Item 7

 Staff Recommendation

*Revised November 12, 2019*

November 13, 2019

CONSIDERATION OF AUTHORIZATION

TO DISBURSE FUNDS FOR PROPOSITION 1 PROJECTS

Marina Cazorla, Program Manager

RECOMMENDED ACTION: Staff recommends that the Ocean Protection Council (OPC) approve the disbursement of $2,~~6~~742,344 to various grantees as follows:

7a. $928,309 to The Nature Conservancy for the Resilient Ormond Beach Planning Project

7b. $529,000 to the Newport Bay Conservancy for the Big Canyon Coastal Habitat Restoration and Adaptation Project

7c. $1,~~1~~285,035 to the Regents of the University of California for the Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California

# LOCATION: Ventura County, Orange County, and Statewide; see Exhibits for more detailed project-specific locations and site maps.

# STRATEGIC PLAN OBJECTIVE(S): Climate Change; Sustainable Fisheries and Marine Ecosystems; Coastal and Ocean Impacts from Land-Based Sources

# EXHIBITS:

Item 7a: Resilient Ormond Beach Planning Project

 7a1 Project Location Map and Project Area Map

 7a2 Draft Preferred Alternative Design

 7a3 Letters of Support

Item 7b: Big Canyon Coastal Habitat Restoration and Adaptation Project

 7b1 & 7b2 Project Location Map and Project Phase Map

 7b3 Draft Restoration Design and Site Photos

 7b4 Notice of Determination for Phase 2A

 7b5 Letters of Support

Item 7c: Automated Early Warning System for HAB Events in California

 7c1 IFCB Locations and Project Graphics

 7c2 Notice of Exemption

 7c3 Letters of Support

# FINDINGS AND RESOLUTION

Staff recommends that OPC adopt the following findings and direct it to file relevant notices of determination or exemption:

**Resilient Ormond Beach Planning Project**

“Based on the accompanying staff report and attached exhibits, the Ocean Protection Council hereby finds that:

1. The proposed project is consistent with the purposes of Division 26.5 of the Public Resources Code, the Ocean Protection Act.
2. The proposed project is consistent with the Ocean Protection Council's Proposition 1 Grant Guidelines, adopted November 2017.
3. The Ocean Protection Council has determined that this project does not trigger CEQA.”

**Big Canyon Coastal Habitat Restoration and Adaptation Project**

“Based on the accompanying staff report and attached exhibits, the Ocean Protection Council hereby finds that:

1. The proposed project is consistent with the purposes of Division 26.5 of the Public Resources Code, the Ocean Protection Act.
2. The proposed project is consistent with the Ocean Protection Council's Proposition 1 Grant Guidelines, adopted November 2017.”
3. The Ocean Protection Council has reviewed the project CEQA documents as follows: For Phase 2A, an Initial Study and Mitigated Negative Declaration (IS/MND) was completed by the City of Newport Beach and was adopted in January 2019. OPC has considered the IS/MND and recommends that the mitigation and avoidance measures identified in the IS/MND be adopted as a condition of approval. The Phase 2B/2C CEQA document will be completed by March 2021. No additional CEQA review is triggered by this planning and design stage of the project. OPC has considered the Phase 2A IS/MND and recommends that the mitigation and avoidance measures identified in the IS/MND (Exhibit 7b4) be adopted as a condition of approval.”

**Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California**

“Based on the accompanying staff report and attached exhibits, the Ocean Protection Council hereby finds that:

1. The proposed project is consistent with the purposes of Division 26.5 of the Public Resources Code, the Ocean Protection Act.
2. The proposed project is consistent with the Ocean Protection Council's Proposition 1 Grant Guidelines, adopted November 2017.
3. The Ocean Protection Council has determined that the Automated Early Warning System for Harmful Algal Bloom Events in California project is categorically exempt from CEQA. A Notice of Exemption (Categorical Exemption 15301) was filed with the State CEQA Clearinghouse on October 14, 2019 (Clearinghouse number 20191000257). OPC has reviewed and considered this exemption and agrees that the exemption satisfies CEQA requirements.”

Staff further recommends that the OPC adopt the following resolution pursuant to Sections 35500 *et seq.* of the Public Resources Code:

“The California Ocean Protection Council hereby approves the disbursement of up to the following amounts to the following grantees:

* + $928,309 to The Nature Conservancy for the Resilient Ormond Beach Planning Project
	+ $529,000 to the Newport Bay Conservancy for the Big Canyon Coastal Habitat Restoration and Adaptation Project
	+ $1,~~1~~285,035 to the Regents of the University of California, University of California San Diego for the Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California

This authorization is subject to the condition that prior to disbursement of funds, all of the above-referenced grantees shall submit for the review and approval of the Executive Director of the OPC detailed work plans, schedules, staff requirements, budgets, and the names of any contractors intended to be used to complete the projects, as well as discrete deliverables that can be produced in intervals to ensure the projects are on target for successful completion. All projects will be developed under a shared understanding of process, management and delivery.”

PROJECT SUMMARIES

**PROJECT SUMMARY 7a: Resilient Ormond Beach Planning Project**

**Project Description**

Ormond Beach is considered by wetland experts to be one of the largest and most important wetland restoration opportunities in Southern California. The proposed project would gather data and plan coastal habitat restoration and public access for a 650-acre project area. The Nature Conservancy (TNC) owns and manages the project area together with the City of Oxnard and the State Coastal Conservancy. These partners have initiated a collaborative restoration planning process that would restore all three of their properties to a natural character, enhance public access opportunities for Oxnard and all of Southern California, and provide for coastal resilience as sea levels rise.

The goals of this planning project are to improve freshwater, estuarine, and marine water quality and fisheries habitat; enhance the resilience of coastal habitats and species to sea level rise and climate change; and provide access and recreation opportunities for local disadvantaged communities and visitors. Project funding would support data collection and monitoring, refinement of restoration alternatives, development of the preferred restoration plan, and preparation of CEQA documents. Specifically, TNC would: 1) fill key surface water, groundwater, and vegetation data gaps, 2) model hydrologic and habitat responses to restoration plans and sea level rise, 3) complete restoration and access plan design, and 4) inform environmental review to facilitate restoration construction and capital improvement.

The project addresses OPC's four funding Priority Issue areas because it: (i) works to restore and enhance the adaptive capacity and resilience of coastal habitats and the species they support in the face of climate change and sea level rise; (ii) will lead to the restoration of estuarine habitat that will benefit the Federally endangered tidewater goby and possibly other fish species of concern; (iii) will lead to the restoration of coastal waterways and wetlands to improve coastal and ocean water quality by improving freshwater quality and supply, and preventing pollution, contaminants, and microplastics from reaching the ocean; and (iv) will enhance the resilience of coastal habitats of the region, including nearby marine managed areas such as the “Laguna Point to Latigo Point” Area of Special Biological Significance (ASBS).

**Site Description and Project Location**

The Ormond Beach project area is in the City of Oxnard in Ventura County. It consists of a four-mile-long coastal complex between Port Hueneme and Pt. Mugu Naval Air Station. It encompasses the seaward edge of a large, flat alluvial plain surrounded by a mix of residential, industrial and agricultural lands (See Exhibit 7a1). Prior to development, the coast of Ventura was a vast complex of dunes, lakes, lagoons, and salt and freshwater marshes. From the Santa Clara River estuary to the beginning of Mugu Lagoon, it appears from historic maps that there were seven lagoons. Most have either disappeared, been severely degraded, or been converted to marinas or ports. The Ormond Beach wetlands have been drained, filled, and degraded over the past century to accommodate agriculture and industrial uses. The wetlands at Ormond Beach once covered approximately 1,100 acres, and only approximately 250 acres remain. This is one of the few areas in Southern California with an intact dune-transition zone-marsh system. Ormond Beach is still habitat for over 200 migratory bird species and 16 federal and state Species of Concern/Fully Protected Species. More shorebird species are known to use Ormond Beach than any other site in Ventura County. The state- and federally-listed endangered California least tern and the state-listed threatened western snowy plover both nest and raise their young at Ormond Beach in dune systems. State and federally-listed endangered light-footed clapper rail and the state-listed endangered Belding's savannah sparrow also occur at Ormond Beach.

Importantly, unlike most areas along the Southern California coast, interstate highways (such as Highways 1 or 101) do not traverse the coastline at the project site, but instead veer inland. Lack of infrastructure provides an uninterrupted transition from the ocean and sand dunes to wetlands, and then to transitional upland open space, habitat and/or agriculture, eventually meeting the urban areas of the City of Oxnard. The predominantly agricultural surroundings of the project area provide an opportunity to expand current protected areas and restore the approximate extent of the historic wetlands.

The City of Oxnard is considered both a "disadvantaged community" (per SB 535) and a "low-income community" (per AB 1550) (CARB 2018). Ormond Beach is the closest coastal access point for the South Oxnard Community. South Oxnard is the lowest income part of the city and is home to a large immigrant and undocumented population, many of whom only or primarily speak Spanish or Mixteco, an indigenous language from Mexico. The residents of the City of Oxnard have long endured industrial development and associated pollution on their coastline, ranking among the top most environmentally burdened communities in the state (CalEnviroScreen 3.0). The area is home to both a Superfund site (Halaco) and the Ormond Beach natural gas power plant, which is scheduled to be retired in December 2020 but may continue to operate longer. The surrounding residential area is comprised of disadvantaged communities that have suffered poor environmental conditions, including polluted ground and surface waters and poor air quality resulting from the intermixed industrial and agriculture. These communities have had extremely limited access to natural areas on the coast for recreation. A restored Ormond Beach area would provide improve environmental conditions for residents while improving access.

**Project History**

Over the past three decades, various development proposals for Ormond Beach included marinas, theme parks, resorts, and residences in and adjoining the remnant wetlands, but all failed. During the 1990s, the State Coastal Conservancy (SCC) worked with the City of Oxnard, the community, and the landowners of Ormond Beach to extinguish lots on the beach. In 2002, SCC acquired a 265-acre property from Southern California Edison. In 2005, SCC gave a grant of $13 million to TNC to acquire an adjoining property from the Metropolitan Water District (MWD) of Southern California. In 2009, SCC funded a restoration feasibility study for Ormond Beach and adjoining wetlands to show how the area could be restored and linked hydrologically and as an ecosystem. TNC recently acquired an additional 20 acres from MWD in September 2019, bringing its total holdings in Ormond Beach to 305 acres. The City of Oxnard owns 80 acres. In 2016, TNC, SCC and the City of Oxnard signed a Memorandum of Understanding in partnership to cooperatively manage and restore their Ormond Beach properties. A Science Advisory Committee of experts was convened to guide the restoration process.

After a two-year planning process with extensive community outreach and engagement, SCC, TNC and the City of Oxnard released a draft Public Access Project Preliminary Restoration Plan in 2019. This preliminary plan considered public access opportunities and constraints and proposed three restoration and access alternatives at 30% design. It then assessed sea level rise effects, including Sea Level Affecting Marsh Model (SLAMM) results on each alternative and quantified comparisons of historic ecology, present ecology, and potential ecology from all three alternatives in relation to restoration goals. It also identified several important data gaps needing to be filled to inform complete design and environmental review. The proposed planning project would will build off of the foundation of these earlier studies and plans, fill identified data gaps, and work through environmental review to facilitate capital improvement. TNC presented the draft preferred alternative in August 2019 at a well-attended public workshop. Attendees provided input about the area, public access, visitor activities. Local nonprofit partner Central Coast Alliance United for a Sustainable Economy (CAUSE) conducted door-to-door surveys in 2017 and small focus groups in 2019 in neighborhoods in South Oxnard to ensure that input on the planning was included – in Spanish, English and Mixtec. A third and final public meeting to release the final preliminary restoration plan is planned for spring 2020.

Other important project partners include the County of Ventura and the Naval Base Ventura County, which also contributed funding toward the acquisition of TNC’s property. For the proposed project, TNC and project partners would also receive a small amount of OPC funding to pass to local environmental justice organizations CAUSE and the Mixtec Indigenous Community Organizing Project (MICOP), organizations with which they have an ongoing collaboration, to support their work on community outreach and engagement in Ormond Beach restoration planning.

**Project Timeline**

Project area data collection and monitoring would begin immediately and continue through 2021. Following data modeling and restoration planning and design in 2021 and 2022, environmental review would begin in 2021 and CEQA and environmental documentation would be completed in 2023. Completion of CEQA and environmental documentation would bring the proposed project to readiness for implementation and construction.

**Project Financing**

Staff recommends that the Ocean Protection Council (OPC) authorize encumbrance of up to $928,309 to The Nature Conservancy for the Resilient Ormond Beach Planning Project.

The proposed project may not require expenditure of the full $928,309.

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| **Ocean Protection Council Prop 1** | **$866,669** |
| **Ocean Protection Council ELPF** | **$61,640** |
| **OPC Total** | **$928,309** |
| State Coastal Conservancy (SCC) | $660,000 |
| The Nature Conservancy (TNC) | $173,124 |
| City of Oxnard | $631,957 |
| **Total Non-OPC Match** | $1,465,081 |
| **TOTAL** | $2,393,390 |

**PROJECT SUMMARY 7b:** **Big Canyon Coastal Habitat Restoration and Adaptation Project**

**Project Description**

Big Canyon contains one of the largest remaining areas in Newport Bay that will allow for marsh migration into the future with sea-level rise (SLR). Phase 2 of the Big Canyon Coastal Habitat Restoration and Adaptation project includes restoration of historical salt marsh with transitional zones for SLR. An impacted coastal creek will be restored by removing non-native plants and re-establishing of native vegetation that will transition into a brackish marsh restoring critical coastal habitat important to marine fisheries and listed species. The proposed project would use OPC funding for: (1) biological surveys for Phase 2a; and (2) design, planning and permitting for Phases 2b and 2c.

The restoration design of Phase 2b and 2c in Lower Big Canyon will consider how flooding, erosion, and tidal inundation will change with SLR in 2050 and 2100. Recent modelling found that predicted high tides would reach the project site with future SLR. Analysis of current flood levels at the site will be conducted to assess potential future tidal flows with expected SLR and inform a design that could reconnect this area to more natural tidal flows and eliminate some of the existing constraints. Habitat evolution modeling will be used to project how habitats may evolve with changing tidal inundation due to SLR. This will inform a vulnerability assessment of potential species and habitat loss over time in this coastal system. In a transition zone habitat, which is sustained by infrequent tidal flows, drought and fire would likely have a lesser impact than in other types of habitats. These analyses will be used to design a restoration project that is sustainable with natural processes to increase the area's adaptive capacity and decrease the climate change vulnerability of the area. The project will decrease the climate change vulnerability of the ecosystem in the Big Canyon watershed and associated habitats in the Upper Newport Bay Ecological Reserve. This will be accomplished primarily through modelling of SLR and using the outcomes to identify vulnerabilities from SLR and implement a design that effectively mitigates them.

The project addresses each of the OPC's Priority Issue Areas through the restoration of a critical coastal habitat next to the Upper Newport Bay State MMA and Ecological Reserve; elimination of fish and bird exposure to selenium impacted sediments; improvement of water quality; and a resilient habitat restoration that can adapt to climate change and SLR.

**Site Description**

Big Canyon is the only natural, undeveloped portion of the Big Canyon watershed, which covers about two square miles, and the only significant remaining natural canyon on the east side of UNB. Big Canyon Creek winds through Big Canyon in a southeast to northwest direction and discharges into UNB. The project is located within the 60-acre City-owned Big Canyon Nature Park as well as CDFW owned land, at the downstream end of the Big Canyon Watershed in the City of Newport Beach in Orange County. Big Canyon Nature Park has been subjected to extensive disturbance since the 1930s. In 1938, Back Bay Drive was constructed, functioning as an effective border between UNB and the Nature Park. The road cuts off tidal flow into the lower canyon that was historically tidal marsh and mudflat, in what are now project areas 2B and 2C. Aerial photographs from the 1950s show extensive disturbance and dredge material placement in the lower canyon project area. These changes resulted in loss of historical salt marsh and the functionality of this coastal habitat that is a vital connection to marine fisheries, habitat and water quality. Hydrological changes have also led to unnatural ponding in some areas, contributing to mosquito breeding. The proposed project seeks to restore these historical wetland habitats and their ecosystem functionality, while building climate change resiliency into the design.

Disturbance throughout Big Canyon allowed invasive species to spread. Nearly two hundred species of invasive and non-native plants are documented in Big Canyon. Invasive Brazilian peppertrees dominate the project area, while other parts of the project area consist of native vegetation or intermixed communities. Peppertrees inhibit the growth of other plants, species diversity is highly reduced within the project area, negatively impacting ecosystem processes. For example, the suppression of understory growth has contributed to erosion, channel incision, and increased disconnect between Big Canyon Creek and the floodplain. Further, reduced native plant diversity fails to provide suitable habitat for local endangered birds like the Least Bell's Vireo and Coastal California Gnatcatcher. Removal of invasive plants and replacement with a mosaic of native riparian, wetland, and upland species will help restore ecosystem function and provide better quality habitat for wildlife. Eight special-status plant species have moderate potential to occur in the project area, and three have a high potential to occur. The mouth of Big Canyon Creek supports populations of the endangered salt marsh bird's beak, Ridgway's Rail, and Belding's Savannah Sparrow, all of which will benefit from Phase 2 restoration. UNB is a critical stopover location for migratory birds travelling along the Pacific Flyway.

The project site also suffers from stream and flood plain erosion, degraded creek water quality by pollution from ground-water seepage, increased peak flows during storm events, and year-round urban dry weather flows. Degraded habitat and naturally high selenium concentrations at Big Canyon critically impact the UNB, making restoration of Big Canyon a priority for regional stakeholders.

**Project History**

Earlier restoration designs for Big Canyon Creek sought to address channel incision, loss of floodplain, unstable banks, poor water quality, and dominance of invasive wetland species. In 2008, detection of high selenium concentrations changed the restoration strategy to integrate water quality improvement measures into the project design. Funded by the City of Newport Beach and Measure M funding, the six-acre Phase 1 restoration in Big Canyon was successfully completed in 2017. Water quality improvements included a stream bypass and groundwater diversion system to isolate high selenium seeps from the creek and divert them to the sanitary sewer. A bio-infiltration basin was constructed to capture and infiltrate runoff from tributary roadways. The creek, creek banks and adjacent flood plain were reconfigured and reinforced using native materials. Restoration activities included wetland and riparian habitat creation and mitigation measures to deal with the polyphagous shot hole borer that has infested native trees in the canyon. The project has successfully reduced selenium and pollutant concentrations by over 65% in dry weather flows and 50-70% of pollutants from stormwater flows that discharge into the Upper Newport Bay State Marine Conservation Area (SMCA).

The design of Phase 2A area began in 2018, and CEQA documentation was completed and was adopted in January 2019. The 100% design drawings were completed in June 2019. The 401 Water Quality Certification was issued in May 2019 by the Santa Ana Regional Water Quality Control Board and the 1600 Streambed Alteration Agreement was received in July 2019 from the California Department of Fish and Wildlife. In September 2019, the California Coastal Commission approved the Coastal Development Permit application with special conditions, which will be completed by early 2020. Approval of the U.S. Army Corps of Engineers 404 permit application is pending, but issuance is anticipated by early 2020. Phase 2A project construction is expected to begin in the late summer 2020 and be completed by February 15, 2021 to avoid impacts during bird nesting season. Project areas 2B and 2C are undergoing site investigations and assessment of restoration options through a feasibility study process with input from a technical advisory committee (TAC). The TAC consists of local agencies, land owners and technical experts.

SCC funded the design and preparation of construction documents for Phase 2A. A USFWS National Coastal Wetland Conservation grant was awarded to the SCC on behalf of the Newport Bay Conservancy and will support implementation of Phase 2A. A California Department of Fish and Wildlife (CDFW) Watershed Restoration Grant will provide further support for the Phase 2A implementation. The SCC grant also funded preparation of a feasibility study for restoring the final phases of the project, Phases 2B/C, which is already underway. Portions of Phase 2 were historical salt marsh that will be restored with transitional zones for SLR adaptation. An impacted coastal creek will transition into a brackish and then tidal marsh, restoring critical coastal habitat that provides spawning for marine fisheries.

**Project Timeline**

The Phases 2B and 2C Feasibility Study will be completed by April 30, 2020. OPC funding would support design, CEQA analyses and permitting for Phases 2B and 2C, based on the selected alternative of the feasibility study. The permitting is anticipated to be completed by July 2021. Various agency permit applications will be submitted following the completion of the 60% design by December 2020. The design and engineering package would be ready for bidding by early 2022. Construction would occur in 2022, pending funding and in accordance with permit conditions and final design.

**Project Financing**

Staff recommends that the Ocean Protection Council (OPC) authorize encumbrance of up to $529,000 to the Newport Bay Conservancy to plan and implement various elements of Phases 2a, 2b and 2c of the Big Canyon Coastal Habitat Restoration and Adaptation project. The proposed project may not require expenditure of the full $529,000.

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| **Ocean Protection Council**  | **$529,000** |
| SCC administering U.S. Fish and Wildlife Service grant | $969,555 |
| State Coastal Conservancy (SCC) Proposition 1 grant | $640,000 |
| SCC passing through USFWS grants | $110,881 |
| City of Newport Beach (In-kind services) | $58,000 |
| Newport Bay Conservancy (In-kind services) | $20,000 |
| California Department of Fish and Wildlife (In-kind services) | $35,000 |
| California Department of Fish and Wildlife grant | 638,740 |
| **Total Non-OPC Match** | 2,452,176 |
| **TOTAL** | 3,001,176 |

**PROJECT SUMMARY 7c: Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California**

**Background on Harmful Algal Blooms in Coastal California**

Harmful Algal Blooms (“HABs”) occur when certain types of algae grow in fresh, brackish, or marine waters. Under certain conditions and with sufficient nutrients, algae can rapidly reproduce and grow into large blooms that may produce harmful toxins. Blooms can last from a few days to months.

In California, the HABs-causing species responsible for the most frequent impacts when it occurs in coastal waters in high numbers is called *Pseudo-nitzschia*. Under certain conditions, this type of microalgae can create domoic acid. Domoic acid is a neurotoxin that causes amnesic shellfish poisoning and accumulates in shellfish, sardines, anchovies, and other organisms such as market squid and game fish. When sea lions, otters, cetaceans, humans, and other predators eat contaminated animals, poisoning and even death may result. *Pseudo-nitzschia* is a marine planktonic diatom. Other types of California HAB species include the phytoplankton *Phaeocystis* and the following species of dinoflagellates: *Akashiwo sanguinea; Alexandrium catenella; Cochlodinium* spp.*; Dinophysis; Heterosigma* spp.; *Lingulodinium polyedrum;* and *Prorocentrum* spp.

Previously considered rare in phytoplankton communities, toxic and/or extremely high-biomass blooms are now recognized as high impact events reported to frequently affect aquaculture operations, recreational zones, marine mammal and bird populations, and even open ocean ecosystems.[[1]](#footnote-1) The wide-ranging impacts of HABs in coastal California have received an increase in attention from scientists, resource managers, policy-makers, and the media in recent years. Researchers have documented continually increasing intensity of toxic domoic acid events in the Santa Barbara Channel since 2000[[2]](#footnote-2).

The precise relationship between climate change and HAB events is still not fully understood, but climate change is associated with warming marine waters, which are thought to trigger and/or exacerbate HAB events. In 2015, a massive 2015 HAB event of toxic *Pseudo-nitzschia* in California and along the entire West Coast demonstrated some of the linkages between HABs and climate change. The event lasted from spring to summer of 2015 and was simultaneous with the Pacific Warm Anomaly, or the "blob."[[3]](#footnote-3)

The historic bloom was unprecedented given its long duration from April to September and its geographic extent along the entire West Coast, in direct association with expansion of the "blob" throughout the North Pacific. The widespread ecosystem effects of the domoic acid toxin included unusual marine mammal mortality events as well as warnings from the California Department of Public Health not to eat recreationally or commercially caught anchovies, sardines, and crabs - or recreationally harvested mussels and clams from many counties in central and northern California. The most economically significant impact was the closure of the recreational and commercial Dungeness and rock crab fisheries, costing California crabbers a total of about $100 million in 2015-2016.[[4]](#footnote-4) The severity of the 2015 HAB event signifies the potential for future enhanced HAB risk in California.

**Project Description and Introduction to IFCBs**

Conventional phytoplankton and HABs monitoring procedures are time consuming and labor intensive and include in-person discrete water “grab” sampling in the field, transport to the lab, and then visual species identification under microscope by scientists - all of which can take up to three days to complete for “fast” analysis, and weeks to months for archived samples. In contrast, the proposed project would innovate by using an array of special scientific instruments called Imaging Flow Cytobots (IFCBs) together with sophisticated computer technology to sort through and continually identify potential HAB species in real time. IFCBs are essentially submersible, high-resolution underwater microscopes able to take real-time images from water flowing through the instrument, while transmitting phytoplankton counts and size instantaneously to computers. Machine learning algorithms are then used to categorize images of taxonomic groups of interest, for example *Pseudo-nitzschia*. IFCBs would be installed at a mix of nearshore pier sites, offshore moorings, and be used to process scientific cruise samples to provide real-time automated measurements of HAB activity. There are already a limited number of IFCBs in use in California, including two in San Francisco Bay and in Santa Cruz that provided preliminary data demonstrating feasibility of an automated phytoplankton classification scheme. Another IFCB deployed on a mooring in Southern California demonstrated that real-time wireless data transmission is possible.

The proposed OPC project would double the current number of IFCBs, effectively creating a statewide and unprecedented IFCB network that would significantly reduce the time for HAB event response and mitigation. Future capacity to mitigate the impacts of HAB events in California will depend on scientists’ understanding of how major climatic perturbations such as marine heat waves may alter HAB trajectories and how predictive models should be modified to capture the dynamic range introduced by these anomalous, low-frequency events. Project leads will also use the data to connect long-term change to shifts in phytoplankton communities. Those efforts would lead to improved predictive models and enhanced adaptive capacity on policy-level time scales. The overarching project goal is to implement an automated early warning system for the detection and identification of a suite of potential HABs to enable rapid response and better decision-making. Specific objectives of the project are to: 1) build out a network of IFCBs to identify HAB species in real-time and near real-time at critical land-based and offshore locations throughout California; 2) integrate real-time automated HAB monitoring into existing Water Quality and HAB Monitoring Programs; 3) integrate automated data streams into HAB risk assessment and operational modeling products for early warning systems that meet the needs of coastal resource managers, as well as retrospective analysis of current and future HAB risk in the State of California; and 4) transfer technology to partner institutions to sustain as part of long-term ocean observing and water quality monitoring programs.

In terms of providing long-term benefits, the proposed IFCB instruments are known to last at least ten years, possibly more. The new IFCB network created by this project will be supported through ongoing operations and maintenance provided by the major existing federal programs leveraged by this project. Anticipated network benefits include:

* Real-time and well-described data on how many phytoplankton of every species are in the water across all sites and the risk of HAB formation based on the numerical values;
* Integration of real-time, annotated data streams into existing HAB and water quality databases run by state and partner agencies.
* Creation of a HAB observing network targeting nearshore and offshore locations in geographic HAB hot spots throughout the state of California;
* Rapid response capability in the phytoplankton monitoring by reducing reliance on weekly land-based samples through increased capacity of daily or hourly automated HAB identification and quantification;
* Improved risk assessment products, such as the CA-wide operational forecast model –the California Harmful Algae Risk Mapping (C-HARM) system – through incorporation of automated data for real-time validation and calibration;
* Improved short- and long-term decision-making through increased understanding of bloom development and connectivity between offshore and nearshore blooms; and
* A network of automated, co-located IFCBs at both land-based and offshore sites that provides continuous insight into bloom development, bloom progression or evolution into the nearshore, and bloom dynamics and impacts in relation to a changing climate.

The proposed project responds to an OPC Proposition 1 Grant Guideline priority area of Coastal and Ocean Water Quality Impacts, specifically projects that "improve [the state's ability] to detect and respond to HABs…by improving our "understanding of offshore bloom dynamics and bloom timelines, and advancing predictive modeling tools and better linking models and model outputs to monitoring and management." Researchers describe gaps in knowledge left by land-based monitoring when it comes to understanding variability of phytoplankton blooms in California.[[5]](#footnote-5) The proposed project would fill many of these gaps and lead to early detection capability by having offshore data where blooms often begin.

**IFCB Site Locations**

OPC funding would enable the purchase of ~~five~~ six new IFCBs, doubling the existing size of the California IFCB network to ten IFCBs. Specific IFCB locations in the proposed HAB observing network were chosen by balancing the presence of existing infrastructure and institutional support, how well they fill gaps in a proposed optimal observing system for HABs, and the desires of key stakeholders. Each site leverages long-running existing time-series of physical, chemical, and biological variables. Sites were also chosen based on known and emerging impacts to water quality, fisheries, ecosystem and human health. The sites will also improve understanding of decadal and longer trends in the coastal ocean. Importantly, most sites were chosen where shore-based and offshore sites could be paired, both to improve the C-HARM model and develop a better understanding of how onshore-offshore connectivity influences HAB events. Bodega Pier is the outlier in that the real-time shore station information will not be paired with offshore sampling at this time.

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| **IFCB locations proposed with OPC Funds** | **Host institution for IFCB** |
| Trinidad Pier (Humboldt County) | Humboldt State University |
| Bodega Bay Marine Lab (Sonoma County) | University of California, Davis |
| M1 mooring (Monterey Bay) | Monterey Bay Aquarium Research Institute (MBARI) |
| Stearns Wharf (Santa Barbara) | University of California, Santa Barbara |
| Newport Pier (Orange County) | USC + SCCWRP |
| Scripps Pier (San Diego) | University of California, San Diego |

**Nearshore**. IFCB units will be installed at Scripps Pier in San Diego, Newport Pier in Orange County, Stearns Wharf in Santa Barbara, Bodega Pier in Bodega Bay, and Trinidad Pier in Humboldt County.

**Offshore**. An IFCB unit will be mounted on the M1 mooring in Monterey Bay. Ship-based sampling for near real-time IFCB analysis will be conducted using samples from these frequent scientific cruises in southern and northern California in collaboration with the following locations and programs: Orange County Sanitation District’s Southern California Bight Regional Water Quality cruises; Santa Barbara Coastal Long-Term Ecological Research cruises, Marine Biodiversity Observation Network cruises, and Plumes & Blooms cruises; and NOAA Fisheries’ Humboldt/Trinidad Head Line cruises.

The proposed ~~five~~ six new IFCBs purchased with OPC funding will join five existing (or soon to be purchased) IFCBs to form the HAB monitoring network.

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| **Existing IFCB Locations** | **Host institution for IFCB** |
| San Francisco Bay | UC Santa Cruz |
| Santa Cruz Municipal Wharf | UC Santa Cruz |
| Catalina Sea Ranch | UC Santa Cruz |
| Del Mar Mooring | UC San Diego |
| ~~Scripps Pier~~ | ~~UC San Diego~~ |

**Project Need and History**

Heightened awareness of HABs after the 2015 domoic acid event led to increased demand for updated predictions, monitoring, and assessment, including reports and testimonials by the project leads to the State of California and to the State Senate and U.S. Congress. Currently, no early warning system exists for offshore blooms, and nearshore or land-based sites are only monitored on a weekly basis. Sudden influx of disoriented or dying marine mammals and birds is often the first sign of a HAB. It has been shown that subsurface offshore blooms can provide "seed" populations to the surface inshore waters, where these surface HAB populations result in intensified and sustained bloom events in the nearshore environment.[[6]](#footnote-6) The State of California and the federal government have invested a great deal in HAB monitoring already, but as the 2015 HAB event was unfolding, what was missing from the current suite of HAB monitoring programs and forecast models were real-time observations of offshore bloom initiation/evolution and the relationship with nearshore HAB development. This prevented agencies such as the California Department of Public Health and the California Department of Fish and Wildlife from being able to respond rapidly to changing conditions up and down the coast of California, and/or to adjust their sampling of water and edible organisms accordingly. The time lag in sampling and toxin testing led to repeated communication breakdowns with fishermen and key stakeholder groups while closures and advisories went into effect or moved around the state, and the crab fishing community suffered unprecedented economic losses.

In 2016, OPC and Ocean Science Trust co-led a workshop comprised of HAB scientists, resource managers, federal agency staff, fishermen, environmental organization representatives, and policy makers from California, Oregon, and Washington to better connect the state of HAB science to biotoxin monitoring for seafood safety, particularly for DA, the cause of the 2015-2016 Dungeness crab fishery closure. The workshop and report recommended immediate implementation of two previous OPC Science Advisory Team Working Group recommendations, the top one being to "continue to build out a robust, cost-effective, and flexible monitoring program that can be responsive to future HAB events." Specifically, it was recommended that the State's monitoring for HAB events be augmented by partnerships with academia.

Funding from NASA Earth System Science Graduate Fellowship, the California OPC/ California Sea Grant, and NOAA ECOHAB supported the early development of a predictive HAB model in California for *Pseudo-nitzschia* blooms and DA events, beginning in 2014. The proposed project leads then developed the operational C-HARM system with support from NASA and NOAA NCCOS to create daily HAB forecasts to better inform management decisions. C-HARM is now running operationally at NOAA CoastWatch and is the only publicly available prediction for HABs in California. The improved real-time monitoring proposed in this project will be an asset for producing timely data to managers and decision-makers to allow them to better interpret C-HARM. The data will also be integrated into the monthly report that SCCOOS produces for stakeholders called the California HAB Bulletin. It provides a synthesis of all IOOS-funded and state-run HAB monitoring data, marine mammal strandings from domoic acid toxicosis, mean C-HARM output, public health alerts, and HABMAP pier summaries.

**Project Timeline**

In the project’s first year, project leads would acquire IFCBs and work with project partners to install the instruments at pier and scientific cruise stations, and streamlined protocols would be established. Once the shore-based stations have been established, IFCBs would be installed at the offshore mooring location that has been leveraged for this project.

During the first three years of the project, project leads and partners will refine the machine-learning classification algorithms and response thresholds for phytoplankton identification. They would also merge the new IFCBs into existing HABMAP efforts and package near real-time data and model output would be packaged to maximize information for managers and rapid action can be taken. During the fifth and last year of the project, project leads will create a detailed Transition Plan to ensure maintenance of the network well beyond the project period.

**Project Financing**

Staff recommends that the Ocean Protection Council authorize encumbrance of up to $1,~~1~~285,035 to the Regents of the University of California for the Automated Early Warning System for Harmful Algal Bloom Events in California project. The proposed project may not require expenditure of the full $1,~~1~~285,035.

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| --- | --- |
| Ocean Protection Council  | $1,~~1~~285,035 |
| MBARI (in-kind) | $202,296 |
| McLane Labs, Inc. (in-kind) | $2,911 |
| Southern California Coastal Water Research Project (in-kind) | $73,000 |
| Orange County Sanitation District (in-kind) | $330,000 |
| **Total Non-OPC Match** | **$845,607** |
| **TOTAL** | **$2,~~0~~130,643** |

# CONSISTENCY WITH THE CALIFORNIA OCEAN PROTECTION ACT (COPA)

The proposed projects are all consistent with the Ocean Protection Act, Division 26.5 of the Public Resources Code, because they are consistent with trust-fund allowable projects, defined in Public Resources Code Section 35650(b)(2) as projects that achieve the following objectives, among others listed in this section of the statute:

* Eliminate or reduce threats to coastal and ocean ecosystems, habitats, and species
* Foster sustainable fisheries
* Improve coastal water quality
* Allow for increased public access to, and enjoyment of, ocean and coastal resources, consistent with sustainable, long-term protection and conservation of those resources
* Improve management, conservation, and protection of coastal waters and ocean ecosystems
* Provide monitoring and scientific data to improve state efforts to protect and conserve ocean resources
* Protect, conserve, and restore coastal waters and ocean ecosystems
* Provide funding for adaptive management, planning, coordination, monitoring, research, and other necessary activities to minimize the adverse impacts of climate change on California’s ocean ecosystem

# CONSISTENCY WITH THE OPC'S STRATEGIC PLAN

Proposed projects implement Focal Areas of OPC’s 2012-2017 Strategic Plan as follows.

**Focal Area A.** Science-based decision-making is central to all three staff recommended project. Both the Ormond Beach and Big Canyon projects’ planning and design incorporate large amounts of scientific data and apply modeling techniques to inform design. The HABs project is specifically intended to provide new, innovate scientific instrumentation in order to provide faster, more accurate scientific data for decision-makers and managers.

**Focal Area B.** Climate Change is addressed by all proposed projects. Both the Resilient Ormond Beach and the Big Canyon projects incorporate analysis of sea-level rise projections and sea-level rise adaptation strategies into their project designs. The HABs project responds to a water quality and ecosystem health problem that has been exacerbated by climate change and warming ocean waters.

**Focal Area C.** Sustainable Fisheries and Marine Ecosystems are addressed by all recommended projects. Both the Resilient Ormond Beach and the Big Canyon projects entail tidal marsh, estuary and/or riparian habitat restoration elements designed to provide habitat for important fish species at various points in their life cycles. Among other goals, the HABs project aims to provide fisheries managers and marine mammal stranding responders with real-time HABs data that will enable them to plan and respond more quickly and effectively.

**Focal Area D.** Coastal and Ocean Impacts from Land are addressed by the Resilient Ormond Beach and the Big Canyon projects, both of which incorporate habitat restoration as well as sediment management and water quality improvements into their design.

# FUNDING SOURCES AND CONSISTENCY WITH GRANT GUIDELINES FOR PROPOSITION 1

The primary source of funds for all staff-recommended projects is the Ocean Protection Council’s appropriation pursuant to the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1, Water Code §79700 et. seq.). Funds appropriated to the Ocean Protection Council derive from Chapter 6 (commencing with §79730) and may be used “for multibenefit water quality, water supply, and watershed protection and restoration efforts for the watersheds of the state” (Water Code §79731). Section 79732 identifies specific purposes for Chapter 6, which include protecting and restoring coastal watersheds, including, but not limited to, bays, estuaries, and nearshore ecosystems. The proposed projects are an appropriate use of Proposition 1 funds because they each have multi-benefits and will improve resiliency and adaptation to climate change, provide healthier marine or estuarine ecosystems, and/or restore watershed and coastal habitat.

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| --- | --- |
| **Summary of Recommended Proposition 1 Round 3 Projects** | **Prop 1 Funding**  |
| Resilient Ormond Beach Planning Project | $866,669 |
| Big Canyon Coastal Habitat Restoration and Adaptation Project | $529,000 |
| Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California | $1,~~1~~285,035 |
| **Proposition 1 Projects recommended this meeting – TOTAL** | **$2,~~5~~680,704** |

The recommended projects were selected through a competitive grant process under the OPC’s Proposition 1 Grant Guidelines, which were adopted in November 2017. OPC staff assembled a Proposition 1 Round 3 Review Committee that consisted of OPC staff together with twelve external reviewers from state and federal government agencies. External reviewers represented various agencies including CDFW, the climate program of the Resources Agency, the State Water Quality Control Board, State Lands Commission, CalRecycle, NOAA, USC Sea Grant, and the Coastal Commission. The Review Committee scored complete and eligible applications for this OPC Proposition 1 funding round according to Scoring Criteria provided on page 11 of the Proposition 1 Grant Guidelines. After all proposals were scored and ranked, the Review Committee recommended which projects should receive site visits from OPC Staff and the Review Committee. Final staff recommendation funding decisions were made by OPC’s Executive Director.

The anticipated funding source of funds for $61,640 of the Resilient Ormond Beach Planning Project for community outreach and engagement will be OPC’s Fiscal Year 2018/19 appropriation of Environmental License Plate (ELPF) funds, for a total project cost of $928,309. Using these funds to support this project is consistent with the California Ocean Protection Act, Section 35650(b), as well as OPC’s Strategic Plan.

# COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The proposed projects have different statuses under CEQA as follows.

**Resilient Ormond Beach Planning Project**

This planning-only project does not trigger CEQA, but will include preparation of CEQA documents.

**Big Canyon Coastal Habitat Restoration and Adaptation Project**

**CEQA for Phase 2a.** The City of Newport Beach is the land owner of the Phase 2A area (APN 440 092-79) and was the lead agency in preparation for the Phase 2A CEQA documentation. The CEQA documentation for Phase 2A, including the Initial Study and Mitigated Negative Declaration (IS/MND), was approved and adopted by the City of Newport Beach the IS/MND on January 22, 2019. A Notice of Determination for the IS/MND for Phase 2 was filed with the Orange County Clerk on January 25, 2019 (State Clearinghouse #2018081098).

**CEQA for Phases 2B and 2C.** The OPC funding would only support design and planning for Phases 2B and 2C, and so no additional CEQA review is triggered by this planning and design stage. However, after planning and design are completed in the future, CEQA documentation for these project phases will likely also include an IS/MND, one of the major tasks of the proposed OPC-funded project. As the California Department of Fish and Wildlife (CDFW) is the landowner for Phases 2B and 2C, it will be the lead agency in the preparation of the CEQA documentation. The Phases 2B/2C CEQA document will be completed by March 2021.

**Automated Early Warning System for Harmful Algal Bloom (HAB) Events in California**

A Notice of Exemption was submitted to the State CEQA Clearinghouse on October 14, 2019 based on Categorical Exemption 15301 for minor alterations of existing facilities.

**Staff Delegation**

For all projects, OPC will delegate to staff the ability to file a notice of determination for CEQA compliance upon OPC approval, consistent with the findings in this staff recommendation.

1. Anderson et al., 2012 [↑](#footnote-ref-1)
2. Sekula –Wood et al. 2011 [↑](#footnote-ref-2)
3. McCabe et al. 2016 [↑](#footnote-ref-3)
4. 2016 OST HAB FAQ [↑](#footnote-ref-4)
5. Frolov et al. (2013) [↑](#footnote-ref-5)
6. Seegers et al., 2015 [↑](#footnote-ref-6)