

G.9 United States Fish and Wildlife Service

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May 31, 2012

Mr. Loyal Mehrhoff  
U.S. Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
300 Ala Moana Blvd., Room 3-122  
Box 50088  
Honolulu, HI 96850

Subject: Guam Department of Public Works, Proposed Ajayan Bridge Replacement  
Project Project No. GQ-ER-0004(114)/GU-NH-0004(114)  
Request for Species List

Director Mr. Loyal Mehrhoff:

The U.S. Department of Transportation - Federal Highways Administration (FHWA), in coordination with the Guam Department of Public Works (DPW) proposes to replace the existing Ajayan River Bridge located on Route 4, on the boundary between Merizo and Inarajan. AECOM is consulting your agency on the behalf of the DPW and FHWA. A Categorical Exclusion document for compliance with the National Environmental Policy Act (NEPA) will be prepared for the project.

#### **Ajayan Bridge Existing Condition**

The Ajayan River Bridge is located on Route 4 on the boundary between Merizo and Inarajan, as shown in Figure 1-1.

The existing single span cast-in-place concrete box girder bridge was constructed in 1968 with a span of approximately 76.2 feet and a skew of 40 degrees. Abutments are founded on concrete piles and the deck has an asphalt concrete wearing surface. The most recent bridge inspection report, dated May 27, 2004, noted that the substructure and channel are rated in serious condition with cracking and differential movement noted for substructure units and significant scour at abutments, as shown in the enclosed Photo Log. The channel alignment and waterway opening are also noted as deficient.

#### **Proposed Action**

The proposed action would replace the existing two-lane bridge across the Ajayan River just upstream of the river mouth as it enters the ocean. Bridge abutment slopes would be protected from erosion by placement of stone rip rap. There would be minimal roadway approach work. Proposed improvements include two 12-foot lanes with 8-foot paved shoulders. Roadway alignment and grade would match existing at points of tie-in. Roadway work within project limits would include removal of the existing pavement and design of full-depth pavement replacement and replacement of guardrail. The proposed action would include geotechnical sampling, testing, and analysis. As shown in Figure 1-2, soil borings for bridge foundations would be taken at two locations, one at each proposed substructure unit, to a depth of at least 100 feet or at least 10 feet into competent bedrock, whichever is shallower. Additionally, two shallow borings to a depth of 15 feet would be taken within the roadway approach area. All work would be conducted within existing right-of-way.

To assist FHWA and DPW with report documentation, compliance with the Endangered Species Act, NEPA, and other relevant laws and regulations, we respectfully request a listing of threatened and endangered species, Federal candidate species, and/or plants and animals of special concern that are known to occur or have the potential to occur within the proposed project area.

We appreciate your efforts in assisting us with the development of this project. If you require additional information, please feel free to contact me at 808.356.5394 (office direct), 808.223.9213 (cell), or via email at [Jennifer.Scheffel@aecom.com](mailto:Jennifer.Scheffel@aecom.com).

Thank you for your attention to this project notification and any comments you may have.

Sincerely,



Jennifer M. Scheffel  
Environmental Planner

Enclosures: Figure 1-1: Site Location Map  
Figure 1-2: Geotechnical Soil Boring Locations  
Photo Log

cc: Joanne M. S. Brown, DPW (via email)  
Ramon Padua, DPW (via email)  
Joaquin Blaz, DPW (via email)  
Paul Wolf, Parsons Brinckerhoff (via email)  
Nora Camacho, Parsons Brinckerhoff (via email)  
James Mischler, Parsons Brinckerhoff (via email)  
Jennifer Scheffel, AECOM (via email)  
Edgar Hipolito, AECOM (via email)  
Nemencio Macario, N.C. Macario & Associates, Inc. (via email)  
Richelle Takara, FHWA (via email)

## Scheffel, Jennifer

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**From:** Paula\_Levin@fws.gov  
**Sent:** Tuesday, June 12, 2012 2:58 PM  
**To:** Rachel\_Rounds@fws.gov  
**Cc:** Scheffel, Jennifer  
**Subject:** Re: Species List for Ajayan Bridge, Guam (2012-SL-0282)  
**Attachments:** FWS BMPs.docx

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Thank you for forwarding Rachel: I do not have a document to review and respond to but under normal circumstances I would recommend standard best management practices to prevent impacts to aquatic habitat from construction (attached). It is likely that the project will undergo review by the U.S. Army Corps of Engineers for a permit for work in navigable waters of the U.S., at which time the Corps would notify us and request review. However, considering this early planning stage, I can only guess that the Corps may determine that this project qualifies for a nationwide permit. If so, these standard BMP's, among other conditions, would be part of the conditions of the permit, and enforceable. Otherwise, even if the project was substantial enough to warrant individual permit review, we would probably offer the same recommendations, based on the presumption that the project involves only a replacement or repair of an existing structure, without additional development or impacts to aquatic habitat. Upon further review, the Service (Section 7 staff) might also add some conditions to avoid impacts to nesting sea turtles or seabirds. Thank you for coordinating.

Paula Levin  
USFWS Pacific Islands  
Coastal Conservation  
(808)792-9417

Rachel Rounds/R1/FWS/DOI

06/12/2012 01:46 PM

To Jennifer.Scheffel@aecom.com  
cc Paula Levin/R1/FWS/DOI@FWS  
Subject Species List for Ajayan Bridge, Guam (2012-SL-0282)

Hi Jennifer,

I received your species list request for the proposed Ajayan Bridge Replacement on Guam. I have reviewed the documentation provided in your May 31, 2012, letter. I have no further comments below what I wrote in the email forwarded below. I recommend that Mariana moorhen surveys be conducted and that it be determined if sea turtle nesting beaches are located nearby. I have also cc'd Paula Levin on this email. She works for our USFWS office on impacts to other resources (such as aquatic habitat) not covered by the Endangered Species Act. She may have additional comments or concerns.

Thanks,

Rachel

Rachel Rounds  
Fish and Wildlife Biologist  
Consultation and HCP Program  
US Fish and Wildlife Service  
Pacific Islands Field Office  
300 Ala Moana Boulevard, Room 3-122

Honolulu, HI 96850  
(808) 792-9454

----- Forwarded by Rachel Rounds/R1/FWS/DOI on 06/12/2012 01:33 PM -----

**Rachel Rounds/R1/FWS/DOI**

05/03/2012 02:53 PM

To "Harnsberger, David" <David.Harnsberger@aecom.com>

cc "Scheffel, Jennifer" <Jennifer.Scheffel@aecom.com>, Jodi Charrier/R1/FWS/DOI@FWS

Subject RE: Fw: Recovery Habitat GIS Data [Link](#)

Hi David,

I have reviewed the attachments you sent with your email to Fred. I assume that this project is funded by the FHWA? You are correct that there is Guam rail recovery habitat near the Ajayan River. However, because the Guam rail is extinct in the wild, we do not consult on loss of Guam rail recovery habitat on this scale (I am assuming that the amount of habitat that might be cleared would be relatively small). We would however recommend that the amount of habitat cleared be minimized to the maximum extent possible.

The two species that would need to be considered in a consultation for a bridge replacement project on Guam are the Mariana moorhen and green sea turtle. In-water effects to the turtle would be addressed by NOAA, but any affects to nesting beaches would be addressed by FWS. Mariana moorhen could be using the river and wetlands along the Ajayan River so surveys may be necessary.

Please let me know if you have any further questions.

Rachel

Rachel Rounds  
Fish and Wildlife Biologist  
Consultation and HCP Program  
US Fish and Wildlife Service  
Pacific Islands Field Office  
300 Ala Moana Boulevard, Room 3-122  
Honolulu, HI 96850  
(808) 792-9454

**Fred Amidon/PIE/R1/FWS/DOI**

05/03/2012 11:07 AM

To "Harnsberger, David" <David.Harnsberger@aecom.com>

cc "Scheffel, Jennifer" <Jennifer.Scheffel@aecom.com>, Jodi Charrier/R1/FWS/DOI@FWS, Rachel Rounds/R1/FWS/DOI@FWS

Subject RE: Fw: Recovery Habitat GIS Data [Link](#)

Hi David,

This is a question for our Section 7 program. I've ccd both Jodi Charrier and Rachel Rounds on this email as they both work on projects in Guam for this office. They should be able to answer your question regarding other species that may occur at the project site.

Thanks,

Fred

"Harnsberger, David" <David.Harnsberger@aecom.com>

05/02/2012 10:56 AM

To "Fred\_Amidon@fws.gov" <Fred\_Amidon@fws.gov>  
cc "Scheffel, Jennifer" <Jennifer.Scheffel@aecom.com>  
Subject RE: Fw: Recovery Habitat GIS Data

Hello Fred,

Thanks for your prompt and clear response to Susan's e-mail below. I have referenced your e-mail in the EA we are working on for that project, so you're now well on your way to true fame ;-D

I'm now underway with a set of figures for a Bridge Replacement Project at the mouth of the Ajayan River at the Southern tip of Guam. When I drop the Critical Habitat and Recovery Habitat shapefiles I have for the project we discussed below into the attached Site Location Map, the only "Rare, Threatened & Endangered Species" data that shows up is the Guam Rail Recovery Habitat Area shown in the 2<sup>nd</sup> attached file. Could you help me confirm that Guam Rail is the only rare, threatened & Endangered plant/animal we will need to be careful of/think about for this bridge replacement project at the mouth of the Ajayan River?

Thanks!

Dave

**From:** Fred\_Amidon@fws.gov [mailto:Fred\_Amidon@fws.gov]

**Sent:** Wednesday, December 14, 2011 3:08 PM

**To:** Harnsberger, David

**Cc:** Susan\_Machida@fws.gov

**Subject:** Re: Fw: Recovery Habitat GIS Data

David,

Based on the maps you sent it looks like you are using the latest recovery habitat maps. If you have any additional questions regarding the files let me know.

Fred Amidon  
Fish and Wildlife Biologist  
Pacific Islands Fish and Wildlife Office

**Susan Machida/PIE/R1/FWS/DOI**

12/09/2011 07:34 AM

To Fred Amidon/PIE/R1/FWS/DOI@FWS  
cc  
Subject Fw: Recovery Habitat GIS Data

Hi Fred,

I got a call from a consultant yesterday. He has some GIS files, received previously from Holly Herod, which he wants to use in another EA he's working on. He wants FWS to verify that these areas are still the current recovery habitat areas for the various species (listed below). Can you verify? I think it would be better that he reference a biologist, rather than GIS,

since he's verifying content.

Thanks. Let me know if you have any questions.

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Susan Machida  
U.S. Fish & Wildlife Service  
300 Ala Moana Boulevard, Room 3-122  
Honolulu, HI 96813  
Tel: 808.792.9400

----- Forwarded by Susan Machida/PIE/R1/FWS/DOI on 12/09/2011 07:31 AM -----

"Harnsberger, David" <[David.Harnsberger@aecom.com](mailto:David.Harnsberger@aecom.com)>

12/08/2011 02:56 PM

To "[susan\\_machida@fws.gov](mailto:susan_machida@fws.gov)" <[susan\\_machida@fws.gov](mailto:susan_machida@fws.gov)>  
cc "Koehler, Tobias" <[Tobias.Koehler@aecom.com](mailto:Tobias.Koehler@aecom.com)>  
Subject Recovery Habitat GIS Data

Good afternoon Ms. Machida,

Thanks for taking the time to speak with me this afternoon. Please find attached the figures I have drafted for the current Env. Assessment (EA) we have underway at the northern end of Andersen Air Force Base. The Recovery Habitat areas shown in these figures are wrought from data that the sub AECOM hired to do the Build-up figures received from the FWS:

USFWS. 2010. GIS data for Mariana Crow, Guam Rail, Guam Micronesian Kingfisher, and Serianthes Recovery Habitat. Personal communication from H. Herod, Section 7 Biologist, Pacific Islands Office, Honolulu, HI to C. Cobb, Sr. Natural Resources Specialist, NAVFAC Pacific, Honolulu, HI. January.

I used the data received for the Build-up EIS to draft the attached figures. If you could verify the areas shown are current, I think I could phrase the reference for our EA like this:

USFWS. 2010. GIS data for Recovery Habitat of the Mariana Crow, Micronesian Kingfisher, Guam Rail, and Firetree. Personal communication from S. Machida, <<your title>>, Pacific Islands Office, Honolulu, HI to David F. Harnsberger, Geologist, AECOM, Honolulu, HI. ## December.

Does this seem right to you?

Thanks!

Dave

-----  
David F. Harnsberger  
Scientist Level I  
Environment, West Region, Pacific District  
(808) 356-5338 (Direct)  
(808) 292-6494 (Cell)  
[david.harnsberger@aecom.com](mailto:david.harnsberger@aecom.com)

**AECOM**



1001 Bishop Street, Suite 1600  
Honolulu, HI 96813  
T 808.523.8874 F 808.523.8950  
[www.aecom.com](http://www.aecom.com)

[attachment "Figure 3-3. Recovery Habitat\_crow\_forSM.jpg" deleted by Fred Amidon/PIE/R1/FWS/DOI] [attachment "Figure 3-4. RecoveryHab\_Rail&Firetree\_forSM.jpg" deleted by Fred Amidon/PIE/R1/FWS/DOI] [attachment "K. Rare, Threatened & Endangered Species\_compressed.pdf" deleted by Rachel Rounds/R1/FWS/DOI] [attachment "Figure 1 - Site Location Map.pdf" deleted by Rachel Rounds/R1/FWS/DOI]



AECOM  
1001 Bishop Street, Suite 1600  
Honolulu, Hawaii 96813-3698  
www.aecom.com

808 523 8874 tel  
808 523 8950 fax

November 13, 2012

Ms. Rachel Rounds  
Fish and Wildlife Biologist  
U.S. Fish and Wildlife Service  
Pacific Islands Field Office  
300 Ala Moana Blvd., Room 3-122  
Box 50088  
Honolulu, HI 96850

Subject: Ajayan Bridge Replacement Project Proposed Construction Description  
FHWA Project No. GQ-ER-0004(114)/GU-NH-0004(114)  
USFWS Project No. 2012-SL-0282

Dear Ms. Rounds,

This letter is to follow-up with you on the proposed subject line project. Our intent is to clarify the project location and give a more thorough description of the demolition and construction work being proposed in the Ajayan Bridge Replacement Project.

### **Background**

In June 2012, AECOM sent a letter to USFWS, National Marine Fisheries Service (NMFS), and Guam Department of Agriculture (DAWR), describing the proposed bridge replacement project and requesting a list of threatened and endangered species that are known to occur or have the potential to occur within the proposed project area (Attachment 1). We received an email response from your office (see Attachment 2) that made a recommendation to conduct a survey for Mariana moorhen and green sea turtle nesting beaches. In addition to the project location and description, we have included an overview of the Best Management Practices (BMPs) that will be implemented during demolition and construction.

### **Project Specifics**

The existing bridge will be demolished by cutting it into sections that will be removed by a crane. The existing bridge abutments will be demolished and the existing piles will be cut down to the river bed. The embankment soil between the old abutment and the new abutment will be removed (Figure 2, Bridge Profile). The bridge will be partially demolished to allow two-way, one land traffic while the first half of the new bridge is being constructed. After phase 1 is complete, it will be shifted to the other side to construct the other half of the bridge. Best

Management Practice (BMP) will include catchment platforms and protective netting, silt screen fences, and a turbidity curtain.

All work will be completed within the existing right-of-way (ROW). The proposed new 40-foot wide by 105-foot long bridge will replace the existing box beam type bridge. A new bridge foundation will be constructed inland, or behind the existing abutment to minimize disturbance to the river channel. Twenty-four new piles will be driven to support the new abutment. The soil between to old abutment and new abutment will be excavated and grouted riprap will be placed on a gradual slope from the new abutment to the remaining old pilings. Each side of the bridge will have a concrete barrier poured integrally with the bridge deck. A standard road barrier and railing on either side of the bridge will tie in to the concrete barrier. All other utilities will be considered as part of the load to be carried by the bridge and supported by the bridge hangers. All construction will take place within the existing right-of-way and, with the exception of the temporary turbidity curtain, no construction will take place in the river channel.

### **Recommendation**

We appreciate the comments sent via email in May. If the Mariana moorhen and green sea turtle are still the outstanding concerns for that location, we will continue consultation as such. If the above information changes your recommendation, we appreciate hearing from you. Please contact Julia Staley at [julia.staley@aecom.com](mailto:julia.staley@aecom.com) or at 808-269-2949.

Sincerely,

Julia Staley  
Environmental Planner

Enclosures: Consultation letter AECOM to USFWS  
Consultation response USFWS to AECOM  
Project Location Map  
Bridge Profile Plan

c: Nora Camacho, PB (via email)  
James Mischler, PB (via email)



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

**Hawaii Federal-Aid Division**

July 31, 2014

300 Ala Moana Blvd, Rm 3-306  
Box 50206  
Honolulu, Hawaii 96850  
Phone: (808) 541-2700  
Fax: (808) 541-2704

In Reply Refer To:  
HDA-HI

**Mr. Loyal Mehrhoff**  
**U.S. Fish and Wildlife Service**  
**Pacific Islands Field Office**  
**300 Ala Moana Blvd., Room 3-122**  
**Box 50088**  
**Honolulu, HI 96850**

**Subject: Route 4 Ajayan Bridge Replacement**  
**FHWA Project No. GQ-ER-0004(114)**  
**Section 7 Endangered Species Act**

Dear Mr. Mehrhoff:

The U.S. Department of Transportation Federal Highways Administration (FHWA), in close coordination with the Guam Department of Public Works (DPW) requests initiation of informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA) and concurrence with a determination of effect for the proposed replacement of the existing Ajayan River Bridge located on Route 4, on the boundary between Merizo and Inarajan(Project No. GQ-ER-0004(114)).

**Ajayan Bridge Existing Condition**

The Ajayan Bridge is located on Route 4 on the boundary between Merizo and Inarajan. The bridge provides two lanes that cross the Ajayan River just upstream of the river mouth as it enters the ocean (Enclosure 1 – Project Location Map).

The existing single-span cast-in-place concrete box girder bridge was constructed in 1968, with a span length of approximately 76.2 feet and a skew of 40 degrees. Abutments are founded on concrete piles; the deck has an asphalt concrete wearing surface. The most recent bridge inspection report, dated May 27, 2004, noted that the substructure and channel are rated in serious condition. The damage noted includes cracking and differential movement of substructure units and significant scour at abutments (Enclosure 2 – Photo Log).

**Project Description**

The existing bridge will be demolished and replaced with a new 40 foot wide by 105 foot long bridge. The proposed improvements include two 12 foot wide lanes and two 8 foot wide paved shoulders. Roadway alignment and grade will match the existing at the point of tie-in.

To accommodate traffic while the new bridge is being constructed, the bridge will be demolished in two phases, demolishing one side (longitudinally) of the bridge at a time. This will allow two-way traffic (one lane, controlled by traffic lights) to use the bridge during demolition and construction.

The project will entail the demolition and removal of the existing bridge structure and existing pile caps. The existing piles below the waterline will be cut and capped at the mudline, but left in-place. This will provide for minimal disturbance of the aquatic ecosystem. Roadway work within the project limits will include removal of the existing pavement, full-depth pavement replacement, and replacement of the guardrails. The proposed action will also include geotechnical sampling, testing, and analysis. As shown in Enclosure 3 – Proposed Geotechnical Soil Boring Locations, soil borings for bridge foundations will be taken at two locations, one at each proposed substructure unit, to a depth of at least 100 feet or at least 10 feet into competent bedrock, whichever is shallower. Additionally, two shallow borings to a depth of 15 feet will be taken within the roadway approach area.

## **Demolition and Construction Methods**

### Demolition

Bridge demolition will include removal of the existing bridge deck, box beam, abutments, wing walls, guardrails, and parapet. The existing bridge is approximately 29.6 feet wide and will be demolished in two phases to allow for one lane to remain open for traffic. Phase 1 will include saw-cutting the westbound portion of the existing bridge and removing it by crane. Phase 2 will include the same actions to the eastbound portion of the existing bridge. Before demolition and removal, a temporary concrete barrier will be installed on the existing bridge, and existing utilities will be temporarily relocated to the opposite portion of the bridge during each phase.

Demolition of the existing abutment walls will be accomplished by use of jackhammers and/or hoe rams, and removed via mechanical equipment such as a backhoe. The existing bridge abutments will be demolished and the existing piles will be cut down to the river bed. The soil between the old abutment and new abutment will be excavated, and 48-inch-thick grouted riprap will be placed on a gradual slope from the new abutment to the remaining old pilings, as shown in Enclosure 4 – Bridge Profile. A combined total of approximately 540 cubic yards of soil and concrete abutment wall material will be excavated from below the mean high water (MHW) line of the Ajayan River. The combined total linear disturbance to the stream channel from the excavation of the soil and concrete abutment wall material will be approximately 407 linear feet.

### Construction

Construction of the new bridge will also be performed in two phases so that two-way signal-controlled traffic can be maintained in one lane during construction. Phase 1 will include demolition of the existing westbound portion of the bridge and construction of the new westbound portion of the bridge. During Phase 1, utilities and two-way signal-controlled traffic will be temporarily relocated to the eastbound portion of the existing bridge. Phase 2 will include demolition of the existing eastbound portion of the bridge and construction of the new eastbound portion of the bridge. During Phase 2, utilities will be permanently installed in the westbound portion of the new bridge, and two-way signal-controlled traffic will be temporarily relocated to the westbound portion of the new bridge. Work areas for Phase 1 and Phase 2 are shown in Enclosure 5 – Traffic Control Plans.

A new bridge foundation will be constructed inland, or behind, the existing abutment to minimize disturbance to the river channel. The proposed abutments will be set back from the existing abutments. The soil and grouted riprap between the remaining existing piles and the new abutment will be sloped back at a 3H:1V ratio. The two new abutments will be constructed at the top of the slope and supported by twelve piles (per abutment), for a combined total of twenty-four new octagonal 16.5-inch-diameter concrete piles (100 tons per pile). The new abutments and abutment piles will be constructed above the MHW line.

Approximately 947 cubic yards of grouted stone riprap will be placed along the abutment walls, below the MHW line, to protect the abutment from erosion caused by waves. The riprap (fill material) will be placed along approximately 401 linear feet of stream channel. The riprap will be placed within the excavation footprint and will not impact additional areas of the stream channel.

#### Best Management Practices

Best management practices (BMPs) will include catchment platforms and protective netting, silt screen fences, and turbidity curtains. Catchment platforms and protective netting will be installed under the bridge to keep debris from falling into the water. Silt screen fences will be placed at the slope toe around the river edges to prevent erosion and rubbish from going into the water. Turbidity curtains will be installed at both river banks surrounding the work areas to prevent the spread of silt and sediment into the river and bay (Enclosure 6 – BMP Drawings).

#### **Natural Environments**

The proposed project is located within the southern end of Guam, which is characterized by hilly volcanic slopes descending from approximately 800 feet in elevation to sea level over distances of less than 2.5 miles. The project site is situated between the Inarajan and Manell watersheds. The Ajayan Bridge is situated on the southern end of the Ajayan River, adjacent to the Ajayan Bay discharge point. Flora and fauna surveys of the proposed project area were conducted by SWCA Environmental Consultants (SWCA) on November 6 and 7, 2013. During these surveys, emphasis was placed on identifying special-status species. The following paragraphs describe the existing terrestrial and aquatic environments that occur within the proposed project area as reported by SWCA and Guam Department of Agriculture, Division of Aquatic and Wildlife Resources (DAWR).

#### Terrestrial Ecology

Forest surrounding the project area consists mostly of secondary thicket/scrub forest with some ravine forest. Areas of forested palustrine wetlands are located along the east and west banks of the Ajayan River. Several typhoons that occurred between the 1970s and 1990s changed the vegetation in the area dramatically. Site visits conducted by Guam DAWR staff in February and March 2013 found that pago (*Hibiscus tiliaceus*) and tangantangan (*Leucaena leucocephala*) were the two common species in the project area.

During flora surveys performed by SWCA on November 6 and 7, 2013, a total of 19 plants were identified to either genera or species. The seven native plants documented consisted of five trees (pago, *Pandanus tectorius*, *Bougainvillea glabra*, *Callicarpa candicans*, and *Morinda citrifolia*), one fern (*Polypodium scolopendria*), and one grass (*Saccharum spontaneum*). The non-native plants documented were puguá (*Areca catechu*), coconut trees (*Cocos nucifera*), beggar's tick (*Bidens alba*), Siam weed (*Chromolaena odorata*), mile-a-minute vine (*Mikania scanden*), daok (*Calophyllum inophyllum*), papaya (*Carica papaya*), tangantangan, kamachile (*Pithecellobium dulce*), and *Musa* sp.

#### Shoreline Ecology

The project area is located at the mouth of the Ajayan River as it discharges into Achang Reef Flat. The shoreline vegetation is composed primarily of coconut trees, pago, and tangantangan.

Although not located within the boundaries of the project area, a small Nypa palm (*Nypa fruticans*) (also referred to as "Nipa") community was identified approximately 10 meters upstream of the Ajayan River. This species is a wetland obligate and grows in brackish marshes.

### Aquatic Ecology

The Ajayan River flows south and discharges at the Ajayan Bay. The Ajayan Bay includes the eastern portion of the Achang Reef Flat Marine Preserve (Enclosure 7 – Achang Reef Flat Marine Preserve). The Ajayan River channel cuts completely through the reef flat at Ajayan Bay. The reef flat consists of inner and outer reef flats that are exposed at low tide. Mangroves and sea grass beds are present in the vicinity of the project site.

According to the University of Guam Marine Laboratory's Guam Coastal Atlas ([www.guammarinelab.com/coastal.atlas/hm/Maps.htm](http://www.guammarinelab.com/coastal.atlas/hm/Maps.htm)), the benthic habitat of the river channel is composed of "sand, uncolonized 90% to 100%", extending from inland waters to 500 meters offshore. The benthic habitat to the east of the channel is composed of "spur and groove, coral 10% to <50%" near the shore, and "pavement, turf 50% to <90%" after approximately 100 meters offshore. The benthic habitat to the west of the channel is composed of "spur and groove, coral 50% to <90%" near the shore, and "pavement, coral 10% to <50%" after approximately 50 meters offshore.

The Achang Reef Flat supports primarily hard corals. Only two soft coral species have been identified by the University of Guam Marine Lab during monitoring of the site.

Achang Reef Flat is classified as M-1, Excellent. Waters in this category are suitable for whole-body contact and recreation. These waters are also needed for research and to ensure the preservation and protection of marine life, including coral, reef-dwelling organisms, fish, and related resources, and aesthetic enjoyment. The surface waters of the Ajayan River are classified as S-3, Low. Waters in this category are used primarily for commercial, agriculture, or industrial activity. Aesthetic enjoyment and recreational body contact are limited. Maintenance of aquatic life is also limited.

### **Agency Coordination**

In May 2012, AECOM sent a letter to USFWS describing the proposed bridge replacement project and requesting a list of threatened and endangered species that are known to occur or have the potential to occur within the proposed project area. AECOM received an email response from your office that recommended (1) surveys for Mariana moorhen be conducted, (2) a determination of sea turtle nesting beaches in the region of influence be made, and (3) best management practices to be implemented (Enclosure 8 – June 2012 Response from USFWS). In November 2012, AECOM sent a second letter to USFWS to clarify the project location and provide a more detailed description of proposed demolition and construction activities for the Ajayan Bridge Replacement Project.

Letters describing proposed project activities and requesting lists of special-status species were also sent to National Marine Fisheries Service (NMFS) and DAWR. FHWA is also sending requests to NMFS for concurrence on ESA and special-status species effect determinations. An Essential Fish Habitat consultation request will also be submitted to NMFS. A description of proposed project activities has been provided to the U.S. Army Corps of Engineers (ACOE). A formal request for a Clean Water Act Section 404 Permit and a Rivers and Harbors Act Section 10 Permit will be submitted to the ACOE.

In addition to the federally listed species identified by USFWS as potentially occurring within the proposed project area, DAWR recommended that a survey be conducted and impacts assessed for the locally endangered and federally threatened Mariana fruit bat and the locally endangered and federal candidate species for listing Pacific tree snail.

As requested by the various agencies, flora and fauna surveys were completed for this project. SWCA performed the flora and fauna survey and their report is included as Enclosure 9 – Flora and Fauna Surveys for the Ajayan Bridge Replacement Project.

## **Federally Threatened and Endangered Species**

Based on background research and the information provided by NMFS, USFWS, and the DAWR, the only federally threatened and endangered species, under USFWS jurisdiction, that may occur within the proposed project area are the federally endangered Mariana common moorhen (*Gallinula choropus guami*), the federally threatened Mariana fruit bat (*Pteropus m. mariannus*), the federal candidate species for listing Pacific tree snail (*Partula radiolata*) and nesting beaches of the federally threatened green sea turtle (*Chelonia mydas*) and the federally endangered hawksbill sea turtle (*Eretmochelys imbricate*).

### Mariana Common Moorhen – Federally Endangered

The federally endangered Mariana common moorhen is a slate-black bird about 14-inches in length. Distinguishing physical characteristics include a red bill and frontal shield, white under tail coverts, a white line along the flank, and long olive green legs.

The Mariana common moorhen are found in natural and man-made wetland areas of Guam, Saipan, Tinian, and Pagan of the Mariana Islands. Only these islands in the Mariana Archipelago have permanent freshwater wetlands capable of supporting the moorhen. The Mariana moorhen inhabits emergent vegetation of freshwater marshes, ponds and placid rivers. The key characteristics of moorhen habitat are the combination of robust emergent vegetation cover and open water areas.

The Mariana common moorhen nests throughout the year and typically lays eggs concealed in emergent vegetation near open water. Moorhens feed on both plant and animal matter in or near water. Grasses, adult insects, and insect larvae have been reported in moorhen stomachs<sup>1</sup>.

### Mariana Fruit Bat – Federally Threatened

The locally endangered and federally threatened Mariana fruit bat is a medium-sized bat weighing 0.66 to 1.15 pounds, with a forearm length ranging from 5.3 to 6.1 inches. The abdomen is colored black to brown, with interspersed gray hair. The shoulders and sides of the neck are usually bright golden brown, but may be paler in some individuals. The head is brown with rounded ears and large eyes.

The Mariana fruit bat is a subspecies endemic to the Mariana archipelago. It is a highly colonial species forming large dense roosts in multiple adjacent trees. There is small percentage of non-colonial solitary roosting individuals. Mating and nursing young have been observed year-round on Guam with no consistent annual peak in births.

The bats' diet is comprised of fruits, nectar, pollen and some leaves. Due to the rapid digestion and metabolism of such foods, the bats are reliant on forest habitat with diverse food sources that are available throughout the year. The Mariana fruit bat forage and roost primarily in native forest. Occasionally foraging in agricultural forests composed primarily of nonnative plants. The bats inhabit several native forest types, including primary and secondary limestone forest, volcanic forest, old coconut plantations, and groves of gaga or ironwood (*Casuarina equisetifolia*). Grass lands with isolated trees are also used by the bats. Foraging sometimes occurs at farms and residential areas with flowering or fruiting trees. On Guam, large *Ficus* spp. had been the favored roosting sites. After the loss of many of these trees to typhoons, roosting shifted to *Aglaia mariannensis* (mapunao), *Macaranga thompsonii*

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<sup>1</sup> U.S. Fish and Wildlife Service. 1991. Recovery Plan for the Mariana Common Moorhen (*Gallinula choropus guami*). U.S. Fish and Wildlife Service. Portland, OR.



(pengua), *Mammea odorata* (chopak), and *Neisosperma oppositifolia* (fagot). Presently the Mariana fruit bat persists in small numbers on Guam, primarily in the northern region of the island<sup>2</sup>.

#### Pacific Tree Snail – Federal Candidate Species for Listing

The locally endangered Pacific tree snail is endemic to the island of Guam. Tree snails live in cool, shaded forest habitats with high humidity and low air movement<sup>3</sup>. The Pacific tree snail was once common along stream courses in southern Guam<sup>4</sup>.

#### Green Sea Turtle – Federally Threatened

The federally threatened green sea turtle is the largest of the cheloniidae, with adults that can exceed 3.2 feet in carapace length and 268 pounds in body mass. Characteristics that distinguish the green sea turtle from other species of sea turtle include a smooth carapace with four pairs of lateral scutes, a single pair of prefrontal scales, and a lower jaw-edge that is coarsely serrated, corresponding to strong grooved and ridges on the inner surface of the upper jaw.

The green sea turtle is a circumglobal species found in tropical seas and, to a lesser extent, in subtropical waters with temperatures above 20°C. In the Pacific United States (U.S.) and its territories, the green sea turtle is found along the coasts of Hawaii, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and unincorporated U.S. island possessions.

The green sea turtle occupies three habitat types that include open beaches, open sea, and feeding grounds in shallow, protected waters. The open beaches are used for nesting purposes where the adult female green sea turtles will emerge at night to excavate nests and deposit a clutch that may be in excess of approximately 100 eggs. The green sea turtle use the shallow water habitats to forage, feeding on selected macroalgae and sea greases. The green sea turtle spends the remaining time in the open sea where they may rest and/or are in transient to feeding grounds and/or nesting habitat<sup>5</sup>.

#### Hawksbill Sea Turtle – Federally Endangered

The federally endangered hawksbill sea turtle is recognized by their relatively small (carapace length less than 3.1 feet), narrow head with tapering “beak,” thick, overlapping shell scutes, and strongly serrated posterior margin of the carapace. In addition, hawksbills may be distinguished from the green sea turtle by the transverse division of the prefrontal scales into two pairs (these scales are elongate and undivided in the green sea turtle).

Hawksbill sea turtles are circumtropical in distribution, generally occurring from 30°N to 30°S latitude within the Atlantic, Pacific, and Indian Oceans and associated bodies of water. Along the far western and southwestern Pacific, hawksbills nest on the islands and mainland of Southeast Asia, from China and Japan, throughout the Philippines, Malaysia, and Indonesia, to Papua New Guinea, the Solomon Islands, and Australia.

The hawksbill sea turtle typically selects remote pocket beaches with little exposed sand to nest and deposit their eggs. The nest site is often within the cover of woody vegetation, although some will

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<sup>2</sup> U.S. Fish and Wildlife Service. 2009. Draft Revised Recovery Plan for the Mariana Fruit Bat or Fanihi (*Pteropus mariannus mariannus*). U.S. Fish and Wildlife Service, Portland, Oregon.

<sup>3</sup> Guam National Wildlife Refuge and U.S. Fish and Wildlife Service. 2009. Guam National Wildlife Refuge Comprehensive Conservation Plan. Guam National Wildlife Refuge, Yigo, Guam and U.S. Fish and Wildlife Service. Honolulu, Hawaii.

<sup>4</sup> Hopper, D.R. and B.D. Smith. 1992. Status of tree snails (Gastropoda: Partulidae) on Guam, with a resurvey of sites studied by H.E. Crampton in 1920. *Pacific Science* 46: 77-85.

<sup>5</sup> National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1998. Recovery Plan for U.S. Pacific Populations of the Green Turtle (*Chelonia mydas*). National Marine Fisheries Service. Silver Spring, MD.

occasionally nest in grass or open sand if preferred cover is not accessible. Hawksbills are typically found feeding on jellyfish, sea urchins, and sponges within the vicinity of rock or reef habitat in shallow tropical waters with little turbidity<sup>6</sup>.

#### Potential Suitable Foraging and Nesting Habitat for Mariana Common Moorhen

No wetlands as designated by the National Wetlands Inventory are located in the project area. However, potentially suitable wetland foraging and nesting habitat for Mariana common moorhen is present within the vicinity of the proposed project. Freshwater wetlands have been identified less than 10 meters upstream from the project site. While uncommon, Mariana common moorhens have been observed near this area. The area has been designated as habitat of low potential for this species.

#### Potential Suitable Foraging and Roosting Habitat for Mariana Fruit Bat

The Mariana fruit bat is not anticipated to use habitat at or near the proposed project site. Secondary thicket/scrub forest and trees including pago, *Pandanus tectorius*, *Bougainvillea glabra*, *Callicarpa candicans*, and *Morinda citrifolia* are present at the project site. However, this is not the preferred forest type or tree species inhabited by Mariana fruit bat. Forest habitat at the project site may not provide diverse food sources need to support Mariana fruit bats. The Mariana fruit bat is primarily found in the northern region of the island, persisting in small numbers. No Mariana fruit bats were observed during station count surveys of the project area performed on November 6 and 7, 2013, described in Flora and Fauna Surveys for the Ajayan Bridge Replacement Project report (Enclosure 9).

#### Potential Suitable Habitat for Pacific Tree Snail

Suitable habitat for Pacific tree snail is present within the vicinity of the proposed project. The Pacific tree snail was once common along stream courses in southern Guam. However, no Pacific tree snails were recorded during partulid tree snail surveys of the project area performed on November 6 and 7, 2013, described in the Flora and Fauna Surveys for the Ajayan Bridge Replacement Project report (Enclosure 9).

#### Potential Suitable Foraging and Nesting Habitat for Green and Hawksbill Sea Turtles

Suitable foraging habitat for green sea turtle and the hawksbill sea turtle is present within the vicinity of the proposed project. The Achang Reef Flat Marine Preserve provides foraging habitat for sea turtles, with food sources such as macroalgae, seagrass beds, and reef-dwelling organisms. Sea turtles have been observed foraging in Ajayan Bay.

Turtle nesting areas are not present at the project site. The *Recovery Plan for U.S. Pacific Populations of Green Turtle* (dated Jan. 12, 1998) reports that there is some low-level nesting of green sea turtle on Guam. The *Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle* (dated Jan. 12, 1998) reports that hawksbill nesting is rare on Guam. Known turtle nesting beaches on Guam include Ritidian National Wildlife Refuge, Haputo, Urnao, Tumon Bay, Cabras Island, Spanish Steps, Cocos Island, Acho Bay, Nomña Bay, Jinapsan, Tarague Beach, and the waterfront annex of Naval Base Guam<sup>7&8</sup>. The closest known turtle nesting beach to the project site is Acho Bay located approximately one mile (1.6 kilometers) northeast of the project site.

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<sup>6</sup> National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1998. Recovery Plan for U.S. Pacific Population of the Hawksbill Turtle (*Eretmochelys imbricate*). National Marine Fisheries Service. Silver Spring, MD.

<sup>7</sup> Department of Agriculture, Division of Aquatic and Wildlife Resources, Guam (DAWR). 2004. Guam Sea Turtle Recovery Annual Progress Report - March 1, 2004 through August 31, 2004. 9 pp.

<sup>8</sup> Grimm, G. and J. Farley. 2008. Sea Turtle Nesting Activity on Navy Lands, Guam, 2007 – 2008. U.S. Navy, NAVFAC Marianas Environmental, Guam. November 2008. 6 pp.

## **Mariana Common Moorhen - Determination of Effects**

Suitable wetland foraging and nesting habitat for Mariana common moorhen is present within the vicinity of the proposed project. Therefore, the Mariana common moorhen could be impacted by various components of the proposed project. The following paragraphs describe the potential effects the proposed project may have on Mariana common moorhen.

### Loss of Forging, Roosting and Nesting Habitat

Wetlands located less than 10 meters north of the project site provide potentially suitable foraging, roosting and nesting habitat for Mariana common moorhen. The proposed project will not result in the direct loss or direct impacts to wetland habitat. Wetlands will be designated as Environmentally Sensitive Areas where no construction activities, equipment, or personnel are allowed. Wetland habitat north of the project site could be degraded or temporarily impacted by various activities associated with the proposed project. Grading and excavating would be the primary activities that could contribute to the degradation or temporary impacts to wetland habitat. The release of sediment into Ajayan River could occur as the existing abutment walls are demolished and removed, soil behind the existing abutment walls is removed, and new grouted riprap is installed. The sediment release into the Ajayan River could migrate upstream (counter the primary direction of flow) to the wetlands. However, BMPs have been developed to avoid and minimize impacts to Mariana common moorhen habitat as a result of soil erosion and sedimentation of wetlands. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization Measures section of this document. **Based on this information, FHWA has determined that the loss of potential foraging habitat due to the release of sediment would be discountable and would have insignificant effects on the Mariana common moorhen.**

### Increased Exposure to Human Activity, Construction Noise and Light

During construction, there would be an increased presence of human activity, construction noise and light. The Mariana common moorhen is known to be wary and to be closely associated with cover provided by edge vegetation. Potential impacts to moorhen from the increased presence of human activity, noise and light would be behavioral disturbance including avoidance of the area and temporary abandonment of nesting, roosting and feeding sites. BMPs have been developed to avoid and/or minimize the potential impacts to Mariana common moorhen from human and construction activity. Some of the BMPs that would be implemented for the proposed project include performing daily surveys, prior to the commencement of work, to insure moorhen are not within the work zone; work stoppage upon observing moorhen within the proposed project area, allowing it to leave on its own; limiting activity beyond the work zone; avoiding night work to the extent practical; minimizing vegetation clearing; performing focused bird surveys prior to vegetation clearing; and avoidance of wetland areas. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization Measures section of this document. **Based on the information, FHWA has determined that the exposure to increased human and construction activity would be discountable and would have insignificant effects on the Mariana common moorhen.**

## **Mariana Fruit Bat - Determination of Effects**

The Mariana fruit bat is not anticipated to use habitat at or near the proposed project site. Therefore, impacts to Mariana fruit bat are not anticipated. To insure impacts do not occur, BMPs have been developed as a precautionary measure. BMPs include performing daily surveys, prior to the commencement of work, to insure Mariana fruit bat are not within the work zone; work stoppage upon observing Mariana fruit bat within the proposed project area, allowing it to leave on its own; limiting activity beyond the work zone; avoiding night work to the extent practical; minimizing vegetation clearing; and performing focused bat surveys prior to vegetation clearing. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization

Measures section of this document. **Based on this information, FHWA has determined the proposed project will have no effect on Mariana fruit bat.**

#### **Pacific Tree Snail – Determination of Effects**

Suitable habitat for Pacific tree snail is present within the vicinity of the proposed project. Vegetation clearing and grading for the proposed project could affect Pacific tree snail and tree snail habitat. However, BMPs have been developed to avoid and minimize impacts to Pacific tree snail and tree snail habitat. BMPs include performing daily surveys, prior to the commencement of work, to insure Pacific tree snail are not within the work zone; work stoppage upon observing Pacific tree snail within the proposed project area, allowing it to leave on its own; limiting activity beyond the work zone; minimizing vegetation clearing; performing focused bat surveys prior to vegetation clearing; and restoration of disturbed areas with native plant as soon as possible. **Based on this information, FHWA has determined the proposed project would have insignificant effects on Pacific tree snail.**

#### **Green Sea Turtle and Hawksbill Sea Turtle - Determination of Effects**

Foraging habitat for the green sea turtle and hawksbill sea turtle occurs within the vicinity of the proposed project. While known turtle nesting areas are not present at the project site and turtle nesting is not anticipated, there is potentially suitable nesting habitat in the vicinity of the project area. Therefore, the green sea turtle and hawksbill sea turtle could be impacted by various components of the proposed project. The following paragraphs describe the potential effects the proposed project may have on green sea turtle and the hawksbill sea turtle.

##### Direct Physical Impact

The proposed project includes the use of heavy equipment such as cranes, saws, backhoes and jackhammers to demolish the existing bridge and construct the replacement bridge. These activities have the potential to directly strike green and hawksbill sea turtles should the animals be present during the placement of riprap or if debris were to accidentally fall into the water. Potential injuries and their severity would depend on the animal's proximity to the falling material or debris, but may include cuts bruises, broken bones, cracked or crushed carapaces, and amputations, any of which could result in the animal's death.

Marine animals will likely avoid the project areas on their own due to the on-going activities. In addition, BMPs have been developed to avoid and/or minimize the potential impacts to sea turtles. Some of the BMPs that would be implemented for the proposed project include performing daily surveys, prior to the commencement of work, to insure sea turtles are not within the work zone; work stoppage upon observing a sea turtle within the proposed project area, allowing it to leave on its own; limiting activity beyond the work zone; insuring all objects that are to be placed in the river, are lowered to the bottom in a controlled manner; and use of catchment platforms and protective netting to keep debris from falling into the water. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization Measures section of this document. **Based on the information, FHWA has determined that direct physical impact to sea turtles is extremely unlikely and would be discountable.**

##### Loss of Foraging Habitat

The Achang Reef Flat Marine Preserve provides foraging habitat for the green sea turtle and the hawksbill sea turtle. This foraging habitat could be degraded or temporarily impacted by various activities associated with the proposed project. Grading and excavating would be the primary activities that could potentially contribute to the degradation or temporary loss of foraging habitat. The release of sediment into Achang Reef Flat Marine Preserve could occur as the existing abutment walls are demolished and removed, soil behind the existing abutment walls is removed, and new grouted riprap is

installed. The sediment released into the Ajayan River could migrate downstream to the Achang Reef Flat Marine Preserve where it would likely disperse and settle on the ocean floor and/or remain suspended in the ocean water. This increase in suspended sediment and sediment deposition within Achang Reef Flat Marine Preserve could damage and /or kill potential food sources for the sea turtles, such as seagrass beds and coral reef communities. Temporary increases in turbidity may also impact habitat quality for foraging sea turtles. However, BMPs have been developed to avoid and minimize impacts to sea turtle foraging habitat as a result of soil erosion, turbidity and/or sediment deposition within the Ajayan River, Ajayan Bay and Achang Reef Flat Marine Preserve. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization Measures section of this document. **Based on this information, FHWA has determined that the loss of potential foraging habitat due to the release of sediment would be discountable and would have insignificant effects on the green and hawksbill sea turtle.**

#### Exposure to Elevated Noise Levels

Several studies have shown that various anthropogenic activities can generate underwater noise levels that can be detected by a marine species within the range of the particular source. Depending on the species and underwater noise frequency, the underwater noise frequency can induce behavioral responses that are potentially damaging to that species. Construction projects adjacent to, and within the ocean is one of the many activities that can produce underwater sound to a level that it causes an adverse impact upon a marine species. Pile driving, such as that employed for this project, is often the construction activity that produces underwater noise frequencies that are potentially harmful to marine species.

Sea turtle hearing research is limited, but available information about sea turtle sensory biology suggests that they are low frequency specialists, with green sea turtles thought to be most acoustically sensitive between 200 and 700 hertz (Hz)<sup>9</sup>. Because the hearing range of green sea turtles overlaps with the expected frequency range of the pile driving signals, NMFS considers it likely that green sea turtles can hear and respond to pile driving noise. Currently, no acoustic thresholds have been established for sea turtles. However, existing research into sea turtle sensory biology suggests that sea turtles are less acoustically sensitive than cetaceans, relying more heavily on visual cues, rather than auditory input<sup>10&11</sup>. Therefore, application of the marine mammal thresholds would be conservative for sea turtles.

Underwater sound pressure levels are often measured and described in terms of the logarithmic decibel (dB) referenced to a baseline of 1 micropascal (re 1  $\mu$ Pa). To assess the potential impacts of an underwater sound on marine resources, NMFS often assesses impacts based on to root-mean-square (dB<sub>rms</sub>) of an acoustic pulse. This is the portion of the pulse that contains 90% of the sound pressure.

The current acoustic thresholds used by NMFS for marine mammal Permanent Threshold Shift due to exposure to in-water sounds are  $\geq 180$  dB and  $\geq 190$  dB for cetaceans and pinnipeds, respectively. Exposure to impulsive in-water sounds at  $\geq 160$  dB is the threshold onset of Temporary Threshold Shift

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<sup>9</sup> Ridgway, S. H., E.G. Wever, J.G. McCormick, J. Palin, and J.H. Anderson. 1969. Hearing in the Giant Sea Turtle, *Chelonia mydas*. PNAS, 64, 884-890.

<sup>10</sup> Hazel, J., I.R. Lawler, H. Marsh, and S. Robson. 2007. Vessel speed increases collision risk for the green turtle *Chelonia mydas*. Endangered Species Research 3: 105-113.

<sup>11</sup> Ridgway, S. H., E.G. Wever, J.G. McCormick, J. Palin, and J.H. Anderson. 1969. Hearing in the Giant Sea Turtle, *Chelonia mydas*. PNAS, 64, 884-890.

and behavioral disturbance for all marine mammals. NMFS considers these to be the thresholds for the onset of adverse effects due to acoustic exposures<sup>12</sup>.

An underwater noise analysis was not conducted for the proposed project. Site-specific noise measurements for pile-driving at the Ajayan River are not available. California Department of Transportation’s (CALTRANS) Compendium of Pile Driving Sound Data (Compendium)<sup>13</sup> was referenced for reporting sound levels that would closely approximate sound levels for similar piles, driven in a similar manner as this action.

The proposed construction of the Ajayan Bridge **would not** require in-water pile driving. A total of twenty-four octagonal 16.5-inch-diameter concrete piles would be installed on the shoreline above the MHW line. Piles would be installed with an impact hammer, which would generate impulsive in-water sounds.

The CALTRANS Compendium reports measured levels for the driving of 24-inch-diameter octagonal piles on land. Impact driving of 24-inch-diameter octagonal piles on land measured 181 dB<sub>rms</sub> at a distance of 10 meters from the source<sup>13</sup>.

In the absence of site specific transmission loss data, the practical spreading loss equation,  $RL = SL - 15\text{Log}R$ , is often used to estimate the RL for actions in shallow nearshore marine waters (RL = received level; SL = source level; and R = range in meters (m)). This equation and the received levels reported in the Compendium, as measured at 10 meters for the 24-inch-diameter octagonal concrete piles on land, was used to calculate the following source levels and isopleth ranges (Table 1).

<b>Piling</b>	<b>Driver</b>	<b>Water Depth</b>	<b>Source Level</b>	<b>Range to 180 dB<sub>rms</sub></b>	<b>Range to 160 dB<sub>rms</sub></b>
24" Concrete	Impact	Land	196	12 meters	251 meters

Since the proposed 16.5-inch-diameter concrete piles for the subject project is smaller in diameter than the 24-inch-diameter octagonal piles in the CALTRANS reports cited above, we believe this project will generate lower sound levels in-water and have smaller effect threshold isopleths than the similar pile driving actions presented in Table 1. Considering the relatively low number of sea turtles expected to occur within the project area, relatively minimal proposed pile driving, expected short-range of low sound levels that can cause behavioral disturbance, and 50-yard (46-meter) shut-down safety range, it is unlikely any sea turtles would be exposed to adverse sound levels produced by pile driving. **Based on this information, FHWA has determined that elevated noise levels due to the pile driving activities would be discountable and would have insignificant effects on the green and hawksbill sea turtles.**

Construction Lighting Impacts

Sea turtle hatchlings emerge from their nest at night and haul themselves towards the ocean where they will spend their entire life. Upon emerging from the nest, hatchlings typically orient themselves toward the brightest direction, which on natural, undeveloped beaches is commonly toward the open horizon of the ocean. However, on developed beaches, the brightest direction is often away from the ocean and toward the lighted structures located along the nesting beach habitat. Therefore, sea turtle hatchlings are often disoriented and unable to find the ocean, which often leads to high mortality

<sup>12</sup> National Marine Fisheries Service, Pacific Islands Region, Protected Resources Division. 2014. ESA – Section 7 Consultation, Biological Opinion, United States Department of the Navy, X-Ray Wharf Improvements, Naval Base Guam – NMFS File No. (PCTS): PRI-2013-9309, PIRO Reference No.: I-PI-13-1105-LVA

<sup>13</sup> California Department of Transportation (CALTRANS), 2007. Compendium of Pile Driving Sound Data. Prepared by Illinworth & Rodkin, 505 Petaluma Blvd. South, Petaluma, CA 94952. September 27, 2007.

rates<sup>14</sup>. In addition, artificial lighting may deter the adult female sea turtle from emerging from the ocean to excavate a nest and lay her clutch of eggs.

Although unlikely, construction of the proposed project may require work after daylight hours; thereby, facilitating the need to use artificial lighting to illuminate the proposed project area. Therefore, the use of artificial lighting after daylight hours could contribute to disorienting sea turtle hatchlings emerging from their nest and/or discourage an adult female sea turtle from emerging from the ocean to excavate a nest and deposit her clutch of eggs. However, if work is required after daylight hours, the potential impact to sea turtles due to artificial lighting would be minimized by the use of sea turtle friendly lighting; thereby, reducing emitted light from the proposed project area. **Based on this information, FHWA has determined that the exposure to construction lighting would be discountable and would have insignificant effects on the green and hawksbill sea turtles.**

#### Increased Exposure to Human Interaction

During project construction, there would be an increased presence of human activity that may result in higher incidents of sea turtle and human interaction. The impacts to sea turtles from human interaction would primarily be associated with behavioral changes in the sea turtles that may include avoiding potentially suitable foraging habitat within the Achang Reef Flat Marine Preserve, abrupt body movements while swimming that could cause injury to the sea turtle and may even result in prolonged inactivity at the bottom of the ocean floor<sup>4</sup>. It is unlikely that the increased human presence at the proposed project site would impact sea turtle nesting behavior given that the closest known nesting site is located approximately one mile (1.6 kilometers) to the northeast of the proposed project site. However, BMPs have been developed to avoid and/or minimize the potential impacts to sea turtles from human interaction. Some of the BMPs that would be implemented for the proposed project include performing daily surveys, prior to the commencement of work, to insure sea turtles are not within the work zone; work stoppage upon observing a sea turtle within the proposed project area, allowing it to leave on its own; and limiting activity beyond the work zone. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization Measures section of this document. **Based on the information, FHWA has determined that the exposure to increased human activity would be discountable and would have insignificant effects on the green and hawksbill sea turtles.**

#### Exposure to Elevated Turbidity

Given that sea turtles breathe air instead of water, increased turbidity should not adversely affect their respiration or other biological functions. Although these animals may be found in turbid waters, it is likely that they may avoid dense turbidity plumes in favor of clearer water. However, BMPs have been developed to avoid and minimize elevated turbidity including use of turbidity curtains and erosion and sediment controls. **Based on this information, FHWA has determined that exposure to any plumes of elevated turbidity related to actions of the project will be non-injurious and will result in insignificant effects to green and hawksbill sea turtles.**

#### Exposure to Waste and Discharges

Construction wastes may include plastic trash and bags that may be ingested and cause digestive blockage or suffocation. Large plastic trash and discarded sections of ropes and lines may entangle marine life. Equipment spills and discharges could include hydrocarbon-based chemicals such as fuel oils, gasoline, lubricants, hydraulic fluids and other toxicants, which could expose protected species to toxic chemicals. Depending on the chemicals and their concentration, exposure could result in a range of

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<sup>14</sup> National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1998. Recovery Plan for U.S. Pacific Population of the Green Turtle (*Chelonia mydas*). National Marine Fisheries Service. Silver Spring, MD.

effects, from avoidance of an area to mortality. Local and federal regulations prohibit the intentional discharge of toxic wastes and plastics into the marine environment. In addition, BMPs have been developed to prevent the introduction of wastes and toxicants in the marine environment. Some of the BMPs that would be implemented for the proposed project include use of catchment platforms and protective netting to keep debris from falling into the water; off-site fueling to the extent feasible; storing and staging of construction materials away from the shoreline and river bank; inspection of equipment; readily available spill kits and absorbent pads; and immediate removal of construction debris from the site. A detailed list of the BMPs that would be implemented for the proposed project is provided in the Avoidance and Minimization Measures section of this document. Based on the information, FHWA has determined that discharges of wastes and toxicants are unlikely. Should a discharge occur appropriate measures would be in place to contain and clean-up the spill. **Based on this information, FHWA has determined that the exposure to wastes and discharges would be discountable and would have insignificant effects on the green and hawksbill sea turtles.**

### **Avoidance and Minimization Measures**

To avoid and minimize the potential impacts the proposed project may have upon the federally threatened green sea turtle, federally endangered hawksbill sea turtle and other biological and environmental resource, the FHWA and the DPW have developed numerous BMPs that would be implemented during the life of the proposed project. The BMPs to be implemented and maintained for the proposed project would include, but not limited to, the following:

- The contractor will designate a competent observer to survey the areas adjacent to the proposed action for Green Sea Turtles and Hawksbill Sea Turtles prior to the start of work each day and prior to resumption of work following any break of more than 30 minutes when work is above or in the water when there is a potential to directly impact Green Sea Turtles and Hawksbill Sea Turtles.
- If a Green Sea Turtle or a Hawksbill Sea Turtle is discovered within 50 yards of the proposed work activities with the potential to impact or disturb species shall be postponed or halted. Work shall only begin/resume after the animals have voluntarily departed the area.
- Special attention shall be given to verify that Green Sea Turtles or Hawksbill Sea Turtles are in the area where equipment or materials are expected to contact the substrate before that equipment may enter the water.
- All objects that are to be placed in the river, such as turbidity curtains, riprap, and excavator bucket, shall be lowered to the bottom in a controlled manner. This can include the use of cranes, winches, or other equipment that affect positive control over the rate of descent to minimize turbidity potential.
- No marine vessels, boats, mooring lines or marker buoys shall be utilized.
- Turbidity curtains and tethers shall be minimum length necessary, and shall remain deployed only as long as needed to properly accomplish the required task.
- Deployment sites shall be devoid of live corals, seagrass beds, or other significant resources.
- Work shall be performed during daylight hours to avoid disorienting nesting sea turtles due to nighttime construction lighting. If work is required after daylight working hours, sea-turtle-friendly lighting shall be used to reduce the brightness of the emitted light.



- From September through April, migratory birds protected under the Migratory Bird Treaty Act of 1917, may use the project site as a foraging, nesting, and resting ground. The protected species must not be harmed or harassed.
- Vegetation (habitat) clearing shall be minimized to the maximum extent possible.
- The contractor must consult with the Guam Division of Aquatic and Wildlife Resources at least 1 week prior to any vegetation removal action.
- Focused bird, tree snail, bat surveys shall be performed prior to vegetation removal.
- Activities that result in sediment/pollutant discharges shall cease during the 21 day spawning moratorium (starting 7 to 10 days after the July full moon) for the primary hard coral spawning event each year. Contractor will contact NMFS for exact spawning dates..
- The Ajayan Bridge is located in the Achang Reef Flat Marine Protected Area (MPA). No take of marine organisms is allowed within this MPA. Any take to include killing, damaging, or wounding of marine organisms is a violation of local natural resource laws.
- Wetlands will be designated as Environmentally Sensitive Areas where no construction activities, equipment, or personnel are allowed.
- Appropriate materials to contain and clean potential spills shall be stored at the work site and be readily available. All project-related materials and equipment placed in the water shall be free of pollutants.
- The contractor shall perform daily pre-work equipment inspections for cleanliness and leaks. Heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.
- Off-site fueling sites shall be used to the maximum extent practical. Should fueling of project-related vehicles or equipment need to occur on-site a designated fueling area will be established at least 50 feet from the shoreline, river bank and wetlands. Project personnel shall be trained on proper fueling and fuel spill cleanup procedures.
- Stockpile, staging, and material storage areas shall be kept at least 50 feet from the shoreline, river bank, and wetlands.
- The contractor shall take appropriate precautions in advance of predicted typhoon events to prevent material losses during surge or flood events, such as relocating materials and equipment to be at least 50 feet from the shoreline and river bank.
- Hazardous materials and petroleum products shall be transported, used, and stored on-site in a manner to prevent contamination of soils and water.
- Spill kits including absorbent pads and other materials shall be readily available on-site.
- Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion-control practices and effective silt containment devices (e.g., silt fencing and turbidity curtains), and the curtailment of work during adverse weather and tidal/flow conditions.
- An Environmental Protection Plan, Erosion Control Plan, Storm Water Pollution Prevention Plan, litter-control plan, Hazard Analysis and Critical Control Point Plan, and project-specific plans shall be prepared, approved by appropriate regulatory agencies, and implemented.
- Solid and sanitary waste disposal procedures and facilities shall be implemented.

- Erosion-control device(s) shall be employed at the job site to prevent debris and soil from entering the river. Device(s) must be secured and able to withstand heavy rains and winds.
- Catchment platforms and protective netting shall be installed under the bridge to keep debris from falling into the water.
- Construction debris must be removed immediately and not stored at the job site. Debris includes excavated soil, cement material, piping, and asphalt.
- Any material or debris removed from the aquatic environment shall be disposed of at upland sites in accordance with applicable laws and regulations.
- Dust-control devices or methodologies (wetting) must be employed at the job site during construction.
- Absorbent pads shall be readily available at the job site during heavy equipment operations, and equipment must be inspected for leaks prior to use.
- Work shall be conducted below the mean high water line during the dry season and low tides when feasible.
- All heavy equipment shall be kept out of the stream bed and disturbance of the existing stream bed shall be avoided.
- Impacts to strand vegetation along the shoreline shall be avoided to minimize beach erosion. Vegetation shall be replaced as soon as possible along both stream banks and shorelines.
- The Nypa palm community upstream of the bridge shall be avoided.
- River corridor access shall be maintained for aquatic species.
- Disturbed areas will be restored with native plants as soon as possible.
- Invasive species controls shall be maintained to ensure that all materials (human-created and natural) transported from off-site are free of such species (e.g., brown tree snake, rhino beetle, invasive plants).

#### **Mariana Common Moorhen - Determination of Effects**

The Ajayan River and nearby wetlands provide potential foraging, roosting and nesting habitat for the federally endangered Mariana common moorhen. Given the results of the field surveys, the information provided by the USFWS and the DAWR, the implementation of BMPs and other avoidance and minimization measures, we have determined that the proposed project ***“may affect, is not likely to adversely affect”*** the federally endangered Mariana common moorhen.

#### **Mariana Fruit Bat – Determination of Effects**

The Mariana fruit bat is not anticipated to use habitat at or near the proposed project site. Given the results of the field surveys, the information provided by the USFWS and the DAWR, the implementation of BMPs and other avoidance and minimization measures, we have determined that the proposed project will have ***“no effect”*** on the locally endangered and federally threatened Mariana fruit bat.

#### **Pacific Tree Snail – Determination of Effects**

Suitable habitat for Pacific tree snail is present within the vicinity of the proposed project. Given the results of the field surveys, the information provided by the USFWS and the DAWR, the implementation of BMPs and other avoidance and minimization measures, we have determined that the proposed project ***“may affect, is not likely to adversely affect”*** the locally endangered and federally candidate species for listing Pacific tree snail.

## Green Sea Turtle and Hawksbill Sea Turtle - Determination of Effects

The Ajayan Bay and Achang Reef Flat Marine Preserve provide foraging habitat for the federally threatened green sea turtle and the federally endangered hawksbill sea turtle. Ajayan Bay is not a known turtle nesting site. Therefore, sea turtle nesting is not anticipated. However, potentially suitable nesting habitat is present near the project. Given the results of the field surveys, the information provided by the NMFS, the USFWS, and the DAWR, the implementation of BMPs and other avoidance and minimization measures, we have determined that the proposed project ***“may affect, is not likely to adversely affect”*** the federally threatened green sea turtle or the federally endangered hawksbill sea turtle.

We trust that we have provided you with the necessary information to evaluate the proposed project and respectfully request your concurrence with our determination of effects for the federally endangered Mariana common moorhen, the locally endangered and federally threatened Mariana fruit bat, the federally threatened green sea turtle and the federally endangered hawksbill sea turtle.

If you require additional information or have any questions, please contact me at (808) 541-2311 or [richelle.takara@fhwa.dot.gov](mailto:richelle.takara@fhwa.dot.gov).

Sincerely yours,



Richelle M. Takara, P.E.  
Transportation Engineer

Enclosure:

- 1) Project Location Map
- 2) Photo Log
- 3) Proposed Geotechnical Soil Boring Locations
- 4) Bridge Profile
- 5) Traffic Control Plans
- 6) BMP Drawings
- 7) Achang Reef Flat Marine Preserve
- 8) June 2012 Response from USFWS
- 9) Flora and Fauna Surveys for the Ajayan Bridge Replacement Project

cc:

- Carl V. Dominguez, DPW (via email)
- Earl Campbell, USFWS (via email)
- Joaquin Blaz, DPW (via email)
- Jim Mischler, Parsons Brinckerhoff (via email)
- Nora Camacho, Parsons Brinckerhoff (via email)
- Nemencio Macario, N.C. Macario (via email)

RECEIVED

SEP 17 2014

HAWAII DIVISION



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Pacific Islands Fish and Wildlife Office  
300 Ala Moana Boulevard, Room 3-122, Box 50088  
Honolulu, Hawaii 96850

In Reply Refer To:  
2014-I-0382

SEP 15 2014

Ms. Richelle Takara  
U.S. Department of Transportation  
300 Ala Moana Blvd., Room 3-306  
Box 50206  
Honolulu, Hawaii 96850

Subject: Informal Consultation for the Route 4 Ajayan Bridge Replacement, Guam

Dear Ms. Takara:

The U.S. Fish and Wildlife Service (Service) received your letter on July 31, 2014, requesting our concurrence that the replacement of the Ajayan Bridge on Route 4 may affect, but is not likely to adversely affect the federally endangered Mariana common moorhen (*Gallinula chloropus guami*) (moorhen), the federally endangered hawksbill sea turtle (*Eretmochelys imbricata*), and the federally threatened green sea turtle (*Chelonia mydas*); and will have no effect on the federally threatened Mariana fruit bat (*Pteropus mariannus mariannus*) (bat). Our analysis and finding in this consultation are based on your letter dated July 31, 2014, and other information available to us. This response is in accordance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). A complete administrative record is on file in our office.

### *Project Description*

The U.S. Department of Transportation, Federal Highway Administration (FHWA), in close coordination with the Guam Department of Public Works (DPW), proposes to replace the Route 4 Ajayan Bridge between the villages of Inarajan and Merizo on Guam. Demolition and construction will each occur in two phases to maintain one passable lane. No new temporary road will be created. A temporary traffic signal will be erected within the roadway to control traffic across the lane in use. The existing bridge and abutments will be demolished using saw cutters, jackhammers and/or hoe rams and removed using mechanical equipment such as backhoes. The soil between the old abutment and the new abutment will be excavated, and riprap will be placed on a gradual slope; a combined total of approximately 540 cubic yards of soil and concrete abutment wall material will be excavated from the mean high water line of the

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Ajayan River. The approximate linear disturbance to the stream channel from this excavation will be approximately 407 linear feet. A new bridge foundation will be constructed inland, behind the existing abutment to minimize disturbance to the river channel. The new abutments will be constructed above the mean high water line.

### *Conservation Measures*

The following measures are identified in your letter and will be implemented to avoid and minimize potential project effects to nesting sea turtles, moorhens, and bats. Other environmental measures are listed in your request letter, dated July 21, 2014, and incorporated by reference into this consultation. The measures in your letter, including the subset below, are considered part of the project description. Any changes to, modifications of, or failure to implement these avoidance and minimization measures may result in a need to reinitiate this consultation.

1. The contractor will designate a competent observer to survey the areas adjacent to the proposed action for green sea turtles and hawksbill sea turtles prior to the start of work each day and prior to resumption of work following any break of more than 30 minutes when work is above or in the water when there is a potential to directly impact sea turtles.
2. If a sea turtle is discovered within 50 yards (150 feet) of the proposed work activities with the potential to impact or disturb species shall be postponed or halted. Work shall only begin/resume after the animals have voluntarily departed the area.
3. Special attention shall be given to verify that sea turtles are in the area where equipment or materials are expected to contact the substrate before that equipment may enter the water.
4. Work shall be performed during daylight hours to avoid disorienting nesting sea turtles due to nighttime construction lighting. If work is required after daylight working hours, sea-turtle-friendly lighting shall be used to reduce the brightness of the emitted light.
5. Vegetation clearing shall be minimized to the maximum extent possible.
6. The contractor must consult with the Guam Division of Aquatic and Wildlife Resources (DAWR) at least one week prior to any vegetation removal.
7. Focused bird, tree snail, and bat surveys shall be performed prior to vegetation removal.
8. If any special status species are found during these surveys, the Service and DAWR shall be informed as soon as possible. Project workers will wait until any federally listed birds or bats voluntarily leave the area before resuming work. If candidate tree snails are found, contractors will coordinate with DAWR to relocate snails or adjust project footprint to avoid impact to snails.

9. Wetlands will be designated as Environmentally Sensitive Areas where no construction activities, equipment, or personnel are allowed.
10. Stockpile, staging, and material storage areas shall be kept at least 16 yards (50 feet) from the shoreline, river bank, and wetlands.
11. Construction debris must be removed immediately and not stored at the job site. Debris includes excavated soil, cement material, piping, and asphalt.
12. Impacts to strand vegetation along the shoreline shall be avoided to minimize beach erosion. Vegetation shall be replaced as soon as possible along both stream banks and shorelines.
13. The Nipa palm (*Nypa fruticans*) community upstream of the bridge shall be avoided.
14. Disturbed areas will be restored with native plants as soon as possible.
15. Invasive species controls shall be maintained to ensure that all materials transported from off-site are free of such species.

#### *Project Area*

The action area is along the shoreline of southern Guam at the Ajayan River mouth, which empties into Achang Bay. According to vegetation surveys done for pre-assessment of this project, the project area contains a mix of shoreline, secondary thicket/scrub forest, and ravine/wetland. Pago (*Hibiscus tiliaceus*) and tangantangan (*Leucaena leucocephala*) are common at the site. Other plant species present include coconut trees (*Cocos nucifera*), *Pandanus tectorius*, *Morinda citrifolia*, *Calophyllum inophyllum* and a mix of native and exotic trees and herbaceous species. Nipa palms, wetland obligates, are present slightly upstream from the project area.

#### *Affected Species*

The Mariana common moorhen, Mariana fruit bat and nesting green and hawksbill sea turtles may occur within the project area. Although there are no recent records of sea turtle nesting in the project area, turtles are present in the area, and nesting has been documented nearby. No proposed or designated critical habitat for the listed species occurs within the project area.

In addition, the Federal candidate Guam tree snail (*Partula radiolata*) may occur within the project area. Although no statutory protection exists for candidate species under the ESA, we encourage conservation of these species to sufficiently remove threats, which could potentially eliminate the need for future listing. We provide the below information on the Guam tree snail for your reference.

### Mariana common moorhen

The Mariana common moorhen is federally endangered, and occurs on Guam, Rota, Saipan, and Tinian, with historical records in Pagan (USFWS 1984, 1992). Moorhens occupy both natural and man-made wetland areas, occasionally using brackish water. Habitat use depends on seasons, as they can utilize temporary bodies of water that are more abundant during the rainy season. Population estimates from Guam in 2001 placed the total population at under 300 (Takano and Haig 2004). Although moorhen numbers have declined in wetlands with historical use, such as Fena Reservoir on Navy property (K. Brindock, DoN, pers. comm. 2013), the current numbers, and whether they have declined as a whole in Guam is currently unknown. Threats include damage to habitat by introduced ungulates, predation by introduced predators such as brown treesnakes (*Boiga irregularis*), and development and modification of wetland habitats.

### Mariana fruit bat

The Mariana fruit bat (or fanihi in Chamorro) is federally listed as threatened throughout its range. Fanihi rely on forest habitat that contains a diversity of food resources available throughout the year (USFWS 2009). They use both primary and secondary forest habitat for foraging and roosting, and have been observed foraging in non-native forests (USFWS 2009). Although fanihi occur throughout the Marianas Archipelago, healthy populations in the four southern islands are considered essential for recovery (USFWS 2009). Of the southern islands, Guam and Rota have harbored the highest numbers of fanihi in recent history, and have the largest areas of available suitable habitat for the species (USFWS 2009). Population numbers of fanihi in Guam have declined throughout the past century, and current numbers are less than 30 bats. The most recent colony to exist on Guam was at Pati Point, at the northern end of the flight line on Andersen Air Force Base (AAFB). Counts within the past two years have indicated that this colony has been abandoned, but individual fanihi are still observed on AAFB and elsewhere throughout the island (J. Quitigua, DAWR, pers. comm. 2013). Major threats in Guam include hunting by humans, predation on young fanihi by brown treesnakes, and habitat loss and degradation (USFWS 2009).

### Green sea turtle

Green sea turtles were once abundant circumglobally in tropical and subtropical waters, but their current numbers are a fraction of their historical abundances (NMFS and USFWS 2007a). They are highly migratory but they faithfully return to natal beaches for nesting. They are known to nest in small numbers in the U.S. Pacific islands, including Guam and the Commonwealth of the Northern Mariana Islands (NMFS and USFWS 1998a). On Guam, green sea turtles have historically nested on multiple beaches throughout the island. Harvesting of green sea turtles and their nests and disturbance at their natal beaches have resulted in accelerated declines (NMFS and USFWS 1998a). Information regarding long-term trends in nesting in the Mariana Islands is limited. However, threats persist at nesting beaches, and nesting is limited to beaches with little to no human disturbance. The main threats to nesting turtles on Guam are habitat destruction and illegal harvest.

### Hawksbill sea turtle

Hawksbill sea turtles occur circumglobally in tropical and subtropical waters, including throughout the Pacific, but are scattered in very low numbers (NMFS and USFWS 1998b). Like green sea turtles, they return to natal beaches to nest. Nesting information in the Mariana Islands is limited, but is thought to be in low numbers (NMFS and USFWS 1998b). Less than ten nests have been recorded in Guam in the past two decades (U.S. Navy 2013). Hawksbill sea turtles face many of the same threats that green sea turtles do, including overharvest and disturbances at nesting sites. Hawksbills have also been historically prized for their shells for crafts and jewelry (NMFS and USFWS 1998b). Threats continue to exist at potential nesting beaches throughout Guam, and continued development and human disturbance at beaches decreases available nesting grounds.

### Guam tree snails

The Guam tree snail is endemic to the island of Guam. It is listed for protection under Guam law (5 GCA §63205), and has been a candidate for Federal listing since 1994. Tree snails occur in multiple habitat types in Guam (Hopper and Smith 1992), but are most likely to occupy shaded native forest habitats (USFWS 2012). This snail has declined throughout its range due to introduced unglates, which diminish the quality of their habitat by disrupting the understory; introduced predators such as the Manokwari flat worm (*Platydemus manokwari*), the rosy wolf snail (*Euglandina rosea*), and rats (*Rattus* sp.); and landscape alteration by people (USFWS 2012).

### *Conclusion*

We have reviewed the information you provided and pertinent information in our files. Because there are measures in place to survey and to postpone work in the event of a turtle nesting or crawl event, to minimize disturbance to shoreline vegetation and topography, and to avoid light disturbance at night, we do not anticipate direct impacts to nesting turtles. In addition, minimal nesting habitat would be disturbed along the shoreline. Therefore, we concur with your determination that this project may affect, but is not likely to adversely affect nesting sea turtles. Similarly, because disturbance to the aquatic environment would be minimized, wetlands areas (above the high water mark) avoided, and surveys conducted for birds before any vegetation clearing would occur within the project area, we do not anticipate direct impacts to moorhens and impacts to their habitat would be considered insignificant. Therefore, we concur with your determination that this project may affect, but is not likely to adversely affect moorhens.

Mariana fruit bats are not known from any recent sightings near your project. As you are aware, it is the action agency's responsibility to make effect determinations for compliance with section 7(a)(2) of the ESA. We have no regulatory or statutory authority for concurring with "no effect" determinations and do not provide concurrence or non-concurrence on an action agency's "no effect" determination. However, we agree that it is unlikely this species would occur within the project area and in the unlikely event that bats are present, we agree with your proposed measures for bats.



Although suitable habitat for tree snails occurs within the project area, it is likely they would have been documented in previous surveys to occur within the project area. We appreciate your plans to survey for snails before any vegetation removal. The Service requests that you share any new information on tree snail occurrences that result from your project survey work.

If you have any additional questions, please contact Ann Marie Gawel, Fish and Wildlife Biologist (phone: 671-355-4008; email: [annmarie\\_gawel@fws.gov](mailto:annmarie_gawel@fws.gov)).

Sincerely,

A handwritten signature in blue ink that reads "Lolani Takara". The signature is written in a cursive style.

for Earl Campbell  
Acting Mariana Island Team Manager

cc: Department of Agriculture, Division of Aquatic and Wildlife Resources

*Literature Cited*

- Brindock, K. 2013. Personal Communication. Conversation. Naval Facilities and Engineering, Environmental Division.
- Hopper, D. and B.D. Smith. 1992. Status of tree snails (Gastropoda: Partulidae) on Guam, with a resurvey of sites studied by H.E. Crampton in 1920. *Pacific Science* 46: 77-85.
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- U.S. Navy. 2013. Final Joint Region Marianas Integrated Natural Resource Management Plan. June 2013

G.10 United States Army Corps of Engineers

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April 17, 2012

Mr. Ryan Winn  
Department of the Army  
U.S. Army Corps of Engineers  
Guam Field Office  
PSC 455 BOX 188 FPOAP 96540-1088

Subject: Jurisdictional Determination for Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for Ajayan Bridge Replacement Project, Merizo, Guam

Dear Mr. Winn:

The U.S. Department of Transportation - Federal Highways Administration (FHWA), in coordination with the Guam Department of Public Works (DPW) proposes to replace the existing Ajayan River Bridge located on Route 4, on the boundary between Merizo and Inarajan. AECOM is contacting your agency on behalf of the DPW and FHWA. A Categorical Exclusion document for compliance with the National Environmental Policy Act (NEPA) will be prepared for the project.

#### **Ajayan Bridge Existing Condition**

The Ajayan River Bridge is located on Route 4 on the boundary between Merizo and Inarajan, as shown in Figure 1-1.

The existing single span cast-in-place concrete box girder bridge was constructed in 1968 with a span of approximately 76.2 feet and a skew of 40 degrees. Abutments are founded on concrete piles and the deck has an asphalt concrete wearing surface. The most recent bridge inspection report, dated May 27, 2004, noted that the substructure and channel are rated in serious condition with cracking and differential movement noted for substructure units and significant scour at abutments, as shown in the attached Photo Log. The channel alignment and waterway opening are also noted as deficient.

#### **Proposed Action**

The proposed action would replace the existing two-lane bridge across the Ajayan River just upstream of the river mouth as it enters the ocean. Bridge abutment slopes would be protected from erosion by placement of stone rip rap. There would be minimal roadway approach work. Proposed improvements include two 12-foot lanes with 8-foot paved shoulders. Roadway alignment and grade would match existing at points of tie-in. Roadway work within project limits would include removal of the existing pavement and design of full-depth pavement replacement and replacement of guardrail. The proposed action would include geotechnical sampling, testing, and analysis. As shown in Figure 1-2, soil borings for bridge foundations would be taken at two locations, one at each proposed substructure unit, to a depth of at least 100 feet or at least 10 feet into competent bedrock, whichever is shallower. Additionally, two shallow borings to a depth of 15 feet would be taken within the roadway approach area. All work would be conducted within existing right-of-way.

The FHWA requests that you review the project information provided above to determine if there are any permits required under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, or any other concerns. On behalf of FHWA, we respectfully request your jurisdictional determination for Section 404 and Section 10 for this project within 30 days. If you should have any questions, please feel free to contact me at 808.356.5394 (office), 808.223.9213 (cell), or via email at [Jennifer.Scheffel@aecom.com](mailto:Jennifer.Scheffel@aecom.com).

Sincerely,



Jennifer M. Scheffel  
Environmental Planner

Enclosures: Figure 1-1: Project Location Map  
Figure 1-2: Geotechnical Boring Locations  
Photo Log

cc: Ms. Richelle Takara, FHWA  
Joanne M. S. Brown, DPW  
Ramon Padua, DPW  
Joaquin Blaz, DPW  
Lynda Aguon, DPR SHPO  
Paul Wolf, PB  
James Mischler, PB  
Nora Camacho, PB  
Gene Niemasz, PTG  
Mr. Edgar Hipolito, AECOM  
Kosal Krishnun, AECOM  
Jennifer Scheffel, AECOM  
Mr. Nemencio Macario, N.C. Macario & Associates, Inc.



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT  
Guam Field Office, PSC 455, Box 188, FPO AP 96540

October 12, 2012

Regulatory Branch

**File No.** POH-2012-00229

Ms. Julie Zimmerman  
AECOM  
1001 Bishop Street, Suite 1600  
Honolulu, Hawaii 96813

Dear Ms. Zimmerman:

This is in response to your request, on behalf of the Federal Highways Administration (FHWA), for a Department of the Army (DA) jurisdictional determination for the proposed Ajayan Bridge Replacement Project. The proposed project is located at the intersection of the Ajayan River and Ajayan Bay, on Route 4, between Merizo and Inarajan, Guam. This regulatory action has been assigned file number POH-2012-00229, which should be referred to in all future correspondence with this office.

Section 404 of the Clean Water Act (CWA) requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including jurisdictional wetlands (33 U.S.C. 1344). The Corps defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The tidal waters of Ajayan Bay of the Pacific Ocean are navigable waters of the U.S.

Therefore, DA authorization is required under Section 404 of the CWA if the bridge replacement would involve a discharge of dredged and/or fill material below the high tide line (HTL) of Ajayan Bay/River and/or into adjacent wetlands. As we have discussed, if the proposed riprap bank armoring, bridge abutments or wingwall would extend below the HTL, or if the proposed roadway approach would be widened into adjacent delineated wetlands, a DA permit would be required.

Nothing in this letter excuses you from compliance with other Federal, State, or local statutes, ordinances, or regulations. You may contact me via email at [ryan.h.winn@usace.army.mil](mailto:ryan.h.winn@usace.army.mil), by mail at the address above, or by phone at (671) 339-2108 if you have questions. For additional information about our Regulatory Program, visit our web site at [www.poa.usace.army.mil/reg](http://www.poa.usace.army.mil/reg).

Sincerely,

Ryan H. Winn  
Project Manager

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G.11 United States Coast Guard

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## Johnson, Landin

---

**From:** Zimmerman, Julie  
**Sent:** Monday, August 27, 2012 5:17 PM  
**To:** 'Thomas.E.Whitaker@uscg.mil'  
**Cc:** Scheffel, Jennifer  
**Subject:** Ajayan Bridge Replacement Project- Section 9 Consultation  
**Attachments:** AJAYAN-S5.pdf; AJAYAN-DWG-65%\_062512.pdf

Thomas:

I am working with Ryan Winn of the U.S. Army Corps of Engineers regarding the Ajayan Bridge Replacement project. Ryan instructed me to contact you to find out if the USCG will require authorization under Section 9 of the Rivers and Harbors Act.

The U.S. Department of Transportation - Federal Highways Administration (FHWA), in coordination with the Guam Department of Public Works (DPW) proposes to replace the existing Ajayan River Bridge located on Route 4, on the boundary between Merizo and Inarajan. The purpose of this project is to replace the existing bridge to meet increasing populations, upgrade to current code requirements, provide adequate travel lane widths, roadway safety, and accommodate river flow capacity.

The Ajayan Bridge is located on Route 4, in the eastern section of Merizo. The two (2) lanes bridge crosses the Ajayan river just upstream the river mouth as it enters the ocean. The existing single span cast-in-place concrete box girder bridge was constructed in 1968 with a span of approximately 76.2 feet and a skewed of 40 degrees. Abutments are founded on concrete piles and the deck has an asphalt concrete wearing course. Proposed improvements shall include two (2) 12 feet lanes with 8 feet paved shoulders. Roadway alignment and grade shall match existing at the point of tie-in.

I am sending the construction plans (65%) for the Ajayan Bridge project. The only work to be done below the ordinary high water mark includes the precast piles supporting the integral abutments of the bridge will be driven to depths underground water level. The attached "Ajayan-S5" provides further details on this.

Please let me know if you have any questions or need any further information in order to make a determination regarding Section 9 .

Thank you,  
Julie

*Julie M. Zimmerman*  
Environmental Planner  
Environment  
Direct 808.356.5392 Fax 808.523.8950  
[Julie.Zimmerman@aecom.com](mailto:Julie.Zimmerman@aecom.com)

**AECOM**  
1001 Bishop Street, Suite 1600, Honolulu, HI 96813  
[www.aecom.com](http://www.aecom.com)

***Please consider the environment before printing this e-mail***

U.S. Department of  
Homeland Security

United States  
Coast Guard



Commander  
Fourteenth Coast Guard District

300 Ala Moana Blvd, 9-216  
Honolulu, HI 96850-4982  
Staff Symbol: (dpw)  
Phone: (808) 541-2320  
Fax: (808) 541-2309

16590  
30 Oct 12

Mrs. Julie Zimmerman  
Environmental Planner, AECOM  
1001 Bishop Street, Suite 1600  
Honolulu, HI 96813

Dear Mrs. Zimmerman,

Coast Guard District Fourteen has reviewed your 4 September 2012 proposal to replace of the Ajayan Bridge located over the Ajayan River, Guam. This information was used to determine the extent of the Coast Guard's involvement in the permitting process.

The Ajayan River is tidally influenced and subject to Coast Guard jurisdiction. However, at the site of the proposed bridge, it does not appear that any vessels other than canoes, rowboats, rafts and small motorboats are able to transit the waterway. Therefore, this location is in our advance approval category for permitting the construction of bridges, pursuant to 33 CFR 115.70. Accordingly, a specific Coast Guard bridge permit will not be required for the project.

Plans for the proposed bridge must provide adequate clearances to pass existing and future high water stages and have no significant impact on the environment. Prior to construction of the proposed bridge, you must check with your local authorities and confirm there are no flooding issues associated with the construction. Where no formal permit is required, the bridge must meet all current needs and/or requirements of navigation. If conditions are found to differ significantly from those you have presented and by which this determination is granted, you could be required to apply for a permit and possibly alter the bridge to meet the needs of navigation.

This authorization is valid for a period of two years to commence construction and five years to complete construction from the date of this letter. Should you not adhere to this time frame, you must resubmit documents for Coast Guard review to ensure that conditions have not changed which would preclude the project from meeting the criteria for advance approval.

Maintenance of the bridge is the responsibility of the owner. If the bridge falls into disrepair or is no longer used for its intended purpose, it must be removed by and at the expense of the owner in its entirety. The bridge must be maintained free and clear of debris at all times.

Additionally, this office has determined that the Ajayan River Bridge does not have significant nighttime navigation and, as such, is exempt from any lighting and or signal requirements as per 33 CFR 118.40.

This determination does not relieve you of your responsibility to obtain appropriate permits from any other federal, state or local agency having jurisdiction in this matter.

16590  
30 Oct 12

If you have any questions or concerns, please do not hesitate to contact my representative in this matter, LT Doug Miller, at (808) 541-2319 or [Douglas.J.Miller@uscg.mil](mailto:Douglas.J.Miller@uscg.mil).

Sincerely,



BRIAN J. HOFFERBER  
Commander, U. S. Coast Guard  
Chief, Waterways Management Branch  
By direction

Copy: USCG Sector Guam

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**Appendix H**  
**BMPs and Minimization Measures**

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### **Best Management Practices and Minimization Measures**

The contractor shall remain vigilant for the presence of federally and locally protected species (e.g., Endangered Species Act [ESA], Marine Mammal Protection Act [MMPA], Migratory Bird Treaty Act [MBTA], Guam Comprehensive Wildlife Conservation Strategy) during construction. The contractor shall designate a competent observer to survey the areas adjacent to the proposed action for federally and locally protected species prior to the start of work each day and prior to resumption of work following any break of more than 30 minutes.

Should protected species be discovered within 50 yards of the proposed work activities with the potential to impact or disturb species shall be postponed or halted. Work shall only begin/resume after the animals have voluntarily departed the area.

No marine mammals or sea turtles may be within 50 yards of pile-driving. Pile-driving shall be postponed or halted until the animals have voluntarily moved beyond the 50-yard safety zone.

No pile-driving shall be conducted after dark unless that work has proceeded uninterrupted since at least 1 hour prior to sunset, and no protected species have been observed within or near the 50-yard range for that work.

Special attention shall be given to verify that no protected marine animals are in the area where equipment or materials are expected to contact the substrate before that equipment may enter the water.

All objects that are to be placed in the river, such as turbidity curtains, riprap, excavator bucket, and piles, shall be lowered to the bottom in a controlled manner. This can include the use of cranes, winches, or other equipment that affect positive control over the rate of descent to minimize turbidity potential.

No marine vessels, boats, mooring lines or marker buoys shall be utilized.

Turbidity curtains and tethers shall be minimum length necessary, and shall remain deployed only as long as needed to properly accomplish the required task.

Deployment sites shall be devoid of live corals, seagrass beds, or other significant resources.

Work shall be performed during daylight hours to prevent disturbance to nearby residents and to avoid disorienting nesting sea turtles due to nighttime construction lighting. If work is required after daylight working hours, sea-turtle-friendly lighting shall be used to reduce the brightness of the emitted light.

From September through April, migratory birds protected under the Migratory Bird Treaty Act of 1917, may use the project site as a foraging, nesting, and resting ground. The protected species must not be harmed or harassed.

Vegetation (habitat) clearing shall be minimized to the maximum extent possible.

The contractor must consult with the Guam Division of Aquatic and Wildlife Resources at least 1 week prior to any vegetation removal action.

Focused bird, tree snail, and bat surveys shall be performed prior to vegetation removal.

In-water work shall stop during coral spawning. Coral spawning takes place around the last quarter moon of July and August. No in-water work shall take place within 3 days of this moon phase.

The Ajayan Bridge is located in the Achang Reef Flat Marine Protected Area (MPA). No take of marine organisms is allowed within this MPA. Any take to include killing, damaging, or wounding of marine organisms is a violation of local natural resource

<b>Best Management Practices and Minimization Measures</b>
laws.
Appropriate materials to contain and clean potential spills shall be stored at the work site and be readily available. All project-related materials and equipment placed in the water shall be free of pollutants.
The contractor shall perform daily pre-work equipment inspections for cleanliness and leaks. Heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.
Off-site fueling sites shall be used to the maximum extent practical. Should fueling of project-related vehicles or equipment need to occur on-site a designated fueling area will be established at least 50 feet from the shoreline, river bank and wetlands. Project personnel shall be trained on proper fueling and fuel spill cleanup procedures..
Stockpile, staging, and material storage areas shall be kept at least 50 feet from the shoreline, river bank, and wetlands.
The contractor shall take appropriate precautions in advance of predicted typhoon events to prevent material losses during surge or flood events, such as relocating materials and equipment to be at least 50 feet from the shoreline and river bank.
Hazardous materials and petroleum products shall be transported, used, and stored on-site in a manner to prevent contamination of soils and water. Spill kits including absorbent pads and other materials shall be readily available on-site.
Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion-control practices and effective silt containment devices (e.g., silt fencing and turbidity curtains), and the curtailment of work during adverse weather and tidal/flow conditions.
An Environmental Protection Plan, Erosion Control Plan, Storm Water Pollution Prevention Plan, litter-control plan, Hazard Analysis and Critical Control Point Plan, and project-specific plans shall be prepared, approved by appropriate regulatory agencies, and implemented.
Solid and sanitary waste disposal procedures and facilities shall be implemented.
Erosion-control device(s) shall be employed at the job site to prevent debris and soil from entering the river. Device(s) must be secured and able to withstand heavy rains and winds.
Catchment platforms and protective netting shall be installed under the bridge to keep debris from falling into the water.
Construction debris must be removed immediately and not stored at the job site. Debris includes excavated soil, cement material, pipings, and asphalt.
Any material or debris removed from the aquatic environment shall be disposed of at upland sites in accordance with applicable laws and regulations.
Dust-control devices or methodologies (wetting) must be employed at the job site during construction.
Absorbent pads shall be readily available at the job site during heavy equipment operations, and equipment must be inspected for leaks prior to use.
Work shall be conducted below the mean high water line during the dry season and low tides when feasible.
All heavy equipment shall be kept out of the stream bed and disturbance of the existing stream bed shall be avoided.

<b>Best Management Practices and Minimization Measures</b>
--

Impacts to strand vegetation along the shoreline shall be avoided to minimize beach erosion. Vegetation shall be replaced as soon as possible along both stream banks and shorelines.
---

“Soft” approaches in lieu of impervious “hard” stabilization and modifications shall be used whenever possible to slow streamflow and allow for water infiltration.
---

Hydrodynamics and sedimentation patterns shall be properly modeled and designed to avoid erosion to adjacent properties when “hard” stabilization is deemed necessary.
--

The Nypa palm community upstream of the bridge shall be avoided.
--

River corridor access shall be maintained for aquatic species.
--

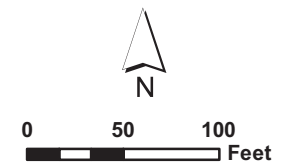
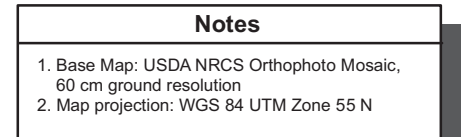
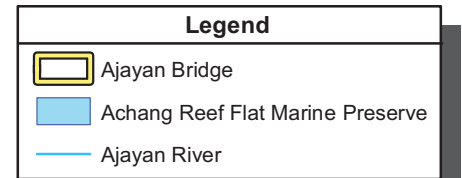
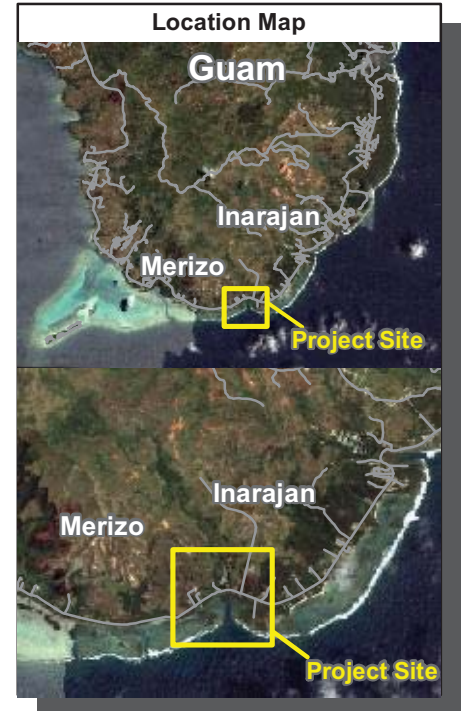
Invasive species controls shall be maintained to ensure that all materials (human-created and natural) transported from off-site are free of such species (e.g., brown tree snake, rhino beetle, invasive plants).
--

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**Appendix I**  
**Achang Reef Flat Marine Preserve**

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**Figure 2**  
**Achang Reef Flat**  
**Marine Preserve**  
**Ajayan Bridge Replacement**  
**Merizo, Guam**

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**Appendix J**  
**Marine Protected Species of the Mariana Islands**

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## MARINE PROTECTED SPECIES of the MARIANA ISLANDS

National Marine Fisheries Service, Pacific Islands Regional Office

### MARINE MAMMALS

All marine mammals are protected under the Marine Mammal Protection Act. Those identified under the ESA Listing are also protected under the Endangered Species Act.

<u>Common Name</u>	<u>Scientific Name</u>	<u>ESA Listing</u>
Blue Whale	<i>Balaenoptera musculus</i>	Endangered
Blainville's Beaked Whale	<i>Mesoplodon densirostris</i>	
Bryde's Whale	<i>Balaenoptera edeni</i>	
Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>	
Dwarf Sperm Whale	<i>Kogia simus</i>	
False Killer Whale	<i>Pseudorca crassidens</i>	
Fin Whale	<i>Balaenoptera physalus</i>	Endangered
Humpback Whale	<i>Megaptera novaeangliae</i>	Endangered
Killer Whale	<i>Orcinus orca</i>	
Long-Finned Pilot Whale	<i>Globicephala melaena</i>	
Longman's Beaked Whale	<i>Indopacetus pacificus</i>	
Melon-Headed Whale	<i>Peponocephala electra</i>	
Minke Whale	<i>Balaenoptera acutorostrata</i>	
Pygmy Killer Whale	<i>Feresa attenuata</i>	
Pygmy Sperm Whale	<i>Kogia breviceps</i>	
Sei Whale	<i>Balaenoptera borealis</i>	Endangered
Short-Finned Pilot Whale	<i>Globicephala macrorhynchus</i>	
Sperm Whale	<i>Physeter macrocephalus</i>	Endangered
Bottlenose Dolphin	<i>Tursiops truncatus</i>	
Common Dolphin	<i>Delphinus delphis</i>	
Fraser's Dolphin	<i>Lagenodelphis hosei</i>	
Pantropical Spotted Dolphin	<i>Stenella attenuata</i>	
Risso's Dolphin	<i>Grampus griseus</i>	
Rough-toothed Dolphin	<i>Steno bredanensis</i>	
Spinner Dolphin	<i>Stenella longirostris</i>	
Striped Dolphin	<i>Stenella coeruleoalba</i>	
Dugong*	<i>Dugong dugon</i>	Endangered
Northern Elephant Seal	<i>Mirounga angustirostris</i>	

### SEA TURTLES

All sea turtles are protected under the Endangered Species Act.

<u>Common Name</u>	<u>Scientific Name</u>	<u>ESA Listing</u>
Green Turtle	<i>Chelonia mydas</i>	Threatened
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	Endangered
Leatherback Turtle	<i>Dermochelys coriacea</i>	Endangered
Olive Ridley Turtle	<i>Lepidochelys olivacea</i>	Threatened

\* Dugongs are under the jurisdiction of the US Fish and Wildlife Service.

Last updated April 2008

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**Appendix K**  
**Flora and Fauna Surveys for Ajayan Bridge Replacement Project**  
**(SWCA 2013)**

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ENVIRONMENTAL CONSULTANTS

Sound Science. Creative Solutions.

2013

## Flora and Fauna Surveys for Ajayan Bridge Replacement Project



Prepared by  
SWCA Environmental Consultants  
P.O. Box 5020  
Hagåtña, Guam 96932

Prepared for  
N.C. Macario and Associates, Inc.  
270 Guerrero Drive  
Tamuning, Guam 96913

Revised 1/17/2014

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## **ACRONYMS and KEY TERMS**

ac	acre
cm	centimeters
ft	feet
GDAWR	Guam Division of Aquatic and Wildlife Resources
h	hours
ha	hectare
in	inch
km	kilometer
m	meter
mm	millimeters
mi	mile
SOGCN	Species of Greatest Conservation Need (Guam locally listed species)
sp.	species (singular)
spp.	species (plural)

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## **EXECUTIVE SUMMARY**

SWCA conducted flora and fauna surveys in the project area for the proposed Ajayan Bridge replacement project. Survey efforts addressed terrestrial flora and fauna. During these surveys, emphasis was placed on identifying special status species including species listed as threatened or endangered under the Endangered Species Act, species listed as threatened or endangered under Guam Endangered Species Regulation No. 9 (5 GCA, Sect. 63.205(c). as well as species considered to be Species of Greatest Conservation Need (SOGCN) by GDAWR.

Key findings within the survey area and its immediate vicinity include:

- No federally or locally listed reptiles, amphibians, birds, mammals, or terrestrial flora were found within the boundaries of the project area;
- No Mariana common moorhens were observed during surveys; however, the area contains suitable habitat for moorhen directly adjacent to the area that will be cleared, therefore we do not dismiss the possibility of moorhens using the area for foraging, nesting, and resting;
- No known turtle nests are located at the project site; however turtles have been known to nest within one mile of the project site and have been observed foraging in the area;
- No species considered to be SOGCN were found during the surveys;

## **Recommendations**

While no federally or locally listed endangered species were observed during site surveys, Marianas common moorhens and sea turtles could potentially be present on or near the project area. SWCA recommends pre-construction surveys to avoid potential harm to these species.

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## **1.0 PROJECT DESCRIPTION**

### **1.1 Purpose and Justification**

The U.S. Department of Transportation- Federal Highways Administration (FHWA), in coordination with the Guam Department of Public Works (DPW) proposes to replace the existing Ajayan River Bridge located on Route 4, on the boundary between Merizo and Inarajan. The structure is failing as a result of exposure to severe weather, particularly strong storms bringing torrential rain, and due to humidity and age. Department of Public Works (DPW) will replace the existing bridge with a superstructure. N.C. Macario and Associates contracted SWCA Environmental Consultants (SWCA) to conduct an environmental analysis of the area that will be impacted by clearing, grading, demolition, excavation, and construction of the replacement bridge (Figure 1).

### **1.2 Location of Project Site**

Situated in southern Guam, the Ajayan Bridge lies across the Ajayan River bordering the Inarajan and Merizo Municipalities on Route 4 near the University of Guam Agricultural Experiment Station (Figure 2).

### **1.3 Proposed Actions**

The proposed action involves clearing, grading, excavating, and construction in the vicinity of the bridge crossing Route 4 in Merizo. The existing bridge will be demolished and replaced with a new 40-ft (12-m) wide by 105-ft (32-m) long bridge. The proposed improvements include two 12-ft (4-m) lanes with 8-ft (2.5 m) paved shoulders. The immediate project area is identified as four individual parcels of land distributed on the east and west sides of the existing bridge. The area of each parcel is as follows: 1,295 ft<sup>2</sup> (120 m<sup>2</sup>), 1,752 ft<sup>2</sup> (162 m<sup>2</sup>), 2,666 ft<sup>2</sup> (247 m<sup>2</sup>), and 9,191 ft<sup>2</sup> (853 m<sup>2</sup>).



Figure 1. Ajayan Bridge Terrestrial Fauna and Flora Survey Project Site Overview

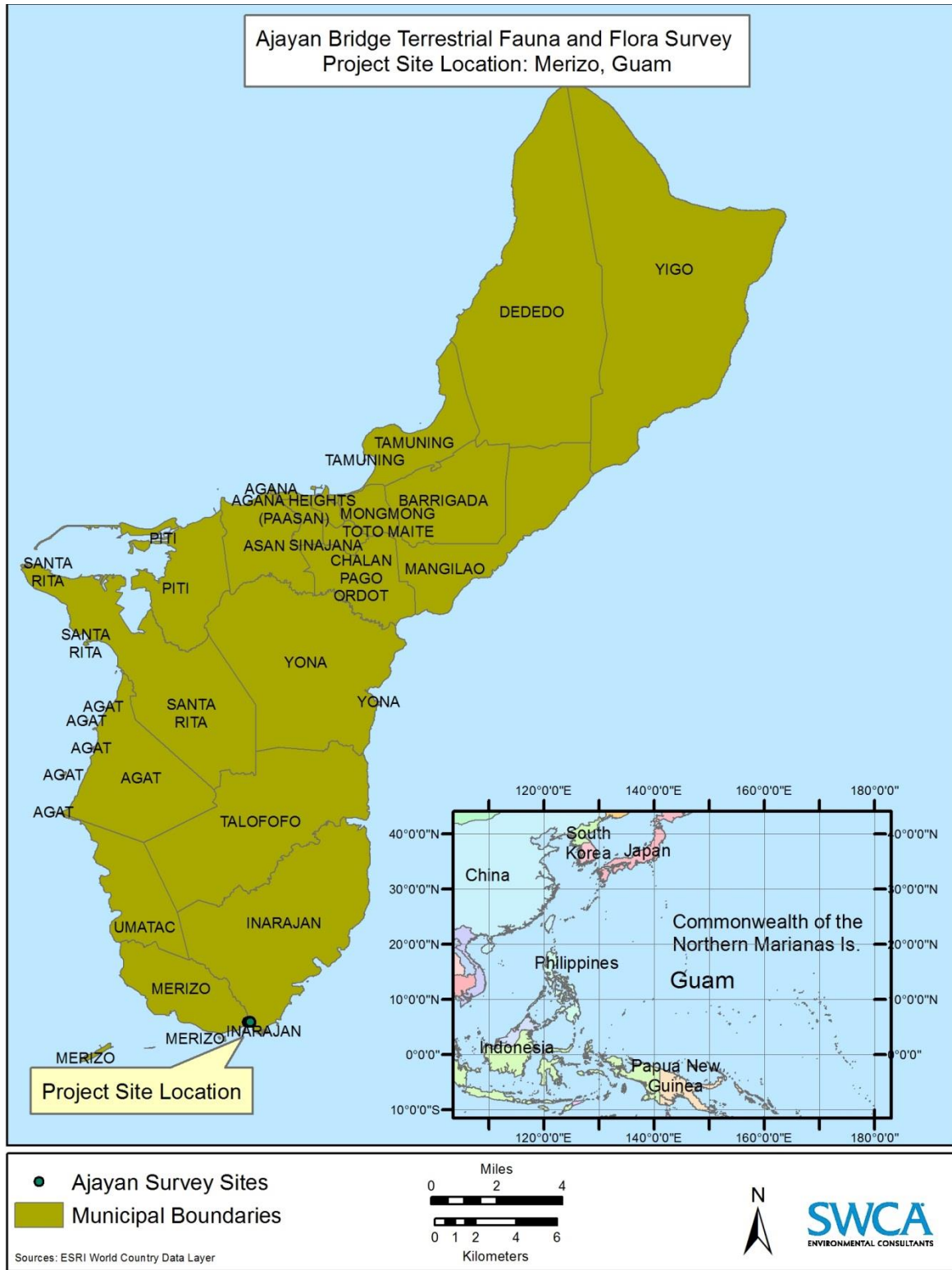


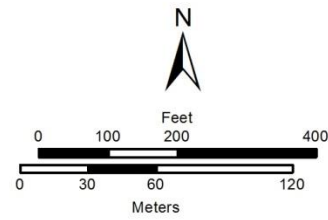
Figure 2. Ajayan Bridge Replacement Project Site



**Legend**

 Proposed Vegetation Removal Area

Sources:



**SWCA**  
ENVIRONMENTAL CONSULTANTS

## **2.0 ENVIRONMENTAL SETTING**

### **2.1 Environment**

Guam has more freshwater vegetation types and overall freshwater areas than other islands in the Marianas. These areas include streams, rivers, and various types of wetlands (freshwater swamps, marshes, man-made reservoirs, mangroves) (Wiles and Ritter 1993, GDAWR 2006b). Freshwater wetland areas are estimated to cover approximately 0.6 percent of the island's area (GDAWR 2006b).

All fresh water on Guam accumulates from rainfall, which averages about 85–115 in/year (216–292 cm/year) (Gingerich 2003). Ranging in length from less than 0.6 mi (1 km) to greater than 3 mi (5 km), Guam's 100 rivers and streams occur in the south and central regions. Low permeability of volcanic rock slows the infiltration of rainwater, allowing groundwater discharge to streams. Clay or argillaceous limestone soils slow water percolation, permitting surface waters to accumulate (Gingerich 2003, GDAWR 2006b). This contrasts Guam's northern limestone plateau which permit rapid seepage of water (Wiles and Ritter 1993).

The proposed project area is situated between the in the Inarajan watershed and Manell watershed. It has a drainage area of about 8.55 square miles and 4.55 square miles, respectively. The main rivers of the Inarajan watershed include Ajayan River, Pasananu River, Fintasa River, Inarajan River, Dante River, Fensol River, Topany River, Nelansa River, Tongan River, Yledigao River, and Laolao River. The main rivers of the Manell watershed include Ajayan River, Nelansa River, Laolao River, Fintasa River, Liyog River and Asgalao Creek.

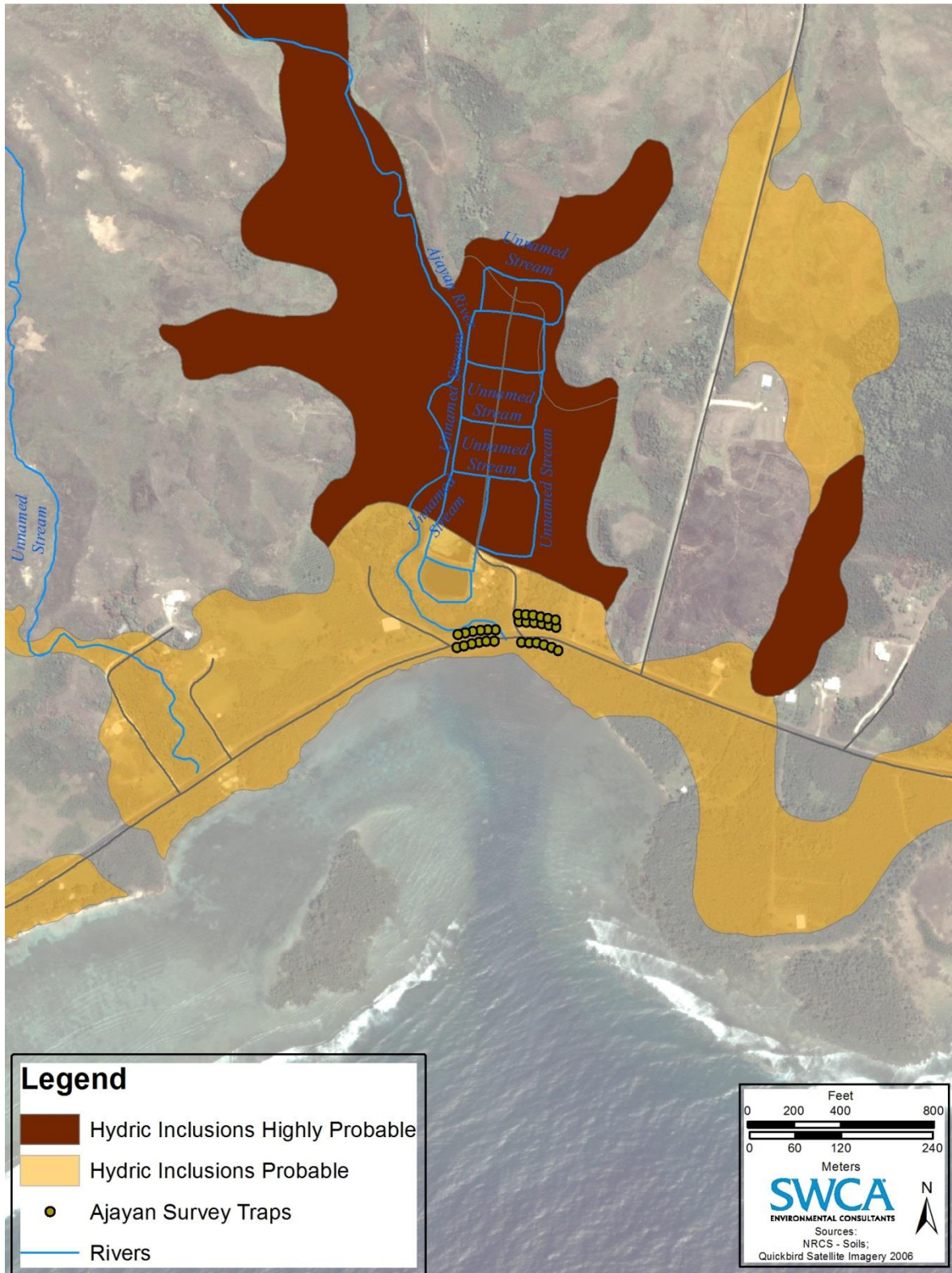
The Ajayan Bridge is situated on the southern end of the Ajayan River, adjacent to the Ajayan Bay discharge point.

### **2.2 Soils**

Guam's soils form from two basic parent types, volcanic and coralline limestone. Laterite soils, which derive from volcanically generated rocks (namely basalt) can mix with basic coralline soils to form the argillaceous clays found in the central and southern regions of the island (Stone 1970). The soils of southern Guam are generally impervious, reddish or yellowish, acidic soils and clays formed on deeply weathered volcanic rock (Young 1988).

In the Inarajan watershed are the soil types Ylig clay, Togcha-Akina silty clays, Sasalaguan clay, Pulantat clay, Inarajan clay, Chacha clay, badland, Ajayan clay, Shioya loamy sand, rock and urban land complex (WERI 2011a). The soil types in the Manell watershed mainly include Ylig clay, Akina silty clay, Akina-Atate silty clays, Sasalaguan clay, Pulantat clay, Lulantat-Kagman clays, Inarajan clay, Togcha-Akina silty clay, badland, Agfayan clay, Shioya loamy sand, rock and urban land complex. Soils on the proposed project site are probable for hydric inclusions (Figure 3) and fall within area characterized as Inarajan clay

Figure 3. Hydric Inclusions Probability



(Figure 4). Inarajan clay is a very deep, poorly drained, slowly permeable soil that occurs along valley bottoms and coastal planes. This soil forms from alluvium derived from volcanic rock. Alluvium is composed of material, such as sand, silt, or clay deposited on land by streams. Vegetation that grows in uncultivated areas of Inarajan clay are mainly wetland plants, grasses, and sedges (Young 1988).

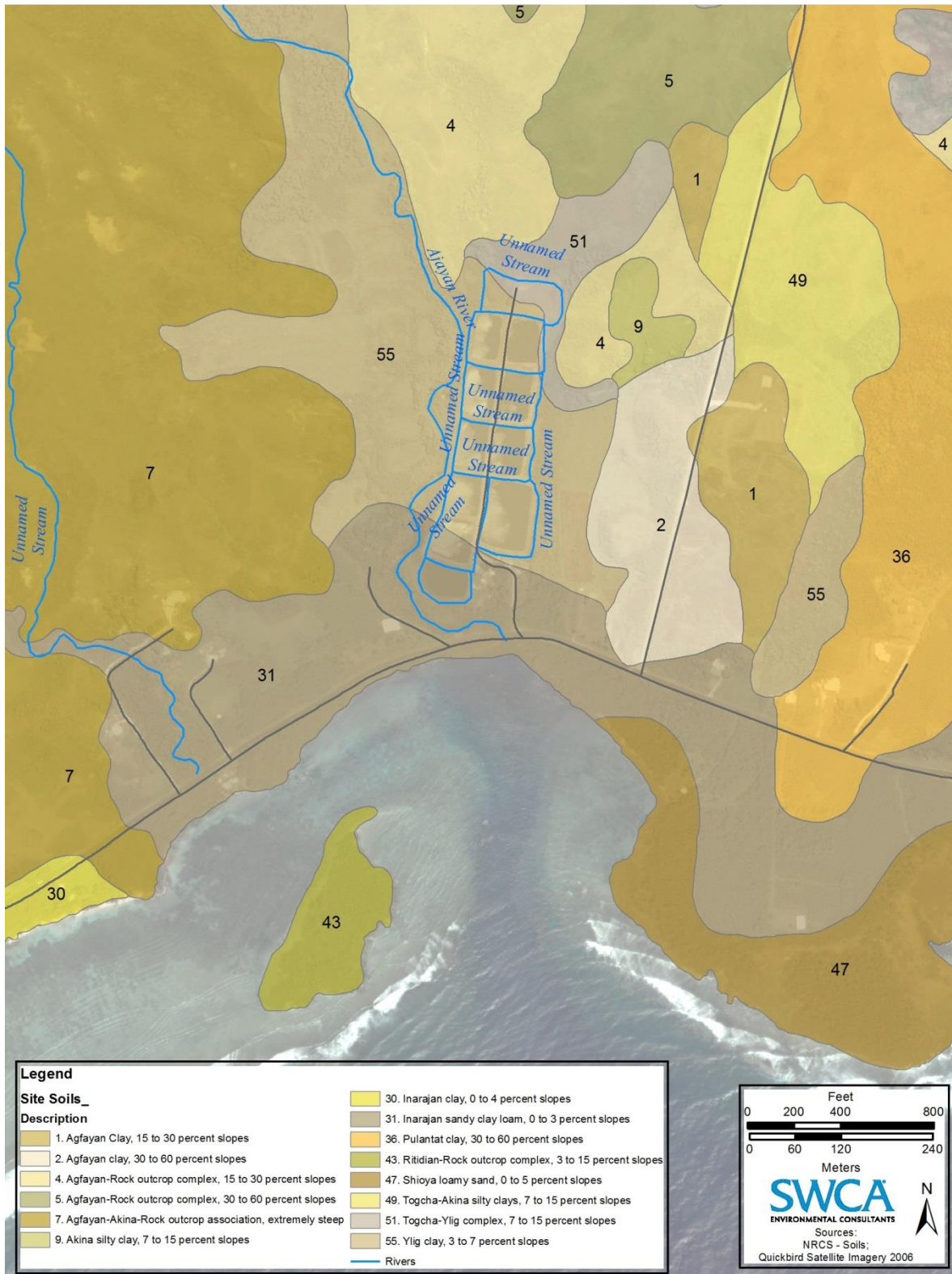
### **2.3 Wetlands**

Of the freshwater environments on Guam, freshwater marshes comprise the largest area, encompassing roughly 0.3 percent of the island's surface. These wetland areas can vary in size from 237 ac (96 ha) to less than 1.2 ac (0.5 ha) (GDAWR 2006b). The largest concentration of mangrove on Guam occurs along the eastern shores of Apra Harbor. Although Guam's mangrove wetlands only total about 173 ac (70 ha), they are the most extensive and diverse in the Mariana Islands (Wiles and Ritter 1993). Wetlands on Guam provide habitat for the endangered Mariana common moorhen (*Gallinula chloropus guami*), migratory shorebirds, and many species of native fish and aquatic invertebrates. The mangroves in Apra Harbor serve as nursery habitat for fishes, such as jacks (Carangidae) and barracudas (Sphyraenidae) (Wiles and Ritter 1993).

Substantial wetland losses have historically occurred on Guam from a number of contributing factors, including military activities and developments, road construction, aquaculture, severe soil erosion from fires, pollution, cultivation of crops, and encroachment of the tall reed, *Phragmites karka* (Wiles and Ritter 1993).

SWCA did not perform a wetland determination. No wetlands as designated by the National Wetlands Inventory (NWI) were located on the project area and therefore the project area is not expected to include wetland; however several wetlands are located nearby. While uncommon, Mariana common moorhens have been observed near this area. The area has been designated as habitat of low potential for this species (USFWS 1991, Wiles and Ritter 1993).

Figure 4. Site Soils Characteristics



## 2.4 Vegetation Types

There are nine general terrestrial vegetation types recognized on Guam. They are limestone forest, savannah complex, swamp forest (including mangroves), ravine forest, secondary thickets and partially cultivated scrub forest, coconut plantation, open ground and pastures, urban vegetation, and reed marsh (WERI 2011b). Secondary thicket/scrub forest and savannah (covering 23 and 21 percent of land on Guam, respectively) are the most common vegetation types. Secondary thicket/scrub forest is a degraded, but diverse, habitat type that generally has an open canopy less than 32 ft (10 m) high and a dense understory (GDAWR 2006b). Savannah habitat comprises Guam's grasslands, which are primarily found in southern Guam on graded volcanic soil (Fosberg 1960, GDAWR 2006b).

Forest surrounding the proposed project area consists primarily of secondary thicket/scrub forest with some ravine forest (WERI 2012) (Figure 5).

## 2.5 Terrestrial Flora

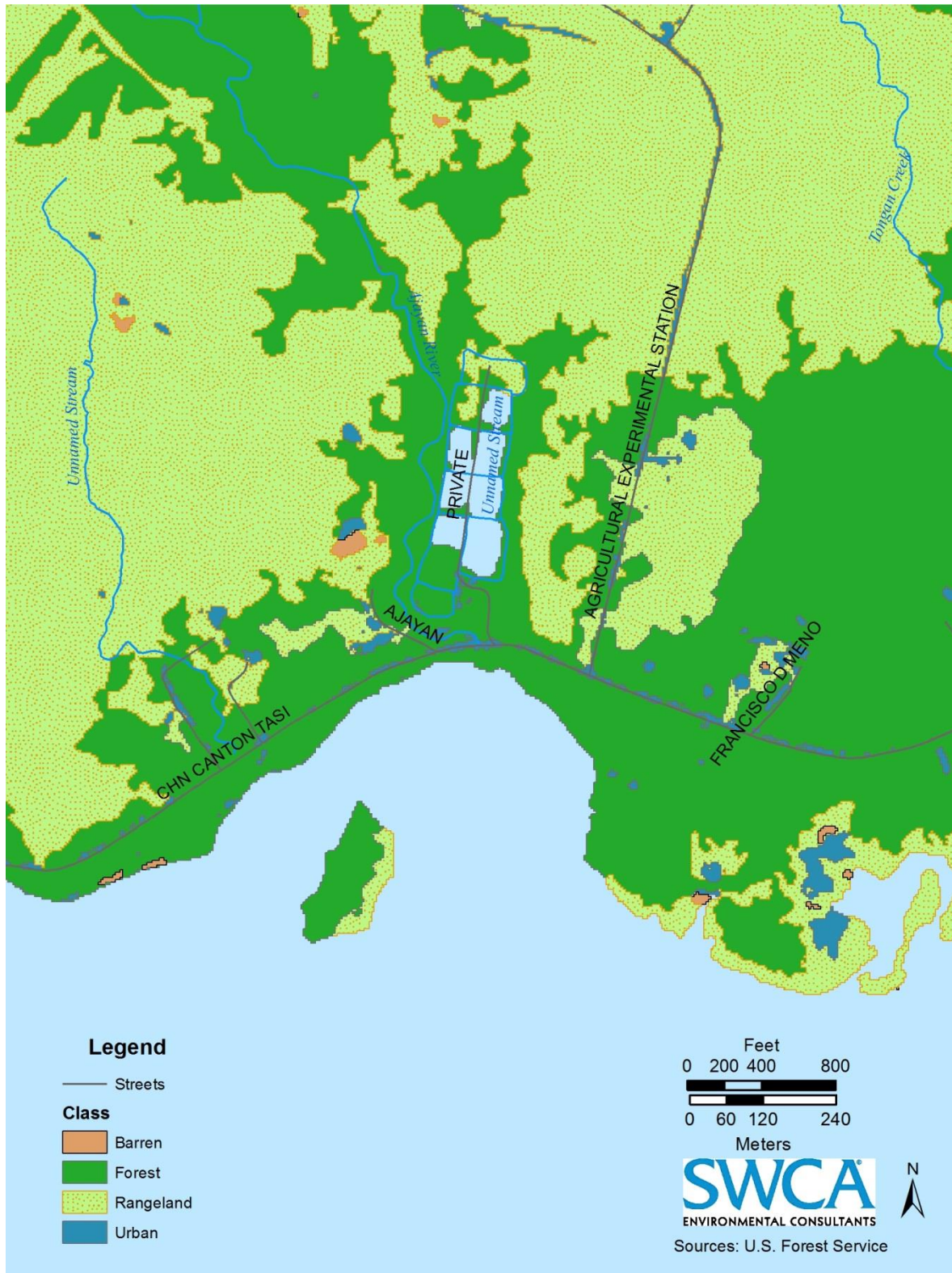
Vegetation is sparse in urban areas on Guam and includes tall grass, weed patches, and shrubby growth that frequently changes in composition (Mueller-Dombois and Fosberg 1998). Secondary thicket/scrub forest habitat immediately abutting the proposed project site likely contains plants such as breadfruit (*Artocarpus altilis*), coconut palm (*Cocos nucifera*), and tangantangan (*Leucaena leucocephala*) (Mueller-Dombois and Fosberg 1998). Because of the bridge's location, ravine forest vegetation, including sea-hibiscus (*Hibiscus tiliaceus*) and kafu (*Pandanus tectorius*), may also be present.

Areas of rangeland occur in the vicinity of the proposed project site. This rangeland likely consists of plants found in the savannah complex. Within the savannah complex, different types of grasses and herbaceous vegetation form a mosaic with erosion scars, shrubs, and tangled ferns. Sword grass (*Miscanthus floridulus*) dominates the landscape, while scattered ironwood (*Casuarina equisetifolia*) trees form sparse woodland (Mueller-Dombois and Fosberg 1998).

Plants found in the emergent and forested or shrub wetland areas will likely be dominated by *Phragmites karka*, but also potentially include sea-hibiscus, kafu, and fish-kill tree (*Barringtonia racemosa*) (Mueller-Dombois and Fosberg 1998).

Guam has one federally endangered plant species, the fire tree (*Serianthes nelsonii*). As only one adult tree of this species, located in the island's north, is known to remain on Guam (GDAWR 2006b), it is unlikely to occur at the proposed project project area. Several plant species are Species of Greatest Conservation Need (SOGCN): the fire tree, *Tabernaemontana rotensis* (endangered), tree fern (*Cyathea lunulata*; endangered), cycad (*Cycas micronesica*), *Heritiera longipetiolata* (endangered), and *Merrilliodendron megacarpum*. These species are not likely to be found at the proposed project area.

Figure 5. Surrounding Forest





## 2.6 Aquatic Flora

### 2.6.1 Shoreline Ecology

The project site is located at the mouth of the Ajayan River as it discharges into Achang Reef Flat. The shoreline vegetation is composed primarily of coconut trees (*Cocos nucifera*), pajo (*Hibiscus tiliaceus*), and tangan tangan (*Leucaena leucocephala*).

Although not located within the boundaries of the project site, *Nypa palm (Nypa fruticans)* was identified upstream of the Ajayan River. The species is a wetland obligate and grows in brackish marshes.

### 2.6.2 Aquatic Ecology

The Ajayan River flows south and discharges at the Achang Reef Flat, one of five marine preserves on Guam which regulate fishing and harvesting of marine animals. The reef flat consists of inner and outer reef flats which are exposed at low tide. Mangroves and sea grass beds are present on the shoreline in the vicinity of the project site. The waters of the Achang Reef Flat are classified as M-1 excellent and are suitable for whole body contact, recreation, and to ensure the preservation and protection of marine life including coral, reef-dwelling organisms, fish, and related resources, research, and aesthetic enjoyment.

The surface waters of the Ajayan River are classified as S-3 Low. Waters in this category are used primarily for commercial, agriculture, or industrial activity. Aesthetic enjoyment is limited and recreational body contact is limited. Maintenance of aquatic life is also limited.

## 2.7 Fauna

Fauna on the proposed project site may include birds, mammals, reptiles and amphibians, and terrestrial invertebrates.

### 2.7.1 Birds

Birds most likely to occur in the vicinity of the proposed project site include the native yellow bittern (*Ixobrychus sinensis*), and introduced Eurasian tree sparrow (*Passer montanus*), black drongo (*Dicrurus macrocercus*), black francolin (*Francolinus francolinus*), and island collared-dove (*Streptopelia bitorquata*). Importantly, the federally and locally endangered Mariana common moorhen has been observed in the vicinity of the proposed project site, although sightings are uncommon.

Mariana common moorhens reside in both permanent and seasonal freshwater wetlands. Wetlands with open water along with equal amounts of emergent, submergent, and floating vegetation are suitable for moorhen presence and activity. The Mariana common moorhen nests throughout the year and typically lays eggs concealed in emergent vegetation near open water (USFWS 1991, 2010). Moorhens move from seasonal to permanent wetlands during the dry season, and subsequently move back to seasonal wetlands during the wet

season (USFWS 2010). During these periods, interisland movements occasionally occur (Worthington 1998, Takano and Haig 2004a, b).

Two additional federally endangered birds still extant on Guam, Mariana crow (*Corvus kubaryi*) and Mariana swiftlet (*Aerodramus bartschi*), are not likely to occur on the proposed project site. The Mariana crow population has been reduced to one individual on Andersen Air Force Base (AAFB), and the Mariana swiftlet population is restricted to three caves on the Naval Magazine (Grimm 2008, SWCA 2011b, USFWS 2011a). The locally endangered Micronesian starling (*Aplonis opaca guami*) is also still found on Guam, but persists in small numbers on AAFB, Mount Santa Rosa, and Cocos Island (GDAWR 2006b, SWCA 2011b).

### **2.7.2 Mammals**

All non-flying mammals on Guam are introduced species (Vogt and Williams 2004). Small mammals are most likely to inhabit the proposed project area. These include rats (*Rattus* spp.), house mice (*Mus musculus*), and the house shrew (*Suncus murinus*) (Wiewel et al. 2009). Other introduced mammals on Guam include feral cats (*Felis catus*), feral dogs (*Canis familiaris*), Philippine deer (*Cervus mariannus*), feral pigs (*Sus scrofa*), and feral water buffalo (*Bubalus bubalis*).

The federally threatened Mariana fruit bat (*Pteropus mariannus mariannus*) is typically associated with a number of forest types, including primary and secondary limestone forest, *Cocos nucifera* forest, *Casuarina equisetifolia* groves, and ravine forest (Wiles et al. 1989, Johnson 2001). Tree species known to be used for roosting include *Aglaia mariannensis*, *Barringtonia asiatica*, *Casuarina equisetifolia*, *Cestrum diurnum*, *Cocos nucifera*, *Cordia subcordata*, *Elaeocarpus joga*, *Erythrina variegata*, *Ficus prolixa*, *Intsia bijuga*, *Macaranga thompsonii*, *Mammea odorata*, *Neisosperma oppositifolia*, *Ochrosia mariannensis*, *Premna obtusifolia*, *Pisonia grandis*, and *Terminalia catappa* (Johnson 2001, Janeke 2006, SWCA 2008a, b, 2011b). Presently the Mariana fruit bat persists in small numbers on Guam, primarily in the northern region of the island (SWCA 2008b, USFWS 2009a, SWCA 2011b). The Mariana fruit bat, also a locally endangered SOGCN, is not likely to use habitat on the proposed project site.

### **2.7.3 Reptiles and Amphibians**

Lizards classified in the families commonly known as skinks and geckos may be found at the proposed project area. Skinks most likely to be observed are the native blue-tailed skink (*Emoia caeruleocauda*) and introduced curious skink (*Carlia ailanpalai*). The curious skink is common in many habitats on Guam and the blue-tailed skink, in most areas where it occurs, is the most visible lizard on the forest floor (USGS 2005). Potential gecko species at the site are the mourning gecko (*Lepidodactylus lugubris*), mutilating gecko (*Gehyra mutilata*), and house gecko (*Hemidactylus frenatus*). These gecko species are found in all major habitat types on Guam; the mourning gecko and house gecko in particular can be found in areas of human disturbance (Sabath 1981). The monitor lizard (*Varanus indicus*), known to have a wide distribution on Guam (USGS 2005), may potentially use habitat on the proposed project site.

Guam has seven locally endangered reptiles: the snake-eyed skink (*Cryptoblepharus poecilopleurus*), Pacific slender-toed gecko (*Nactus pelagicus*), tide-pool skink (*Emoia atrocostata*), Slevin's skink (*Emoia slevini* [also known as the Mariana skink]), azure-tailed skink (*Emoia cyanura*), moth skink (*Lipinia noctua*), and Micronesian gecko (*Perochirus ateles*) (GDAWR 2006a). The snake-eyed skink, Slevin's skink, azure-tailed skink, and Micronesian gecko are not known to persist on Guam (Vogt and Williams 2004, USGS 2005, GDAWR 2006b).

The invasive brown treesnake (*Boiga irregularis*) may occur within proposed project area. The brown treesnake arrived on Guam after World War II and is responsible for the extirpation and extinction of Guam's native forest birds (Rodda and Savidge 2007). Brown treesnakes are known to habitually travel through all types of forested and nonforested habitats on Guam (Rodda et al. 1999).

Two introduced species of turtle have breeding populations on Guam: the soft-shell turtle (*Pelodiscus sinensis*) and red-eared slider (*Trachemys scripta elegans*) (Wiles and Ritter 1993, Leberer 2003). Of these, the red-eared slider is most likely to be present on the proposed project site, as its breeding populations occur throughout southern Guam (Leberer 2003).

Four sea turtles species occur in the coastal waters surrounding Guam. The green sea turtle (*Chelonia mydas*) and Loggerhead Sea turtle (*Caretta caretta*) are federally and locally listed as threatened, and Hawksbill sea turtle (*Eretmochelys imbricate*) and Leatherback sea turtles (*Dermochelys coriacea*) are federally and locally listed as endangered. Turtle nesting areas have been identified at Ritidian National Wildlife Refuge, Haputo, Urunao, Tumon Bay, Cabras Island, the waterfront annex of Naval Base Guam, Spanish Steps, Cocos Island, Acho Bay, Nomña Bay, Jinapsan, and Tarague Beach (NOAA 2010). Acho Bay is located near the project site. Turtle nesting areas are not present on the project area; however, sea turtles have been observed foraging in the vicinity of the project area (GDAWR).

Due to its remote status as a Pacific island, Guam has no native amphibian species. However, eight introduced amphibians are found on Guam. These include the marine toad (*Rhinella marina*; established in 1937) and the eastern dwarf treefrog (*Litoria fallax*; established in 1938), as well as the more recently established greenhouse frog (*Eleutherodactylus planirostris*), Hong Kong whipping frog (*Polypedates megacephalus*), and Gunther's Amoy Frog (*Hylarana [Sylvirana] guentheri*; locally known as the barking frog) (Christy et al. 2007). The following species, as of 2007, were of questionable status: the crab-eating frog (*Fejervarya cancrivora*), Indian rice frog (*Fejervarya limnocharis*), and the marbled pigmy frog (*Microhyla pulchra*) (Christy et al. 2007).

## **2.7.5 Invertebrates**

### 2.6.5.1 Terrestrial Invertebrates

Two species of butterfly are locally listed as SOGCN: the Mariana eight spot butterfly (*Hypolimnas octocula mariannensis* [also known as the forest flicker]) and the Mariana wandering butterfly (*Vagrans egistina* [also known as the Marianas rusty]). Both butterflies are federal candidate species for listing under the U.S. Endangered Species Act (USFWS 2011b, c). The Mariana eight spot and Mariana wandering butterflies inhabit primarily limestone forest, where their host plants *Elatostema calcareum*, *Procris pedunculata* and *Maytenus thompsonii* occur (Schreiner and Nafus 1997, GDAWR 2006b). These butterflies are not likely to be found at the proposed project area.

There are three species of partulid tree snails that are locally protected: one that is threatened, the Guam tree snail (*Partula radiolata*), and two endangered, the humped tree snail (*Partula gibba*) and fragile tree snail (*Samoana fragilis*) (GDAWR 2006a). All three partulids are federal candidate species for listing under the U.S. Endangered Species Act (USFWS 2012b, c, d). Most likely to be found on the proposed project site is the Guam tree snail, which was once thought to be common along stream courses in southern Guam (Hopper and Smith 1992). This species was the only partulid found during a 2008 survey on the Naval Magazine (Smith et al. 2008). The only recently reported populations of humped tree snail and fragile tree snail are from northern regions of the island (Smith et al. 2008, SWCA 2011a). All Guam's partulid tree snails are considered in decline (GDAWR 2006b).

### 3.0 METHODS AND RESULTS

#### 3.1 Flora Surveys

##### 3.1.1 Terrestrial Flora

###### *Visual surveys*

Identifiable terrestrial flora was recorded in the survey area. Visual surveys focused on locally and federally listed. Each listed plant species encountered was marked with flagging tape and location recorded with a Trimble® GeoExplorer® 2008 Series Global Positioning System (GPS) unit.

###### *Results*

A total of 19 plants were identified to either genera or species on 6 and 7 November 2013 (Table 1). The 7 native plants documented consisted of five trees (*Hibiscus tiliaceus*, *Pandanus tectorius*, *Bougainvillea glabra*, *Callicarpa candicans* and *Morinda citrifolia*), one fern (*Polypodium scolopendria*), and one grass (*Saccharum spontaneum*). No listed plant species were located on the proposed project site or immediate vicinity.

*Nypa* palm was identified upstream on the banks of the Ajayan River, however, it was not observed within the boundaries of the project site.

**Table 1.** Plant species identified during visual surveys at and immediately adjacent to the proposed Ajayan Bridge replacement project area, Guam: November 2013. Plant names are arranged alphabetically by family and then by species. The taxonomy, nomenclature, and biogeographic status of the plants are in accordance with Stone (1970), Moore and Krizman (1981), Stemmermann (1981), Falanruw et al. (1990) Raulerson and Rinehart (1991, 1992), McConnell and Gutierrez (2006), N = native to the Mariana Islands; I = introduced or alien (all plants brought to the Mariana Islands by humans, intentionally or accidentally); NA = not applicable; NCN = no common name.

Family and Scientific Name	Common Name	Biogeographic Status
ARECACEAE		
<i>Areca catechu</i>	pugua	I
<i>Cocos nucifera</i>	coconut palm	I
ASTERACEAE		
<i>Bidens alba</i>	beggar's tick	I
<i>Chromolaena odorata</i>	Siam weed	I
<i>Mikania scandens</i>	mile-a-minute vine	I
CALOPHYLLACEAE		
<i>Calophyllum inophyllum</i>	daok	I

Family and Scientific Name	Common Name	Biogeographic Status
CARICACEAE <i>Carica papaya</i>	papaya	I
FABACEAE- MIMOSIOIDEAE <i>Leucaena leucocephala</i>	tangantangan	I
<i>Pithecellobium dulce</i>	kamachile	I
LAMIACEAE <i>Callicarpa candicans</i>	Malayan lilac	N
MALVACEAE <i>Hibiscus tiliaceus</i>	sea-hibiscus	N
MUSACEAE <i>Musa sp.</i>	NA	NA
NYCTAGINACEAE <i>Bougainvillea glabra</i>	bougainvillea	N
PANDANACEAE <i>Pandanus tectorius</i>	kafu	N
POACEAE <i>Bambusa sp.</i>	NA	I
<i>Saccharum spontaneum</i>	wild cane	N
POLYPODIACEAE <i>Polypodium scolopendria</i>	monarch fern	N
RUBIACEAE <i>Morinda citrifolia</i>	Indian mulberry	N

## 3.2 Fauna Surveys

### 3.2.1 Terrestrial Fauna

#### 3.2.1.1 Birds

##### *Mariana common moorhen surveys*

Visual and audio survey for Mariana common moorhens were conducted along the Ajayan River and an adjacent tributary. Surveys were located in riparian vegetation communities, primarily composed of *Hibiscus tiliaceus*. Surveys were conducted between 0600 h and 1000 h and the observer monitored the region for moorhen movements, vocalizations, and observations. At each station, the observer recorded the number of individuals of each bird species observed or heard.

##### *Results*

On 6 and 7 November 2013, 2 Mariana common moorhen surveys were completed at four locations on the survey area and immediate vicinity. No Mariana common moorhens were detected during any of the surveys; however, the introduced island collared-dove (*Streptopelia bitorquata*), white tern (*Gygis alba*) and Eurasian tree sparrow (*Passer montanus*) were heard or observed.

##### *Mariana swiftlet surveys*

Station count surveys were carried out at four locations to determine the presence of Mariana swiftlets in the survey area and immediate vicinity. The survey location was chosen as a vantage point that provided wide and unimpeded views of the survey area. Bushnell® Legend 10 x 42 binoculars were used to detect and count swiftlets at the survey station. All Mariana swiftlet detections were documented using the Trimble® GPS unit. Wind speed, cloud cover, and rainfall (presence/absence) were recorded at the commencement of each survey period and hourly thereafter.

##### *Results*

Two station count surveys for Mariana swiftlets were completed, one each on 6 and 7 November 2013. No Mariana swiftlets were detected during any of the surveys.

#### 3.2.1.2 Mammals

##### *Mariana fruit bat surveys*

Station count surveys (or solitary fruit bat counts) as described in USFWS (2009b) and Uzzurum et al. (2003) were conducted to determine the presence of solitary Mariana fruit bats, locate aggregations or colonies, and assess flight paths. These surveys were carried out at four locations in the survey area which were chosen as a vantage point that provided wide and unimpeded views of the survey area. As suggested in USFWS (2009b), we standardized morning counts to commence pre-dawn and continue for about two hours after full light. The Bushnell® binoculars and a Bushnell® Elite 20-60x zoom spotting scope mounted on a Manfrotto™ tripod were used to detect and count fruit bats. Wind speed,

cloud cover, and rainfall (presence/absence) were recorded at the commencement of each survey period and hourly thereafter.

### *Results*

Two station count surveys for Mariana fruit bats were completed, one each on 6 and 7 November 2013. No Mariana fruit bats were detected during any of the surveys.

Feral dogs (*Canis familiaris*) were recorded in the survey area. Adult dogs were observed and heard on and adjacent to the proposed project site. Additionally, skeletal remains of two feral pigs (*Sus scrofa*) were found in the survey area.

### 3.2.1.3 Reptiles and Amphibians

Herpetological surveys were performed nocturnally (targeting geckos) and diurnally (targeting skinks) to increase the possibility of encountering as many species as possible. Reptiles and amphibians (herpetofauna) were detected by capture using glue board traps (henceforth referred to as traps) and/or visual surveys. Capturing individuals was valuable for identification of fast moving, cryptic or morphologically similar species. Visual surveys were intended to detect species that might not be trapped.

#### *Trap surveys*

Fieldwork sessions commenced between 0700 h and 0900 h. Throughout the site, non-scented traps were set randomly on trunks of trees and the ground at each trap location. Trap location intervals were no more than 33 ft (10 m) apart, and if no tree was present within 15 ft (5 m) of a ground trap, only the ground trap was set. Tree traps were nailed to a tree or plant with a minimum diameter at breast height of 1.5 in (50 mm) between 3 and 6 ft (1–2 m) above the ground. A total of 30 survey stations (55 traps) were established. All stations consisted of one tree trap and one ground trap except stations 1.1, 1.3, 1.4, and 1.5, which had only a ground trap. All traps were set in the shade. Traps were checked two hours from opening.

#### *Visual surveys*

Visual surveys were conducted on 6 and 7 November 2013. Search speed was approximately 0.2 mi/h (0.3 km/hr). Species, location, time and weather conditions were recorded. Incidental observations and comments were also recorded.

### *Results*

Herpetofauna was surveyed on 6 and 7 November 2013. The surveys were conducted in the vicinity where site clearing and construction will occur. A total of 17 herpetofauna individuals representing two species were detected at the site (Table 2). These included the curious skink (*Carlia fusca*) and the cane toad (*Rhinella marina*), both are introduced species.



**Table 2.** Vertebrate species identified during visual surveys at and immediately adjacent to the proposed Ajayan Bridge replacement project area, Guam: November 2013, N = native to the Mariana Islands; I = introduced or alien (all plants brought to the Mariana Islands by humans, intentionally or accidentally)

Scientific Name	Common Name	Biogeographic Status
<b>Avian</b>		
<i>Passer montanus</i>	Eurasian Tree Sparrow	I
<i>Gypis alba</i>	White Tern	N
<i>Streptopelia bitorquata</i>	Island Collared Dove	I
<i>Dicrurus macrocerus</i>	Black Drongo	I
<b>Reptiles</b>		
<i>Carlia fusca</i>	Curious skink	I
<i>Rhinella marinus</i>	Marine toad	I
<b>Mammals</b>		
<i>Sus scrofa</i>	Feral Pigs	I
<i>Canis familiaris</i>	Feral Dogs	I

#### 3.2.1.4 Invertebrates

##### *Mariana eight-spot butterfly and Mariana wandering butterfly surveys*

During terrestrial flora surveys (see section 3.1.1), known Mariana eight-spot and Mariana wandering butterfly host plants (*Elatostema calcareum*, *Procris pedunculata* and *Maytenus thompsonii*) in the survey area and immediate vicinity were searched. If any known host plants were located, visual surveys were conducted for eggs, larvae, chrysalids, and adults of both butterfly species.

##### *Results*

Visual surveys on 6 and 7 November 2013 did not document known Mariana eight-spot and Mariana wandering butterfly host plants. Additionally, no adults of either species were observed. Two butterfly species were detected in the survey area: the native blue-banded king crow (*Euploea eunice*) and introduced black citrus swallowtail (*Papilio polytes*).

##### *Partulid tree snail surveys*

General visual surveys for partulid tree snails were conducted on the proposed project site and immediate vicinity. Target species included the Guam tree snail (*Partula radiolata*), humped tree snail (*Partula gibba*), and fragile tree snail (*Samoana fragilis*). During the surveys, the observer examined the leaves and stems of known partulid host plants for the presence of snails. Information on known partulid host plant species was obtained from Hopper and Smith (1992), Smith et al. (2008), and SWCA (2011a).

##### *Results*

No partulid tree snails were recorded during the surveys on 6 and 7 November, 2013.

**Table 3.** Invertebrate species identified during visual surveys at and immediately adjacent to the proposed Ajayan Bridge replacement project area, Guam: November 2013, N = native to the Mariana Islands; I = introduced or alien (all plants brought to the Mariana Islands by humans, intentionally or accidentally)

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<b>Butterflies</b>		
<i>Euploea Eunice</i>	Blue-banded King Crow	Native
<i>Papilio polytes</i>	Black Citrus Swallowtail	Introduced

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## **4.0 CONCLUSIONS**

### **4.1 Flora**

#### **4.1.1 Terrestrial Flora**

##### 4.1.1.1 Federal and Locally Listed Species

No federally or locally threatened or endangered terrestrial flora species were found on the proposed Ajayan Bridge project site.

##### 4.1.1.2 Invasive Species

Three terrestrial flora species recorded on the proposed Guatali Bridge project site are considered to be invasive by the International Union for Conservation of Nature/Species Survival Commission (IUCN/SSC) Invasive Species Specialist Group: *Chromolaena odorata*, *Leucaena leucocephala*, and *Mikania scandens*, (IUCN/SSC - ISSG 2005, 2006, 2010a, b). General impacts of these species include preventing reproduction and establishment of other plant species (*C. odorata*); killing other plants by eliminating light and smothering them (*M. scandens*); and replacing native forest with dense monospecific thickets (*L. leucocephala*).

### **4.2 FAUNA**

#### **4.2.1 Terrestrial Fauna**

##### 4.2.1.1 Federal and Locally Listed Species

###### *Birds*

No federally or locally threatened or endangered bird species were found on the proposed Ajayan Bridge project site. However, because the region contains suitable Mariana common moorhen habitat, we do not dismiss the possibility of moorhens using the area for foraging, nesting, and resting.

###### *Mammals*

No federally or locally threatened or endangered mammal species were found on the proposed Ajayan Bridge project site. The Mariana fruit bat survey methods employed during this project rely on observing fruit bats in low light and daytime conditions. Any fruit bats that were using areas prior to, or after, the survey periods would not have been detected. The results from each survey represent a relatively small temporal and spatial snapshot.

###### *Reptiles and Amphibians*

No federal or locally threatened or endangered reptile or amphibian species were observed on the proposed Ajayan Bridge project site.

Known sea turtle nesting areas are located near the project site and sea turtles have been observed foraging in the vicinity of the Ajayan Bridge.

*Invertebrates*

No federal or locally threatened or endangered invertebrate species were observed on the proposed Ajayan Bridge project site.

4.2.1.2 Invasive Species

*Birds*

The black drongo was detected during bird surveys on the proposed Ajayan Bridge project site. This bird was introduced by the Japanese to Rota from Taiwan in 1935 (Baker 1951) and is presumed to have colonized Guam on its own (Jenkins 1983). It is considered to be strongly territorial and aggressive, and known to displace smaller birds that might otherwise nest within their territories (Fritts and Rodda 1998). Although not technically invasive, the black drongo is regarded as a factor in population declines of the federally endangered Rota white-eye (*Zosterops rotensis*) and Mariana crow on Rota (USFWS 2005, 2007).

*Mammals*

No invasive mammal species were found on the proposed Ajayan Bridge project site; however, skeletal remains of two feral pigs were discovered on the site.

*Reptiles and Amphibians*

The curious skink and marine toad are both prolific introduced species observed during the herpetological survey.

*Invertebrates*

No invasive invertebrate species were found on the proposed Ajayan Bridge project site.

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**Appendix L**  
**Ajayan Bay Archeological Site 66-05-0111**

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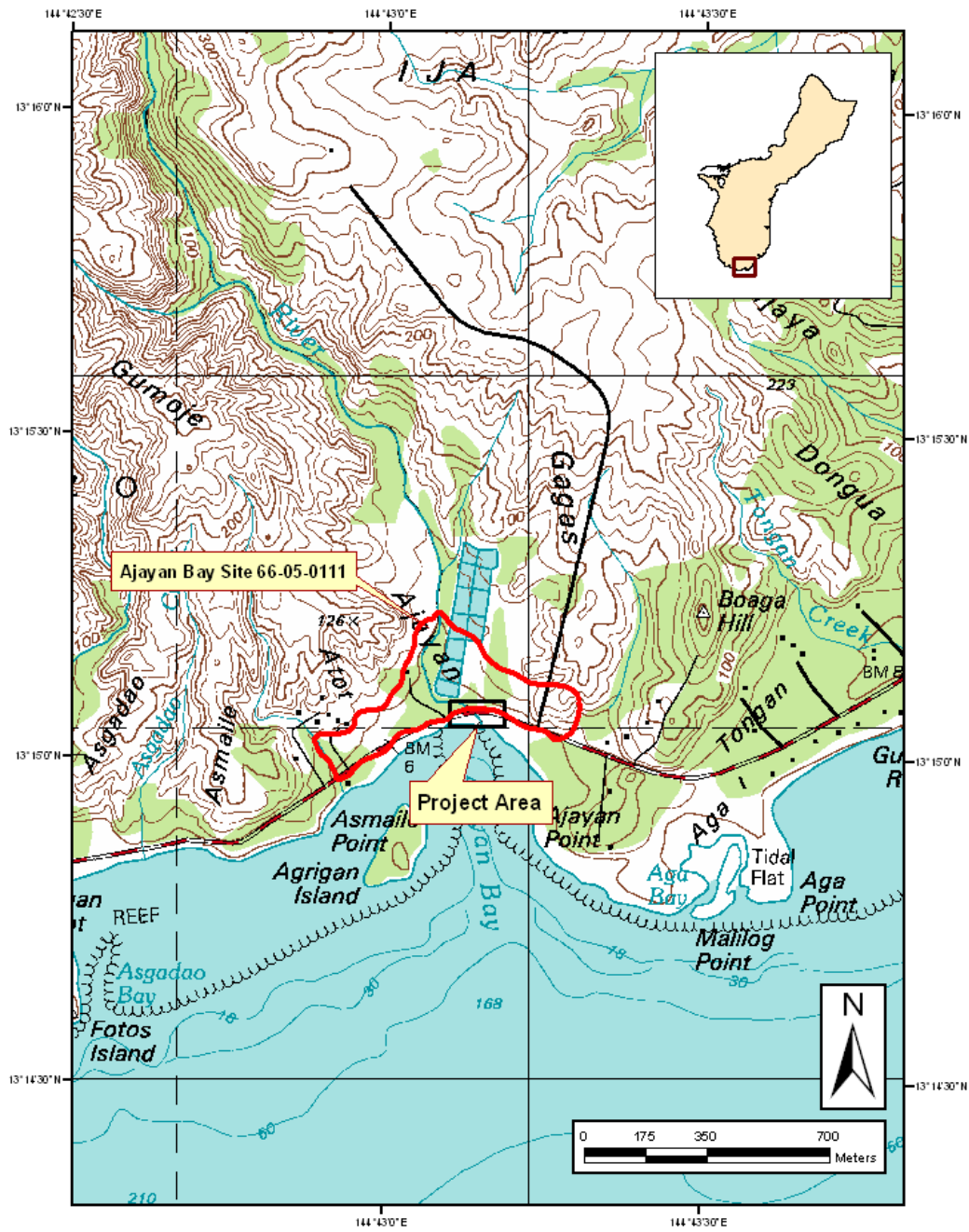


Figure 5. Location of archaeological sites in the vicinity of the current APE on a portion of USGS 2000 map, Inarajan Quadrangle (1:24,000).

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