

Tijuana River National Estuarine Research Reserve (TRNERR)

Program Manager Reports

Report Period: January 1, 2024 through June 30, 2024 **unless noted*

TASK: REFUGE MANAGER REPORT

**Sally Brown, Refuge Manager, San Diego Bay NWR
and Tijuana Slough NWR**

*Period: January 1, 2024 through August 9, 2024

1. Personnel

Funding for the San Diego National Wildlife Refuge Complex has declined by 28 percent between FY 2017 and FY 2024 such that the Complex is no longer able to staff the Tijuana Slough National Wildlife Refuge with a Park Ranger, Biologist, and Assistant Refuge Manager. As a result of these funding declines, staffing is reduced to a single employee for both the San Diego Bay and Tijuana Slough National Wildlife Refuges.

2. Wildlife

It is nesting season for our threatened and endangered birds and there are western snowy plover and California least tern eggs in the nesting area delineated by twine fencing and chicks on the beach. These eggs are well camouflaged, and the chicks are small and unable to fly. Please help us provide a safe refuge for them by keeping dogs leashed and observing from a distance.

Fledgling numbers have been low this year, particularly for California least terns, though yearly total estimates are not available at this time. Human associated disturbance observed this season include pedestrian, dog, and bicycle tracks through the nesting areas, bicyclists on ebikes speeding along the beach, and dogs off leash. The Refuge Manager patrols the north side of the river regularly to contact individuals to inform them of the presence of threatened and endangered species and to request compliance with leash laws. Most people encountered are happy to cooperate in the recovery of our listed species once informed of their presence.

Refuge staff continue working as part of a consortium of scientists, NGOs and resource agencies investigating possible reintroduction sites for the critically endangered Pacific pocket mouse. You can read about ongoing conservation efforts for this species here <https://institute.sandiegozoo.org/species/pacific-pocket-mouse>. Note that the 'type location' for the species when it was initially described in the scientific literature was for a specimen taken from the Tijuana River Valley. A recent taxonomic reassessment for the species suggests that these historic records represented a unique subspecies (Patton J. L. and R. N. Fisher. 2023. Taxonomic reassessment of the Little pocket mouse, *Perognathus longimembris* (Rodentia, Heteromyidae) of southern California and northern Baja California. *Therya* vol.14 no.1.).

Refuges is continuing its work with Team Ridgway's Rail in a captive rearing effort between State and Federal wildlife agencies, San Diego Zoo Wildlife Alliance, SeaWorld San Diego and the Living Coast Discovery Center. Results of a genetic study conducted by the U.S. Geological Survey has helped direct releases of young captive reared rails to marshes in Orange County this season.

Surveys for endangered salt marsh bird's-beak were conducted in the marsh this year as part of the Rare Plant Inspect and Manage Monitoring effort by the San Diego Management and Monitoring Program. You can read about this management and monitoring effort here:

https://sdmmp.com/view_project.php?sdid=SDID_sarah.mccutcheon%40aecom.com_57cf0196dff76#data-files-tab

A recent survey effort by the California Botanic Garden documented Coulter's saltbush within the Refuge, and seed has been collected from this rare species and stored at the botanic garden.

3. Multi-agency Planning Efforts

FWS is working with the City of Imperial Beach on planning and environmental assessment efforts for the City's Bayshore Bikeway Resiliency Planning project.

Refuge staff have begun preliminary design work on a proposal to replace the viewing deck at the end of Seacoast Drive. The structure has been damaged by tidal overwash and sand deposition.

The San Diego NWR Complex continues to participate in the team that is planning the Tijuana Estuary Tidal Restoration Program II Phase I.

Refuges is also in the final year of construction for the Otay River Estuary Restoration Project (ORERP) which will restore approximately 120 acres of intertidal habitat in south bay. In addition, the ORERP project team is coordinating with the Port of San Diego on their proposal to restore the adjacent Pond 20 site located north of Palm Avenue and east of 13th Street. These projects will restore an abandoned salt pond, former agricultural areas, and one active salt evaporation pond into native intertidal salt marsh habitats.

4. Tijuana Rivermouth and Water Quality Data

Refuge staff are working on documentation required to renew our Tijuana River Inlet Dredging permit, including a 401 Water Quality Application, Essential Fish Habitat Assessment, and Endangered Species Act Section 7 analysis. The permit will allow land managers to respond in the event that the river inlet requires maintenance dredging

5. Wildland Urban Interface

The San Diego NWR Complex has been working to manage an infestation of *Caulerpa prolifera*, an invasive algae that threatens the marine ecosystem within south San Diego

Bay. Refuge staff have been successful in our pursuit of grant funding for eradication level surveys and the installation of benthic barriers to kill the algae within the infested area. Left unchecked, this algae would form a dense mat within subtidal habitats, outcompeting our native eelgrass and affecting our fisheries and foraging areas for green sea turtles. It is likely that the *Caulerpa* was introduced by a person emptying a saltwater aquarium into the bay. Please clean out aquariums in facilities (e.g., sinks and toilets) that connect to water treatment plants to avoid introducing invasive species into the environment.

TASK: OVERSIGHT AND IMPLEMENTATION OF RESERVE OPERATIONS

Chris Peregrin, TRNERR Reserve Manager, California State Parks

1. Development and Coordinated Implementation of Reserve Programs

The Reserve Management Team worked with the TRNERR Program Managers to respond to the Necessary Action and the Recommendations identified in the Reserve's 312 findings (see *Tijuana River NERR Section 312 Evaluation Status Report*).

The Assistant Reserve Manager coordinated the TRNERR Program Manager reports and submitted Performance Progress Report(s) for NOAA Award NA22NOS4200084 3rd period.

The Assistant Reserve Manager coordinated the TRNERR Program Manager reports and submitted Performance Progress Report(s) for NOAA Award NA23NOS4200172 1st period.

The TRNERR Management Team worked with the TRNERR Program Managers to further the Draft TRNERR Comprehensive Management Plan. During this award period, NOAA OCM returned comments on the draft document from NERR system representatives of each of the core programs. TRNERR expects to incorporate these comments and revise the draft for re-submittal to NOAA in the next reporting period.

The Reserve Manager travelled to Washington D.C., to contribute to the NERRA Board meeting and Capitol Hill visits March 25-27, 2024, and the NERRS Program Managers meeting March 28-29, 2024.

The Reserve Manager contributed to the NERR Manager Meeting held March 15, 2024.

The Reserve Manager attended NOAA West Coast regional meetings during this period.

The TRNERR Management Team and Program Managers hosted the quarterly TRNERR Advisory Council meetings on February 6, and May 7, 2024. New business topics for each meeting included:

February 6, 2024

- a. Evaluating the potential for real-time water quality monitoring of sewage pollution in the Tijuana River Estuary, Dr. Natalie Mladenov (SDSU)
- b. Update on the Imperial Beach Community Resilience Plan, Meagan Openshaw (City of IB, Director of Community Development) and Dennis Larson (Nexus Planning)

May 7, 2024

- a. Update on the flooding in the Tijuana River Valley Regional Park Campground, Charles Gailband (San Diego County Parks & Recreation)

The Assistant Reserve Manager continued role of Cooperating Association Liaison for the Southwest Wetlands Interpretive Association (SWIA) and is attending the regular SWIA Board Meetings.

The Reserve Manager continued coordination with CA State Parks Peace Officers and seasonal lifeguards to support Reserve operations through public safety.

The Management Team met with the TRNERR Program Managers approximately weekly in virtual format for this term of the grant to ensure programmatic coordination.

The Reserve Manager attended monthly CA State Parks San Diego Coast District Manager Team Meetings. One of the goals of this engagement is to ensure effective integration of Reserve programs with CA State Parks operations.

The TRNERR Management Team worked with the Education Program and CA State Parks Interpretation and Administration to recruit, interview, and hire a new State Park Interpreter I. Welcome Jessie Looney! Jessie is supported through the CA State Parks homebase funding with anticipated supplemental funding from the NOAA Operations Award and primarily focused on supporting the TRNERR Education Program, as well as also interpretation and education at Silver Strand State Beach.

The Reserve Manager and Coastal Training Program Director supported a tour of the Reserve for board members of the Conrad Prebys Foundation February 21, 2024.

TRNERR staff collaborated to continue the monthly staff program sharing gathering- an informal lunch hour that includes a discussion on a variety of topics, rotating across core programs.

The Reserve Manager and SD Coast District Natural Resources lead supported a visit by Marina Cazorla, CA State Parks Coastal Programs Manager, June 7, 2024. Representatives from CA Coastal Conservancy and U.S. Navy joined as well.

The TRNERR Management Team and the TRNERR Program Managers collaborated on the selection of the new Margaret A. Davidson Fellow- Shanasia Sylman. The Coastal Training Program Director is serving as primary TRNERR support (*see also Coastal Training Program*).

2. Management of Reserve Budget

The Assistant Reserve Manager coordinated the expenditures of the NOAA NERRS Operations Award NA23NOS4200172 and worked with CA State Parks Headquarters and SD Coast District Office administrative staff to close out NOAA award NA22NOS4200084.

California State Parks established the San Diego Coast District NOAA Grant Review Team primarily for oversight of the reserve operations award submittal process as well as staffing of positions split between SWIA and California State Parks. The Grant Review Team is composed of the Assistant Reserve Manager, San Diego Coast District Natural Resources Program lead, the San Diego Coast District superintendent, the San Diego Coast District Environmental Coordinator, and TRNERR Research Coordinator and the SWIA Administrative Director, who are both employees of the Southwest Wetlands Interpretive Association. The Grant Review Team has the decision-making authority over all state park agreements, grants, and contracts associated with reserve operations including the NOAA operations award and the Coastal Training Program contract.

San Diego Coast District NOAA Grant Review Team coordinated the NOAA Operations award submittal for 2024, covering the period of July 1, 2024 through December 31, 2025. The Assistant Reserve Manager worked with NOAA OCM Liaison to finalize the submittal to NOAA.

NOAA has rolled out a new internet-based grant management program known as eRA Commons. The Assistant Reserve Manager continued work with CA State Parks Administrative team and NOAA OCM Liaison and support staff to integrate all TRNERR grant submittals.

The Reserve Management Team worked with NOAA OCM Liaison and NOAA support staff to further the grant application and environmental review for the NERRS Inflation Reduction Act non-competitive funding opportunity (NOAA-NOS-OCM-2024-2008108). The grant totals \$400,000 to support staff and contracts across five years with focus on the following outcomes:

1. Advance priority projects that enhance climate resilience of the Reserve and surrounding communities.
2. Implement on-the-ground activities that enhance climate resilience of the Reserve and surrounding communities.

3. Development of TRNERR Partnerships

The Reserve Management Team collaborated with San Diego Urban Corps on a grant application to CA Ocean Protection Council for the support of a 5-person Urban Corps crew to work at the Reserve September 2024 through August 2025. The grant application was successful. A work plan has been drafted and will be finalized in Summer 2024 prior to the start of work in Fall 2024.

The Reserve Manager worked with CA State Parks SD Coast District and State Parks Headquarters managers toward approvals for, and to develop details of, a grant application to support an effort led by local non-profit organization Wildcoast. Wildcoast is seeking funding from the USEPA to address environmental and community challenges on the U.S. and Mexico Border, if successful this grant will support efforts within the Reserve and in other locations throughout the watershed.

The San Diego Coast District NOAA Grant Review Team worked with CA State Parks Partnerships office to further the development of an updated operating agreement between CA State Parks and SWIA for management of the TRNERR.

The Reserve Manager and Education Coordinator worked with SD Coast District and State Parks Headquarters managers toward approvals for, and to develop details of, a grant application to support an effort led by local nonprofit organization Friends of Friendship Park (FoFP). FoFP is seeking funding from the State Coastal Conservancy to develop interpretive and art elements describing the history and opportunities of Friendship Park; if successful this grant will support efforts in the Reserve and include educational events throughout the region.

The Reserve Management Team and Program Managers met with City of Imperial Beach representatives and their consultants to discuss draft concepts for the Imperial Beach Community Resilience Plan- an effort that will identify various climate adaptation approaches including the influence of the Tijuana Estuary, San Diego Bay, and open coastal areas.

The Reserve Manager supported a visit by USEPA representatives, including Chief Financial Officer Faisal Amin, January 25, 2024. Attendees included:

- Faisal Amin (OCFO), Chief Financial Officer
- Gregg Trembl (OCFO), Deputy Chief Financial Officer
- Angel Robinson (OCFO), Director of the Office of Budget Leadership
- Ed Walsh (OCFO) Primary POC
- Rafael DeLeon, Principal Deputy Assistant Administrator (OITA)
- Cheree Peterson, Deputy Regional Administrator, Region 9
- Tomás Torres, Director R9 Water Division
- Hector Aguirre, Assistant Director R9 Water Division
- Doug Liden, Environmental Engineer, Water Division

The Reserve Manager supported the Coastal Training Program in efforts to develop a Binational Emergency Response Guide (BERG). (*see also Coastal Training Program*)

The Reserve Manager contributed to the Tijuana River Valley Recovery Team Meetings on March 20, and April 11, 2024.

The Reserve Manager worked with NOAA OCM to present on Hurricane Hillary impacts to TRNERR at the 5th Annual NOAA Hurricane Preparedness Virtual Summit on April 24, 2024.

The Reserve Management Team and Research Coordinator contributed to the development of an application to the Navy Sentinel Landscape Initiative to designate regions of the Tijuana River Valley, including TRNERR, and San Diego Bay as a “San Diego Bay to Border Sentinel Landscape.” This federal designation, advanced through a partnership involving the U.S. Departments of Defense, Interior, and Agriculture, would recognize the significance of this area for Department of Defense readiness, in the context of the supporting lands, resources, designations, and communities that use the area. The application process was led by the Port of San Diego and the State Coastal Conservancy and supported by the U.S. Navy, and was submitted in January 2024. This application was ultimately not approved; however, it was received favorably and the program will consider new applications in the coming years. It is anticipated that the group will revise and resubmit at the next opportunity.

The Reserve Management Team supported a visit by USEPA Border Office representatives, May 7, 2024. Attendees included:

- Anthony Isham (Border Program, Env. Health and Communications Coordinator)
- Lorena Lopez-Powers (Border Program, Arizona-Sonora Regional Coordinator)
- Marisol Anaya (Border Program, California-Baja California Regional Coordinator)
- Jared Vollmer (Pacific Islands and Mexico Border Program Manager)
- Ruben Mojica-Hernandez (Region 9 Intergovernmental Branch Manager)

The Reserve Manager supported CA State Parks efforts to respond to AB 1150- CA State legislation that directs CA State Parks to develop and enter into ‘Community Access Agreements’ with underrepresented community members and organizations.

The Reserve Manager contributed to the IBWC Minute 320 Sediment Working Group, May 7, 2024.

The Reserve Management team and Program Managers joined SWIA Board and staff for an organizational development retreat on June 20, 2024.

The Reserve Management Team and Program Managers furthered community connection by facilitating various uses of the Tijuana Estuary facilities, including:

- City of Imperial Beach Public Library Nature Book Club- January 27, February 24, April 27, May 25, June 22
- Water Education for Latino Leaders- February 9
- San Diego Regional Water Quality Control Board Public Meeting- February 26
- SD Children in Nature- March 16
- Outdoor Outreach- March 18, June 25
- Border Bioblitz Discovery Day- May 5
- CA State Senator Padilla press event- June 24

4. Oversight of Reserve Facilities and Public Access Opportunities

Tropical Storm Hilary moved through the San Diego region in August 2023, resulting in damages to the sewage treatment infrastructure along the border, including the

International Boundary and Water Commission (IBWC) South Bay International Wastewater Treatment Plant infrastructure elements that divert low flow spills in the Tijuana River canyon tributaries of Smuggler's Gulch and Goat Canyon. As a result of this damage, approximately 2 million gallons/day of sewage was released through Border Field State Park. Despite IBWC efforts to repair the system, these canyon tributaries saw only minor and intermittent relief from these flows and Border Field State Park remained closed to the public through the end of the calendar year and through this reporting period.

El Niño driven storms resulted in significant flooding of Border Field State Park with large amounts of sediment and debris deposited on the park roads and trails, and multiple emergency declarations from CA Governor Newsom. In response to this damage and through special emergency funding, the Reserve Manager worked with CA State Parks Headquarters, SD Coast District, and CA State Parks Maintenance Supervisor to develop and submit a request for emergency funding. Through this process \$500,000 was allocated to Border Field State Park to remove debris and repair damages to Monument Road. The work was initiated at the end of this reporting period and is anticipated to run through the following year.

The Reserve Manager worked with CA State Parks Southern Service Center design team to further efforts focused on the realignment and repair of Monument Road, and restoration of wetland habitat in Border Field State Park. During this review period, the team focused on the 60% design package, the biological technical report, and initiating efforts with the consultant hired to complete the CEQA/NEPA analysis.

The Reserve Manager coordinated with SD County vector control to facilitate access for mosquito abatement efforts. Through monitoring efforts in the southern part of the Reserve, vector control representatives documented a significant increase in mosquito numbers, including species known to transmit disease to humans. These mosquitoes were documented in association with the unusually large amount of freshwater ponding resulting from the on-going sewage spill through Smuggler's Gulch and Goat Canyon.

The Reserve Manager and Education Coordinator worked with CA State Parks design team at the Southern Service Center, and San Diego Coast District management to initiate work on the Monument Mesa Day Use and Interpretive Area project. During this reporting period the team kicked off collaborative efforts for the preliminary plan phase of this major capital outlay project that involves improvements to the day use amenities and development of interpretation and education elements.

The Reserve Management Team re-initiated quarterly meetings of the TRNERR Trails Committee. During this reporting period, the committee met on February 13 to discuss the trails directly around the Tijuana Estuary Visitor Center, and on May 21 to discuss the trails in Goat Canyon.

The USFWS acquired grant funding to purchase Feather Friendly window film for installation on the Tijuana Estuary Visitor Center windows. This product has been

shown to reduce bird strikes and was installed on priority windows throughout the visitor center by USFWS and CA State Parks staff.

TASK: EDUCATION PROGRAM

Anne Marie Tipton, TRNERR Education Coordinator, California State Parks

1. Implementation of Education Programs

A. Formal and Non-formal Teacher Training

The Education Coordinator conducted one hybrid Tijuana Estuary Explorers training in February with two elementary teachers and one informal educator. There was also one MARSH teacher training for one elementary teacher. Reserve staff trained nine informal educators from YMCA Camp Surf in Imperial Beach as an orientation of the Reserve and to avoid visitation conflicts.

B. Student-centered Formal and Informal programs

In this reporting period through late May, the only education staff was EC Tipton who was on leave in March and April. However, in late May, the Reserve hired its second permanent State Park Interpreter for the first time in 42 years, Jessie Looney. Docents and San Diego Coast District interpretive staff assisted with in-person but not virtual programs. Even in this difficult staffing situation, there were six more programs and almost 200 more students served in in-person programs compared to the same time last year. The Reserve had nineteen elementary school in-person programs with a total of 637 students.

The Education Coordinator continued carrying out the 3 virtual programs through California State Parks, Parks Online Resources for Teachers and Students (PORTS). The Reserve delivered one high school level *Detecting a Changing Climate*, three *Can Salt Marshes Help Fight Climate Change* to middle schoolers, and five *Salt Marsh Secrets* to elementary students. A total of 255 students were reached through these programs.

The Reserve's virtual programs developed for PORTS are available on their own landing page on the PORTS website: <https://ports.parks.ca.gov/>

C. Interpretation

TRNERR had a booth for *Love Your Wetlands Day* at Kendall Frost Marsh in February and RC Crooks gave a talk to the whole crowd, with a total of 1,000 people. The *San Diego Festival of Science & Engineering Science Expo* came back to Petco Park in early March, 265 people visited our booth. Booth activities included the carbon sequestration maze, a display about SWMP, and the Research Program created a new plant sampling demo with remarkably accurate plastic plants glued onto a bulletin board. The Reserve also had a table at the Border Bioblitz and reached out to 60 people.

New Nature Walk

Newly trained docent, Camille Locke's new monthly program, *Explore the Colors of the Estuary: a Community Art Therapy Experience* premiered January 14 and will take place every second Sunday of the month. This new experience begins with a nature walk along the North McCoy trail. With a bit of guidance, participants observe the marsh with an artist's eye and ear. At the trail's end, with the use of a singing bowl, Locke leads a guided meditation to find stillness and a sense of relaxation. Then, while taking inspiration from the varying colors around them, participants paint with watercolors to capture the beautifully preserved habitat. By the end of this experience, it is hoped that participants painted without self-judgment and feel an interconnectedness with nature. Like Docent Ron, Camille has also done private tours at TRNERR, the last one with juvenile justice clients of *A Reason to Survive* arts non-profit. For more information about ongoing tours go to <https://trnerr.org/visit/public-programs/>

D. Visitor Services

The Visitor Center had 4,186 visitors from January to June, this is 1,322 less than the same period last year.

2. Production of Outreach Materials

Reserve Education staff produced an e-newsletter 4 out of 6 months this reporting period including highlighting volunteers, other special events, and accomplishments.

3. Volunteer Capacity Building

The Info Ambassadors volunteer training was cancelled due to Education Coordinator being on leave. The Reserve Volunteer Coordinator continued engaging long-term volunteers in work around the reserve. (*see also Stewardship*)

4. Environmental education and interpretive capacity and leadership roles

The Education Coordinator was not as active due to leave of absence.

Task: COASTAL TRAINING PROGRAM (CTP)

**Dr. Kristen Goodrich, TRNERR CTP Coordinator,
Southwest Wetlands Interpretive Association**

1. Deliver training and technical assistance to coastal decision-makers

CTP delivered several training workshops in this reporting period including for U.S. and Mexico agencies on emergency preparedness and response related to debris-related flooding. CTP continues to coordinate the development of the Binational Emergency Response Guide (BERG) as a component of the ResiDUOS project. The establishment of a BERG emerged as a prioritized initiative through collaborative efforts among U.S. and Mexico agencies and stakeholders, facilitated by CTP during multiple binational workshops. In this period, three workshops were held for U.S. and Mexican agencies to populate a matrix that will help support understanding of roles and responsibilities and

various marine debris-related flooding scenarios. This increased engagement including individual meetings and information gathering with decision-makers, has enhanced understanding of the local, state, and federal response frameworks essential for facilitating a coordinated, well-managed, and prompt emergency response to incidents of debris-related flooding.

CTP continued to lead and collaborate on several NERRS Science Collaborative (NSC) transfer grant projects. During this reporting period for the NSC transfer project '[Transferring Knowledge to Understand the NERRS Niche in Addressing Marine Debris](#),' (NERRS' Niche) CTP conducted monthly Core Team meetings and drafted a roadmap for the national system. CTP is currently in the process of working with a graphic design / communication team at NSC to create a visually compelling document and identify a web platform to host it. For another NSC transfer project, '[Engaging with Cultural Ecosystem Services Across the National Estuarine Research Reserve System](#)' (CES), with He'eia, Kachemak Bay, and Wells NERRs, CTP developed a process agenda for an in-person workshop to develop guidance for the NERRS on inclusion of human dimensions in reserve management. CTP continued to participate in the [Resilient Roads and Reserves project](#) to leverage California Reserves' experiences to inform how they, their state partner agencies, other California coastal managers, and the whole NERRS can better engage in planning processes involving dual management concerns for flood-vulnerable roads and adjacent coastal habitats. CTP continues to serve as collaborative lead on the [Habitat Heartbeats](#) project, assessing management applications for bivalve biosensors.

Concurrently, CTP, in partnership with Waste for Life, Centro de Comunidad, and other organizations and supported by the Binational Resilience Initiative (BRI) at the San Diego Foundation (SDF), continues to coordinate binational and interdisciplinary aspects of the ReCREA project, including playing a role to interpret, translate, and connect community needs, interdisciplinary academic and technical expertise, and application to coastal decision-making to inform broader solid waste management solutions in the region. In this reporting period, in partnership with Universidad Xochilcalco, CTP hosted an event that featured repurposed and recycled materials that enhance the vibrancy of public spaces, functional infrastructure, and become products for market, developed collaboratively by scientists, community members, and students. As part of the San Diego-Tijuana region's designation as World Design Capital in 2024, the ReCREA project was chosen as a legacy project for its innovative approach to sustainability, community engagement, and cross-border collaboration.

Additionally, in partnership with UABC Valle de las Palmas and funded by BRI, CTP is leading a project that is implementing a green infrastructure pilot project at a school located in Los Laureles Canyon, a sub-basin of the Tijuana River and an area of emphasis for the Reserve. The initiative aims to create a model for integrating green infrastructure into urban environments, while providing training, technical assistance, and development opportunities. This work will inform ongoing collaborations with various organizations in Mexico to develop a comprehensive proposal for updating state regulations to include green infrastructure techniques. By integrating nature-based

solutions into regulatory frameworks, CTP is modeling pathways toward enhancing environmental resilience and scaling up the promotion of sustainable practices throughout the region.

CTP offered continuous technical assistance to coastal decision-makers in local governments in both the U.S. and Mexico. This included supporting the staff of Assemblymember David Alvarez from the 80th District in organizing the Tijuana portion of the inaugural Cali-Baja Fridays event, which was focused on environmental issues.

During this reporting period, CTP conducted several presentations for various audiences, including (but not limited to):

- On the border: Planning for a joint San Diego-Tijuana future at San Diego State University
- South Coast Climate Collaborative Forum at UC Irvine
- The American Association for the Advancement of Science at the University of San Diego on the topic of Reserve efforts to evaluate and elevate cultural heritage of the Tijuana Estuary; and
- The virtual 'Think Blue Brigade' career panel with I Love a Clean San Diego

Additional, and varied, technical assistance was provided to coastal decision-makers in this reporting period, including facilitating meetings, providing survey and evaluation assistance, offering field experiences including California State Parks Coastal Program, Water Education for Latino Leaders (WELL) program, and assisting organizations with grant writing, plan/policy revisions, and strategic/action and communications planning, including for TRNERR's non-profit partner's board. A complete catalog of technical assistance and ongoing projects and partnerships can be found [here](#).

The CTP Coordinator continues to serve as Vice President of the National Estuarine Research Reserve Association and on various regional advisory bodies including the San Diego Regional Climate Collaborative (SDRCC) as well as other NERR system-level working groups including on topics of plastics, human dimensions, indigenous knowledge, equity, and disaster resilience. The CTP Associate currently represents TRNERR on the steering committee supporting the 7th annual State of Biodiversity workshop, symposium, and assessment report in collaboration with SDRCC, San Diego Association of Governments, and the San Diego Natural History Museum. The CTP Associate also represents TRNERR in the development of a chapter on the border region for California's 5th Climate Change Assessment as well as on efforts to pilot a sea level rise vulnerability assessment for San Diego based park units within California State Parks. In this reporting period, CTP was involved in the Margaret A. Davidson Fellowship selection process (as well as articulation of management needs to be inclusive of interdisciplinary approaches including social science) and will serve as the mentor in the next reporting period when the fellowship commences.

As site custodians for TRNERR as part of [National Geographic's Preserving Legacies](#) project, CTP is involved in strategic planning for workshops that will be held in the next reporting period to understand vulnerability of cultural heritage to climate change at the

Tijuana Estuary in partnership with California State Historic Resource Office and Scripps Institution of Oceanography. A series of five workshops will be held in the following reporting period. These workshops will focus on measuring the vulnerability of cultural heritage to climate change impacts, which requires 1) the identification of the significance of cultural heritage, 2) the identification of climate impacts and 3) the measurement of the exposure, sensitivity, and adaptive capacity of the analyzed resource. Work will build on workshop results by engaging with tribes on defining indigenous definitions of values and cultural heritage. The CTP Associate is currently supporting the Coastal Conservancy in developing tribal engagement training through the Climate Science Development, which will support staff for future meaningful community engagement within and around TRNERR.

Finally, regarding current manuscripts: (1) 'Grounded and Engaged Research as a Cross-Border Bridge: Reflections from the Binational Tijuana River Watershed' as part of the *Oxford Handbook of Grounded and Engaged Normative Theory* is currently under review; and (2) 'Centering knowledge co-production in sustainability science: Why, How, and When' was published in *Oceanography*.

2. Report training and technical assistance outcomes

In this reporting period, after training delivery, CTP administered post-workshop evaluations and collected and analyzed data. During the transition of the national CTP performance monitoring database, CTP staff developed an internal database [system](#) for tracking and will continue to populate a catalog until the new performance monitoring database is launched. Staff continues to populate the detailed technical assistance [catalog](#) that reflects offerings from FY16 to present. The catalog includes a separate worksheet with ongoing (i.e., multi-year) CTP technical assistance. Analysis of evaluation data from training provided during the Marine Debris Leadership Academy (MDLA) is underway and informing future offerings.

TASK: STEWARDSHIP PROGRAM

**Lorena Warner-Lara, TRNERR Assistant Reserve Manager,
California State Parks**

1. Protection and Restoration of the Tijuana River Valley

The Reserve Manager worked with contractor Engineering/Environmental Resources Group Inc. for the export of approximately 20,000 cubic yards of sediment from the processing pad; this material was excavated from the basins, placed on the processing pad, and tested for contaminants in Fall 2023. Material was delivered to a local nursery for beneficial reuse in Spring 2024. This year's sediment basin maintenance fund remained at \$1.9 million and supported the excavation and export of these 20,000 cubic yards, which is about 1/3 of the total material currently captured in the sediment basins.

The Goat Canyon Sediment Basins currently contain two types of debris capture infrastructure: stationary bollards and floating booms. The facility was originally constructed with the stationary bollards (2005) which were designed to capture large to

medium sized debris and later upgraded with two floating trash boom systems (2011) designed to increase the capture efficiency of floating debris such as plastics and foam. Currently, the Goat Canyon Sediment Basins contain one upper and one lower floating trash boom.

The existing trash capture infrastructure is effective at capturing and consolidating large volumes of debris within the Sediment Basins; however, the system can be overwhelmed with repeated storms and high volume of debris, reducing debris capture efficiency. In recent transborder flows, the existing trash boom interception technology in Goat Canyon has flipped over due to the high velocity flash flood nature of rain events in this ephemeral creek and the large volume of debris. A debris interception technology specialist has been consulted in order to address these vulnerabilities and the unique challenges of using trash boom technology in Goat Canyon's event dominated system, compared to more common aquatic environments with deep water, lower velocity, and year-round flows. Through competitive grant contests and by leveraging operational funding opportunities, the Reserve has acquired support funding through two sources, to upgrade the existing trash booms and implement clean-up and educational programming. These funding sources include:

- NOAA Marine Debris Program NOAA-NOS-ORR-2022-2007199; \$269,000
- NOAA NERRS Operations Award Supplemental NA23NOS4200172; \$80,000

The Reserve Management Team continued work on the Nelson Sloan Quarry Restoration and Beneficial Reuse of Sediment Project with the State Coastal Conservancy (SCC), San Diego County Parks, and consultant (Dudek) on final design and permitting. This project will help with long-term stabilization of Goat Canyon sediment management activities and can provide a receiving site for future sediment excavated from the Tijuana Estuary Tidal Restoration Program (TETRP). SCC granted \$250,000 in 2017, and an additional \$250,000 in 2020, to the California State Parks to support environmental compliance and the development of a use agreement for restoration of the abandoned Nelson Sloan Quarry in the Tijuana River Valley (TRV). These grants supplemented approximately \$800,000 additional funds from CA Department of Water Resources and San Diego County Water Authority toward this effort. On July 6, 2023, California State Parks issued a Notice of Determination (NOD) to certify the Final Environmental Impact Report (FEIR) for the Nelson Sloan Quarry Restoration and Beneficial Reuse of Sediment Project. The NOD and the FEIR were published on the [State Clearinghouse](#) on July 6, 2023. The project is anticipated to be an important part of sediment management in the TRV and this phase of planning will be completed in early 2025.

During this reporting period, efforts of the above project focused on the regulatory permitting needs for a Coastal Development Permit through the City of San Diego, a report of waste discharge permit from the San Diego Regional Water Quality Control Board, and an endangered species take permit for CA gnatcatcher and a possible low-effect habitat conservation plan for the Quino checkerspot butterfly through the US Fish and Wildlife Service. Additional effort was coordinated to develop updated cost

estimates for project implementation with input from the CA State Parks Southern Service Center.

The Reserve Management Team, Research Coordinator, SWIA Project Manager, USFWS, and project team continued work on the Tijuana Estuary Tidal Restoration Program II Phase I. The State Coastal Conservancy granted \$340,000 (2017) and \$3.192 million (2023) to Southwest Wetlands Interpretive Association to support planning related to TETRP II Phase I, a tidal prism and wetland restoration project in the Tijuana Estuary. These grants supplemented approximately \$900,000 additional funds from the CA Wildlife Conservation Board toward this effort. California State Parks issued a Notice of Determination on the Final EIR which was published in the [State Clearinghouse](#) on March 24, 2023. A Record of Decision for the Final EIS was issued by the U.S. Fish and Wildlife Service in May 2023 and the Notice of Availability was published in the [Federal Register](#) on March 31, 2023. Under Alternative 2, approximately 68 acres of coastal wetlands and 15 acres of native transitional and upland habitat would be restored within the Tijuana Estuary. In January 2024, the Coastal Conservancy Board approved a \$30 million grant to SWIA for project implementation- this represents about 50% of needed implementation funds. During this reporting period, the team advanced elements of the project design and regulatory permit application packages. (see also *Research*)

The Reserve Manager, Research Coordinator, and Coastal Training Program Director coordinated final comments with SD Coast District Natural Resources lead on the final draft of the CA State Parks San Diego Coast District Coastal Hazards Vulnerability Assessment and Adaptation Pathways report (January 2024). This report includes a chapter on the Tijuana River National Estuarine Research Reserve and Border Field State Park.

2. Sensitive plant and animal species habitat protected

The Stewardship Program maintained fencing and signage along dunes and coastal bluffs with US Fish and Wildlife Service.

3. Critical monitoring needs identified to maintain habitat health and monitor impacts to sensitive species and restoration projects

The Stewardship Program facilitated continued monitoring of California gnatcatcher, least Bell's vireo, California least tern, and Western snowy plover in the Reserve. Blackhawk Environmental conducted both the least Bell's vireo and California gnatcatcher protocol surveys for the 2024 survey season in the Goat Canyon drainage and Bunker Hill. Regular plover and tern monitoring began in March 2024 and will continue until September 2024. This work is largely accomplished through contract with a private consultant and through our partnership with the U.S. Fish and Wildlife Service staff at Tijuana Slough National Wildlife Refuge.

4. On-going restoration and enhancement projects continue trajectory toward healthy vegetation communities and integrate into functional ecosystem components with continued outreach opportunities

During this period, the Retired Annuitant Environmental Scientist, the Manager and Assistant Reserve Manager continued to work with Stewardship staff to develop skills and understanding of projects to support healthy vegetation communities. One of the Stewardship Maintenance Aide positions is funded through a combination of funds from the NOAA Marine Debris and the CA State Parks Wildlife and Forest Resilience programs. The other is a split position between the Stewardship (CA State Parks) and Research (SWIA) programs funded by this NOAA operations award. The Assistant Reserve Manager also works as an Environmental Scientist for the Stewardship Program, however, is not funded by this award but is partially counted as match.

Retired Annuitant Environmental Scientist and Stewardship Maintenance Aides continued maintenance of priority restoration sites when feasible. However, access to much of Border Field State Park was restricted due to the prolonged rainy season, a malfunctioning pump station in the river valley, sewage contamination, and flooding in the park. (see *also Oversight & Implementation*)

During this period, the CSP San Diego Coast District Natural Resources Staff attempted to continue work on a stewardship project focused on site protection, invasive plant control, seed collection, propagation for restoration of rare plant habitat for Orcutt's liveforever (*Dudleya attenuata ssp. attenuata*) within the Reserve. However, due to the aforementioned park access issues, access to that project area was near impossible. Ultimately, staff were unable to access the site. District Natural Resources Staff did assist TRNERR staff and volunteers with removal of asparagus vine (*Asparagus asparagoides*) in the small riparian area near the visitor center.

During this period, the Volunteer Coordinator, Stewardship Maintenance Aides, and the new USFWS Refuge Manager Sally Brown worked with the Reserve's weekly Stewardship Volunteers to maintain trails and a healthy native habitat primarily around the visitor center and the northern part of the Reserve.

The Assistant Reserve Manager facilitated Tijuana River Action Network meetings with various land managers, public stakeholder groups, and the Reserve's Binational Liaison (CTP), CTP Associate, and Volunteer Coordinator. Tijuana River Action Month (TRAM) is a series of education and stewardship events held during September and October to benefit the Tijuana River Watershed. Planning for the 2024 TRAM has begun and is anticipated to run September 15 through October 20.

5. Identify public access and safety issues within the Reserve

Stewardship staff supported the Reserve Manager in coordination with public and Reserve partners to identify high priority access issues and, where feasible, worked to maintain and enhance public access at key locations throughout the Reserve. Work was restricted to the northern part of the Reserve as public access to the southern portion at

Border Field was closed during this reporting period. (see also *Oversight and Implementation*)

TASK: INVASIVE PLANT CONTROL

**Lorena Warner-Lara, TRNERR Assistant Reserve Manager,
California State Parks**

1. High quality nesting habitat for CA Least Tern and Western Snowy Plover

CSP Retired Annuitant Environmental Scientist and one of the Stewardship Maintenance Aides treated 278 colonies of ice plant (*Carpobrotus edulis*) throughout the dune systems at Border Field State Park. The table shows a comparison over the last ten years. This year like last continued to be low. The work was completed in January and February 2024 using a glyphosate-based nonselective herbicide approved for use near water. A little less than a third of the ice plant colonies were small enough to be pulled by hand.

2024	278 colonies
2023	170 colonies
2022	192 colonies
2021	546 colonies
2020	386 colonies
2019	418 colonies
2018	Too many to count
2017	375 colonies
2016	310 colonies
2015	500 individuals

Foliar applications involve spraying the leaves of target species with a low concentration mixture (1.5-5%) of herbicide in accordance with label instructions. Foliage is covered thoroughly, but not to the point of run-off. Treatment days are determined based on the weather forecast, ideally when there is little to no wind (5 mph or less) and rain is not expected for 8 to 12 hours. These conditions minimize drift and allow the sprayed vegetation to dry completely.

2. High Quality Habitat for Riparian Birds

CSP Retired Annuitant Environmental Scientist and the Stewardship Maintenance Aides primarily treated castor bean (*Ricinus communis*), giant reed (*Arundo donax*), and tamarisk (*Tamarix ramosissima*) throughout the Goat Canyon drainage this period. Roundup Pro Concentrate, and Pathfinder II, post-emergent, broad-spectrum herbicides were used. Some annual forbs were mowed before herbicide treatment to reduce seed production and increase plant diversity while also creating some fuel reduction.

Annual weeds were hand-pulled around native plantings. Other plants treated included fennel (*Foeniculum vulgare*), iceplant (*Carpobrotus sp.*), Russian thistle (*Salsola*), Australian saltbush (*Atriplex semibaccata*), lens-pod white top (*Lepidium draba*), bristly ox-tongue (*Helminthotheca echioides*), Sahara mustard (*Brassica tournefortii*), black mustard (*Brassica nigra*), catsear (*Hypochaeris radicata*), tocalote (*Centaurea melitensis*), and globe daisy (*Glebionis coronaria*). CSP District Natural Resources staff assisted in annual treatment of approximately two acres of St. John's wort (*Hypericum ssp.*).

CA State Parks has allocated approximately \$90,000/year through a five-year program to control the invasive non-native giant reed (*Arundo donax*) in Border Field State Park. The effort is funded by CA State Parks Wildfire and Forest Resilience Program. During this reporting period, efforts by the Stewardship staff focused on re-establishing access to previously treated *Arundo* occurrences. This is one of the anticipated work sites for the San Diego Urban Corps crew that will start later this year (see also *Oversight and Implementation and Research*).

TASK: TEACHERS ON THE ESTUARY

Anne Marie Tipton, TRNERR Education Coordinator, California State Parks

1. Educators increase their knowledge of and appreciation of estuarine and watershed environments, as well as the necessary skills, to act as stewards of estuarine and watershed resources.

No trainings were conducted during this reporting period. A training is planned for Fall of 2024.

TASK: IMPROVEMENTS TO GOAT CANYON SEDIMENT BASINS TRASH CAPTURE

Chris Peregrin, TRNERR Reserve Manager, California State Parks

1. Purchase and install five pontoon hydrodynamic float units

The TRNERR Reserve Manager had discussions with CA State Parks engineer to advise on the proposed design and alignment of the trash booms to ensure that it meets stability standards given the expected forces for the area. (see also *Stewardship*)

TASK: RESEARCH COORDINATION AND IMPLEMENTATION

**Dr. Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association**

1. Research by TRNERR staff increases local knowledge

R.Booth leads our volunteer program, and manages volunteer involvement in our research and monitoring. This includes participation in the State of California's [Marine Biotxin Monitoring Program](#), assistance with field work such as vegetation monitoring and minnow trapping, and analysis of sediment samples in the laboratory. TRNERR also uses volunteers to participate in [Ocean Travelers](#), led by the Smithsonian Environmental Research Center, which aims to better understand the origins, abundances, and identities of the epibionts that are traveling on marine litter.

Our Research program uses the Tijuana Estuary as a centerpiece for understanding a range of Southern California systems. The work in the Tijuana Estuary is complemented by studies the Research team does in other systems, including South San Diego Bay (managed by the US Fish and Wildlife Service) and Los Peñasquitos

Lagoon (managed by California State Parks). TRNERR is also work collaboratively on projects throughout the region (and beyond).

TRNERR employees are supported in part by this award (NOAA and matching funds from the State of California and the National Fish and Wildlife Foundation), as well as leveraged external funding. A contract with Michelle Cordrey, a former Research Associate, advances our GIS and SWMP efforts. The research done by Reserve staff is outlined below.

2. The Reserve offers attractive opportunities for researchers

Research projects are listed in the Research and Monitoring Database. Some examples are listed below.

- TRNERR is collaborating with SDSU researchers, who are examining pollutants and hydrodynamics in the estuary. This work is being done using deployed sensors as well as field sampling. Work during this time period includes maintaining a site next to our Boca Rio SWMP station and establishing a new site on the main stem of the Tijuana River in order to characterize a non-tidal stretch in the river valley.
- TRNERR continues to participate in the region-wide estuarine monitoring as part of [Bight '23](#), led by the Southern California Coastal Water Research Project. The Reserve is currently working on data entry and data analyses for a variety of indicators, including fish, invertebrates, eDNA, vegetation, sediments, and water quality.
- TRNERR is also working with colleagues on a number of Science Collaborative projects. L. Miller (San Diego State University) is a PI on the project, [Habitat Heartbeats](#), which is expanding on the use of biosentinel shellfish. TRNERR also are participating in the multi-Reserve projects [NAMASTE](#) and [MAREA](#), and are wrapping up [HiTIDER](#).
- A SDSU PhD student, D. Kelley, is examining marsh crabs and burrowing activities in a number of San Diego systems, including the Tijuana Estuary and San Diego Bay.
- N. Vanelli, a M.S. student at Cal State Long Beach, is examining the role of vegetation in sediment trapping.

In addition, Dr. Crooks was involved in advising or supporting a number of graduate student research projects, and serves on the committees of several University of San Diego (USD) students. These students are examining:

- the relationship between marsh vegetation structure and spider communities.
- assessment of estuarine fish diversity using community science, traditional methods. (e.g. seines and minnow traps), and eDNA.
- mosquito communities along an estuarine gradient.

TRNERR also supported a variety of intern projects. This summer, two High Tech High students interned at TRNERR to fulfill their graduation requirement. Both students were interested in pursuing biological or environmental sciences in college and were looking for some field and lab experience. They:

- assisted with SWMP by calibrating, preparing, post-checking, and deploying sondes.
- learned about various water quality parameters, identifying meaningful readings, and understanding the importance of good water quality for organisms.
- became familiar with ongoing water quality issues in Southern California and experienced these issues firsthand through minnow trapping and fieldwork.
- contributed to the development of a fish guide for fall fieldwork.
- participated in sampling of marine debris project, Ocean Travelers.

3. Restoration offers opportunities for coupled science / management

The next phase of the Tijuana Estuary Tidal Restoration Program (TETRP) continues to advance. TRNERR is working on final design, permitting, and pre-restoration monitoring. The TETRP Science Advisory Team (SAT) met during this reporting period, and assisted with including experimental approaches into the design. This included investigating the role of “starter” channels on marsh plain development and how slope affects to development of marsh vegetation communities.

4. TRNERR is used as a reference site

The Tijuana Estuary has been used a reference site included in the [mitigation monitoring program for the impacts of the San Onofre Nuclear Generating Station \(SONGS\)](#). However, because of very low abundances of fish and invertebrates driven by prolonged sewage input and anoxia, the estuary will not act as a reference site for the fall, 2024, sampling. If conditions improve, its use as a reference site may be reconsidered. The new reference site will be Los Peñasquitos Lagoon, and will build upon our long-term monitoring program there. TRNERR is supporting the SONGS team in transitioning to this new site.

5. Communication of key research findings and perspectives

During this reporting period, the Reserve presented to a variety of audiences in a variety of venues. Examples of this work include:

- Dr. Crooks participates as a Science Advisor for the Los Peñasquitos Lagoon Restoration planning effort (with separate funding).
- Dr. Crooks works with the Southern California Wetlands Recovery Project to develop a regional monitoring program (with [EPA WDPG funding to the State Coastal Conservancy](#)).
- Dr. Crooks presented on Tijuana Estuary anoxia and impacts to estuarine biota to the San Diego Regional Water Quality Control Board (which included a site visit).
- Dr. Crooks co-organized a special session for the American Academy for the Advancement of Science – Pacific Division meeting: *Challenges and Opportunities for Science-Based Management of San Diego County's Coastal Wetlands*.
- Dr. Uyeda organized Love Your Wetlands Day in Mission Bay, and Dr. Crooks presented at this.
- TRNERR participated in the Imperial Beach Community Resilience planning effort.

- TRNERR hosted leadership from the National Fish and Wildlife Foundation IDEA (Impact-Directed Environmental Accounts) Program. As authorized by Congress, NFWF can receive and administer restitution and community service payments in order to conserve and manage natural resources, and the Reserve has now received two grants as part of this program.
- The Reserve participated in the annual San Diego Science Expo.
- TRNERR participated in the San Diego Biodiversity Conservation Summit, a workshop to facilitate dialogue about priorities, gaps, needs, and opportunities related to biodiversity conservation in San Diego County.
- Participating in writing the CA 5th Climate Assessment – San Diego Region.
- Led a Southwestern Community College field trip.
- Dr. Crooks participated in the Coastal and Deltaic Wetlands Regional Convening - organized by the Wetlands for Climate Partnership, The Nature Conservancy, and the San Francisco Estuary Institute and their partners. The goal of the Partnership is to accelerate coastal and deltaic wetland restoration and conservation to meet California's climate and biodiversity goals.
- Supported work by students in the UC Davis Environmental Policy and Management (EPM) program. Their capstone project worked with the Ocean Science Trust to explore the overlap between blue carbon ecosystems and frontline communities.
- Participating in the BEST 30x30 (Bay and Estuary Science Toward 30x30). This collaborative effort is providing expert scientific input to the state of California to ensure estuaries, coastal wetlands, and bays are prioritized and durably protected through California's 30x30 Initiative. BEST 30x30 is coordinated by the Pew Charitable Trusts and Coastal Policy Solutions in partnership with the California Marine Sanctuary Foundation and the Central Coast Wetland Group.
- Supported a field trip for the State Parks Natural Resource Division.
- Published a paper on effects of remarkable red-tide event on estuarine and coastal biota: *Skelton, Z.R. et al. 2024. Organismal responses to deteriorating water quality during the historic 2020 red tide off Southern California. Elem Sci Anth 12: 00067. <https://doi.org/10.1525/elementa.2023.00067>.*

6. Reporting and Database Entry

Projects were entered in the database.

TASK: IMPLEMENTATION OF THE SYSTEM-WIDE MONITORING PROGRAM

**Dr. Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association**

1. High quality meteorological and water quality data

NOAA SWMP funding allows SWIA and TRNERR to leverage partnerships to maintain a robust monitoring program that addresses issues relevant to the Reserve specifically, and the region as a whole. Our partners and funders include California State Parks, the

USFWS, the State Coastal Conservancy, the Los Peñasquitos Lagoon Foundation, and the National Fish and Wildlife Foundation.

The Reserve operates two SWMP stations in the Tijuana River Estuary. One of these sites, Boca Rio, is associated with an enhanced suite of monitoring conducted by Reserve partners (see above). This includes a [web camera](#) deployed as part of the High Performance Wireless Research and Education Network (HPWREN). Two sites are monitored in South San Diego Bay, both SWMP.

In addition to the formal SWMP sites, TRNERR also deploy loggers at additional sites. There are three telemetered sites in Los Peñasquitos Lagoon, and this data is available at torreypines.trnerr.org. This data was used in the Skelton et al. 2024 paper on red tide impacts. Also, TRNERR had previously operated an additional site in the southern part of the Tijuana Estuary, but it needed to be pulled due to shifting channel configurations. TRNERR is exploring options for deploying instrumentation in that area, given its pivotal role in TETRP.

These water quality data are used for a variety of research and management efforts, including management of tidal inlets. Monitoring data are also being used to inform active restoration planning and post-construction monitoring, including TETRP, South San Diego Bay salt ponds restoration, and Los Peñasquitos Lagoon restoration as part of a TMDL (Total Maximum Daily Load) associated with excess sediment and freshwater.

Dr. Crooks continues to serve as Chair of SWMP Oversight Committee, which helps ensure that high-quality data is produced by the Reserves. One of the efforts underway is establishment of the SWMP at the new Connecticut NERR.

2. Understanding of long-term vegetation dynamics and SSAM-1

TRNERR conducted semi-annual vegetation monitoring in the spring, with the aid of volunteers. These sites include transects sampled using SWMP biomonitoring protocols. The Reserve is also using vegetation monitoring data in a paper on transient increases in sea level associated with marine heat waves, which is being prepared for publication.

3. Integration of monitoring with education and outreach programming

SWMP remains a centerpiece of TOTE activities. The spring climate TOTE was cancelled, but the Reserve has started planning for a training in the fall (see Education program report for more details). SWMP is also used in outreach activities, described above (Task 1: Outcome 5).

TASK: PROFESSIONAL DEVELOPMENT, TRAINING, PRESENTING
Dr. Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association

1. NERRs Integration and Leadership Development

This task did not occur during this reporting period.

2. Staff Development

This task did not occur during this reporting period.

3. TRNERR Staff Program Support and Enhancement

Travel associated with field work and meetings occurred during this reporting period.

TASK: INVASIVE SPECIES - APPLICATION OF RESEARCH TO MANAGEMENT
Dr. Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association

1. Improved understanding and management of local invaders

A central element of the long-term biotic monitoring program is to detect and track invasive species. It is hoped that our work in eDNA will be useful for identifying biological invasions, including those associated with anthropogenic introductions (e.g., Japanese gobies and mosquitofish) as well as species on the move due to climate change (e.g. longtail gobies and bullseye puffers). Also, SWMP vegetation monitoring is to examine the distribution and abundance of invasive plants, which is going to be used in the development of a planting plan for the TETRP site. Dr. Crooks is also adjunct faculty in the Department of Environmental and Ocean Sciences at the University of San Diego, and advises students who are working on invasive species.

2. Improved regional, national, and international information sharing

Dr. Crooks is Co-President of the Society for the Study of Marine Bioinvasions, and the group is currently planning for the next meeting, to be held in Portugal in 2025. Dr. Crooks also routinely shares information about invasive species issues in outreach efforts (see Task 1).

TASK: MARGARET A. DAVIDSON FELLOWSHIP SUPPORT
Dr. Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association

1. Successful implementation of Davidson Fellowship

TRNERR's current Davidson Fellow, N.Grayson from the Scripps Institution of Oceanography is helping to characterize the biopotential of San Diego's coastal waters, including the Reserve. N.Grayson will be presenting her work at an upcoming TRNERR Seminar Series.

TASK: RESEARCH AND MONITORING SUPPORT
Dr. Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association

1. Facilitation of research, monitoring, and other Reserve-based activities

TRNERR is scoping on specifications and preparing for the purchase of research vehicle.