SANTA MONICA BAY NATIONAL ESTUARY PROGRAM

Annual Report
1 October 2020 – 30 September 2021

Report Date: 29 October 2021

Prepared for the United States Environmental Protection Agency

Common Report Acronyms

Army Corps	United States Army Corps of Engineers
ASBS	Areas of Special Biological Significance
BEP	Boater Education Program
BRP	Santa Monica Bay Restoration Plan
BWER	Ballona Wetlands Ecological Reserve
CalTrans	California Department of Transportation
CCMP	Comprehensive Conservation and Management Plan (formerly BRP)
CCVA	Climate Change Vulnerability Assessment
CDBW	California Department of Boating and Waterways
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CDWR	California Department of Water Resources
CMP	Santa Monica Bay Comprehensive Monitoring Program
CNRA	California Natural Resources Agency
CoSMoS	Coastal Storm Modelling System
CRAM	California Rapid Assessment Method
CRI	Loyola Marymount University's Coastal Research Institute
CVA	Clean Vessel Act
CWMW	California Wetland Monitoring Workgroup
DDT	Dichlorodiphenyltrichloroethane
EMPA	Estuarine Marine Protected Area
EWMP	Enhanced Watershed Management Plans
FMP	Fishery Management Plan
FOLD	Friends of the LAX Dunes
GB	Santa Monica Bay Restoration Commission Governing Board
GHG	Greenhouse Gases
GPRA	Government Performance and Results Act
HABs	Harmful Algal Blooms
HHW	Household Hazardous Waste
HtB	Heal the Bay
JWPCP	Joint Water Pollution Control Plant (Carson)
LACDBH	Los Angeles County Department of Beaches and Harbors
LACDPH	Los Angeles County Department of Public Health
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation Districts
LADWP	Los Angeles Department of Water and Power
LARC	Los Angeles Regional Collaborative for Climate Action
LARWQCB	Los Angeles Regional Water Quality Control Board
LASAN	City of Los Angeles Sanitation
LCP	Local Coastal Plan
LVMWD	Las Virgenes Municipal Water District
MDRA	Marina Del Rey Anglers
MPA	Marine Protected Area
MRCA	Mountains Recreation and Conservation Authority
MWD	Metropolitan Water District of Southern California

NEP	National Estuary Program
NMFS	National Oceanic and Atmospheric Administration's National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service
NRC	Natural Resource Council
NZMS	New Zealand Mudsnails
OA	Ocean Acidification
OPC	Ocean Protection Council
OREHP	Ocean Resource Enhancement Hatchery Program
OWDS	On-site Wastewater Disposal Systems
PCB	Polychlorinated biphenyls
POTW	Public Owned Treatment Works
Prop.	Proposition Grant
PVPLC	Palos Verdes Peninsula Land Conservancy
RCDSMM	Resource Conservation District of the Santa Monica Mountains
SCC	California State Coastal Conservancy
SCCOOS	Southern California Ocean Observing Systems
SCCWRP	Southern California Coastal Water Research Project
SCMI	Southern California Marine Institute
SFEP	San Francisco Estuary Partnership
SLC	State Lands Commission
SLR	Sea Level Rise
SMBNEP	Santa Monica Bay National Estuary Program
SMBRC	Santa Monica Bay Restoration Commission
SMMC	Santa Monica Mountains Conservancy
State Parks	California Department of Parks and Recreation
SWRCB	State Water Resources Control Board
TAC	Santa Monica Bay Restoration Commission Technical Advisory Committee
TBF	The Bay Foundation (also known as the Santa Monica Bay Restoration Foundation)
TMDL	Total Maximum Daily Load
UCD	University of California, Davis
UCLA	University of California, Los Angeles
UCSB	University of California, Santa Barbara
USC	University of Southern California
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WBMWD	West Basin Municipal Water District
WMP	Watershed Management Plans

Annual Report Overview and Structure

This annual report outlines and provides an update for each of the Fiscal Year 2021 (FY21) Work Plan tasks for the time period 1 October 2020 through 30 September 2021, the annual reporting period for FY21. The FY21 Work Plan contains activities identified in the 2018 CCMP Action Plan and is focused on a subset of the identified Actions and Next Steps in the Action Plan. The top priorities of SMBNEP from the CCMP included improving water quality, conserving and rehabilitating natural resources, protecting the Bay's benefits and values to people, and understanding and addressing climate change impacts. Given the cross-cutting and multi-benefit nature of most of the projects and programs listed in the FY21 Work Plan and this annual report, they are not arbitrarily separated and categorized into one of those four priority areas. These four priority areas should be thought of as integrated and supported throughout the annual report. Many of the FY21 tasks continue past efforts.

Within these priority areas, seven goals were identified in the 2018 CCMP Action Plan and are listed below. All seven goals are to be addressed by the actions and next steps identified in the FY21 Work Plan and this annual report. The goals are achieved through actions by many different entities, including public agencies, municipalities, and non-profit organizations that take the lead on specific projects.

Seven CCMP Action Plan Goals:

1. Protect, enhance, and improve ecosystems of Santa Monica Bay and its watersheds
2. Improve water availability
3. Improve water quality
4. Enhance socio-economic benefits to the public
5. Enhance public engagement and education
6. Mitigate impacts and increase resiliency to climate change
7. Improve monitoring and ability to assess effectiveness of management actions

The main section of this annual report follows the Work Plan structure, which is based on the CCMP Action Plan. Thus, it consists of a large table that is organized by Action number and next steps identified with that Action from the 2018 CCMP. The tableis intended to provide current status and a synthesis of updates by next step or project on efforts undertaken during this reporting period. For some next steps that required more description, a narrative section follows the table (organized sequentially by Action number). Narratives for individual steps are categorized by Action. In some cases, the table identified that a next step did not have project activities during this time period; this was due to a combination of factors including but not limited to funding, partner prioritizations, or permitting delays.

The following table summarizes the primary work activities that occurred during this annual reporting period. Additional information can be found on the SMBNEP website, the CCMP Action Plan, the Work Plan, and as part of individual products produced for each project. The table provides brief updates on each of the CCMP actions that were implemented during this reporting period. Additional information for 22 of the 44 actions are presented in the *Annual Report Narratives* subsequent to the table.

For quick reference:

The following Actions are summarized solely in the table: 10-11, 14, 16, 19-20, 23, 25, 26, 28-31, 40-44. The following Actions are further informed by Report Narratives: 1-9, 12-13, 15, 17, 18, 21-22, 24, 27, 32-33, 35-36, 38.

During this time period, the continued spread of the novel coronavirus and its associated disease (COVID-19) required implementing social distancing, restrictions on volunteer events, and other guidelines. SMBNEP continues to follow recommendations by the Center for Disease Control and Prevention as well as recommendations by local authorities such as Los Angeles County Department of Public Health. SMBNEP is responding to challenges and continues ongoing efforts to adapt to restrictions.

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
1	Acquire open space for preservation of habitat and ecological services	Bond funded acquisitions	To acquire and protect 91 acres of undeveloped land in Carbon Canyon to prevent development in a fire-prone area and expand recreational opportunities	Completed	The Carbon Canyon Acquisition Project (funded by Prop. 12) was completed in November 2020 (see additional narrative)
		Support partners in identification and prioritization of key acquisition or conservation easement Properties	To acquire and/or protect high priority properties that are at risk of development, or provide high diversity, include wildlife corridors, and/or provide socio-economic benefits	Ongoing	MRCA acquired approximately 0.75 acres to improve public access to Escondido Beach and Escondido Canyon Park by donation and MRCA funding (see additional narrative); see Action #25 for efforts related to increased public access for beaches and other public trail systems
2	Restore kelp forests in the Bay to improve the extent and condition of the habitat	Implement the rocky reef/kelp forest restoration project	To restore five acres of rocky reef kelp forest by reducing urchin density within barrens to the target 2 urchins per square meter to allow the reestablishment of giant kelp	Ongoing	Partnered with commercial urchin harvesters to cull urchin densities within 1.11 acres of urchin barrens off White Point, Palos Verdes; TBF pre-monitored 1.07 acres of urchin barren during this time period
		Biological response monitoring of restoration areas	To track the response of the kelp forest community after restoration activities occur	Ongoing	Conducted all pre- and post-restoration monitoring for 1.11 acres cleared during this project period; annual biological response surveys were conducted in summer 2021

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		Conduct carbon sequestration assessment of kelp restoration project	To assess carbon sequestration potential of kelp forest restoration	Ongoing	Initiated literature search and identified research priorities and partners
3	Recover abalone populations in the Santa Monica Bay and region to support rare species and socioeconomic benefits to people	Establish abalone outplanting sites and conduct juvenile and larval outplanting	To reintroduce abalone and test effectiveness of outplanting methods	Ongoing	Maintained temperature and dissolved oxygen logger deployments at outplanting site; SAFEs were stocked with 61 red abalone and 500 white abalone on 24 May 2021 and BARTs were stocked with 480 white abalone on 17 June 2021; SAFEs were stocked with 414 white abalone on 30 September 2021
		Monitor abalone restoration and reference sites	To conduct SCUBA-based surveys within outplant sites to assess the survivability of outplanted abalone and suitability of the site for future outplanting efforts	Ongoing	Outplant monitoring occurred at scheduled intervals of one week, two weeks, and one month post SAFE opening, followed by quarterly site monitoring thereafter; during this reporting period, 351 live white abalone were observed on site and 749 white abalone shells were collected; during this reporting period, 23 live red abalone were observed on site and 144 red abalone shells were collected
		Captive spawn abalone	To research captive spawning and larval culturing techniques, and raise abalone in aquaculture facility for outplanting	Ongoing	In July 2021, TBF aquarists partnered with NOAA NMFS, a CSU COAST intern, and The Cultured Abalone Farm to conduct a red abalone larval feeding experiment to assess the effects of two different feeds on developing red abalone larvae through a mortality analysis; experiment is ongoing with improved settlement techniques and additional data being acquired

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		Maintain aquaculture facility for abalone	To facilitate captive spawning and rearing of red, green, and white abalone in support of future restoration activities for outplanting in the wild	Ongoing	TBF and SCMI staff continued to operate and maintain two abalone laboratory spaces at SCMI, housing red and endangered white abalone; staff transferred 902 juvenile white abalone from the Moss Landing Marine Lab on 19 February 2021 and 573 juvenile white abalone from The Cultured Abalone Farm on 1 March 2021; TBF staff transferred 3,000 red abalone from The Cultured Abalone Farm on 31 August 2021
4	Assess and restore seagrass habitats in the Santa Monica Bay and nearshore environments to benefit marine ecosystems	Survey the extent and condition of seagrasses in the Bay using R2Deep2, side-scan sonar, and SCUBA divers to inform the Comprehensive Monitoring Program	To survey the extent and condition of seagrasses in the Bay using R2Deep2, side-scan sonar, and SCUBA divers to inform the CMP and restoration activities	Ongoing	Baseline monitoring of Catalina Island extant eelgrass beds occurred on 2 October 2020 and 25 June 2021, while additional site visits were made for oceanographic sensor deployments on 21 October 2020 and 17 August 2021; side-scan sonar mapping at East End occurred on 15 April 2021 and at Palisades on 29 April and 6 May 2021; surveys, mapping, and genetic sample collection for the Malibu eelgrass sites occurred on 12 November 2020 (see additional narrative)

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	and improve coastal resilience	Develop restoration methods for eelgrass (*Zostera pacifica*) in the Santa Monica Bay	To improve understanding and probability of success for offshore eelgrass restoration using transplant methods	Ongoing	Collaborated with Paua Marine Research Group and partner agencies to improve understanding of eelgrass restoration methods to apply to the pilot project; eelgrass TAC met on 16 March 2021 and provided recommendations for transplant experimental design and success / evaluation criteria
		Conduct pilot restoration project(s) of offshore eelgrass in the Bay	To conduct a pilot restoration project of offshore eelgrass in the Bay within a one-acre footprint	Ongoing	Preliminary implementation and monitoring plans for eelgrass restoration pilot project have been drafted; NEP Coastal Watershed Grant was awarded to transplant to two additional sites within Santa Monica Bay; Scientific Collection Permit approved on 28 May 2021; application for Coastal Development Permit request for waiver was approved on 8 July 2021; development and approval of the QAPP (Quality Assurance Project Plan) by the EPA occurred on 7 June 2021; eelgrass transplants were implemented on 20, 22, and 27 July 2021; sites were monitored at 24 hrs, 1 week, 2 weeks, and 1 month post-transplant activities and will be monitored quarterly thereafter through 2022 (see additional narrative)
		Evaluate restoration potential of seagrasses in the	To improve understanding and probability of success for seagrass restoration projects	Ongoing	Outreach to seagrass experts throughout CA was initiated to form a TAC to inform transplant methods and monitoring protocols; first TAC meeting was on 16 March; genetics study

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		Bay, harbor, wetlands, and nearshore environments			continued with collection of *Z. pacifica* samples from Malibu bed on 12 November 2020; TBF staff continued participation on the regional Submerged Aquatic Vegetation Scientific Advisory Committee to inform regional standardization for seagrass monitoring; quarterly monitoring of sites will continue through 2022 (see additional narrative)
5	Assess and implement offshore artificial reefs to benefit marine ecosystems and provide socioeconomic benefits to people	Implement rocky reef restoration project off Palos Verdes	To restore 69 acres of rocky reef habitat lost to landslides activity using high relief rocky modules that will resist future burial from sediment deposition	Ongoing	Palos Verdes Reef Restoration Project (funded by Prop. 12) completed post-construction monitoring during this reporting period and developed a report of first-year monitoring results (see additional narrative)
		Annual monitoring with the use of side scan sonar and SCUBA based surveys	To assess nearshore coastal marine habitats using side-scan sonar and SCUBA to inform data gaps in the CMP and future restoration projects	Ongoing	Opportunistic communications between TBF and Vantuna Research Group occurred during this report period reaffirming the need for this work; next step will be to seek funding; TBF, SIO and VRG submitted a Prop 50 grant proposal to seek funding for Santa Monica Bay, Catalina Island, and La Jolla soft bottom habitat and extant eelgrass bed surveys Acoustic Telemetry Sensor Array recorded over 11,132 detections of ten individual juvenile white sharks and two adults in SMB; most detections occurred from October to December 2020; these twelve sharks represent a sharp decline from 2015-2016 data; Santa Monica

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					Bay waters were much warmer in 2015-2016; data will inform the CMP; data provided by CSULB shark lab
		Preliminary work regarding the benefits of dynamic revetments and nearshore reefs	To preliminarily advance work towards understanding dynamic revetments and nearshore reefs, including feasibility of using recycled concrete for construction	Ongoing	Conversations and preliminary research occurred, including participation in some webinars and discussions about these adaptation strategies; some elements were incorporated into LCPs by coastal municipalities (e.g., City of Manhattan Beach); cobble placement was planned by State Parks for protection of the Adamson House in Malibu
6	Restore coastal strand and foredune habitat to beaches and sandy shores to improve coastal resilience	Continue long-term monitoring of the Santa Monica Beach Restoration Pilot Project	To continue long-term monitoring to inform coastal resilience, ecosystem benefits, and adaptive management of the restoration area	Ongoing	Continued physical and biological surveys at the frequency described in the Implementation and Monitoring Plan; vegetation continues to expand, and dunes continue forming; data from southern portion of restoration area show over 0.5 meters of sand accretion, with dunes along fence lines of up to a meter in height; snowy plovers regularly recorded in monitoring data; since the original project permit was set to expire in 2021, City of Santa Monica opted to pursue a permit amendment to establish the site as a permanent feature of the coastline; TBF worked with the City to draft a CDP amendment, including supplemental documents

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		Conduct Phase 1 (outreach and planning) and Phase 2 (implementation) of the Malibu Living Shoreline Project	To restore three acres of beach and dune habitat to improve coastal resilience and ecosystem benefits and improve public engagement	Ongoing	Baseline monitoring, including topographic and biological surveys, were completed in October 2020; final Coastal Development Permit (CDP) application was approved in December 2020; through coordination with LACDBH, a Right of Entry (ROE) permit was obtained in December 2020; supplemental project plan was drafted and submitted as part of the ROE application package; project implementation began in December 2020 through February 2021; through restoration actions, approximately 25 tons of invasive iceplant was removed; other implementation actions included planting of over 500 native plants, seeding, and installation of interpretive post and rope fencing, sand fencing, and biomimicry stakes; CRI completed a research study to track sand accretion by the biomimicry stakes; the first round of semi-annual post-restoration monitoring was completed in June 2021; TBF began planning for sign installation
		Find funding for and implement another beach and bluff restoration project	To restore 3.5 acres of bluff, beach, and eelgrass habitat as part of a living shoreline pilot project (Los Angeles Living Shoreline Project); restore dune habitats in Manhattan Beach through iceplant removal and revegetation	Ongoing	Continued work on the Manhattan Beach Dune Restoration project; completed an innovative outreach video comprised of public comment on the project that was solicited through an interactive community engagement video forum; received final design deliverables from restoration design consultant (RIOS/CRC) in Dec 2020; obtained a Right of Entry Permit (ROE) to conduct scientific monitoring on-site;

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			with native plants		finalized the Restoration the Monitoring Plan (RMP) in July 2021; the final Coastal Development Permit (CDP) application package, including the RMP, was submitted in August 2021; began drafting LA County Flood Control District Permit application packages; continued to coordinate with LACDBH to amend ROE permit to include implementation and post-restoration activities; conducted scientific monitoring (see additional narrative)
				Ongoing	Continued work on the Los Angeles Living Shoreline Project; received final design deliverables from restoration design consultant (Integral Consulting) in Dec 2020; continued project outreach and coordination with project partners; obtained a Right of Entry Permit (ROE) to conduct scientific monitoring on-site; finalized the Restoration and Monitoring Plan (RMP) in June 2021; the final Coastal Development Permit (CDP) application package, including the RMP, was submitted in July 2021 and a supplemental project plan was submitted in September 2021; submitted a State Parks Scientific Collection permit application package in September 2021; continued to coordinate with LACDBH to amend ROE permit to include implementation and post-restoration activities (see additional narrative)

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					Submitted a Scope of Work for the Santa Monica Dune Restoration project, which was selected by a Trustee Council to receive mitigation funding from the Refugio Beach oil spill (see additional narrative)
		Support efforts to standardize sandy beach monitoring and a regional approach to restoration	To continue efforts to standardize sandy beach monitoring and data collection for southern California through stakeholder partnerships and CMP implementation	Ongoing	Continued ongoing coordination with the Beach Ecology Coalition group, including presenting on 14 January 2021 to over 90 individuals as part of the virtual winter meeting; continued stakeholder and agency communications; continued the Site Suitability Model analysis project in partnership with CRI, LACDBH, and State Parks; continued CRI beach characterization study, including an outline for a manuscript; presented at the American Shore and Beach Preservation Association National Summit (ASBPA, invited speaker); TBF staff was elected to the Board of Directors of ASBPA in September 2021; TBF and partners applied for Proposition 50 grant to conduct sandy shore monitoring in the Bay, including filling CMP data gaps and developing research projects in support of indicator development
		Conduct community restoration events in the northern 48-acre dune area	To engage community through hands-on stewardship and habitat restoration through events held at the LAX Dunes	Ongoing	TBF halted public community events in March 2020 as required by LA County Public Health due to COVID-19; TBF began planning and coordination with LAWA to reconvene community restoration events in fall 2021 (first event in October 2021)

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7	Restore and maintain the entire LAX Dunes system to support native plants, wildlife, and rare species	Support LAWA in long-term maintenance and adaptive management of the 48-acre northern dune area	To continue and strengthen partnership with LAWA to restore and maintain the LAX Dunes	Ongoing	Continued to coordinate and work with LAWA and project partners on seed collection, habitat restoration, future restoration planning, and monitoring; conducted non-native weed removal with Los Angeles Conservation Corps (LACC) in March, April, and May 2021; conducted ongoing scientific monitoring; conducted habitat restoration with IO Environmental and Infrastructure, Inc. in April and May 2021; finalized and submitted the Revised Ecological Landscape Plan in April 2021 (approved by Coastal Commission); assisted LAWA in preparing a CDP amendment for submission for the Coastal Dune Improvement Project (CDIP) (see additional narrative)
		Engage underserved students and volunteers and inland communities	To recruit underserved students and volunteers, particularly from inland communities, to participate in hand-on stewardship and restoration at the LAX Dunes	Ongoing	Minimal activities occurred during this semi-annual reporting period, due to halting of events as required by LA County Public Health due to COVID-19; TBF began planning and coordination with LAWA and outreach to various community groups to reconvene community events
		Initiate planning for areas within the adjacent dunes, including baseline monitoring	To conduct baseline monitoring and develop recommendations for habitat management	Ongoing	Conducted several site visits with LAWA and project partners in the adjacent 52-acre dune area; project partner, California Botanic Garden, performed frequent seed collection and vegetation monitoring in the adjacent dune areas; TBF consulted with LAWA on restoration planning actions in the entire 300-acre LAX

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					Dunes, including reviewing the draft Replacement Plan, which identifies restoration priorities in the dunes; TBF continued monitoring planning for the adjacent 52-acre dune area
8	Restore coastal bluff habitats in the Bay watershed to support ecosystem services	Use Beach Bluff Restoration Master Plan to explore bluff restoration and continue recovery of El Segundo Blue Butterfly	To provide habitat and ecological benefits in support of the recovery and eventual delisting of the endangered El Segundo Blue Butterfly and to restore bluff habitats	Ongoing	TBF continues ongoing communications with LAWA to develop a restoration plan and enhance habitat for the El Segundo Blue Butterfly at the LAX Dunes, especially within the El Segundo Blue Butterfly Preserve (southern dunes); participated in several meetings with LAWA and Wildlands Conservation Science (WCS) related to future restoration planning for the Preserve and the entire LAX Dunes complex and reviewed and provided feedback for the draft Replacement Plan; continued ongoing participation and support for the El Segundo Blue Butterfly Coalition (ESB Coalition), a group of public stakeholders, organizations, and agencies dedicated to restoration for the butterfly; TBF supported efforts by LACDBH to conduct bluff and beach restoration associated with the RV Park expansion at Dockweiler Beach
		Identify partners and funding to support bluff restoration projects	To establish project partners, project sites, and identify potential funding sources in support of bluff restoration	Ongoing	Continued to identify and coordinate with project partners, agencies, and stakeholders to prioritize project locations; continued work as part of ESB Coalition; continued discussions with LACDBH and City of Los Angeles for additional bluff restoration projects on

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					Dockweiler Beach; see also updates as part of the Los Angeles Living Shoreline Project (Action #6)
		Initiate restoration of one bluff restoration project	To restore 13 acres of rare coastal bluff habitat to support threatened and endangered wildlife and plant species, reduce coastal erosion, improve water infiltration, and enhance public access	Ongoing	Implementation of the Abalone Cove Habitat Restoration Project (funded by Prop. 12) continued during this reporting period, including site preparation, irrigation maintenance, plant propagation and installation, removal of invasive plants, and trail improvement planning (see additional narrative); see also the narrative for Action 6 for the Los Angeles Living Shoreline Project
		Initiate Pt. Dume stair replacement and bluff restoration project to benefit people and wildlife	To replace a deteriorated beach access staircase and restore bluff habitat at Point Dume State Beach	Ongoing	Construction of the Point Dume State Beach staircase continued, with completion anticipatedby the end of 2021 which would be followed by restoration of native plant species impacted by the construction

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
9	Implement Malibu Creek Ecosystem Restoration Project (Rindge Dam and other barrier removals) to support ecosystem restoration	Support lead agencies in efforts to complete the design and engineering plans for the Malibu Creek Ecosystem Restoration Project	To develop design and engineering plans to remove Rindge Dam and additional barriers, to restore terrestrial and aquatic habitat connectivity and establish natural sediment transport regime	Ongoing	Malibu Creek Ecosystem Restoration Project was approved and listed as an authorized Ecosystem Restoration Project in the Federal Water Resources Development Act of 2020; the State Legislature appropriated $12.5 million for the project; the Notice of Determination and Record of Decision are anticipated to be signed by the end of 2021 (see additional narrative)
10	Remove additional barriers to support fish migration and ecosystem services	Identify, prioritize, and acquire funding for barrier removal projects	To engage with partner entities to identify potential opportunities for fish barrier removal	Ongoing	Opportunistically participated in meetings and engaged in conversations to advance project prioritization and funding, especially with entities such as State Parks and Resource Conservation District of Santa Monica Mountains; communicated about several grant opportunities for fish barrier removal and restoration

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11	Restore urban streams, including daylighting culverted streams, removing cement channels, and restoring riparian habitats	Identify additional urban streams for restoration and prioritize actions	To engage with partner entities to identify potential opportunities for urban stream restoration	Ongoing	No activities occurred during this annual reporting period
12	Restore smaller coastal lagoons and other wetland types to increase wetland habitat area and condition throughout the watershed	Finalize restoration planning and permitting for Topanga Lagoon restoration project and initiate project	To create a restored habitat that integrates fish passage barrier removal, wetland habitat restoration, visitor services, and recreational opportunities at Topanga Lagoon	Ongoing	Topanga Lagoon Restoration Planning project (funded by Prop. 12) continued Phase 1 implementation, including a public workshop held in February 2021 to review three conceptual design alternatives for the project and modeling results, and get input from the participants on the alternatives; RCDSMM staff presented a project update at the 15 April 2021 SMBRC Governing Board meeting; an additional $1.19 million was approved to address increased data and community engagement needs; additional technical advisory committee and stakeholdermeetings to finalize concept alternatives are anticipated between October and December 2021; TBF supported baseline assessment through deployment and management of a water quality sensor in partnership with RCDSMM (see

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
					additional narrative)
		Complete land acquisition, feasibility analyses, and restoration design in coordination with bridge redevelopment for Trancas Lagoon	To restore habitats adjacent to Trancas Lagoon after CalTrans bridge expansion is completed	Ongoing	CalTrans continued planning for bridge expansion and restoration activities
		Conduct comprehensive monitoring of small lagoons in northern Bay to inform CMP and seek funding to continue Malibu Lagoon monitoring	To conduct comprehensive monitoring of the northern Bay lagoons, inform the Comprehensive Monitoring Program (wetlands chapter), and acquire funding to continue long-term monitoring and data collection at Malibu Lagoon	Ongoing	Continued conversations with partners such as CSULB, SCCWRP, UCLA, and RCDSMM to gain information on bar-built estuaries; continued participation on the Estuarine MPA Technical Advisory Committee, which includes Malibu Lagoon as a study site; continued coordination with EMPA monitoring, including deployment, management, and maintenance of two water quality sondes in Malibu Lagoon; SCCWRP, TBF, and CSULB applied for Proposition 50 money to conduct monitoring of the small lagoons in northern Bay to fill CMP data gaps
		Assess restoration options and priorities for other wetland types (e.g., freshwater systems)	To complete acquisition and planning to restore wetlands associated with the AES Power Plant redevelopment in Redondo Beach	Ongoing	No activities occurred during this annual reporting period

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13	Restore Ballona Wetlands Ecological Reserve to enhance wetland habitats and benefits to people	Support the lead agencies by contributing technical information to the Final Environmental Impact Statement and Report and permitting	To support the lead agencies in completing permitting	Ongoing	In June 2021, SMBRC Governing Board adopted a resolution regarding public access at the BWER, and SMBRC staff conveyed the resolution to CDFW; continued to provide technical support and communicated with the lead agencies regarding BWER scientific information; the Final Environmental Impact Report for the Ballona Wetlands Restoration Project was certified in December 2020 by CDFW; the project was awarded $1,692,360 from the State Coastal Conservancy (Prop. 12) for technical studies, engineering, and design; CDFW continues partnership with Army Corps to further restoration planning
		Continue community engagement and hand-restoration within the Reserve with FBW	To restore four acres of degraded wetland and transition habitat at the Ballona Wetlands Ecological Reserve through community restoration	Ongoing	Continued to conduct frequent restoration maintenance, small partner events, and biological monitoring in accordance with permits (TBF and FBW); public community events were halted as required by LA County Public Health due to COVID-19 in March 2020; community restoration events reconvened in August 2021 with COVID-19 safety guidelines in place; continued restoration activities and associated monitoring in permitted areas as part of a project funded by Prop 12; conducted non-native vegetation removal, seeding, and planting of over 1,400 native plants along with FBW, LACC, and Edith Read & Associates in November 2020; continued post-restoration site maintenance and monitoring (see additional

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
					narrative)
14	Implement wildlife crossings and other innovative projects for benefits to wildlife and people	Support lead agencies to find funding for Phase 2 of the Liberty Canyon Wildlife Crossing project	To implement Phase 2 of the Liberty Canyon Wildlife Crossing Project (Final/ 100% Design) in support of wildlife movement and safety and enhanced habitats	Ongoing	MRCA and National Wildlife Federation received $25 million from Wallis Annenberg and the Annenberg Foundation and $20 million from Wildlife Conservation Board to expedite implementation of the project
		Support lead agencies in permitting and environmental review of Liberty Canyon Wildlife Crossing project	To complete implementation of the Liberty Canyon Wildlife Crossing Project in support of wildlife movement and safety and enhanced habitats	Ongoing	The project continued the final design and engineering phase during this reporting period, including CalTrans' completion of the 60% and 90% design / engineering plans; construction is anticipated to start in early 2022
15	Implement projects that improve understanding and/or enhance endangered and threatened species populations (e.g., habitat improvements for Western	Support Southern California Steelhead Trout genetic banking study	To conduct the Southern California Steelhead Trout genetic banking study to inform population recovery	Ongoing	No activities occurred during this annual reporting period
		Support restoration and monitoring activities to benefit California red legged frog populations	To improve riparian and stream habitats to support populations of California red legged frog	Ongoing	Implementation of the California Red-legged Frogs Project (funded by Prop. 12) resumed following postponement due to fire impacts, including continued daytime frog surveys (see additional narrative)

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	Snowy Plover, genetic banking)	Support projects within western snowy plover critical habitat	To provide habitat and ecological benefits in support of the threatened Western Snowy Plover and to restore critical habitat	Ongoing	Continued beach and dune restoration projects and continued to inform management actions in support of ecological benefits to plovers; ongoing communications with USFWS regarding habitat enhancement projects; continued conversations with Audubon Society and plover monitoring teams and received summary plover reports monthly; ongoing communications with City of Santa Monica and PV Audubon about an additional beach restoration project in Santa Monica to support plovers; the project footprint for the recently approved Santa Monica Dune Restoration project encompasses an existing plover enclosure, which would be expanded and enhanced as part of the scope of the project (see Action #6) (see additional narrative)
16	Support the implementation of activities and projects such as those in Enhanced Watershed Management Plans (EWMPs) and activities identified in the TMDL implementation	Continue to support implementation of projects identified in EWMPs and WMPs	To allocate and oversee State Bond funding for implementation of projects identified in EWMPs and WMPs; support implementation of projects made available under Measure W	Ongoing	Continued overseeing implementation of capital projects for storm water pollution reduction through multi-benefit solutions including two projects funded by Prop. 12 and four projects funded by Prop. 84 (see also Action #17); in October 2020, SMBRC staff conveyed an SMBRC Governing Board resolution to the LARWQCB expressing support of an MS4 permit that furthers SMBRC goals and CCMP implementation, and supports continued collaboration between stakeholders in implementation of stormwater pollution control programs for restoring and enhancing the Bay

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
	schedule to help achieve TMDL goals for 303d listed waterbodies in the Bay and its watershed				and its watersheds; see Action #43 for efforts related to Measure W support
		Continue implementation of LA IRWMP	To facilitate and support coordination and allocation of IRWMP funding and implementation of projects identified in EWMPs and WMPs in the watershed	Ongoing	Continued to participate in activities of the Greater Los Angeles IRWMP Leadership Committee; SMBRC Governing Board approved the revisions to the MOU for IRWM Planning and Implementation for the Greater Los Angeles County Region in February 2021, renewing SMBRC's continued participation in the Leadership Committee
		Facilitate other sources of State funding	To facilitate and support allocation of funding from other State bond measures such as Prop. 1 and 65 for implementation of projects identified in EWMPs and WMPs in the watershed	Ongoing	Staff informed SMBRC Governing Board and stakeholders of funding opportunities under the nonpoint source pollution grant program
17	Infiltrate, capture, and reuse	Complete rain garden metal fate study with CRI	To assess the fate of sequestered or retained heavy metals in the Culver City Rain Garden	Ongoing	No activities occurred during this annual reporting period

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	stormwater and dry-weather runoff through green infrastructure, LID, and other multi-benefit projects and improve understanding of ecosystem services provided	Complete additional LID projects throughout the watershed	To complete more LID projects throughout the watershed to improve flood protection and water quality, and provide additional benefits	Ongoing	Continued to work with grantees to implement four previously funded Prop. 84 projects: Culver Boulevard Urban Stormwater Project, Westwood Neighborhood Greenway Project, Santa Monica Bay Catch Basin Insert Project, and Ladera Park Water Quality Enhancement Project; Continued to coordinate with SCC to oversee two Prop. 12 projects: Monteith Park and View Park Green Alley Stormwater Improvements Project and Beach Cities Green Streets (see additional narratives)
		Seek funding and partnerships to conduct a cost-benefit analysis of LID projects	To continue to inform regional assessments of LID projects and water quality benefits	Ongoing	No activities occurred during this annual reporting period
18	Support installation and monitoring of additional sewage and bilge pumpout facilities in Southern California harbors	Continue quarterly monitoring of public sewage pumpout stations	To assess the condition of public sewage pumpout and dump stations	Ongoing	Per statewide directive, monitoring is now occurring on a triannual basis and includes dump stations; conducted three triannual monitoring efforts of 71 public sewage pumpout and eight dump stations in Southern California harbors; finalized two triannual monitoring reports; finalized Pumpout Report 2020
		Support installation of sewage pumpouts in Marina del Rey or King Harbor	To provide the boating community with additional pollution prevention resources	Ongoing	Communicated with Marina del Rey and King Harbor staff to promote Clean Vessel Act (CVA) sewage management grants; King Harbor submitted a CVA application for two new sewage pumpout units

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		Support installation of bilge pumpouts in Marina del Rey or King Harbor	To support installation of bilge pumpouts	Ongoing	No activities occurred during this annual reporting period
		Support efforts of neighboring harbors in installation of bilge and sewage pumpouts in southern California	To provide the boating community with additional pollution prevention resources	Ongoing	Communicated with Avalon Bay, Ventura, San Diego, and Long Beach harbor staff to promote CVA sewage management grants; with CVA funding, Port of San Diego installed five new units to replace old facilities, Oceanside Harbor installed one new pumpout unit, and Newport Harbor also installed five new units to replace old facilities
19	Support minimization of biological impacts of water intake and discharge from coastal power generation and seawater desalination facilities, including public engagement and education	Educate and increase public support of the state-wide desalination requirements	To support efforts by state regulatory agencies to achieve full implementation of the state-wide desalination requirements in the California Ocean Plan and Once-Through Cooling Policy including education on the benefit of increasing sources of local water supplies	Ongoing	SWRCB staff held an “Ocean Plan Desalination Update & Provisions and Volumetric Reporting requirements in Recycled Water” workshop for industry and other stakeholders on 20 May 2021, which included updates on pertinent regulations, emerging technologies, and new projects as well as a panel of treatment plant operators to discuss their perspectives on desalination and reuse

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20	Support elimination of non-point pollution from onsite wastewater treatment systems	Complete sewer connections of residential properties to the centralized wastewater treatment facility in the Malibu Civic Center area	To improve water quality and reduce nutrient pollution through connecting residential properties to the centralized wastewater treatment facility	Ongoing	City of Malibu continued Phase 2 design and planning, including development of funding agreements, approval of a coastal development permit, development of designs for wastewater collection and recycled water distribution systems, and providing updates at community meetings in January and May 2021; Final design is anticipated to be complete in late 2021
		Continue the coordinated OWTS identification, permitting, and inspection system between the LARWQCB and the cities and counties in the watershed	To continue to support efforts by the LARWQCB and cities and counties to achieve full implementation of the statewide policy for siting design, operation, and maintenance of OWTSs	Ongoing	No activities occurred during this annual reporting period
	Support policies that promote reuse, recycling, and advanced wastewater treatment to reduce reliance on imported	Support recycled wastewater efforts by JWPCP of LACSD	To support expansion of wastewater effluent recycling by JWPCP of LACSD	Ongoing	MWD and LACSD boards approved initiating the CEQA process in November 2020, with anticipated completion by 2023; Continued testing at the demonstration facility; MWD and LACSD staff presented on JWPCP's efforts in expansion of wastewater recycling at the December 2020 SMBRC Governing Board meeting; LACSD and SMBRC staff informed SMBRC Governing Board and stakeholders of JWPCP's Advanced Purification Center virtual

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21	water sources				tour opportunities
		Hyperion Treatment Plant to implement pilot project for recycled water	To support timely completion of Hyperion's pilot project	Ongoing	At the December 2020 SMBRC Governing Board meeting, LASAN staff presented on updates and next steps for Hyperion and other recycled water and advanced wastewater treatment effort; implementation of the Hyperion 2035 Program was temporarily halted due to facility impacts associated with the 11 July 2021 unplanned discharge incident, including flooding of the Advanced Water Purification Facility construction site; efforts to bring the Hyperion Water Reclamation Plan back to normal operation continued
		Support recycled wastewater efforts by Tapia Water Reclamation Facility and others through expansion of distribution system and regional partnerships	To support expansion of recycled wastewater distribution and reuse	Ongoing	LVMWD staff presented on the completion of the Pure Water Project (funded by Prop.12) at the December 2020 SMBRC Governing Board meeting (see additional narrative); City of Santa Monica continued construction of the Advanced Water TreatmentFacility

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22	Support policies and implement projects that divert landfill waste and encourage composting to improve water quality and lower greenhouse gas emissions	Support continuation of Table to Farm compost hubs	To reduce food waste being sent to landfills, compost food waste, and apply compost to urban gardens to grow food	Ongoing	Continued Table to Farm community garden project funded by US EPA Environmental Justice Small Grants Program and SoCalGas at Environmental Charter School (ECS) Inglewood; developed and set garden irrigation infrastructure; planted produce in fall 2020 and spring 2021 in three raised garden beds and two in-ground beds; finalized and produced two bilingual garden signs; installed a free community library box alongside community garden beds and an on-campus seed exchange mail box; engaged over 30 community members at the community garden during socially distant community events; produced and distributed one bilingual (English/Spanish) postcard announcing community garden to 2,500 surrounding Inglewood residents; co-led monthly volunteer community garden events; no updates or activities occurred from October 2020 – August 2021 on the existing three Table to Farm compost hubs in Inglewood, Gardena, and Lawndale due to COVID-19 and ECS campus closures; applied for two grant opportunities to fund revitalization of ECS/Table to Farm compost hubs

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24	Support the inclusion of coastal resilience through natural means and softscape measures into local coastal plan updates	Attend stakeholder meetings for local cities LCP development / updates / implementation	To continue involvement in stakeholder meetings for local cities LCP development and implementation	Ongoing	Attended and participated in stakeholder meetings and workshops related to LCPs to encourage inclusions of nature-based adaptation and living shoreline measures as coastal resilience strategies (e.g., participated on City of Manhattan Beach's climate adaptation stakeholder committees); supported AdaptLA in efforts to incorporated SLR resiliency into policy
		Opportunistically assist cities in the development of sea level rise vulnerability studies	To identify and partner with cities to develop sea level rise vulnerability studies to strategically recommend coastal resilience strategies	Ongoing	Partnered with cities in the development of sea level rise vulnerability studies and recommend nature-based living shoreline measures be included as adaptation strategies; communicated with City of Manhattan Beach, City of Malibu, City of Hermosa Beach, City of Los Angeles, and others
		Use data collected from beach restoration "soft-scape" projects to inform and assist LCP development	To provide science-based data to inform LCP development and support beach restoration	Ongoing	Continued ongoing communications regarding TBF's living shorelines projects with local municipalities, LACDBH, consulting firms, and other NGOs; continued outreach to universities and presentations to other scientists; TBF partnered with Cal Sea Grant, USC Sean Grant, and UCSB to form the California Dune Science Network, including a website summarizing beach restoration project information and began planning for a workshop to be held in December 2021; see also Action #6

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25	Support best management practices, increased public access, and improved public facilities for beaches and other public trail systems to support both enhanced natural resources values and benefits to people	Support implementation of identified actions within plans such as the LACDBH Sea Level Rise Vulnerability Assessment	To implement adaptation projects that will improve coastal resilience	Ongoing	Continued ongoing partnership with LACDBH and other coastal municipalities about opportunities to implement nature-based adaptation solutions to sea level rise; LACDBH and TBF continued discussions to prioritize infrastructure protection and reduce beach erosion through nature-based adaptation; continued ongoing conversations with City of Santa Monica and received approval for funding for the Santa Monica Dune Restoration project (see also Action's #6 and #24)
		Continue to advise BMPs for beaches that promote habitat condition improvements and support for unique species	To build upon and continue partnerships with groups and agencies to benefit beach habitat conditions	Ongoing	Continued partnerships and active participation with groups and agencies such as LACDBH, Audubon Society, Pepperdine, Beach Ecology Coalition, State Parks, USC Sea Grant, Cal Sea Grant, Scripps, and USFWS to implement and provide recommendations for best management practices along beaches; conversations continued in conjunction with TBF's living shorelines projects; supported Beach Ecology Coalition in developing an agenda and presenting at the January meeting; TBF staff presented at American Shore and Beach Preservation Association National Summit on beach restoration and coastal resiliency for CA

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26	Participate in research, education, outreach, and policy on invasive species removal and control	Conduct New Zealand Mudsnail surveys	To track the spread of NZMS in the Santa Monica Mountains and develop management recommendations for control	Ongoing	No activities occurred during this annual reporting period
27	Produce educational resources and materials and conduct outreach to improve best management practices for Southern California boaters (e.g., fuel, sewage, and hazardous waste management)	Produce educational materials	To produce educational materials to increase awareness of boating best management practices to boaters	Ongoing	Produced and distributed: Winter 2020, Spring 2021, and Summer 2021 Changing Tide newsletters; 2021 Tide Calendars in Spanish and English; "How to Conduct Dockwalking" video, "Fishing in California? Get Clear on Marine Protected Areas!" video in English and with Spanish closed captions; "Consider a Marine Composting Toilet" video in English and with Spanish closed captions; "Recycle Fishing Lines" guide with MPA resources, and "California MPA Knowledge Review" interactive quiz; ; finalized binder card bilingual resource for inclusion in the California Boater Kit; assembled 2,700 Boater Kits for 2021
					Conducted outreach to the boating community at 12 virtual events: three virtual Clean Boating Webinars with 71 total attendees, 2020 and 2021 States Organization for Boating Access

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		Conduct outreach	To conduct outreach to increase awareness of boating best management practices to boaters	Ongoing	virtual conference on California CVA virtual outreach methodologies with partners SFEP and California Coastal Commission/State Parks, California Clean Boating Network (CCBN) virtual event with 135 attendees, and six virtual Dockwalker Trainings for 90 volunteers; co-hosted CCBN virtual event and worked with CDFW to secure their participation and outreach on MPAs; conducted digital media campaign for the Boater's Guide for Southern California which reached 116,284 people; continued implementing an interactive Clean Boating Questionnaire for virtual engagement and Boater Kit distribution; distributed 2,556 2021 Boater Kits; co-produced a Boater Kit Feedback Survey Report regarding boaters input on the Boater Kit and its components; implemented a Boater Sewage Disposal Survey, received 424 responses, and drafted a report; promoted and received 89 "California MPA Knowledge Review" quiz participants, implemented social media campaign to promote "Fishing in California? Get Clear on Marine Protected Areas" video reaching 238,800 people; implemented social media campaign to promote "Marine Sanitation Device & Y-Valve Information for Boaters" video reaching more than 36,017 people (see additional narrative)

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		Manage Pumpout Nav app	Increase proper disposal of boater sewage	Ongoing	Continued to manage Pumpout Nav app, ensured pumpout status is accurate, and responded to problems reported; in partnership with SFEP contributed to and supported app developmentand maintenance
		Research public engagement metrics and specific engagement tools on reduction of pollutants to waterways	To optimize public engagement resources to increase impact of pollutant reduction strategies to waterways	Ongoing	Received funding from a CVA 21 Education and Outreach grant to implement a community based social marketing pilot project on proper boat sewage disposal in southern California harbors; attended a workshop on Community Based Social Marketing; documented resources on incorporation of behavior change into the design and delivery of community programs
		Find funding and implement fuel spill prevention tools and outreach	To reduce fuel and oil pollution from the boating community	Ongoing	Assembled 2,700 California Boater Kits, each with a fuel bib and two oil absorbent sheets for southern California boaters in partnership with California Boating Clean and Green Program; co-hosted three Clean Boating Webinars conducted in partnership with California Coastal Commission / State Parks which include information on oil recycling and oil pollution best management practices
		Support and develop marine debris reduction and cleanup efforts	To reduce fishing line marine debris from the angling community	Ongoing	Began development and finalized instruction collateral for do-it-yourself fishing line recycling instructions; produced 2021 Tide Calendars in English and Spanish which features fishing line recycling station locations within southern California harbors

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28	Support efforts of disadvantaged communities to achieve healthy habitats, implement green infrastructure, and reduce pollution	Utilize the BallonaCreek Greenway Plan to identify parcels in disadvantaged communities for implementation	To identify opportunities for the creation of parks, parklets, and green corridors	Ongoing	Baldwin Hills Conservancy continued overseeing projects that aim to increase greenspace access and green infrastructure for underserved communities, including the Mar Vista Community Greening Plan and Greenway Design project, which held nine youth team meetings, five community advisory meetings, and five community workshops to inform design priorities
		Support IRWMP and similar programs to preferentially invest in disadvantaged communities	To support green infrastructure projects for IRWMP and Measure W funding in disadvantaged communities	Ongoing	See Action #16 for efforts related to IRWMP and Action #43 for efforts related to Measure W
29	Reduce health risks of swimming in contaminated waters and consuming contaminated seafoods through more comprehensive source control and, advanced monitoring and public notification	Continue implementation and improvement of beach water quality monitoring and reporting system	To support Heal the Bay's efforts to standardize beach water quality monitoring and effectively disseminate the information to the public	Ongoing	HtB released the thirty-first annual Beach Report Card, providing beach water quality grades for over 500 beaches across CA, and the third annual River Report Card, providing water quality at 28 freshwater recreation areas in Los Angeles County during summer 2020, HtB secured $138,250 from state, nonprofit, and private entities to support the continued development and release of water quality reports and the maintenance of the NowCast system and interactive website to inform the public and to update grading methodology for the River Report Card; Assemblymember Bloom, in partnership with HtB, introduced legislation to protect public health at freshwater

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					swimming and recreation sites statewide, in part, through water quality monitoring using standardized protocols and metrics and public notification (AB1066); at the August 2021 SMBRC Governing Board meeting, LACDPH staff presented on the 11 July 2021 Hyperion Water Reclamation Plant sewage discharge, LACDPH's response activities, and areas to improve notification systems to avoid similar notification issues in the future
		Maintain and enhance the existing seafood contamination education and enforcement program	To support and facilitate the continuation and enhancement of the existing seafood contamination education and enforcement program	Ongoing	FCEC released annual reporting of angler outreach efforts, enforcement, and pier sign conditions for the August 2019 to July 2020 period; convened a Palos Verdes Shelf Technical Information Exchange Group meeting in April 2021, with the next meeting anticipated for the end of 2021; USEPA worked with HtB to develop a youth aquarium education program and a patio education and outreach program and to develop and begin theapproval process of the HtB Angler Outreach Program Health and Safety Plan for COVID-19
30	Conduct community engagement, education, and inform policies	Link water conservation with outreach events and social media	To opportunistically incorporate water conservation topics during outreach events and on social media	Ongoing	TBF's watershed program and community engagement program jointly applied for a water conservation outreach grant, but did not receive it; continued to explore outreach ideas

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	related to water conservation and reuse to reduce water demand and reliance on imported sources	Educate, engage communities, and provide resources that promote the importance of native plants	To promote the use of drought tolerant native plants	Ongoing	Continued to educate community and volunteers on the importance of using drought tolerant native plants in habitat restoration and residential landscaping through online communications such as social media; communicated and developed partnerships with local native plant nurseries; applied for grant opportunity to fund outreach to educate the community in water conservation (see above), including through use of drought tolerant plants
		Support efforts by water agencies to promote water conservation and reuse including dissemination of materials	To promote current information on water conservation and reuse efforts developed by water agencies	Ongoing	Applied for grant opportunity to fund outreach to educate the community in water conservation (see above)
31	Achieve water quality benefits by businesses through community engagement and implementation of best management practices	Develop funding to support the expansion of best management practices to incorporate other business sectors	To contribute to source reduction of single-use disposable items from food service establishments	Ongoing	Trialed ReThink Disposable program at Yacht Clubs with food service

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32	Reduce marine debris by supporting bans on single-use items, conducting outreach, and participating in trash reduction programs	Find funding for and continue ReThink Disposable LA	To contribute to source reduction of single-use disposable items from food service establishments	Ongoing	Worked with California Boating Clean and Green Program and Southern California Yachting Association to conduct ReThink Disposable program outreach to over 30 LA County yacht clubs with food service; secured participation from three yacht club participants; ReThink Disposable program implementation is in progress
		Support municipality bans of polystyrene, non-recyclable plastics, and single use items	To contribute to source reduction of polystyrene, non-recyclable plastics, and single use items	Ongoing	Participated in Reusable LA Coalition; contributed signatory to letters to LA County Board of Supervisors urging support for the motion and drafting of a Food Accessories Upon Request ordinance in Los Angeles County; to LA County Board of Supervisors to support the Single-Use Foodware Accessories Request Ordinance (passed); to City of Los Angeles to support to a motion to draft a Food Accessories Upon Request ordinance; to City of Los Angeles City Councilmembers and Mayor Garcetti to support the Foodware Accessories Upon Request Ordinance (passed); to City of Pasadena Mayor Gordo and City Councilmembers to support Disposable Accessory Foodware Items Opt-In Ordinance (passed); to City of Beverly Hills Public Works Commission urging support for the motion and drafting of a Food Accessories Upon Request ordinance; to Honorable Luz M. Rivas, Chair of the California Assembly Natural Resources Committee urging support

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
					of AB 1276 and the expansion of the plastic straws upon request law to include other single-use food accessories, other food facilities, and third-party delivery platforms (passed); to Senator Merkley and Representative Lowenthal to support the Break Free from Plastic Pollution Act
33	Monitor microplastics (including microfibers) and other marine debris in the Bay and coastal environments to inform management actions	Complete the development of a microplastics in sediment extraction and analysis method	To complete the development of a microplastics in sediment extraction and analysis method	Ongoing	CRI continued work refining and drafting the microplastics extraction protocol with recovery studies, including development of a new component of the protocol with recommendation for spectroscopy mapping to reduce effort and assess type of plastic
		Publish a manuscript on the results of the Bay studies	To assist in characterizing microplastics in the Bay and nearshore environment and disseminate results	Ongoing	CRI continued analyses and drafting to inform a future manuscript; studies were temporarily halted due to COVID-19 and lack of access to LMU's campus, but resumed in December 2020
		Conduct additional studies to inform the transport, accumulation, and fate of microplastics in our marine and nearshore environments	To continue to collect data to inform the regional fate and transport model of microplastics in the nearshore marine environment	Ongoing	Studies were temporarily halted due to COVID-19 and lack of access to LMU's campus, but resumed in December 2020

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34	Improve understanding of emerging contaminants through monitoring andresearch to inform source control and reduce loading (e.g., fire retardants), especially in the context of climate change	Improve analytical methodology and standardize monitoring of more emerging contaminants	To update and implement State-wide recommendations for monitoring of emerging contaminants in aquatic ecosystems	Ongoing	No activities occurred during this annual reporting period
35	Monitor and inform management actions for Harmful Algal Blooms (HABs)	Continue to support research and monitoring efforts for HABs, especially in context of climate change and CMP implementation	To support research and monitoring efforts that fill data gaps in our region for HAB occurrences, frequencies, causes, and impacts, especially in the context of climate change	Ongoing	CRI continued work by a Visiting Assistant Professor / Researcher through Loyola Marymount University to assist in filling harmful algal bloom research gaps for our region; water samples collected on 30 October 2020, 27 March 2021, and 18 June 2021; in spring and early summer 2021, phytoplankton species identification and quantification equipment (FlowCam) was rented from Yogogawa Fluid Imaging technologies to further the research program; analyses of samples are ongoing, with an outline for a draft manuscript in progress

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		Conduct monthly maintenance of SCCOOS shore station at Santa Monica Pier and seek support for additional sensors	To collect data on oceanographic conditions in the nearshore environment and potentially inform long-term changes related to environmental factors, including climate change	Ongoing	SCCOOS continued maintenance of the SCCOOS Santa Monica Pier Shore Station; this included approximately monthly maintenance, calibration, and water sampling to support an interactive data web portal for the SCCOOS Santa Monica Pier Shore Station
		Improve public outreach and education on HABs	To improve public understanding of harmful algal blooms, causes, and impacts	Ongoing	No activities occurred during this reporting period
36	Monitor chemical, physical, and biological characteristics in the Bay to inform climate change impacts such as ocean acidification	Implement the Kelp Forest Hydrodynamic Study	To assess sediment transport, alteration of advective currents, and wave attenuation within kelp forests	Ongoing	Prepared a draft manuscript for submission on study results
		Support OA sensor array maintenance, calibration, and data downloads in accordance with SOP	To continue using high-frequency, high-resolution OA sensors to characterize OAH conditions in Santa Monica Bay	Ongoing	Repaired telemetry malfunction and continued testing of OA sensor / Wirewalker mooring system; the Wirewalker's pH sensor was removed for repair on 5 August 2021; the OA sensor was redeployed off Palos Verdes with the Wirewalker mooring on 22 September 2021; retrieval of the system for troubleshooting is anticipated in October 2021 due to issues with the Wirewalker's dissolved oxygen sensor

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
		Support inclusion of climate change impacts into CMP, especially through new models and data	To include climate change into the Comprehensive Monitoring Program including new models and data	Ongoing	Completed the final draft of the Comprehensive Monitoring Program (CMP) for each major habitat in the Bay and its watershed; SMBRC Governing Board approved the revised CMP at the 15 April 2021 meeting, initiating USEPA's review and consideration of concurrence of the full revised CCMP package (see additional narrative for SMBNEP Program Activity Updates); continued work on the CRI climate modeling project for sea surface temperature, including case studies for HABs and halibut; continued work to incorporate sea level rise and other climate modeling into beach studies and others
		Convene technical advisors to prioritize actions based on information from CMP	To prioritize monitoring and data collection needs based on the revised CMP for major habitats in the Bay and implement the prioritized monitoring protocols	Ongoing	SMBRC Governing Board approved the revised CMP, which included detailed data gaps analyses within each habitat chapter and summarized in Chapter 9; SMBRC staff released the Request for Proposals for Proposition 50 grant funds, which prioritizes projects that fulfill monitoring needs identified in the CMP, on 12 July 2021 and the application closed 24 September 2021; SMBRC Governing Board is anticipated to consider approval of the projects recommended for funding at its December 2021 meeting

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37	Increase understanding of deep water habitats such as submarine canyons, deep reefs, and outfall pipes	Conduct ROV surveys to collect physical, chemical, and visual data	To use the ROV to conduct underwater surveys to supplement monitoring	Ongoing	CRI graduate student continued work on a literature review and completed building a nearshore Remotely Operated Vehicle to conduct single-scan sonar surveys as well as help fill other data gaps; field testing of the new vehicle successfully occurred in a pond; TBF's ROV, R2Deep2, is being updated for use by VRG to help fill CMP data gaps
		Identify and apply emerging technology and techniques to better characterize Bay habitats, including recommendations	To utilize cutting edge advancements in remote sensing, and remote platforms to better characterize the condition of the Bay's habitats	Ongoing	No activities occurred during this annual reporting period
38	Monitor and improve understanding of rocky intertidal habitats to inform restoration actions	Support study recommendations and outreach efforts for improved protection	To improve understanding of rocky intertidal habitats to fill CMP data gaps and inform restoration activities	Ongoing	CRI marine invertebrate mussel study assessing physiological impacts of temperature and other climate stressors was temporarily halted due to COVID-19 and lack of access to LMU's campus; study resumed remotely in spring 2021 collecting mussels throughout the West Coast to assess potential range shifts associated with temperature and climate change, the study will have regional implications for Santa Monica Bay and the CMP; study resumed in person laboratory experiments in summer 2021; intertidal surveys (associated with the Palos Verdes Kelp Restoration Project) conducted at two sites on

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
					11 December 2020
39	Monitor and inform effective management of Marine Protected Areas, Fishery Management Plans, and local fisheries for recreational and commercially important species	Support MDRA in their implementation of the youth and veteran fishing program	To provide disadvantaged youth and veterans the opportunity to experience nature, boating, and fishing and encourage sustainable lifestyles	Ongoing	MDRA hosted Youth Fishing and Veterans Fishing Programs with over 400 participants
		Support MDRA in the completion of a halibut FMP	To provide technical and outreach support to MDRA in participating and tracking the development of a halibut FMP by CDFW and promotion of sustainable fisheries	Ongoing	Communications between TBF and MDRA continued during this reporting period
		Continue opportunistic aerial surveys to track boating and vessel activity	To continue to track ocean vessels and fishing trends within the South Coast MPA Network	Ongoing	No aerial surveys conducted during this reporting period due to COVID-19; pilots experimented with mounted GoPro camera surveys to collect observational data; due to GoPro battery life and other issues, this method was deemed not feasible to replace surveyors; passenger restrictions were still in place at the time of this report
		Conduct MPA Watch to monitor and inform use of MPAs in the Bay	To implement a community-science based program to monitor activities in MPAs and encourage appropriate enforcement and regulation activities	Ongoing	HtB conducted trainings for MPA Watch volunteers, conduct shore-based surveys, and shared data with local enforcement agencies; see Action #27 for additional MPA outreach efforts

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40	Research and inform best management and pollution reduction practices to address non-point source pollution and facilitate reduction	Identify partners and identify funding sources for long-term monitoring efforts for LID and water conservation efforts	To implement the SMB Comprehensive Monitoring Program	Ongoing	See Action #36 for efforts related to CMP implementation
		Implement monitoring programs for long-term monitoring and to inform effectiveness of LID/BMP implementation projects	To fill data gaps and inform LID/BMP effectiveness in reducing non-point source pollution, especially nutrient pollution	Ongoing	Continued work on a CRI manuscript to assess the effectiveness of the Culver City Rain Gardens for stormwater pollution retention; sent draft manuscript for external scientific review in September 2021 with anticipated submittal to journal by December 2021
42	Inform strategies to reduce greenhouse gas emissions and increase carbon	Research landfill diversion's reduction on greenhouse gas emissions and carbon sequestration due to compost application	To conduct research on landfill diversion to obtain quantifiable GHG reduction metrics	Ongoing	CRI student completed a literature review to support this research

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
	sequestration in support of existing state actions and policies	Conduct research to establish rate of carbon sequestration associated with key habitats in the Santa Monica Bay and its watershed	To conduct research to identify processes and metrics to further understand rates of carbon sequestration within key habitats in Santa Monica Bay and its watershed	Ongoing	Efforts between TBF and Sea Trees focused on carbon sequestration rates and pathways for giant kelp forests; held discussions between UCI, Scripps, TBF, and Sea Trees to advance understanding of carbon sequestration rates from kelp forests utilizing modeling and in situ observation; supported UCLA IoES Senior practicum to potentially inform carbon sequestration rates for SAV
43	Implement the County-wide Safe Clean Water Program to support stormwater pollution control projects (if approved by voters in 2018)	Participate in advisory board and support implementation of projects from the new funding mechanism	To improve stormwater management in urban areas and reduce stormwater pollution through attainment of water quality objectives, increased stormwater retention, increased service to disadvantaged communities, and coordination of efforts across the County	Ongoing	Continued to support the efforts of agencies to utilize funds made available under Measure W for stormwater improvement and LID projects throughout the watershed by serving as member of the Safe Clean Water Program's South Santa Monica Bay Area Steering Committee; in October 2020, LA County approved fiscal year 2020-2021 funding, including about $11 million for eight projects in the watershed that were supported by the SMBRC Governing Board; at the 17 June 2021 SMBRC Governing Board meeting, County staff presented on proposed projects within the watershed for fiscal year 2021-2022 and the Governing Board adopted a resolution that supports funding for seven of these projects; SMBRC staff conveyed this recommendation to the County Board of Supervisors in a letter and at the June 2021 Regional Oversight Committee meeting; in September 2021, the County approved funding of these seven

#	CCMP Action	CCMP Next Step(s) / Project Activity Name	Objective(s)	Status	Annual Report Update
					projects, two of which received $3.3 million for fiscal year 2021-2022
44	Support the development and implementation of a comprehensive regional sediment management plan for restoring natural hydrological functions of river systems and mitigating impacts from climate change	Convene meetings to initiate program development and identify opportunities	To facilitate communications and inform opportunities to advance sediment management in Los Angeles County	Ongoing	No activities occurred during this annual reporting period
		Develop plans and/or update existing plans to promote sediment transport and deposition along the coast based on hydrodynamic modeling and analyses	To protect public and private infrastructure and ecosystem services by increasing the Los Angeles County coastline's resilience to sea level rise and coastal flooding	Ongoing	No activities occurred during this annual reporting period
		Build capacity and conduct pilot projects to inform future actions and advance program development / design	To utilize pilot level projects to test assumptions and develop preferred methods for sediment transport and/or placement	Ongoing	No activities occurred during this annual reporting period

Annual Report Narratives

The following section contains summary supplemental narratives for programs or projects within a subset of CCMP Actions. No additional narrative was determined to be needed for the following Actions during this reporting period, as the necessary detail was contained in the table preceding this section: Actions 10-11, 14, 16, 19-20, 23, 25-26, 28, 29-31, 34, 37, 39-44. The following Actions are further informed by Report Narratives below: 1-9, 12-13, 15, 17, 18, 21-22, 24, 27, 32-33, 35-36, and 38.

SMBNEP Program Activity Updates

In February 2021, the SMBRC Governing Board approved the Introduction Chapter of the CCMP, which connects all the components of the revised CCMP and provides background information on the NEP study area and the CCMP, including an overview of its purpose and scope, the need for its revision, and its development. In April 2021, the SMBRC Governing Board also approved the revised Comprehensive Monitoring Program (CMP), a major revision led by SMBRC's Technical Advisory Committee and external expert scientists over approximately two years. The revised CMP includes new indicators, including indicators for assessing climate change vulnerability, and correspondingly new monitoring programs, new technologies, a synthesis of new research and monitoring objectives, directions for future studies, and a summary of data gaps. The SMBRC Governing Board's approval of the Introduction Chapter and the CMP initiated USEPA's review and consideration of concurrence of the full revised CCMP package. SMBNEP received a letter signed on 14 September 2021 from Tomas Torres, Director Water Division Region Nine, that USEPA considers the revision of the SMBNEP CCMP to be completed.

In response to USEPA's 2019 SMBNEP Program Evaluation, the FY21 Work Plan included efforts to create a readily recognizable brand and better promote awareness of SMBNEP. Beginning in February 2021, TBF, SMBRC, and USEPA staff collaborated on the development of SMBNEP's brand identity and the creation of a new logo and unified website. SMBNEP's new 2021 logo captures the purpose and goals of the NEP, while honoring the watershed's geographical, biological, and cultural diversity. The logo was finalized in May 2021 with the SMBRC Governing Board endorsing its use in June 2021. The SMBNEP website (https://www.smbnep.org/), which launched in late September 2021, serves to inform stakeholders about SMBNEP's purpose and priorities, outlines SMBNEP's organizational structure, provides information on SMBNEP events, and is a repository for plans, reports, and other guiding documents that detail SMBNEP's tasks and accomplishments.

SMBNEP also worked to develop the Fiscal Year 2022 (FY22) Work Plan with input from SMBRC Governing Board members and interested stakeholders, including members of the public. This involved producing a preliminary draft of planned activities, providing an overview of the preliminary draft to the SMBRC Governing Board, and other stakeholders. A public workshop of the Santa Monica Bay Stakeholders was convened in February 2021 and written comment period was provided to capture input for the FY22 Work Plan; other input captured will support future update or revision of the CCMP. In April 2021, the SMBRC Governing Board approved the final draft of the FY22 Work Plan.

ACTION #1 – Acquire Open Space

The Carbon Canyon Acquisition Project received $350,000 in Prop. 12 funds and was managed by SCC. The project was completed during this reporting period. The project entailed the acquisition in fee of 91 acres of undeveloped land in Carbon Canyon, outside of Malibu. As of November 2020, MRCA owns and operates the land in perpetuity, permanently protecting 91 acres of open space and habitat in the Santa Monica Mountains, preserving habitat and wildlife corridors, preventing development, preserving the scenic viewshed, and increasing public access to recreation.

During this reporting period, MRCA also acquired about 0.75 acres to improve public access to Escondido Beach and Escondido Canyon Park: A 0.5-acre fee lot was donated by a private seller and partially funded by MRCA ($10,000); a 1200-square foot easement for a Pacific Coast Highway undercrossing was donated by a private seller; and a 0.25-acre trail easement was donated by Los Angeles County. This acquisition also supports Action #25 to increase public access for beaches and other public trail systems.

ACTION #2 – Restore Kelp Forests

Teams of restoration divers (via SCUBA) have been clearing the ocean floor of excess purple sea urchins (*Strongylocentrotus purpuratus*), thereby reducing herbivory and allowing for the natural recruitment and development of giant kelp (*Macrocystis pyrifera*). During the reporting period of 1 October 2020 through 30 September 2021, 1.11 acres of reef were cleared of excess urchins off White Point. This site continues to contain very high urchin densities in the eastern portion of the cove and little to no macroalgae. In addition, the topography of this site consists of high relief, deep crevices, and stacked boulder complexes making restoration activities challenging.

A total of 56.55 acres of reef have been restored along Palos Verdes since the beginning of the project in July 2013. In that time, TBF and partners documented the development of a variety of macroalgae communities occurring on the reefs, higher densities and biomass of kelp bass (*Paralabrax clathratus)* and other fish species within restoration sites, increased density of CA spiny lobster (*Panulirus interruptus)*, higher algal and invertebrate diversity at all restoration sites, and increased *Strongylocentrotus* spp. gonadosomatic indices. These increases are comparable to reference site values. Focusing on kelp restoration areas where *S. purpuratus* suppression had occurred, canopy percent cover and kelp acreage increased in the completed restoration sites. The Central Region and Region Nine Kelp Survey Consortium, (CRKSC) reported in 2019 that percent *M. pyrifera* canopy increased by the following cover percentages across The Bay Foundation Palos Verdes restoration sites from 2011 pre-restoration to 2018 post-restoration. The breakdown by site includes: Hawthorne (119%), Honeymoon Cove (349%), Marguerite (524%), Point Fermin (159%), Resort Point (14%), and Underwater Arch Cove (631%). (MBC Aquatic Sciences 2018). During the same timeframe, White Point averaged 7.5% canopy cover, highlighting the necessity for restoration activities. Additional efforts will be conducted to further work at White Point and Point Fermin.

The Vantuna Research Group (VRG) collaborated with TBF to utilize the biological response data generated from this project and published the results in the Marine Ecology Progress Series (MEPS) scholarly journal. This publication highlights the scientifically defensible results of this project's active restoration techniques and methodological approach.

ACTION #3 – Recover Abalone Populations

TBF operates and maintains two mariculture facilities located at SCMI. These spaces serve as a wet lab and hatchery for abalone rearing, experimentation, and long-term housing of broodstock. The facility is a registered aquaculture facility and has been certified as "sabellid free" by CDFW. The outplant event schedule for May 2020 was postponed due to COVID-19 restrictions on project partner dive operations. In August 2020, CDFW divers were cleared to resume white abalone field work and in September, NOAA divers were also cleared to resume activities. With all project partners back in operation, planning for the fall 2020 outplant event proceeded. A total of 572 abalone were selected and tagged for outplanting off Palos Verdes, using two methods, SAFE (Short-term Abalone Fixed Enclosure) modules and BARTs (Baby Abalone Recruitment Traps) used by CDFW. Six SAFEs were stocked with a total of 324 abalone on 25 September 2020. On October 22, 2020, the SAFEs were opened and two BARTs were stocked with 238 abalone in total. A spring 2021 outplant occurred where SAFEs were stocked with 61 red abalone and 500 white abalone on 24 May 2021 and BARTs were stocked with 480 white abalone on 17 June 2021. Additionally, a fall 2021 outplant occurred in which SAFEs were stocked with 414 white abalone on 30 September 2021.

Site monitoring follows this schedule after SAFEs have been opened, allowing abalone to egress onto the reef: one week, two weeks, one month, and quarterly. Site monitoring is not performed if weather or ocean conditions do not permit a safe or productive day of diving. For assessment, the site is broken into ten 4 x 30-meter surveys and the divers will survey that area in approximately 40 minutes (1 dive). Divers use flashlights to investigate crevices to carefully look under small rocks for abalone. When a diver encounters an abalone, its location, length (if able to measure), tag ID, and any other notes are recorded. The site can be monitored in a single day with a minimum of four divers. TBF has visited the site 23 times during this reporting period. During those visits a total of 351 live white abalone and 23 live red abalone have been observed. As the outplanted abalone are juvenile abalone their behavior is to retreat deep into the cracks and hide to avoid predation. A meaningful assessment of the success of these outplants is appropriate following three to five years, based upon work conducted in the Puget Sound, when these individuals are likely to achieve adult size. At that time these adult abalone will be free from most predators and position themselves on open faces of the reef. In addition, 749 white abalone shells and 144 red abalone shells have been collected from individuals that were depredated or died. Many of the shells collected showed growth following outplant; meaning some of the individuals survived for a period of time and the habitat is providing sufficient forage for the abalone to grow.

On 19 February 2021, staff transferred 902 juvenile white abalone from the Moss Landing Marine Lab and on 1 March 2021, 573 juvenile white abalone from The Cultured Abalone Farm to SCMI. These animals were outplanted during both the fall and spring 2021 outplants. Over 11,000 juvenile white abalone less than 20 mm were transferred from the Bodega Marine Lab to southern California. The transport was facilitated by two volunteer pilots coordinated through the non-profit LightHawk. By utilizing small planes, the transport time was significantly reduced from a10-hour drive to a 2.5-hour flight. By reducing the transit time, the abalone were exposed to less stress during the process. These abalone will be held and cared for in southern California partner facilities until they grow large enough to be outplanted.

ACTION #4 – Assess and Restore Seagrass Habitats

Santa Monica Bay Subtidal Eelgrass Restoration: This innovative project, funded by State Coastal Conservancy (LA Living Shoreline Project), Honda Marine Science Foundation, and NEP Coastal Watershed Grants Program, incorporates the experimental establishment of subtidal eelgrass offshore of Dockweiler Beach, Redondo Canyon, and Malaga Cove within Santa Monica Bay. TBF staff participated on a regional Submerged Aquatic Vegetation Technical Advisory Committee, led by SCCWRP. This group provided external scientific input and recommendations to the subtidal components of the restoration project, while concurrently spreading awareness of the importance of open coast eelgrass transplants. Further, TBF staff convened the preeminent SAV researchers in California to establish the “Santa Monica Bay Subtidal Eelgrass Restoration Project Technical Advisory Committee” (TAC). The TAC meeting occurred on 16 March 2021 and was comprised of researchers from academic institutions, governmental agencies, and environmental consultants. This meeting proved invaluable in refining the approach of the project and providing essential recommendations and insights into transplanting and monitoring processes. The members of the TAC meeting expressed overwhelming support for the project and highlighted the importance of conducting this work.

Baseline monitoring surveys of extant *Z. pacifica* donor sites were conducted by project partners on 2 October 2020 at East End and Palisades off Catalina Island, including deploying a physical oceanographic sensor tracking wave characterization. Additional baseline monitoring surveys were conducted on 21 October 2020 at the donor sites and the sensor was retrieved. This deployment of the wave characterization sensor allowed TBF staff and project partners to test a deployment method for sensors that will be used to capture data on key physical and chemical properties. Additionally, to determine the size and extent of these donor beds, side-scan sonar mapping at East End occurred on 15 April 2021 and at Palisades on 29 April and 6 May 2021. Additional baseline monitoring occurred on 25 June 2021 to complete pre-harvest surveys and again on 17 August 2021 for post-harvest surveys and sensor deployments.

The Scientific Collection Permit application required to harvest *Z. pacifica* from identified donor sites and the subsequent transplant to restoration sites was submitted on 16 December 2020. CDFW approved the SCP on 28 May 2021. The CDP waiver application was approved on 8 July 2021 and development and approval of the QAPP (Quality Assurance Project Plan) by EPA occurred on 7 June 2021.

The project harvested *Z. pacifica* material from two donor beds on the backside of Catalina Island to utilize for three transplants within Santa Monica Bay. Palisades and East End were the two beds this project was permitted to harvest material from due to the extant bed stability, size, high turion density, and selected depth range. The overall size of both the Palisades (97 acres) and East End (21 acres) were expansive.

Transplant material was harvested on three separate cruises and transplanted the same day into soft bottom substrate 35-40 feet in depth. This occurred on 20, 22, and 27 July 2021 to three distinct transplant sites off Redondo Beach, Malaga Cove, and Dockweiler Beach, respectively. Each site received roughly 500 turions, shoot-like structures supporting the blades of the eelgrass. Two methods were utilized: one used a single turion placed into holes excavated by divers, and the second bundled 8-10 turions together. Post-transplant monitoring was conducted 24 hours and 1 month after transplant to inform survivability. Survivability varied from site to site and by method. In general, survivability at 24 hours was 100% across all sites and methods, except single shoots at Dockweiler 91%. At the one-month interval Redondo (85% single to 85% bundle) and Malaga (86% single and 77% bundle) outperformed Dockweiler (74% single to 26% bundle).

The Eelgrass Genetics Research project led by Dr. Demian Willette through LMU's Coastal Research Institute to evaluate population genetics of *Z. pacifica* (Permit ID: S-191500002-19150-001) was temporarily suspended due to COVID-19 due to campus access restrictions. However, after the establishment of extensive safety protocols to allow dive operations to occur, sample collection and surveys at several Malibu sites were conducted on 12 November 2020; these samples are planned for analysis in fall 2021. Preliminary data from the project has verified the species-level genetic distinction of several of the potential *Z. pacifica* eelgrass donor beds, and it is expected that the genetic research findings will provide useful information for project implementation once the study continues.

ACTION #5 – Assess and Implement Offshore Artificial Reefs

SMBRC staff continued to coordinate with SCC in overseeing implementation of the Palos Verdes Reef Restoration Project, which received $1,409,000 in Prop. 12 funds. Vantuna Research Group and Southern California Marine Institute completed construction of an artificial reef in September 2020 to restore rocky reef habitat near Bunker Point off the Palos Verdes Peninsula, which involved strategically placing 57,000 tons of quarry rock in a 42-acre area. The Project aims to restore the nearshore ecological rocky-reef community, support an estimated six tons of reef fishes and a proportional amount of invertebrates, and increase the abundance of commercial and recreational species, offsetting historical losses to ecosystem services. During this reporting period, post-construction biological and physical monitoring and sediment chemistry surveys, the first-year monitoring report were completed.

Four acoustic receivers were purchased by TBF in 2016 to improve the coverage of the Southern California Acoustic Telemetry Network, led by Dr. Chris Lowe at CSU Long Beach. Three receivers were first deployed in May 2017 to sites in the northern Santa Monica Bay, with the fourth subsequently included within the network. Currently, there are eight receivers deployed throughout the Santa Monica Bay to inform SMBNEP of the movements, positions, and permanence of great white sharks, giant sea bass, and other species of interest. Data generated by this expansion of the network will improve protection and understanding for these species and contribute to the CMP. The receivers were downloaded bi-monthly, cleaned, and redeployed to their moorings. During this reporting period, the receivers detected two Giant Sea Bass (*Stereolepsis gigas*) and two shovelnose guitarfish (*Rhinobatos productus*). Additionally, twelve individual white sharks (ten juveniles and two adults) (*Carcharodon carcharias*), were detected throughout the Bay in the last year. Semi-annual species count updates are provided to TBF by Dr. Lowe's lab at CSULB.

ACTION #6 – Restore Healthy Beaches

Malibu Living Shoreline Project: This project, in partnership with the City of Malibu, Los Angeles County Department of Beaches and Harbors (LACDBH), and State Coastal Conservancy (SCC) aims to restore approximately three acres of sandy beach and dune habitats at Zuma Beach and Point Dume Beach to improve coastal resiliency and increase the health of the beach systems through a living shoreline approach. During this time period, work focused on continued outreach, completing permitting and baseline monitoring tasks, and initiating restoration activities. Specifically, both the final Coastal Development Permit (CDP) and a Right of Entry (ROE) permit were obtained in December 2020, and a supplemental project plan was drafted and included as part of the ROE permit application package. Project documents are publicly available on the project's webpage.

Project implementation, in partnership with the Los Angeles Conservation Corps (LACC), was conducted in December 2020 and continued through March 2021. Approximately 25 tons of invasive iceplant and other non-native vegetation were removed from the project area. The site was subsequently seeded and over 500 native plants were planted. In addition, sand fence segments and biomimicry stakes were installed to promote dune growth and symbolic post and rope fencing was established to delineate project boundaries. Project implementation was covered by multiple local news outlets. In addition, multiple virtual outreach events were conducted. TBF also continues to present at conferences and to other groups about this project. Post-restoration monitoring is ongoing. In a special research study by CRI, the biomimicry stakes have already been effective at accreting sand, with some portions of plots showing over 30 cm of sand accretion across a three-month period. Supplemental planting / seeding and installation of interpretive signage is anticipated for Winter 2021-22.

Los Angeles Living Shoreline Project: This innovative project, in partnership with LACDBH, State Parks, SCC, and Honda Marine Science Foundation, aims to implement a multi-habitat approach to restore approximately 3.5 acres of beach and coastal bluff habitat. This project at Dockweiler Beach directly supports a disadvantaged community and adds to SMBNEP's efforts to improve coastal resilience in Los Angeles County. It also incorporates the experimental establishment of offshore eelgrass within a one-acre footprint (see Action #4 – eelgrass).

Significant progress was made during this reporting period, including planning, coordination with experts and stakeholders, managing a subconsultant to conduct restoration design services (Integral Consulting, Inc.) and providing design feedback, permitting meetings, and community engagement activities. Final design deliverables were submitted by Integral in November 2020. Significant collaboration occurred through communications with various agencies such as SCC, California Coastal Commission, LACDBH, LA County Public Works, City of Los Angeles, California Department of Parks and Recreation, LA County Lifeguards, US Fish and Wildlife Service, CDFW, US Environmental Protection Agency, and others. TBF continues to present at conferences and to other groups about this project (e.g., El Segundo Blue Butterfly Coalition, Society for Ecological Restoration conference).

For the beach and bluff components of the project, a ROE permit was obtained from LACDBH to conduct scientific monitoring on-site. The ROE permit is in the process of being amended to include implementation and post-restoration activities. In addition, the Restoration the Monitoring Plan (RMP) for the Beach and Bluff was finalized in June 2021 and the final Coastal Development Permit (CDP) application package, including the RMP, was submitted in July 2021. Ongoing coordination and communication with California Coastal Commission staff is occurring for this project, which is likely to be permitted in fall 2021. A State Parks Scientific Collection Permit application package was also submitted in September 2021. Implementation is anticipated for fall / winter 2021-22.

Manhattan Beach Dune Restoration: This project aims to restore approximately three acres of foredune habitat along beaches in the City of Manhattan Beach to provide infrastructure protection and increase coastal resilience, while improving habitat quality through invasive plant removal and native plant establishment. The project is located on existing back dunes along the coast of Manhattan Beach, adjacent to Bruce's Beach, from approximately 36th Street to 23rd Street, within 0.6 miles of coastline. The restoration project will involve the removal of non-native vegetation, seeding / planting of native vegetation, strategic installation of sand fencing and other features to help establish vegetation, installation ofsymbolic fencing, and installation of educational features like interpretive signage.

Substantial progress was made during this reporting period including restoration planning; external coordination with partners, experts, and public stakeholders; conducting several planning and design meetings with partners and restoration design consultant (RIOS/CRC); completion of final design deliverables by RIOS, including a draft site plan, artistic perspective renderings, a bi-lingual primary interpretive sign design, and secondary signage design; completion of an innovative outreach video

comprised of public comment on the project that was solicited through an interactive community engagement video forum; meetings and presentations with local stakeholder groups, including LA County Public Works, LA County Lifeguards, Manhattan Beach Botanic Society, and Manhattan Beach City Council; hosting several virtual public workshops to educate the local community and interested stakeholders on the project and to solicit public feedback; and additional outreach activities. The public stakeholder workshops were attended by interested individuals contributing feedback to restoration design elements. Widespread support for this project has been identified through the many avenues listed above, including the two public virtual stakeholder meetings. TBF continues to present at conferences and to other groups about this project. TBF continued consultation with a Native American representative who engages in the project as a cultural advisor.

In addition, TBF obtained a ROE permit to conduct scientific monitoring on-site. TBF is coordinating with LACDBH to amend the ROE permit to include implementation and post-restoration activities. The project RMP was finalized in July 2021 and the final CDP application package, including the RMP, was submitted in August 2021. Ongoing coordination and communication with City of Manhattan Beach has occurred. Lastly, TBF began drafting two LA County Flood Control District Permit application packages for submission.

Santa Monica Dune Restoration: This project is being planned in partnership with City of Santa Monica, California State Parks, Audubon Society, and public stakeholders and will include restoration of approximately 4.5 acres of beach habitat on Santa Monica Beach, including the area with the current snowy plover enclosure. This project was approved to receive funding by the Refugio Beach Oil Spill Trustee Committee in September 2021 through the National Fish and Wildlife Foundation. The project is anticipated to officially begin in early 2022; however, substantial planning and coordination with the City of Santa Monica has already occurred along with some outreach.

Beach Monitoring: In partnership with Loyola Marymount University's Coastal Research Institute (CRI), this research program is conducting a beach characterization study and informing a Site Suitability Model (SSM) analysis to determine potential areas for beach restoration, evaluating factors such as coastal infrastructure, sea level rise vulnerability, and physical and biological characteristics, while contributing information to SMBNEP's Comprehensive Monitoring Program. These research projects serve to evaluate existing conditions, assess the potential threats faced by these beaches, as well to determine which sites have the highest probability of being successfully restored with a high adaptive capacity.

During this reporting period, two additional beaches were surveyed, and existing data continued to be compiled and analyzed, with the beginning of a draft manuscript started in partnership with TBF, CRI, and USC Sea Grant. New data were acquired from public databases such as wind data from National Weather Service to inform the beach characterization work and SSM. Summary results from both projects were mentioned at the American Shore and Beach Preservation Association National Summit in March, and in other virtual venues such as the winter Beach Ecology Coalition meeting in

January 2021, the Society for Ecological Restoration conference, and the National Conference on Ecosystem Restoration. Work continued on evaluating and combining GIS layers for the site suitability analysis and discussions with coastal municipalities and agencies will serve to inform its future use. The model will eventually be analyzed against the ongoing in situ data collection along beaches of Santa Monica Bay as part of this research program. Lastly, a Proposition 50 grant application package was submitted in September 2021 to SMBRC to fill data gaps for the sandy shore chapter of the CMP. TBF was the lead, in partnership with UCSB, CRI, USC Sea Grant, Pepperdine, and the Center for Urban Resilience.

ACTION #7 – Restore LAX Dunes

The LAX Dunes are the largest remaining remnant contiguous coastal dune system in southern California. The 302-acre dune site is owned and managed by Los Angeles World Airports (LAWA). The site provides habitat for over 900 species, including the beautiful and delicate federally endangered El Segundo Blue Butterfly. During this period, TBF continued coordination and work with LAWA and partners on revegetation efforts, habitat restoration, future restoration planning, and scientific monitoring of the LAX Dunes. Lead botanist project partner, California Botanic Garden (CalBG), conducted seed collection, vegetation surveys, seed bulking, and growing; project ornithologist, Cooper Ecological Monitoring performed an avian survey of the site; scientific consulting partner and restoration ecologists, Coastal Restoration Consultants, advised ongoing restoration, planning for future restoration activities, and revisions to the Ecological Landscape Plan; LACC conducted non-native vegetation removal; and Io and Environmental and Infrastructure performed non-native vegetation removal herbicide application, and removal of remnant irrigation infrastructure. Public community events were halted starting in March 2022 as required by LA County Public Health due to COVID-19, however TBF and LAWA have recently began planning and coordination to reconvene events starting in fall 2201.

LMU's Coastal Research Institute and Dr. Michelle Lum's laboratory also continued work on identifying plant growth promoting bacteria of California native plants that can be used as an inoculum to enhance restoration efforts. Preliminary analysis showed a number of bacteria isolates are plant growth promoting bacteria and appear to enhance the germination and/or growth of native plant species. Dr. Lum and her research student implemented an experimental inoculated seed germination project at the LAX Dunes in December 2020 and monitored through summer 2021. Seeds of both species being evaluated had germinated beginning in March 2021, data analyses are still being undertaken.

ACTION #8 – Restore Coastal Bluffs

SMBRC staff continued to coordinate with SCC in overseeing implementation of the Abalone Cove Habitat Restoration funded by Prop. 12. The project involves habitat restoration of 13-acres at Abalone Cove Reserve. The restoration includes the removal of invasive trees, shrubs, and herbaceous plants; the propagation of native plant species; irrigation and planting specifications; maintenance schedule; and monitoring and reporting protocols. During this reporting period, the project continued site preparation, irrigation maintenance, and trail improvement planning. Additionally,

approximately 4,500 coastal sage scrub and southern cactus scrub plant species were grown in preparation for planting in late 2022, over 13 acres of mustard was removed and maintained free of invasive species, and hundreds of acacia seedlings were removed by staff and volunteers.

Additional coordination between TBF and LACDBH continues regarding potential bluff restoration projects adjacent to County beaches, including several sites at Dockweiler Beach, and one being led by LACDBH. Several bluff restoration projects are being conducted in the SMBNEP study area by partners such as Palos Verdes Peninsula Land Conservancy, Los Angeles Conservation Corps, City of Redondo, and South Bay Parkland Conservancy. Projects are removing invasive species, planting natives, and providing habitat for the federally endangered El Segundo Blue Butterfly. Additional work continues through a stakeholder engagement group known as the El Segundo Blue Butterfly Coalition (ESB Coalition), bringing together partners from many different non-profit groups, agencies, and representatives from municipalities. The ESB Coalition is working on several projects, including a website, mapping tool to track restoration efforts, and coordination of projectupdates from many partners.

ACTION #9 – Implement the Malibu Creek Ecosystem Restoration Project

The lead agencies for the Malibu Creek Ecosystem Restoration Project are the US Army Corps of Engineers (federal) and the California Department of Parks and Recreation (state). The primary purpose of the project is to restore aquatic habitat connectivity along Malibu Creek and its tributaries, establish a more natural sediment regime from the watershed to the shoreline, and restore aquatic habitat of sufficient quality along Malibu Creek and tributaries to sustain or enhance indigenous populationsof aquatic species within the next several decades, allowing for migratory opportunities to about 15 miles of aquatic habitat that have been unreachable for many decades in this watershed. In November 2020, the Army Corps signed the Malibu Creek Ecosystem Restoration Project Report. The report, Final Environmental Impact Statement, and other documents are publicly available on the Army Corps website. In December 2020, the Project was authorized as an ecosystem restoration project in the Federal Water Resources Development Act of 2020. Also, the State Legislature appropriated $12.5 million for the project, which will be used to develop removal plans to 90% design. The Notice of Determination and Record of Decision are anticipated to be signed by the end of 2021.

ACTION #12 – Restore Small Coastal Lagoons

SMBRC staff continued to coordinate with SCC in overseeing implementation of the Topanga Lagoon Restoration Planning project funded by Prop. 12. The project aims to advance the planning effort for the restoration of Topanga Lagoon to improve habitat for the endangered steelhead trout and tidewater goby, be resilient to sea level rise and climate change, as well as improve visitor experience and enhance recreational opportunities. During this reporting period, the project continued Phase 1 implementation, including holding a public workshop in February 2021 to review three conceptual design alternatives for the project, review modeling results, and get input from stakeholders to refine preliminary concept alternatives, and planning for upcoming additional technical advisory committee and stakeholder meetings. The project received

an additional $1.19 million from Coastal Conservancy and State Parks for additional data needs and community engagement to inform conceptual design development and environmental review. Technical advisory and stakeholder meetings are anticipated for late 2021. TBF worked with RCDSMM to coordinate, deploy, and manage a water quality sensor in the lagoon. The 30% conceptual plans are anticipated to be completed by late 2022.

TBF continued coordination with SCCWRP and Moss Landing Marine Laboratory for the Estuarine Marine Protected Area, (EMPA) monitoring program, which includes Malibu Lagoon as a study site. TBF partnered with CSULB to coordinate, deploy, and manage two water quality sensors in the lagoon. CSULB and partners implemented the first round of EMPA monitoring in the lagoon in March and April 2021. SCCWRP led a Proposition 50 proposal in partnership with TBF and CSULB to fill CMP data gaps for the small northern Bay wetland lagoon systems.

Additionally, TBF partnered on a proposal led by SCC to the EPA Wetland Program Development Grant (with many other partners) to help take the next steps in standardizing regional wetland monitoring for southern California. This proposal was preliminarily accepted, with additional work towards a Scope of Work by SCC and partners.

ACTION #13 – Restore Ballona Wetlands Ecological Reserve

Ballona Reserve Community Stewardship Project: TBF, in partnership with California Department of Fish and Wildlife (CDFW), Friends of Ballona Wetlands (FBW), and community volunteers are conducting a project to remove invasive vegetation while broadening public involvement and stewardship at the Ballona Wetlands Ecological Reserve (Reserve), in Area B, south of Culver Boulevard. During this period, TBF continued maintaining and expanding the community restoration site at the Reserve. TBF staff, partners, and interns continued restoration efforts through frequent site maintenance days. Community events were halted starting in March 2020 as required by LA County Public Health due to COVID-19, however reconvened with COVID safety measures in place starting in August 2021. Ongoing communications occurred with California Coastal Commission and other partners, especially regarding restoration activities to correct the impacts from illegal driving and dumping activities on site. TBF along with partners, FBW, LACC, CDWF, and Edith Read & Associates, conducted non-native vegetation removal, seeding, planting of over 1,400 native plants, and installation of erosion control in November 2020. Ongoing scientific monitoring and maintenance continued in accordance with the Implementation and Monitoring Plan.

ACTION #15 – Enhance Populations of Rare Species

SMBRC staff continued to coordinate with SCC in overseeing implementation of the reestablishment of California red-legged frogs (CRLF) project funded by Prop. 12. The project builds on an earlier effort by National Park Service (NPS) to reintroduce the CRLF to the Santa Monica Mountains and consists of actions to establish self-sustaining populations of CRLF in Santa Monica Mountain streams and to address impacts from the Woolsey fire. During this reporting period, daytime surveys for CRLF continued at four re-introduction sites. Adult frogs and tadpoles were detected in three

of the four sites. The habitat of the three sites is slowly improving and wild breeding was observed during this period.

See also Action #3 in support of white abalone enhancement, Action #6 in support of western snowy plover habitat enhancement, and other Actions throughout this document.

ACTION #17 – Implement and Study Runoff Capture Projects

SMBRC staff continued overseeing implementation for the following previously funded Prop. 84 projects:

Culver Boulevard Realignment and Urban Stormwater Project: SMBRC staff continued to coordinate with SWRCB staff in overseeing implementation of this stormwater pollution reduction project. This project, carried out by the City of Culver City, consists of capturing and treating dry-weather runoff and storm runoff from a drainage area of 800 acres for local irrigation and using a belowground infiltration basin to recharge groundwater. During this reporting period, the project completed phase II and III of construction including installation of stormwater storage gallery and infiltration system. Electrification, system testing, and landscaping is anticipated to begin in October 2021.

***Westwood Neighborhood Greenway Project*:** SMBRC staff worked with the grantee, City of Los Angeles, to continue to implement the Westwood Neighborhood Greenway Project, which will clean and conserve water while providing native habitat for wildlife and opportunities for public engagement. This project aims to improve water quality by diverting and capturing runoff from 2,400 acres of drainage area into two bioswales. Construction was completed in September 2020. A one-year time extension for the project was approved to allow for project performance monitoring, water quality data analysis, and continued maintenance of the established vegetation and mechanical components. During this reporting period, the grantee submitted as-built drawings and initiated monitoring for dry weather runoff.

***Santa Monica Bay Catch Basin Insert Project*:** $589,386 in Prop. 84 funds were allocated to this project. SMBRC staff worked with the grantee, City of Rancho Palos Verdes, to finalize remaining deliverables for this project, which retrofitted and installed 1,112 connector pipe screen (CPS) units in all suitable catch basins across the Palos Verdes Peninsula (PVP) watershed draining to Santa Monica Bay, spanning approximately 14 sq. miles. This project aims to help mitigate trash and marine debris and assist cities in the PVP watershed in implementing the requirements for stormwater permits. During this reporting period, the grantee submitted as-built drawings and the summary of changes to the approved design plan and initiated development of the final project report.

***Ladera Park Water Quality Enhancement Project*:** SMBRC staff continued to coordinate with SWRCB staff in overseeing implementation of the Ladera Park Water Quality Enhancement Project by the Los Angeles County Department of Public Works. This project aims to treat, store, and infiltrate runoff from a 110-acre tributary area through a combination of pre-treatment, retention, and infiltration facilities. A one-year

time extension for the project was approved during this reporting period to allow completion of construction and monitoring. Above-ground construction continued during this reporting period, including completion of the shade structure and continued installation of stormwater features and landscaping. Construction is anticipated to be completed by November 2021 with monitoring beginning in December 2021. SMBRC staff continued to coordinate with SCC in overseeing implementation of previously funded Prop. 12 projects:

***Monteith Park and View Park Green Alley Stormwater Capture*:** The project consists of constructing an infiltration system and recreational and aesthetic improvements at Monteith Park and at View Park alley. Stormwater will be diverted into the infiltration system and be allowed to percolate into the ground. The project will prevent potentially polluted runoff from being discharged downstream thus improving the water quality in the Ballona Creek Watershed. During this reporting period, work to finalize the project design continued, with completion of final design anticipated by the end of 2021 and construction bid proposals anticipated to be distributed in February 2022. Also, the grantee requested a grant agreement amendment to accommodate an adjusted timeline.

***Beach Cities Green Streets Project*:** This project consists of designing and constructing Green Street infrastructure to help meet water quality objectives set for the Santa Monica Bay beaches. The Beach Cities will retrofit existing impervious areas within the public parkways and right-of-ways using green infrastructure technologies such as porous pavement, catch basin trash screens, bio-filtration / bio-retention systems and dry wells. The project is slightly delayed due to the COVID-19 pandemic and delays in holding public outreach events. During this reporting period, the grantee completed the geotechnical assessment, topographic survey, preliminary hydrology and best management practices (BMP) sizing, and draft designs for each of the sites. City staff also held a virtual webinar in May 2021 to discuss project information and answer any questions from community members.

***Paramount Ranch Storm Flow and Sediment Reduction*:** The proposed project was canceled due to Woolsey Fire impacts and the Prop. 12 funds were reallocated to the Topanga Lagoon Restoration Planning project and the Palos Verdes Restoration Reef project.

ACTION #18 – Install and Monitor Pumpout Facilities

TBF's Boater Education Program works to provide the boating community with the tools and resources they need to prevent pollution, including functional sewage and bilge pumpouts. The program monitors public sewage pumpout and dump stations to ensure they are operating at peak efficiency. Monitoring efforts provide technical assistance for facility managers to support maintenance and part replacements such as nozzles and banjo valves. A collaborative approach to proper sewage disposal monitoring allows statewide consistency, utilizes the Pumpout Nav app for surveying, and is conducted in partnership with San Francisco Estuary Partnership and Morro Bay National Estuary Program supported by the federal Clean Vessel Act Education and Outreach grant administered through California State Parks Division of Boating and Waterways. Pumpout Nav's data is maintained by monitoring agencies and app updates are

developed and published regularly. During this annual reporting period, Pumpout Nav was updated to integrate dump station surveying and to feature the "Consider a Marine Composting Toilet" video on the "Learn" section of the app. Annual monitoring of pumpout units found an average 77% usability (based on analysis of equipment performance), and 100% of the units tested with biodegradable dye tablets were leak-free.

ACTION #21 – Support Policies to Reduce Reliance on Imported Water

SMBRC staff continued to coordinate with SCC in overseeing implementation of the Pure Water Project Las Virgenes-Triunfo (Pure Water Project), which received $925,720 in Prop. 12 funds. The project involves constructing a 100 gallon-per-minute, indirect potable water reuse demonstration project for reservoir augmentation that will produce up to six million gallons of local, drought resistant water supply per day, while improving in-stream habitat. The demonstration facility is needed to test the advanced microfiltration, reverse osmosis, ultraviolet light disinfection, and oxidation components of a Pure Water advanced treatment facility prior to implementation of a full-scale project. Following completion of construction of the Demonstration Facility in September 2020, LVMWD staff provided updates on the Project and its benefits at the December 2020 SMBRC Governing Board meeting.

ACTION #22 – Implement Composting and Landfill Diversion Projects

The Table to Farm program, initiated in 2016, is a partnership between Environmental Charter Schools, TBF, and the community at large working collaboratively to reduce greenhouse gas emissions by recycling organic food waste. Between 2016 and 2019, three compost hubs were established at Environmental Charter Schools Inglewood, Gardena, and Lawndale. Two local restaurants per campuscontributed their food scraps for composting on campus. For the majority of this reporting period, organics recycling was on pause due to COVID-19 campus closures and restaurant limitations. In 2020, a community garden was established outside of Environmental Charter School Inglewood's gates. The garden is thriving and has monthly volunteer events to support the upkeep of planting, harvesting, and maintenance.

ACTION #24 – Include Coastal Resilience into LCP Updates

TBF continued to work with coastal municipalities such as LACDBH, City of Malibu, City of Santa Monica, City of Manhattan Beach, City of Hermosa Beach, City of Los Angeles (Venice Beach) and others to incorporate coastal resiliency planning into Local Coastal Program updates / revisions and other policies and actions. During this reporting period, City of Manhattan Beach launched their virtual reality interactive videos as part of their "Climate Ready MB" effort that also includes an LCP revision. The VR videos discuss what will happen with sea level rise and how we can use nature-based solutions to help. These visualizations were also incorporated into outreach for the Manhattan Beach Dune Restoration Project (see also Action #6). TBF continued to support and inform City of Manhattan Beach's other climate resiliency efforts, participate on stakeholder committees, and support inclusion of dune restoration into other multi-benefit projects. TBF continues conversations with Coastal Commission and other state agencies about their inclusion of coastal resilience into state documents and reports.

ACTION #27 – Conduct Boater Outreach to Improve BMPs

TBF's Boater Education Program works with the Southern California coastal boating communities on public engagement campaigns that decrease boat related pollution and increase environmental stewardship. The program evolves each year with new and innovative ways to promote clean boating. Over the last two decades, TBF has successfully worked to support a clean boating community in Southern California, engaging hundreds of thousands of boaters using a multi-faceted strategy based on: 1) creation of tools like the Southern California Boater's Guide, When Nature Calls sewage guide, Boater Kits, and educational videos; 2) direct outreach to the boating community through presentations, interactive surveys, social media, and an email listserv; 3) a partnership approach that galvanizes statewide clean boating messages in part with San Francisco Estuary Partnership, Morro Bay National Estuary Program, and California's Boating Clean and Green Program via projects like the Pumpout Nav app, Dockwalker Program, and California Clean Boating Network (CCBN); and 4) strong relationships with the boating industry, boating public, marinas, yacht clubs, and other organizations throughout the State.

The Boater Education Program expanded its efforts to engage boaters and anglers on Marine Protected Areas (MPAs), these efforts focused on disseminatinginformation about MPAs and their associated regulations. In 2021, with funding from Coastal Quest, the Boater Education Program produced content and carried out outreach specific to California's network of MPAs through video, quiz, social media, and virtual presentations.

ACTION #32 – Reduce Marine Debris

Most marine debris come from land-based sources which are transported to oceans via storm water runoff. Much of this debris is from of single-use disposable products, the result of convenient 'to go' items that have a short useful life span and then are quickly disposed. It has become evident that source reduction of plastic is the only viable solution to solving the world's plastic pollution issue. In 2018, TBF partnered with Clean Water Action to bring ReThink Disposable to Los Angeles, a technical assistance program for food service businesses targeting the reduction of single-use disposable items used on-site. By implementing ReThink Disposable, quantitative results of reducedsingle use disposables and restaurant cost savings have been measured, documented,and utilized by TBF to further TBF's long standing support of municipal efforts to adopt plastic reduction ordinances. TBF is continuing to implement ReThink Disposable and is currently working with three LA county yacht clubs with food service. TBF also works collaboratively as part of the Reusable LA coalition to pass comprehensive bans on single-use disposable plastics. Reusable LA was awarded a National Reuse Award for "Most Impactful Community Leadership Award" as a result of its leadership role in advancing reusables through policy advocacy, community engagement, and fruitful collaboration. During this reporting period, TBF signedonto six letters to government officials urging the passing of several source reduction policies.

ACTION #33 – Monitor Microplastics and Other Marine Debris

LMU's Coastal Research Institute and Dr. James Landry's laboratory continued work on microplastics research in support of this action. Dr. Landry's lab is completing a protocol to extract microplastics effectively from sediments (especially sand), analyzing them using infrared spectroscopy, and quantifying results. Dr. Landry's lab, through CRI, is also working on initiating methods and studies to identify microplastics in nearshore marine invertebrates such as sand crabs, amphipods, and mussels. CRI microplastics research processing sediment and invertebrates for microplastics was halted in March 2020 due to COVID-19 and LMU access restrictions but resumed work again in December 2020 once on campus activities were allowed to continue in a restricted manner by LA County Department of Public Health. Work on this project continues, including planning for a manuscript.

ACTION #35 – Monitor Harmful Algal Blooms

CRI and its Visiting Assistant Professor / Researcher, Dr. Amber Bratcher-Covino, continued research on Harmful Algal Blooms (HABs) to fill data gaps in the Santa Monica Bay region. Dr. Bratcher-Covino conducted three survey field work days in October 2020, March 2021, and June 2021, including the collection and processing of ocean surface water samples from 12 stations throughout Santa Monica Bay. Her students completed a literature review and a synthesis of existing phytoplankton data for the region and presented at the CalCOFI conference in December 2020. Additional work on modeling OAH and HABs continues by SCCWRP, with efforts to expand the model. Dr. Bratcher-Covino also initiated and coordinated efforts to rent and use equipment to better facilitate algae speciation and quantification. A FlowCam microscope made by Yokogawa Fluid Imaging Technologies was delivered for use with multiple CRI and TBF staff and interns trained in its operation in April 2021. Samples were analyzed using this device by Dr. Bratcher-Covino and student interns through July 2021 and a database of species was produced. Further analyses are ongoing and Dr. Bratcher-Covino aims to submit a manuscript based on her research during the next reporting period.

ACTION #36 – Monitor Climate Change Impacts and Ocean Acidification

LMU's Coastal Research Institute and Dr. Jeremy Pal's research team continued work on modeling coastal climate stressors (such as temperature) and predicted effects or impacts on various species. Both present, 1986-2005, and future, 2011-2050, were considered and modeled. Habitat suitability models (HSMs) depicted the frequency of suitable days per year in which sea surface temperature fell in a specified temperature range with the use of data from the National Oceanic and Atmospheric Administration. Additionally, the data were used to verify the accuracy of projected data from eight of the eleven climate change projection models from the Intergovernmental Panel on Climate Change. Preliminary results were expanded upon during this reporting period, with specific research ongoing on Harmful Algal Blooms (HABs) and California halibut.The CA halibut study was conducted in partnership with Heal the Bay and informed by scientists from Heal the Bay and TBF. Final maps were created in November and distributed via a report to the Hewlett Packard Foundation. Additional work continues remotely.

ACTION #38 – Monitor Rocky Intertidal Habitats

LMU's Coastal Research Institute and Dr. M. Christina Vasquez's laboratory continued research on physiological stress in rocky intertidal marine invertebrates, particularly mussels. Her research seeks to inform physiological reactions in mussels to stressors such as temperature and oxygen change. Dr. Vasquez's research was significantly impacted by the virus pandemic, and her experiments were halted due to the closure of LMU's campus in compliance with LA County Public Health policies regarding COVID-19. Once campus restrictions were lifted in a reduced capacity, Dr. Vasquez redirected her research to inform temperature stress on mussels and to support filling a data gap in the CMP. Additionally, TBF staff conducted intertidal surveys associated with the Palos Verdes Kelp Restoration Project at Underwater Arch Cove and Honeymoon Cove on 11 December 2020. Subtidal reefs offshore of these sites were restored in 2014. Intertidal surveys at these two sites may be conducted in December 2021.