

State Water Resources Control Board and Regional Water Quality Control Boards

Supplemental Environmental Project (SEP) Proposal Form

Name of Project: Ocean Connectors: Habitat Restoration and Education Program

Project Applicant: City of San Diego / The Ocean Foundation (Ocean Connectors)

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Project Category (check one or more)

- Public Health
- Pollution Prevention
- Pollution Reduction
- Environmental Restoration and Protection
- Assessments and Audits
- Environmental Compliance Promotion
- Other project with environmental and/or public health benefits

Project Location (include, as appropriate, city, county, address, waterbody)

The project is located in the Sweetwater Hydrologic Unit (HU 909). The Sweetwater HU is approximately 145,000 acres extending from South San Diego Bay to Cuyamaca Rancho State Park. The Sweetwater HU includes 4 major water bodies: Sweetwater River, Sweetwater Reservoir, Loveland Reservoir, and San Diego Bay. Portions of the San Diego Bay National Wildlife Refuge (NWR), including Sweetwater Marsh, are contained within the Sweetwater HU.

The project areas for this SEP are located within the southern portion of San Diego Bay in National City and Chula Vista (see Figure 1). The community service area that the project will provide encompasses all of National City, including the entirety of the National City School District (see Figure 2), the City of Chula Vista, and the City of Imperial Beach. The project area includes four restoration sites within the San Diego Bay Watershed Management Area; Paradise Creek restoration site (see Figure 3), two sites within the Sweetwater Marsh in the San Diego Bay NWR (see Figure 4 - Unit 1 and Figure 5 - Unit 2), and the South San Diego Bay Unit of San Diego Bay NWR restoration site (see Figure 6). Other locations for community engagement activities include the Chula Vista Wildlife Reserve (Figure 7) and Sweetwater Channel (Figure 8).

Project Description

Ocean Connectors provides a unique opportunity to deliver outreach and education programs that significantly benefit the health and quality of some of San Diego's most polluted watersheds and support

the mission and objectives of the San Diego Regional Water Quality Control Board (RWQCB), including Chapters Three and Four of the Practical Vision Plan. The existing program is possible through partnerships with the U.S. Fish & Wildlife Service (USFWS) and the environmental education nonprofit organization Paradise Creek Educational Park, Incorporated (PCEPI).

According to the San Diego Bay Debris Study ([2016](#)), mudflats and saltmarsh habitats are key reservoirs for plastic debris in an enclosed bay environment. 100% of surveyed mudflat and saltmarsh habitats contained at least one plastic debris item. An estimated 3,004 ($\pm 1,900$) macro and meso-sized plastic debris pieces were found per survey site in mudflats and saltmarsh habitats, a quantity that was 27 times greater than that at beach sites. Salt marsh and mudflat habitats provide important nesting and foraging lands for a variety of terrestrial birds and aquatic species. Fourteen of the 71 sites surveyed contributed more than 80% of total plastic debris and were located in or near the San Diego Bay National Wildlife Refuge (NWR), which protects critical saltmarsh and mudflat habitat and provides a buffer from surrounding urban development ([San Diego Bay Debris Study, 2016](#)).

Paradise Creek and San Diego Bay are both listed as 303(d) impaired water bodies by the United States Environmental Protection Agency (USEPA). San Diego Bay's beneficial uses include estuarine habitat, marine habitat, wildlife habitat, contact and non-contact water recreation, shellfish harvesting, and commercial and sport fishing. Many of these Beneficial Uses are considered impaired due to Mercury (128207), PAHs (Polycyclic Aromatic Hydrocarbons) (127732), and PCBs (Polychlorinated biphenyls) (105763). Paradise Creek is a tributary to San Diego Bay, through the Sweetwater River, and listed as impaired due to Phosphorus (77187) and Selenium (78587).

This SEP will focus on restoration and enhancement of wetland and riparian habitat directly adjacent to Paradise Creek and other areas of San Diego Bay, including the Sweetwater Marsh Units 1 & 2 and South San Diego Bay Unit of the San Diego Bay NWR, the Sweetwater Channel, and the Chula Vista Wildlife Reserve. SEP activities will include litter abatement, invasive plant removal, native plant revegetation, and site monitoring and maintenance. These activities promote the restoration of aquatic ecosystems in accordance with R9-2015-0041, support key beneficial uses for habitats and ecosystems, and further the recovery of streams and coastal wetlands around one of the RWQCB's priority waterbodies, San Diego Bay. Additionally, the proposed SEP will directly benefit and serve Disadvantaged Communities (DACs) in the San Diego Bay Region. All work performed under this SEP includes or supports community-based education and outreach programs for schoolchildren within the National City School District as well as DACs within the city limits of National City, Chula Vista, and Imperial Beach.

Restoration work will be combined with community outreach and education programs that serve DACs and improve accessibility to programs that highlight environmental issues and community-based solutions. Participants in the program will learn how to reduce negative impacts to our coastal habitats and wildlife from drought, overdevelopment, water contamination, trash, climate change, and invasive species. Bilingual (English and Spanish) curriculum expands the reach of the program and supports the environmental justice initiatives of the RWQCB to foster diversity and inclusion in the next generation of environmental professionals. This SEP promotes community-based action in areas disproportionately impacted by pollution and other environmental issues. DAC access to these stewardship activities are particularly important in coastal areas where limited public transportation, limited free parking, and other

issues can often limit participation. The City of San Diego partnership with Ocean Connectors in this proposed SEP will further Ocean Connector's goals in education and outreach and empower local communities to restore and enhance vital ecosystems adjacent to San Diego Bay.

Brief work plan containing tasks, deliverables, milestones, and schedule. The deliverables must include quarterly progress reports and a final completion report

Ocean Connectors has identified urban stream and wetland areas that form part of the San Diego Bay Watershed Management Area and are heavily impacted by litter, invasive species, and inadequate public access and awareness. Ocean Connectors will focus on Paradise Creek, Sweetwater Marsh and Channel, and the wetlands in South San Diego Bay. The work to be performed under this SEP fulfills the objectives of the San Diego RWQCB Practical Vision Plan and directly supports the San Diego Bay Watershed Management Area Water Quality Improvement Plan (WQIP; 2016) by improving water quality in the target areas of National City, Chula Vista, Imperial Beach, and San Diego. The Ocean Connectors Habitat Restoration and Education Program project fully aligns with the WQIP goals to protect, preserve, enhance, and restore water quality through adaptive planning and management of priority waterbodies. The focused priority conditions this project will address within the WQIP are:

Lower Sweetwater Hydrologic Area (HA; 909.1) - Riparian Area Quality

Habitat restoration will be completed within Paradise Creek, which the WQIP deemed to have the greatest potential for improvement benefitting both water quality and the community. The City of National City has an established partnership with local environmental group, Paradise Creek Educational Park, Inc. who assist in maintaining portions of the Paradise creek and completes regular creek cleanups. Ocean Connectors has an existing partnership as well with Paradise Creek Educational Park, Inc. and as part of this SEP will assist with habitat restoration within Paradise Creek. The WQIP states that improvements to riparian area quality in Paradise Creek also positively impact the downstream Paradise Marsh portion of the Sweetwater Marsh where Ocean Connectors will also be working with USFWS on habitat restoration.

Lower Sweetwater HA (909.1) - Physical Aesthetics

The City of Chula Vista and the Port have identified physical aesthetic impacts, due to trash, as a focused priority condition within the Lower Sweetwater HA. This SEP will focus on strategies to reduce trash, through Ocean Connectors educational program and both community and kayak cleanup events. Reducing trash in the Lower Sweetwater HA improves both the aesthetic quality as well as various beneficial uses of receiving waters. By focusing on trash removal, this SEP will improve receiving water quality and increase public awareness and education about proper waste disposal. The Best Management Practices (BMP) this SEP will enforce that focus on trash also have the potential to address other pollutants, thus achieving a multiple-benefit effect.

Otay Valley HA (910.2) - Physical Aesthetics

The City of Chula Vista, City of Imperial Beach, and the Port have identified physical aesthetic impacts due to trash as a focused priority condition with the Otay Valley HA. The Otay River Watershed Management Plan (ORWMP) also identifies trash as a significant issue. This SEP will help to increase public awareness and education about proper waste disposal through the Ocean Connectors educational program and community cleanup & restoration events in the South San Diego Bay Unit and Chula Vista Wildlife Reserve. The BMPs that this SEP will enforce focus on trash also have the potential to address other pollutants

(such as bacteria, which is a focused priority condition in the WQIP for swimmable waters within the Coronado HA 910.1), thus achieving a multiple-benefit effect.

Ocean Connectors has successfully conducted youth-led habitat restoration programs in San Diego Bay in partnership with USFWS since 2011, and at Paradise Creek in partnership with PCEPI since 2017. Under this SEP Ocean Connectors intends to expand these restoration efforts into subsequent phases. Ocean Connectors work at Paradise Creek in National City directly improves conditions of a section 303(d) segment of impaired river and stream corridor. Restoration sites are located in Environmental Justice communities, contain ecologically-sensitive habitats with vulnerabilities to sea level rise, urban runoff, and invasive species, and require targeted restoration efforts to continue creating suitable habitat for native species and community access, such as bird watching, walking, and interpretation.

The Ocean Connectors restoration sites were selected due to:

- Proximity to partner elementary and high schools in National City,
- Location within Environmental Justice neighborhoods of San Diego County,
- Impaired water quality, habitat vulnerabilities, and environmental challenges,
- Need for increased community awareness, education, and access,
- A strong need for climate change resilience and adaptation, and
- Existing involvement of close organizational partners (USFWS and PCEPI).

In addition to the WQIP, this SEP also supports various other established monitoring and management plans for the San Diego Bay and the state of California, including:

- San Diego Multiple Species Conservation Program, 1992
- California Wildlife Action Plan, 2007
- Sea Level Rise Adaptation Strategy for San Diego Bay, 2012
- San Diego Bay Integrated Natural Resources Management Plan, 2013
- California Water Action Plan, 2014
- California Coastal Commission Sea Level Rise Policy Guidance, 2015

The restoration of the Ocean Connectors sites is fully consistent with the overall mission of the RWQCB to protect and restore the biological integrity and health of the region's waters, particularly in DACs and environmentally sensitive areas of San Diego Bay.

Tasks

1. Habitat Restoration: The Ocean Connectors Habitat Restoration and Education Program will restore a total of 6.5 acres of degraded natural habitat; 3 acres at the Sweetwater Marsh Unit 1, and 2 acres at the Sweetwater Marsh Unit 2, both units are in the San Diego Bay NWR, 0.75 acres at the South San Diego Bay Unit of San Diego Bay NWR, and 0.75 acres of section 303(d) shoreline at Paradise Creek. The restoration will address the source of environmental problems through litter and invasive plant removal and native plant revegetation, which will lead to habitat improvements that benefit wildlife, enhance water quality, and increase community health and wellbeing. These efforts are focused within the Sweetwater Marsh, Paradise Creek, and South San

Diego Bay. The restoration will be achieved through a combination of the educational school programs as well as community outreach events.

2. Environmental Education Program Expansion: Ocean Connectors will conduct multiyear environmental education programs focusing on migratory species, climate change, and habitat restoration (see Figure 9a & 9b for example curriculum).

Ocean Connectors currently reaches all 3,000 elementary students at public schools in grades 4 through 6 within the National City School District. Children and their families learn about the connection between their quality of life, community wellbeing, and watershed health. This baseline understanding cultivates a future generation of environmentally aware coastal residents.

With this SEP, Ocean Connectors will be able to increase their reach to an additional 3,500 students within the National City School District, totaling 6,500 students with an additional 600 new students each year entering the program. Currently, Ocean Connectors' scaffolded learning experiences end in grade 6. Ocean Connectors aim to expand and provide curriculum and instruction for National City School District students to include grades 3 and 7 and with e-learning curriculum to include grades Kindergarten - 12, creating a holistic learning experience and STEM career pathways. In partnership with AquaOptimism, Ocean Connectors will make an e-learning platform and nested ocean/water/climate curriculum available to 100% of National City students through grade 12. This curriculum focuses on career readiness and highlights populations that are typically underrepresented in STEM fields. Hybrid learning models, such as the new e-learning program, increase accessibility for all students. This SEP will allow Ocean Connectors to reach 100% of the students within the National City School District, and National City Middle and High Schools (grades Kindergarten – 12) via in-classroom instruction, field trips, or e-learning opportunities.

Ocean Connectors will provide an estimated 250 schoolteachers with bilingual environmental science curricula, developed with educational experts and scientists, free of charge. Teachers will attend professional development workshops and training to obtain tools for reinforcing environmental themes throughout the year. Ocean Connectors works in partnership with the National City School District and Sweetwater Union High School District to meet learning standards such as Common Core, Next Generation Science Standards, and Ocean and Climate Literacy Principles.

Ocean Connectors will connect local students with park rangers, nonprofit leaders, activists, and scientists, which will provide an important mentorship opportunity for this underserved audience of predominantly Latino students (at least 85%). Ocean Connectors cultivates a strong curiosity for the natural world that begins from a young age and continues into adulthood, inspiring individuals who are typically underrepresented in scientific fields to stay in school and pursue college. This program also reaches beyond the target audience of schoolchildren to engage teachers, parents, and other community members.

3. Community Outreach Programs: Ocean Connectors will engage the community in cleanup, restoration, and conservation education. Along with the 6.5 acres of restoration (listed above which will also have litter abatement conducted on them) there will be 2 additional sites for strictly litter abatement; Chula Vista Wildlife Reserve (1.5 acres) and Sweetwater Channel (4.75 acres) totaling 6.25 acres of litter abatement conducted. Community Engagement days will allow students to involve their families in their environmental stewardship activities. Examples of these activities include: Bay Clean Up Day (litter removal from shoreline), Restoration Days (planting native and removal of invasive species along the watershed and on the San Diego Bay NWR), Creek Days (habitat restoration in Paradise Creek Education Park), and more. Under this SEP, Ocean Connectors will be able to provide 17 community restoration events in Year 1 and 23 in each subsequent year.

As part of the community outreach program with this SEP, Ocean Connectors will be able to provide 40 kayak cleanup tour events per year free of charge to the underserved communities in the area. This is an educational and stewardship opportunity that is not typically available to underserved populations. Transportation to the site location will be made available free of charge to further increase accessibility.

4. Eco Tours: Ocean Connectors currently offers 1 paid Eco Tour a month. A marine biologist-led Wildlife Kayaking Eco Tour offers a unique experience showcasing the South San Diego Bay NWR, the Sweetwater Marsh, and the many species that inhabit this biodiversity hotspot. Guests on the tour learn about the population of green sea turtles that live in San Diego Bay, threats and challenges facing native and migratory species, and what they can do to ensure our region’s environmental health. Kayaking through the wetlands offers a unique opportunity to see the accumulated plastics and pollution. The Eco Tour provides patrons with the opportunity to remove litter as they kayak through otherwise inaccessible territory and make an immediate impact in the wetlands. Data on the microplastics collected and removed from the wetland during the tours will be logged into NOAA’s Marine Debris Tracker App (Figure 10). This SEPs will allow for an additional paid Eco Tour to be provided monthly (2 per month total) and a full-time Eco Tour Manager to be hired at Ocean Connectors to not only manage and increase the current level of Eco Tours offered but also manage the free kayak/cleanup tours.

A timeline with deliverables is summarized below:

DELIVERABLES	Year 1	Year 2	Year 3	TOTAL
Volume of Invasive Removal (cubic ft)	350	850	850	2050
# of Native Plants Planted	1300	1300	1300	3900
Pounds of Pollutants Removed (lbs)	+250	+700	+700	+1650
# of Students in Environmental Education Expansion	6500	6500	6500	8900 (600 additional unique students each year)
Student Knowledge Increases (minimum of 20% increase per year)	+20%	+20%	+20%	+20%

DELIVERABLES	Year 1	Year 2	Year 3	TOTAL
Positive Student Behavior Metrics (80% or higher for each year)	80%	80%	80%	80%
Teacher Satisfaction Rating (90% or higher for each year)	90%	90%	90%	90%
# of Community Engagement Events – Restoration Events (2 per month)	17	23	23	63
# of Community Engagement Events – Free Kayak Clean Up Tours	40	40	40	120
Eco Tours (2 per month)	24	24	24	72
# of Community Members Engaged	850	1350	1350	3550

Planning/Ramp Up – (First 6 months of Year 1)

- Environmental Education Program & Habitat Restoration: Continuation of current Ocean Connectors programs (including classroom and field activities). Planning with partners: PCEPI, USFWS, SWUHSD, and National City School District to increase education and restoration efforts. This includes, developing AquaOptimism platform rollout plan, conducting restoration site assessments and mapping, and data collection. Ocean Connectors will hire a part-time Education Coordinator position dedicated to the Ocean Connectors Habitat Restoration and Education Program at Paradise Creek, the Sweetwater Marsh Units 1 & 2 of San Diego Bay NWR, and the South San Diego Bay Unit of San Diego Bay NWR.
- Community Outreach & Eco Tours: Ocean Connectors will conduct Community Engagement Day program development, and Accessible Eco Tour program development.

Year 1 through Year 3

- Habitat Restoration: Habitat restoration will be conducted at the Sweetwater Marsh Units 1 & 2 of San Diego Bay NWR, Paradise Creek, and the South San Diego Bay Unit of San Diego Bay NWR. These will be completed through the Environmental Education Program and Community Outreach Events. The total deliverables will be a minimum of 2050 cubic ft of invasive species removed, 1650 pounds of pollutants removed, and 3900 native plants by the end of the final year.
- Environmental Education Program Expansion: Annual deliverables for the education program will be evaluated through surveys and pre/post education program testing. The pre/post tests will be given to students before and after they have completed the annual program through Ocean Connectors. These tests will be conducted every school year and broken out by each grade (grades Kindergarten-12). The results will show the percentage of knowledge gained through access to the program. Teachers will also be given surveys to fill out at the end of the school year once the students completed the program. Tests and surveys will be collected in July of each year (see Figure 11 for example documentation). The annual deliverables are derived from the tests and surveys and aim to show that the students gain a 20% increase in knowledge through the program, the students have an 80% positive behavior engagement with the program, and teachers have a 90% satisfaction with the overall program.
- Community Outreach Programs: 17 community events will be provided in Year 1 and 23 events per year in Years 2 and 3, and 40 free kayak cleanup tours will be provided to DAC communities annually and the number of events will be reported out quarterly to the RWQCB.

- Eco Tours: Two Paid Eco Tour will be provided each month. The number of tours and participants will be reported out quarterly and annually to the RWQCB.

Quarterly & Final Deliverables

- Habitat Restoration: The final deliverables will be a total of 2,050 cubic ft of invasive species removed from the restoration sites, 1,650 pounds of trash/pollutants removed, and 3,900 native species planted. Before and after pictures for each site will be collected from multiple photo-points and included with all supporting data in the Final Report.
- Environmental Education Program Expansion: The final deliverables for the education program will be to maintain or exceed the annual percentages of the student knowledge increase, positive student behavior engagement, and teacher satisfaction. All data collected will be included in the Quarterly Reports and summarized in the Final Report.
- Community Outreach Program: The final deliverables will be a total of 63 community engagement events, 120 free kayak cleanup tours, and up to 3,550 community members engaged. Quarterly progress reports will include a list of events conducted and participants for each event, and the events and participants will be totaled in the Final Report.
- Eco Tours: The final deliverable will be offering 72 Eco Tours. Quarterly progress reports will include a list of tour dates and number of participants, and total numbers will be summarized in the Final Report.

Reporting

- Quarterly Reports: Ocean Connectors to provide a quarterly summary and update on the listed tasks above. City to provide RWQCB with 4 quarterly reports a year.
- Final Report: City to provide RWQCB with a Final Report after the end of the 3 years.

Timeline below with milestones and end dates and budget broken down into tasks.

	ACTIVITY	DURATION	BUDGET ESTIMATE*
1	<p><u>Environmental Education Program Expansion & Habitat Restoration</u></p> <ul style="list-style-type: none"> - Expanding curriculum from 3rd-7th grades to include Kindergarten -12th grades - Habitat Restoration within the 4 sites - Litter abatement within all 6 sites 	36 months	\$147,921.72 (annually)
2	<p><u>Community Outreach Programs & Habitat Restoration</u></p> <ul style="list-style-type: none"> - Cleanup/restoration/conservation activities (17 events in Year 1 and 23 restoration events for Year 2 & 3 and 40 free kayak cleanup tours per year) - Habitat Restoration within the 4 restoration sites 	36 months	\$124,311.72 (annually)

ACTIVITY		DURATION	BUDGET ESTIMATE*
	- Litter abatement within all 6 sites		
3	Eco Tours - Eco Tours on kayaks in the San Diego Bay NWR lead by a Marine Biologist (2 tours per month) - Litter abatement within the Sweetwater Channel site	36 months	\$88,374.21 (annually)
TOTAL		3 years	\$1,081,823.00

** City shall shift costs between components as necessary to fulfill the terms of the settlement agreement and complete required deliverables. Expenditures required for successful completion of activity will be allowed prior to final settlement agreement.*

Attached is a budget table provided by Ocean Connectors of the breakdown in costs/salaries (see Attachment 1).

Total project cost and amount of SEP money requested. If there are other funding sources, indicate if the funds have been committed and whether there are any restriction on the funds

Total project cost for this SEP is \$1,081,823.00.

Project readiness, including status of CEQA, permits, and landowner agreements

The educational project component is categorically exempt under Section 15322, which applies to educational or training programs that involve no physical alteration in the area affected, in that this project provides a marine education and conservation program without any physical changes in the school structures for this program. The restoration sites are also exempt under Section 15333, which is for small habitat restoration projects. The project sites are all less than 5 acres in size and there would be no significant adverse impact on listed species or their habitat. There would also be no disturbance or removal of hazardous material and no significant cumulative impacts from the restoration. The project sites also fall under Section 15301, existing facilities, the restoration of the sites will not involve expansion of existing or formal use of the existing sites. Section 15304 also applies to the restoration sites as minor alterations of land will not involve removal of existing healthy, mature, scenic trees. The City will also complete a notice of exemption prior to project approval.

For the Sweetwater Marsh Units 1 & 2 as well as the South San Diego Bay Unit they are managed and permitted by the USFWS. The following documents identify how USFWS allow for Ocean Connectors to conduct restoration work within the San Diego Bay NWR; The Environmental Action Memorandum, Endangered Species Act Section 7 consultation, and Comprehensive Conservation Plan and Environmental Impact Statement for the San Diego Bay NWR ([August 2006](#)). Ocean Connectors has also acquired similar documents with PCEPI that allow for restoration work within Paradise Creek. All documents can be provided upon request.

The restoration sites proposed, Sweetwater Marsh Units 1 & 2, South San Diego Bay Unit, and Chula Vista NWR, are categorically exempt from the provisions of CEQA pursuant to 14 California Code of Regulations Section 15304(d), which exempts minor alteration in land, water, and vegetation within an officially designated wildlife management area. The restoration activities undertaken take place on the San Diego Bay National Wildlife Refuge and Chula Vista Wildlife Refuge. The Refuges are covered by a Comprehensive Conservation Plan (CCP), which guides wildlife and habitat conservation and restoration and educational activities within the Refuge. The USFWS determined on November 15th, 2007, through National Environmental Action Memorandum, that activities covered by the CCP will not adversely affect coastal resources. The Coastal Commission in its federal consistency determination concurred with the USFWS determination. An Endangered Species Action Section 7 consultation was also conducted on October 4th, 2007 and allows for grading, irrigation installation, trail development and native plant restoration site development to be implemented within the San Diego Bay NWR.

The restoration activities, all of which will be done by hand or using hand tools, to be undertaken on the shoreline of Paradise Creek fall under voluntary park cleanup activities on City of National City property and have exclusive rights and clearance through National City. All permits have been previously acquired, and no future permitting is anticipated.

Expected benefits or improvements to water quality or beneficial uses

The Ocean Connectors Habitat Restoration and Education Program conducts hands-on restoration of upland, wetland, and river corridor habitat within the San Diego Bay NWR and lower reaches of the Otay and Sweetwater River Watersheds, including Paradise Creek in National City. The direct benefits to water quality and ecosystem health include:

- Revegetation with native plants (see Table 1) leads to increased carbon uptake and decreased erosion and sediment deposition into Paradise Creek, San Diego Bay NWR, and South San Diego Bay. Planting native plants along the banks and tributaries of water sources traps and stabilizes sediment particles and prevents substrate from eroding into the water and degrading water quality. Native plants also perform carbon sequestration, enhancing the condition of the water for fish and other wildlife species. The restoration efforts put forth in this project will also benefit the native habitats for monarch butterflies, osprey, light-footed Ridgway's rail, California least terns, and snowy plovers.
- Hand removal of invasive plants, such as chrysanthemum, ice plant, and common mallow, creates better quality nesting and foraging habitat for native wildlife and pollinator insects. Invasive plants impede native plant growth and pollination, interfere with ecosystem hydrology, and degrade water and soil quality. Invasive plants will be removed in the target areas, as well as surrounding zones to minimize spreading, and wood chips will be applied to prevent re-infestation.
- Litter removal around freshwater sources prevents trash from being ingested by wildlife using San Diego Bay and improves watershed quality by preventing harmful substances, heavy metals, and chemicals from leeching into urban streams and groundwater. Litter can contaminate water quality and smother native plants, causing further damage to impaired waterways in South San Diego County.

- This project improves ecosystem hydrology and increases climate change resilience for wetland plant and animal species. Strategically placed salt-tolerant and drought-tolerant native plants create a natural buffer from sea level rise and periodic drought and flooding, thereby protecting local communities and infrastructure from climate-related risks and habitat vulnerabilities. Native species will benefit from expanded wetland habitats, upland migration areas, and wetland-upland transitional zones.
- Targeted education and outreach activities create more environmental stewards in Environmental Justice communities around San Diego Bay, leading to future generations that protect and conserve environmental resources. Multiyear outreach and education programs are the key to long-term preservation of urban waterways and water bodies. Community engagement is critical, and National City residents should have access to the beauty, functionality, and benefits of their river and bay ecosystem.

Table 1. San Diego Native Plant Species for Restoration Sites – Ocean Connectors Plant Pallet

Common Name	Scientific Name
Common Yarrow	<i>Achilea millefolium</i>
Deerweed	<i>Acmispon glaber</i>
California Milkweed	<i>Asclepias californica</i>
Narrow Leaf Milkweed	<i>Asclepias fascicularis</i>
Fourwing Saltbush	<i>Atriplex canescens</i>
Watson’s Saltbush	<i>Atriplex watsonii</i>
California Sagebrush	<i>Artemisia californica</i>
Parish’s Glasswort	<i>Arthrocnemum subterminale</i>
Desert Broom	<i>Baccharis sarothroides</i>
San Diego Sunflower	<i>Bahiopsis laciniata</i>
Saltwort	<i>Batis maritima</i>
Beach Evening Primrose	<i>Camissoniopsis cheiranthifolia</i>
Sticky Monkey-Flower	<i>Diplacus aurantiacus</i>
Shoregrass	<i>Distichlis spicata</i>
Fingertips	<i>Dudleya edulis</i>
Bush Sunflower	<i>Encelia californica</i>
California Fuchsia	<i>Epilobium canum</i>
Buckwheat	<i>Eriogonum fasciculatum</i>
Alkali Heath	<i>Frankenia salina</i>
Island Snapdragon	<i>Gambelia speciosa</i>
Chapparal Yucca	<i>Hesperoyucca whipplei</i>
Goldenbush	<i>Isocoma menziesii</i>
San Diego Marsh Elder	<i>Iva hayesiana</i>
Marsh Jaumea	<i>Jaumea carnosa</i>
Spiny Rush	<i>Juncus acutus</i>
California Sea Lavender	<i>Limonium californicum</i>
California Boxthorn	<i>Lycium californicum</i>
Monarch Bushmallow	<i>Malacothamnus foliosus</i>

Common Name	Scientific Name
Wishbone Brush	<i>Mirabilis laevis</i>
Bladderpod	<i>Peritoma arborea</i>
Lemonade Berry	<i>Rhus integrifolia</i>
Matilija Poppy	<i>Romneya coulteri</i>
Pickleweed	<i>Salicornia pacifica</i>
White Sage	<i>Salvia apiana</i>
Black Sage	<i>Salvia melifera</i>
Black Elderberry	<i>Sambucus nigra</i>
Jojoba	<i>Simmondsia chinensis</i>
California Cordgrass	<i>Spartina foliosa</i>
California Seablite	<i>Suaeda californica</i>
Lilac Verbena	<i>Verbena lilacina</i>
Mint Verbena	<i>Verbena menthifolia</i>

In summary, Ocean Connectors addresses RWQCB priority conditions for the watersheds of San Diego Bay, including surface water quality, aesthetics, and swimmable waters, through removing trash and invasive plants along essential habitat areas of the Sweetwater Marsh and Channel and South San Diego Bay, improving soil quality, and revegetating the target sites with native plant species. This project also addresses beneficial uses designated under the Clean Water Act section 303 and the Porter-Cologne Water Quality Control Act. Restoration and enhancement of wetlands within Paradise Creek and South San Diego Bay will provide high quality habitat for fish, birds, and coastal salt marsh plants. The enhancement and education of San Diego Bay provided by this project's programs and outreach events to the students and public that live in the surrounding area will be beneficial for not only recreational uses, such as fishing and boating, but for improving water quality conditions and providing habitat support for wetland and coastal salt marsh species. Ocean Connectors planning efforts, assessments, and studies play a leading role in contributing to water quality improvements, enhancing natural hydrologic processes, and providing benefits to community health and wellbeing.

Is the project located within, or does it benefit, an Environmental Justice community, a Disadvantaged Community, or a community that has a financial hardship? If yes, describe

Sweetwater River and San Diego Bay have within a 5-mile radius approximately 70 DACs and approximately 70 SDACs (severely disadvantaged communities) (see Figure 12; cited from the California Department of Water Resources DAC Mapping Tool). San Diego Bay is mainly overseen by the Port of San Diego, with only a few small areas being owned by the City of San Diego at the north end of the bay.

San Diego Bay provides free public access and free parking year-round for many uses including fishing, water sports, picnicking, paths and trails, and boat ramps. Uses are supported with maintained landscaping and lawns, trash removal, boat docks and launching facilities, restrooms, and developed play areas.

Will this project further the State Water Board's core value of the human right to water? If yes, describe

Not applicable for this project.

Optional Information provided below

Whether this project is resilient to climate change and conforms with State Water Board Resolution No. 2017-0012, Comprehensive Response to Climate Change

The selected sites are vulnerable to climate-related risks such as drought, flooding, and species habitat loss. Previous years of drought in California have led to die-off of native plants, erosion, and reduced biodiversity. The design of this project will reduce climate change vulnerabilities through installing drought-tolerant native plants in upland transition areas, which will serve multiple purposes for habitat conservation and provide nesting and foraging space for endangered, threatened, and migratory wildlife and pollinator insects. In the river corridor and wetland areas, participants will install native plants with a high-tolerance for salt, as flooding and inundation are expected to increase. Ocean Connectors is committed to working closely with its partners USFWS, PCEPI, and the City of National City to implement adaptive management techniques that ensure the continued success of the restoration process alongside changing climatic conditions and impacts.

The sites are also prone to sea level rise and erosion due to climate change. Data in the Sea Level Rise Adaptation Strategy for San Diego Bay indicate that even with a sea level rise of 55 inches, the majority of the sites will remain above water. The installation of salt-tolerant native plants will aid the sites in adapting to sea level rise and periodic flooding and will provide migration zones for wetland species. The project's educational curriculum and restoration component will focus on climate change resiliency to ensure that the work goes beyond short-term outcomes to promote awareness, preparation and adaptation for climate change impacts affecting the entire San Diego Bay watershed.

Whether this project can be the basis for additional funding from other sources

The Ocean Foundation, the fiscal sponsor of Ocean Connectors, is an international public foundation styled as a community foundation and is a tax-exempt IRC 501(c)(3) charity corporation. The Ocean Foundation is an active California "domestic nonprofit" corporation in good standing, recognized by the California Attorney General and Secretary of State (pursuant to original Articles of Incorporation filed December 17, 2001). The Ocean Foundation has a 4-star rating on Charity Navigator and a Platinum-level seal on GuideStar, indicating transparency and sound practices related to philanthropy, voluntarism, and grantmaking.

As of August 2009, The Ocean Foundation became the fiscal sponsor organization of Ocean Connectors, the project leader of this proposal. As with all fiscal sponsorships, Ocean Connectors may solicit gifts, contributions, and grants on behalf of The Ocean Foundation, which are for the activities of the Ocean Connectors project. The Ocean Foundation gives consent to Ocean Connectors to apply for funding from the RWQCB, and to enter into an agreement (with The Ocean Foundation as the signatory) if funding is awarded under this SEP.

Ocean Connectors has demonstrated a commitment to improving water quality, over a decade of leadership in the target Environmental Justice communities, and a strong track record of successful project completion with USFWS, the California Coastal Commission, the California State Coastal Conservancy, the

Port of San Diego, USEPA, and various other awarding agencies. In 2018, Ocean Connectors received settlement funding from the Port of San Diego in response to their original SEP, and successfully worked with PCEPI to complete all deliverables in accordance with that agreement. Ocean Connectors is fiscally sound and has the institutional stability and capacity to fulfill all stated project objectives, and to accomplish the work and deliverables described in this SEP.

Whether this project is required by another entity or agency

The proposed project is not work required by any other entity.

The goal of this SEP is to further the restoration and education goals within the San Diego Bay DAC communities that Ocean Connectors has been pursuing since 2007. Without this SEP, Ocean Connectors would not be able to expand and reach 100% of the school district within National City, increasing the number of students they can provide free education to from 3,000 to 8,900 students by the end of 3 years. They will also be able to increase the amount of restoration from 2 acres to 6.5 acres and include an additional 6.25 acres in litter abatement. This SEP will also reach up to 140 DAC communities within and around the San Diego Bay. The expansion of Ocean Connectors education program, ability to provide more community restoration/cleanup events, and begin providing free kayak clean up tours will engage the local DAC communities with their coastal wetland habitats, creating awareness and future environmental stewardship. This SEP will allow multiyear outreach and education programs, key to long-term preservation of urban waterways and water bodies, to become well established and follow DAC students through up to 3 years of schooling.

Funding from this SEP will allow Ocean Connectors to double their education reach for students in National City, creating a scaffolding learning experience from Kindergarten to 12th grade. This would allow them to provide STEM career pathways. The funding also allows Ocean Connectors to involve the community in their education and restoration initiatives. Teaching students is important but allowing families to experience conservation work together is very powerful. This funding also makes ocean conservation education, restoration, and recreation accessible to everyone, especially in the DAC communities within San Diego Bay. By providing transportation and free events, Ocean Connectors are able to capture an audience that previously did not have access to the experiences. Because of this SEP, Ocean Connectors will be eligible for additional funding to support these experiences in the future.

Whether this project has monitoring, success criteria, or other tools to track long-term success

USFWS and PCEPI provide ongoing management and supervision of the Ocean Connectors habitat restoration sites, and they are key partners and supporters of the overall project. All long-term maintenance on Refuge land, including watering, future planting, modifications, and weed and litter abatement, is coordinated and supervised by park rangers of the USFWS Refuges Complex. Monitoring, enforcement, and maintenance of the Paradise Creek location is supervised by PCEPI and the City of National City. In addition, outside volunteers and students from other outreach programs and colleges are involved in the maintenance, preparation, and restoration of both sites, which helps provide year-round habitat improvements. USFWS and PCEPI are active partners in designing and leading the development of the Ocean Connectors educational resources and materials, and planning restoration events. Although long-term monitoring, preservation, and maintenance extend beyond the scope of this

SEP, this project makes a significant contribution to habitat management in the target areas. The criteria that will be used to measure success include:

- Perform up to 1,650 pounds of litter abatement.
- Remove 2,050 cubic feet of invasive plants.
- Perform native plant revegetation along river corridor, upland, and wetland habitats by planting up to 3,900 native plants.
- Engage underserved schoolchildren and their families, volunteers, and teachers in learning about climate change resilience, conservation of migratory species, and habitat restoration and protection (totaling up to 6,500 students and 850 community members in Year 1 and 1,350 community members annually in Years 2 & 3).
- Increase community knowledge of these topics and improve environmental behaviors and actions, as measured by pre and post evaluation surveys.
- Development of local community members in Environmental Justice areas into environmental stewards and activists, as measured by volunteerism and participation at public events, leading to social justice and equity for underserved communities.

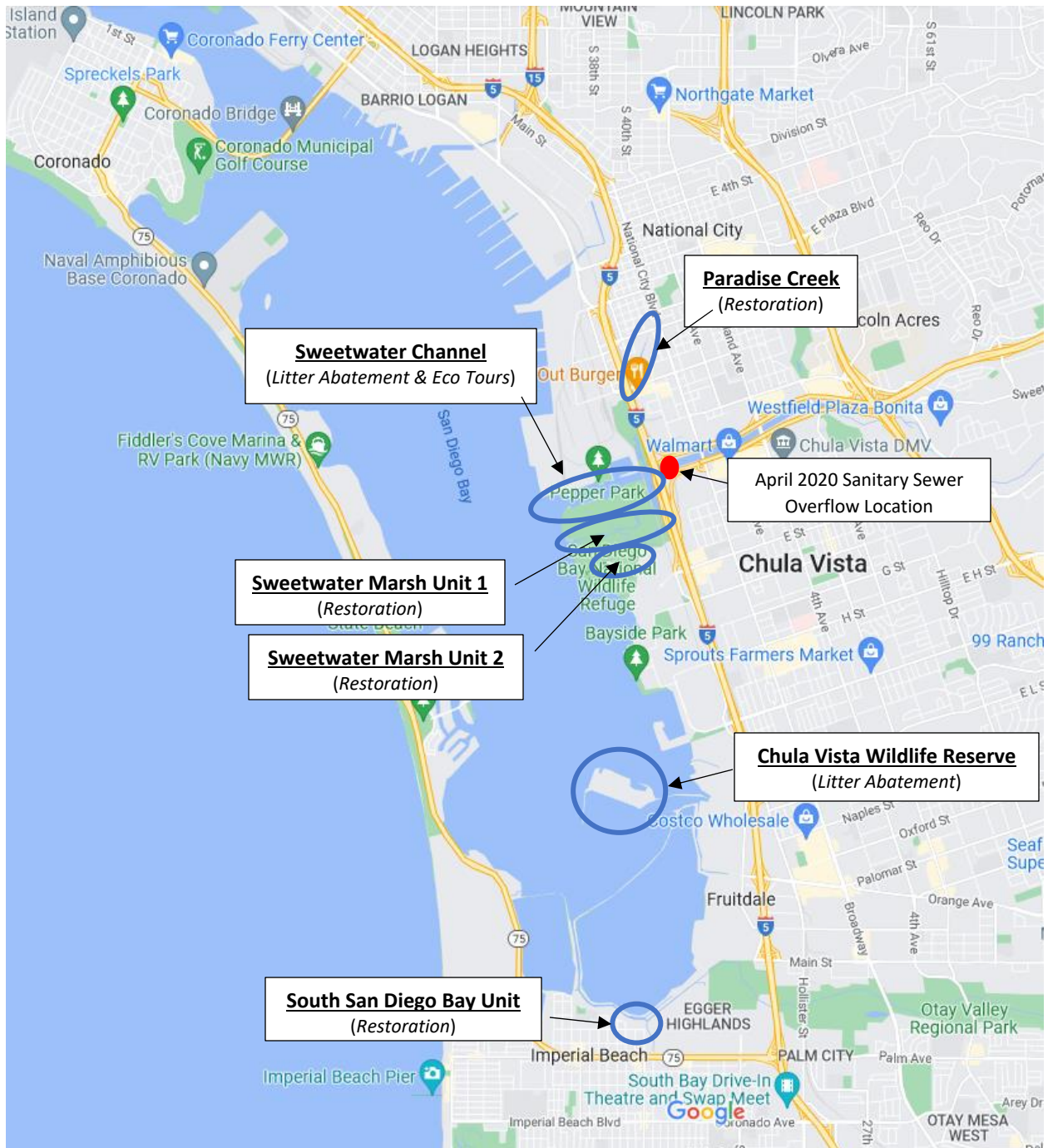
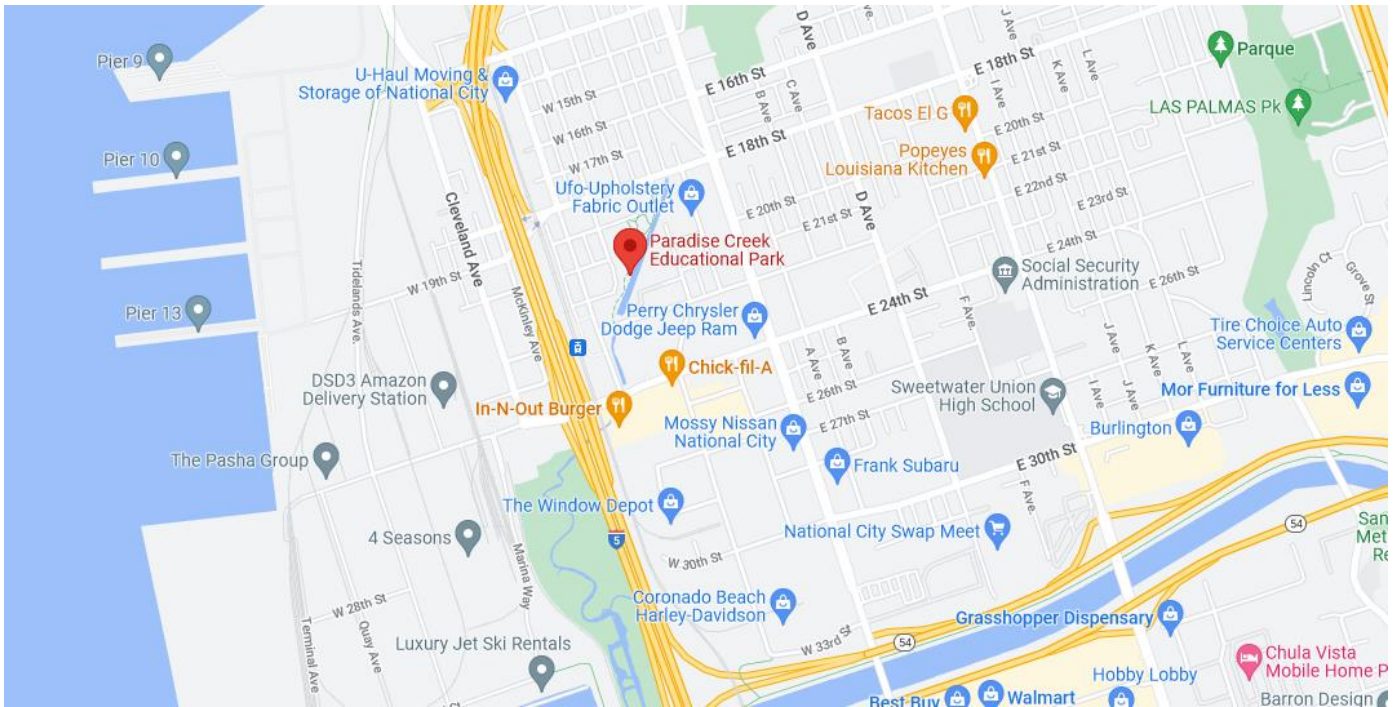


FIGURE 1: Vicinity Map

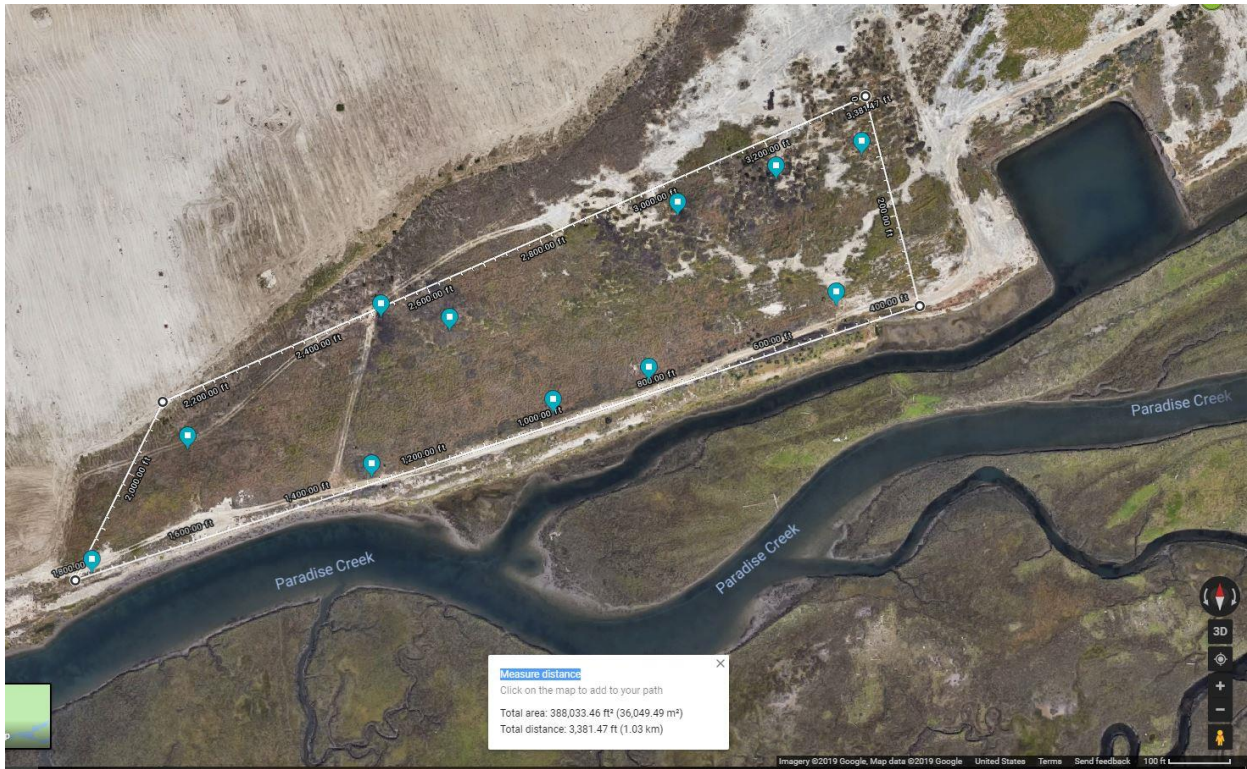


FIGURE 2: School District of National City



Paradise Creek Educational Park 2016 — Wetlands Restoration Education (RestorEd) sites

- 1- Salt Marsh shoreline at north end
- 2- Salt pan
- 3- Uplands native plants at south end of boardwalk
- 4- Islands uplands plants
- 5- Invasive plant removal at shoreline at midpoint
- 6- Invasive removal and plantings at south end

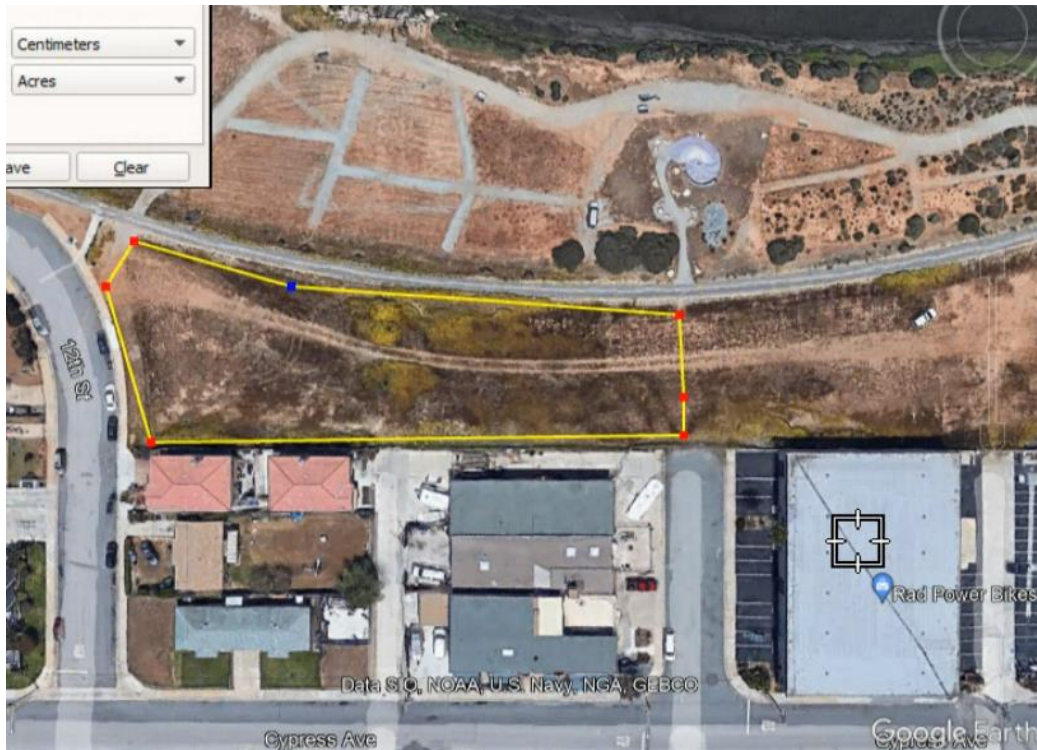
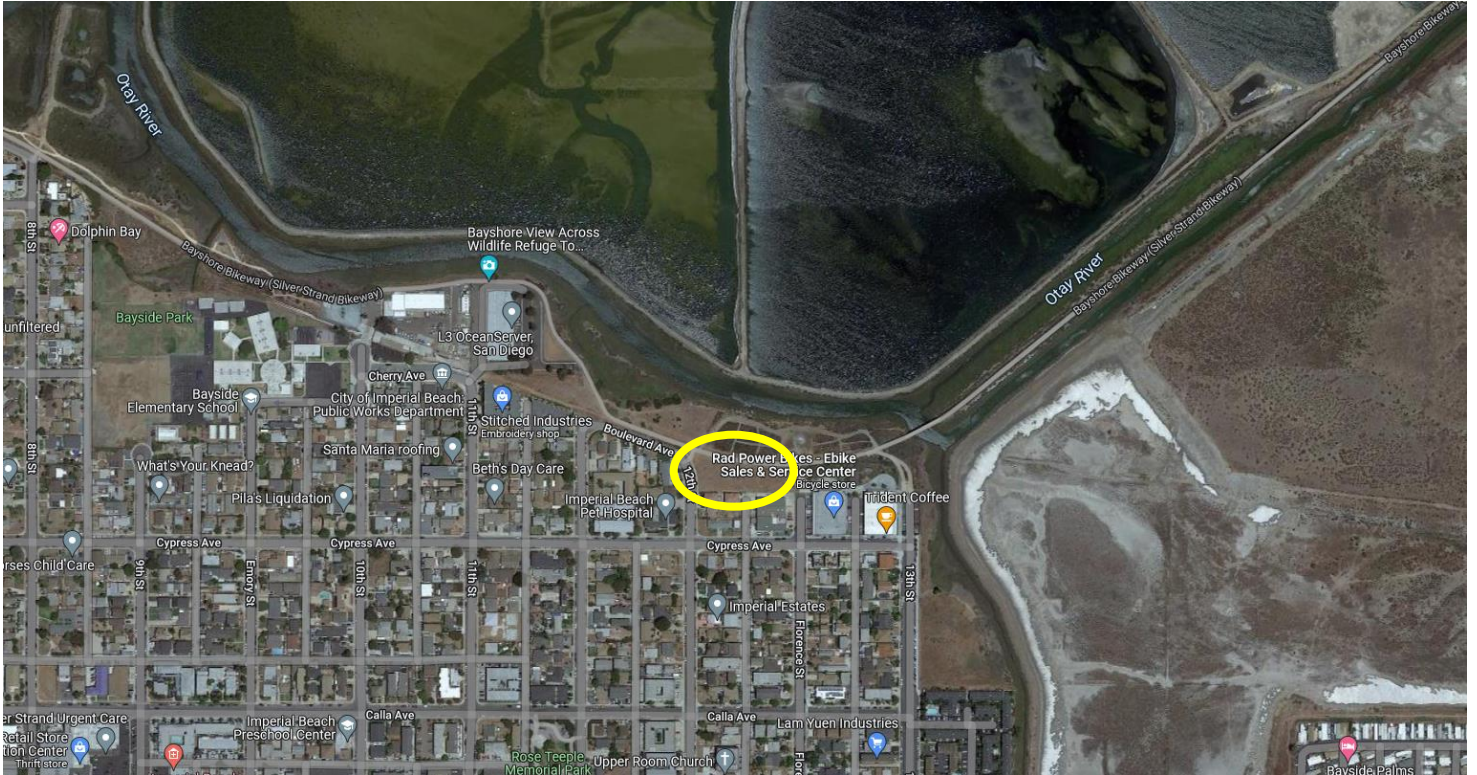


Public Utilities

FIGURE 4: Sweetwater Marsh Unit 1 - Restoration Site
Located in the San Diego Bay National Wildlife Refuge

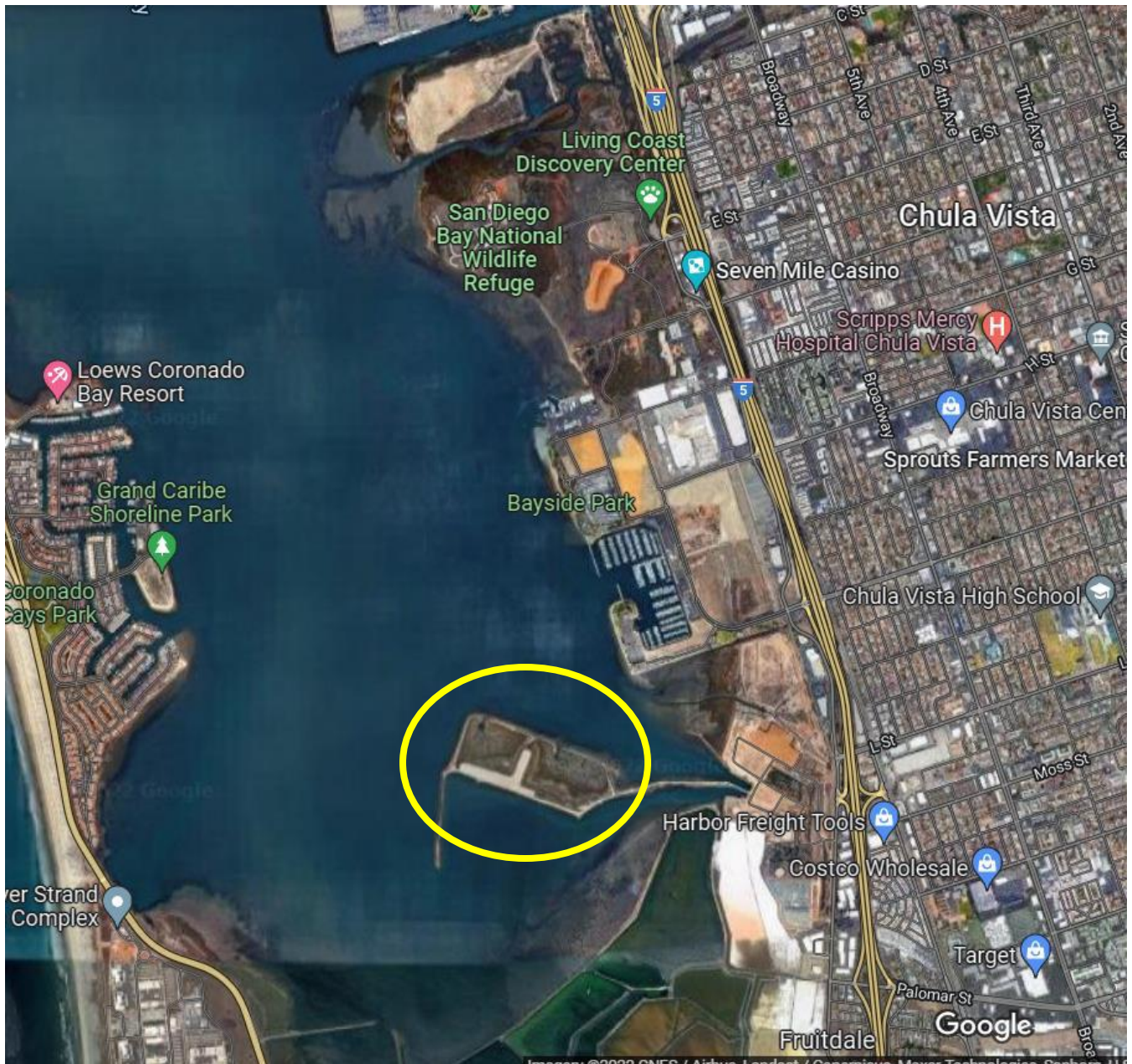


FIGURE 5: Sweetwater Marsh Unit 2 - Restoration Site
Located in the San Diego Bay National Wildlife Refuge



Public Utilities

FIGURE 6: South San Diego Bay Unit - Restoration Site
Located in the San Diego Bay National Wildlife Refuge



Public Utilities

FIGURE 7: Chula Vista Wildlife Reserve – Litter Abatement



FIGURE 8: Sweetwater Channel
Litter Abatement & Eco Tours
Located in the San Diego Bay National Wildlife Refuge

	9 th	10 th	11 th	12 th
Course	Life Science		Physical Science	
	Earth Science	Biology	Physics	Chemistry
Unit Title	Reimagining Fuel (water)	Healthy Fish, Healthy Food (ocean)	Salmon Cannon (water)	Climate Change and the Ocean Habitat (ocean)
Water Issue(s) Addressed	Using water to reduce CO2 (reduce global warming)	Impact of pollutants such as hormones and chemicals on food sources Coastline destruction/impact analyze ecosystem that is being harmed	Tension between renewable energy natural life flow of salmon Interrupting ecosystem to create renewable energy, creating another problem (and solving)	Impact of brinicles on ocean animals Climate change Low water temperatures
Essential Question	How can innovations in energy be used to solve complex problems?	How can we impact the ocean environment to harvest healthy food?	In what ways do innovations harm and help progress?	How is climate change impacting ocean life? Why are polar animals bigger than animals that live in warmer climates?
Phenomenon	Algae Fuel & Food CME Group	Aquaponic Fish & Veggies Worth Their Salt Sustainable Salt Water Aquaponics	Salmon Cannon	Breathability in Oceans Rising Tide of Marine Disease Brinicles
SDG Alignment				
BlueTech Ocean Literacy / Conservancy Alignment	<p>Ocean Literacy Principle #1: The Earth has one big ocean with many features.</p> <p>Ocean Literacy Principle #3: The ocean is a major influence on weather and climate.</p> <p>Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems.</p>	<p>Ocean Literacy Principle #1: The Earth has one big ocean with many features.</p> <p>Ocean Literacy Principle #2: The ocean and life in the ocean shape the features of Earth.</p> <p>Ocean Literacy Principle #3: The ocean is a major influence on weather and climate.</p>	<p>Ocean Literacy Principle #2: The ocean and life in the ocean shape the features of Earth.</p> <p>Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems.</p> <p>Ocean Literacy Principle #4: The ocean made the Earth habitable.</p> <p>Ocean Literacy Principle #5: The ocean supports a great</p>	<p>Ocean Literacy Principle #1: The Earth has one big ocean with many features.</p> <p>Ocean Literacy Principle #2: The ocean and life in the ocean shape the features of Earth.</p> <p>Ocean Literacy Principle #3: The ocean is a major influence on weather and climate.</p>
	<p>Ocean Literacy Principle #6: The ocean and humans are inextricably interconnected.</p>	<p>Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems.</p> <p>Ocean Literacy Principle #6: The ocean and humans are inextricably interconnected.</p>	<p>diversity of life and ecosystems.</p> <p>Ocean Literacy Principle #6: The ocean and humans are inextricably interconnected.</p>	<p>Ocean Literacy Principle #5: The ocean supports a great diversity of life and ecosystems.</p> <p>Ocean Literacy Principle #7: The ocean is largely unexplored.</p>
Career Alignment	CEO Business Director Biofuels Production Manager (Product Manager) Biochemical Engineer	Environmental Engineer Food Science Technician Water Resource Specialist	Fisher Physicist Quality Control Analyst	Marine Conservationist Photographer Commercial Diver Marine Biologist and Filmmaker Hydrologist Geoscientist Oceanographer Aquatic Toxicity Testing Support
Next Generation Science Standards Addressed	LS1-5 ESS3-4	LS2-2	PS2-1 PS3-3	PS1-5 PS3-4
Student Action / Outreach Exhibition	Algae raceway (engineering) - Powerplant in their city where they could propose the raceway to	Aquaponic model for an ocean food problem	Design Woosh system - Safely launch, measure, graph	Contrasting two environments to explore the difference between temperatures and impact on growth



	reduce CO2 - Analyze steps, create model, consider costs			Grow something with more and less oxygen (adjusting the temp) to see the differences in size. Plants need the oxygen in the same way that the animals do.
Progression of Modules	<p>Module 1 Unit launch with algae food and fuel phenomenon and context setting</p> <p>Module 2 Career exploration and connection</p> <p>Module 3 Research: Why do we need alternative sources of energy?</p> <p>Module 4 Research: How can we design solutions in our own city?</p> <p>Module 5 Investigate: Career connection to research</p> <p>Module 6 Engineering challenge: Designing an algae raceway</p>	<p>Module 1 Unit launch with aquaponic phenomenon and context setting</p> <p>Module 2 Career exploration and connection</p> <p>Module 3 Research: What is the relationship between pollutants and healthy ocean food sources?</p> <p>Module 4 Research: How do humans work to preserve coastlines and farm organic and healthy ocean food sources?</p> <p>Module 5 Investigate: Career connection to research</p> <p>Module 6 Engineering challenge: Designing a solution using an aquaponic model?</p>	<p>Module 1 Unit launch with salmon cannon phenomenon and context setting</p> <p>Module 2 Career exploration and connection</p> <p>Module 3 Research: What tensions exist between innovation and the ecosystem?</p> <p>Module 4 Research: How can innovations in water sources consider existing ecosystems and find solutions?</p> <p>Module 5 Investigate: Career connection to research</p> <p>Module 6 Engineering challenge: How can I design a whoosh system for an existing</p>	<p>Module 1 Unit launch with climate change and brinicles phenomenon and context setting</p> <p>Module 2 Career exploration and connection</p> <p>Module 3 Research: What is the impact of climate change on ocean environments?</p> <p>Module 4 Research:</p> <p>Module 5 Investigate: Career connection to research</p> <p>Module 6 Engineering challenge: How can I create contrasting temperature ocean environments that reveal growth differences data?</p> <p>Module 7 Student Action/Reflection of learning in preparation for</p>
	<p>Module 7 Student Action/Reflection of learning in preparation for exhibition of algae raceway</p> <p>Module 8 Exhibition with feedback</p>	<p>Module 7 Student Action/Reflection of learning in preparation for exhibition of aquaponic model</p> <p>Module 8 Exhibition with feedback</p>	<p>water problem?</p> <p>Module 7 Student Action/Reflection of learning in preparation for exhibition of whoosh system</p> <p>Module 8 Exhibition with feedback</p>	<p>exhibition of contrasting temperature environments and findings</p> <p>Module 8 Exhibition with feedback</p>



Site Name	
Location	
Date	
Weather	
Survey distance (km)	
Number of People/Kayaks	
Name of Recorder	

MATERIAL	CODE	USE	CODE	Medical/Personal Hygiene	CODE
Plastic	PL	Household Product	HP	Syringe	SY
Glass	G	Fishing Gear	FG	Condom	CO
Paper	PA	Dumping Activities	DA	Medical Bottle	MB
Metal	M	Medical / Personal Hygiene	MP	Disposable Diapers	DD
Cloth	C	Smoking Related Activities	SR	Other	OT
Rubber	R				
Wood	W				

Fishing Gear	CODE	Household Product	CODE	Smoking Related Activities	CODE
Nets	NE	Food Packaging	FP	Filter	FI
Rope	RO	Drink Bottles	DB	Lighter	LI
Line	LI	Bottle Caps	BC	Tobacco Packaging	TP
Buoys	BO	Straws	ST	Other	OT
Crab/Lobster Pots	PO	Knife	KN		
Other	OT	Fork	FO		





Dumping Activities	CODE	Spoon	SP	Texture	CODE
Building Material	BM	Foam Cup/Plate	FO	Hard	H
Household Appliances	HA	Toys	TO	Foamed	FO
Tire	TY	Balloon	BA	Film	FI
Belt	BE	Gloves	GL		
Other	OT	Bag	BAG		
		Clothes	CL		
		Other	OT		


Color	CODE
Opaque	O
Clear	C
Pigmented	P
Mixed	M

MATERIAL	USE	PRODUCT	SIZE (mm)	COLOR	TEXTURE	WEIGHT (g)	COMMENT

Overall Summary of Learnings

All students saw significant knowledge increases from the beginning of the program and all, with the exception of 5th graders, met the overall learning goal. While behaviors and attitudes didn't shift significantly, 4th and 5th graders met the target goal, while 6th and 7th graders fell just shy.

				
Overall Learning Scores: % got at least 80% or more correct (4/5)	84% (+6% From Pre)	64% (+23% From Pre)	82% (+11% From Pre)	86% (+15% From Pre)
Overall Behavioral/Attitudinal Scores: average score	85% (+5% From Pre)	80% (+0% From Pre)	74% (-5% From Pre)	76% (+1% From Pre)



Target Metrics:
Learning: At least 80% score at least 80% correct on posttest
Behavioral/Attitudinal: 80% average score on posttest
 = significant **increase** from pre-test to post-test at a 95% Confidence Interval

LEARNINGS SUMMARY FROM SEA TURTLES (4th Grade)

4th Graders saw significant increases in overall learning from the pre to post test with nearly two-thirds answering all questions correctly.



	Pre-Test (n=441) % Correct	Post-Test (n=324) % Correct	% Change From Pre to Post
Overall Learning Scores (% got at least 80% or more correct (4/5))	78%	84%	+6%
Overall Learning Scores (% got 100% correct (5/5))	44%	62%	+18%
When an animal is endangered it means there are not very many of these animals alive today	54%	70%	+16%
It is important to use reusable shopping bags and water bottles because using less plastic can help sea turtles and other animals	84%	88%	+4%
Sea turtles are threatened by hunting and trash in the ocean	86%	89%	+3%
To help protect sea turtles, people should pick up litter in the community	95%	91%	-4%
The 3 R's stand for Reduce, Reuse, Recycle. Two ways to "reduce to help the ocean are make less trash and use less plastic	91%	93%	+2%



 = significant **increase** from pre-test to post-test at a 95% Confidence Interval
 = significant **decrease** from pre-test to post-test at a 95% Confidence Interval

BEHAVIORAL SUMMARY FROM SEA TURTLES (4th Grade)

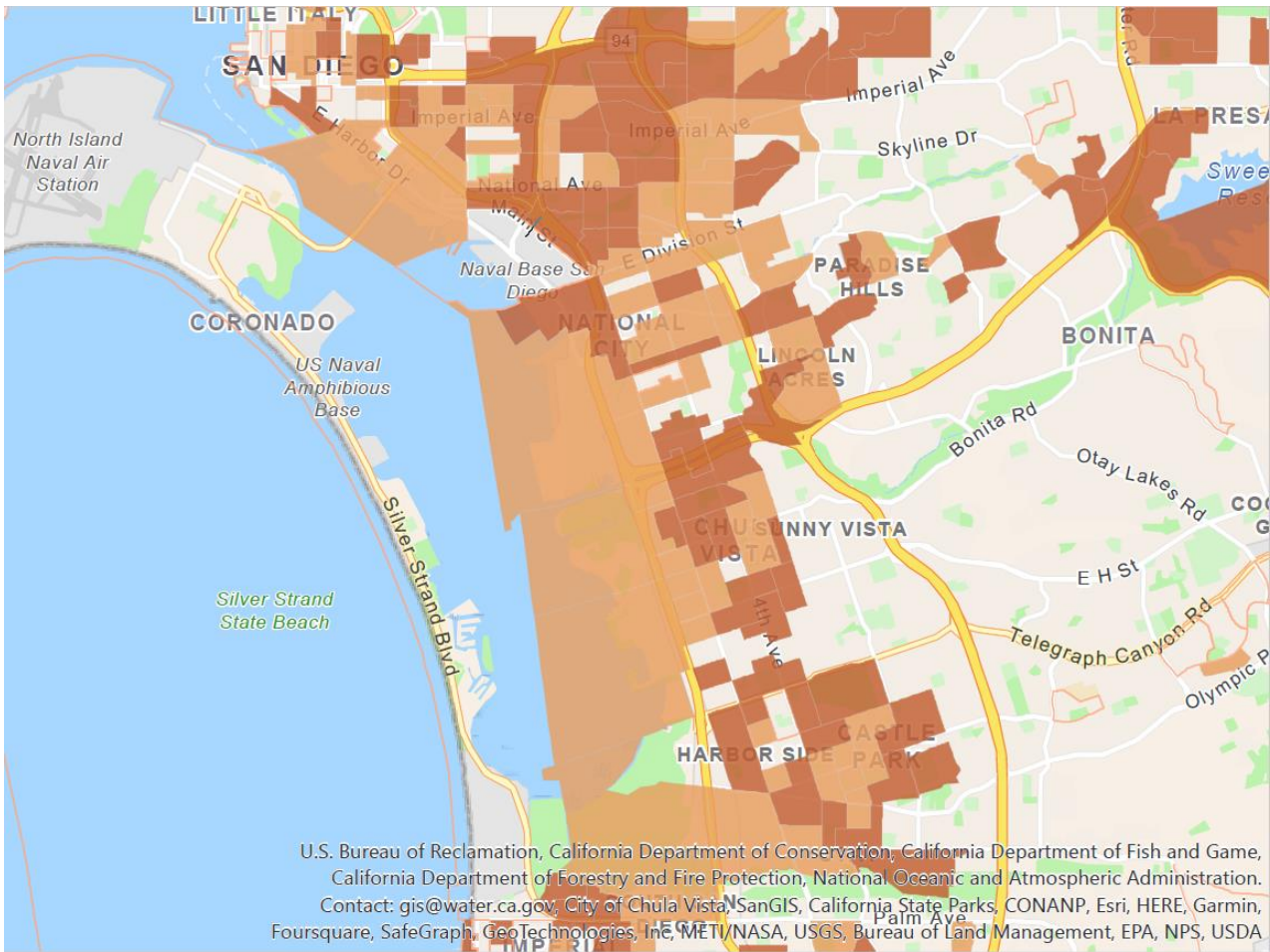
Following the Sea Turtle program, 4th graders' behaviors and attitudes didn't shift significantly, however they significantly felt overall that they would be more likely to pick up litter and could help solve environmental problems.



BEHAVIORAL MEASURES	Pre-Test (n=441) % At least a few times a month	Post-Test (n=324) % At least a few times a month	% Change From Pre to Post
How often do you think about the environment or animals?	85%	89%	+4%
How often do you pick up litter that is not your own?	80%	86%	+6%
ATTITUDINAL MEASURES	Pre-Test % Pretty much/Definitely Agree	Post-Test % Pretty much/Definitely Agree	% Change From Pre to Post
I feel it is important to help the wildlife living in our oceans and natural areas	89%	90%	+1%
I feel it is important to protect wetlands and coastal habitats	84%	88%	+4%
I feel that I can help solve environmental problems	64%	71%	+7%
AVERAGE BEHAVIORAL/ATTITUDINAL SCORE	80%	85%	+5%

 = significant **increase** from pre-test to post-test at a 95% Confidence Interval
 = significant **decrease** from pre-test to post-test at a 95% Confidence Interval





U.S. Bureau of Reclamation, California Department of Conservation, California Department of Fish and Game, California Department of Forestry and Fire Protection, National Oceanic and Atmospheric Administration. Contact: gis@water.ca.gov, City of Chula Vista, SANGIS, California State Parks, CONANP, Esri, HERE, Garmin, Foursquare, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

