

COASTAL CONSERVANCY

Staff Recommendation
October 18, 2012

HUMBOLDT BAY SEA LEVEL RISE ADAPTATION PLAN

Project No. 12-029-01
Project Manager: Joel Gerwein

RECOMMENDED ACTION: Consideration and possible Conservancy authorization to disburse up to \$250,000 to the Coastal Ecosystems Institute of Northern California to prepare a sea level rise adaptation plan for the Humboldt Bay Region.

LOCATION: Humboldt Bay, County of Humboldt, California

PROGRAM CATEGORY: Integrated Coastal and Marine Resources Protection

EXHIBITS

- Exhibit 1: [Project Location](#)
 - Exhibit 2: [Figures and Photographs](#)
 - Exhibit 3: [Project Letters](#)
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RESOLUTION AND FINDINGS:

Staff recommends that the State Coastal Conservancy adopt the following resolution pursuant to Sections 31111 and 31220 of the Public Resources Code:

“The State Coastal Conservancy hereby authorizes the disbursement of two hundred and fifty thousand dollars (\$250,000) to the Coastal Ecosystems Institute of Northern California (CEI) to prepare a sea level rise adaptation plan for the Humboldt Bay region, subject to the following condition that prior to the disbursement of funds, (1) the Conservancy’s Executive Officer shall approve in writing a work program, budget, schedule and any contractors to be employed for these tasks; and (2) CEI shall provide evidence satisfactory to the Conservancy’s Executive Officer that it has obtained all remaining funds needed to complete the plan.”

Staff further recommends that the Conservancy adopt the following findings:

“Based on the accompanying staff report and attached exhibits, the State Coastal Conservancy hereby finds that:

1. The proposed project is consistent with the current Project Selection Criteria and Guidelines.

2. The proposed authorization is consistent with the purposes and objectives of Chapter 5.5 of Division 21 of the Public Resources Code (Section 31220), regarding integrated coastal and marine resources protection.
 3. Humboldt Bay has been identified in the Certified Local Coastal Programs of the Cities of Eureka and Arcata and the County of Humboldt as a resource requiring protection.
 4. CEI is an organization existing under Section 501(c)(3) of the Internal Revenue Service code whose purposes are consistent with Division 21 of the Public Resources Code.”
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PROJECT SUMMARY:

The proposed project would provide a grant of \$250,000 to the Coastal Ecosystems Institute of Northern California (CEI) to prepare a sea level rise adaptation plan (Plan) for the Humboldt Bay region. The Plan will include a sea level rise vulnerability assessment and adaptation strategies. Plan preparation would be overseen by a sea level rise working group convened through the Humboldt Bay Initiative. The Plan will help the region’s communities develop and implement strategies to preserve environmental and economic resources in the face of a changing climate and future development.

CEI will oversee the preparation of a sea level rise (SLR) vulnerability assessment for Humboldt Bay. The vulnerability assessment will assess flooding frequency in the Humboldt Bay region due to the combination of SLR, high tides, and storms. It will include estimates of extreme water level return intervals, such as the 10-year or 100-year flood elevation, and tidal datums such as mean higher high water (MHHW), under different rates of SLR for Humboldt Bay. The response of the shallow groundwater zone surrounding Humboldt Bay to incremental SLR will also be estimated. Using the recently completed high resolution Coastal LiDAR, maps of areas vulnerable to inundation from Humboldt Bay tidal water that correspond to specific return intervals and tidal datums for existing conditions and different rates of SLR will be produced. Similarly, inundation maps will be produced for areas vulnerable to increased groundwater levels in response to different rates of SLR. These maps will indicate areas surrounding Humboldt Bay that are most likely to be vulnerable to inundation from SLR effects. Analyses of resources impacted within these inundation areas will be conducted. The vulnerability of resources, such as tidal marshes, agricultural land, and built infrastructure such as highways, wastewater treatment plants, and residential and commercial areas, will be determined using these inundation maps.

CEI will work with the Humboldt Bay Harbor Recreation and Conservation District (Harbor District) to oversee public outreach and the adaptation planning process for the project, which will build on the vulnerability assessment. CEI anticipates subcontracting approximately \$95,000 to the Harbor District for this purpose. An Adaptation Plan will be prepared that identifies generalized strategies for the region to respond to SLR and provides site specific examples of these strategies. However, adaptation planning and implementation will ultimately need to be done by individual jurisdictions around Humboldt Bay, such as the Cities of Arcata and Eureka and the County of Humboldt. It will be critical for individual jurisdictions to coordinate their planning processes in order for adaptation to be effective. The Harbor District

will convene an Adaptation Planning Working Group, composed of the Cities of Arcata and Eureka and the County, as well as land management and regulatory agencies and tribes with jurisdiction in the Humboldt Bay region, such as the US Fish and Wildlife Service Humboldt Bay National Wildlife Refuge, the California Department of Fish and Game, and the Wiyot Tribe. In addition, the Harbor District will keep the public informed about the planning process and solicit public input through regular public meetings, a Humboldt Bay Sea Level Rise website, and other means.

As California's second largest natural bay and the largest estuary on the Pacific coast between San Francisco Bay and Coos Bay, Oregon, Humboldt Bay (see Exhibit 1) is a complex ecosystem and valuable resource for California and the nation because of its natural and environmental resources, its aesthetic appeal and recreational opportunities, its ecological services, economic benefits, and its vital transportation links. Visitors and Humboldt County residents alike value Humboldt Bay for its natural and man-made attributes. The Humboldt Bay region will be severely impacted by sea level rise. Resources, land uses and infrastructure vulnerable to sea level rise include coastal marshes, agricultural lands, wastewater treatment plants, Highway 101, and commercial and residential areas. In order to minimize impacts to natural resources and human communities, it is essential to begin planning to adapt to sea level rise and other changes as soon as possible.

Inundation of some areas adjacent to Humboldt Bay already occurs periodically when severe storms and king high tides coincide (see Exhibit 2). For example, severe storms in winter 2005-2006 resulted in overtopping and breaches of levees and dikes, leading to flooding of Arcata's wastewater treatment ponds, southbound Highway 101, and agricultural land. Facilities located near the Bay provide numerous essential services to the community, and are at risk from projected increases in sea levels due to their elevation. Threats to Humboldt County from a 1.4 meter rise in sea level include:

- Residences: 7,800 people will be living in the 100-year floodplain, with disproportionate impacts on low-income households.
- \$1.4 billion in property replacement value will be located within the 100-year floodplain.
- 240 miles of roads, including 58 miles of highway. The U.S. 101 corridor between Arcata and Eureka is especially at risk.
- 3 contaminated sites (in addition to the 10 that are currently within the 100-year floodplain).
- Other infrastructure at risk includes the City of Eureka wastewater treatment plant, the Humboldt Bay power plant, and fuel storage tanks.

Without advance planning, projected changes could lead to devastating losses of species and ecological functions, as well as hundreds of millions of dollars of direct damages and lost infrastructure and economic productivity.

Both the County of Humboldt and the City of Arcata have joined the International Council on Local Environmental Initiatives and the Cities for Climate Protection Campaign and have prepared Climate Action Plans. These plans focus on inventorying and reducing greenhouse gas emissions. Sea level rise adaptation will require a coordinated approach between the Cities, the County, and other land managers around the Bay, such as the Harbor District and the National Wildlife Refuge. Implementation of an adaptation plan through changes to zoning, repair and construction of shoreline protection, and relocation of infrastructure will likely be implemented

by individual jurisdictions. However, planning needs to be coordinated between the various jurisdictions in order to be effective. Efforts to coordinate sea level rise adaptation planning are underway, and include regular meetings between planners from the Cities, the County, and the Harbor District, as well as efforts by the Humboldt Bay Initiative to collect data and refine regional modeling of sea level rise impacts. While local jurisdictions recognize the need for comprehensive planning, local resources are insufficient to support such an effort.

The Coastal Ecosystems Institute of Northern California (CEI) is a non-profit organization whose mission is develop, integrate and disseminate scientific information about coastal ecosystems, and to advance communication, collaboration, and activities that enhance ecosystem health (i.e. ecosystem-based management). CEI is the nonprofit entity of the Humboldt Bay Initiative (HBI), a network of Humboldt Bay agencies and organizations formed in 2007 to develop an ecosystem based approach to coastal resource management. HBI and CEI have embarked on a climate adaptation strategy based on a Coordinated Response to Climate and Coastal Change (HBI Strategic Plan 2009). Local accomplishments include:

- Local, existing data compiled
- Community climate adaptation planning workshop demonstrated use of a cumulative impact tool for rising sea level impacts
- Shoreline and dike assessment
- Essential vertical land elevation data is being acquired
- Baseline physical and ecological data are being collected for three Humboldt Bay salt marshes.

The Harbor District is a county-wide special district with permit jurisdiction over all tide, submerged and other lands granted to the District, including all of Humboldt Bay. It was created by the state legislature in 1970, and approved by the Humboldt County electorate in 1973 to oversee development of harbors in Humboldt Bay for benefit of the public. Along with the US Army Corps of Engineers and the California Coastal Commission, the Harbor District regulates dredging and disposal activities in Humboldt Bay. Its role in maintaining the Port of Humboldt Bay and conserving Humboldt Bay's natural resources makes it uniquely qualified to carry out its portion of this project.

Site Description:

Humboldt Bay is located approximately 265 miles north of San Francisco, California, and approximately 250 miles south of Coos Bay, Oregon, in the heartland of California's majestic Redwood forest region (Exhibit 1). The Humboldt Bay watershed includes rolling farmlands, scenic beaches and dunes, creeks, lush woodlands, and diverse wetlands.

Humboldt Bay has numerous ecosystems that are home to many plant and animal species, including several classified as endangered or threatened under federal or state law. The biota associated with Humboldt Bay is diverse and ecologically significant at scales ranging from a local focus on fisheries and algal uses by local residents to a participation in hemispheric ecological patterns such as shorebird and waterfowl migration. The Bay hosts over 100 plant species, 300 invertebrate species, 100 fish species, and 200 bird species, including those that rely on the bay as they travel the Pacific Flyway. Recent studies indicate the importance of the Bay in the life cycles of commercially and recreationally important fish species, and the general level

of biological vitality in the Bay has been identified as an important aesthetic and quality-of-life variable for both residents and visitors to the area. During the late-nineteenth and early twentieth centuries, diking and filling reduced Bay salt marshes from an estimated 9,000 acres to only 900 acres today. Bay habitat has been further disturbed by discharges of agricultural and urban runoff, industrial and recreational uses, and colonization by invasive cordgrass.

Humboldt Bay's bountiful aquatic organisms support commercial and sport finfishing and shellfishing, and the Bay supports many other water-dependent and water-related activities. Tourism and recreation are central to Humboldt County's local economy, including businesses such as restaurants and marinas that cater to recreational fishermen, birders, boaters, bathers, hunters, and nature enthusiasts. Both residents and visitors enjoy the numerous ecological, cultural, and economic assets of Humboldt Bay. The population of Humboldt Bay is approximately 58,000, divided between Eureka, in the central portion of the Bay, Arcata, located on Humboldt Bay's northern section, and several unincorporated communities around the Bay.

Project History:

The Conservancy has engaged multiple partners to plan for habitat protection and restoration and climate change adaptation in Humboldt Bay. In 2006, the Conservancy made two grants to California Sea Grant for this purpose: \$75,000 to support the development of a Humboldt Bay Ecosystem Based Management (EBM) Program, and \$115,000 to prepare a Subtidal and Intertidal Habitat Goals Project. The Humboldt Bay EBM Program resulted in the HBI's formation. In addition, in 2010, the Conservancy contracted with Trinity Associates to map shoreline protection around Humboldt Bay to inform sea level rise adaptation planning. In January 2012, the Conservancy authorized a grant to the Harbor District to evaluate the feasibility of using dredged materials for tidal marsh restoration and sea level rise adaptation projects.

The Conservancy has also worked with the Harbor District on several other planning and implementation projects to enhance natural resources and public access in Humboldt Bay. In 2000, the Conservancy granted \$100,000 to the Harbor District to prepare the Humboldt Bay Management Plan, a comprehensive plan to protect and enhance Humboldt Bay's natural, recreational and economic resources. In 2010, the Conservancy granted \$92,000 to the Harbor District for final designs and permitting for additional access points for the Humboldt Bay Water Trail. Also in 2010, the Conservancy granted \$30,000 in federal funds to the Harbor District to complete technical studies to support planning for regional invasive *Spartina* control.

CEI and Harbor District staff contacted the Conservancy regarding this project in Spring 2012, and Conservancy staff has been working with these groups to develop the project since that time.

PROJECT FINANCING

Coastal Conservancy	\$250,000.00
Total Project Costs	\$250,000.00

The anticipated source of funds is an appropriation to the Conservancy from the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84). Proposition 84 authorizes the use of these funds to protect and restore the natural habitat values of coastal waters and lands (Section 75060 of the Public Resources Code). Section 75060(b) of the Public Resources Code specifically allocates funding to the Conservancy for expenditure pursuant to the Conservancy’s enabling legislation, Division 21 of the Public Resources Code. The proposed project will protect coastal resources by assisting the stakeholders in the Humboldt Bay plan in adapting to the impacts of sea level rise. As discussed in the section found immediately below, the project is consistent with Chapter 5.5 of Division 21 of the Public Resources Code.

In-kind contributions for the project in the form of staff resources will be extensive, through project review, provision of necessary data, and participation in HBI, which will serve in a technical advisory capacity. Agencies that will provide significant in-kind staff time contributions include: the Harbor District, County of Humboldt, City of Arcata, City of Eureka, Humboldt County Association of Governments, and U.S. Fish and Wildlife Service.

CONSISTENCY WITH CONSERVANCY’S ENABLING LEGISLATION:

This project would be undertaken pursuant to Chapter 5.5 (Section 31220) of the Conservancy’s enabling legislation, Division 21 of the Public Resources Code, regarding integrated coastal and marine resources protection. Section 31220(a) authorizes the Conservancy to undertake and award grants for projects that meet one or more criteria of Section 31220(b). Consistent with Section 31220(b), the proposed project aims to achieve the following objective: reduce threats to coastal and marine fish and wildlife by assessing risks and vulnerability from impacts of projected sea level rise on the natural and manmade assets of Humboldt Bay and identify adaptation strategies to address these threats.

Section 31220(c) requires that projects funded under Section 31220 be consistent with the Integrated Watershed Management Program established under Public Resources Code Section 30947, local watershed management plans, if available, and water quality control plans adopted by the State Water Resources Control Board and regional water quality control boards; and include a monitoring and evaluation component. As discussed in detail below under “Consistency with Local Watershed Management Plan/State Water Quality Control Plan,” the proposed project is consistent with local and state watershed plans. In addition, the project includes a monitoring and evaluation component. Consistent with Section 31220(a), which requires consultation with the State Water Resources Control Board (SWRCB) to ensure consistency with Chapter 3 (commencing with Section 30915) of Division 20.4 of the Public Resources Code, staff has notified the SWRCB of the nature of the project and provided the opportunity for comment, input and review.

Consistent with Section 31111, the Conservancy may fund plans and feasibility studies, such as the proposed project and award grants to nonprofit organizations for these purposes.

CONSISTENCY WITH CONSERVANCY'S 2007 STRATEGIC PLAN GOAL(S) & OBJECTIVE(S):

Consistent with **Goal 5, Objective A** of the Conservancy's 2007 Strategic Plan, the proposed project will result in a plan for enhancing wetland and upland habitats of Humboldt Bay that incorporates predicted habitat evolutions from climate change.

CONSISTENCY WITH CONSERVANCY'S PROJECT SELECTION CRITERIA & GUIDELINES:

The proposed project is consistent with the Conservancy's Project Selection Criteria and Guidelines, last updated on November 10, 2011, in the following respects:

Required Criteria

1. **Promotion of the Conservancy's statutory programs and purposes:** See the "Consistency with Conservancy's Enabling Legislation" section above.
2. **Consistency with purposes of the funding source:** See the "Project Financing" section above.
3. **Support of the public:** The project has the support of state and elected officials including Congressman Mike Thompson, State Senator Noreen Evans, State Assemblymember Wes Chesbro, Humboldt County Board of Supervisors, the Cities of Eureka and Arcata, and environmental groups including the Humboldt Baykeeper and the Redwood Community Action Agency.
4. **Location:** The proposed project would be located within the coastal zone of Humboldt County, the City of Eureka, and the City of Arcata.
5. **Need:** While CEI and the Harbor District have obtained in-kind commitments and matching funds from public agencies and partnering organizations, at this time the vulnerability assessment and adaptation plan cannot move forward without Conservancy assistance.
6. **Greater-than-local interest:** The project will serve to demonstrate a method for downscaling information on projected future sea level rise to a regional scale that can be used by local planners. Additionally, the interagency multijurisdictional planning effort will serve as a model for coastal resource planning and government agency collaboration that could be readily duplicated statewide.
7. **Sea level rise vulnerability:** The project will create a methodology and products (including geographic information system data layers and maps) for estimating a range of potential future sea level rise scenarios in Humboldt Bay, assess risk and vulnerability of natural and manmade assets, and identify possible adaptation strategies.

Additional Criteria

8. **Urgency:** This project is urgently needed to provide local jurisdictions with a vulnerability assessment based on downscaled models and recently available LiDAR data. The current statewide projections of sea level rise and erosion rates is based on best available statewide data and was expressly not intended for use by local planners.
9. **Leverage:** See the “Project Financing” section above.
10. **Innovation:** This project will demonstrate an innovate technical approach to planning for impacts of sea level rise, specifically flooding and coastal erosion in a coastal wetland ecosystem that contains adjacent infrastructure including an airport, roads, and two wastewater treatment plants.
11. **Readiness:** CEI and the Harbor District have demonstrated that they have the expertise, local public support, and administrative capability necessary to commence the project in fall 2012.
12. **Cooperation:** Numerous agencies and organization are already engaged in climate change adaptation planning and will participate in this project as well, including the Cities of Eureka and Arcata, Humboldt County, the US Fish and Wildlife Service, the Department of Fish and Game, the Wiyot Tribe, and several non-profits and private companies in the region. These agencies and organizations all have an interest in man-made and/or natural resources in the Humboldt Bay and are eager to find opportunities to address potential future risks to those resources.

CONSISTENCY WITH LOCAL COASTAL PROGRAM POLICIES:

The proposed project area falls within the jurisdiction of the Local Coastal Programs (LCP) of the City of Eureka, County of Humboldt, and the City of Arcata. Consistency with the LCP for each of these jurisdictions is discussed below. The Humboldt Bay Area Plan (HBAP) of the Humboldt County Local Coastal Program (LCP), certified by the California Coastal Commission in 1982, supports planning to protect environmentally sensitive habitats, such as coastal marshes at risk from sea level rise, and to protect property and residents. The HBAP cites Section 30240(a) of the California Coastal Act, stating that “environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values” (HBAP Section 3.30, p. 38). In addition, the HBAP stresses the tremendous value of salt marsh, brackish marsh, and other natural habitats for fish and wildlife in Humboldt Bay (HBAP, Section 3.30(A), pp.39-40). The County’s updated Draft General Plan includes the following policies: S-PX4. Development on or Adjacent to Coastal Bluffs and Beaches. Allow development in areas immediately adjacent to coastal bluffs and beaches only if it can be demonstrated by a certified engineering geologist that wave action, storm swell, tsunami inundation, and projected sea level rise using the best available scientific information and at the time of review, are not a hazard to the proposed development. (2012 Draft General Plan, pg. 14-16)

S-P27. Pre-disaster Planning and Mitigation. The County shall proactively reduce known hazards through pre-disaster planning and mitigation efforts. (ibid, pg 14-18)

The proposed project is also consistent with resource protection and hazard mitigation policies in the City of Arcata’s certified LCP and the City of Eureka’s certified LCP. Section D of the City of Arcata’s LCP, regarding wetlands and riparian resources, provides for the establishment of

Wetland Buffer Areas to protect sensitive wetlands. The City of Arcata's General Plan contains the following policy:

RC-1a Maintain Biological and Ecological Integrity. Maintaining ecological balance, system function, biological integrity, and natural diversity is the primary focus of the Resource Conservation and Management Element. Protecting ecological functions of natural habitats, and natural drainage and infiltration processes, will enhance natural ecosystems in the Planning Area....An "adaptive management" approach shall be utilized to maintain ecological and biological integrity, including monitoring the status of ecological systems in the City and adjusting City implementation of this Plan, in order to more closely approximate the conditions provided in the Planning Area's least-disturbed natural ecosystems. (Arcata General Plan 2008, pg. 4-24)

The City of Eureka's 1997 General Plan Policy Document (GPPD), which was certified by the Coastal Commission as an update to the City of Eureka's LCP in 1999, contains several policies consistent with the project. The GPPD designates wetlands as environmentally sensitive habitat areas (GPPD Section 6.A.6, pg. B-15) and states that the City of Eureka "shall ensure that environmentally sensitive habitat areas are protected against any significant disruption of habitat values, and that only uses dependent on such resources shall be allowed within such areas" (GPPD Section 6.A.7, pg. B-15). The GPPD also states that the City of Eureka "shall maintain and, where feasible, restore biological productivity and the quality of coastal waters, streams, wetlands, and estuaries" (GPPD Section 6.A.1, pg. B-14).

CONSISTENCY WITH LOCAL WATERSHED MANAGEMENT PLAN/STATE WATER QUALITY CONTROL PLAN:

Projects undertaken pursuant to Chapter 5.5 of Public Resources Code Division 21 (Section 31220) must be consistent with local watershed management plans, if available, and with water quality control plans, adopted by the state and regional water boards. The proposed project is consistent with the Water Quality Control Plan for the North Coast (adopted by the Regional Water Quality Control Board North Coast Region in 1988 and last updated in 2007) in that it constitutes an important step towards the protection and enhancement of wildlife habitat, habitat for rare, threatened and endangered species, and estuarine habitat in Humboldt Bay. The Water Quality Control Plan for the North Coast designates wildlife habitat, rare, threatened, and endangered species habitat, and estuarine habitat as beneficial uses of Humboldt Bay (Water Quality Control Plan for the North Coast, Table 2-1, pp. 2-8 to 2-12).

The proposed project is also consistent with the North Coast Integrated Regional Water Management Plan, Phase I (NCIRWMP) (2007). Objective 1 of the NCIRWMP is to "conserve and enhance native salmonid populations by protecting and restoring required habitats, water quality and watershed processes." Consistent with Objective 1, the project will plan for the protection of tidal marshes and other habitats in Humboldt Bay that provide valuable habitat for salmonids.

The Harbor District adopted the Humboldt Bay Management Plan (HBMP) in 2007, which includes the following policy related to planning to accommodate sea level rise.

HSM-7: Identify needs for potential shoreline improvements necessary to accommodate bay water surface elevation changes, including potential effects of climate change

Policy: The District shall consult with the County of Humboldt, the City of Arcata, the City of Eureka, other affected local agencies, relevant state and federal agencies, and affected local parties to identify the potential effects on the Humboldt Bay shoreline and nearby areas that may occur because of meteorological or climate-related water surface-level fluctuations in the bay prior to the year 2050. Based upon these consultations, the District and other affected parties shall develop a plan that identifies any necessary shoreline alterations or maintenance programs needed to accommodate the water-level fluctuations. The District shall adopt findings with respect to the contents and recommendations of this plan when approving District operational programs or when approving any application for project approval submitted to the District. (HBMP 2007, pg. 169)

COMPLIANCE WITH CEQA:

The proposed project is statutorily exempt from the California Environmental Quality Act (CEQA), pursuant to 14 California Code of Regulations Section 15262. Consistent with Section 15262, the project will only involve preparation of planning documents, specifically a vulnerability assessment, and will consider environmental factors. Upon approval, staff will file a Notice of Exemption for this project.