ASPA	Weather Proof Sewage Lift Stations	300,000	Steve Branz	699-1462	steveb@aspower.com
21	ASPA	Tafuna Wastewater Treatment Plant	450,000	Steve Branz	699-1462	steveb@aspower.com
22	ASPA	Water Wells Mitigation	1,000,000	Will Spitzenburg	699-7430	williams@aspower.com
23	ASPA	Water Tanks Mitigation	10,000,000	Will Spitzenburg	699-7430	williams@aspower.com

Questions and Concerns

Closing

June 2014 Sign-In Sheet



TOFR SIGN IN SHEET/Conference Room

Meeting: Hazard Mitigation Council

Date: 6|19|14

Time: 9:30am–11:00a

NAME	TITLE	OFFFICE/AGENCY	EMAIL	CONTACT INFO
David Herdrich	~~ASHPO~~ Historic Preservation Officer	ASHPO	tavita22@yahoo.com	254-3220
James R Taylor	~~ASTCA~~ MANAGER	ASTCA	isakala1008seq	733 9014
Casuallen Fale	AS-EPA Water Division	AS-EPA	Casuallen.fale@epa.as.gov	256-4668
Jewel Potoae	Water Quality Chief	AS-EPA	jewel.potoae@epa.as.gov	633-2304
Tim Bodell	EPA	engineer	tbodell@gmail.com	252-7700
Robert Koch	ASDOC	GIS Planner	robert.koch@doc.as	258-6919
Line Kruse	PLANNER	DOC/PLANNING	line.kruse@doc.as	633-5155
Alefa Afalava	Mitigation Program Coordinator	ASDHS TEMCO		
Jacinta Kruse	D. Director	ASDHS	j.brown@asdhs.as.gov	699-0411; 733-2747
Gaua Ualita	PROJECT MANAGER	DPW-A&E		733-1640
Salamona Aselua	Exec. Asst. to Lt. Gov.	Lt. Gov's office		
Uaealesi Doris Sipelii	Civil Engineer	DPW-Civil/Hwy	doris@asgdpw.org	699-9921/ 733-2290
Luki Tuitasi	Asst. Dir	DPW	tuitasi.luki@gmail	733-4498
ESTELA RUBIN	CIVIL ENGINEER	DPW	estela@asgdpw.org	699-9921

TOFR SIGN IN SHEET/Conference Room

Meeting: Hazard Mitigation Council

Date: 6/19/14

Time: 9:30 - 11 am

NAME	TITLE	OFFICE/AGENCY	EMAIL	CONTACT INFO
Reuben Sialtui	Chief Eng.	DPW	reuben@asgdpw.org	699-9921
Don McMullen	GEN-MANAGER	DPW	djmcmullen@hotmail	733-1646
Joachim	ESD Manager	ASPA	joachim@aspower.com	733-1151
Penaia Faalii	FSM Manager	ASPA	penaia@aspower.com	733-4552
Alfonso Galeai	Director	TOFR/OPM	alfonso.galeai@tofr.as.gov	633-1990
Laupule Tilei	Deputy	DPW	laupule@asgdpw.org	733-2001
JAMES BUIKA	Mitigation Consultant	Jamie Caplan Consulting	buikaj001@hawaii.rr.com	808 283 8636

July 2014 Agenda

American Samoa Hazard Mitigation Council Meeting
July 10, 2014
8:30am – 10:30am

Agenda

Welcoming Remarks

- Lemanu P. Mauga Governor's Authorized Representative

Purpose of Meeting

i. Mitigation Plan Goals & Objectives
   a. Current Goals
   b. Current Objectives
ii. Mitigation Council By-Laws
   a. Discussion and Adoption
iii. Prioritization of Mitigation Projects

Questions and Concerns

Closing

July 2014 Sign-In Sheet

TOFR SIGN IN SHEET/Conference Room

Meeting: Hazard Mitigation Council

Date: 7/10/14

Time: 8:30am - 10:20am

NAME	TITLE	OFFICE/AGENCY	EMAIL	CONTACT INFO
PAT M. GALEA'I	FED. GRANTS COORDINATOR	DOC	pat.galeai@doc.as	633-5155 x 231
GAFATASI AFALAVA	REP. HOUSE	FONO	gafaafalava@gmail.com	733-9512
Tamasi R. Tayler	OSP MANAGER	ACTCA	isakalolo0735@yahoo	733 9014
David J. Herdrich	Historic Preservation Officer	ASHPO	tavita22@yahoo.com	254-3220
Faleosina Voigt	DPW Director	DPW	faleosina@asgdpw.org	733-2699 699-9921/72
Joadian	ASPA ED	ASPA	joadian@aspower.com	733 1031
Will Spitzenberg	SR WATER ENGINEER ~~ASPA~~	ASPA	william@aspower.com	~~733~~ 699-7430
LEWIS WOLMAN	CHAIRMAN	CHAMBER OF COMM	lwolman@blueskynet.as	258-1077
Alfonso P. Galea	Director TOFR	TOFR	alfonso.galea@tofr.as.gov	699-1330
Ameko Pato	DM ASEPA	ASEPA	ameko.pato@epa.as.gov	633-5466
Utuali'i Iuni T. Savusa	DIR. ASDHS	ASDHS	i.savusa@asdhs.as.gov	699-0417
Claire Tuia Poumele	Dir	DPA	claire.poumele@dpa.as.gov	733-3076
Steve Maga	HM Coordinator	TOFR	steve.maga@tofr.as.gov	699-1330

Mitigation Project Ranking Worksheet
Territory of American Samoa Multi-Hazard Mitigation Plan

Please use the following criteria to assist you in ranking the order of mitigation projects on the following pages. The first choice in the table beginning on page two is to identify which hazard-ranking category each mitigation project addresses. For instance, undergrounding power lines are most likely to address Tropical Cyclones so it would receive 3 points. If a project addresses multiple hazards please choose the highest hazard ranking number. Hazard Ranking points are in Table 1 below.

Table 1 Hazard Ranking

Points	Hazard Ranking	Hazards
3	High	Landslides Tsunami Flood Tropical Cyclone
2	Moderate	Earthquake HAZMAT Climate Change (including SLR) Coastal Erosion Drought High Surf
1	Low	Lightning Wildfire Volcano Soil Hazards

The second choice on the table will help you identify the beneficial impact of each mitigation project. Again please choose the highest number if a project is relevant to more than one Project Result. Project Result Points are in Table 2 below.

Table 2 Mitigation Project Results

Points	Hazard Ranking
4	Projects that save lives and protect property from natural hazards.
3	Projects that protect property from natural hazards.
2	Projects that reduce the probability of personal or property damages from natural hazards.
1	Projects that educate people on the subjects of hazard mitigation, hazard research, and disaster preparedness

The highest number in the Total column will be 7 and the lowest will be 2. Multiple projects will have identical project ranking. If a project should receive a "high" score and it ranked medium than please make a note of this. We can make changes to ranking based on decisions made by the Council.

We will reclassify the list below into three categories, high (7 points), medium (4-6 points), and low (2-3 points) for the purposes of the Hazard Mitigation Plan.

Points	Agency	Project Title	Hazard Ranking			Mitigation Project Result Points				Total
			3-High	2-Med	1-Low	4	3	2	1	
2011 Mitigation Plan Projects										
Example		*Satala Power Plant*	*3*			*4*				7
2	DPR	Vaipito Stream Revetment								
3	ASPA	Leone to Amanave Underground (U/G) lines								
4	ASTCA	Airport to Malaeimi U/G lines								
5	DPW	Maintenance and Operation Building Enhancement - DPW Project #8 Below								
6	DPW	Afono Culvert Improvement								
7	ASPA	Nuuli to Mesepa U/G lines								
8	ASTCA	Mesepa to Futiga U/G lines								
9	ASPA	Poloa to Fagamalo U/G lines								
10	ASTCA	Pavaiai to Aoloau U/G lines								
11	DPW	Fagaima Road Flood Mitigation								
12	DPW	Ottoville Drainage Flood Mitigation								
14	DPR	Faga'alu Shoreline Wave Action Mitigation								
15	DOC	Evacuation and Fagatogo Wave Action Mitigation								
16	DPW	Permanent Landslide Repair Route 11								
17	DPW	Permanent Landslide Repair Route 005								
18	DPR	Pago Pago-West Wave Action Mitigation								
19	DPW	Fatuoaiga Drainage Flood Mitigation								
20	DPW	Ili'ili Drainage Flood Mitigation								
21	DPR	Utulei Shoreline Wave Action Mitigation								
22	ASPA	Fagatogo Reservoir Mitigation								

Points	Agency	Project Title	Hazard Ranking			Mitigation Project Result Points				Total
			3-High	2-Med	1-Low	4	3	2	1	
23	ASPA	Utumoa River Flood Mitigation								
24	HC	High Court and District Court Building Relocation - Change to Elevation Project								
25	DPW	Tago Stream Flood Mitigation								
26	DOE - Now DPW	ASG-DOE Facilities Electrical Upgrade								
27	OPI	Office of Public Information Building								
28	ASTCA	Generator Sets								
Proposed Projects to add to 2014 Mitigation Plan										
1	ASTCA	Afono Pass to Blue Sky Tower U/G Communications Lines								
2	ASTCA	Amouli to Aoa U/G Communications Lines								
3	ASTCA	Fagaitua,Masefau,Masausi,Sailele U/G Comm. Lines								
4	ASTCA	Leone to Poloa U/G Communications Lines								
5	ASTCA	Aunu'u Tower Replacement Parts								
6	ASTCA	Lauli'I/Breaker's Point Tower Replacement Parts								
7	ASTCA	Manu'a Islands U/G Comm. Lines								
8	DHS	Wind Shutters EOC Project								
9	DOC	Mapping Project								
10	DPW	#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)								
11	DPW	#3 Amouli Stream Mitigation Project Ofu, Manu'a								
12	DPW	#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)								
13	DPW	#4 Leone Village Road								

Points	Agency	Project Title	Hazard Ranking			Mitigation Project Result Points				Total
			3-High	2-Med	1-Low	4	3	2	1	
14	DPW	#5 Happy Valley Road Drainage								
15	DPW	#6 Pava'ia'I Elementary								
16	DPW	#7 Electrical Upgrades Campus Grounds Drainage 10 Schools								
17	DPW	#8 Upgrading of DPW-M&O Building								
18	EPA	Landslide Early Warning System - Faga'alu Pilot Project								
19	Port	Fuel Farm Relocation								
20	Port	Runway Shoreline Protection								
21	ASPA	Faga'alu Booster Station								
22	ASPA	Pago Water Booster Station Mitigation								
23	ASPA	Weather Proof Sewage Lift Stations								
24	ASPA	Tafuna Wastewater Treatment Plant								
25	ASPA	Water Wells Mitigation								
26	ASPA	Water Tanks Mitigation								

June 2014

TOFR SIGN IN SHEET/Conference Room

Meeting: Stakeholder Homeland Security

Date: 6/17/14
Time: 9:30 am – 10:30am

NAME	TITLE	OFFICE/AGENCY	EMAIL	CONTACT INFO
Jacinta Brown	Deputy Director	ASDHS	j.brown@asdhs.as.gov	733-2747
Lima Fiatoa		ASDRO	lima.fiatoa@tofr.as.gov	731-9990
Steve Maga		ASDRO/TOFR	steve.maga@tofr.as.gov	733-5620
Alefa Afalava		TEMCO	a.afalava@asdhs.as.gov	733-2462
Vinnie Atofau	Emergency Manager			
Jim Buika	Disaster Mgmt Expert	Jamie Caplan Consulting	buikaj001@hawaii.rr.com	808 283 8636

TOFR SIGN IN SHEET/Conference Room

Meeting: ASPA Stakeholder Meeting

Date: 6/17/14
Time: 2pm – 3:30pm

NAME	TITLE	OFFICE/AGENCY	EMAIL	CONTACT INFO
April Tuufuli	Grants Financial Mgr	ASPA	atuufuli@aspower.com	699-7561
Anita I. Mulisela	"	ASPA	anita@aspower.com	"
William E. Spitzenberg	Sr. Water Engineer	ASPA	williams@aspower.com	733-3299
Joachim Fonoti	ESD Manager	ASPA	joachim@aspower.com	733-1151
Lima Fiatoa		TOFR	lima.fiatoa@tofr.as.gov	731-9990
Jim Buika	consultant.	Jamie Caplan Consulting	buikaj001@hawaii.rr.com	(808) 283-8636

TOFR SIGN IN SHEET/Conference Room

Meeting: ASEPA Stakeholder Meeting

Date: 6/17/14

Time: 11:30am – 1pm

NAME	TITLE	OFFFICE/AGENCY	EMAIL	CONTACT INFO
Tim Bodell	Technical services	ASEPA	tbodell@gmail.com	252 7700
Lima Fiatoa	*	TOFR	lima.fiatoa@tofr.as.gov	731-9990
Jim Buika	Opportunity gator	Jamie Caplan Consulting	buikaj001@hawaii.rr.com	808 283 8636
Steve Maga		ASDRO / TOFR	steve.maga@tofr.as.gov	733-5620

TOFR SIGN IN SHEET/Conference Room

Meeting: DPW Stakeholder Meeting.

Date: 6/18/14

Time: 1:20 pm

NAME	TITLE	OFFFICE/AGENCY	EMAIL	CONTACT INFO
JAMES BUIKA	Planning Consultant	JAMIE CAPLAN LLC	buikaj001@hawaii.rr.com	(808)283-8636
ESTELA RUBIN	DPW – ENGR. I	DPW	estela@asgdpw.org	721-1105/699-9921
Uaealesi Doris Sipelu	Civil Engineer	DPW – Civil/Highway	doris@asgdpw.org	699-9901/733-2296
Lima Fiatoa			lima.fiatoa@tofr.as.gov	731-9990
Steve Maga	HM Coordinator	TOFR/ASDRO	steve.maga@tofr.as.gov	733-5620
Reuben S.	DPW – Chief Eng	DPW	reuben@asgdpw.org	733-1381

TOFR SIGN IN SHEET

Meeting: DOC stakeholder Meeting

Date: 6/20/14

Time: 10am – 12pm

NAME	TITLE	Division	EMAIL	CONTACT INFO
Steve Maga	HM Coordinator	TOFR	steve.maga@tofr.as.gov	
Marvis Vaiagae	PNRS Coordinator	DOC	marvis.vaiagae@doc.as	254-6117
Robert Koch	GIS	DOC	robert.koch@doc.as	258-6919
Kang Sevao	GIS Tech 1	DOC	kang.sevao@doc.as	254-7848
James Buika	Disaster Management Expert	Jamie Caplan Consulting	buikaj001@hawaii.rr.com	
				808-283-8636

April 2014 Sign-In Sheet

TOFR SIGN IN SHEET

Meeting: DPS - Stakeholder

Date: 4/23/14

Time: 1:40 pm

NAME	TITLE	Division	EMAIL	CONTACT INFO
Cliff O'Brien	Fire Chief	Dept. Public Safety	obrien_cliff@yahoo.com.	733-7222
Maino Mose	Fire Fighter I	DPS	mainomose22@yahoo	731-8[illegible]
[illegible]	Project Lead	JCC	jamiee jamiecoph[illegible]	413-586-0867
Caroline Cunningham	risk assessment/	JCC / LBG	cacunningham@lbghg[illegible].com	417-7009-2438

TOFR SIGN IN SHEET

Meeting: ASTCA

Date: ______

Time: ______

NAME	TITLE	Division	EMAIL	CONTACT INFO
Vamos R Taylor	Project Manager	ASTCA	isakalq1[illegible]935@yahoo.com	733-9014

TOFR SIGN IN SHEET

Meeting: DOC

Date: 4/24/14

Time: 130 PM

NAME	TITLE	Division	EMAIL	CONTACT INFO
KENISELI LAFAELE	DIRECTOR	DOC	keniseli.lafaele@doc.as	633 5155
Robert Koch	GIS Planner	DOC - ASCMP	robert.koch@doc.as	684-258-6919
Marvis Vaiaga	Permit Mgr.	DOC-ASCMP	marvis.vaiagae@doc.as	254-6117
Alefa Afalava	HAZARD MITIGATION COORDINATOR	ASDHS-TEMCO	afalava.alefa@yahoo.com	733-2462
PAT M. GALEA'I	FED. GRANTS COORDINATOR	DOC PLANNING	pat.galeai@doc.as	633-5155 x231
Uili Leauanae	Deputy Director	DOC	[illegible]	[illegible]
LIMA FIATOA		TOFR	lima.fiatoa@tofr.as.gov	63[illegible]
Jamie Caplan	Project Lead	JCC	jamie@jamiecaplan.com	
Caroline Cunningham	risk assessment Subcontractor	JCC/LBG	cacunningham@louisberger.com	919-609-2430
Sandra Lutu	ASCMP Manager	DOC-ASCMP	sandra.lutu@doc.as	254-7791
Junior Sauni	GIS Tech	DOC-ASCMP	junior.sauni@doc.as	633-5151
Alex Zodiacal	EDD Mgr	DOC-EDD	alex.zodiacal@doc.as	633-5155

Name	Department	Email	Phone
Joachim Fong	ASPA	joachim@aspower.com	7331151
Walton Young	ASPA	walton@aspower.com	2580268
Alefa Afalava	TEMCO	afalava.alefa@yahoo.com	733-2462
Steve Maga	TOFR	steve.maga@tofr.as.gov	733-5620
Caroline Cunningham	JCC	cacunningham@louisberger.com	
Jamie Caplan	JCC	jamie@jamiecaplan.com	413-586-0867
Edward Setu	ASPA	eti@aspower.com	733-1719
Lima Fiatoa	TOFR	lima.fiatoa@tofr.as.gov	
Aperica Tuufuli	ASPA	atuufuli@aspower.com	699-7561
Sivakumar	ASPA	sivak@aspower.com	6991505
Ted Lacato	ASPA	Ted@aspower.com	2522824

April 2014 Sign-In Sheet

TOFR SIGN IN SHEET

Meeting: Town Hall Meeting

Date: 4/25/14

Time: 8am

NAME	TITLE	Division	EMAIL	CONTACT INFO
Salu Tuigamala	Dep. Dir.	TOFR	salu.tuigamala@tofr.as.gov	699-1830
Sandi Tonumaipe'a		GO.	sandi.tonumaipea@tofr.as.gov	256-7114
Aperila Taufeti	Grants/Financial Mgr	ASPA	ataufeti@aspower.com	699-7561
Anita Malisdu	Assistant	ASPA		699-7561
Caroline Cunningham	Contractor	JCC/LBG	ccunningham@lausberger.com	—
Jamie Caplan	project lead consultant	JCC	jamie@jamiecaplan.com	—
JoAnn Vaka	HR Administrator	TOFR	joann.vaka@tofr	699-1330
Taeaotui P.T.	[illegible]	—	—	
[illegible]	Super	PWD		
Erica Magalei	IT Manager	TOFR	erica@meli.com	699-1330
Lanny Sanitoa	Representative	FONO	lsanitoa@blueskynet.as	733-3501
Kirk Aab	IT Technician	DPW	Kirk.Aab@gmail	
Lemapu Fairholt	Grants Assistant	TOFR	lemapu.fairholt@tofr.as.gov	699-1329
Toaiva Mauga-Seve	Exe. Assistant	TOFR	toaiva.seve@tofr.as.gov	699-1329
Lisa Talamoa	HR Asst Admin	TOFR	lisa.talamoa@tofr.as.	699-7920

TOFR SIGN IN SHEET

Meeting: Town Hall Meeting

Date: 4/25/14

Time: 8am

NAME	TITLE	Division	EMAIL	CONTACT INFO
Ramona Paselio	IT	TOFR-OPM	mpaselio25@yahoo.com	699-1330
Alphonsus Pereira	Insurance Administrator	TOFR	a.pereira@tofr.as.gov	699-1330
Solinuu Sauvao	Field Compliance Admin	TOFR-FCO	solijsa@yahoo	699-1330
MAUREEN A.F. SAULO	ADMIN. ASSISTANT	TOFR	maureen.saulo@tofr.as.gov	699-1329
ARAMOA APA	PROJ. MGR	DPW	talivaa.apa@gmail.com	770-1187
Patrick T. Reid	Tsunami proj mgr	ASDHS	p.reid@asdhs.as.gov	258-7661
Alefa Afalava	HAZMIT COORDINATOR	TEMCO	a.afalava@asdhs.as.gov	733-2462
GALA UALITA	FCO	TOFR	gala.ualita@tofr.as.gov	733-1640
Levi Levi	FCO Supervisor	TOFR	—	—

samoa news, Wednesday, April 23, 2014 ♦ Page 5

DOE Director concurs with head of Family Planning...

SEX ED SHOULD BE TAUGHT IN SCHOOL

by Fili Sagapolutele
Samoa News Correspondent

Education Department director Vaitinasa Dr. Salu Hunkin-Finau said Samoan parents today may not be inclined to have sex education taught in classrooms, and that the issue of sex education is "still swept under the rug". However, the DOE director said that she concurs with Marilyn A. Pavitt-Anesi, who heads LBJ hospital's Family Planning division, that sex education should be part of the health curriculum, and taught in a culturally sensitive manner.

Pavitt-Anesi told Samoa News that data on teen pregnancy between 2011 and 2013 shows an increase of only point-three of one percent, but she believes these statistics can be brought down further, and there is more work to be done.

She recalled that in 2012, Fagaitua High School seniors hosted a forum for politicians running for the local House race in the Eastern District, and students noted at that forum that they wanted sex education as part of their school curriculum.

Pavitt-Anesi supports "having health education courses which include sex education" (but that is her own personal opinion) and she supports it being taught in a manner that is culturally accepted, in order to get the right message across to teenagers. (See yesterday's story for more details)

Responding to Samoa News questions and request for comments, Dr. Hunkin-Finau pointed out that typical Samoan parents today may not be so inclined for DOE to teach sex education at all in public schools.

"...however, I truly believe if parents were made aware of the rise in teen pregnancy in our community over the last five years, and the impact of teaching sex education compared to not educating students about sex, I believe most parents would be open to reviewing the curriculum and having their children learn about it in school," she said Monday night.

"I believe our community has come of age regarding this rather sensitive issue — because it's not just about the physical development of the reproductive system of males and females, but tied very closely to this aspect, is the moral responsibility NOT taught alongside the physical development part of the curriculum in school," she said.

"The moral responsibility part of teaching sex education must be borne by the parents, community and religious leaders," said the DOE director, who added that a "classic example of what happens to a community faced with a brewing issue — denied its importance for discussion and preventive plan — is the the most recent pink eye epidemic."

"I was surprised. It caught people like wild fire. Over 3000 students and over 300 teachers and staff were affected. Despite Health Department's not so enthusiastic campaign to inform the public to stay home, wash hands, etc., people and children were still visible with pink eye everywhere in public," she said. "Why was that? In my humble opinion, people did and still do not thoroughly understand pink eye, how to prevent spreading it, and steps to take care of it, if contracted.

"Sex education or 'Aoaoga tau Itu Tino Sa' has not received its full approval from the community to be thoroughly taught in the classroom. Sex Education is still swept under the rug [or in Samoan] O se mataupu o loo ta'ai faafala ona o le popolega o matua I lona faatalanoaina maaleale," the DOE director said.

Dr. Hunkin-Finau says she concurs with Marilyn Pavitt-Anesi's opinion that sex education should be taught in school in a culturally responsive manner and that it should be part of the Health/Physician Education (PE) course work. "I believe students in grades 7 to 12 should have at least a half a semester of Health/PE class which should include sex education," she noted.

She offered a suggestion for Samoa News and its reporter. She said, "It would be interesting if you were to do a random survey of, say, 100 high school parents and 100 elementary parents of students in grades 6-8, to ask how they feel about sex education and whether it would be beneficial for their children if offered in school, what age it should be taught and how/what specific contents should be taught."

U.S. Vice President Joe Biden, left, talks with Ukrainian Prime Minister Arseniy Yatsenyuk during a meeting in Kiev, Ukraine, Tuesday, April. 22, 2014. Biden called on Moscow to encourage pro-Russia separatists in eastern Ukraine to vacate government buildings and checkpoints, accept amnesty and "address their grievances politically." (AP Photo/Sergei Chuzavkov)

American Samoa Hazard Mitigation Council Hosts Hazard Mitigation Meetings

April 21-25, 2014

American Samoa Hazard Mitigation Plan

The American Samoa Hazard Mitigation Council is hosting a **Town Hall Meeting** on Friday, April 25, 2014 from 8am to 11am at the Department of Public Works 2nd floor conference room to discuss American Samoa's Hazard Mitigation Plan for reducing risk to natural hazards such as earthquake, landslides and tsunami. The public is encouraged to attend this Town Hall Meeting and to speak-up regarding their interests and concerns for strategies that could reduce risk in American Samoa. Mitigation strategies include planning, policy and regulation changes, educational programs, and infrastructure projects among others.

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The Territory of American Samoa's "FEMA approved" mitigation plan enabled over $18 million for hazard mitigation funding following the 2009 tsunami disaster. FEMA provides funds for mitigation work before and after a disaster if an approved mitigation plan is in place. Keeping the plan current protects the Territory. Projects identified in the plan receive priority as funding becomes available.

Projects such flood control projects in Fagatogo, Faga'alu and Matu'u. The hardening of government infrastructures such as the conversion of aerial utility lines into underground conduits as well as roof hardening projects to address wind hazards.

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NEWS IN BRIEF...

Continued from page 8

The Dutch ministry statement said such incidents have occurred before, citing one from March 21 and another from Sept. 10 last year.

SINKHOLE IN FLORIDA SEEMS TO BE OPENING AGAIN

THE VILLAGES, Fla. (AP) — A sinkhole that was plugged over the weekend between two houses in a sprawling Florida retirement community appears to be opening again.

Gina Lambert of the Villages Public Safety Department said Wednesday that the sinkhole expanded overnight by another 6 to 10 feet. She said crews will probably pour cement into the more than 50-foot deep hole. Crews poured dirt into the hole throughout the day.

Over the weekend, repair crews filled the sinkhole after neighbors noticed it was growing and alerted authorities. At that time, a Tampa firm had been working on the sinkhole for about three weeks.

District Public Safety Battalion Chief Pete Carpenter said Saturday that the sinkhole expanded under the foundations of both houses.

UNITED FLIGHT DIVERTS TO LA WITH ENGINE PROBLEM

LOS ANGELES (AP) — A Federal Aviation Administration spokesman says a United Airlines flight from San Francisco to San Diego diverted to Los Angeles International Airport because of an engine issue.

FAA spokesman Ian Gregor says United Flight 284 landed without incident at 7:27 a.m. Wednesday.

There are no immediate details of the nature of the problem with the aircraft, a twin-engine Boeing 757.

The airline's flight status website notes the diversion and a delay for maintenance.

CAMILLA'S BROTHER DIES IN NEW YORK OF HEAD INJURY

NEW YORK (AP) — The Prince of Wales and his wife, Camilla, are "utterly devastated" by the death of her brother, who fell outside a hotel bar and suffered a head injury.

Mark Shand, chairman of an elephant conservation charity, was in New York for a charity auction at Sotheby's.

The New York Police Department said he had arrived at the Gramercy Park Hotel's Rose Bar just before 1 a.m. Wednesday accompanied by a relative. He went out to smoke a cigarette around 2:30 a.m. and fell backward as he tried to re-enter through a revolving door, they said. He was taken to a hospital, where he was pronounced dead at 11:25 a.m., police said. The cause of his death will be determined by the medical examiner's office.

Shand, 62, was known for his work as a travel writer and conservationist. He was the author of several books including "Elephant Tales" and "River Dog: A Journey Down the Brahmaputra."

OBAMA CALLS FOR PEACEFUL END TO ISLAND DISPUTE

TOKYO (AP) — President Barack Obama says he wants to see a dispute between China and Japan over islands in the East China Sea resolved peacefully.

But he is affirming that U.S. treaty obligations to Japan cover all areas under Japan's administration. He's referring to the disputed Senkaku islands.

China also claims the remote islands. The dispute has badly strained relations between the two Asian powers.

Obama says the islands have historically been administered by Japan and the U.S. does not believe that they should be subject to change unilaterally.

Obama said at a press conference with Japan's prime minister that he wants the maritime issue to be worked out "through dialogue."

He urged them to "keep the rhetoric low."

(Continued on page 14)

President Barack Obama, left, and Japanese Prime Minister Shinzo Abe shake hands as they arrive to participate in a bilateral meeting at the Akasaka State Guest House in Tokyo, Thursday, April 24, 2014. Facing fresh questions about his commitment to Asia, Obama will seek to convince Japan's leaders Thursday that he can deliver on his security and economic pledges, even as the crisis in Ukraine demands U.S. attention and resources elsewhere. (AP Photo/Carolyn Kaster)

Tiny Pacific nation sues 9 nuclear-armed powers

NEW YORK (AP) — The tiny Pacific nation of the Marshall Islands is taking on the United States and the world's eight other nuclear-armed nations with an unprecedented lawsuit demanding that they meet their obligations toward disarmament and accusing them of "flagrant violations" of international law.

The island group that was used for dozens of U.S. nuclear tests after World War II filed suit Thursday against each of the nine countries in the International Court of Justice in The Hague, Netherlands. It also filed a federal lawsuit against the United States in San Francisco, naming President Barack Obama, the departments and secretaries of defense and energy and the National Nuclear Security Administration.

The Marshall Islands claims the nine countries are modernizing their nuclear arsenals instead of negotiating disarmament, and it estimates that they will spend $1 trillion on those arsenals over the next decade.

"I personally see it as kind of David and Goliath, except that there are no slingshots involved," David Krieger, president of the California-based Nuclear Age Peace Foundation, told The Associated Press. He is acting as a consultant in the case. There are hopes that other countries will join the legal effort, he said.

The countries targeted also include Russia, Britain, France, China, Israel, India, Pakistan and North Korea. The last four are not parties to the 1968 Nuclear Nonproliferation Treaty, but the lawsuits argue they are bound by its provisions under "customary international law." The nonproliferation treaty, considered the cornerstone of nuclear disarmament efforts, requires negotiations among countries in good faith on disarmament.

None of the countries had been informed in advance of the lawsuits. U.S. State Department spokeswoman Jen Psaki declined to comment on the lawsuit.

Paul Hirschson, a spokesman for the Israeli Foreign Ministry, said he was unaware of the lawsuit, however "it doesn't sound relevant because we are not members of the nuclear nonproliferation treaty."

"It sounds like it doesn't have any legal legs," he said about the lawsuit, adding that he was not a legal expert.

The Marshall Islands were the site of 67 nuclear tests by the United States over a 12-year period, with lasting health and environmental impacts.

"Our people have suffered the catastrophic and irreparable damage of these weapons, and we vow to fight so that no one else on earth will ever again experience these atrocities," the country's foreign minister, Tony de Brum, said in a statement announcing the lawsuits.

The country is seeking action, not compensation. It wants the courts to require that the nine nuclear-armed states meet their obligations.

"There hasn't been a case where individual governments are saying to the nuclear states, 'You are not complying with your disarmament obligations,'" John Burroughs, executive director of the New York-based Lawyers Committee on Nuclear Policy, part of the international pro bono legal team, told the AP. "This is a contentious case that could result in a binding judgment."

Several Nobel Peace Prize winners are said to support the legal action, including South African Archbishop Desmond Tutu and Iranian-born rights lawyer Shirin Ebadi. "We must ask why these leaders continue to break their promises and put their citizens and the world at risk of horrific devastation," Tutu said in the statement announcing the legal action.

The Marshall Islands is asking the countries to accept the International Court of Justice's jurisdiction in this case and explain their positions on the issue. The court has seen cases on nuclear weapons before. In the 1970s, Australia and New Zealand took France to the court in an effort to stop its atmospheric nuclear tests in the Pacific.

The idea to challenge the nine nuclear-armed powers came out of a lunch meeting in late 2012 after the Nuclear Age Peace Foundation gave the Marshall Islands foreign minister a leadership award, Krieger said.

"I've known Tony long time," he said. "We both have had a strong interest for a long time in seeing action by the nuclear weapons states."

Frustration with the nuclear-armed states has grown in recent years as action toward disarmament appeared to stall, Burroughs and Krieger said.

"One thing I would point to is the U.S. withdrawal in 2002 from the Anti-Ballistic Missile Treaty; that cast a shadow over future disarmament movement," Krieger said. The treaty originally had bound the U.S. and the Soviet Union. "One other thing, in 1995, the Nuclear Nonproliferation Treaty had a review and was extended indefinitely. I think the nuclear states party to the treaty felt that once that happened, there was no longer pressure on them to fulfill their obligations."

In 1996, the International Court of Justice said unanimously that an obligation existed to bring the disarmament negotiations to a conclusion, Burroughs said. Instead, "progress toward disarmament has essentially been stalemated since then," he said.

Some of the nuclear-armed countries might argue in response to these new lawsuits that they've been making progress in certain areas or that they support the start of negotiations toward disarmament, but the Marshall Islands government is likely to say, "Good, but not enough" or "Your actions belie your words," Burroughs said.

The Marshall Islands foreign minister has approached other countries about filing suit as well, Krieger said. "I think there has been some interest, but I'm not sure anybody is ready."

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American Samoa Hazard Mitigation Council

May 6th, 2014

To: All ASG Agencies, Departments, Offices and Authorities
All Eligible Non-Profit Agencies

From: Chairman, Hazard Mitigation Council
Lemanu P. Mauga, Governors Authorized Representative

Subject: Call for Proposed Hazard Mitigation Projects

This letter is to serve notice that all interested parties may now submit proposals for Hazard Mitigation Projects. The deadline for the submission of proposals is May 19th, 2014 to Ms. Lima Fiatoa, State Hazard Mitigation Officer at the Territorial Office of Fiscal Reform or Ms. Alefa Afalava at the American Samoa Department of Homeland Security.

Eligible projects that are approved by the Hazard Mitigation Council Members will be added to the Territory Hazard Mitigation Plan update for 2014.

Hazard Mitigation projects must be designed to protect homes, businesses, public facilities and infrastructure from future disasters. Projects must reduce the loss of life and property due to disasters.

Projects chosen could be eligible for funding from various FEMA grant programs such as Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Program, or the Flood Mitigation Assistance Program.

To be eligible a project must meet five minimum criteria:

- Conform to and be included in the Territory's Plan.
- Be both engineering and technically feasible.
- Conform to environmental laws and regulations.
- Solve a problem independently or constitute a functional portion of a solution, and
- Be cost effective.

Criteria to be considered include:

- Repetitive history of damage at the site.
- Severity of hazard and vulnerability of the project location.
- Level of protection provided by the project.
- Measures designed to accomplish multi-objectives, including damage reduction, environmental enhancement, and economic recovery from disasters.
- Protection of primary residences versus secondary homes and businesses.

COST EFFECTIVENESS:
To be eligible, projects must show benefits greater than the cost, with a BCA of 1.0 or greater, using FEMA's Benefit Cost Analysis. This is a fairly complicated calculation considering the amount of historic damages from past disasters, the cost of down times, the frequency of disasters, and the estimated net present value of costs avoided in the future disasters due to the project and any other relevant criteria. Possible loss of life or injury can also be considered, but is difficult to quantify.

LACK OF MAINTENANCE:
FEMA will not consider projects that are a result of lack of maintenance. FEMA will not pay for replacing the rusted purloins and beams. However, if a project is designed to increase the size and strength of the steel, this could become eligible as a strengthening project.

MITIGATION ACTIONS:

Mitigation Actions are categorized into four types:

- Planning and Regulations
- Structure and Infrastructure projects
- Natural System Protection
- Education and Awareness Programs

TYPES OF PROJECTS:
The following types of projects have been approved by FEMA in the past:

- Underground Utilities
- Strengthening critical buildings to be able to resist 130 mph winds
- Relocation of facilities such as the Ofu Dispensary and Samoan Affairs Office Building.
- Flood control measures
- Public Outreach

PREMILINARY SUBMISSIONS:
To avoid unnecessary work, the first submissions should be very preliminary. My staff will review them and determine if the projects will be eligible. If so, a request will be made for a second, more detailed, submission.

The first submission should include:

- A brief description of the Project
- A listing of any environmental concerns, particularly if the project is in the Flood Plain.
- A Preliminary Project Budget or Cost Estimate.
- A Preliminary list of Benefits and the Estimated Amounts of each.

Please remember that if you do not include a project, it will not be eligible for funding. Final approval and prioritization of projects will be made by the Hazard Mitigation Council. If selected, you will be asked to make a presentation of your proposed projects to the Council on ***May 29th, 2014.***

Please submit your preliminary projects by ***May 19th, 2014.***

If you need assistance, please contact Lima Fiatoa, State Hazard Mitigation Officer at 699-1329/1330.

NEWS IN BRIEF...

Continued from page 5

PUERTO RICO MILITARY POLICE UNIT LEAVES GUANTANAMO PRISON

SAN JUAN, Puerto Rico (AP) — A yearlong tour of duty at the Guantanamo Bay prison is ending for a Puerto Rico-based U.S. Army military police unit.

Members of the Army Reserve's 613th Military Police unit primarily worked as guards at the U.S. base in Cuba. About 130 soldiers in the unit are scheduled to arrive back home Wednesday in Puerto Rico. The Puerto Rico soldiers are being replaced by a military police unit based in Salt Lake City.

The U.S. holds 154 prisoners at Guantanamo for terrorism offenses or for suspected links to al-Qaeda and the Taliban. President Barack Obama had vowed to close the prison upon taking office but was blocked by Congress.

UN OFFICIALS MEET WITH UKRAINE GOVERNMENT

KIEV, Ukraine (AP) — The United Nations' under-secretary-general for political affairs has arrived in Kiev to meet with Ukraine's interim government. Jeffrey Feltman met with Ukraine's acting president Oleksandr Turchynov early on Wednesday. British Foreign Secretary William Hague also arrived in Ukraine to speak with the nation's leaders.

The U.S. and European nations have increased diplomatic efforts ahead of Ukraine's May 25 presidential election, as a pro-Russian insurgency continues to rock the country's eastern regions. Feltman was in Moscow on Tuesday and met Gennady Gatilov, a deputy foreign minister.

Speaking in a BBC interview, Hague lent his support to the election. He says Ukrainians "cannot be bullied out of having their elections by disorder that is deliberately fomented and coordinated from another country, in this instance Russia."

PRIMARY FEATURING CLAY AIKEN TOO CLOSE TO CALL

RALEIGH, N.C. (AP) — The Democratic congressional primary race between former "American Idol" runner-up Clay Aiken and textile entrepreneur Keith Crisco remained very close and without a clear winner.

Aiken and Crisco each had about 40 percent of the vote, trailed by licensed family counselor Toni Morris of Fayetteville in Tuesday's primary race in the 2nd Congressional District.

Aiken's first political campaign drew an unusual amount of celebrity buzz thanks to his singing career and a second-place finish on "Celebrity Apprentice." Crisco spent four years as the state's top business recruiter under under former Democratic Gov. Beverly Perdue.

The primary winner will challenge incumbent Republican U.S. Rep. Renee Ellmers in November. Ellmers, first elected in the 2010 tea party wave, handily defeated her challenger in the heavily Republican district.

Aiken has said reporters are the only people asking whether being a gay man could impede his campaign to represent such a conservative district. Both he and Crisco touted themselves as centrists.

CALIFORNIA DEPUTY CHARGED WITH ON-DUTY SEX CRIMES

VISALIA, Calif. (AP) — Authorities say a total of five women accuse a former deputy sheriff in Central California of assaulting them while he was on duty.

Tulare County Assistant District Attorney Anthony Fultz said Monday that 43-year-old William Nulick faces a total of 12 felony and six misdemeanor counts ranging from sexual battery to false imprisonment and forcible oral copulation. Nulick could spend 15 years to life in state prison if he's convicted.

Fultz says Nulick was first charged late last year after one woman came forward with the accusations. Three women later accused Nulick, who has pleaded not guilty.

On Wednesday Nulick is due in court for arraignment on the fifth case. Fultz says Nulick no longer works for the Tulare County Sheriff's Department.

HOUSE SPEAKER J. BOEHNER TO FACE COLLEGE PROFESSOR IN US HOUSE BID

WASHINGTON (AP) — House Speaker John Boehner defeated two tea party challengers Tuesday in his bid for a 13th term in Congress, brushing aside some GOP discontent over his leadership in Washington.

Boehner easily beat high school teacher J.D. Winteregg and businessman Eric Gurr in the GOP primary.

"I am humbled to have such strong support from the people of the 8th Congressional District, and I look forward to continuing to lead the U.S. House in addressing our shared priorities of jobs and the economy," Boehner said.

The race drew attention after the Virginia-based Tea Party Leadership Fund spent $320,000 in support of Winteregg, a political novice, amid dissatisfaction among some GOP voters over Boehner's stances in favor of immigration and raising the debt ceiling. Winteregg released an online ad poking fun at the "electile dysfunction" personified by Boehner.

Still, Boehner never faced a major threat, and he countered the primary opposition in the final weeks with a flurry of ads and campaign stops in western Ohio.

(Continued on page 10)

Obama: Climate rules can't wait 'til after election

WASHINGTON (AP) — Within weeks, President Barack Obama's administration is set to unveil unprecedented emissions limits on power plants across the U.S., much to the dismay of many Democratic candidates who are running for election in energy-producing states. Fearful of a political backlash, they wish their fellow Democrat in the White House would hold off until after the voting. But Obama can't wait that long.

Unlike the Keystone XL oil pipeline, whose review the administration has delayed, probably until after November's elections, the clock is ticking for the power plant rules — the cornerstone of Obama's campaign to curb climate change. Unless he starts now, the rules won't be in place before he leaves office, making it easier for his successor to stop them.

So even though the action could bolster Republican attacks against some of this year's most vulnerable Democrats, the administration is proceeding at full speed. Obama's counselor on climate issues, John Podesta, affirmed that the proposal will be unveiled in early June — just as this year's general election is heating up.

"Having this debate now will only injure Democrats," said Hank Sheinkopf, a longtime Democratic strategist. "Democrats are in trouble. The best thing when you're in trouble is to avoid further controversy."

To be sure, Americans generally support cutting pollution. A Pew Research Center poll late last year found 65 percent of Americans favor "setting stricter emission limits on power plants in order to address climate change," while 30 percent were opposed.

But Democrats are fighting most of their toughest races this year in conservative-leaning states that rely heavily on the energy industry, including Louisiana, Arkansas, Kentucky, West Virginia, Alaska and Montana. Already, conservative groups have spent millions accusing Democrats in those states of supporting energy policies that would impede local jobs and economic development.

Never mind that it's Obama's administration — not House or Senate candidates — drafting the rules. Even when Democrats try to distance themselves from Obama on the issue, Republicans say that's evidence that congressional Democrats are impotent to rein in their party's out-of-control president.

Republican Rep. Steve Daines, who is running to unseat Democratic Sen. John Walsh in Montana, calls the new rules part of a broader war Obama is waging on Montana's jobs and families. Daines said in an interview, "The Democratic-led Senate has been complicit in supporting President Barack Obama's war on coal, and Montanans don't like it."

Seeking to head off those arguments, some Democrats already are assailing the expected new rules in hopes voters won't lump candidates together with Obama in states where the president is highly unpopular. Rep. Nick Rahall, a Democrat from coal-rich West Virginia and a top GOP target, said an earlier Obama plan affecting only new power plants "hinged on fantasy and endangers our economy."

"Count me as a skeptic, but I expect the EPA's proposal for new regulations aimed at existing plants to be just as far-fetched and unworkable," Rahall said.

Last year, the administration proposed the first-ever carbon dioxide limits on newly built power plants, drawing fierce criticism from energy advocates from both parties who say the technology to capture enough pollution to meet those standards isn't yet commercially viable.

Climate activists say the next step — rules cracking down on existing plants — are even more critical to curbing the pollutants blamed for global warming. Unlike with new plants, the Clean Air Act doesn't let the government regulate emissions from existing plants directly. Instead, the government will issue guidelines for reducing emissions, then each state will develop its own plan to meet those guidelines.

Rolling out such regulations is complex, and the Environmental Protection Agency is notorious for missing deadlines. There's little wiggle room for delay in the process, as laid out in an executive order Obama signed last year.

White House officials declined to say whether Democratic candidates or lawmakers have reached out to the White House's political office to ask for the rules to be delayed until after the election. Obama plans to play an active role in promoting the change by speaking about it once it's released, officials said.

Meanwhile, conservative groups are ready to attack. The American Energy Alliance, which has spent more than $1 million on television criticizing Obama's energy policies and candidates who support them, said it's more than likely the emissions rules will wind up in the group's ads this year.

"It wouldn't matter when they were coming out, but it just so happens to be an election year as well," said Tom Pyle, the group's president. "That's not something that's gone unnoticed by us."

Jamal Crawford of Clippers wins NBA 'Sixth Man'

LOS ANGELES (AP) — Just as he has to wait to come into games, Jamal Crawford had to be patient about receiving the NBA Sixth Man Award.

The 34-year-old guard was honored on Thursday, a week later than usual.

The delay was caused by the controversy involving team owner Donald Sterling, who was banned for life by the NBA after a recording surfaced in which he made racist comments.

"We've known it for a while, but obviously with all the stuff going on we decided to try to let it die down before we gave him the award or he would never be able to talk about the award," Clippers coach Doc Rivers said. "I'm glad we're finally able to do this."

Crawford became the oldest recipient and the first to win with different teams.

He also was honored as the league's best player off the bench while with the Atlanta Hawks in 2009-10.

"It's pretty cool," he said during a presentation at the team's practice facility, with teammates including Chris Paul and Blake Griffin cheering him and poking fun of his suit and tie.

"I didn't know what a family was on the court until I got with these guys," an emotional Crawford said.

"I've been on a lot of teams and usually guys, they go their own way. But with us, everybody is included, everybody is a part. They make everybody feel like family."

Crawford led the league's reserve players in scoring this season, averaging 18.6 points.

He came off the bench in 45 of 69 games he played in, helping the Clippers to a 57-25 record, their best regular-season mark in franchise history.

Crawford went so far as to say he hopes to spend the rest of his career with the Clippers, an organization roiled by Sterling telling his friend V. Stiviano that he didn't want her to bring black people to Clippers games.

"As long as I'm with this group of guys and with Doc leading us, everything else will work itself out," Crawford said.

The Clippers had a 31-14 record when Crawford came off the bench this season.

Crawford set the single-season franchise record for 3-pointers made with 161. That surpassed his record from last season, his first in Los Angeles, when he was runner-up for the Sixth Man award.

"He can score in his sleep," Rivers said. "I've never seen a guy that can sit for 15 minutes and literally be on the floor for a half-second and they swing him the ball and he's ready to shoot and make some shots."

Rivers even made an exception to his policy of not running a play for someone when they first enter the game.

"He's a lethal scorer, but he adds more value when he does other things," the coach said.

Rivers was among those in the NBA who knew Crawford by reputation, a player who only wanted to score and not defend. But Crawford put that to rest this season, especially when Paul was injured.

"This year he's ran the point guard position, he's been my best passer at times when C.P. was out," Rivers said. "He's been our defender, he's in the right spots. He's been a complete team guy, so I'm really happy for him."

Crawford received 57 first-place votes and 421 total points from a panel of 125 sports writers and broadcasters throughout the U.S. and Canada.

He joined Kevin McHale, Ricky Pierce and Detlef Schrempf as two-time winners.

Taj Gibson of Chicago finished second with 395 points and San Antonio's Manu Ginobili was third with 138.

Crawford had his best month in January, scoring in double figures in 15 of 16 games and helping the Clippers go 12-4 that month.

On Jan. 25, he had 37 points and 11 assists in a win over Toronto — the most points he scored off the bench in his career and his most with the Clippers.

It was the second time this season he had that many points and assists; he totaled those numbers against Sacramento on Nov. 29.

Crawford missed 13 games in March and April because of a sore Achilles tendon, but rallied to return in time for the playoffs. The Clippers and Thunder are tied 1-1 in their Western Conference semifinals series.

The award sponsor Kia will donate a 2015 vehicle to a charity of Crawford's choice.

American Samoa Hazard Mitigation Council

May 6thth, 2014

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All Eligible Non-Profit Agencies

From: Chairman, Hazard Mitigation Council
Lemanu P. Mauga, Governors Authorized Representative

Subject: Call for Proposed Hazard Mitigation Projects

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1

Nigeria refused help...

Continued from page 4

school, where they captured dozens of girls. Police say 53 escaped on their own and 276 remain captive.

The following day, Jonathan was photographed dancing at a political party rally in northern Kano city, and newspapers asked what their leader was doing partying when the country was in shock over the kidnappings.

The Defense Ministry also announced that all but eight of the kidnapped girls had been freed, quoting the school principal. When the principal objected and demanded the military produce the rescued girls, it retracted its statement.

Frantic, some Chibok fathers made their way into the dangerous Sambisa Forest themselves, where the girls were last seen. But they turned back when villagers in the forest warned that Boko Haram would kill both them and their daughters.

The parents said the forest dwellers did not see any soldiers looking for the girls.

And a state senator said that every time he gave the military information from people who had caught sight of the girls, the insurgents moved camp.

The military denied any collusion with the extremists and said it had been pursuing every lead.

For two weeks, Jonathan did not discuss the abducted girls in public.

In his Easter Day message, he said only that his thoughts were with the families of those killed by insurgents and the dozens wounded by the Abuja bombing.

Last week, angry Nigerian women, including at least two mothers of abducted girls, took to the streets in Abuja to protest the government's failure to rescue the girls. Jonathan did not meet with them. Instead, he cancelled the weekly executive council meeting to offer condolences to his vice president, whose brother had died in a car crash.

His wife, Patience Jonathan, that night called a meeting to "investigate" what happened at Chibok, and said the kidnappings were engineered to hurt the name of her husband and his government. She accused the leader of the protests of being a Boko Haram member, detained her and released her after several hours.

Finally, at a Labor Day rally, Jonathan made a public pronouncement that "the cruel abduction of some innocent girls, our future mothers and leaders, in a very horrific and despicable situation in Borno state, is quite regrettable."

He pledged, "We must find our girls."

On May 2, he set up a "largely fact-finding" committee to put together a strategy for rescuing the girls. Last Sunday, he raised eyebrows by saying on TV that he was "happy" the missing girls were "unharmed," but then admitting that the government had no new information from the abductors.

Jonathan also hinted last week at why, apart from national pride, initial offers of help may have been ignored.

Even before the kidnappings, he complained, he had asked Obama in two telephone calls for help with intelligence on the extremists but received questions about alleged military abuses. Jonathan said he responded that the U.S. leader should "send someone to see what we are doing" on the ground, and "don't just say there is some matter of alleged abuses."

The Nigerian military is accused of widespread killings that go beyond members of Boko Haram. The Associated Press documented last year how thousands of people are dying in military detention, through the mortuary records of a Maiduguri hospital. And Amnesty International reported in October that hundreds of detainees were killed, tortured, starved, or even asphyxiated in overcrowded cells.

On May 4, Boko Haram abducted at least 11 more girls, aged 12 to 15, from two villages in the northeast. One escaped. And the Chibok girls are still missing, in a conservative society where girls who are raped can be stigmatized.

"It is very painful. I know my daughter, very obedient and very religious ... she wanted to be a doctor," Mark said. "I was eager to see my daughter with such a hope. Now....I don't know what I can explain to the world."

Allegations of gambling...

Continued from page 1

Hall responded that the policy is already in place.

"The policy is established that it is against the law to promote and participate in gambling activities. It should be addressed on a case by case basis," said Hall to Assistant AG Fuimaono.

Hall further stated that "if a person commits a felony, i.e., robbery, you arrest that person, you do not continue to investigate for the purpose of preventing felony robbery."

He said, "I have stated in the past, if the problem can be resolved with a cease and desist order and the activity stops, you as the Consumer Protector have resolved the problem."

The ASTCA board chair further pointed out, "It is not necessary to criminally prosecute, if the activity can be stopped and no further gambling activities occur thereafter. I think this is a fair and reasonable action for your office to take against ALL the organizations that you are investigating."

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Clippers interim CEO is confident francise will sell

LOS ANGELES (AP) — The interim CEO hand-picked by the NBA to run the Los Angeles Clippers said Monday he's confident the league will succeed in forcing a sale of the team owned by Donald Sterling since 1981.

Dick Parsons arrived in Los Angeles and met with management and staff of the Clippers. Sterling has been banned for life by the NBA and fined $2.5 million after recordings of him making racist comments surfaced. "My personal belief is the league will prevail, which means there will be an ownership change," Parsons said during a news conference at Staples Center. "A prolonged legal battle is in no one's interest, certainly not the league's. I would hope we could avoid that."

Parsons said he won't be involved in the ownership fight. He said he's being paid by the NBA but he doesn't report to Commissioner Adam Silver or the league's owners.

Donald Sterling apologized for the racist comments captured during a recorded conversation, saying in a televised interview Monday night that they were a "terrible mistake. I embarrassed the league. I humiliated them. I don't know how, why I did it," he told CNN's Anderson Cooper. "I mean, it's so terrible."

Sterling said he apologized to the NBA, and he doesn't believe the other owners would vote to have him removed as owner of the Clippers. "Of course they support me. They can't understand why I would say that. I can't understand why I would say that," he said. "People want me to hire a wall of lawyers and them to have to hire a wall of lawyers and go to war. I don't think that's the answer."

Sterling said he believes the players on the team "love" him.

"They know I'm not a racist, and I'm not a racist," he said. "I think I create opportunities for them, so they can make $100 million. I don't give them anything, believe me, and those players could get that same amount of money anywhere else. Of course they earn it, and they work harder than any other sport."

Parsons doesn't know Sterling and won't be talking to him because the 80-year-old owner is banned. "He's a little late, to be sure," Parsons said about Sterling's apology. "I'm here to turn one of the burners off under the pot, not to turn it up higher."

Clippers coach Doc Rivers said he was aware of Sterling's apology, although he had not seen the interview.

"I'm glad that he did it," Rivers said by phone from Oklahoma City, where the team plays Tuesday. "That's what you have to do and you should do it. Probably should have done it right away."

Sterling's estranged wife, Shelly, has said she will fight to keep her 50 percent ownership of the team. Parsons said he anticipates talking with her at some point, although he said Donald Sterling is the only controlling owner of the team.

Parsons described himself as a conservator of the team, someone who will try to keep it from losing value and ensure there is a viable franchise to work with once the ownership issue is resolved. "I want to leave this place in good shape and in good hands," he said.

With Sterling barred from anything to do with the team or league, and team President Andy Roeser on an indefinite leave of absence, Parsons will be a key contact for the team's support staff.

"A lot of these folks have felt beleaguered, beyond disappointed with the way the franchise has been characterized," said Parsons, who wore a Clippers lapel pin on his suit. "Part of my job will be to tell the folks here to stay focused on the business. Ultimately, there will be a change of ownership and management."

He said he let them know they are appreciated and the interaction gave him ideas on how to move forward, although he has offered no specifics since taking the job Thursday. "I'm only beginning to get my arms around what I'm going to do," he said.

Rivers endorsed Parsons' hiring, believing he can calm the situation and allow employees to focus on their jobs.

"He's just gotten in the door, but he's going to make a big difference, especially for the folks downtown," Rivers said. "They want to know if they're safe and where do we go from here."

Parsons has spoken to Rivers, but not yet to the players. The team is tied 2-2 with Oklahoma City in the Western Conference semifinals. "I really think it's going to become America's team if we get this right," he said. "Americans love a story where someone gets knocked down and they get back up into the ring. This team has talent."

Parsons, the 66-year-old former Citigroup chairman and former Time Warner chairman and CEO, was set to return to New York in the evening because his wife is having major surgery on Tuesday. He called himself semi-retired, although he is currently a senior adviser at Providence Equity Partners.

The folksy Parsons described the team's crisis as "a very exciting challenge and an interesting time for everybody." He likened his job to that of a ship's captain in charge of keeping it afloat, headed in the right direction and possibly picking up speed.

"There's huge danger and pitfalls in front of us," he said, "but there's tremendous opportunity for this franchise."

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Talosagaina Taotasi su'esu'ega mataupu na tula'i malae va'alele...

tusia Ausage Fausia

Ua talosagaina e le ali'i faipule mai le Itumalo o Ituau le tatau lea ona faia se su'esu'ega i le mataupu lea na tula'i mai i le malae va'alele.

O le fa'alavelave lea o lo o fa'agasolo ai i le taimi nei su'esu'ega a le Matagaluega o Uafu ma Malae Va'alele, ina ua toeititi lava fetoai se va'alele a le Polenisia ma se Helicopter i le malae va'alele i Tafuna, na mafua ai ona tusi le ali'i faipule ia Taotasi Archie Soliai i le Fa'atonusili o le Malae Va'alele, ma fa'ailoa i ai lona popolega i le tulaga saogalemu o tagata femalagaa'i.

Na taua e le afioga a Taotasi i sana tusi ia Taimalelagi Dr. Claire Tuia Poumele i le vaiaso na te'a nei e fa'apea, o le to'a ma le tomai o le pailate a le Polenisia na mafua ai ona leai se fa'alavelave matuia na semanu e tula'i mai i le malae va'alele.

"O le vave ma le mataala o le fa'aiuga sa faia e le pailate a le kamupani va'alele a le Polenisia na mafua ai ona leai se fa'alavelave matuia na semanu e tula'i mai ma a'afia ai soifua e to'atele o le atunu'u," o se vaega lea o le tusi a Taotasi ia Taimalelagi.

Na taua e Taotasi e fa'apea, e tusa ai ma ripoti aemaise ai o lona talitonuga e uiga i le mea sa tupu, sa taumafai le pailate a le Polenisia e faia ni feso'ota'iga ma le pailate a le va'alele Helicopter ina ia aua ai ne'i tula'i mai se fa'alavelave, mulimuli ai fai lana fa'aiuga e tulaueleele i se auala saogalemu ina ia foia ai se fa'alavelave e ono tula'i mai.

"O lenei fa'alavelave ua tula'i mai ai atugaluga i le tele o auala e mafai ona a'afia ai le saogalemu o tagata," o se vaega lea o le tusi a Taotasi.

E le gata na talosagaina e Taotasi le tatau lea ona faia se su'esu'ega e uiga i lenei mataupu, ae tatau fo'i ona fa'anatinati i ai se fa'aiuga tatau.

"Ou te manatu e tutusa o ta talitonuga i le mataupu lenei, a aunoa ma se Fale Vaai (traffic control tower) na te fa'atonutonuina le ulufale mai o va'alele i totonu o le malae va'alele, e le mafai ona foia fa'afitauli fa'apenei e ono tutupu mai."

Na taua fo'i e le ali'i faipule e fa'apea, e tatau i le malo ona faaalu ana mea totino uma aemaise ai ma le tamaoaiga, e fausia ai se Fale Vaai ina ia mautinoa e mafai ona puipuia tulaga o femalagaaiga i soo se taimi, ma foia ai le ono tutupu mai o ni fa'alavelave matuia fa'apenei i le lumana'i.

Sa ia talosagaina fo'i le tatau lea ona toe vaavaai i tulafono a le vaega a le feterale o lo o vaavaaia ma pulea malae va'alele (FAA), e ono mafai ai ona fesoasoani i le tulaga saogalemu o le malae va'alele.

Feso'ota'i mai i le tusitala ia ausage@samoanews.com

Climber who fell 1,000 feet to death is named

PORTLAND, Ore. (AP) — A climber from New Jersey died Tuesday after falling about 1,000 feet from the top of Oregon's tallest peak, officials said.

Robert Cormier, 57, of Jersey City, ascended Mount Hood's south side with two others but continued alone when one of his companions suffered a leg cramp, Hood River County sheriff's spokesman Pete Hughes said.

Cormier appeared to reach the summit before he fell near Eliot Glacier at the volcanic peak 50 miles east of Portland.

A helicopter photographed the climber and his position but saw "no signs of life," Hughes said. The office later confirmed his death.

Hughes says rescuers will wait until next week to recover Cormier, when colder temperatures would afford them more stability on the rocks and ice.

Spring is the prime season for climbing Mount Hood because the weather is better but not so warm that the ice melts and rocks fall more readily.

The peak is notorious for loose rocks in warm weather.

Conditions were warm in the area on Monday and Tuesday, with a reported temperature of 47 degrees Tuesday morning on the summit. "Climbers up there reported the snow was getting warm, and they wanted to get down and get off," Hughes said.

Thousands of people climb the 11,240-foot peak each year.

The most recent death at Mount Hood was in August. A Polish military officer visiting the United States for training with a drone manufacturer went to the summit on a day off. The novice climber fell about 1,000 feet.

The most fatalities in one accident were seven students from Oregon Episcopal School and two adults who died after they dug a snow cave during a sudden storm in May 1986.

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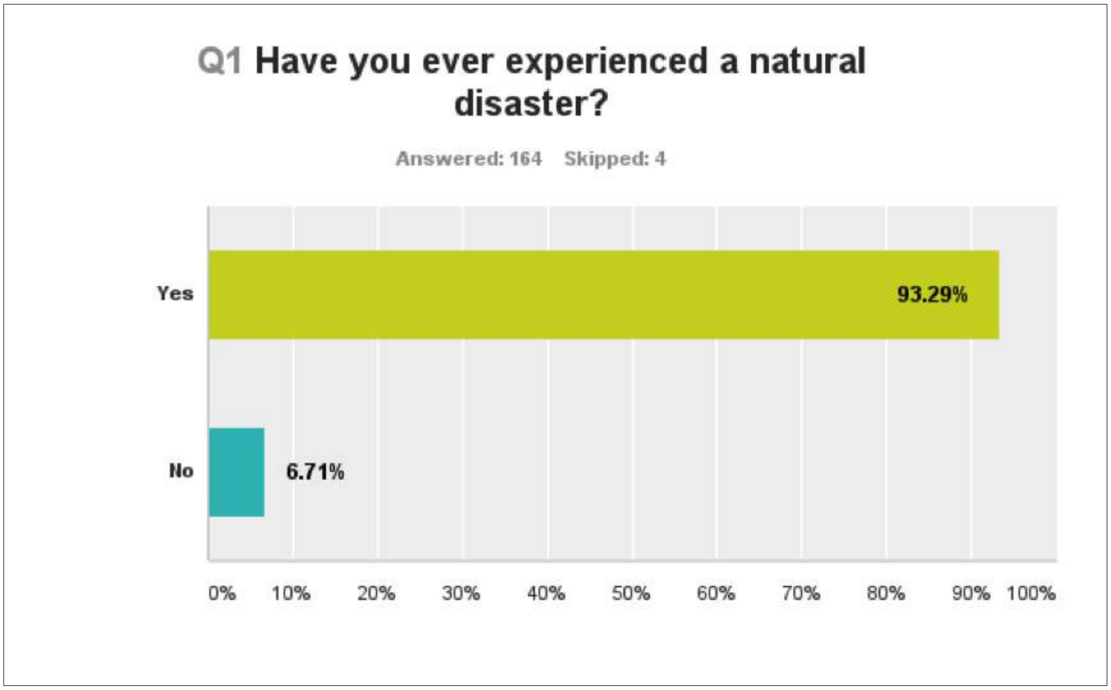
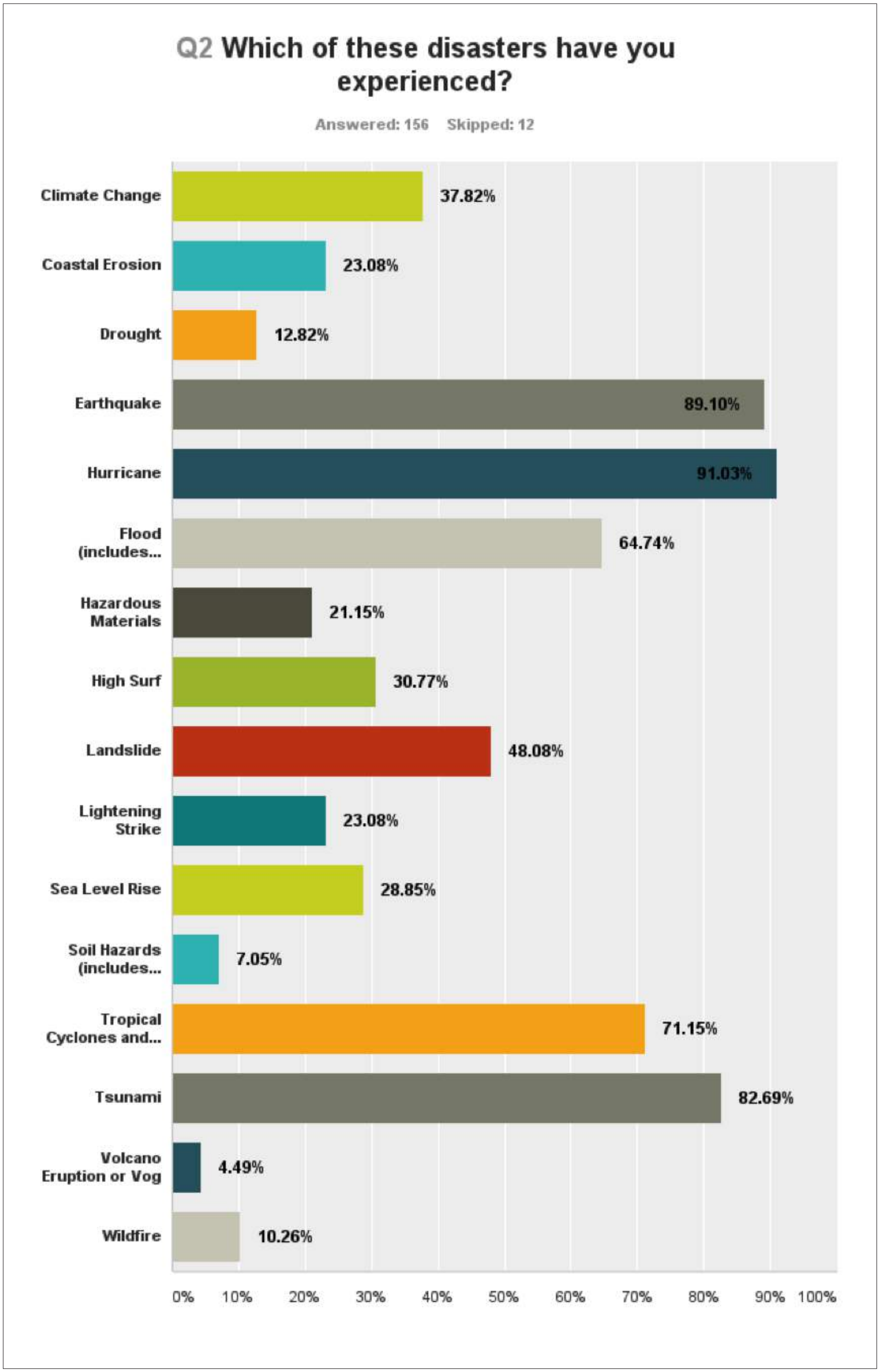
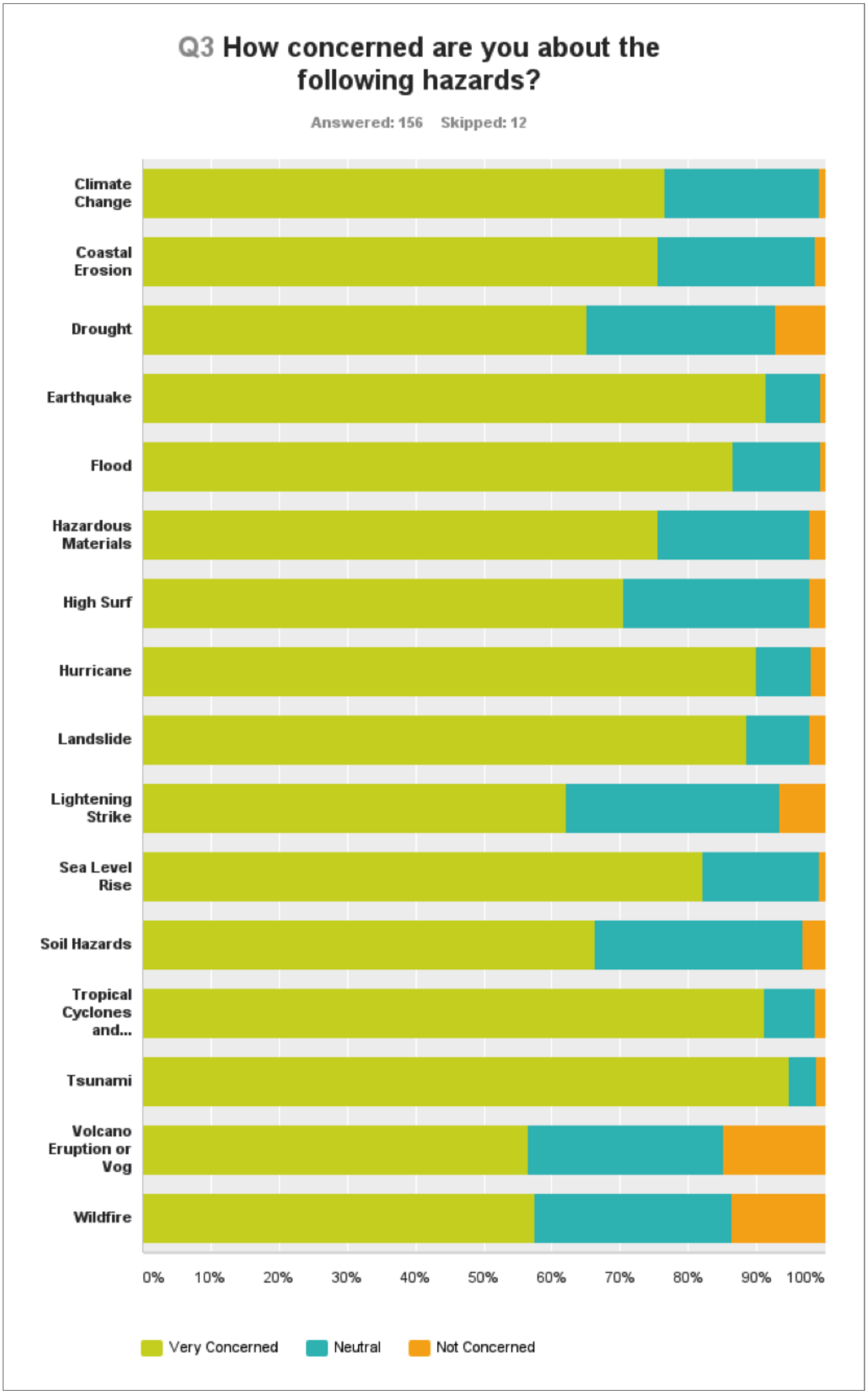
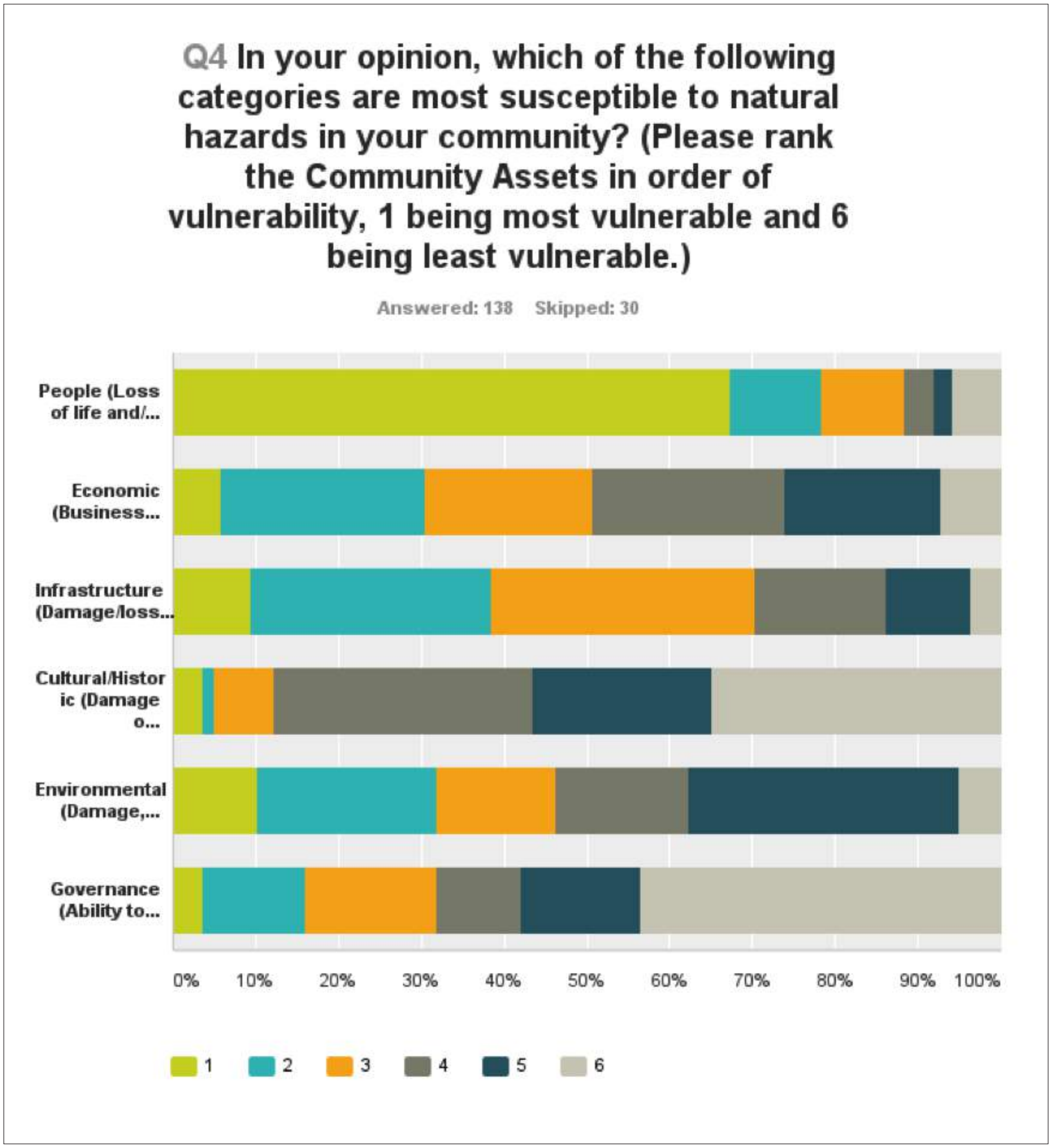
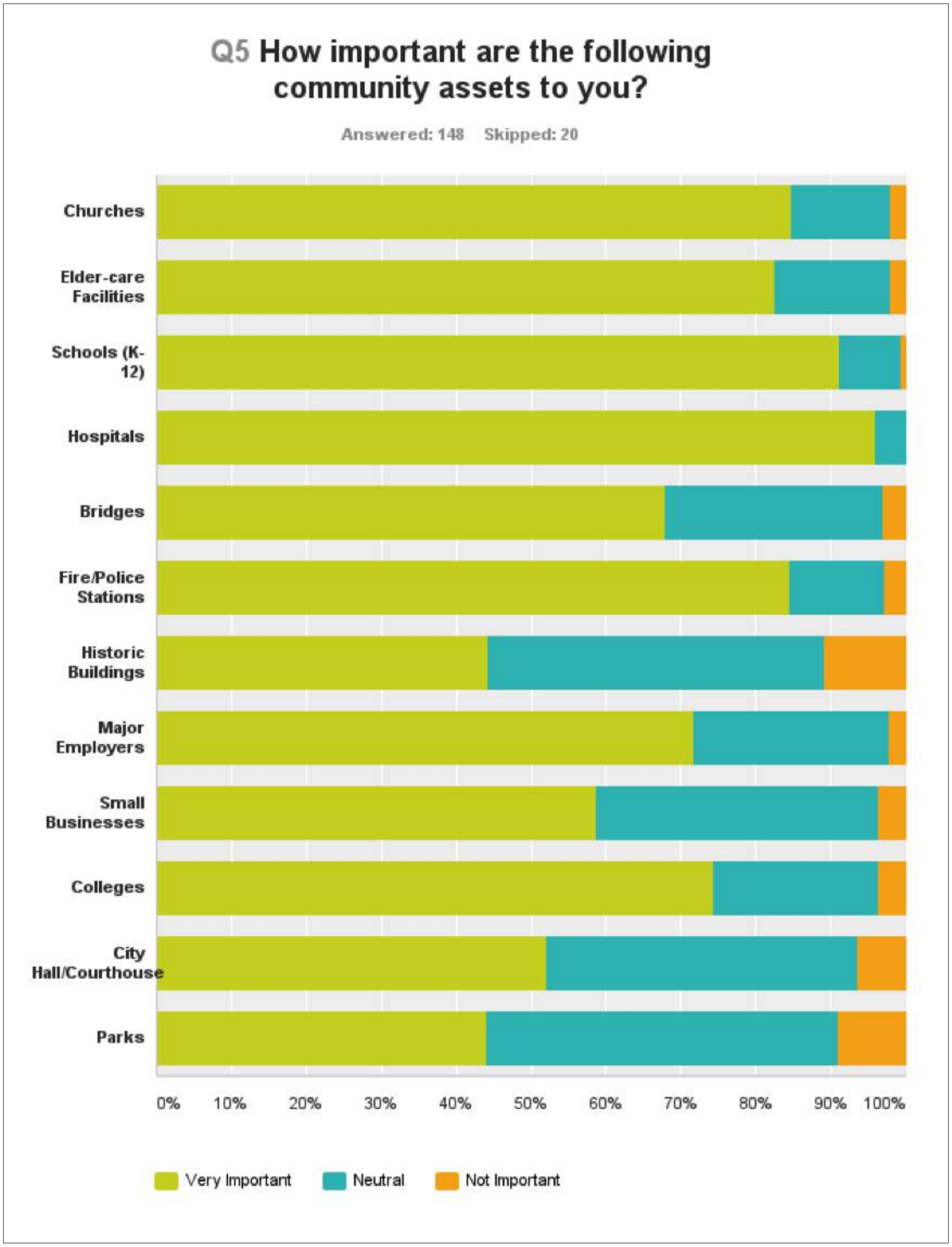

Q1 Have you ever experienced a natural disaster?
Answered: 164 Skipped: 4
Yes
93.29%
No
6.71%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

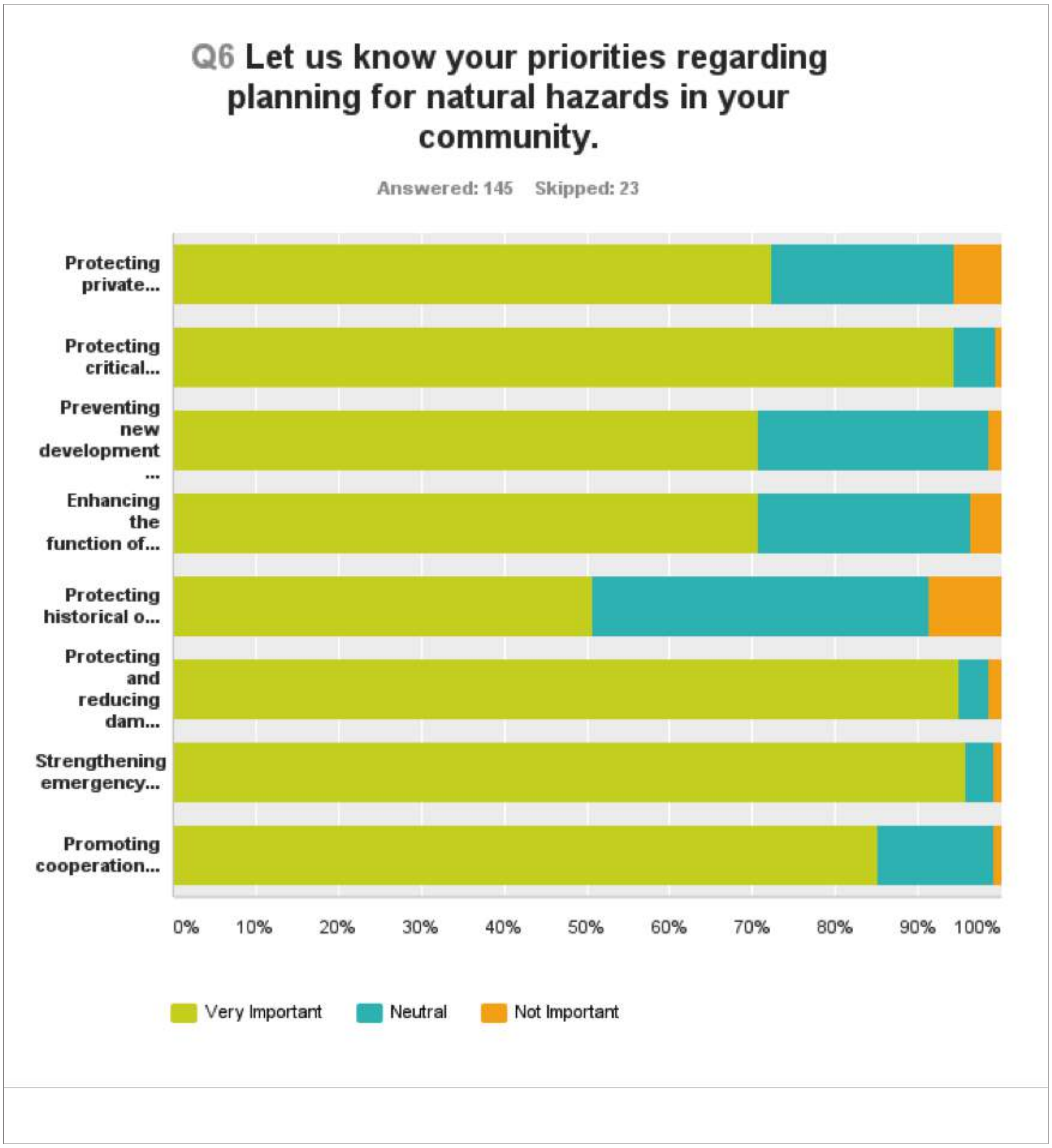

Q2 Which of these disasters have you experienced?
Answered: 156 Skipped: 12
Climate Change
37.82%
Coastal Erosion
23.08%
Drought
12.82%
Earthquake
89.10%
Hurricane
91.03%
Flood (includes...
64.74%
Hazardous Materials
21.15%
High Surf
30.77%
Landslide
48.08%
Lightening Strike
23.08%
Sea Level Rise
28.85%
Soil Hazards (includes...
7.05%
Tropical Cyclones and...
71.15%
Tsunami
82.69%
Volcano Eruption or Vog
4.49%
Wildfire
10.26%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


Q3 How concerned are you about the following hazards?
Answered: 156 Skipped: 12
Climate Change
Coastal Erosion
Drought
Earthquake
Flood
Hazardous Materials
High Surf
Hurricane
Landslide
Lightening Strike
Sea Level Rise
Soil Hazards
Tropical Cyclones and...
Tsunami
Volcano Eruption or Vog
Wildfire
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Very Concerned
Neutral
Not Concerned


Q4 In your opinion, which of the following categories are most susceptible to natural hazards in your community? (Please rank the Community Assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable.)
Answered: 138 Skipped: 30
People (Loss of life and/...
Economic (Business...
Infrastructure (Damage/loss...
Cultural/Historic (Damage o...
Environmental (Damage,...
Governance (Ability to...
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
1 2 3 4 5 6



Q5 How important are the following community assets to you?
Answered: 148 Skipped: 20
Churches
Elder-care Facilities
Schools (K-12)
Hospitals
Bridges
Fire/Police Stations
Historic Buildings
Major Employers
Small Businesses
Colleges
City Hall/Courthouse
Parks
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Very Important
Neutral
Not Important


Q6 Let us know your priorities regarding planning for natural hazards in your community.
Answered: 145 Skipped: 23
Protecting private...
Protecting critical...
Preventing new development ...
Enhancing the function of...
Protecting historical o...
Protecting and reducing dam...
Strengthening emergency...
Promoting cooperation...
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Very Important
Neutral
Not Important

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Q7 In your opinion, what are some actions that your local government could take to reduce or eliminate the risk of future natural hazard damages in your community?

Answered: 60 Skipped: 108

#	Responses	Date
1	EDUCATE. There should be more organizations that should reach out to the public to teach about what to do in times of crisis AND to REDUCE future natural hazard because everyone will just panic when it happens. I think educating our people is the most important. Start with that.	6/26/2014 8:59 AM
2	Education through use of Television, community sponsored events, Education services and monthly mandatory alerts by land, sea and air.	5/23/2014 9:02 PM
3	Better natural shoreline protection, note instead of building better strong sea walls, make sure coral reefs are healthy and plant trees along shoreline roots will assist.	5/9/2014 5:44 PM
4	Public awareness	5/7/2014 3:58 PM
5	Outreach; Development for specific natural hazard damages.	5/7/2014 3:43 PM
6	Need leaders who have the skills to facilitate a cooperative effort and who is empowering to gather agencies together and work together	5/6/2014 6:06 PM
7	I think they need to get rid of strey dogs !!!	5/5/2014 4:46 PM
8	Better waste management	5/4/2014 12:39 AM
9	monthly drills	5/2/2014 9:57 PM
10	Be better prepared. Upgrade systems. More community awareness. Maintain maintenance on emergency equipment. Have a plan in place in case of a natural disaster.	5/2/2014 10:40 AM
11	Mayors of each village with a evacuation plan for his/her village people; food/water storage for each family; 72 hour kit for each family member; identify shelters for temporary stay; light sources; disaster building standards are met for homes; schools and work places evacuation plans.	5/1/2014 8:27 PM
12	Initiate and promotes ways to conserve energy and reduce the harm that has been done to the environment.	5/1/2014 6:28 PM
13	Conduct preparedness trainings for villages and all government and private agencies/departments. Provide information for preparedness via media.	5/1/2014 5:15 PM
14	Invest more money to improve the infrastructure, training and awareness.	5/1/2014 4:38 PM
15	More public awareness especially with village education, involving mayors and high chiefs and their tulafale using 'rollcall' as a tool to account for all individual so all or most of the villagers attend such important educations.	5/1/2014 3:40 PM
16	more trainings for the community and protect the ocean and the forest.	5/1/2014 2:33 PM
17	Alternate roads, energency lanes, more sea walls, identify emergency routes in case of disaster on main roads.	5/1/2014 4:37 AM
18	increase public awareness	5/1/2014 2:13 AM
19	Increase Public Awareness	4/30/2014 10:44 PM
20	barb wire and security cameras and maybe a backup underground road from East to West. Thank you	4/30/2014 8:36 PM
21	improve awareness on all possible natural disaster emergencies, not just a particular one, promote prevention,prevention prevention	4/30/2014 8:00 PM
22	Establishment of a village-based emergency rapid reaction program.	4/30/2014 6:57 PM

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23	strictly enforce building codes government and major business develop Continuity of Operations Plans Conduct exercises and drills Harden utilities and electricity transmission lines Government develop Critical Infrastructure Plans	4/30/2014 6:54 PM
24	Have drills and plan running one day out of each month, keeps the mind focus and reminding each individual family what exactly to do during a major disaster.	4/30/2014 6:23 PM
25	UNDERGROUND BASES	4/30/2014 5:19 PM
26	A lot of programs, and trainings that our local government offers. Each departments has their own way by keeping the island clean, and maintain safety in every way, from drinking water, to the enviroment, and surroundings. The community is lending a hand to support the Government in ways to eliminate the risk of future natural hazards damages.	4/30/2014 5:19 PM
27	education, training, medias	4/30/2014 5:07 PM
28	In my opinion, our local government could reduce or eliminate dangerous hazardous materials from our natural features(streams, wetlands, etc.), Our facilities-home, businesses, etc; having our community together and teach each other the possibilities of having a safe environment and to generate that guidance from each other to promote ways of reducing dangerous materials/hazardous from our functioning society.	4/30/2014 4:19 PM
29	N/A	4/30/2014 3:48 PM
30	pray that these hazards will not happen	4/30/2014 3:43 PM
31	no need	4/30/2014 3:26 PM
32	making sure buildings are correctly built to prevent damages, making sure that flood waters are correctly drained, making sure that there are emergency services in all areas not just one, making sure they have a joint community plan!	4/30/2014 2:56 PM
33	Inspect areas that are easily damaged and come up with an idea or a solution to prevent it from getting damaged. Fix what needs to be fixed before it's too late. The government have brains too you know.	4/30/2014 2:51 PM
34	Provide funding or budget for these such occurences	4/30/2014 2:24 PM
35	Better assessment, better prioritization, better fund management	4/30/2014 3:22 AM
36	Conduct practice drills every couple months, and run through drills for top 3 susceptible hazardous events, and train 1st responders on how to act and what to do in such events.	4/29/2014 11:13 PM
37	Community awareness, outreach and training programs	4/29/2014 10:27 PM
38	Prevention - don't wait to disaster happens or about to happen to act. Maintenance - self-explanatory. Pro active - get out of the office, get out of the car, survey, examine, analyze and then Act.	4/27/2014 1:09 PM
39	Have key people who can facilitate what they need to do to warn people.	4/27/2014 1:00 PM
40	Continuous outreach programs and workshops. Monthly awareness programs.	4/27/2014 12:50 PM
41	Better planning and making resources available.	4/27/2014 12:40 PM
42	Outreach educational program to educate people.	4/27/2014 12:23 PM
43	Start doing what is needed to prevent these things from happening again.	4/27/2014 12:13 PM
44	proper use of funds to disaster programs	4/25/2014 8:45 PM
45	focus on stream and waterfalls	4/25/2014 8:40 PM
46	Provide awareness courses of natural hazards and always have an emergency plan.	4/25/2014 8:36 PM
47	-consolidation, reconstitution and reactivation of working groups; -information sharing and data gathering capability government-wide; -public and private partnerships for the purpose of mutual aid/leveraging resources; -more table top exercises and AARs;	4/25/2014 8:30 PM
48	Outreach and awareness.	4/25/2014 8:28 PM
49	1. hazard assessment 2. develop CERT programs 3. Educations and awareness for all hazards	4/25/2014 8:21 PM
50	Preventative and outreach measures.	4/25/2014 8:21 PM

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51	improve and provide consistent preparedness and awareness	4/25/2014 8:16 PM
52	Invest in better long lasting infrastructure instead of filling potholes with rocks, re-concrete them. We need more stability/concrete infrastures and ensure safety and protect our livelihoods.	4/25/2014 8:15 PM
53	Enforcement of existing laws, policies, and procedures	4/25/2014 8:11 PM
54	Not only mitigate, but we need to educate the public on ideas to reduce damages.	4/23/2014 4:59 PM
55	More practice drills for both public & private sectors.	4/23/2014 4:52 PM
56	Is to be prepare and alert all times no matter what!	4/23/2014 4:32 PM
57	Let the community know of everyone's responsibilities in times of disaster to prevent overlapping and gaps. Safeguard our roads that lead to hospitals and dispensaries.	4/23/2014 2:29 PM
58	They could start with supplying the island with better technology!	4/23/2014 5:33 AM
59	Better pro-activity in taking preventive measures to limit large losses during natural disasters. Also a thorough maintenance of these preventive measures is vital as well.	4/9/2014 4:14 PM
60	Be more prepare :)	4/2/2014 4:22 PM

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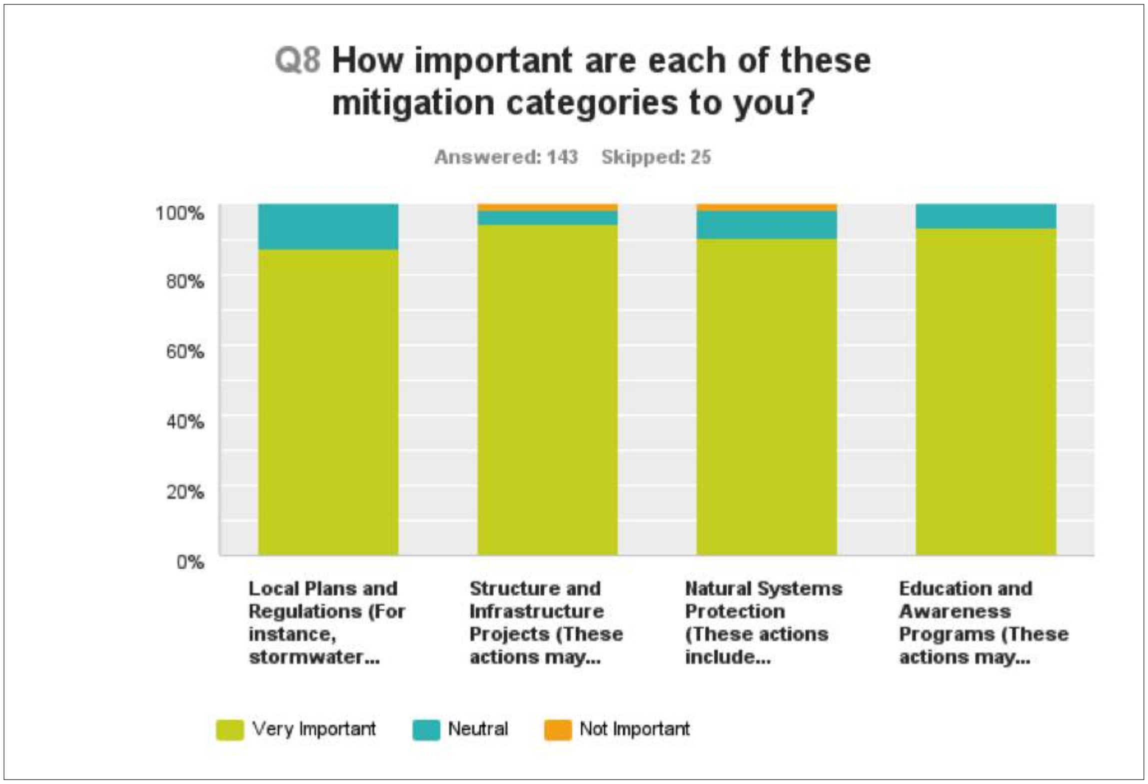
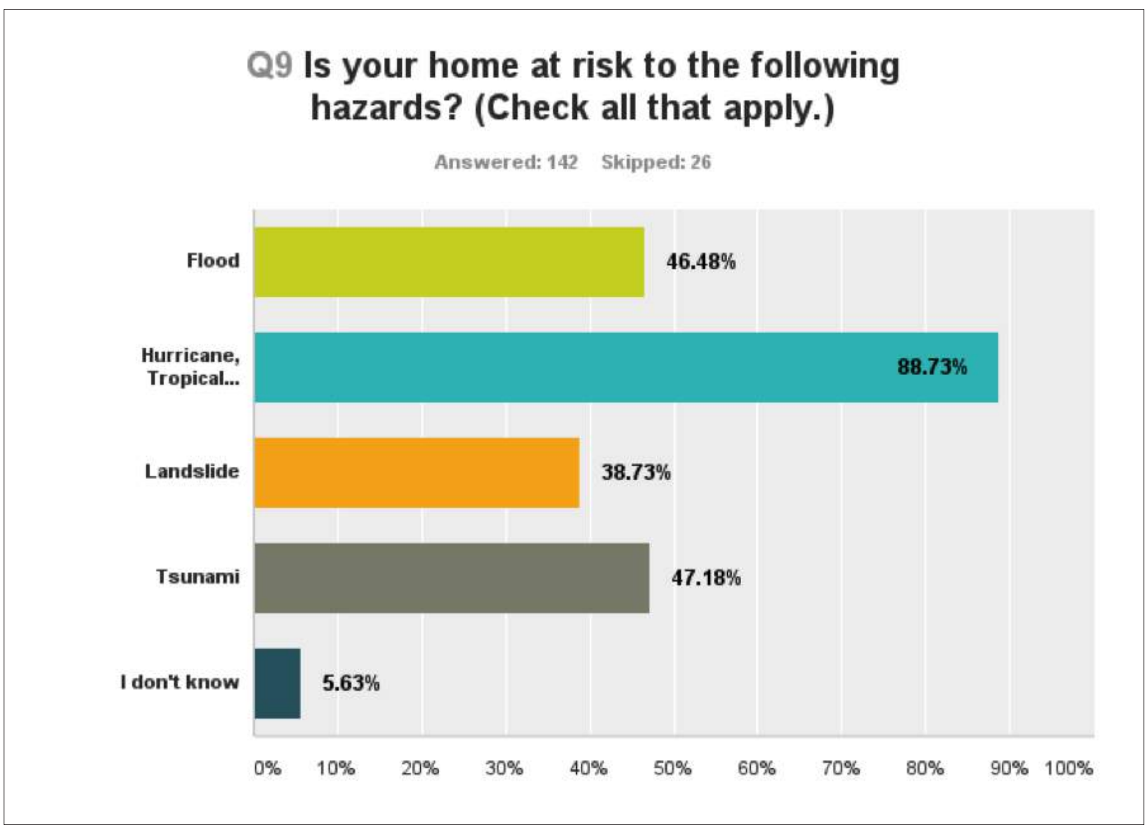
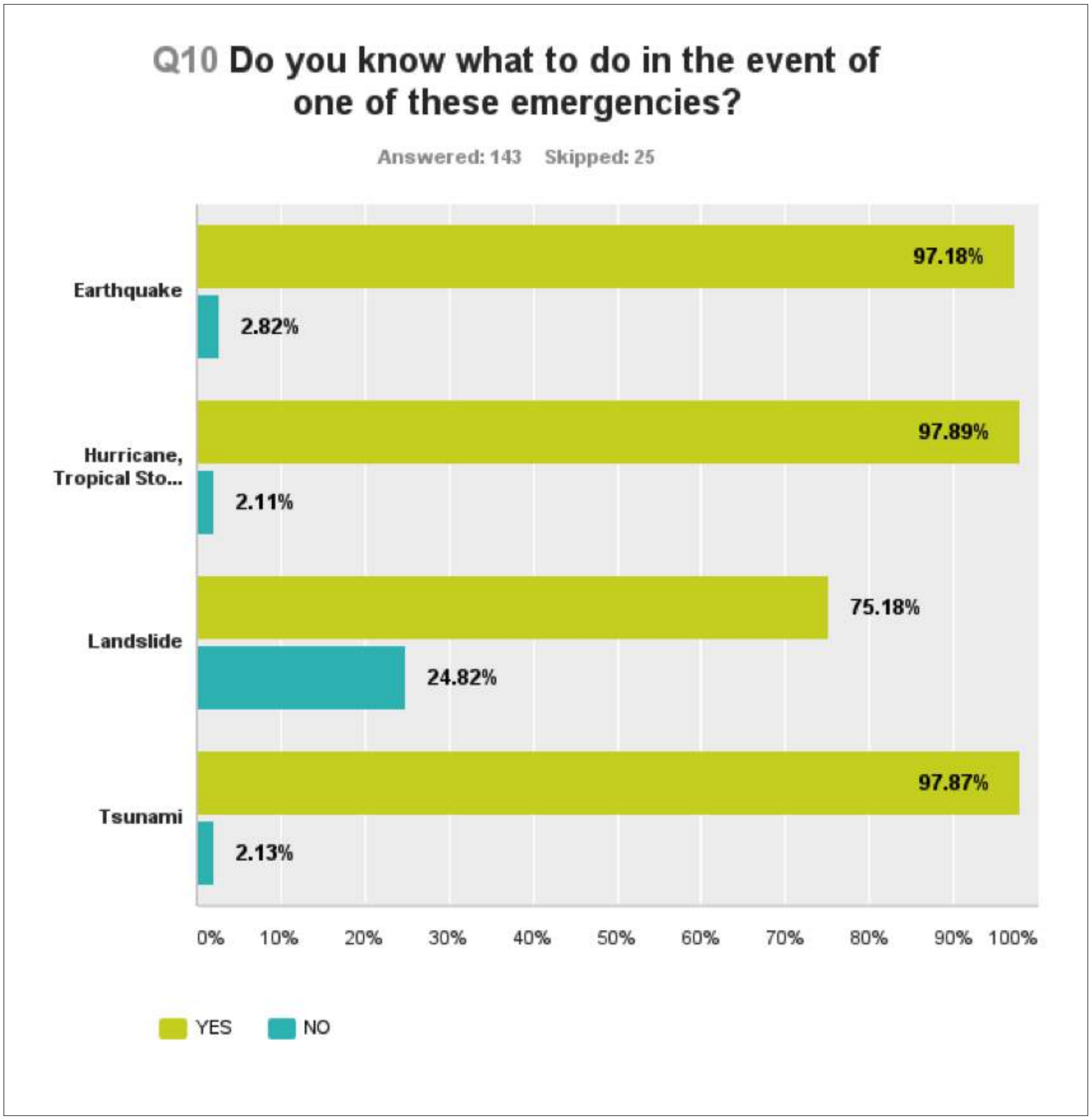
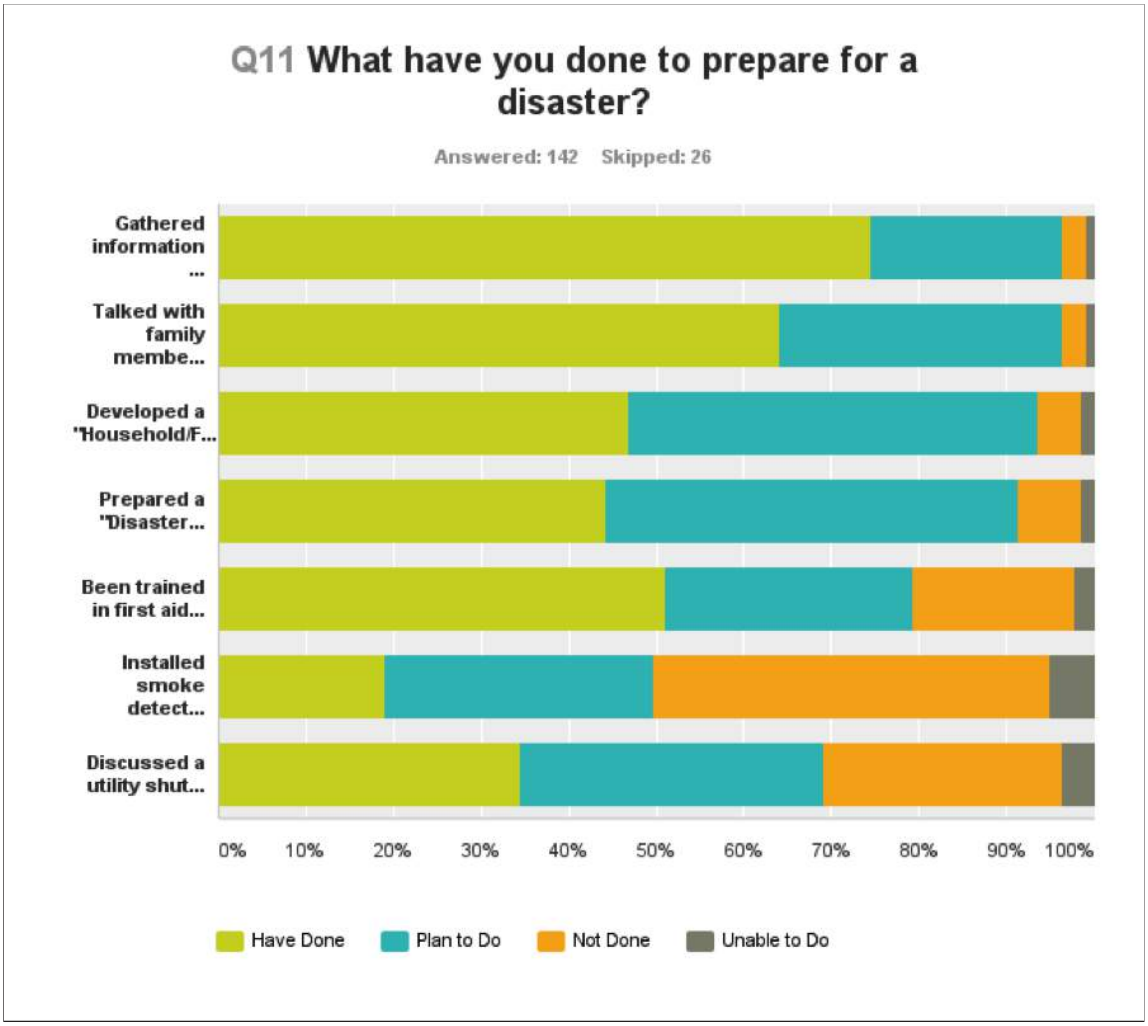
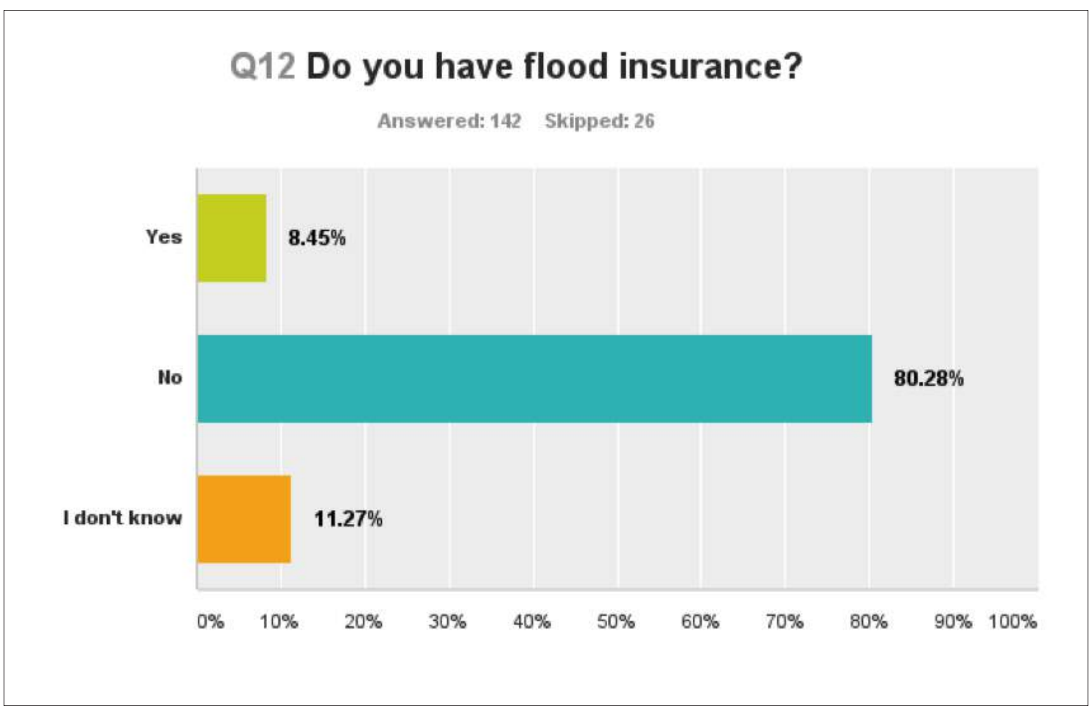
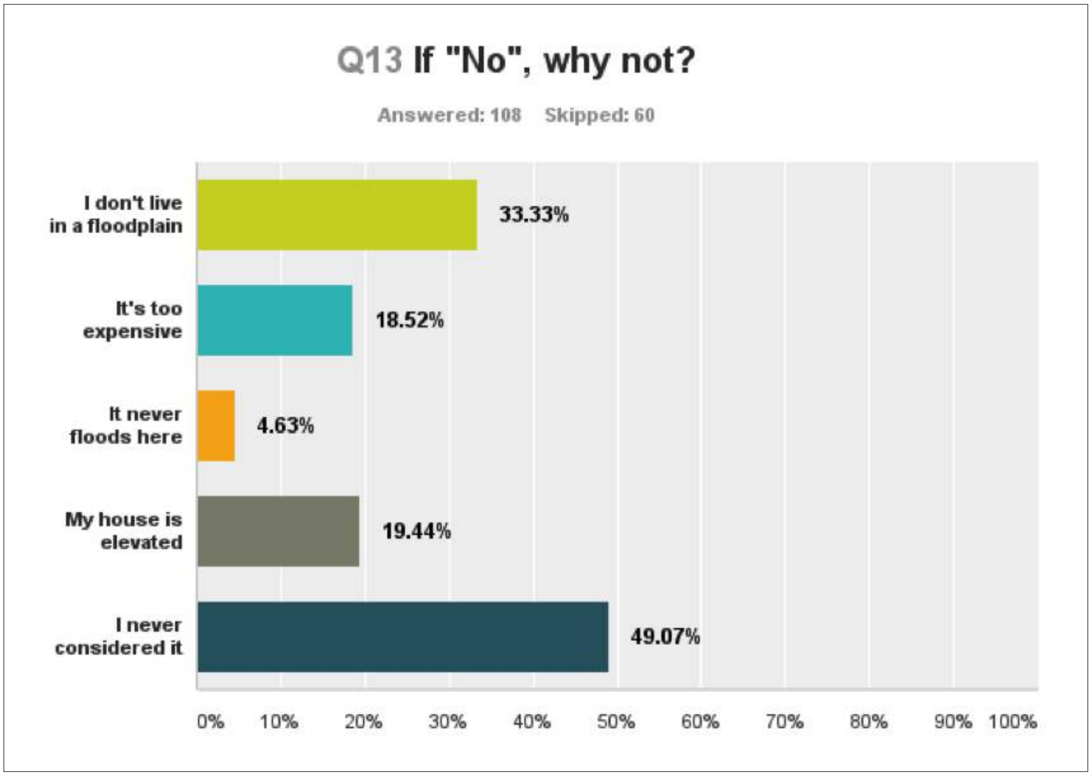

Q8 How important are each of these mitigation categories to you?
Answered: 143 Skipped: 25
100%
80%
60%
40%
20%
0%
Local Plans and Regulations (For instance, stormwater...
Structure and Infrastructure Projects (These actions may...
Natural Systems Protection (These actions include...
Education and Awareness Programs (These actions may...
Very Important
Neutral
Not Important

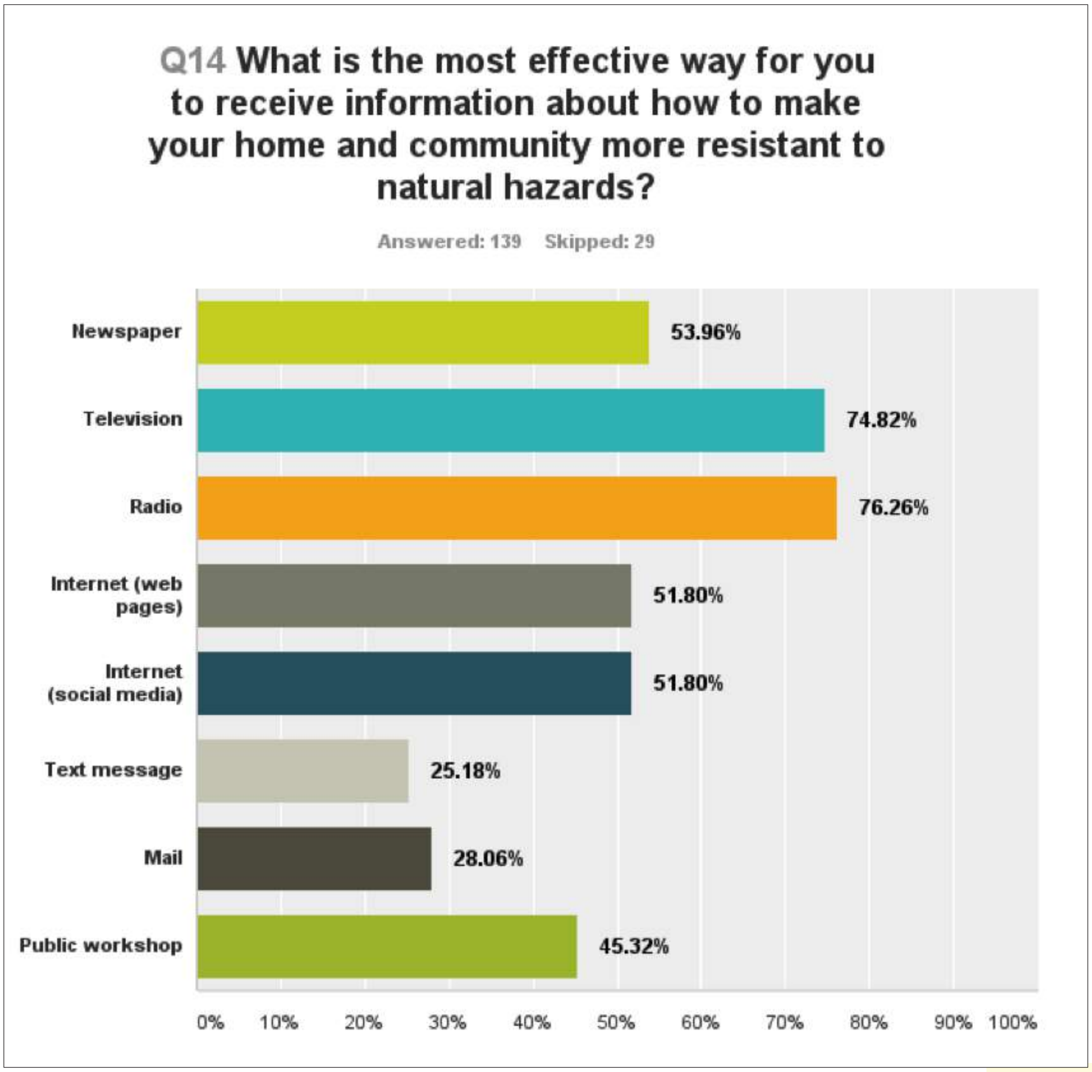

Q9 Is your home at risk to the following hazards? (Check all that apply.)
Answered: 142 Skipped: 26
Flood
46.48%
Hurricane, Tropical...
88.73%
Landslide
38.73%
Tsunami
47.18%
I don't know
5.63%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

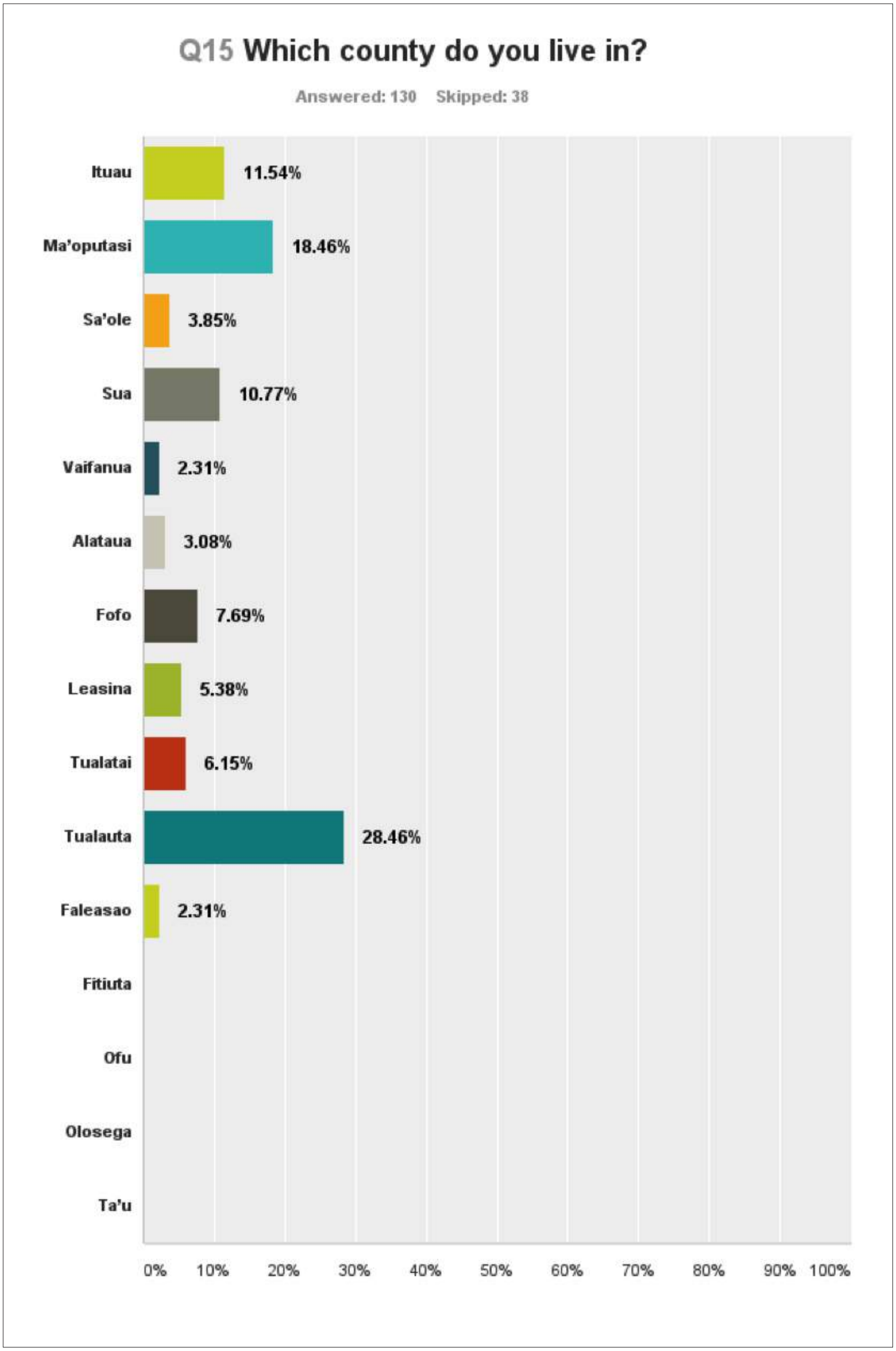

Q10 Do you know what to do in the event of one of these emergencies?
Answered: 143 Skipped: 25
Earthquake
97.18%
2.82%
Hurricane, Tropical Sto...
97.89%
2.11%
Landslide
75.18%
24.82%
Tsunami
97.87%
2.13%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
YES
NO

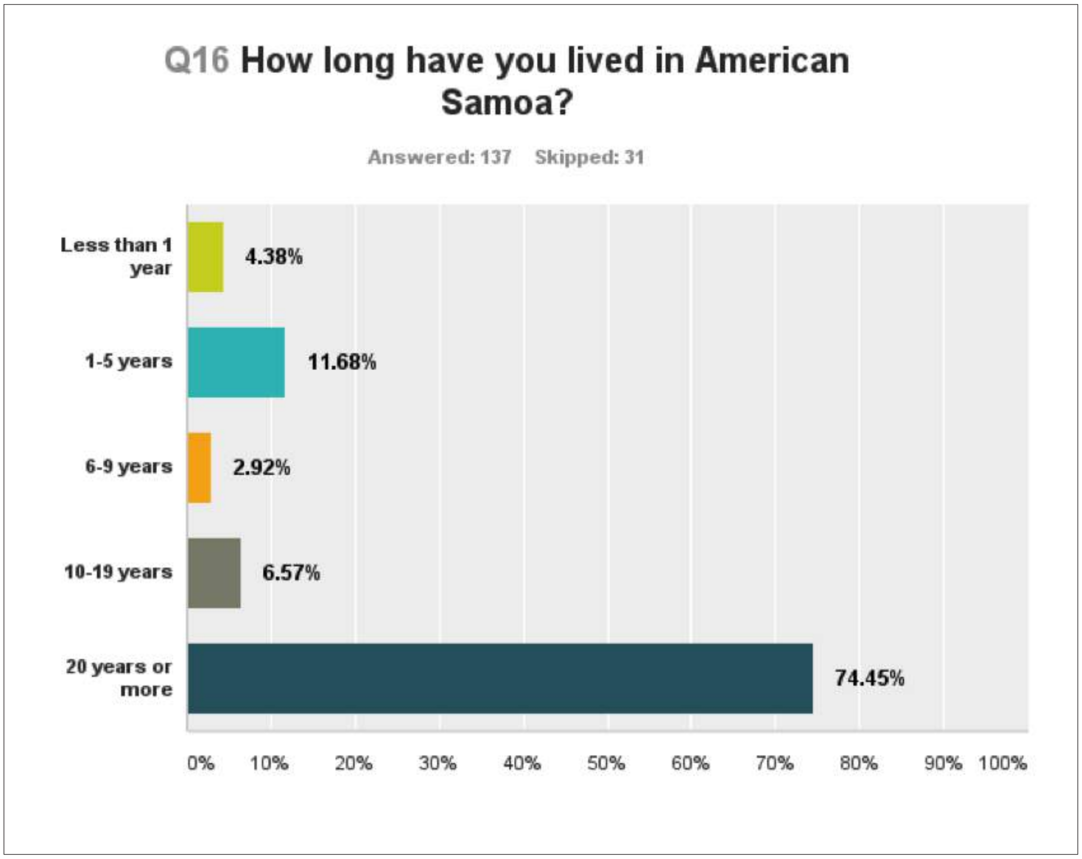

Q11 What have you done to prepare for a disaster?
Answered: 142 Skipped: 26
Gathered information ...
Talked with family membe...
Developed a "Household/F...
Prepared a "Disaster...
Been trained in first aid...
Installed smoke detect...
Discussed a utility shut...
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Have Done
Plan to Do
Not Done
Unable to Do


Q12 Do you have flood insurance?
Answered: 142 Skipped: 26
Yes
8.45%
No
80.28%
I don't know
11.27%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


Q13 If "No", why not?
Answered: 108 Skipped: 60
I don't live in a floodplain
33.33%
It's too expensive
18.52%
It never floods here
4.63%
My house is elevated
19.44%
I never considered it
49.07%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


Q14 What is the most effective way for you to receive information about how to make your home and community more resistant to natural hazards?
Answered: 139 Skipped: 29
Newspaper
53.96%
Television
74.82%
Radio
76.26%
Internet (web pages)
51.80%
Internet (social media)
51.80%
Text message
25.18%
Mail
28.06%
Public workshop
45.32%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


Q15 Which county do you live in?
Answered: 130 Skipped: 38
Ituau
11.54%
Ma'oputasi
18.46%
Sa'ole
3.85%
Sua
10.77%
Vaifanua
2.31%
Alataua
3.08%
Fofo
7.69%
Leasina
5.38%
Tualatai
6.15%
Tualauta
28.46%
Faleasao
2.31%
Fitiuta
Ofu
Olosega
Ta'u
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%


Q16 How long have you lived in American Samoa?
Answered: 137 Skipped: 31
Less than 1 year
4.38%
1-5 years
11.68%
6-9 years
2.92%
10-19 years
6.57%
20 years or more
74.45%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

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Q17 Please add any comments you would like to make regarding hazard mitigation and disaster preparedness.

Answered: 24 Skipped: 144

#	Responses	Date
1	We need to educate our community. We MUST IMPLEMENT! Make things more fun so younger individuals will actually WANT to come and learn.	6/26/2014 9:04 AM
2	Need advance training and technology. Disaster plans will not suffice if there are no mock drills once a month or once every three months in the wee hours of the morning...Either by village, county or entire Island all at once since disasters my strike one portion of the Island(s).	5/23/2014 9:08 PM
3	Landslide awareness & preparedness.	5/7/2014 3:49 PM
4	none	5/2/2014 10:43 AM
5	I still put emphasis on village education via matai system because if it is through church others may not participate. Village meetings or education/classes is simple and it may be consider 'old' but in the importance of the information that's needed to give to all, this simple way is much more effective and less cost-effective.	5/1/2014 3:48 PM
6	provide more trainings and give out first aid kit to each house	5/1/2014 2:38 PM
7	Disaster preparedness Management & Team should increase public awareness programs.	4/30/2014 10:50 PM
8	My family experienced 2009 Tsunami and even up til now we still have that fear of rising water even if its not detected by NOAA and the Akapo Team!! Thank you for this survey.	4/30/2014 8:50 PM
9	set a day of every month for public awareness and a sale of the first aid and preparedness supplies so people can stack up on them and prepare	4/30/2014 8:07 PM
10	Most difficult here to maintain and adequate level of awareness and preparedness. Each year after a major disaster these two essentials diminish. Will we still be as ready for a tsunami 20 years after the last, or will the next generation be as ill-prepared as this one when the next one strikes?	4/30/2014 7:02 PM
11	Have a Plan, or plan on failing.	4/30/2014 6:31 PM
12	BE ALERT	4/30/2014 5:33 PM
13	needs more effort to get message to our community	4/30/2014 5:10 PM
14	To have our alarms/sirens work twice a month-making sure it's possibilities of getting everyone alerted from a natural disaster. And having the agency go around each houses/buildings to connect with the people if they are prepared or help them to be prepared for a natural disaster.	4/30/2014 4:27 PM
15	Being informed and following up on these plans would really help	4/30/2014 4:03 PM
16	More drills instead of just once a year or twice.	4/30/2014 2:55 PM
17	With this survey, I've just completed a quick assessment of my emergency preparedness for my household.	4/29/2014 3:07 PM
18	Need public workshop.	4/27/2014 1:38 PM
19	Homeland Security and Public Works to give equal attention to all areas in AS Public Works to walk the talk and Homeland Security to act on feedback as they aired concerns sound so sincere.	4/27/2014 1:12 PM
20	Request to include the protection of our drinking water resources in the Territory's Hazard Mitigation Plan. Currently our drinking water resource is under a "boil water notice" as a result of bacteria contamination ever since the 2009 tsunami.	4/27/2014 12:21 PM
21	Availability of resources, more awareness on both areas	4/25/2014 8:13 PM
22	Need to improve more on protecting our people from any disasters.	4/23/2014 10:53 PM
23	Please help us!	4/23/2014 5:37 AM

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APPENDIX D - Critical Facility Analysis

A new critical facility was not available for the 2014 plan update. The existing data (used in previous plan updates) was used for this effort. However, the planning team did work to identify potential sites of concern during the planning process. New sites are noted in the table below. Data was not available to determine if specific buildings resided in hazard areas for all hazards. Hazards that were analyzed include:

- Sea level rise (SLR)
- Flood plains A/AE 100-year/1.0-percent annual chance flood & V/VE zones
- Landslide
- Earthquake
- Tsunami
- Coastal erosion.

Refer to Chapter 4: Risk Assessment, for a complete description of the methodology and data sources used for each hazards. The table below lists the critical facilities and indicates whether or not the critical facility is at risk to hazards.

Tutuila Critical Facilities

Tutuila critical facilities have a combined estimated value of $1,225,730,003.

Table 1 Tutuila Critical Facility Analysis

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Critical Facilities													
Church/Shelter	CCCAS Hall	Aasu		$360,000							X		
Church/Shelter	CCCAS Hall	Aasu		$360,000							X		
Church/Shelter	CCCAS Hall	Afono		$288,000				X			X	X	
Church/Shelter	Catholic Hall	Alao		$580,000				X			X	X	
Church/Shelter	Catholic Hall	Alao		$580,000				X			X	X	
Church/Shelter	CCCAS	Amanave		$480,000				X				X	X
Church/Shelter	CCCAS	Amanave		$480,000				X				X	X
Church/Shelter	CCCAS	Amanave		$480,000				X				X	X
Church/Shelter	CCCAS Hall	Amaua		$616,000				X			X	X	X
Church/Shelter	CCCAS Hall	Amaua		$616,000				X			X	X	X
Church/Shelter	CCCAS Hall	Amouli		$560,000				X			X	X	X
Church/Shelter	CCCAS Hall	Aoa		$781,500				X			X	X	
Church/Shelter	CCCAS Hall	Aoa		$781,500				X			X	X	
Church/Shelter	CCCAS Hall	Aoloau		$792,000							X		
Church/Shelter	CCCAS Hall	Aoloau		$792,000							X		
Church/Shelter	CCCAS Hall	Aoloau		$792,000							X		

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Church/Shelter	CCCAS	Asili		$760,000							X	X	X
Church/Shelter	CCCAS	Asili		$760,000							X	X	X
Church/Shelter	CCCAS Hall	Auasi		$318,000				X			X	X	
Church/Shelter	CCCAS Hall	Auasi		$318,000				X			X	X	
Church/Shelter	LDS Church	Auto		$210,000				X			X	X	X
Church/Shelter	CCCAS Hall	Fagaalu		$360,000				X			X	X	
Church/Shelter	CCCAS Church	Fagamalo		$572,000				X			X	X	
Church/Shelter	CCCAS Church	Fagamalo		$572,000				X			X	X	
Church/Shelter	CCCAS Hall	Fagasa		$784,000				X			X	X	
Church/Shelter	CCCAS Hall	Fagasa		$784,000							X	X	
Church/Shelter	CCCAS Hall	Fagatogo		$288,000							X	X	
Church/Shelter	Methodist Hall	Fagatogo		$712,500				X			X	X	
Church/Shelter	CCCAS Hall	Malaeloa		$861,000							X	X	
Church/Shelter	CCCAS Hall	Malaeloa		$861,000							X	X	
Church/Shelter	LDS Church	Mapusaga		$966,000							X		
Church/Shelter	LDS Church	Mapusaga		$966,000							X		
Church/Shelter	CCCAS Hall	Masausi		$120,000				X			X	X	
Church/Shelter	Methodist Hall	Nuuuli-tai		$303,900				X			X	X	
Church/Shelter	CCCAS Hall	Onenoa		$162,000				X			X	X	
Church/Shelter	CCCAS Hall	Sailele		$486,000				X			X	X	
Church/Shelter	CCCAS Maota Tina	Tafuna		$714,000							X	X	
Church/Shelter	CCCAS Hall	Taputimu		$852,000							X	X	
Church/Shelter	CCCAS Hall	Taputimu		$852,000							X	X	
Church/Shelter	CCCAS Hall	Tula		$594,000				X			X	X	
Church/Shelter	CCCAS Hall	Tula		$594,000				X			X	X	
Church/Shelter	CCCAS Hall	Tula		$594,000							X	X	
Church/Shelter	CCCAS Hall	Tula		$594,000							X	X	
Church/Shelter	CCCAS Hall	Utumea		$560,000				X			X	X	
Church/Shelter	CCCAS Hall	Vailoatai		$460,000							X	X	
Church/Shelter	CCCAS Hall	Vaitogi		$528,000							X	X	
Church/Shelter	CCCAS Hall	Vaitogi		$528,000							X	X	
Church/Shelter	CCCAS Hall	Vatia		$360,000				X			X	X	X
Commercial	VCS Samoa Packing Co	Atuu		$16,382,320				X			X	X	
Commercial	Star Kist Samoa Co.	Satala		$17,909,360				X			X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Commercial	Star Kist Samoa Co.	Satala		$17,909,360							X	X	
Communications	KSBS Radio Station	Fagaalu	A. Sene	$384,000							X	X	
Communications	American Samoa Telec	Fagatogo	ASG	$960,000				X			X	X	
Communications	KVZK-TV	Fagatogo	ASG	$650,000							X	X	
Communications	KKHJ Radio Station	Pago Pago				X	X	X			X	X	
Communications	Blue Sky Company	Tafuna		$400,000							X	X	
Fire	Sub-station East	Fagaitua	ASG	$288,000				X			X	X	X
Fire	DPS Fire Division	Fagatogo	ASG	$150,000				X			X	X	
Fire	DPS Fire Division	Fagatogo	ASG	$150,000				X			X	X	
Fire	Fire Station	Tualatai/ Leone			X						X		
Fire	Fire Station	Tualauta/ Nu'uuli			X						X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Fuel Storage	Airport Tank Farm	PPG Airport		$7,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	ASG Gov.'t Bldgs.	Fagatogo	ASG	$14,000,000				X			X	X	
Government	Governors House	Fagatogo										X	
Government	High Court	Fagatogo		$1,452,328				X			X	X	
Government	District Court	Pago Pago		$54,349			X	X			X	X	
Government	New District Court	Pago Pago						X				X	
Government	Temco and DMV	Tafuna		$349,080				X			X	X	
Government	Dept of Education	Utulei									X	X	
Government	Faletusi Library	Utulei		$960,000							X	X	
Government	LT Gov House	Utulei						X			X	X	
Government	Samoan Affairs	Utulei		$550,000							X	X	
Hospital	LBJ Tropical Medical	Fagaalu	ASG	$18,836,193							X	X	
Hospital	LBJ Tropical Medical	Fagaalu	ASG	$18,836,193							X	X	
Hospital	LBJ Tropical Medical	Fagaalu	ASG	$18,836,193							X	X	
Hospital	LBJ Tropical Medical	Fagaalu	ASG	$18,836,193							X	X	
Hospital 2	Hospital	Saole			X						X	X	X
Police	Faqaitua Sub-station	Fagaitua	ASG	$144,000				X			X	X	X
Police	DPS Central Station	Fagatogo	ASG	$770,414				X			X	X	
Processing Site	Samoa Packing	Atuu		$16,382,320				X			X	X	
Processing Site	Star Kist Samoa	Atuu		$17,909,360				X			X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Processing Site	Samoa Seiner Suppls	Container Dock										X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Alofau Elementary	Alofau	ASG	$745,000							X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000				X			X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000				X			X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000				X			X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000				X			X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000				X			X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000							X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000							X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000							X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000							X	X	
School/Shelter	Aua Elementary	Aua	ASG	$1,500,000							X	X	
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	X
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	
School/Shelter	Faqaitua High	Fagaitua	ASG	$1,750,000				X			X	X	
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Illiili Elementary	Iliili	ASG	$1,250,000							X		
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000				X			X	X	
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000				X			X	X	
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000							X	X	
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000							X	X	
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000							X	X	
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000							X	X	
School/Shelter	Laulii Elementary	Laulii	ASG	$545,000							X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
School/Shelter	Leone High	Leone	ASG	$1,960,000							X		
School/Shelter	Leone High	Leone	ASG	$1,960,000							X		
School/Shelter	Leone High	Leone	ASG	$1,960,000							X		
School/Shelter	Masefau Elementary	Masefau	ASG	$675,000			X	X			X	X	X
School/Shelter	Masefau Elementary	Masefau	ASG	$675,000			X	X			X	X	X
School/Shelter	Masefau Elementary	Masefau	ASG	$675,000			X	X			X	X	X
School/Shelter	Masefau Elementary	Masefau	ASG	$675,000				X			X		X
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Manulele Elementary	Nuuuli-uta	ASG	$940,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pago Pago Elementary	Pago Pago	ASG	$1,400,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Pavaiai Elementary	Pavaiai	ASG	$2,650,000							X	X	
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000				X			X	X	X
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000				X			X	X	X
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	X
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	X
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	X
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	X
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	
School/Shelter	Seetaqa Elementary	Seetaga	ASG	$520,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
School/Shelter	Samoana High	Utulei	ASG	$1,055,000							X	X	
Transportation	Container Dock	Fagatogo	ASG	$18,131,380				X			X	X	
Transportation	InterIsland Ferry T.	Fagatogo	ASG	$400,000				X			X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Transportation	PPG Intern. Airport	Tafuna	ASG	$69,080,080							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
Utilities	ASPA Tafuna Plant	Tafuna	ASG	$18,000,000							X	X	
ASTCA INFRASTRUCTURE													
50 Ft Pole	Afono Mafa Site	Afono			X					X			
50 Ft Pole	Airport Site	Tafuna			X						X	X	
60 Ft	Alofau	Alofau			X					X	X	X	
N/A	Alofau	Alofau			X					X	X	X	

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Bldg	Alofau	Alofau			X					X	X	X	
DCO Bldg	Alofau	Alofau			X					X	X	X	
DCO Bldg	Alofau	Aolofau			X					X	X	X	
60 Ft	Alofau	Alofau			X					X	X	X	
50 Ft Pole	Aoa Mafa Site	Aoa			X					X	X	X	
DCO Bldg	Aunuu	Aunuu			X			X				X	
110 Ft	Aunuu	Aunuu			X			X				X	
DCO Bldg	Aunuu	Aunuu			X			X				X	
110 Ft	Aunuu	Aunuu			X			X				X	
110 Ft	Breakers Point	Laulii			X							X	X
110 Ft	Breakers Point	Laulii			X							X	X
DCO Bldg	Breakers Point	Laulii			X							X	X
DCO Bldg	Breakers Point	Laulii			X							X	X
40 Ft	Fagaitua	Fagaitua			X			X			X	X	
DCO Bldg	Fagaitua	Fagaitua			X			X			X	X	
50 Ft Pole	Fagasa Mafa Site	Fagasa			X								
30 Ft	Fagatogo	Fagatogo			X						X	X	
DCO Bldg	Fagatogo	Fagatogo			X						X	X	
50 Ft	Fagatogo	Fagatogo			X						X	X	
50 Ft	Fagatogo	Fagatogo			X						X	X	
N/A	Fagatogo	Fagatogo			X			X			X	X	
BTS Bldg	Fagatogo 5e	Fagatogo			X					X	X	X	
50 Ft Pole	Faleniu Site	Faleniu			X			X			X	X	
100ft	Fitiuta	Fitiuta			X							X	
140 Ft	Iliili	Iliili			X						X	X	
35 Ft	Iliili	Iliili			X						X	X	
140 Ft	Iliili	Iliili			X						X	X	
DCO Bldg	Iliili	Iliili			X						X	X	
DCO Bldg	Iliili	Iliili			X						X	X	
50 Ft	Leone	Leone			X						X	X	
25 Ft Pole	Matuu Site	Matuu			X			X		X		X	X
DCO Bldg	New Leone	Leone			X						X		
DCO Bldg	New Leone	Leone			X						X		
N/A	New Leone	Leone			X						X		
N/A	New Leone	Leone			X						X		
N/A	Nuuuli	Nuuuli			X			X			X	X	
50 Ft	Olotele	Aoloau			X						X		
110 Ft	Olotele	Aoloau			X						X		
50 Ft	Olotele	Aoloau			X						X		
40 Ft	Olotele	Aoloau			X						X		

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
25 Ft	Olotele	Aoloau			X						X		
30 Ft	Olotele	Aoloau			X						X		
50 Ft Pole	Onenoa Tank Site	Onenoa			X					X	X	X	
50 Ft Pole	Poloa Tank Site	Poloa			X								
110 Ft	Satala	Satala			X						X	X	
110 Ft	Satala	Satala			X						X	X	
DCO Bldg	Satala	Satala			X						X	X	
DCO Bldg	Satala	Satala			X						X	X	
110 Ft	Tafuna	Nuuuli			X						X	X	
DCO Bldg	Tafuna	Nuuuli			X						X	X	
DCO Bldg	Tafuna	Nuuuli			X						X	X	
110 Ft	Tafuna	Nuuuli			X						X	X	
N/A	Tafuna	Tafuna			X						X	X	
N/A	Tafuna	Tafuna			X						X	X	
N/A	Tafuna	Tafuna			X						X	X	
40 Ft	Taputimu	Taputimu			X						X	X	
140 Ft	Taputimu	Taputimu			X						X	X	
DCO Bldg	Taputimu	Taputimu			X						X	X	
DCO Bldg	Taputimu	Taputimu			X						X	X	
140 Ft	Taputimu	Taputimu			X						X	X	
50 Ft Pole	Utulei Print Shop Site	Utulei			X			X			X	X	
Assembly Areas													
1	1	Pago Pago			X					X	X	X	
2	2	Pago Pago			X					X	X	X	
3	3	Pago Pago			X					X	X	X	
4	4	Fagatogo			X					X	X	X	
5	5	Anua			X					X	X	X	
6	6	Atuu			X					X		X	
7	7	Fagatogo			X					X		X	
8	8	Fagaalu			X					X		X	
9	9	Fagaalu			X					X		X	
10	10	Utulei			X					X	X	X	
11	11	Aua			X					X	X	X	
12	12	Laulii			X					X		X	X
13	13	Fatumafuti			X							X	
14	14	Leone			X			X			X	X	
15	15	Leone			X							X	
16	16	Amaluia			X							X	X
17	17	Amaluia			X							X	X

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
18	18	Asili			X							X	
19	19	Afao			X						X	X	
20	20	Afao			X					X		X	X
21	21	Utumea West			X					X		X	X
22	22	Amanave			X					X		X	
23	23	Poloa			X							X	
24	24	Fagalii			X							X	
25	25	Maloata			X							X	
26	26	Fagamalo			X					X		X	
Tsunami Sirens													
1	1	Leloaloa			X						X	X	X
2	2	Laulii			X							X	X
3	3	Auto			X							X	
4	4	Pago Pago			X		X				X	X	
5	5	Utulei			X						X	X	
6	6	Fagaalu			X						X	X	
7	7	Faganeanea			X					X		X	X
8	8	Nu'uuli			X						X	X	X
9	9	Nu'uuli			X						X	X	
10	10	Fagatogo			X						X	X	X
11	11	Aumi			X					X		X	X
12	12	Alofau			X						X	X	X
13	13	Amouli			X						X	X	X
14	14	Alao			X						X	X	
15	15	Tula			X						X	X	
16	16	Onenoa			X						X	X	
17	17	Aoa			X						X	X	
18	18	Saiele			X						X	X	
19	19	Masefau			X		X				X	X	
20	20	Vatia			X						X	X	X
21	21	Afona			X						X	X	
22	22	Fagasa			X						X	X	
23	23	Tafuna			X						X	X	
24	24	Tafuna			X						X	X	
25	25	Leone			X						X		
26	26	Leone			X						X	X	
27	27	Leone			X						X	X	
28	28	Amaluia			X						X	X	X
29	29	Asili			X						X	X	X
30	30	Afao			X						X	X	X

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
31	31	Nua			X						X	X	X
32	32	Agugulu			X						X	X	
33	33	Amanave			X						X	X	X
34	34	Poloa			X					X		X	X
35	35	Fagalii			X							X	
36	36	Fagamalo			X						X	X	
43	43	Vaitogi			X						X	X	
Safe Zones													
1		East Tutuila			X	X	X						
2		Nua/Afao			X	X	X						
3		Maloata			X	X	X						
4		Fagamalo			X	X	X						

Ta’u Critical Facilities

Ta’u critical facilities did not include value estimates.

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Critical Facilities													
Church/Shelter	Church	Luma							X				
Church/Shelter	Church	Luma				X			X				
Church/Shelter	LMS Church	Leusoalii							X				
Church/Shelter	LMS Church	Luma				X			X				
Commercial	Amerika Samoa Bank	Maia							X				
Commercial	Niumata Hotel	Luma				X			X				
Commercial	Pay-n-Save Retail and Grocery Store	Luma				X			X				
Commercial	Salisa Store	Luma				X			X				
Commercial	Store	Maia							X				
Commercial	Store	Luma				X			X				
Commercial	Store	Luma				X			X				
Commercial	Store	Luma				X			X				
Commercial	U'u Gaoa Store	Luma				X							
Fuel Tank	ASPA Tanks	Faleasao					X		X				
Government	ASPA	Faleasao				X			X				
Government	ASPA	Faleasao				X	X		X				
Government	ASPA	Faleasao					X		X				
Government	DPW	Siufaga				X	X		X				
Government	DPW	Faleasao					X		X				
Government	Manuatele Criminal Justice Planning Agency	Luma											
Government	United States Post Office & Store	Faleasao							X				
Hospital	Hospital	Luma				X			X				
School/Shelter	Early Childhood Education	Luma				X			X				
School/Shelter	Faleasao Elementary School	Faleasao				X			X				

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
School/Shelter	Faleasao Elementary School	Faleasao							X				
School/Shelter	Faleasao Elementary School	Faleasao							X				
School/Shelter	Faleasao Elementary School	Faleasao							X				
School/Shelter	Faleasao Elementary School	Faleasao				X	X		X				
School/Shelter	Faleasao Elementary School	Faleasao				X			X				
School/Shelter	Manu'a High School	Luma											
School/Shelter	Manu'a High School	Luma											
School/Shelter	Manu'a High School	Luma											
School/Shelter	Manu'a High School	Luma											
School/Shelter	Manu'a High School	Luma											
School/Shelter	Manu'a High School Gymnasium	Luma											
School/Shelter	Manu'a High School Locker Room	Luma											
School/Shelter	Matasaua School	Leusoalii							X				
School/Shelter	Matasaua School	Leusoalii							X				
School/Shelter	Matasaua School	Leusoalii							X				
School/Shelter	Matasaua School	Leusoalii							X				
Transportation	Aiport Terminal	Maia							X				

Facility Type	Name	Village	Ownership	Value (Est.)	New for 2014	1ft SLR	3ft SLR	A/AE FP	V/VE FP	High Landlide Risk	High Earthquake Risk	Tsunami Risk	Coastal Erosion
Unknown	Unknown	Luma				X			X				
Tsunami Sirens													
37	37	Siufaga (Ta'u)	X						X				
38	38	Luma (Ta'u)	X				X		X				
39	39	Faleasao (Ta'u)	X						X				
40	40	Leusoalii (Ta'u)	X										
41	41	Olosega	X										
42	42	Ofu	X						X				
ASTCA Infrastructure													
130 Ft	Tau	Tau	X						X				
130 Ft	Tau	Tau	X						X				
DCO Bldg	Tau	Tau	X						X				
DCO Bldg	Tau	Tau	X						X				
60 Ft	Ofu	Ofu	X						X				
DCO Bldg	Ofu	Ofu	X						X				
DCO Bldg	Ofu	Ofu	X						X				
60 Ft	Ofu	Ofu	X						X				
40 Ft Pole	Ofu Site	Ofu	X						X				
30 Ft Pole	Olosega Site	Olosega	X										

6/30/2014

American Samoa Power Authority

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FEMA Hazard Mitigation 2014 Proposed Projects
Hazard Mitigation Council Briefing
June 19, 2014

1

American Samoa Power Authority

List of ASPA HM 2014 Proposed Projects

Project Title	Project Costs
1. Fagaalu Water Booster Station (#18)	$ 200,000
2. Pago Pago Water Booster Station (#19)	$ 200,000
3. Weather Proof Sewage Lift Stations (#20)	$ 300,000
4. Tafuna Wastewater Treatment Plant (#21)	$ 450,000
5. Water Wells Mitigation (#22)	$ 1,000,000
6. Water Tanks Mitigation (#23) A. Tramway Tank B. Aua Tank C. Blunts Point Tank D. Pava'ia'i #1 Tank E. Pava'ia'i #2 Tank	$ 10,000,000

2

American Samoa Power Authority

Overview of ASPA Water Booster Station Mitigation

Fagaalu & Pago Booster Stations:
- Located in the flood zone that will be impacted by a Tsunami.
- Flood waters will result in:
  - Loss of electrical controls and equipment
  - Disruption of water supply to hospital & residents
  - Disruption of water supply to the canneries
    - shutting down cannery operation
    - further impacting already fragile economy
  - Disruption of water supply to the eastern side of Tutuila -
    - Residents affected will resort to untreated water
    - Increase risk of diseases from untreated water sources

Mitigation Proposal to Reduce Damage & Down Time:
- Additional Protective Barrier Wall
- Standby Generator

3

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ASPA Fagaalu & Pago Water Booster Stations

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6/30/2014

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Overview of ASPA Wastewater Lift Station Mitigation

Nine (9) Wastewater Lift Stations:
- Located in the flood zone that will be impacted by Tsunami (Atu'u, Satala, Korea, Malaloa, Matafao Elem., Fagaalu Hospital, Fatu ma Futi, Coconut Point #1, #2, #3, Freddies Beach)
- Flood waters will result in:
  - Loss of electrical controls and equipment
  - Result in lift stations & collection system not functioning
  - Will cause sewage to flow into the streets & backup into houses
    - after flood water recede
  - Increase risk of spreading diseases following a natural disaster

Mitigation Proposal to Redce Damage & Down Time:
- Weather Proof Lift Stations – Barrier Wall
- Standby Generators

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Overview of Tafuna Wastewater Treatment Plant Mitigation

Tafuna Wastewater Treatment Plant:
- Structural Reinforcement and Refurbishment:
  - Cat walks and structures are critical elements of the system
  - Cat walks are made of wood & rotting, posing safety danger
- Location poses risk to tsunami disaster:
  - 2009 Tsunami caused $60,000 damages
  - Proven risk of posing damages with sewer spillage

Mitigation Proposal to Reduce Damage & Safety Risks :
- Refurbish and reinforce cat walks to safety standard
- Construct barrier wall preventing tsunami danger
- Construct barrier wall retaining sewer spillage

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American Samoa Power Authority

Overview of ASPA Water Wells Mitigation

Water Wells:
- 56 wells in operation: 48 in Tutuila & 8 in Manu'a islands
- Electrical source is from power grid
- Loss of electricity during a natural disaster will result in:
  - Disruption to steady supply of potable water
  - Disruption to business operation in affected areas
  - Increased health and safety risks in affected areas

Mitigation Proposal to Reduce Down Time & Risks:
- Provide on-site generators for backup power supply

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ASPA Water Tanks – Critical System Component

8

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Overview of ASPA Water Tanks Mitigation

ASPA's 10 Water Tanks:
- Welded steel tanks - critical components of water system
- Capacities ranging from 750,000 to 1,000,000 gallons
- Replacement cost for 1 tank estimated at $1.5-2 million
- Majority were designed and built by Chicago Bridge and Iron Company in the 1970's (same as Guam tank)
- In advanced stage of corrosion (Pago & Pavaiai Tank photos)
  - Need to repair or replace
  - Risk of catastrophic failure > flooding, extensive damage, potential loss of life to residents downhill of the tanks

Mitigation Proposal to Meet Safety Standards & Reduce Risks:
- Replacement or repair of deteriorating tanks

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American Samoa Power Authority

Steel Tank Repairs or Replacement

Cost Estimate & Impact

Tank	Type	Capacity gallons	Estimated Cost of Repair*	Estimated Cost of Replacement	Priority Rank	Pop. Served	Other Impacts
Tramway	Steel welded	1,000,000	$ 346,000	$ 2,000,000	1	2,421	Governors Mansion, EOB, Fono, Market, Businesses, Residents
Aua	Steel welded	1,000,000	$ 212,000	$ 2,000,000	2	1,900	Schools, Businesses, Residents
Blunts Point	Steel welded	1,000,000	$ 181,000	$ 2,000,000	3	900	Hospital, Canneries, Schools, Businesses, Residents
Pava'ia'i #1	Steel welded	750,000	$ 175,000	$ 1,500,000	4	1,500	Schools, Businesses, Residents
Pava'ia'i #2	Steel welded	1,000,000	$ 172,000	$ 2,000,000	5	1,000	Schools, Businesses, Residents
Nuuuli	Steel welded	1,000,000	$ 147,000	$ 2,000,000	6	3,500	Canneries, Schools, Businesses, Residents
Futiga	Steel welded	1,000,000	$ 136,000	$ 2,000,000	7	2,800	Schools, Businesses, Residents

*[illegible] 2009 estimate plus 20%

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Tramway and Aua Tanks

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Pago Pago and Pava'ia'i Tanks

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Guam Tank - Potential Risk & Damages

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ASPA requests to keep existing Hazard Mitigation projects from past years on the Hazard Mitigation Project Plan

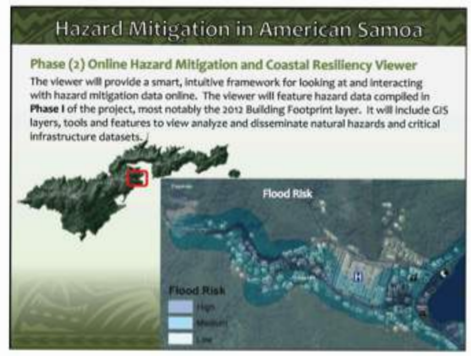
Fa'afetai Tele
from ASPA

14

7/13/2014

7/13/2014

7/13/2014



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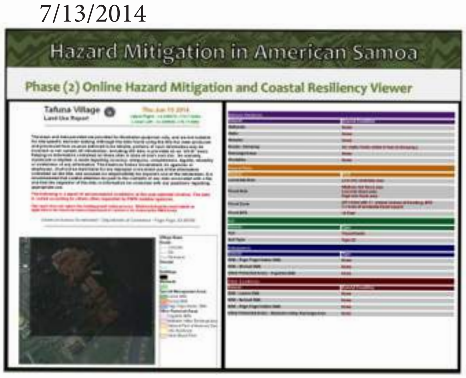

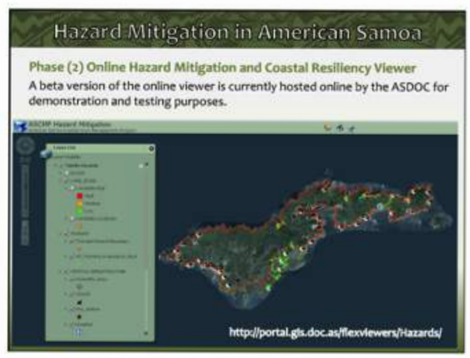

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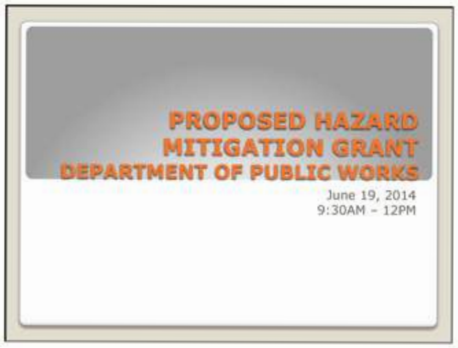
Fa'afetai lava
For additional questions please contact:
Department of Commerce
American Samoa Government
A.P. Lutali Executive Office Bldg
Utulei, American Samoa 96799
684-633-5155

7/13/2014



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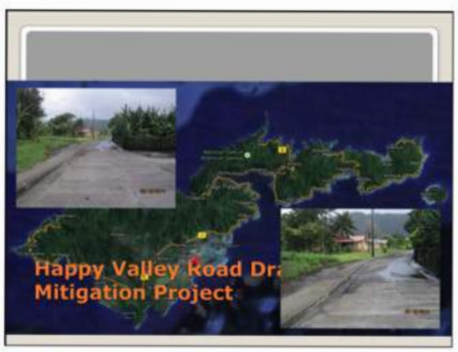
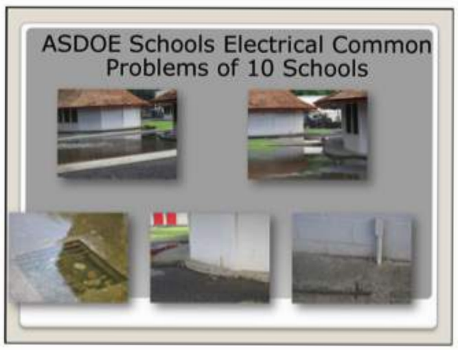
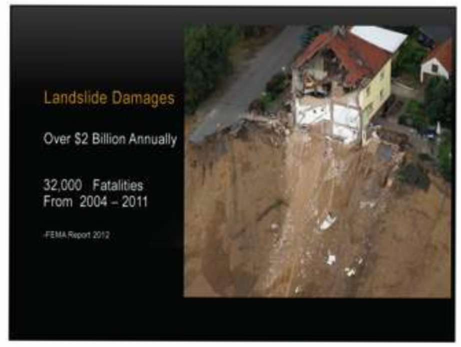
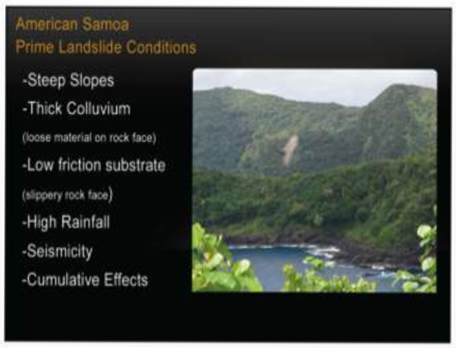



•Matafao Elementary
•Samoana High School
•Pago Pago Elementary
•Lauli Elementary
•Afonotele Elementary
•Aiofau Elmentary
ASDOE Schools Electric
Mitigation Project
•Manulele Elmentary
•Lupelele Elementary


ASDOE Schools Electrical Common
Problems of 10 Schools

7/13/2014





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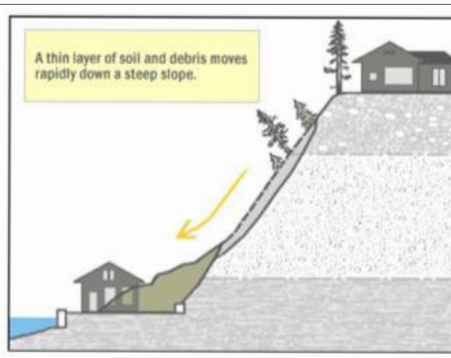

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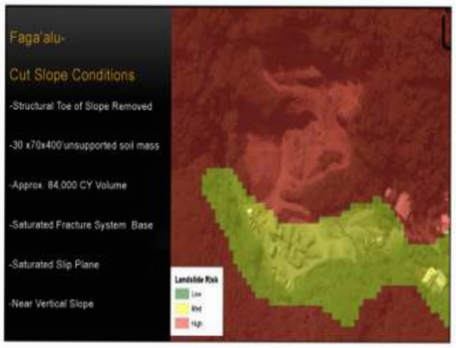

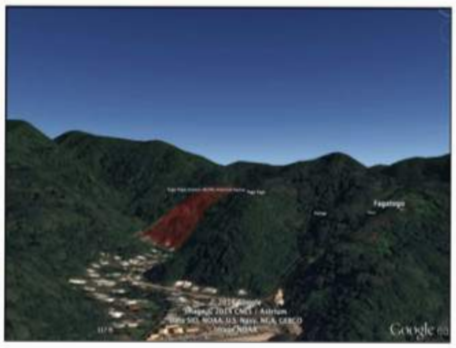

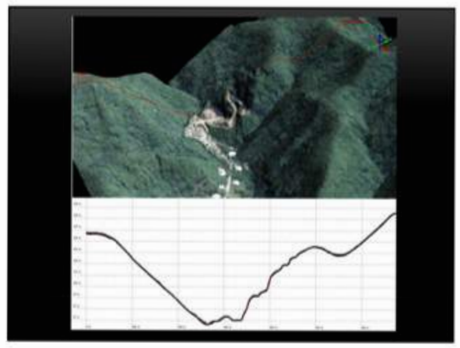

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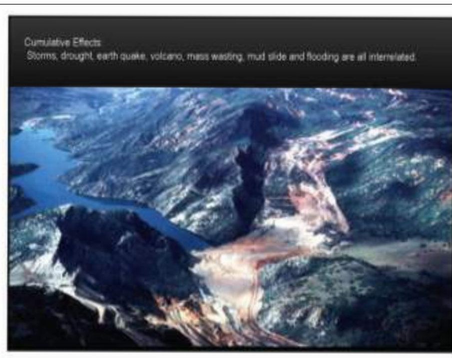

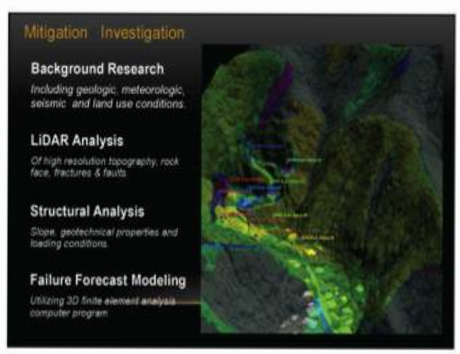

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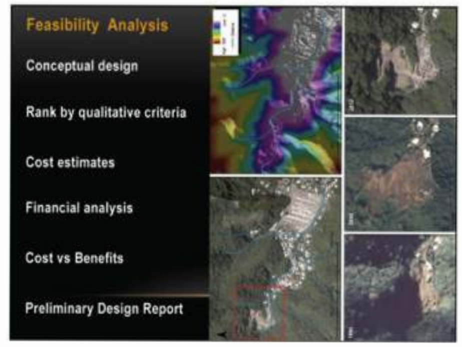

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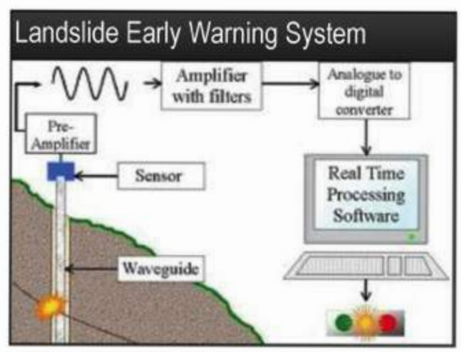


American Samoa Power Authority

Fagaʼalu Booster Station

2014 Hazard Mitigation Projects

Jurisdiction:	American Samoa		Agency/Organization:	ASPA	
Project Title: Fagaalu Water Booster Station Mitigation			Contact Person:	Will Spitzenberg	
			Phone: 684-699-7430		
			e-mail: williams@aspower.com		
Hazard(s):	Tsunami				
Flood Zone:	Yes	Base Flood Elevation:	4'Above MSL	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Yes, booster stations are required to maintain flow and pressure to canneries and eastern village customers					
Environmental Impact:			Historical Preservation Impact:		
High X	Medium	Low	High	Medium	Low X
Risk of Hazard Impact:			Importance to Protection of Life and Property and Recovery from Disaster:		
High	Medium X	Low	High X	Medium	Low
Estimated Cost of Project: $200,000			Project Period (duration): 24 months		
Value of Structure or Facility: $500,000			TMK:		
Estimated Value of Facility Contents: $0					
Sources of Financial Support: FEMA					
Project Objectives:					
• To weatherize/reinforce booster station structures to withstand Tsunami for the continued ability of ASPA to provide adequate water supply and pressure to the canneries and eastern village customers.					
Project Description:					
Install reinforcements for critical columns and structures and install berms and retaining walls so that the booster station can continue operating after a Tsunami.					

2014 Hazard Mitigation Projects

Jurisdiction:	American Samoa		Agency/Organization:	ASPA	
Project Title: Pago Water Booster Station Mitigation			Contact Person:	Will Spitzenberg	
			Phone: 684-699-7430		
			e-mail: williams@aspower.com		
Hazard(s):	Tsunami				
Flood Zone:	Yes	Base Flood Elevation:	5'Above MSL	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Yes, booster stations are required to maintain flow and pressure to canneries and eastern village customers					
Environmental Impact:			Historical Preservation Impact:		
High X	Medium	Low	High	Medium	Low X
Risk of Hazard Impact:			Importance to Protection of Life and Property and Recovery from Disaster:		
High	Medium X	Low	High X	Medium	Low
Estimated Cost of Project: $200,000			Project Period (duration): 24 months		
Value of Structure or Facility: $500,000			TMK:		
Estimated Value of Facility Contents: $0					
Sources of Financial Support: FEMA					
Project Objectives:					
• To weatherize/reinforce booster station structures to withstand Tsunami for the continued ability of ASPA to provide adequate water supply and pressure to the canneries.					
Project Description:					
Install reinforcements for critical columns and structures and install berms and retaining walls so that the booster station can continue operating after a Tsunami.					

2014 Hazard Mitigation Projects

Jurisdiction:	American Samoa	Agency/Organization:	ASPA
Project Title: Weather Proof Sewerage Lift Stations		Contact Person:	Steve Branz
		Phone: 684-699-1462	
		e-mail: steveb@aspower.com	
Hazard(s):	Tsunami		

Flood Zone:	Yes	Base Flood Elevation:	5'Above MSL	Erosion Rate:	

Critical Facility/Population/Asset at Risk: Yes, sewerage lift stations are required to maintain wastewater treatment

Environmental Impact:			Historical Preservation Impact:		
High X	Medium	Low	High	Medium	Low X
Risk of Hazard Impact:			Importance to Protection of Life and Property and Recovery from Disaster:		
High X	Medium	Low	High X	Medium	Low

Estimated Cost of Project: $300,000	Project Period (duration): 24 months
Value of Structure or Facility: $3,000,000	TMK:
Estimated Value of Facility Contents: $0	
Sources of Financial Support: FEMA	

Project Objectives:

- To weatherize computer controls to preclude critical electrical component loss during Tsunami.

Project Description:

Install and raise computerized controls above ground level and install in weather proof panels rated to weather Tsunami.

2014 Hazard Mitigation Projects

Jurisdiction:	American Samoa	Agency/Organization:	ASPA
Project Title: Tafuna Wastewater Treatment Plant Reinforcement		Contact Person:	Steve Branz
		Phone: 684-699-1462	
		e-mail: steveb@aspower.com	
Hazard(s):	Tsunami		

Flood Zone:	Yes	Base Flood Elevation:	5'Above MSL	Erosion Rate:	

Critical Facility/Population/Asset at Risk:.Yes, wastewater treatment plants are required to maintain wastewater treatment

Environmental Impact:			Historical Preservation Impact:		
High X	Medium	Low	High	Medium	Low X
Risk of Hazard Impact:			Importance to Protection of Life and Property and Recovery from Disaster:		
High X	Medium	Low	High X	Medium	Low

Estimated Cost of Project: $450,000	Project Period (duration): 24 months
Value of Structure or Facility: $6,000,000	TMK:
Estimated Value of Facility Contents: $0	
Sources of Financial Support: FEMA	

Project Objectives:

- To weatherize/reinforce wastewater treatment plant structures to withstand Tsunami for the continued
- ability of ASPA to treat wastewater.

Project Description:

Install reinforcements for critical columns and structures and install berms and retaining walls so that the wastewater
treatment plant can continue operating after a Tsunami.

2014 Hazard Mitigation Projects

Jurisdiction:	American Samoa		Agency/Organization:	ASPA	
Project Title: Water Wells Mitigation			Contact Person:	Will Spitzenberg	
			Phone: 684-699-7430		
			e-mail: williams@aspower.com		
Hazard(s):	Earthquake, Hurricane				
Flood Zone:		Base Flood Elevation:	20'-200' Above MSL	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Yes, water wells are required to supplywater and pressurize the entire water system to get water to the community.					
Environmental Impact:			Historical Preservation Impact:		
High X	Medium	Low	High	Medium	Low X
Risk of Hazard Impact:			Importance to Protection of Life and Property and Recovery from Disaster:		
High	Medium	LowX	High X	Medium	Low
Estimated Cost of Project: $1,000,000			Project Period (duration): 5 years		
Value of Structure or Facility: $2,000,000			TMK:		
Estimated Value of Facility Contents: $0					
Sources of Financial Support: FEMA					
Project Objectives:					

- To weatherize/reinforce over 50 water well structures to withstand strong winds during hurricanes and earth movement during earthquake for the continued ability of ASPA to provide adequate water supply to its customers and the community of American Samoa.

Project Description:

Install reinforcements for water wells and install weather proof enclosures to withstand strong winds and the elements.

Water Tanks Mitigation

2014 Hazard Mitigation Projects

Jurisdiction:	American Samoa		Agency/Organization:	ASPA	
Project Title: Water Tanks Mitigation			Contact Person:	Will Spitzenberg	
			Phone: 684-699-7430		
			e-mail: williams@aspower.com		
Hazard(s):	Earthquake, Hurricane				
Flood Zone:	No	Base Flood Elevation:	200-300'Above MSL	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Yes, water tanks are required to maintain flow and pressurize the entire water system to supply water to the community.					
Environmental Impact:			Historical Preservation Impact:		
High X	Medium	Low	High	Medium	Low X
Risk of Hazard Impact:			Importance to Protection of Life and Property and Recovery from Disaster:		
High X	Medium	Low	High X	Medium	Low
Estimated Cost of Project: $10,000,000			Project Period (duration): 5 years		
Value of Structure or Facility: $20,000,000			TMK:		
Estimated Value of Facility Contents: $0					
Sources of Financial Support: FEMA					
Project Objectives:					
• To weatherize/reinforce water tank structures to withstand strong winds during hurricanes and earth movement during earthquake for the continued ability of ASPA to provide adequate water supply and pressure to the canneries and eastern village customers.					
Project Description:					
Install reinforcements for water tanks and install berms and retaining walls so that the water tanks can continue operating after an earthquake or hurricane.					

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: ASTCA
Project Title: Afono Pass to Blue Sky Tower Underground Communications	Contact Person: James Taylor Sr. Phone: (684) 733-9054 e-mail: jtaylor@samoatelco.com /isakala100935@yahoo.com vani.atafua@astca.net / vatafua_83@yahoo.com

Hazard(s): Hurricane

Flood Zone: VE	Base Flood Elevation:	Erosion Rate:

Critical Facility/Population/Asset at Risk:

Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Risk of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low
Estimated Cost of Project: $916,546.40	Project Period (duration):
Value of Structure or Facility	TMK

Estimated Value of Facility Contents:

Sources of Financial Support: Labor (ASTCA)

Project Objectives: The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disasters.

Project Description: This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Afono pass to B/Sky tower. The length of the road project is 7,920 feet. The scope of work includes excavation of a 2-ft x 3-ft x 7,920 LFT deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4-inch dia PVC conduits (schedule 40) side by side, place plastic spacers every 4-feet apart, imbedded in 3,000 psi concrete , backfill, and compact surface to existing top soil. Construct and install underground vaults every 500-feet apart of conduits.

Hazard Mitigation Proposal Cost Estimate

Location: AFONO PASS TO BLUE SKY TOWER - 7,920 FT

THIS IS AN ESTIMATED COST FOR THE " AFONO PASS TO BLUE SKY TOWER "
TO CONSTRUCT A 2 EACH 4" PVC CONDUIT UNDERGROUND CABLE DUCT.

	Description	Unit		Unit Rate	Qty	Total
1	7,920 LF X 24" TRENCHING & BACKFILLING	LF	@	$ 53.30	7,920	$ 422,136.00
2	7,920 LF @ 3,000 PSI CONCRETE READY MIX	LF	@	$ 8.34	7,920	$ 66,052.80
3	15,840 LF 4" DIA PVC CONDUIT INSTALL IN PLACE	LF	@	$ 8.80	15,840	$ 139,392.00
4	14 EA. VAULT, CONCRETE BUILT/INSTALL IN PLACE	EA	@	$ 6,068.00	14	$ 84,952.00
5	15,840 LF. 4" X 20' SCHEDULE 40 PVC CONDUIT	LF	@	$ 1.93	15,840	$ 30,571.20
6	14 EACH MANHOLE FRAME/COVER-30" ID	EA	@	$ 550.00	14	$ 7,700.00
7	MISC. U.G SUPPLIES (GLUE, BURIAL TAPE, PULL STRING)	LS				$ 5,000.00
8	CLEARING & GRUBBING	LS				$ 10,000.00
9	TRAFFIC CONTROL	LS				$ 5,000.00
10	7,920 LF, FIBER OPTIC; 72RW5/SM	LF	@	$ 2.25	7,920	$ 17,820.00
11	MISCELLANEOUS CABLE SPLICING MATERIALS	LS				$ 5,000.00
12	ARCHEOLOGICAL SURVEY	LS	@	$ 5.00	7,920	$ 39,600.00
13	ENGINEERING 10%					$ 83,322.40
				TOTAL		$ 916,546.40

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: ASTCA
Project Title: Amouli to Aoa Underground Communications	Contact Person: James Taylor Sr.
	Phone: (684) 733-9054
	e-mail: jtaylor@samoatelco.com /isakala100935@yahoo.com
	vani.atafua@astca.net / vatafua_83@yahoo.com

Hazard(s): Hurricane

Flood Zone: VE	Base Flood Elevation:	Erosion Rate:

Critical Facility/Population/Asset at Risk:

Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Risk of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low
Estimated Cost of Project: $1,208,042.00	Project Period (duration):
Value of Structure or Facility	TMK

Estimated Value of Facility Contents:

Sources of Financial Support: Labor (ASTCA)

Project Objectives: The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disasters.

Project Description: This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Leone DCO to Poloa. The length of the road project is 10,560 feet. The scope of work includes excavation of a 2-ft x 3-ft x 10,560 LFT deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4-inch dia PVC conduits (schedule 40) side by side, place plastic spacers every 4-feet apart, imbedded in 3,000 psi concrete , backfill, and compact surface to existing top soil. Construct and install underground vaults every 500-feet apart of conduits.

Hazard Mitigation Proposal Cost Estimate

Location: AMOULI TO AOA - 10,560 LF

THIS IS AN ESTIMATED COST FOR THE " AMOULI TO AOA "
TO CONSTRUCT A 2 EACH 4" PVC CONDUIT UNDERGROUND CABLE DUCT.

	Description	Unit		Unit Rate	Qty	Total
1	10,560 LF X 24" TRENCHING & BACKFILLING	LF	@	$ 53.30	10,560	$ 562,848.00
2	10,560 LF @ 3,000 PSI CONCRETE READY MIX	LF	@	$ 8.34	10,560	$ 88,070.40
3	21,120 LF 4" DIA PVC CONDUIT INSTALL IN PLACE	LF	@	$ 8.80	21,120	$ 185,856.00
4	18 EA. VAULT, CONCRETE BUILT/INSTALL IN PLACE	EA	@	$ 6,068.00	18	$ 109,224.00
5	21,120 LF. 4" X 20' SCHEDULE 40 PVC CONDUIT	LF	@	$ 1.93	21,120	$ 40,761.60
6	18 EACH MANHOLE FRAME/COVER-30" ID	EA	@	$ 550.00	18	$ 9,900.00
7	MISC. U.G SUPPLIES (GLUE, BURIAL TAPE, PULL STRING)	LS				$ 5,000.00
8	CLEARING & GRUBBING	LS				$ 10,000.00
9	TRAFFIC CONTROL	LS				$ 5,000.00
10	10,560 LF, FIBER OPTIC; 72RW5/SM	LF	@	$ 2.25	10,560	$ 23,760.00
11	MISCELLANEOUS CABLE SPLICING MATERIALS	LS				$ 5,000.00
12	ARCHEOLOGICAL SURVEY	LS	@	$ 5.00	10,560	$ 52,800.00
13	ENGINEERING 10%					$ 109,822.00
				TOTAL		$ 1,208,042.00

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: ASTCA
Project Title: Fagaitua to Masefau, Masausi, & Sailele Underground Communications	Contact Person: James Taylor Sr. Phone: (684) 733-9054 e-mail: jtaylor@samoatelco.com /isakala100935@yahoo.com vani.atafua@astca.net / vatafua_83@yahoo.com
Hazard(s): Hurricane	
Flood Zone: VE	Base Flood Elevation: / Erosion Rate:
Critical Facility/Population/Asset at Risk:	
Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Risk of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low
Estimated Cost of Project: $2,149,563.68	Project Period (duration):
Value of Structure or Facility	TMK
Estimated Value of Facility Contents:	
Sources of Financial Support: Labor (ASTCA)	

Project Objectives: The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave action, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disasters.

Project Description: This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Leone DCO to Poloa. The length of the road project is 19,008 feet. The scope of work includes excavation of a 2-ft x 3-ft x 19,008 LFT deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4-inch dia PVC conduits (schedule 40) side by side, place plastic spacers every 4-feet apart, imbedded in 3,000 psi concrete , backfill, and compact surface to existing top soil. Construct and install underground vaults every 500-feet apart of conduits.

Hazard Mitigation Proposal Cost Estimate

Location: FAGAITUA TO MASEFAU, MASAUSI AND SAILELE - 19,008 LF

THIS IS AN ESTIMATED COST FOR THE " FAGAITUA TO MASEFAU, MASAUSI AND SAILELE "
TO CONSTRUCT A 2 EACH 4" PVC CONDUIT UNDERGROUND CABLE DUCT.

	Description	Unit		Unit Rate	Qty	Total
1	19,008 LF X 24" TRENCHING & BACKFILLING	LF	@	$ 53.30	19,008	$ 1,013,126.40
2	19,008 LF @ 3,000 PSI CONCRETE READY MIX	LF	@	$ 8.34	19,008	$ 158,526.72
3	38,016 LF 4" DIA PVC CONDUIT INSTALL IN PLACE	LF	@	$ 8.80	38,016	$ 334,540.80
4	49 EA. VAULT, CONCRETE BUILT/INSTALL IN PLACE	EA	@	$ 6,068.00	32	$ 194,176.00
5	38,016 LF. 4" X 20' SCHEDULE 40 PVC CONDUIT	LF	@	$ 1.93	38,016	$ 73,370.88
6	49 EACH MANHOLE FRAME/COVER-30" ID	EA	@	$ 550.00	32	$ 17,600.00
7	MISC. U.G SUPPLIES (GLUE, BURIAL TAPE, PULL STRING)	LS				$ 5,000.00
8	CLEARING & GRUBBING	LS				$ 10,000.00
9	TRAFFIC CONTROL	LS				$ 5,000.00
10	19,008 LF, FIBER OPTIC; 72RW5/SM	LF	@	$ 2.25	19,008	$ 42,768.00
11	MISCELLANEOUS CABLE SPLICING MATERIALS	LS				$ 5,000.00
12	ARCHEOLOGICAL SURVEY	LS	@	$ 5.00	19,008	$ 95,040.00
13	ENGINEERING 10%					$ 195,414.88
				TOTAL		$ 2,149,563.68

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: ASTCA
Project Title: Leone to Poloa Underground Communications	Contact Person: James Taylor Sr. Phone: (684) 733-9054 e-mail: jtaylor@samoatelco.com /isakala100935@yahoo.com vani.atafua@astca.net / vatafua_83@yahoo.com
Hazard(s): Hurricane	

Flood Zone: VE	Base Flood Elevation:	Erosion Rate:

Critical Facility/Population/Asset at Risk:

Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Risk of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low
Estimated Cost of Project: $3,270,350.60	Project Period (duration):
Value of Structure or Facility	TMK

Estimated Value of Facility Contents:

Sources of Financial Support: Labor (ASTCA)

Project Objectives: The main objective of this project is to mitigate communications infrastructure consisting of fiber and copper cable from hurricane hazard impact. During the hurricane disaster event, utility poles and cables are a target for destruction by heavy winds, wave acton, debris impact, fallen trees, etc. By constructing underground communications and utilities, damage will be very minimal and not disrupt utilities during a hurricane or other natural disasters.

Project Description: This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is from Leone DCO to Poloa. The length of the road project is 29,040 feet. The scope of work includes excavation of a 2-ft x 3-ft x 29,040 LFT deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 3no x 4-inch dia PVC conduits (schedule 40) side by side, place plastic spacers every 4-feet apart, imbedded in 3,000 psi concrete , backfill, and compact surface to existing top soil. Construct and install underground vaults every 500-feet apart of conduits.

Hazard Mitigation Proposal Cost Estimate

Location: Leone to Poloa - 29,040 FT

THIS IS AN ESTIMATED COST FOR THE " LEONE TO POLOA"
TO CONSTRUCT A 2 EACH 4" PVC CONDUIT UNDERGROUND CABLE DUCT.

	Description	Unit		Unit Rate	Qty	Total
1	29,040 LF X 24" TRENCHING & BACKFILLING	LF	@	$ 53.30	29,040	$ 1,547,832.00
2	29,040 LF @ 3,000 PSI CONCRETE READY MIX	LF	@	$ 8.34	29,040	$ 242,193.60
3	58,080 LF 4" DIA PVC CONDUIT INSTALL IN PLACE	LF	@	$ 8.80	58,080	$ 511,104.00
4	49 EA. VAULT, CONCRETE BUILT/INSTALL IN PLACE	EA	@	$ 6,068.00	49	$ 297,332.00
5	58,080 LF. 4" X 20' SCHEDULE 40 PVC CONDUIT	LF	@	$ 1.93	58,080	$ 112,094.40
6	49 EACH MANHOLE FRAME/COVER-30" ID	EA	@	$ 550.00	49	$ 26,950.00
7	MISC. U.G SUPPLIES (GLUE, BURIAL TAPE, PULL STRING)	LS				$ 5,000.00
8	CLEARING & GRUBBING	LS				$ 10,000.00
9	TRAFFIC CONTROL	LS				$ 5,000.00
10	29,040 LF, FIBER OPTIC; 72RW5/SM	LF	@	$ 2.25	29,040	$ 65,340.00
11	MISCELLANEOUS CABLE SPLICING MATERIALS	LS				$ 5,000.00
12	ARCHEOLOGICAL SURVEY	LS	@	$ 5.00	29,040	$ 145,200.00
13	ENGINEERING 10%					$ 297,304.60
				TOTAL		$ 3,270,350.60

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization ASTCA	
Project Title: Aunu'u Tower replacement parts	Contact Person: James Taylor Sr.	
	Phone: (684) 733-9054	
	e-mail: jtaylor@samoatelco.com/isakala100935@yahoo.con	
	vani.atafua@astca.net / vatafua_83@yahoo.com	
Hazard(s) Hurricane, Earthquake		
Flood Zone	Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk:		
Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low	
Ris of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low	
Estimated Cost of Project: $ 44,127.00	Project Period (duration):	
Value of Structure or Facility $ 60,000.00	TMK	
Estimated Value of Facility Contents:		
Sources of Financial Support		
Project Objectives: The tower was installed in 1984, and due to the environmental deteriorating (weather condition), the tower needs replacement tower parts.		
Project Description: This is an ASTCA project to replace deffective parts of the Aunu'u tower due to deteriorating parts from weather conditions.		

AMERICN SAMOA TELECOMMUNICATIONS AUTHORITY
Hazard Mitigation Proposal Cost Estimate

Location: Aunu'u

THIS IS AN ESTIMATED COST FOR THE " AUNU'U " TOWER

	Description	Unit Rate	Qty	Total
1	140' SELF-SUPPORTING TOWER	$ 27,627.00	1	$ 27,627.00
	Model 72-L940, 140' Series Self - supporting tower constructed of tubular steel members. 16' center to center distance between legs at the base & 6' at the top with the top 40' a vertical section; 3-leg construction. Anchor nolts Hot dipped galvanized sections and components Tubular construction of tower sections Hot dipped galvanized tower assembly hardware Inside climbing ladder in one tower corner Vertical (9-run) waveguide ladder - leg clamps on one tower leg 13' rotatable top platform with (9) antenna mounting pipes (2) microwave mounts for 8' dishes at the 120' level (2) side strut brackets Safety climb cable system for 140' tower Safety climb cable sleeve 1/2" x 4' lighting rod copper Minimum EIA-F grounding kit for 3-leg tower			
2	FOUNDATION DESIGN BASED ON CUSTOMER FURNISHED SOILS SUPPORT		1	$ 600.00
3	STRUCTURAL ANALYSIS CERTIFIED BY A REGISTERED PROFFESIONAL ENGINEER LICENSED IN THE STATE OF OREGON		1	$ 400.00
4	FREIGHT			$ 15,500.00
				$ 44,127.00

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization ASTCA	
Project Title: Laulii / Breakers Point Tower replacement parts	Contact Person: James Taylor Sr.	
	Phone: (684) 733-9054	
	e-mail: jtaylor@samoatelco.com/isakala100935@yahoo.con	
	vani.atafua@astca.net / vatafua_83@yahoo.com	
Hazard(s) Hurricane, Earthquake		
Flood Zone	Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk:		
Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low	
Ris of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low	
Estimated Cost of Project: $ 44,127.00	Project Period (duration):	
Value of Structure or Facility $ 60,000.00	TMK	
Estimated Value of Facility Contents:		
Sources of Financial Support		
Project Objectives: The tower was installed in 1984, and due to the environmental deteriorating (weather condition), the tower needs replacement tower parts.		
Project Description: This is an ASTCA project to replace deffective parts of the Breakers Point tower due to deteriorating parts from weather conditions.		

AMERICN SAMOA TELECOMMUNICATIONS AUTHORITY
Hazard Mitigation Proposal Cost Estimate

Location: Laulii / Breakers Point

THIS IS AN ESTIMATED COST FOR THE " LAULII / BREAKERS POINT " TOWER.

	Description	Unit Rate	Qty	Total
1	140' SELF-SUPPORTING TOWER	$ 27,627.00	1	$ 27,627.00
	Model 72-L940, 140' Series Self - supporting tower constructed of tubular steel members. 16' center to center distance between legs at the base & 6' at the top with the top 40' a vertical section; 3-leg construction. Anchor nolts Hot dipped galvanized sections and components Tubular construction of tower sections Hot dipped galvanized tower assembly hardware Inside climbing ladder in one tower corner Vertical (9-run) waveguide ladder - leg clamps on one tower leg 13' rotatable top platform with (9) antenna mounting pipes (2) microwave mounts for 8' dishes at the 120' level (2) side strut brackets Safety climb cable system for 140' tower Safety climb cable sleeve 1/2" x 4' lighting rod copper Minimum EIA-F grounding kit for 3-leg tower			
2	FOUNDATION DESIGN BASED ON CUSTOMER FURNISHED SOILS SUPPORT		1	$ 600.00
3	STRUCTURAL ANALYSIS CERTIFIED BY A REGISTERED PROFFESIONAL ENGINEER LICENSED IN THE STATE OF OREGON		1	$ 400.00
4	FREIGHT			$ 15,500.00
				$ 44,127.00

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization ASTCA
Project Title: Manu'a Islands Underground Communications	Contact Person: James Taylor Sr. Phone: (684) 733-9014, 699-9025 e-mail: jtaylor@samoatelco.com, isakala100935@yahoo.com vani.atafua@astca.net, vatafua_83@yahoo.com
Hazard(s) Hurricane	
Flood Zone	Base Flood Elevation: / Erosion Rate:
Critical Facility/Population/Asset at Risk:	
Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Ris of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster High Medium Low
Estimated Cost of Project: $6,842,532.48	Project Period (duration):
Value of Structure or Facility	TMK
Estimated Value of Facility Contents:	
Sources of Financial Support	
Project Objectives: To minimize and maintain uninterrupted Communication services at various key facilities in Manu'a: 1. High Schools 2. Elementry Schools 3. Medical Dispensaries 4. ASG Buildings 5.ASTCA Digital Exchanges 6.Private Sectors 7. All Residents 8. Disaster Shelters	
Project Description: This is an ASTCA project to replace overhead utility poles and cable with underground conduits and vaults. The project location is for Ta'u and Ofu Manu'a. The length of the road project is 52,800 feet. The scope of work includes excavation of a 2-ft x 3-ft x 52,800 LFT deep trench, compaction of the subgrade, backfilling 6-inches of bedding, install 2no x 4-inch dia PVC conduits (schedule 40) side by side, place plastic spacers every 4-feet apart, imbedded in 3,000 psi concrete , backfill, and compact surface to existing top soil. Construct and install underground vaults every 500-feet apart of conduits.	

Hazard Mitigation Proposal Cost Estimate

Location Manu'a Islands

THIS IS AN ESTIMATED COST FOR THE " MANU'A ISLANDS "
TO CONSTRUCT A 2 EACH 4" PVC CONDUIT UNDERGROUND CABLE DUCT.

	Description	Unit		Unit Rate	Qty	Total
1	52,800 LF X 36" TRENCHING & BACKFILLING	LF	@	$ 53.30	52,800	$ 2,814,240.00
2	52,800 LF @ 3,000 PSI CONCRETE READY MIX	LF	@	$ 8.34	52,800	$ 440,352.00
3	105,600 LF 4" DIA PVC CONDUIT INSTALL IN PLACE	LF	@	$ 8.80	116,160	$ 1,022,208.00
4	176 EA. VAULT, CONCRETE BUILT/INSTALL IN PLACE	EA	@	$ 6,068.00	176	$ 1,067,968.00
5	105,600 LF. 4" X 20' SCHEDULE 40 PVC CONDUIT	LF	@	$ 1.93	116,160	$ 224,188.80
6	176 EACH MANHOLE FRAME/COVER-30" ID	EA	@	$ 550.00	176	$ 96,800.00
7	MISC. U.G SUPPLIES (GLUE, BURIAL TAPE, PULL STRING)	LS				$ 5,000.00
8	CLEARING & GRUBBING	LS				$ 10,000.00
9	TRAFFIC CONTROL	LS				$ 5,000.00
10	52,800 LF, FIBER OPTIC; 72RW5/SM	LF	@	$ 2.25	52,800	$ 118,800.00
11	MISCELLANEOUS CABLE SPLICING MATERIALS	LS				$ 5,000.00
12	ARCHEOLOGICAL SURVEY	LS	@	$ 5.00	52,800	$ 264,000.00
13	ENGINEERING 10%					$ 607,335.68
14	TRANSPORTATION: SEA / AIR	LS				$ 124,200.00
15	LABOR / PER DIEM	LS				$ 37,440.00
				TOTAL		$ 6,842,532.48

AMERICAN SAMOA DEPARTMENT OF HOMELAND SECURITY

WIND SHUTTERS EOC PROJECT

SCOPE OF WORK

The proposed shutter project will consist of a shutter system that can be manually operated from left to right or meet in the middle. These shutters do not have electronic motors and are dependent on staff to operate. There is no need for power or electricity. The existing building that houses American Samoa Department of Homeland Security (ASDHS), Territorial Emergency Management Coordinating Office (TEMCO) and the Emergency Operations Center (EOC). There is only one American Samoa government recognized EOC and this is housed in this enclosed building with an Importance Factor of 1.5 and Saffir-Simpson Hurricane wind scale of Category 3 (111-129 mph). Its occupancy category is 4. The building structure was built with intention that it can withstand wind force up to 120 mph but its physical location with an open parking lot leave all glass windows and doors unprotected from positive or negative wind pressures of wind speed up to 120 mph. All windows and doors on both ground and top level need protection from wind borne debris when threatened with strong enough winds that can be damaging. This shutter project will decrease the damages to the buildings from strong winds within Category 3 wind speeds and partial damages to winds in higher categories 4 and 5.

PROBLEM DESCRIPTION and PROPOSED SOLUTION

At the proposed project site for the shutters project, wind hazard potential and past damages have occurred at the project location from hurricanes and tropical storms. This is a list of past cyclones; Tropical Cyclone Percy that was a Category 3 when reached American Samoa on February 23, 2005 and Tropical Cyclone Olaf that reached Category 5 on February 18, 2005. Tropical Cyclone Wilma was in 2011 and damages were estimated at $2mil dollars. There were no reported damages to the building structure but it's situated in open space that can be prone to damages to the exposed windows. Most openings to the building structure are large and without current shutters program. A list of significant cyclone events is attached.

The wind design of the building is up to 120 mph or category 3 and the building code at the time of construction is that of the International Building Code 2007.

The building is located in the village of Tafuna and about 2 miles from the coastline. It is not located in the FEMA Special Flood Hazard Area (SFHA) as reflected on Map 12 of the FEMA approved American Samoa Hazard Mitigation Plan (ASHMP) dated August 2011. The longitude is -170.728279 and latitude of -14.337780. Please see attached map and geographic location map.

Proposed Solution

The proposed solution is the accordion shutter system that can protect the windows and doors to the building from strong winds up to Category 5, as experienced in the past with Tropical Cyclones Heta and Olaf. The installation of shutters will further protect building contents especially all communication and state of art equipment that's critical during disaster events for response coordination with first responders community. Acquirement of the shutter system can prevent downtime to emergency operations and the huge amount of money in repair costs. The replacement costs provided by Lively Architects in Honolulu to the building itself is attached. This assessment does not include contents of the building.

DESCRIPTION OF EXISTING CONDITIONS

The shutter system is a proposed mitigation project to safeguard the ASDHS-TEMCO-EOC building. This is an office building belonging to the American Samoa government ASDHS which serves all 55,000 people of this Territory especially during emergencies. This 2010 Census population for the Territory was disputed by former statistician as should've been higher. For the purposes of this application, we will use the number officially recorded by the 2010 Census count.

This building is the new location for the main ASHDS office building centralizing all of its formerly separate office locations. ASDHS-TEMCO is the designated emergency management office that coordinates response efforts in the untimely event of a disaster whether manmade or natural. The building was formerly used as the Joint Field Office (JFO) by FEMA during the 2009 Samoa Earthquake and Tsunami recovery efforts in 2010. The building is also in compliance with the American Disability Act (ADA) with a lift on the side of the building for the physically disabled to walk up to the second floor.

Because this is a huge two story building with 12,800 sq feet for both top and ground level, it can serve as a shelter for employees who live farther away from the EOC. In addition to ASDHS employees, there are also first response liaison members and representatives from the Governor's office that can be on site to offer assistance during EOC activations and use it as a shelter in the meantime. But, currently, the building lacks a shutter system and this does not qualify it or allow it to meet the American Red Cross Standards for hurricane evacuation shelters (ARC 4496).

According to an independent architectural firm from Honolulu Hawaii, namely Lively Architects, the replacement costs for this ASDHS building is from $1.7 to $2 million and an annual operating budget for maintenance and office operations of about $450,000. The building is a steel building reinforced with concrete columns with TEMCO, Information Technology, Logistics and Special Projects sections and EOC office downstairs. The top level is where the Director, Deputy Director, Grants and Finance sections as well as OTICIDE office. OTICIDE operation includes these systems: Federal Bureau of Investigations (FBI) National Crime Information Center (NCIC), National Law Enforcement Telecommunications Systems (NLETS) to name a few. It also has the INTERPOL I24/7 network sharing wanted and information notices for wanted, trace and locate, watch, advisories for ocean going vessels and individuals of interest.

The prime location of this building with 16 parking lot spaces at the intersection on main Airport Road presents a higher risk to being damaged by strong forced winds or wind borne debris. This critical infrastructure faces the main road and is widely open without other huge structures to block the wind forces in order to minimize potential damages. The enclosed building also has standby generator with a 100 kW that can accommodate the huge need of electricity in the event of a

power outage. Even on good days, the electricity necessary to hold all personnel and office is quite tremendous in dollar figures.
As for the feasibility of this proposed shutter project, the value of the building itself based on the appraisal performed by Blue Pacific Management Corporation on the Square Foot Appraisal Form Total Indicated Value as $1,456,920. The total market value as defined of the Real Property that is subject of this attached report to be $1,350,000. (See attached) These figures were established as of July 26, 2012 by Mr. James L. McGuire. The acquisition of shutters for this building will further safeguard this investment as it was fully funded by USDHS/FEMA. Protecting this asset from potential damages caused by strong winds is not only ideal but proper considering how much money and effort were committed to receive this critical infrastructure to assist the people of American Samoa.

WORK SCHEDULE

The anticipated shutter system project work schedule is detailed below. This is for the ASDHS-TEMCO-EOC building. The project is expected to take as long as 12 months. Management and staff will be notified ahead of time for the scheduled installation of shutters to minimize disruptions in their daily work duties and responsibilities.

<u>Proposed Work Schedule</u>

Task Description	Phase	Time Duration
Request for Bids and Award Site Inspection	1	1 month
Contract Routing / P.O. Issued Permits Routing and Acquisition	2	2.5 months
Time to Ship and Deliver Goods	3	2.5 months (longer shipping time)
Site Preparation	3	.5 month
Construction / Installation	4	3 months
Completion and Final Payment	5	.5 month
Room for unexpected miscellaneous		2 months
	TOTAL:	12 months

COST ESTIMATES WIND SHUTTERS

ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	AMOUNT	SOURCE

On hurricaneshutters.com, a resource in providing ICC code-approved shutters for local Floridians, a chart is provided averaging shutter prices at $12.00 per square footage not including shipping or installation costs. Please see attached. The following was calculated:
Measurements for doors:
(4) Double doors at 7' x 10' = $12.00 x 80 ft.^2 = $840.00 per door
(3) Single doors at 3.5' x 6.5' = $12.00 x 26 ft.^2 = $312.00 per door
(9) Glass windows at 6' x 4' = $12.00 x 24 ft.^2 = $288.00 per window
(4) Ventilation access points at 2' x 2' = $12.00 x 4 ft.^2 = $48.00 per vent

Double Doors:
$840.00 x (4) = $3360.00

Single Doors:
$312.00 x (3) = $936.00

Glass Windows:
$288.00 x (9) = $2592.00

Vents:
$48.00 x (4) = $192.00

SUBTOTAL

Double Doors:	$3360.00
Single Doors:	$936.00
Glass Windows:	$2592.00
Vents:	$192.00
	$7080.00

In determining installation costs, an estimation of $1500.00 per double door, $500.00 per single door, $310.00 per window and $126.00 per ventilation point was made known.
Shipping costs was estimated as follows:

Double doors:	$614.00 per door
Single Doors:	$328.00 per door
Glass Windows:	$326.00 per window
Vents:	$62.00 per vent

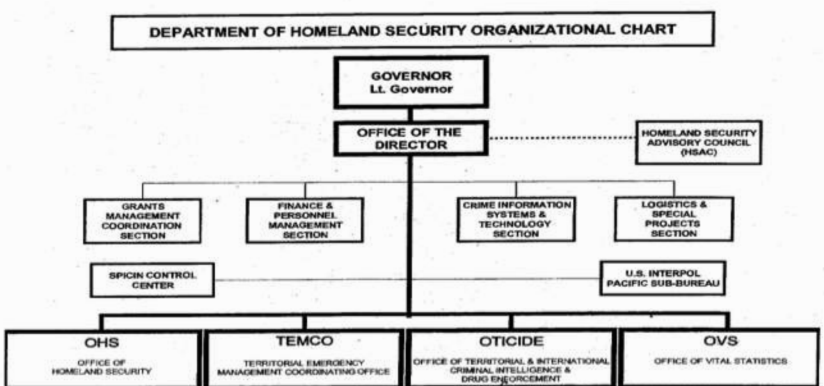
Grand Total:

Product -	$7,080.00
Installation -	$25,794.00
Shipping -	$10,622.00
TOTAL:	**$43,496.00**

NARRATIVE

Lying in the South Pacific Ocean, American Samoa is remotely located in the halfway point between New Zealand and Hawaii. Of the 5 islands; Manu'a, Swains, Aunu'u and Rose, structuring this unincorporated territory of the United States, Tutuila is the largest and most populous. The American Samoa Government (ASG) was promulgated by the AS Constitution in 1967 forming the existing two tier government with federal frameworks mainly influencing funding sources and agency regulations.

The American Samoa Department of Homeland Security (ASDHS) was created by the Civil Defense Act of 2008 that became effective on January 5, 2009. ASDHS consists of four offices; Office of Homeland Security (OHS), Territorial Emergency Management Coordinating Office (TEMCO), Office of Vital Statistics (OVS) and Office of Territorial and International Criminal Intelligence and Drug Enforcement (OTICIDE). Federal grant funding allocations from USDHS/FEMA has significantly enhanced first response community capabilities to effectively prepare, protect, respond to and recover from emergencies. Below is the organizational chart:



6/16/09

Michael R. Sala
Director, Department of Homeland Security

Date

6/18/09

Hon. Togiola T.A. Tulafono
Governor, American Samoa Government

Date

Department of Commerce

Mapping Project

2014 Hazard Mitigation Projects

Jurisdiction: Territory of American Samoa	Agency/Organization: American Samoa Department of Commerce
Project Title: The American Samoa Hazard Mitigation Mapping Project	Contact Person: Sandra Lutu Phone: 684-633-5155 e-mail: sandra.lutu@doc.as
Hazard(s): Tsunamis, sea level rise, flood inundation, and mass slumping	

Flood Zone:	Base Flood Elevation:	Erosion Rate:

Critical Facility/Population/Asset at Risk: Building Footprints

Environmental Impact: **High** Medium Low	Historical Preservation Impact: High **Medium** Low
Risk of Hazard Impact: **High** Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: **High** Medium Low
Estimated Cost of Project: $50,000	Project Period (duration): FY2014 - FY2015
Value of Structure or Facility:	TMK:

Estimated Value of Facility Contents:

Sources of Financial Support: ASCMP is currently seeking appropriations from NOAA Sea Grant to collect compile data, and conduct participatory mapping, outreach and training in regards to coastal resiliency in American Samoa.

Project Objectives:

- American Samoa Hazards Geodatabase
- American Samoa Buildings Footprint layer
- American Samoa Hazard Mitigation and Resiliency Online Viewer
- Training Sessions for ASDOC and ASG

Project Description:

ASCMP is proposing the development of hazard data, online tools and analysis to support the territories Hazard Mitigation Plan and provide a rapid analysis tool for decision makers. The project will achieve this goal through the following three components:

Phase (1) Data Assessment and Development

American Samoa Building Footprint: ASCMP will produce a new building footprint GIS layer from a 2012 Aerial Imagery and Light Detection and Ranging (LiDAR). The update of the territories building footprint layer is crucial for hazard analyses in the territory. The building footprint layer currently in use was derived from 2005 imagery and does not include infrastructure changes since 2005.

The project will also leverage off island data sources including natural hazard datasets developed by the University of Hawaii and NOAA Coastal Services Center (CSC). These include tsunami impact modeling and sea level rise/inundation datasets. ASCMP is currently in possession of the sea level rise data and will be seeking permission to include the tsunami data developed at the University of Hawaii.

Participatory Mapping: ASCMP staff has worked closely with NOAA programs to facilitate participatory mapping workshops in the Fagaloa region of Tutuila. These workshops have focused on the collection of coastal and marine data for watershed mapping and analysis. Funding for this project will support future participatory mapping efforts to collect additional data in support of coastal hazard identification. These efforts greatly supplement current hazard data and engage local communities in the data development process. Most importantly, these workshops raise aware of natural hazards and help efforts to foster resilient communities.

Hazards Geodatabase: ASCMP GIS is in possession of a variety of natural hazard GIS layers including landslide, flooding, tsunami and volcanism data. The metadata and sources of these datasets will be revisited and examined to determine the data integrity and applicability to hazard mitigation planning in the territory. A needs assessment of the data will be produce to assist in the planning and development of future datasets. All developed and reviewed GIS layers will be compiled into a centralized geodatabase hosted on ASCMP servers. Final GIS layers will include FGDC metadata and will available in a geodatabase format as outlined in the ASCMP annual data management plan.

(2) ArcGIS Online Mapping: Hazard Mitigation and Coastal Resiliency Viewer

ASCMP will launch and host an online mapping service through ArcGIS Viewer for Flex. The viewer will provide a smart, intuitive framework for looking at and interacting with hazard mitigation data online. The viewer will feature hazard data compiled in Phase one of the project, most notably the 2012 Building Footprint layer. It will include tools, widgets and features to view analyze and disseminate data pertaining to natural hazards relation to infrastructure.

The tool would follow similar workflows as developed for the Land Use Web Portal system currently in place on ASDOC servers (http://portal.gis.doc.as/Landuse/) and will include a report generation tool with similar functionality. The report generation tool will prompt users to choose an area of interest such as a single building footprint, a highlighted area of interest (multiple building footprints), and or a selection based up an attribute of a boundary layer e.g., a village or district. Upon selecting the area of interest, the user can then generate a report detailing the proximity of the area of interest to different hazards.

The American Samoa Hazard Mitigation and Coastal Resiliency Viewer will be hosted on ASDOC servers and continually updated as data becomes available. The viewer will be hosted on the ASDOCs and ASCMP web portal homepages.

(3) Education, Outreach and Training

ASCMP will conduct an internal (ASDOC) and external (ASG) training workshops to provide training on use of the American Samoa Hazard Mitigation and Coastal Resiliency Viewer. Training will help promote use and facilitate the use of the tools and data throughout the territory. Additionally, ASCMP distribute the geodatabase throughout the territory through the GIS users' group meetings.

Department of Parks and Recreation

This project was proposed in 2011. It has yet to be completed and has been resubmitted for 2014.

Vaipito stream revetment: Existing revetment 100ft in from stream mouth up to behind Pago Plaza

Jurisdiction: **American Samoa**	*Agency/Organization:* **Department of Parks and Recreation**
Project Title: Summary 4 **Vaipito stream revetment: Existing revetment 100ft in from stream mouth up to behind Pago Plaza**	*Contact Person:* **Samana Semo Veavea, Jr. – Director** *Phone:* **684-699-9513** *e-mail:* **semo_veavea@yahoo.com**

Hazard(s): **Tsunami, tropical cyclone (hurricanes), high winds, storm surge, flooding**		
Flood Zone ***high/ extensive***	***Base Flood Elevation:*** ***High/ extensive***	***Erosion Rate:*** ***high/ extensive***

Critical Facility/Population/Asset at Risk:

Facilities: Pago Pago village road and bridge, Pago Plaza Business Center, businesses, family homes, FFAS soccer field and building, and TAO office, shoreline seawall

Population: Up to 5,000 in Pago Pago village.

Environmental Impact: ***[High] Medium Low***	***Historical Preservation Impact:*** ***[High] Medium Low***
Risk of Hazard Impact: ***[High] Medium Low***	***Importance to Protection of Life and Property and Recovery from Disaster: [High] Medium Low***
Estimated Cost of Project: $448,000 Approximately 1280LF x ($350 per Linear Foot)	***Project Period (duration)*** ***180 days***
Value of Structure or Facility:	***TMK #:***

Estimated Value of Facility Contents: Approximately $10million homes and business furnishings and property.

Sources of Financial Support: American Samoa Government

Project Objectives: ***1)*** Complete revetment at Vaipito Stream from 100ft in at mouth to behind Pago Plaza.
Project Description: ***Summary 4 – Vaipito Stream Revetment: From Existing Revetment to Behind Pago Plaza*** During the 9/29 Tsunami, waves washed out the improved park land causing damages to the shoreline of Fagaalu Park. Community concern after the 9/29 Tsunami was brought forward in regards to Pago Pago village where Vaipito stream is not protected from erosion, flooding, storm surge waves, and tsunami. The stream area to be protected in this project is from the existing rock revetment at the mouth of Vaipito stream to behind Pago Plaza. This project proposal is based on the model for and cost per linear foot at 7ft height and 5ft width. The scope of work consists of the repair work and stabilization of stream embankment, identified under the jurisdiction of the Department of Park and Recreation. Project revetment includes 1280 LF . All work would be in accordance with the typical section attached. (Attached 1)

Department of Public Works

#1 Rockfall: Rte.009 (Utumea, Poloa, Amanave)

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Public Works
Project Title: Rockfall Mitigation Project	Contact Person: Faleosina Voigt Phone: 699-9921 e-mail: faleosina@asgdpw.org
Hazard(s): Rockfall	
Flood Zone: / Base Flood Elevation: / Erosion Rate:	
Critical Facility/Population/Asset at Risk:	
Environmental Impact: High X Medium Low	Historical Preservation Impact: High Medium Low X
Risk of Hazard Impact: High X Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High X Medium Low
Estimated Cost of Project: $2,400,000.00	Project Period (duration): 10 months
Value of Structure or Facility:	TMK:
Estimated Value of Facility Contents:	
Sources of Financial Support:	

Project Objectives:

To minimize the danger of approaching traffic due to rockfall that occurs during heavy-longer rains on the following sites;

1. Utumea Village - Route 009 (between Seetaga and Agugulu Villages)
2. Boundary of Poloa and Amanave Villages - Route 09

Project Description:

The proposed project is a permanent stabilization of higher ground adjacent to the road by removing the loose rocks that are potentially dangerous to the approaching traffic and reduce the severity of damages in some cases that cannot be avoided. Securing these areas to the slope so it will prevent rocks falling to the road during heavy-longer rains and saturates the higher ground. The proposed improvement also includes sheltering the area with earthen berms and fences/nets and installed signs to warn approaching traffic on potential rockfall sites.

#3 Amouli Stream Mitigation Project Ofu, Manu'a

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Public Works
Project Title: Amouli Stream MitigationProject Ofu, Manua, American Samoa	Contact Person: Faleosina Voigt Phone: 699-9921 e-mail: faleosina@asgdpw.org
Hazard(s): Flood	

Flood Zone:	Base Flood Elevation:	Erosion Rate:

Critical Facility/Population/Asset at Risk:	
Environmental Impact: High X Medium Low	Historical Preservation Impact: High Medium Low X
Risk of Hazard Impact: High X Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High X Medium Low
Estimated Cost of Project: $300,000.00	Project Period (duration): 10 months
Value of Structure or Facility:	TMK:
Estimated Value of Facility Contents:	
Sources of Financial Support:	
Project Objectives: The proposed project objective is to protect life and property adjacent to the stream. Residents along the stream always suffered flooding because of the existing stream low capacity.	
Project Description: The proposed project is to improve stream flow capacity to prevent flooding on the residents within the area. The proposed improvement is consist of bankline stabilization to prevent soil erosion that would lower the flow capacity of the stream. The proposed improvement would lower the frequency of stream flow overflowing to the stream banks and floods the residents living adjacent to the stream.	

#2 Landslide: Rte.6 (Afono,Masefau), Rte.1 (Matuu,Gataivai)

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Public Works
Project Title: Landslide Mitigation Project	Contact Person: Faleosina Voigt Phone: 699-9921 e-mail: faleosina@asgdpw.org

Hazard(s): Landslide

Flood Zone:	Base Flood Elevation:	Erosion Rate:

Critical Facility/Population/Asset at Risk:

Environmental Impact: High X Medium Low	Historical Preservation Impact: High Medium Low X
Risk of Hazard Impact: High X Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High X Medium Low
Estimated Cost of Project: $4,000,000.00	Project Period (duration): 10 months
Value of Structure or Facility:	TMK:

Estimated Value of Facility Contents:

Sources of Financial Support:

Project Objectives:

To minimize the danger of approaching traffic due to landslide that occurs during heavy-longer rains on the following sites;

1. Afono Pass - Afono Village, Route 006
2. Masefau Landslide - Masefau Village, Route 006
3. Fatu ma Futi - Matu'u Village, Route 001
4. Blunt's Point - Gatavai Village, Route 001

Project Description:

The proposed project is a permanent stabilization of higher grounds adjacent to the road by removing the loose rocks and soil that are potentially dangerous to the approaching traffic and reduce the severity of damages in some cases that cannot be avoided. Securing these areas to the slope so it will prevent sliding during heavy-longer rains and sheltering the improvement with earthen berms and fences/nets and installed signs to warn approaching traffic on potential sliding sites.

#4 Leone Village Road

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Public Works	
Project Title: Leone Village Mitigation Project, Tutuila, American Samoa	Contact Person: Faleosina Voigt	
	Phone: 699-9921	
	e-mail: faleosina@asgdpw.org	
Hazard(s): Flood		
Flood Zone:	Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk:		
Environmental Impact: High X Medium Low	Historical Preservation Impact: High Medium Low X	
Risk of Hazard Impact: High X Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High X Medium Low	
Estimated Cost of Project: $2,200,000.00	Project Period (duration): 10 months	
Value of Structure or Facility:	TMK:	
Estimated Value of Facility Contents:		
Sources of Financial Support:		

Project Objectives:
The proposed project is to protect life and properties of the people residing along the stream. Village residents suffers flooding every time during heavy rainfall due to stream runoff overflow to the road and residential areas. The insufficient capacity of the existing culverts and the lack of drainage structures on the village road made difficult for the public to access their homes because of the flooding on the road. Due to the insufficient capacity of these existing culverts, low stream banklines and lack of drainage structures on the road, vehicles including emergency vehicles need to wait to let the flooding subsides before this village road can be accessed.

Project Description:
The proposed project is to remove and replace all existing insufficient capacity culverts on this stream and construct drainage structures on the road to convey surface and stream overflow runoff to the outfall including reconstruction of the existing badly damage village road. The improvement will also include stream bank stabilization to selected areas where the existing stream bank is low and became a hazard to the residents due to overbanking of stream runoff. These improvements will enhance the village access road and protect life and properties within the area.

#5 Happy Valley Road Drainage

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Public Works	
Project Title: Petesa Mitigation Project Tutuila, American Samoa	Contact Person: Faleosina Voigt	
	Phone: 699-9921	
	e-mail: faleosina@asgdpw.org	
Hazard(s): Flood		
Flood Zone:	Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk:		
Environmental Impact: High X Medium Low	Historical Preservation Impact: High Medium Low X	
Risk of Hazard Impact: High X Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High X Medium Low	
Estimated Cost of Project: $220,000.00	Project Period (duration): 8 months	
Value of Structure or Facility:	TMK:	
Estimated Value of Facility Contents:		
Sources of Financial Support:		
Project Objectives: The proposed project objective is to protect property and health of the residents living within the area especially to school children. The proposed project is to mitigate the direct effect to the health of the school children walking to and from school because the area is natural low and runoff ponds for days during heavy rainfall. The proposed project is to avoid runoff from adjacent properties to sits on this low area of the road and prevent the area to be a mosquito breeding ground with foul smell due to decaying insects and small animals.		
Project Description: The proposed project is to construct approximately 100 ft. L x 15 ft. W x 8 ft. D runoff trap structure at the low point within the area. The proposed runoff trap would mitigate the runoff from adjacent properties to ponds for days on the low point of the road. The proposed structure will also enhance infiltration and recharge to ground.		

#6 Pava'ia'I Elementary

2014 Hazard Mitigation Projects

Jurisdiction:	**Agency/Organization:** ASG/Department of Public Works – School Maintenance Division
Project Title: **Pavaiai Elementary School Lower Campus Grounds Drainage Upgrade, Restoration, Renovations of Finish Ground Cover(Pervious Concrete Pavement).** To include a Concrete Driveway Apron at Gated entryway, with 2 additional soak pits to capture the over run-off of flash flooding water.	**Contact Person:** Don McMullin – G.M. DPW/School Maint. Div. **Phone:** 699-9921 733-1641cell **e-mail:** djmcmullin@hotmail.com

Hazard(s):

Flood Zone:	**Base Flood Elevation:**	**Erosion Rate:**

Critical Facility/Population/Asset at Risk: Flash flood water run-off erosion to 3 Classroom Building walkways and Building foundations with complete washout of cinder fill to areas between buildings,will displace the existing walkways, creating hazard for student and staff population. Affected area is also main entry and drop-off area for School Bus transporting students, and accessway for staff vehicles, as well as parking area for vehicles. Constant grounds wash-out during Storm weather creates hazards for all vehicle andpedestrian traffic as well. Problems originating on the school campus grounds wash out off campus creating the same hazards with the addition of heavy pooling/flooding water to the immediate neighborhood residences, causing property damage to these residents, and all wash-out debris spread out over the concrete road.

Environmental Impact: High Medium Low	**Historical Preservation Impact:** High Medium Low
Risk of Hazard Impact: High Medium Low	**Importance to Protection of Life and Property and Recovery from Disaster:** High Medium Low
Estimated Cost of Project: $310,000.00 for the proposed work to improve, upgrade, & satisfactorily alleviate the problems originating on the School grounds only. Additional upgrades & corrective action outside the Campus grounds will require additional funding to supplement the entire project needs.	**Project Period (duration):**
Value of Structure or Facility:	**TMK:**

Estimated Value of Facility Contents:

Sources of Financial Support:
Requesting possible - Hazard Mitigation 2014
Funding & DOI/CIP Funding

Project Objectives:
Alleviate the overflow of accumulating run-off water originating from the fall and run-off of water from the Pavaiai Elementary Upper Campus grounds and (4) 2-Story Classroom Bldg. Structures at the lower Campus, causing major ground erosion to the affected lower campus grounds, washing away the finish top cinder grade and washing out the entire area between the bldgs., and running out side of the campus ground to the village back road, Flooding the area with cinder debris and floodwaters washing over from the concrete roadway and pooling at various areas affecting the more immediately located residential structures around this side of the school.

Project Description:

- Propose to upgrade the entire lower campus affected area with a engineered finish ground sloped run-off to redirect the storm water run-off to the designed lanes and upgraded soak pits strategically located to capture the immediate run-off volume, with the sloping graded areas between (3) of the (4) buildings paved via Pervious concrete which should allow for some additional drainage/seepage of the water run-off as it passes over, thereby decreasing the volume of run-off to the soak pits, and spill-over to the outside areas off the campus grounds.
- Construction of a properly designed Concrete Driveway entry apron at the entrance/exit Gateway with redesigned soak pits at both sides of the driveway to capture run-off water from the high area run.
- Installation of Rain Gutters on the (4) 2-Story Classroom Buildings to capture run-off from the building roofs and control the fall from the roof to the ground area, to prevent the erosion of the fill material from the base of the buildings and building foundation.

American Samoa Government
Department of Public Works
Tafuna Industrial Park, DPW Complex
Pago Pago, American Samoa 96799
Tel: (684) 699-9921 FAX: (684) 699-9913
SCHOOL MAINTENANCE DIVISION

PROJECT PROPOSAL :

ELECTRICAL UPGRADING & CAMPUS GROUNDS DRAINAGE UPGRADING
(10 ASDOE school locations)

Project Narrative:

Flash flooding storm water run-off on the campus grounds of ten school locations has contributed to the deterioration of the electrical power distribution systems underground line feeds, affecting the electrical power needs of all facilities tied into the system.
The ASDOE have a number of school sites which require a long overdue upgrading of their existing electrical distribution systems. Most specifically are the schools still utilizing the older "Fale" type classroom buildings, which were built in the early 1960's some 50 plus years ago.
These schools electrical distribution are still being served from a main panel and power entry at one point(Fale/Kitchen bldg.) and distributes to the various other "Fale" and other classroom buildings on site with underground service feed wires running from the main to each individual building.
These underground wire feeds are not contained within PVC conduits. They are set directly into the ground. Over the years, most notably during the storm weather seasons erosion of the campus grounds have resulted in exposure of the insulated wire feeds, and signs of deteriorating insulation and exposed wire are common. The load demands of many buildings are exceeding the load capacity of the wire as well.
We have over the past 10 years been experiencing problems with these schools and have discovered the need to upgrade the distribution system with new properly rated wire in PVC conduit and installed to meet all present day NEIS and IBC Electrical standards, and to ensure the safety of our student and general public.

The Projects will require two (2) Phases to Upgrade and Develop.

PHASE I : Electrical Upgrade: The assessment and Design of a properly approved (NEIS,IBC Electrical Standards) Electrical system for each individual school.

PHASE II (A) Electrical Uprade : The Solicitation, selection and contract award to a qualified Electrical Contractor via RFQ – RFB, to Supply and Perform the work required as per plan and scope provided by Phase One (1) of the projects.

PHASE II (B): Upgrading and Development of the Campus Grounds Drainage System

The following Scope of Work serves as Phase I to solicit the services of a qualified Electrical Engineer and as a basic design idea for the work it will require to upgrade our schools (in need) to a standard of proper electrical load capacity distribution, and will include the upgrade also of the Main service entry, Main Safety, Main Panel board and Circuit breakers, and all subpanels, breakers, and re-wiring, as may be required. for the following list of schools:

1. Lupelele Elementary
2. Manulele Elementary
3. Pavaiai Elementary
4. Pago Pago Elementary
5. Lauli'i Elementary
6. Alofau Elementary
7. Matafao Elementary
8. Leone High School
9. Samoana High School
10. Afonotele Elementary

PHASE ONE: ELECTRICAL UPGRADE ASSESSMENT & DEVELOPMENT

Scope of Work :

Retain the services of a Qualified Licensed Electrical Engineer to assess all existing electrical systems, distribution and metering, and to provide all the upgrading design plans and Scope of Work required for the **supply and performance of the work** for the schools listed above, and described in the scope of work as follows :

- All new layout plans for excavation and installation of new PVC conduit and wire feed from point of beginning to all other facilities within the distribution design.
- All new layout for excavation, fabrication, and installation of new manhole/pull boxes as required via new distribution design.
- Design plans to include all necessary and relevant detail drawings and specifications to clearly define the specifics of the new installations. (e.g. – detail of type conduit, and the wire, at the point of exit from the ground to the point of entry into the building. And all above ground, and surface mounting of conduits to facilities,.....)
- Provide all specifications of materials (conduits, wire gauge and type, all metering devices /equipment, and accessories as per proposed design.
- Provide follow up and consulting services for all designed work for the various project locations.
- Participate in all Pre-bid meetings with prospective bidders.
- Provide any additional relevant addendums to the projects scope of work.
- Assist with the Project Management and inspections as needed, and requested by the DPW Project Manager for the project.
- Provide the As-built Plan drawings upon completion of all work.

Contractor/Engineer will combine all data as per scope of work to develop and provide the Scope of Work, Detail Plans, Layout plans, and all specifications and general notes required for Phase II; the solicitation of qualified Electrical Contractors to provide their Bid Proposals for the projects.

PHASE II (A): ELECTRICAL UPGRADE
Solicitation, selection and contracting qualified contractors to supply and perform the project SOW designs developed from Phase I for each of the (10) school locations.

PROPOSED BUDGET REQUEST

#	SCHOOL / LOCATION	BUDGET PROPOSAL
A 1	**PHASE ONE – ELECTRICAL ENGINEER CONTRACTOR** (Assess, Develop & define the SOW for all (10) school locations)	$85,000.00/annual
2	PROJECT VEHICLE	$35,000.00
B	**PHASE II (A) – ELECTRICAL UPGRADES CONTRACTUAL SERVICES**	**Cost Estimates per School**
1	LUPELELE ELEMENTARY / ILI'ILI	$168,000.00
2	MANULELE ELEMENTARY / FAGAIMA NUUULI	$144,000.00
3	PAVAIAI ELEMENTARY / PAVAIAI	$156,000.00
4	PAGO PAGO ELEMENTARY / PAGO PAGO	$168,000.00
5	LAULII ELEMENTARY / LAULII	$108,000.00
6	ALOFAU ELEMENTARY / ALOFAU	$132,000.00
7	MATAFAO ELEMENTARY / FAGAALU	$180,000.00
8	LEONE HIGH SCHOOL / LEONE	$156,000.00
9	SAMOANA HIGH SCHOOL / UTULEI	$120,000.00
10	AFONOTELE ELEMENTARY / AFONO	$96,000.00
	TOTAL PROPOSAL – COST ESTIMATE	$1,633,000.00
		$1,635,000.00

PHASE II (B) CAMPUS GROUNDS DRAINAGE SYSTEM UPGRADE & DEVELOPMENT

2

PROPOSED BUDGET

C	PHASE II (B) - CAMPUS GROUNDS / DRAINAGE UPGRADE	
1	LUPELELE ELEMENTARY	
2	MANULELE ELEMENTARY	
3	PAVAIAI ELEMENTARY	
4	PAGO PAGO ELEMENTARY	
5	LAULII ELEMENTARY	
6	ALOFAU ELEMENTARY	
7	MATAFAO ELEMENTARY	
8	LEONE HIGH SCHOOL	
9	SAMOANA HIGH SCHOOL	
10	AFONOTELE ELEMENTARY	

#8 Ugrading of DPW-M&O Building

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: DPW
Project Title: Upgrading of DPW-M&O Building	Contact Person: Faleosina Voigt Phone: 633-9921 e-mail: Faleosina@yahoo.com
Hazard(s): Tropical Cyclone, Fire	
Flood Zone: / Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk: ASG-DPW Facility	
Environmental Impact: High / Medium X / Low	Historical Preservation Impact: High / Medium / Low X
Risk of Hazard Impact: High X / Medium / Low	Importance to Protection of Life and Property and Recovery from Disaster: High X / Medium / Low
Estimated Cost of Project: $400,000.00	Project Period (duration): 5 months
Value of Structure or Facility: $ 2,500,000.00	TMK:
Estimated Value of Facility Contents: $ 10,000,000.00	
Sources of Financial Support: FEMA	

Project Objectives:

- The proposed activity will reduce and/or eliminate the impact of damages caused by hurricane, tropical cyclones, and other windstorms and local fire by upgrading the building and installation fire protection system. This will allow the building to remain operational, safe and secure. The building serves as DPW base of operation during disaster response.

Project Description:

The M&O Building is a 120'x400' steel portal frame structure and now serves as the main office the Department of Public Work. The intended occupancy and use of the building was altered wherein offices were built-in for the different divisions of DPW.

The proposed project will involve repairs of its metal roof and cladding for leaks and damaged from previous tropical cyclone, structural strengthening and upgrading of itswindows to withstand 120 miles wind. Install fire sprinkler system to keep the building safe from local fire.

2014 Hazard Mitigation Projects

Jurisdiction: American Samoa	Agency/Organization: AS EPA
Project Title: Landslide Early Warning System –Faga'alu Pilot Project	Contact Person: Fa'amao Asalele Alt. Timothy Bodell, PE
	Phone: 252 7700
	email: tbodell@gmail.com

Hazard(s): Landslide, mud flow, blocked stream, mass wasting and rock fall hazards

Flood Zone: Fagaalu	Base Flood Elevation: Sea Level	Erosion Rate: tons/hour

Critical Facility/Population/Asset at Risk: LBJ Hospital, Residential Community, critical infrastructure, priority watershed, critical habitat, coral reef and marine resources

Environmental Impact: ***High*** Medium Low	Historical Preservation Impact: ***High*** Medium Low
Risk of Hazard Impact: ***High*** Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: ***High*** Medium Low
Estimated Cost of Project: $486,000	Project Period (duration): January through Decemeber 2105
Value of Structure or Facility: $18 Million	TMK: ?

Estimated Value of Facility Contents:
$6 Million

Sources of Financial Support:	Sole Source Grant Application plus work in kind by professional staff, computer and surveying equipment

Project Objectives:

- To perform geotechnical investigation of the landslide risk area to current professional standards.
- To research and deploy a state of the art landslide early warning system to protect Faga'alu as a pilot project establishing training and developing local capacity to be used throughout American Samoa.

Project Description:

Due to recent excavation of cut slopes of a primary stabilizing geologic feature a critical risk for landslide hazard above the Faga'alu Quarry in near or long term is apparent. Current technology is available to provide early warning of the conditions precursory to slope failure and save many lives. The proposed project will analyze the Faga'alu Quarry Landslide risk conditions, procure specialized equipment, deploy an early warning system and train local specialist to apply the early warning system at critical sites throughout American Samoa. LiDAR and field investigation of the slope above the high risk quarry cut slope will be performed to current professional standards.

Faga'alu Landslide Early Warning System (FLEWS) Project

2014 Pre-Hazard Mitigation Grant Application - proposed by ASEPA

Landslides around the world kill over 8000 people and cost over $2 Billion every year. Over the last decade advances in landslide analysis, remote sensing and geophysical instrumentation established effective Landslide Early Warning Systems (LEWS).

LEWS are proven effective to save lives by monitoring precursory conditions of movement, pressure and acoustical indications prior to landslide slope failure. By installing sensors at critical points within potential landslide anatomy and connecting them via satellite, cell phone and internet, warnings are reported many hours before critical mass failure. LEWS are currently saving lives all over the world for example:

Case Study No LEW

March 2014

Oslo Valley Landslide

Moderate Size

41 Fatalities

Over 150 Blunt Force Injuries

No Early Warning System

No Site Evacuation

Case Study with LEW

April 2013

Bingham Canyon Slide

Largest in Modern History

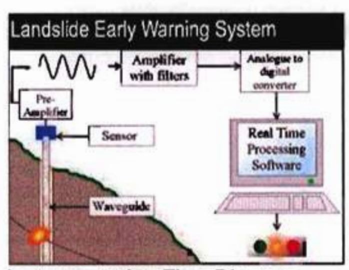
Zero Fatalities

Zero Injuries

Early Warning System

Site Evacuation 7 Hours Prio

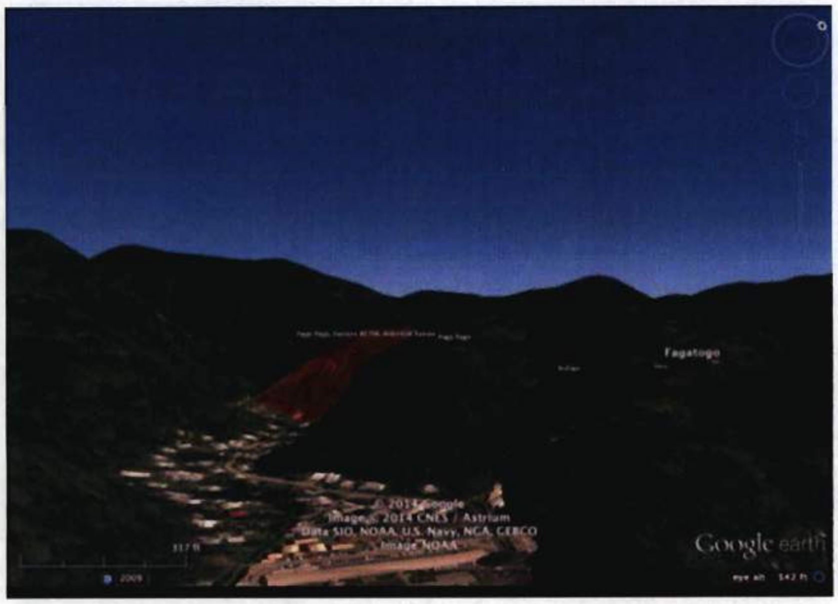
Instrument Installation USGS 2011)



Instrumentation Flow Diagram

American Samoa Environmental Protection Agency May 2014

Faga'alu Landslide Early Warning System (FLEWS) Project



American Samoa has prime conditions for rock fall, cut slope failure, hillside mass wasting and catastrophic flank collapse landslide hazards. Excavation activities above Faga'alu Village have removed a dominant geologic structure leaving an elevated mass of earth in an apparent landslide condition. Cumulative effects of the landslide event may include unintentional stream blockage, renegade dam break, flooding and mud flows. Without an early warning system the village center, hospital, infrastructure, priority watershed, coastal habitat, residential and commercial structures may be exposed to unacceptable risk levels of a pending natural hazard.

The objectives of the proposed project include:

- Collection of high resolution LiDAR and Multispectral data sets of the study area.
- Research and analysis of local geology, topography, rainfall and seismic information.
- Field mapping of stratigraphy, faults, fissures, orientation and subsidence conditions.
- 3D GIS analysis of data sets to model and forecast critical slope failure conditions.
- Procurement of survey equipment, sensors, connectivity hardware and software.
- Installation of sensors, instrumentation, IT programming and WWW interface.
- Integration of alarms into community hazard warning alert system.
- Maintenance and operation of all system components.
- Training of local technicians to install and maintain components for future deployments.

American Samoa Environmental Protection Agency May 2014

High Court

High Court Building Elevation

This project was proposed in 2011. It is resubmitted for 2014. However, instead of relocating the building, the High Court recommends that the building be elevated.

<table>
<tr><td colspan="2">Jurisdiction: Fagatogo, American Samoa</td><td colspan="2">Agency/Organization: Judicial Branch-ASG</td></tr>
<tr><td colspan="2" rowspan="3">Project Title:

High Court and District Court Relocation</td><td colspan="2">Contact Person: SANDY ILAOA</td></tr>
<tr><td colspan="2">Phone: 684-633-4156</td></tr>
<tr><td colspan="2">e-mail: sandyilaoa@gmail.com</td></tr>
<tr><td colspan="4">Hazard(s): Flood, Hurricane, Cyclone, Tsunami, Storm Surge, Heavy Rainfall</td></tr>
<tr><td>Flood Zone: VE</td><td colspan="2">Base Flood Elevation: 7-8 ft</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:

ASG- DISTRICT COURT, HIGH COURT, AMERICAN SAMOA TELECOMMUNICATIONS AUTHORITY
Public Facilities-CCCAS OF FAGATOGO,
Businesses-Numerous Retail and Convenience Stores.
The Church is a critical facility as it serves as shelter during times of disaster.</td></tr>
<tr><td colspan="2">Environmental Impact:

High x Medium Low</td><td colspan="2">Historical Preservation Impact:

High x Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High x Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:

High x Medium Low</td></tr>
</table>

Estimated Cost of Project: $2,750,000.00	Project Period (duration): 3 YEARS
Value of Structure or Facility:	TMK:
Estimated Value of Facility Contents:	
Sources of Financial Support:	
Project Objectives: • Mitigate damages caused by future disasters. • Avoid impairment following disaster. • Preservation of significant legal and historic documents. • Secure a safe and secure structure and location to accommodate the needs and requirements of the High Court and District Court to maintain fair and just services without variance.	
Project Description: Relocate court operations.	

Office of Public Information

Public Information Building Hardening and Renovations

This project was previously submitted for the 2011 Mitigation Plan update. It has been resubmitted for consideration 2014.

<table>
<tr><td colspan="2">Jurisdiction: Utulei, American Samoa</td><td colspan="2">Agency/Organization: DEPT OF PUBLIC INFORMATION</td></tr>
<tr><td colspan="2" rowspan="3">Project Title:

PUBLIC INFORMATIONS BUILDING HARDENING AND RENOVATIONS</td><td>Contact Person:</td><td>JEFF ALWIN</td></tr>
<tr><td>Phone:</td><td>684-633-4191</td></tr>
<tr><td>e-mail:</td><td>alwin@samoatelco.com</td></tr>
<tr><td colspan="4">Hazard(s): Flood, Hurricane, Cyclone, Tsunami, Storm Surge, Heavy Rainfall</td></tr>
<tr><td>Flood Zone:</td><td colspan="2">Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:

ASG- DEPT OF PUBLIC INFORMATION (KVZK TV STATION), DEPT OF EDUCATION, REX E. LEE AUDITORIUM, LT. GOVERNOR'S RESIDENCE.

Public Facilities-SAMOANA HIGH SCHOOL, SADIE'S BY THE SEA HOTEL

Businesses-SADIE'S BY THE SEA HOTEL & RESTAURANT

The High School is a critical facility as it serves as shelter during times of disaster.</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium x Low</td><td colspan="2">Historical Preservation Impact:

High x Medium Low</td></tr>
</table>

Risk of Hazard Impact: High x Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High x Medium Low
Estimated Cost of Project: $4,500,000.00	Project Period (duration): 4 YEARS
Value of Structure or Facility:	TMK:
$2,904,000.00	
Estimated Value of Facility Contents: $2,000,000.00	
Sources of Financial Support:	

Project Objectives:

- Mitigate damages caused by future disasters.
- Avoid impairment following disaster.
- Preservation of significant historical contents.
- Secure a safe and secure structure and location to accommodate the communication needs to the public.

Project Description:

- Dismantle and uninstall existing television equipment and move to safe storage facility; construct Temporary MCR.
- Move all contents to temporary location.
- Repair Building, Harden walls, and Restructure interior of building to accommodate.
- Reinstall all dismantled equipment.

Department of Port Administration Projects

Fuel Farm Relocation

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Port Administration
Project Title: Protection of Critical Facility: Pago Pago International Airport: Aviation Fuel Farm Relocation	Contact Person: Chris Soti Phone: (684) 733 4548 Email: chrissoti@yahoo.com
Hazard(s): Tropical Cyclones and Strong Winds and Fire	
Flood Zone:	Base Flood Elevation: 0 -5ft / Erosion Rate:
Critical Facility/Population/Asset at Risk: Facilities: 1) Airport Terminal and Administration/Operations, 2) Airlines Offices, 3) Customs, 4) Airport Shops, 5) Immigration, 6) Aircraft Hangars, 7) Airport Users, 8) NOAA Population: All Airport Users/Operators and the Public Assets: 1) Airport Terminal and Facilities, 2) Ramp/Apron , 3)Aircraft, 4) Runways	
Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Risk of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High Medium Low
Estimated Cost of Project: $5,500,000.00	Project Period (duration): 18 Months
Value of Structure or Facility: Est. >$20M	TMK:
Estimated Value of Facility Contents: To Be Assessed	
Sources of Financial Support: FEMA/ASG	
Project Objectives: To relocate the existing Aviation Fuel Farm and associated pipelines etc. to the new proposed site near Pala Lagoon inside the Airport Operations Area (AOA). This is to ensure that airport users and the public are safe from the high hazard of the existing location of the existing Aviation Fuel Farm poses when cyclones or natural disasters occur.	
Project Description: A new Aviation Fuel Farm will be constructed on the other side of Runway 8-26, further away from the public and airport users thus the Airport terminal and car park. A new fuel pipeline will run from this new site to the fuel pits on the Apron/Ramp area . The existing Aviation Fuel Farm which is so close to the airport car park and terminal, will be demolished and relocated. This old site will be cleaned up for expansion of the Airport Carpark.	

2014 Hazard Mitigation Projects

Jurisdiction:	Agency/Organization: Department of Port Administration
Project Title: Protection of Critical Facility: Pago Pago International Airport: Runway Shoreline Protection	Contact Person: Chris Soti Phone: (684) 733 4548 Email: chrissoti@yahoo.com
Hazard(s): Tropical Cyclones and Strong Winds and Wave Action	
Flood Zone: | Base Flood Elevation: 0 -5ft	Erosion Rate:
Critical Facility/Population/Asset at Risk: Facilities: 1) Airport and its operations Population: All Airport Users/Operators, Passengers and the Public Assets: 1) Runway 8-26 and Runway 5-23, 2) Security Perimeter Fence , 3)Aircraft, 4) Security Perimeter Road	
Environmental Impact: High Medium Low	Historical Preservation Impact: High Medium Low
Risk of Hazard Impact: High Medium Low	Importance to Protection of Life and Property and Recovery from Disaster: High Medium Low
Estimated Cost of Project: $5,000,000.00	Project Period (duration): 12 Months
Value of Structure or Facility: Est. >$20M	TMK:
Estimated Value of Facility Contents: To Be Assessed	
Sources of Financial Support: FEMA/ASG	
Project Objectives: To protect the Runways, Security Perimeter Fence and Road from strong wave action, flooding and erosion occurring along the Airport shoreline and coastline. Allow the Runways and Airport to remain operational, safe and secure after cyclones and storms to allow urgent relief aid and assistance to arrive via air quickly.	
Project Description: Proposed rock seawall/revetment will be designed and constructed along the Airport's shorelines to protect the Runways and Security Perimeter Fence and Road from wave action from cyclones or natural disasters. Total length of the Airport shoreline to be protected is 6350 LF.	

Satala Power Plant

FEMA comes through with additional funding for new Satala power plant **4/2/14 By Fili Sagapolutele**

fili@samoanews.com
The Federal Emergency Management will award more than $25 million to the American Samoa Power Authority as part of additional funding to rebuild the Satala Plant destroyed by the 2009 tsunami, but ASPA's chief executive officer Utu Abe Malae says the challenge for the government is coming up with the 10% local share for the multi million dollar project. In a news release sent yesterday by his office, Congressman Faleomavaega Eni announced that FEMA will award $25.27 million in additional federal funding for the Satala power plant project. The funds will assist in replacing the power plant building and purchasing 23 megawatts of generating equipment (diesel generator sets), switch gear, transformers, radiators, tie-lines, and fuel tanks, according to the release. Prior to this additional grant award, FEMA previously obligated $6.60 million towards this project, which has a cost of $52.19 million and is partly covered through insurance proceeds — $17.50 million — with the remainder funded by a 90% federal share and 10% local share, it says. "Financially, the biggest challenge is the 10% matching from ASG" but that is being addressed by the Territorial Office of Fiscal Reforms (TOFR), Treasury Department, and the Capital Improvement Project leadership, Utu said yesterday responding to media questions. He also says funding is processed locally through TOFR and the Lieutenant Governor's Office. Utu said the engines for the project are already purchased and in storage in Wisconsin. (In its FY 2014 first quarter performance report, ASPA said all seven diesel engines for the Satala power plant were shipped to Darien, Wisconsin after engine tests were successfully completed last December.) According to Utu, the building and facilities have been awarded to a stateside company, Louis Berger, and the project will begin "very soon". Last June, the Morristown, New Jersey-based Louis Berger announced it has won a $36 million contract to help rebuild the Satala Power Plant. The company said it will provide the engineering and plant design, equipment procurement, and installation and commissioning of the power generation and ancillary electrical equipment. The major equipment will include seven primary generators, two emergency back-up generators, switchgear assembly, two station transformers and motor control centers, according to a company news release. There were concerns raised in the Fono last year from ASPA's residential neighbors in Satala about the possibility of loud noise coming from the power plant when it is fully operational again. "In order for ASPA to be a better neighbor than at present or before, there will be cleaner emissions from more fuel efficient engines; the plant will be quieter; an acoustic wall installed and noise emission will actually be further from neighbors," Utu said. "We will make accessibility easier for our neighbors as the plans include improving the present road." In his news release, Faleomavaega said this "crucial federal funding from FEMA... will restore American Samoa's ability to meet our energy demands" and that the replacement of the power plant, is a "monumental victory for our people that will help us move even further beyond the memory of this tragedy". He called the project a "significant undertaking" and thanked FEMA for working hand-in-hand with the Lolo administration and ASPA to provide the assistance and expertise required. Utu said "FEMA has been very responsive to our needs and it is sad that some of those responsible for that assistance are moving on to other opportunities in the near future. We will miss them." Click on attachment below to download a copy of the final federal Environmental Assessment notice for the ASPA project.

- See more at: http://www.samoanews.com/content/en/fema-comes-through-additional-funding-new-satala-power-plant#sthash.5QTq0ahW.dpuf

Faga'itua students wade through floodwaters

12/10/13 By B. Chen
blue@samoanews.com
Faga'itua High School students ere released early yesterday after their campus was flooded following heavy rains during the morning hours. FHS vice principal Suaese "Pooch" Taase told Samoa News yesterday that it only took 30 minutes for the water to accumulate and because there was so much debris that had piled up, the waterway was blocked and everything started backing up. "The rain was pouring hard, causing an overflow," Taase reported, adding that flooding is not a common occurrence on their campus. Another FHS official explained that debris including banana leaves and coconuts had piled up overtime and by 9:30 a.m. yesterday, the campus was flooded, both outside and in some of the ground level classrooms. The debris was cleared by school janitors, teachers, and FHS staff with the help of several students. The student body was instructed to gather in the gym, which is at a higher elevation, to await a decision on whether or not they were to return to class or go home. Per protocol, Taase said he had to file an incident report with the DOE main office and they had to await approval from the DOE's secondary division before releasing the students. He said once the approval was granted, they had to contact the school bus drivers so the students can be transported home. "We didn't want to release the kids and have them standing around on the road in the rain," he said. According to Taase, one of the buildings that flooded (Bldg. D) will be torn down and rebuilt, at a higher elevation.

- See more at: http://www.samoanews.com/node/79550?quicktabs_3=0#sthash.zMOpNb1J.dpuf

*Projects Completed but not part of the 2011 Mitigation Plan

Route 009-Leone

Another Road Project Completed by Department of Public Works. . .

Thursday, 08 November 2012

(Leone: Thusday, November 8, 2012) - A dedication ceremony was held today to celebrate the completion of the route 009-Leone including Auma village road project.

The Route 009 project consists of an armor stone revetment, 200 linear feet of crib retaining wall, road widening including curb and gutter and or swales with guardrails, 750 linear feet of asphalt pavement, and additional 940 linear feet of on-going construction of asphalt pavement with drainage improvement along route 001 near Sogi's junction as well as the California Mart locations.

Project contractor is McConnel Dowell Ltd for the original amount of $365,373.63. Revised amount is $779,323.64 due to additional change orders throughout the duration of project.

Project was funded by U.S. DOT-Federal Highway Administration (FHwA). Project engineer is Fa'alava'i Ta'ase CE and Project Inspector is Alofa Tanuvasa—both from the Department of Public Works.

Director of Public Works Taeaotui Punaofo Tilei, thanks Governor Togiola for his support, FHwA for funding, but especially the villages of Leone and Auma for their patience while the contractor and government worked on completing the project.

Airport Road Reconstruction and Intersection Improvement Project is Approved and Ready to Start

Thursday, 27 September 2012

(TAFUNA: Thursday, September 27, 2012) - The drive from the Tafuna intersection towards the airport seems so long, when you have to drive 1 mile per hour-- just so the tires on your vehicle do not break off all at once, from driving into a pothole the size of a mini swimming pool.

The ground breaking ceremony for the airport road reconstruction and intersection improvement project was held today, in Tafuna—and it was a momentous occasion for the Department of Public Works under the direction of Director Taeaotui Punaofo Tilei and the whole Government of American Samoa.

"The project is anticipated to be completed within 6 years. . ." said Taeaotui, during his remarks in describing the project. According to Taeaotui, the contract amount is approximately $7,997,885.00, and it has been awarded to an American Samoan contractor, Whitehorn Constructions Inc. He explained funding was approved and given by the U.S. Department of Transportation and The Federal Highway Administration, and he is thrilled to finally announce that the airport road is ready to be reconstructed with improvements.

The project includes the reconstruction of 8,700-linear feet for Route 014-Airport Road (from intersection with Route 001 extending just past the intersection with Route 106 at the police substation including intersection improvements. The new structure that will be constructed include: Sidewalks, bike lanes, medians, buffer areas, curb and gutters, pavement markings, drainages, roundabouts at 4 intersections and street lights with 35kW Photo Voltic.

Federal Highway Administration representative, John Nickelson and Honorable Governor Togiola T.A. Tulafono also gave remarks, both of which were encouraging and filled with gratitude for the airport road project to finally undergo its reconstruction and repairs.

CCCAS of Aua Reverend, Viliamu Leilua blessed the project site and the honors of turning the soil were given to Governor Togiola, FHA Rep. John Nickelson, Cabinet members and Fono Representatives that were present.

The Department of Public Works credits the architectural portion and designs of the project to Department Deputy Director Faleosina Voight and her staff: Design Engineer, Estela P. Rubin, Project Engineer, Reuben R. Siatu'u, and Project Inspector, Alofa Tanuvasa.

---americansamoa.gov---

Road projects a go says DPW head, but no dates provided

Sat, 09/22/2012 - 8:48am | Category: Local News Show in Skybox - See more at: http://www.samoanews.com/node/8988?quicktabs_1=0&quicktabs_3=1#sthash.LSGwPguj.dpuf

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By Samoa News staff

reporters@samoanews.com

After numerous delays government has announced several road projects should be starting soon.

Public Works Department director Taeaotui Punaofo Tilei told a House committee hearing on Wednesday, the bond review for reconstruction of the Airport Road project is now complete and the ground breaking will be held within the next couple of days, but was unable to confirm a date.

Whitehorn Construction, based in Lake Elsinore, Calif., was awarded the Airport Road project on Aug. 23 after submitting a bid which was $3.04 million lower than McConnell Dowell's bid of $11.03 million.

Whitehorn's local office was set up several months ago and was required to submit a performance bond.

Samoa News understands the legal review, conducted by the Attorney General's Office, was completed last week. It is also understood the contractor is prepared to move forward with the groundbreaking followed by the mobilization of its crew to the construction site.

Prior to the Airport Road project's completion, Taeaotui said government would start working on reconstruction of the road from Lauli'i to the area called Vista - also part of Lauli'i - but an area that needs fixing. From Vista, work will continue eastward to Alofau village.

Taeaotui says other projects such as seawalls for Aua and Nu'uuli, as well as the Leone bridge project, should also be starting soon. Again, no dates were provided.

The Leone bridge project, delayed for several months now, is overseen by the US Army Corp of Engineers. ASG has blamed the Army Corps as the cause of the delay, but federal officials told lawmakers that all federal requirements must be met before moving the project forward. Among the issues that have since been addressed is a secondary temporary road for traffic use during construction work on the new bridge.

The bridge was destroyed by the 2009 tsunami and funding for the bridge project was part of American Samoa's total award of $49.34 million in 2010, under the federal Emergency Relief (ER) program, allocating funds to assist in repairing damages to federal-aid highways, damaged by the 2009 earthquake and tsunami.

McConnell Dowell was awarded the $3.80 million "design-build" contract last year.

Next week Saturday, on Sept. 29, the territory will mark the three year anniversary of the earthquake and tsunami that killed 34 residents.

- See more at:
http://www.samoanews.com/?q=node/8988#sthash.4FXKD5Xo.dpuf

http://www.asbar.org/index.php?option=com_content&view=article&id=10434&catid=228&Itemid=172

7.1444.5 Loan to American Samoa Government—Renovations of Capital Improvements and Projects.

Cite as [A.S.C.A. § 7.1444.5]

(a) In accordance with the provisions of section 7.1444(g)(3), which limits any investment in obligations or other instruments issued or guaranteed by the government to no more than seventeen and one-half percent of Fund assets at cost, the Governor, on behalf of the American Samoa Government (ASG), and the Board of Directors of the American Samoa Government Employees' Retirement Fund (ASGERF) are authorized to enter into a loan agreement whereby the ASGERF will lend and ASG will borrow an amount not to exceed $20,000,000.

(b) The Governor is authorized to utilize the $20,000,000 loan amount in financing the costs of acquiring, improving, equipping or renovating all or a portion of the following capital projects: harbor dredging projects in Tutuila and Manu'a, port office/fire department buildings, port tug boat, KVZK antennae, customs bond warehouse, executive office building-annex (Territorial Energy Office, Election Office and the Office of Protection and Advocacy for the Disable), executive office building-tax office extension, executive office building-roof, territorial registrar's office, library extension, immigration office building, procurement warehouse, airport hangar, Airport terminal and jet-way, seawalls, animal pound and veterinary clinic, Fono building, funding the Pacific Arts Festival, fiber optic cable, Lee Auditorium, stream realignment, bridge and soil stabilization/retaining wall, purchase of ten school buses, capital projects for the American Samoa Districts, and repairs to and refurbishment of the MV Sili. Unless a specific amount is appropriated for a particular project, improvement or acquisition, the Governor shall determine the application of available loan proceeds as between the various improvements set forth in this section (the "Improvements") so as to accomplish, as nearly as may be, all of such Improvements. If an amount is specifically appropriated for an Improvement, said amount shall act as a ceiling for expenditures on that particular Improvement. If the Governor shall determine that it has become impractical to accomplish any of such Improvements or portions thereof for any reason, including changed conditions, lack of funding or costs substantially in excess of those estimated, the Governor shall not be required to finance all of such Improvements. Any remaining proceeds of the loan amount may be used to finance additional capital projects as approved by the Legislature.

(c) Such loan shall be general obligation of American Samoa Government and the Governor is authorized to pledge the full faith and credit of American Samoa Government to the full and prompt payment of the principal of and interest on such loan. The Governor, and/or his designee(s), are authorized to negotiate the terms of the loan, including an interest rate, repayment terms and such other terms and conditions as may be required, except that the interest rate shall be fixed at seven and one-half percent (7.5%). The Governor and the ASGERF Board are further authorized to execute all instruments and documents necessary to conclude the transaction, including promissory notes which evidence the indebtedness of ASG. The Governor is authorized to pledge the Full Faith and Credit of ASG as well as to provide collateral as required by the ASGERF Board to secure the loan.

(d) Interest and principal payments on the loan authorized in this section shall be amortized over a ten-year term and payments made quarterly.

(e) There is appropriated such sums from the Government's general funds necessary for repayment of the loan authorized in this section, in order to finance the costs of acquiring, improving, equipping or renovating all or a portion of the following capital projects: harbor dredging projects in Tutuila and Manu'a, port office/fire department buildings, port tug boat, KVZK antennae, customs bond warehouse, executive office building-annex (Territorial Energy Office, Election Office and the Office of Protection and Advocacy for the Disabled), executive office building-tax office extension, executive office building-roof, territorial registrar's office, library extension, immigration office building, procurement warehouse, airport hangar, Airport terminal and jet-way, seawalls, animal pound and veterinary clinic, Fono building, for funding the Pacific Arts Festival, fiber optic cable, Lee Auditorium, stream realignment, bridge and soil stabilization/retaining wall, purchase of ten school buses, capital projects for the American Samoa Districts, and repairs to and refurbishment of the MV Sili.

(f) Funds shall be made available from the following sources as identified below, for repayment of the loan authorized in this section to finance the costs of acquiring, improving, equipping or renovating all or a portion of the following capital projects: harbor dredging projects in Tutuila and Manu'a, port office/fire department buildings, port tug boat, KVZK antennae, customs bond warehouse, executive office building-annex (Territorial Energy Office, Election Office and the Office of Protection and Advocacy for the Disabled), executive office building-tax office extension, executive office building-roof, territorial registrar's office, library extension, immigration office building, procurement warehouse, airport hangar, Airport terminal and jet-way, seawalls, animal pound and veterinary clinic, Fono building, for funding the Pacific Arts Festival, fiber optic cable, Lee Auditorium, stream realignment, bridge and soil stabilization/retaining wall, purchase of ten school buses, capital projects for the American Samoa Districts, and repairs to and refurbishment of the MV Sili: (1) Forty percent (40%) of the excise taxes collected on beer and malt extracts as imposed pursuant to A.S.C.A., section 11.1002(a)(1)(A).
(2) Twelve and one-half percent (12.5%) of the excise taxes collected on alcoholic beverages as imposed pursuant to A.S.C.A., Section 11.1002(a)(1)(B).
(3) Twenty percent (20%) of the excise taxes collected on tobacco products as imposed pursuant to A.S.C.A., section 11.1002(a)(1)(C).
(4) All of the revenues collected from the Customs Entry Declaration Forms Processing Fee as imposed pursuant to A.S.C.A., section 27.1014(a)(5).
History: *2007, PL 30-5, 2008, PL 30-14, 2008, PL 30-29; 2008, PL 30-34.*

PAGO PAGO, AMERICAN SAMOA (April 10, 2012)—SunWize Technologies, Inc., a leading provider of sustainable energy solutions, recently completed the largest solar installation on the island of American Samoa in the South Pacific.

Backed by the United States Department of Energy and the American Samoa Power Authority (ASPA), the new 1.75-MW solar electric system took over five months to install. The installation marks a new beginning for the ASPA and the people it serves. American Samoa was completely dependent on diesel generators for all electrical power, but the new PV solar installation will help alleviate that dependency by providing a much-needed 'green' energy resource. ASPA is still working to obtain additional funding to install more of these clean, renewable energy sources in the near future."

The ASPA's PV system consists of 7,308 Sharp solar panels in a fixed, ground-mount system—one of the largest of its kind anywhere in the South Pacific. Because land is at a premium in American Samoa, the new system was installed near the airport on a 3.93-acre site and 1.3 overflow site.

The ASPA project faced challenges in addition to the island's remote location. Because the installation site is located a mere 1,100 feet from the ocean, SunWize had to engineer a custom, hot-dip galvanized racking system to withstand the extremely corrosive ocean air. The potential for 150-mile-per-hour typhoon-force winds required SunWize to secure this racking system with special footings that could be installed even with the island's volcanic rock soil and limited concrete resources. During the project's installation phase, SunWize hired a number of local subcontractors, employing 50 Samoans to assist with a variety of tasks.

Even though they had to manage a number of complex situations, the Sunwize team knew that the project's eventual results would be extremely positive. American Samoa's location near the equator receives over 1000 watts per square meter at peak hours of the day, an amount that's ideal for solar. The availability of solar energy may also lower American Samoa's electrical rates in the future. Residents and business owners currently pay around \$0.40 per kilowatt; however, 75 percent of that amount goes toward a fuel surcharge that the ASPA must pay its diesel suppliers.

"The two power plants operated in parallel until September 29, 2009, when a devastating tsunami destroyed the Satala power plant located inside Pago Pago harbor, taking out about 60% of ASPA's generation capacity. A temporary power station is now in place at Satala providing power from containerized generators. The ASPA through assistance from FEMA is planning the construction of a new replacement Satala power plant. The Tafuna plant and the temporary Satala plant are still operating independently until a planned Tie-line system for Satala is installed; this will allow the two plants to once again operate in parallel.

In April 2012, ASPA commissioned its Photovoltaic (PV) Solar Powered Systems located at two sites at the Pago Pago International Airport. The total PV system capacity is 1.754MW-DC, or 1.527MW-AC. The total project cost was $9M USD, and was fully funded from the American Recovery and Reinvestment Act (ARRA) of 2009. The PV system is expected to generate about 2% of ASPA's annual energy. The PV system is connected to the Tafuna Power Plant Grid System, which supplies power from the Central district to the Western district of Tutuila island. (Read the full Article. .PV SYSTEM WRITE UP forUtu NZ March 20 2013 v3)" [1]

Samoa's first grid-connected solar project nearing completion[2]

Posted date: February 16, 2014 | No comment

Press Release – Samoa's first grid connected Solar Photovoltaic project to generate and supply electricity to EPC electricity network is nearing completion.

The project which is financed through a 4million grant from the Japanese Government under the auspices of the Pacific Environment Community Fund will be owned and operated by the Electric Power Corporation.

The 546kW project is being built on land belonging to the Electric Power Corporation and is split amongst three sites – Tanugamanono, Vaitele and Salelologa.

The first ground mounted 150kW system at Tanugamanono was completed last year and has been generating and supplying clean power from the sun into the EPC power network since December 20th 2013.

Vaitele site consists of a ground mounted and a roof mounted system with a total capacity of 246kW. This system is now operational and began generating and feeding power into the network this week.

The last of the systems is being built at EPC's Salelologa compound with a total capacity of 150kW. Work is almost completed on this site and is expected to be operational by the end of February.

When completed, the project is expected to generate and supply 800,000 units of electricity (kWh) per year which is equivalent to the electricity demand of 800 homes per annum. It will also save about 190,000 liters of diesel fuel or approximately SAT$570,000 per year. The systems have an expected lifespan of at least 20 years.

1 American Samoa Power Authority: 1.75MW Photovoltaic Solar Power System. (2013). American Samoa Delegation. Retrieved August 8, 2014 from http://www.asrec.net/wp-content/uploads/2013/08/PV-SYSTEM-WRITE-UP-forUtu-NZ-March-20-2013-v3.pdf

2 Ugapo, Palemia. (2014). "Samoa's first grid-connected solar project nearing completion." Savali. Retrieved August 8, 2014 from http://www.savalinews.com/2014/02/16/samoas-first-grid-connected-solar-project-nearing-completion/

EPC's Acting General Manager Taule'ale'ausumai Aumalaga Tiotio says "while this project is small in size, it is a significant step towards the implementation of EPC's proposed renewable energy projects which aim to reduce the reliance of the corporation on imported fossil fuels and ultimately provide affordable and reliable electricity for Samoa".

EPC already owns and operates another solar system on Apolima Island with a battery backup. There are other similar renewable energy projects currently in the pipeline, which will continue to replace use of diesel fuel for electricity generation.

APPENDIX J - Summary of Significant Flooding Events

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses($)[1]
MANU'A					
11/23/1999	Flood	Ta'u	Scattered thunderstorms over the territory with rainfall totals of 2.92 inches for the day. Flooding of low-lying areas and overflow of streams was widespread across the islands.	0/0	None reported
1/19/2000	Flood	Ta'u	Widespread Flood	0/0	$27,600
10/11/2000	Flood	Manu'a	Widespread flooding of low lying areas and overflow most of the streams across the territory. Some mud and landslides were also reported by the Territorial emergency Management Coordinating Office (TEMCO).	0/0	None reported
1/19/2000	Flash Flood	Ta'u	Heavy rain associated with a stationary trough of low pressure associated with a tropical disturbance west of Tutuila and eastward across the Manu'a Islands caused widespread flooding across the territory.	0/0	None reported
11/20/2000	Flood	Manu'a	None reported	0/0	None reported
12/26/2001	Flood	Manu'a	Various tropical systems developed north of American Samoa and began spreading showers over the territory on Christmas day with heavier showers arriving on the 26th. Overtopped streams and heavy runoff flooded roads and low-lying areas across the territory. Total rainfall from this tropical depression was 3.61 inches.	0/0	None reported
5/26/2002	Flood	Ta'u	Residences of Ta'u reported heavy runoffs and landslide at the Auauuli due to heavy showers.	0/0	None reported

1 Inflated to 2014 dollars.

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
5/24/2005	Flash Flood	Manu'a	An active trough associated with heavy rain and thunderstorms resulted in 4 inches of rain across the Islands. Over-flow of small streams and street ponding created traffic congestion for motorists.	0/0	None reported
8/17/2005	Flash Flood	Manu'a	A stationary trough near the Islands was associated produced heavy rain near mountainous areas caused flash flooding and made driving difficult for motorists. Some residents were overwhelmed with puddles of water in their homes. A total precipitation amount of 2.45 inches was reported.	0/0	None reported
12/7/2005	Flash Flood	Manu'a	The Weather Service Office (WSO) recorded between 2 to 3 inches of rainfall for this event. Residents along low-lying villages reported runoff and increasing flow of water along small streams. Roads were covered with water and residential yards experienced ponding.	0/0	None reported
12/26/2005	Flood	Manu'a	A convection in the vicinity of the Islands increased immensely in the early hours which produced over 3 inches across the islands. Flooding of roadways, especially in villages prone to flooding, was reported. Rising water near small streams surprised several residents as in-flow of water swept through their homes. The Weather Service Office received a total of 3.14 inches of rain for this episode.	0/0	None reported
2/6/2006	Heavy Rain	Manu'a	--	--	None reported
2/7/2007	Flash Flood	Ofu	The Weather Service Office recorded between 2 to 3 inches of rainfall for this event. Residents along low-lying villages reported run-off and increasing flow of water along small streams. Roads were covered with water and residential yards were left with puddle of water.	0/0	None reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
2/22/2007	Flash Flood	Ta'u	Locally heavy rainfall swathed some village grounds with runoff along small streams. A flash flood warning was issued and 1-3 inches of rainfall was reported.	0/0	None reported
TUTUILA					
10/9/1967*	Flood	Tutuila	Flooding, landslides, electrical power failures. Damaged roads, culverts, and homes. 7.5 inches of rain was reported at Pago Pago Airport.	0/0	None reported
12/26/1969*	Flood	Tutuila	Roads blocked	0/0	$162,000 to clear roads
11/9/1979*	Flood	Tutuila, Manu'a	None reported. Disaster Declaration.	0/0	None reported
5/3/1985*	Flood	Tutuila	Major damage to Pago Pago. Thirteen residences, five businesses, and several public facilities were flooded, causing $60,000 in public damages, and $40,000 of damage to businesses. The local Red Cross chapter provided assistance to a number of families during this event.	0/0	$132,650 in public damage, $88,000 to businesses
6/30/1994	Flash Flood	Tutuila	Flooding of low lying areas especially along the east side of the island of Tutuila. Some homes were damaged due to minor flooding.	--	$8,000
7/10/1994	Flash Flood	Tutuila	Minor flooding due to isolated heavy showers on Tutuila.	--	None reported
7/13/1994	Flash Flood	Tutuila	Minor flooding due to heavy showers on Tutuila.	--	None reported
11/12/1994	Heavy Rain	Tutuila (western villages)	Western parts of American Samoa received nearly 7 inches of rain in 6 hours. Minor flooding was reported.	0/0	None reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
9/25/1998	Flood	Tutuila	Heavy storms brought floods to several villages island wide, especially homes near stream. A large number of underground water wells were shut down because of high salt content, but two desalination machines-to make the water drinkable-were acquired with support from the federal government. The rainfall recorded for this month was 4.30 in. at WSO-Pago Pago, where the normal for September is 6.61 in.	0	0
5/3/1985*	Flood	Tutuila	Major damage to Pago Pago. Thirteen residences, five businesses, and several public facilities were flooded, causing $60,000 in public damages, and $40,000 of damage to businesses. The local Red Cross chapter provided assistance to a number of families during this event.	0/0	$132,650 in public damage, $88,000 to businesses
6/30/1994	Flash Flood	Tutuila	Flooding of low lying areas especially along the east side of the island of Tutuila. Some homes were damaged due to minor flooding.	--	$8,000
7/10/1994	Flash Flood	Tutuila	Minor flooding due to isolated heavy showers on Tutuila.	--	None reported
7/13/1994	Flash Flood	Tutuila	Minor flooding due to heavy showers on Tutuila.	--	None reported
11/12/1994	Heavy Rain	Tutuila (western villages)	Western parts of American Samoa received nearly 7 inches of rain in 6 hours. Minor flooding was reported.	0/0	None reported
9/25/1998	Flood	Tutuila	Heavy storms brought floods to several villages island wide, especially homes near stream. A large number of underground water wells were shut down because of high salt content, but two desalination machines-to make the water drinkable-were acquired with support from the federal government. The rainfall recorded for this month was 4.30 in. at WSO-Pago Pago, where the normal for September is 6.61 in.	0	0

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
7/12/1999	Flood	Tutuila	None reported	0/0	0
8/19/1999	Flash Flood	Tutuila	Heavy showers caused by a trough of low pressure over Samoa dumped 2 inches of rainfall between 2000 and 2300 causing flooding of low lying areas across the territory.	0/0	None reported
9/15/1999	Flood	Tutuila	The heavy showers associated with a stationary trough flooded and overflow many of the streams. Mud and landslides occurred at Poloa and Fagamalo causing temporary blockage of the road. Moreover heavy showers added on already saturated grounds again caused mud and land slide along the Poloa-Fagamalo road and widespread flooding of low lying areas as well as overflow of streams.	0/0	$114,000
11/23/1999	Flood	Tutuila	An active trough of low pressure that extends onto the islands from the southwest spread heavy showers with scattered thunderstorms over the territory with rainfall totals of 2.92 inches for the day. Flooding of low-lying areas and overflow of streams was widespread across the islands.	0	None reported
12/2/1999	Flood	Pago Pago	None reported	0	None reported
12/28/1999	Flood	Tutuila	None reported	0	None reported
1/19/2000	Flash Flood	Tutuila	Heavy rain associated with a stationary trough of low pressure that extends from a tropical disturbance northwest of Tutuila caused widespread flooding across the territory.	0	$27,000

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
2/27/2000	Flash Flood	Tutuila	Heavy rain associated with a tropical disturbance near Samoa dumbed 6.65 inches of rainfall in 7 hours. Several families were evacuated from Tula village in the eastern tip of Tutuila because of flooding. TEMCO reported many other families with homes being flooded across the territory because of the heavy rain. A man just escaped injury as his car was smashed by a large rock at the Laauli'i lookout because of a landslide, one of the various land and mudslides being reported by TEMCO across the territory.	0	$552,000
3/5/2000	Flood	Tutuila	Heavy showers associated with a tropical depression far south of Samoa fell across the territory Sunday afternoon to Monday morning. The Weather Station Office at Tafuna Airport recorded 8.18 inches of rainfall from Sunday afternoon to Monday afternoon. Numerous small streams were overflow with widespread flooding of low-lying areas as well as mud and police and TEMCO reported landslides across Tutuila Sunday and Monday.	0	None reported
3/25/2000	Flood	Tutuila	Heavy showers associated with a trough of low pressure dumbed almost 2 inches of rainfall as recorded at the airport in 2 hours. The heavy showers caused widespread flooding of low lying areas, small streams to over flow and numerous mudslides over western Tutuila.	0	None reported
10/11/2000	Flood	Tutuila	None reported	0	--

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
11/20/2000	Flood	Tutuila	A stationary trough of low pressure over American Samoa spread heavy showers over the territory causing localized flooding of low lying areas and overflow streams ditches. Debris was washed onto the road creating hazardous driving conditions.	0	None reported
1/7/2001	Flood	Tutuila	Heavy showers in the afternoon dumbed more than 2 inches of rainfall in 4 hours as an upper level trough of low pressure moved over the islands. Minor flooding in Pago Pago with various small streams being overflowed, washing debris over roads and walkways. No major damages were reported.	0	None reported
2/14/2001	Flood	Tutuila	An active trough of low-pressure southwest of Samoa occasionally spread heavy showers over Tutuila. Minor flooding of streams and low-lying areas along the roadways due to both heavy showers and heavy runoffs. No major damages were reported apart from debris washed onto the roads public parks.	0	None reported
3/23/2001	Flood	Tutuila	Heavy showers and thunderstorms associated with an active trough of low pressure just south of Samoa caused widespread flooding of low lying areas as well as overflowing of small streams and caused bonding of streets and roadways across Tutuila. The police reported various mud and landslides west of Poloa.	0	None reported
3/26/2001	Flood	Tutuila	An active trough of low pressure became nearly stationary across the Samoan Island for several days. These heavy showers and heavy runoff caused flooding of low lying areas, overflow of small streams and mud and landslides across the Tutuila.	0	None reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
5/13/2001	Flood	Central Portion	A convective cell over central Tutuila dumped heavy showers over the area causing flooding of low lying areas and overflow streams from Nu'uuli to Aua. Heavy runoffs and the overflow of streams washed debris onto the road causing traffic jams in Pago Pago from Pago Park. Suspended road construction work for 24 hours. Except for clean-up work and the temporary suspension of road construction no major damages were reported.	0	None reported
7/14/2001	Flood	Tutuila	Heavy showers fell over Tutuila dumping more than 2 inches of rainfall in 4 hours. These heavy showers were associated with a trough of low pressure that moved over the islands. Widespread flooding of low lying areas and small streams. Ponding of streets as well as heavy runoffs were noted at Nu'uuli and the Bay area.	0	None reported
11/4/2001	Flood	Tutuila	Minor flooding reported from Nu'uuli to Pago Pago. No major damages were reported except for some debris being washed onto the roads in Tafuna and Nu'uuli.	0	None reported
11/10/2001	Flood	Tutuila	An upper level trough of low pressure moving over the territory from the north dump heavy showers over Tutuila causing flooding of low lying areas and overflow of steams. The heavy showers and runoffs plus saturated grounds caused mud and landslides at Poloa and at Avau Point.	0	None reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
12/25/2001	Flood	Tutuila	An active trough of low pressure was oriented northwest to southeast about 200-300 miles to the north of Samoa through the last 10 days. Various tropical systems developed within this rough, with the first of these tropical depressions began spreading showers over the territory on Christmas day with heavier showers arriving on the 26th. The thunderstorms with heavy showers caused flooding of streams. 'The overflow streams and heavy runoff flooded roads and low lying areas across the territory. Total rainfall from this tropical depression was 3.61 inches.	0	None reported
3/20/2002	Flood	Tutuila	Heavy showers associated with a stationary trough of low pressure over Samoa dumped 2 inches of rainfall in 24 hours causing flooding of low lying areas in the afternoon and into the evenings. Heavy runoffs continued to overflow small streams and caused some minor landslides as grounds has been saturated as it was raining on and off for the last two days. No major damages were reported.	0	None reported
4/19/2002	Flood	Tutuila	Heavy showers caused widespread flooding across the territory marking one of the wettest Flag Day in recent memories. More than two inches of rainfall fell in 2 hours during an activity packed Flag Day celebration. With the heavy runoff and showers, numerous land and mudslides occurred across Tutuila. The Weather Service at Tafuna recorded 6.56 inches of rainfall in three days.	0	$66,000

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
5/26/2002	Flood	Tutuila	Heavy showers dumped 2.09 inches of rainfall in less than 4 hours causing flooding of low-lying areas and streets. The heavy showers and runoffs caused overflow of streams and flooding of streets. Except for debris being washed onto the streets, no major damages were reported.	0	--
10/6/2002	Flood	Tutuila	Heavy showers caused flooding of low-lying areas and heavy runoffs washed debris onto the roads across the island. Land and mudslides were reported along many mountainous areas and along the public highway due to heavy showers and runoffs. Except for cleanup work no major damages were reported across the territory.	0	--
11/15/2002	Flood	Tutuila	Heavy showers dumped more than 3 inches of rainfall in less than 3 hours causing overrun of streams and overflow ditches. Widespread flooding of low-lying areas and streets. Some land and mudslides were reported with debris decorating much of the island. Very little damage was reported except for usual cleanup.	0	--
4/10/2003	Flood	Tutuila	An active convective band of thundershowers dumped 2.72 inches of rainfall in less than 3 hours.	0	--

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
5/19/2003	Flash Flood	Tutuila	A flash flood occurred across Tutuila from Nu'uuli Uta to Pago Pago many communities near mountains and valleys. The main stream in Pago Pago rapidly overflowed and flooded many homes and businesses along the stream and all of lower Pago Pago. Over ten landslides were reported. A major landslide buried and killed 3 young men from the age of 18 to 23 years old in Pago Pago as two other men narrowly escaped this same landslide. One of these men was med-vac to Honolulu for treatment as the Hospital at Fagaalu was 90% out of business as the whole hospital was flooded. A lady in her early 40s was killed by a landslide in Fagatogo that buried the Langkilde Business Center. Another young men in his 20s was rescued and was med-vac to Honolulu on the same flight with gentleman from Pago Pago. Torrential rainfall and excessive runoff flooded Pago Pago, Fagatogo, Lower Utulei, and Fagaalu where the hospital is located. The whole village of Matu'u was flooded so as the inland and valley side of Nu'uuli. Numerous families were evacuated and had taken up shelters at temporary shelters set up by the Territorial Emergency Management Coordinating Office TEMCO. FEMA and TEMCO are currently providing assistance to families who were affected by the floods and landslides. President Bush had declared American Samoa a disaster area due to the flash floods and landslides. 10.68 inches of rain was reported. (An additional death has since been reported.)	5/6	$65M property; $1.2M crop damage

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
6/13/2003	Flood	Tutuila	Heavy showers fell on the territory from an active trough of low pressure over Samoa. More than 2 inches of rain fell between 330 pm and 430pm which caused rapid flooding of low lying areas and triggered some landslides in areas previously affected by the heavy rain of May 19, 2003.	0/0	$64,000
12/22/2003	Heavy Rain	Tutuila	An active upper level trough of low pressure, which moved over, the islands Monday evening dumped almost 3 inches of rainfall in 6 hours. The heavy showers caused widespread flooding of low lying areas and overflow streams creating traffic jams in flooded streets.	0/0	None Reported
9/7/2004	Flood	Tutuila	Heavy rain caused street ponding and flooding in some villages. An unstable air mass aloft, well- associated with a trough connected to a strong gale southwest of Pago Pago, remained over the Samoan Islands within 24 hours. No damages or injuries reported.	0	None Reported
9/8/2004	Flash Flood	Tutuila	Heavy rain caused stream overflow and street flooding of over 2 feet across Tutuila. The Tafuna Office recorded about 3.30 inches of rain within the 24-hour period. Rocks and debris were spotted along the main-road. No injury or damages reported.	0	None Reported
5/24/2005	Flash Flood	Tutuila	Thunderstorms associated with a trough near the Islands brought a lot of rain over Tutuila and Manu'a. Several residents experienced flooding in their homes due to overflow of small streams and poor drainages in some areas on Tutuila Island. The Weather Service Office recorded a total precipitation of 5.21 inches during this period.	0	None Reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
6/30/2005	Flood	Tutuila	Less than 30 homes in Fagatogo village were tarnished with mud and debris due to overflow of small streams from heavy rain. Heavy rain over Tutuila caused street ponding and drainage issues across the Island.	0	None Reported
8/17/2005	Flash Flood	Tutuila	An active trough associated with heavy rain and thunderstorms dumped a lot of rain across the Islands. The Weather Service Office in Tafuna recorded about 4 inches from this event. Overflow of small streams and street ponding created traffic congestion for motorists. There were no reports of mudslides or injuries.	0	None Reported
12/7/2005	Flash Flood	Tutuila	A stationary trough near the Islands was associated with a lot of active weather producing a lot of rain across the Samoan Islands. Reports of heavy rain near mountainous areas caused flash flooding and made driving difficult for motorists. Some residents were overwhelmed with puddles of water in their homes. A 24-hour total of 2.45 inches was accumulated for the day's event.	0	None Reported
12/8/2005	Flood	Tutuila	A stationary trough near Samoan Islands produced widespread showers across Tutuila. The WSO recorded about 1.48 inches of rain for this event, but reports from across Tutuila Aunu'u and Manu'a were that roadways were flooded in several villages due to the overflow of small streams and poor drainage. A few flooded roads on Tutuila caused several small cars and sports vehicles to stall for hours. No injury reported.	0	None Reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
12/15/2005	Flash Flood	Tutuila	Heavy rain caused flash flooding and loss of control of water flow in a lot of villages on the Island of Tutuila. Flood-prone roads caused some small cars and vans to stall for hours, and reports of increasing water in small streams across the Island was noticeable throughout this event. An area of convective activity from the north of Tutuila produced a lot of rain and the Weather Service Office recorded about 2.46 inches of rain for this episode.	0	None Reported
12/17/2005	Flood	Tutuila	A nearly stationary trough in the vicinity of the Samoan Islands produced widespread showers across Tutuila Island. Thunderstorms were observed by the Weather Service Office in Pago Pago. Almost all roadways received at least 1 to 3 inches of ponding while other villages experienced overflow of small streams due to continuous downpour of rain for this event. The Weather Service Office recorded a total precipitation of 2.51 inches for this episode.	0	None Reported
12/21/2005	Flood	Tutuila	Occasional showers caused ponding along roadways and overflow of small streams near mountainous areas. A total precipitation of 3.06 inches was recorded at the Weather Service Office.	0	None Reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
12/26/2005	Flood	Tutuila	A convection in the vicinity of the Islands increased immensely which produced a lot of rain across Tutuila and Manu'a Islands. Flooding of roadways especially villages prone to flooding in Tutuila reported stalled vehicles and traffic congestion. Rising water near small streams surprised several residents as inflow of water swept through their homes. The Weather Service Office received a total of 3.14 inches of rain for this episode.	0	None Reported
1/31/2006	Flash Flood	Tutuila	Locally heavy rainfall across the Island of Tutuila caused an increase in rising waters and overflow of small streams, especially villages located to the West of the International Airport. Homes were swamped with water from 6 inches to 3 feet, and many personal properties were spoiled and damaged from this episode. Motorists experienced difficulties bypassing stalled sedans and trucks in some flooded areas in the village of Tafuna. Less than 50 people evacuated their homes. The Weather Service Office recorded a total precipitation of 5.68 inches for this event.	0	$118,000 in property; $18,000 in crop
2/1/2006	Flash Flood, Heavy Rain	Tutuila	Heavy rainfall flooded 50 percent of homes in the village of Tafuna. Personal properties, including household goods, were ruined by the increasing flow of water. Two families were "forced from their homes by the floodwaters" and no injury reported. Heavy rainfall impacted roads causing potholes and "in some cases becoming deeper, resulting in an overall traffic slowdown around the Island." The Weather Service Office recorded a total precipitation of 5.53 inches.	0	$59,000 in property; $2,000 in crop

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
2/6/2006	Heavy Rain	Tutuila	Heavy rainfall caused an increase in rising water in several villages across the Island of Tutuila. Some roads were flooded with at least 1 to 3 inches of water, causing traffic congestion in some areas. A total rainfall of 4.22 inches was recorded	0/0	None Reported
12/4/2006	Flash Flood	Pago Pago	Thunderstorms and heavy rainfall were associated with an active trough near the Islands. The Weather Service Office recorded about 4.72 inches of precipitation for this event; residents reported widespread flooding and landslides across the Island of Tutuila.	0	None Reported
2/2/2007	Flash Flood	Pago Pago	The Weather Service Office recorded between 2 to 3 inches of rainfall in 3 hours. Residents along low-lying villages reported run-off and increasing flow of water along small streams. Roads were covered with water and there was ponding in residential yards.	0	None Reported
2/22/2007	Flash Flood	Tutuila, Pago Pago	An intensified convection from the east expanded across Manu'a, Aunu'u and Tutuila Islands early Thursday morning. Locally heavy rainfall swathed some village grounds with runoff along small streams. The Weather Service replaced a Small Stream Flood Advisory with a Flash Flood Warning and recorded about 1 to 3 inches of rainfall for this event.	0	None Reported
9/3/2007	Flash Flood	Pago Pago	A Flash Flood Warning for Tutuila was issued. Debris washed onto the roads and mud and landslides occurred at Malota and Fagamalo. Three inches of rain in there hours were reported.	0	None Reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
12/7/2007	Flash Flood	Pago Pago	A monsoon trough that extends all the way from the Solomon Islands southeastward to just south of the Samoa Group spread heavy rain and thunderstorms across the islands over the weekend. The sat nearly stationary just to the south of the islands and caused widespread flooding across Tutuila. Flash Flooding was reported from the Malaeimi Valley to the Bay Area. Heavy showers and runoffs overflowed most streams from Faganeanea to Pago Pago and dumped lots of debris and rocks on the roads. The X-Ray room and part of the Surgical Ward at the LBJ Medical Center was flooded as the jammed and clogged up Fagaalu stream force all the water and mud onto the hospital parking lot into part of the hospital. Fortunately, the hospital had taken all necessary precautions avoiding a major disaster in protecting lives and properties. The National Weather Service had a Flash Flood Warning, which gave enough time for the public to prepare for the flooding.	0	$287,000 in property damage

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
12/8/2008	Flash Flood	Vaitogi	An active trough of low pressure developed northeast of the islands. The Pago Pago National Weather Service Office recorded 13.55 inches of rainfall total over 6 days. Furthermore, the Pago Pago NWS had issued small stream advisories for the islands during the period and a flash flood warning on the last day of the episode. The Department of Public Safety and the Department of the Public Works both reported roads inundated by the overflow of streams and major works due to drainage problems. No other major damages were reported. With a saturated ground from the previous days, a slow- moving trough poured 3.59 inches of rain over the islands on the 8th of December. The Pago Pago NWS issued the flash flood warning. The flash flood from the slow-moving trough produced heavy runoffs of streams and inundated low lying of the islands.	0	--
12/10/2009	Flash Flood	Pago Pago	Heavy rainfall caused runoff and flooded roadways. Two homes were flooded in the village of Tafuna due to poor drainages. The WSO received 6.41 inches of rainfall during this event.	0	None Reported
11/20/2010	Flash Flood	Tutuila, Vaitogi	Over 2 inches of rainfall caused small stream runoff and flooded roadways along villages with poor drainages on Tutuila and some parts of Aunu'u and Manu'a. No injury or damages reported.	0	None Reported
12/18/2010	Flash Flood	Tutuila, Vaitogi	Heavy rainfall caused runoff and overflow of small streams on Tutuila, Aunu'u and Manu'a, especially near poor drainage areas. The Weather Service Office received nearly 3 inches of rainfall during this episode.	0	None Reported

Event Name, Date	Event	Geographical Extent	Impacts	Deaths/ Injuries	Estimated Losses ($)
6/3/2011	Flash Flood	Tutuila, Vaitogi	On a late Friday morning, a slow moving Squall line or Mesoscale Convective System had inundated low-lying areas of Tutuila and Aunu'u. The National Weather Service Office in Pago Pago issued a Flash Flood Warning and later recorded rainfall totals of 2.17 inches in an hour period. Residents had reported inundations along poor drainage and low lying areas. The American Samoa Department of Homeland Security reported overflow of streams onto roads in which had created numerous counts of potholes on and along major roadways. No other damages were reported.	0	None Reported
11/21/2011	Flash Flood	Tutuila, Vaitogi	A nearly stationary trough to the southwest of the Samoan Islands has triggered heavy rainfall. Flash flooding, landslides, and heavy run-off were reported from across the Island of Tutuila. The Weather Service office received 2.56 inches of rainfall for this episode.	0/0	None Reported
7/29/2014	Flooding	All islands	July 29- August 3 flooding and storms that also spurred landslides. The events resulted in a disaster declaration. Over $5 million in damages including government buildings flooding (2 feet in the registrar's office) and 100 homes destroyed. One fatality was reported from a teenager swimming in a swollen creek. She was swept out to sea. Additional damage to agriculture was reported. Bananas were near maturation when the storms destroyed many of them. Additional information is reported below.	1/0	$5 million

*Reported from previous plan

(Source: National Climatic Data Center)

Eleven disaster Declarations potentially had flood impacts including all declarations from tropical storms and hurricanes. The following declarations specifically list flood as a hazard.

November 9, 1979: Flooding, Mudslides, Landslides (DR-610)
Unfortunately little information could be found on this event. It was the second declaration made in American Samoa and the first due to flooding.

May 19-21, 2003: Heavy Rainfall, Flooding, Landslides, and Mudslides (DR- 1473)
FEMA Disaster #1473. Between May 19-21, 2003, heavy rainfall caused flooding, landslides, and mudslides on the Island of Tutuila near Pago Pago, Fagatogo, Nu'uuli, Fagaalu, and Utulei, prompting the Territory to declare an emergency. Rainfall on May 19 at Pago-Pago totaled 10.68 inches. Widespread debris flows, rock falls, and slumps occurred due to the extremely heavy rains. Five people were killed in landslides, although much of the property damage was flood related. FEMA declared American Samoa a disaster area on June 6, 2003. Estimated FEMA assistance is $1.5 million for public building and nearly $9.6 million for individuals. NOAA's National Climatic Data Center estimated over $50 million (2003 dollars) in total damages.
The declaration covers damage to private and public property from heavy rains, flooding, and mud and landslides that occurred May 19-21.

After the declaration, FEMA designated the island of Tutuila eligible for federal aid to stricken residents that can include grants to help pay for temporary housing, home repairs and other serious disaster-related expenses. Low-interest loans from the U.S. Small Business Administration will also be available to cover residential and business losses not fully compensated by insurance.

In addition, FEMA said federal funds will be provided for the territory and affected local governments on the island of Tutuila to pay 75 percent of the approved costs for debris removal, emergency services related to the disaster, and the restoration of damaged public facilities.

Under the declaration, cost-shared funding will be available to the territorial government for approved projects that reduce future disaster risks, FEMA said. President Bush indicated that additional areas may be designated for aid later if requested by the Territory and warranted by the results of further damage assessments.

Over 1,300 residents have registered for disaster assistance since President Bush declared the disaster. Almost 1,900 residents have visited the Disaster Recovery Center (DRC) located at the Lee Auditorium. The rain and mudslides claimed four lives and left several other people severely injured.

September 29-October 6, 2009: Earthquake, Tsunami, and Flooding (DR- 1859)
NOTE: This event is also related to the 2009 Tsunami and will be detailed further in the tsunami profile section.

A series of waves from the tsunami disabled the local power plants; destroyed 248 homes and 28 rental units; and damaged another 2,750 dwellings. One school was destroyed and another four suffered substantial damage (over 50% destroyed). Roads, bridges, churches, and everything in the waves' paths were damaged to varying degrees. The small island and its 65,000 residents were left to rebuild their property and their lives.[1] Over $140 million in relief and rebuilding money was provided by FEMA and other federal agencies.

July 29-August 3, 2014: Severe Storms, Flooding and Landslides (DR- 4192)[2]

This event brought heavy rain, winds, flooding and landslides to the area. High surf of 14 to 16 feet impacted south facing shores and wind gusts of 50 miles per hour were reported. July was a particularly wet month for the territory. Typically it receives around 6 inches of rain but received over 18 inches in 2014, making it the second wettest July on record. Given the inundation of rain, the terrain was saturated making it highly susceptible to landslides.

Damage across Tutuila was extensive. Governor Lolo Matalasi Moliga requested (and was granted) a disaster declaration due to these events. In his letter, the governor said the flooding, associated runoff and resulting landslides produced serious and extensive damage to both public and private property, and directly caused injuries and one death. The fatality occurred in Fagaalu Bay, when a female high school student was swept out to sea while swimming in the heavy rains.

The weather events left many residents homeless. Dozens of people were required to evacuate to temporary shelters, and over 100 homes were destroyed. Three shelters were opened at Samoana High School, CCCAS Gataivai and the Catholic Hall, which accommodated over 100 displaced residents. Those housed at the two shelters are residents of both Utulei and Gataivai, where a landslide destroyed at least three homes and damaged the church.

2014 Flooding[3]

Several government departments were also impacted by flooding including Territorial Registrar's office, the Department of Education, the E-Rate Office, and the Department of Public Safety. The Territorial Registrar saw water seep into the building and ordered staff to clear out cabinets to avoid damage to records. The building sustained nearly 2 feet of water but no records were impacted. The roof of the old Veteran's Affairs building was also partially torn off by strong winds.

1 Disaster Assitance in American Samoa Tops $33 million. FEMA. Retrieved August 8, 2014 from http://www.fema.gov/news-release/2010/03/17/disaster-assistance-american-samoa-tops-33-million

2 Sagapolutele, Fili. (2014). "Lolo asks for Presidential Disaster Declaration over flooding and landslides." Samoa News. Retrieved August 8, 2014 from http://www.samoanews.com/content/en/lolo-asks-presidential-disaster-declaration-over-flooding-and-landslides

3 Disaster declaration for American Samoa. Fiji One. Retrieved August 8, 2014 from http://fijione.tv/disaster-declaration-for-american-samoa/

In addition to structural damage, several banana trees were blown down. This was of particular concern as the bananas were near mature stage for picking and slated to be sold to schools. The photo below demonstrates some of the severe flooding experienced around the island.

APPENDIX L - Previous Occurrences of High Surf

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
ALL ISLANDS						
3/29/1999	High Surf	All (south-facing shores)	8-12	High surf of 8 to 12 feet along south shores of the islands.	0/0	None Reported
4/27/1999	High Surf	All (south-facing shores)	6-10	High surf of 6 to 10 feet along the south shores.	0	None Reported
5/12/1999	High Surf	All (south-facing shores)	8-12	Surf of 8 to 12 feet along south shores.	0	None Reported
10/12/2004	Heavy Surf/High Surf	All (south-facing shores)	8-12	High pressure far south of the Islands generated south to southeast swells of 4 to 6 feet, producing 8 to 12 feet surf along south shores of all Islands.	0	None Reported
10/22/2004	Heavy Surf/High Surf	All (south-facing shores)	10-12	A large area of trade wind swells was reinforced by a south swell of 4 to 6 feet. Large surf of 10 to 12 feet with occasional higher sets reached south shores of all Islands.	0	None Reported
10/30/2004	Heavy Surf/High Surf	All (south-facing shores)	5-7	Large south swells of 5 to 7 feet were generated by intense low pressure far south of the Islands.	0	None Reported
2/3/2005	Heavy Surf/High Surf	All (southeast-facing shores)	10-14	Southeast swells of 5 to 7 feet generated by Tropical Cyclone Meena far east of Tutuila produced surf heights of 10 to 14 feet along southeast facing shores of Tutuila and Manu'a.	0	None Reported
2/27/2005	Heavy Surf/High Surf	All (south-southwest facing shores)	not reported	Large swells generated by Tropical Cyclone Percy pummeled east and south facing shores of Tutuila and Manu'a Islands.	0	None Reported
6/1/2005	Heavy Surf/High Surf	All (south and southwest-facing shores)	5-6	South to southwest swells of 5 to 6 feet produced surf heights of 10 to 12 feet along south and southwest facing shores of Tutuila and Manu'a.	0	None Reported

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
6/5/2005	Heavy Surf/High Surf	All (south-southwest facing shores)	10-14 (Manu'a& Tutuila);	An intense low pressure near New Zealand generated large south to southwest swells of 7 feet, producing surf heights of 12 to 14 feet with occasional higher sets along south shores of Tutuila and Manu'a. Swells of 4 to 5 feet from this trend reached Swains for a couple of days.	0	None Reported
7/1/2005	Heavy Surf/High Surf	All (south-facing shores)	10-14	Surf of 10 to 14 feet was generated by a south swell from a low-pressure area far south of Tutuila and Manu'a Islands.	0	None Reported
7/22/2005	Heavy Surf/High Surf	All (south-facing shores)	12	Large swells associated with an intense low pressure far south of the Islands reached Tutuila and Manu'a Islands, producing surf heights around 12 feet along south shores of the Islands.	0	None Reported
8/8/2005	Heavy Surf/High Surf	All (east and southeast-facing shores)	10-12	Large surf near 10 to 12 feet was generated by strong low pressure far south of the Samoan Islands. Coral debris were washed on-shore and near the street from this event.	0	None Reported
9/12/2005	Heavy Surf/High Surf	All (south-facing shores)	10-14	An intense low pressure far south of the Islands generated south swells of 5 to 7 feet, which produced surf heights of 10 to 14 feet along south facing shores of American Samoa.	0	None Reported
10/1/2005	Heavy Surf/High Surf	All (south-facing shores)	10-12	An intense low pressure far south of the Islands generated a south swell of 4 to 6 feet, which produced high surf of 10 to 12 feet along south facing shores of the Islands.	0	None Reported
11/1/2005	Heavy Surf/High Surf	All (south-facing shores)	8-12	The normal surf was generated by a very low intense pressure area far south of the island of Tutuila, Aunu'u and Manu'a. Surf swells 8 to 12 feet high in the islands.	0	None Reported

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
6/23/2007	High Surf	All (south-facing shores)	8-12	High surf of 8 to 12 feet with occasional higher sets impacted much of south facing shores of Tutuila, Aunu'u and the Manu'a islands in the last week of the month. Higher than normal surf was generated from a gale low off of New Zealand. There were no significant damages.	0	None Reported
8/24/2007	High Surf	All (south-facing shores)	not reported	High Surf Advisories were posted for all south-facing shores of Tutuila from August 24th to August 31st. Result of heavy swell from an intense low-pressure area far south of the islands No significant damages were reported.	0	None Reported
9/1/2007	High Surf	All (south-facing shores)	8-12	High surf continued into September generated from a low far south of the islands September 1st to September 5th. No significant damages were reported.	0	--
9/14/2007	High Surf	All (south-facing shores)	8-14	Another intense low-pressure system far south of the islands generated heavy southerly swell across the Samoan Islands from September 14th to the 19th. Surf of 8 to 14 feet impacted most of south facing shores especially from Avau to Fatumafuti and from Lauli'i to Tula. No significant damages were reported.	0	None Reported

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
6/1/2008	High Surf	All (south-facing shores)	8-14	A series of Low Pressure Systems moving eastward across New Zealand generated swells of 8 to 14 feet along south facing shores of Tutuila, Aunu'u, and Manu'a. This event occurred on the 1st to the 21st of June. During this period, high surf advisory where posted at major beaches of the islands, which caused less activities and beach goers to be seen at the beaches. Sea spray from breaking waves and wave crest were also observed. There were no reports of serious injuries or property damage.	0	None Reported
7/1/2008	High Surf	All (south-facing shores)	8-14	EPISODE NARRATIVE: Heavy swell from a series intense low pressure systems far south of American Samoa combined with strong trade wind surge generated surf of 8 to 14 feet with occasional higher sets. This high surf episode lasted from June 24th continuing towards July 23th. Some coastal flooding was reported during high tides from Pagai to Cape Matatula on the 14th of July. The rainfall recorded on this day was 1.78 inches, which was the highest rainfall for the month of July. In addition, high surf advisory was posted on major beaches and was announced on local media for public awareness. No significant damages were reported.	0	None Reported
9/5/2008	High Surf	All (south-facing shores)	10-14	A High Surf Advisory was issued on September 5 due to a series of Low Pressure Systems north of New Zealand, which produced moderate to strong swells. These Swells affected south facing shores of the islands of Tutuila, Aunu'u, and Manu'a	0	None Reported

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
5/14-15/2014 [1]	High Surf	All	7-9	High Surf Advisory issued	--	--
6/1/2014	High Surf	All	7-9	High surf advisory (7 to 9 ft.)	--	None Reported
MANU'A						
2/15/2005	Heavy Surf/High Surf	Manu'a	--	A 68-foot vessel was afloat within 50 miles north of Manu'a, said to be "disabled with no steering wheel but had power." High swells generated by Hurricane Olaf. Crew members were not hurt. The Associated Press reported a vessel sank on February 16th in "50-foot waves and 120 mph winds about 95 miles north of American Samoa and the four rescued crew members were on a life raft when they were found." There were reports about other missing vessels based in Western Samoa, but were later found by Coast Guards and Rescue Team from New Zealand.	0/2	$10,000

1 High Surf Advisory. (2014). NOAA. Retrieved August 8, 2014 from http://alerts.weather.gov/cap/wwacapget.php?x=AS125154314360.HighSurfAdvisory.1251543EC210AS.STUCFWPPG.925ea42183e00926419895f300ded287

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
TUTUILA						
6/2/1998	High Surf	Tutuila	5-8	A surface high southwest of Samoa produced waves from 5 to 8 feet and a resulting high surf advisory was broadcasted from June 2-4. A police officer was killed at sea (because of high surf) on June 3, after he responded to a call about a teenager that was going to commit suicide at sea. The youngster was saved but the officer was later found on the 4th of June.	1/0	None Reported
4/6/2000	High Surf	Tutuila (south-facing shores)	8-14	High surf of 8-14 feet affected the south shores of Tutuila for 6 days, creating strong rip currents at most of the bays especially from Nu'uuli to Fagaalu. The high surf gave warnings were issued to swimmers and fishermen.	0	None Reported
4/28/2000	High Surf	Tutuila	--	--	0	None Reported
5/14/2000	High Surf	Tutuila (south-facing shores)	20	An intense low pressure are far south of Samoa generated high swell which created surf up to 20 ft. in some exposed areas along south shores of American Samoa. The extremely high surf combined with high tides caused some beach erosion. Many low-lying areas along the main road were blocked with debris, sand and rocks and needed cleanup. These were some of the highest surf observed in a non-Tropical Cyclone system.	0	$100,000

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
5/28/2000	High Surf	Tutuila (south-facing shores)	20-30	Another strong low pressure in a series of low-pressure systems which moved from west to east, south of Samoa, generated high swell with surf up to 20 feet. Surf up to 30 feet was reported from Vailoatai to Vaitogi. Some areas of road from Nu'uuli to Fagaalu were again overrun by the high surf during high tides, causing some traffic backups	0	None Reported
6/1/2000	High Surf	Tutuila (south-facing shores)	3-5	An intense low-pressure area south of Samoa, moving from west to east, generated high surf along south shores of American Samoa. Damaging wave action and strong rip currents associated with the extremely high surf were being observed all the way from Vaitogi to Vailoatai and from Nu'uuli to Fagaalu. Surf of 3 to 5 feet was also observed within the Bay Area, which is very rare. Sections of the Main road were washed off or overrun by surf spreading debris, sand and rocks from Vasaaiga to Fatumafuti.	0	$50,000
12/15/2000	High Surf Advisory	Tutuila (south-facing shores)	10-15	Surf of 10 to 15 feet bounded south shores of Tutuila over the weekend. These high surf were generated by an unusually strong low pressure are east of New Zealand at this time of the year. Some beaches were closed to the public due to strong rip currents especially during high tides. No major damages were reported through this episode.	0	None Reported

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
12/3/2001	High Surf Advisory	Tutuila (south-facing shores)	--	High surf generated by an intense low-pressure area far south of Samoa washed out a temporary access road at Avau Point which cost about $200,000.00 to construct. The exceptionally high surf was reported throughout the south shores of the Tutuila. No other major damages were reported besides debris being washed onto the roads along lower coastal areas.	0	$200,000
12/26/2001	High Surf Advisory	Tutuila (north-facing shores)	--	High surf generated by Tropical Cyclone Waka affected the north shores of the territory. The high surf then came from the west and later from the south as Waka continued southward.	0	None Reported
1/1/2002	High Surf Advisory	Tutuila (south-facing shores)	--	High surf generated by Tropical Cyclone Waka continued along the south shores.	0	None Reported
8/19/2002	High Surf Advisory	Tutuila (south-facing shores)	--	High Surf Advisory was issued for south shores of Tutuila due to heavy swell generated by a low-pressure area far south of Samoa. No significant damages or injuries were reported during this high surf episode.	0	None Reported
5/1/2003	Heavy Surf/High Surf	Tutuila	--	None reported	0	None Reported

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
5/17/2003	Heavy Surf/High Surf	Tutuila	--	This high surf/heavy surf event, which lasted for over a week created many problems not only for the swimmers and fishermen but for the general public as well due to flash flooding. The high surf combined with exceptionally high tides blocked all streams from draining into the ocean that caused numerous flooding in all bridges from the Bay Area to Nu'uuli. Estimated damages to the bridges and coastal roads were in the millions. President Bush has declared American Samoa a disaster area because of the flash floods, which included coastal flooding.	0	$3,500,000
6/1/2003	Heavy Surf/High Surf	Tutuila (south-facing shores)	--	A semi-permanent ridge of high pressure, which was nearly stationary far south of the islands, produced strong trades and high surf that affected much of the south shores of Tutuila for more than a week.	0	None Reported
10/9/2003	Heavy Surf/High Surf	Tutuila (south-facing shores)	10+	Another strong ridge of high moved south of Samoa and generating heavy surf and swell in excess of 10 ft. Impacts from October 9th to October 12th. The high surf created strong rip currents from Nu'uuli to Fagaalu and from Lauli'i to Cape Matatula.	0	None Reported
9/8/2004	Heavy Surf/High Surf	Tutuila (south-facing shores)	0	Large south swells swept an alia to shore, near the Maliu Mai beach resort at Fogagogo. 4 fishermen, ranging in age from 17 to 40, were not seriously injured. "A huge wave turned their vessel upside down and the engine dropped off", reported the Samoa News. A high surf advisory was issued due to large south swells.	0/6	$5,000

Date	Event	Location	Mag	Details and Impacts	Deaths/ Injuries	Damage
8/20/2005	Heavy Surf/High Surf	Tutuila (south-facing shores)	4-6	A combination of south and southeast swells near 4 to 6 feet impacted south facing shores of the Islands. Corals were washed up along a few low-lying areas in Tutuila.	0	None Reported
10/17/2005	High Surf Advisory	Tutuila (south-facing shores)	10-18	An intense low-pressure area far south of Samoa generated heavy swell, which caused high surf of 10-18 feet that bounded the south shores of Tutuila for about a week. It provided excellent surfing conditions for the surfers but created some problems for marine patrols.	0	None Reported
2/7/2008	High Surf	Tutuila (south-facing shores)	--	High Surf Advisories were posted for all south-facing shores of the island of Tutuila for four days.	0	None Reported
5/20/2008	High Surf	Tutuila (south-facing shores)	10-20	Heavy surf impacted most of south facings shores of Tutuila but most especially from Avau to Matu'u and from Alao to Cape Matatula. Surf of 20 feet forced the closure of Avau Beach on the 24th and the 25th. Some coastal flooding was reported during high tides from Pagai to Cape Matatula. This high surf episode lasted from May 20th to the 26th.	0	None Reported

As American Samoa remembers tsunami tragedy, territory declared 'Tsunami Ready'[1]
9/29/12 By Joyetter Feagaimaalii-Luamanu
reporters@samoanews.com

Today American Samoa marks the third year anniversary of the disaster that claimed the lives of 34 people, causing millions of dollars in damage to homes and property. Appropriately yesterday, American Samoa received its first certification as a Tsunami Ready community by the National Oceanic Atmospheric Administration.

Details on the Tsunami Ready program were published in Friday's edition.

The ceremony held at the government's Fale Samoa at Utulei Beach Park, led off with an invocation by Rev. Dr. Fa'atauva'a Talamoni of the CCCAS in Pago Pago.

Addressing those gathered, Gov. Togiola Tulafono, said during the tsunami on September 29, 2009 the territory's preparation were not adequate, not good enough — and that makes today (Friday) just that much more special being told and being presented this blessing of readiness and preparedness — it should be comforting for all of us.

He thanked the National Oceanic & Atmospheric Administration and Federal Emergency Management Agency for being great partners and for all their efforts, which have enabled American Samoa to be certified Tsunami Ready.

The governor noted that before American Samoa was hit by the disaster, the NOAA office was trying to work with government to put in place a warning system.

"Everybody blamed everybody else in the world when the disaster struck. Unfortunately we concentrated only on the disaster and failed to recognize the efforts of NOAA and US Army that were conducted long before the disaster, and the efforts of Department of Homeland Security prior to the disaster, to help us get ready.

"There were a lot of wonderful and great efforts that were ignored when we lost lives. "No one else cared about anything — all the criticism was focused on why the lives lost, nobody wants to lose anybody… that's very clear, and if you listened to the news at that time, it makes it sound as if we didn't care. WE DID CARE," he said.

(Togiola is referring to the community's outrage that the siren system was not in place at the time of the 2009 disaster, despite the many years the Homeland Security office, which was under the governor's office at the time, had to plan and implement the system.)

1 Feagaimaalii-Luamanu. Joyetter. (2012). Samoa News - 9-29-2012. Retrived September 30, 2014 from http://www.samoanews.com/node/9927

The governor said works have been in place since the disaster and resulted in a great day such as this. He quoted a message by Rev. Dr. Talamoni that knowing is only half the battle, the other half God will help us.

However, he noted that while he was walking the villages in Manu'a during his campaign for office, High Talking Chief Malaepule from Manu'a told him, "God's blessings don't come for free, you must work for it."

The other half of the work is maintaining the systems so they are always ready. Togiola urged everyone to continue to be aware and prepared and to continue with the drills in the school, villages.

He added that we must never be a complacent community. "We have to keep up the vigilance. We can go from a tsunami ready community today and tsunami disasters tomorrow, very easily, don't let up the effort."

The governor acknowledged DHSS Director Mike Sala, Deputy Director Jacinta Brown and the DHSS employees.

He made special recognition of Brown noting that she been their brains and muscles throughout this project. Another person he acknowledged was Vinnie Atofau Jr. "These two are such hardworking smart individuals."

Togiola also received recognition — a commendation letter and Tsunami Ready street signs presented to him by Pacific Regional Director NOAA/National Weather Service Jeff Ladouce.

Ladouce told the governor that he should be proud of this accomplishment, noting that he's extremely pleased to be present to recognize the dedicated efforts of everyone, involved in achieving Tsunami Ready status. "Your demonstrated commitment to disaster preparation and to personnel safety is huge."

The regional director recognized, the US Army Corps of Engineers, DHSS, FEMA, US Geological Survey, the National Park, and the local weather office. He said that on February 2009 and later in July of that year they conducted training and outreach program that has been credited for saving thousands of lives just a couple of months later.

FEMA Region IX Administrator, Nancy Ward also gave remarks during the ceremony, noting that "while the pain of that day will be slow in receding for our fellow Americans who call Samoa home, the last 36 months have also brought some bittersweet progress that is as important to note as our collective losses."

She said that FEMA is proud to have provided funding and technical expertise.

“We are even prouder to be only one asset in the broad array of “Whole Community” organizations that have helped to reduce the tyranny of distance in American Samoa.

“So, on the third anniversary of a terrible chapter in American Samoa’s history, let us share some pride along with our prayers knowing that we have truly honored the lost by making future generations safer,” said Ward.

APPENDIX N: 2003 Flood Mitigation Plan Recommendations

2003 Flood Mitigation Plan Recommendations

These are included for future references and were taken from the 2003 Flood Mitigation Plan.

Flood Mitigation Activities: Short-Term Recommendations

Short-term flood mitigation activities identified in the American Samoa Flood Mitigation Plan include general mitigation activities able to be implemented during in the first two years, given current resources and authorities.

1. Develop a sustained flood education and outreach program for American Samoa through the following actions:
   - Provide additional flood mitigation and flood insurance information, such as that developed by FEMA/NFIP, Flood Insurance Rate Maps (FIRMs), and information on flood-proofing methods to residents and businesses. For example, make information available on the Internet, at the public library, and in government offices.
   - Publicize the availability of flood information in existing local media, such as newsletters, radio, and television.
   - Develop a contact list of landowners, businesses (private architectural/engineering consultants), and local organizations that may have an interest in flood mitigation or flood response issues.
   - Participate in a flood mitigation and emergency response workshop in coordination with Department of Commerce (DOC) and Territorial Emergency Management Coordinating Office (TEMCO). Invite private sector businesses and organizations to participate.

2. Amend the Floodplain Management Regulations and Zoning Ordinances to include additional provisions:
   - Amend the Floodplain management regulations and zoning ordinances to better account for floodplain management.
   - Update Flood Insurance Rate Maps. The American Samoa Government can coordinate with FEMA and the U.S. Army Corps of Engineers to develop new FIRMs for the Territory.
   - Increase the base elevation requirement for new construction in the 100-year floodplain to at least one-foot above base flood elevation. An increased elevation standard is one activity to receive credit from the NFIP Community Ratings System Program.
   - Develop a digital Territory Hazards Map, overlaying building and land development with flood hazard overlay zones, delineated wetland areas, and special conservation areas. Flood and general grade elevation data should be shown on the map. Maps can then be made available as part of the site plan for the land use permit application.
   - Hire a Floodplain Administrator to oversee Floodplain Management Regulations.
   - Develop Storm Water Management Plan. Structural and non-structural techniques should be encouraged in public and private development projects.
   - Require storm water management practices for new proposed land development through the PNRS.
   - Enforce accepted storm water management practices in land use application reviews.

- Develop policies and regulations for better land use planning and subdivision in development of communal and privately owned land.
- Work with villages and individual owners to preserve undeveloped open space, wetlands, and lowland rain forests.
- Investigate incorporation of specific floodways within certain 100-year flood plain areas. Develop an interior drainage master plan of streams and their tributaries to identify stream flow paths, drainage improvements, and stream bank stabilization measures to provide drainage easements.
- Increase setback distances to floodways and streams in flood-prone areas to provide an additional buffer for preventing residential encroachment.
- Generate a rainfall intensity curve for American Samoa, to be used in storm water calculations necessary for drainage design of proposed land development projects.

3. Identify, prioritize, and mitigate properties at risk to flooding through the following actions:
   - Develop a list of improved structures within the Territory's floodplains using hazard assessment methods and other available data sources.
   - Develop criteria to prioritize the mitigation needs of improved structures in the floodplain. Possible criteria include:
     - Location in 100-year zone
     - Existence of elevation certificates
     - Available flood damage records
     - Historical flood levels and damages
   - Identify the mitigation activities appropriate for properties that are highest on the list of improved structures in the floodplain. Mitigation activities could include:
     - Elevation of structure
     - Acquisition/relocation
   - Improved flood insurance coverage
   - Identify and pursue funding for resource intensive mitigation activities (e.g., flood proofing, elevation, acquisition). Possible funding sources include the Flood Mitigation Assistance Program and Community Development Block Grants.
   - Implement mitigation activities for prioritized locations.

4. Advocate limiting the impact of new road networks on the Territory's floodplain. Coordinate with the Department of Public Works to identify flood mitigation needs that can be coordinated with future road improvements.

Flood Mitigation Activities: Long-Term Recommendations

Long-term flood mitigation activities recommended in the American Samoa Flood Mitigation Plan include activities likely to take more than two years to implement and that may require new or additional resources.

1. Reduce federal flood insurance premiums by pursuing a National Flood Insurance Program (NFIP) Community Ratings System (CRS) rating through the following recommended actions:
    - American Samoa Government staff should attend a CRS training workshop to learn the CRS administrative procedures. A weeklong CRS course for local officials is offered free at FEMA's Emergency Management Institute. Identify activities that Samoan government officials must take in order to obtain credits with the CRS. The four categories of activities are:
        - Public information
        - Mapping and regulations
        - Flood damage reduction
        - Flood preparedness

2. Link floodplain hazards to the Parks Master Plan, Wetlands Management Plan, and the Tualauta County Master Plan. Identify valuable wetlands and undeveloped parcels in the floodplain for possible acquisition as open space or conservation areas.