Tijuana River National Estuarine Research Reserve (TRNERR)

Program Manager Reports
Report Period: July 1, 2021 through December 31, 2021 **unless noted*

TASK: REFUGE MANAGER REPORT
Brian Collins, Refuge Manager, San Diego Bay NWR and Tijuana Slough NWR
*Period: August 1, 2021 through December 31, 2021

1. PERSONNEL
No changes to report.

2. WILDLIFE
Nesting season for our threatened and endangered birds is coming very soon. Nesting season starts around February 15th for light-footed Ridgway's rails and Belding's Savannah sparrows, March 15th for western snowy plovers and April 15th for California least tern, least Bell's vireo, and California gnatcatcher.

We plan to continue into the third year of movement ecology and population genetics structure studies using satellite and cellular network telemetry to track wild and zoologically bred light-footed Ridgway's rails within southern California marshes. We are working with colleagues from USGS and the University of Idaho and many other cooperators on these ongoing research efforts.

We also are continuing our work with Team Ridgway's Rail in an ongoing zoological breeding effort between State and Federal wildlife agencies, San Diego Zoo Wildlife Alliance, SeaWorld San Diego and the Living Coast Discovery Center.

Parallel to these efforts, the USFWS Refuges Division of Inventory and Monitoring have provided funding and cooperative technical assistance for researchers to collaborate to develop a formal survey and data management protocol for future researchers, wildlife monitors, land managers, and wildlife regulatory agencies to use to track the trajectory of the species' populations over time. This formal protocol seeks to standardize collection methods to create a means for data collected over time in different marshes by different investigators be able to be statistically valid and comparable over time to allow for consistent data collection over multiple generations of investigators.

3. MULTI-AGENCY PLANNING EFFORTS
Refuge staff continue our participation in the USMCA Eligible Public Entities Coordinating Group (EPECG) team that is tasked with consulting with the USEPA on prioritizing actions to implement improvements to water quality treatment infrastructure to reduce the magnitude of flows of sewage, sediment, and trash into the Tijuana River Valley. See https://www.epa.gov/sustainable-water-infrastructure/usmca-tijuana-river-

watershed for an update on the chosen 'Comprehensive Alternative' intended to address transborder pollution.

The San Diego NWR Complex continues work as a co-lead agency for an Environmental Impact Report / Environmental Impact Statement (EIR/EIS) on the Tijuana Estuary Tidal Restoration Program II Phase I, and we are on track to complete the environmental regulatory documentation for the upcoming Draft EIR/EIS for the program. It will hopefully hit the streets for public review later this spring or early summer. https://www.fws.gov/refuge/Tijuana_Slough/what_we_do/TETRP2PI.html

4. TIJUANA RIVER MOUTH AND WATER QUALITY DATA
The Reserve's automated telemetry stations are in operation. These links are a useful proxy to get a glimpse of some water quality parameters in the system which in turn provide us information relative to mouth closure likelihood as well as indicators (Salinity in Oneonta Slough) of the presence of potentially contaminated freshwater runoff.

Oneonta Slough datalogger link: https://tijuanariver.trnerr.org/OS.html

And here is a link with a camera view northwest in Oneonta channel with Tijuana Estuary and Scripps tides. This datalogger system is located near the end of the river mouth trail. https://tijuanariver.trnerr.org/BocaRio/

5. Southern Border Fuels Reduction Initiative
The California Conservation Corps crews have recently returned to continue work on the Refuge on the Southern Border Fuels Reduction Initiative. This project is located within a 230-acre treatment area west of the western terminus of Sunset Ave., and just south of the navy airfield. We are reducing cover of non-native vegetation including stands of giant reed (*Arundo donax*), Tamarisk, castor bean, and other species.

6. Volunteer Stewardship and Habitat Restoration
The Refuge is working with San Diego Audubon Society on a project funded by the USFWS' Coastal Program to restore and improve the habitat as well as the visitor experience on around 2 acres near the corner of I.B. Blvd and 3rd Street. We are working with the City of Imperial Beach who have graciously offered to allow the project to access city water for hand irrigation of installed plants. The first volunteer planting event will take place on Sunday February 13th. For information on volunteering on this project, contact Megan Flaherty, Conservation Manager for San Diego Audubon flaherty@sandiegoaudubon.org.

7. San Diego Bay NWR
Refuge staff continue collaboration with the City of Imperial Beach by information and input on the City's planning efforts for the Bayshore Bikeway Resiliency Planning project. We are providing technical assistance to the city in its evaluations of feasible project options moving forward.

8. Otay River Estuary Restoration Project
https://www.fws.gov/refuge/San_Diego_Bay/what_we_do/Resource_Management/Otay_Restoration/Otay_River_Estuary_Restoration_Project.html

We are in the final stages of regulatory permitting and compliance for the upcoming construction of the Otay River Estuary Restoration Project (ORERP) to restore approximately 120 acres of intertidal habitat in south San Diego Bay. We expect to break ground on the construction of this major habitat mitigation project in Fall 2022. The ORERP project team continues its close coordination with the Port of San Diego via the Port's plans for the development of a mitigation bank funded wetland restoration of the former Pond 20 salt pond off Palm Ave. and east of 13th Street. We expect both projects in south San Diego Bay to be under construction in the next few years. These projects will serve to transform an abandoned salt pond, former agricultural areas, and one active salt evaporation pond into native intertidal salt marsh habitats, similar to what the Refuge created in the former western salt ponds west of 7th Street and east of Highway 75.

TASK: OVERSIGHT AND IMPLEMENTATION OF RESERVE OPERATIONS
Chris Peregrin, TRNERR Reserve Manager, California State Parks

1. 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 Reserve Manager contributed to virtual NERRA board meetings, October 26, November 19, December 14, and the NERRA Government Affairs meeting November 9.

The Reserve Manager attended the virtual NERRS Annual Meeting (virtual) November 15-18.

The Reserve Manager attended the NOAA West Coast Managers meeting, August 5.

The Reserve Manager contributed to the CA NERRS bi-monthly check-in.

The Reserve Manager worked with the TRNERR Program Management Team to host the quarterly TRNERR Advisory Council meetings. Advisory Council meeting were held virtually with shorter format than previous in-person meetings.

- August 3. New business topic included a presentation by Chris Helmer (City of Imperial Beach) and Bryn Evans (Dudek) gave a presentation and led a discussion on the Tijuana River Valley Sediment Management Work Plan.
- November 2. New business topic included a presentation by Dr. Jeff Crooks on the Tijuana Estuary Tidal Restoration Program (TETRP) II Phase I project in preparation of upcoming Draft EIR/EIS public review.

The Assistant Reserve Manager continued role of Cooperating Association Liaison for the Southwest Wetlands Interpretive Association 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 weekly CA State Parks SDCD Manager Team Meetings. One of the goals of this engagement is to ensure effective integration of Reserve programs with CA State Parks operations.

The Management Team worked with the TRNERR Education Program to recruit, interview and hire and new visitor services Park Aide to support the Visitor Center operations. Welcome Kelley Hubbard (*see also Education*).

The Management Team worked with the TRNERR Education Program to recruit, interview, and hire a new Education Specialist (Environmental Services Intern) to support the Education program and also interpretive programming for an additional State Park unit- Silver Strand State Beach. Welcome Empress Holliday (*see also Education*).

Thank you, Tracey Ekker! Office Technician Tracey Ekker retired during this reporting period. Tracey supported TRNERR administrative operations for nearly 20 years. She is greatly missed, and we look forward to seeing her around the Reserve.

The Reserve Manager worked with CA State Parks administrative staff to prioritize the hiring paperwork for the TRNERR administrative support position. All hiring paperwork is making its way through Sacramento headquarters processing. We hope to recruit, interview, and hire in the upcoming reporting period.

COVID-19 continues to spread in the San Diego region resulting in significant operational response and adjustments. The Management Team continues working with CA State Parks management, and TRNERR Program Managers to implement a safe environment for staff and visitors of the Reserve.

2. Management of Reserve Budget

The Reserve Manager continued work with the Assistant Reserve Manager and CA State Parks Administration staff to manage the NOAA & CA State Parks operating budgets.

The Reserve Manager supported the Assistant Reserve Manager and CA State Parks Administration staff to manage the Nelson Sloan Quarry Restoration Project grants and administration process. The Nelson Sloan Quarry project is funded through three grant

allocations from the State of California- one from CA Department of Water Resources (via San Diego County Water Authority) and the other two through the State Coastal Conservancy. During this reporting period, contract agreements with the San Diego County Water Authority, and with consultant Dudek, were set to expire. Significant effort was focused on processing contract extensions to enable the continued work on this important project.

The Assistant Reserve Manager coordinated TRNERR Program Managers development of the NOAA Operations Award Progress Report for FY20, second period.

3. Protection and Restoration of the Tijuana River Valley

The Reserve Manager worked with contractor ERRG on the Goat Canyon Sediment Basin maintenance activities. During this reporting period efforts focused on final material removal from 2020 rainy season, and excavation of basin material from 2021 rain season (*see also Stewardship*).

The Management Team worked on contract development and service agreements to enable CA gnatcatcher and least Bell's vireo surveys for upcoming season (*see also Stewardship*).

The Reserve Manager continued work with the Assistant Reserve Manager, design staff from CA State Parks Southern Service Center, CA State Parks Administrative staff, and the State's project consultant (Dudek) to continue on-the-ground studies and design work for the completion of the final design and environmental review for the Nelson Sloan Quarry Restoration and Beneficial Reuse of Sediment Project. During this period, significant focus was placed Native American consultation. Additional effort was focused on development of the Draft Environmental Impact Report which was released for public review (*see also Stewardship*). The Reserve Manager supported the Assistant Reserve Manager and CA State Parks Contracting and Budgets offices to extend the contract agreements for this project (*See also above Management of Reserve Budgets*).

The Reserve Manager continued work with the TRNERR Research Coordinator, SWIA Project Management, US Fish and Wildlife Service, and project consultants to further the design for the Tijuana Estuary Tidal Restoration Program (TETRP) II Phase I project. This project seeks to restore roughly 80 acres of salt marsh within the Reserve. During this period significant focus included preparation of the Draft EIR/EIS for public review; anticipated for release in the following reporting period (*see also Stewardship and Research*).

The Reserve Manager continued engagement with USEPA to identify issues with water and wastewater infrastructure that contribute toward cross-border pollution, and to prioritize improvements that will address the wastewater and freshwater discharges into the Tijuana River. During this award period, efforts were continued toward identifying priority projects for the $300million allocation in the federal government through the United States-Mexico-Canada Agreement. The Reserve Manager serves on the Eligible Public Entities Coordinator Group (EPECG; formerly the Inter-Agency Consultation

Group) for this effort, representing the CA Natural Resources Agency and the Tijuana River National Estuarine Research Reserve.

The Reserve Manager and Assistant Reserve Manager contributed to the technical advisory committee toward the development of a Tijuana River Valley Sediment Management Plan. This effort is led by the City of Imperial Beach, with consultant Dudek, and funded by the State Coastal Conservancy.

The Reserve Manager continued work with the TRNERR Research Coordinator, CA State Parks resource managers, and external researchers to collaborate on project planning for a dune restoration research project ("Using Green Engineering Techniques to Restore Coastal Sand Dunes in Border Field State Park, San Diego, California") involving California Ocean Protection Council, California Sea Grant Program, and the University of Southern California Sea Grant Program. During this award period site monitoring continued and the project team considered effort toward project expansion with an additional restoration treatment involving sand fencing.

The Reserve Manager continued work with the Assistant Reserve Manager, CTP Coordinator and Binational Liaison to coordinate the NOAA Marine Debris 2018 grant efforts.

The Reserve Manager worked with the Assistant Reserve Manager, CTP Coordinator, Research Coordinator, and Binational Liaison to kick off a new effort funded by NOAA Marine Debris North American Marine Debris Prevention and Removal grant opportunity. This grant is supported through USMCA funds (*See also Coastal Training Program*).

The Reserve Manager, Assistant Reserve Manager, and Research Coordinator continued collaboration with the Tijuana River Valley Recovery Team (TRVRT).

The Reserve Manager worked with CA State Parks Natural Resources Program and Law Enforcement to respond to the oil spill "Pipeline P00547 Incident." On October 2nd, 2021, an oil spill was detected originating from an underwater pipe connected to the Elly platform about 4.5 miles offshore near Long Beach, California. The spill resulted in impacts along the Southern California Coast, including TRNERR. Response involved regular surveys of coastline and estuarine habitats, including TRNERR, coordination with CA Department of Fish and Wildlife and US Coast Guard, and public communication.

4. Development of TRNERR Partnerships

The Nelson Sloan Quarry Restoration and Beneficial Reuse of Sediment Project has offered additional opportunity to strengthen existing partnership and develop new working relationships.

- Working relationships with the County of San Diego, Department of Parks and Recreation have been strengthened, and collaboration toward future partnerships for sediment management has increased.

- Consultation processes with Kumeyaay Native Americans have included many virtual meetings and also some site visits. These efforts have deepened Reserve understanding of Kumeyaay interest in sediment management in the Tijuana River Watershed. We expect this consultation process to grow into stronger working relationships and shared management strategies.
- Wildlife regulatory agencies have taken an interest in the project, especially in relation to the presence of the Federally Endangered Quino checkerspot butterfly. The presence of this species in this area was first made known through surveys in support of the project. We expect our working relationship with the USFWS and CDFW to strengthen as we continue to develop this project toward implementation.
- The project was presented at the newly established South County Environmental Justice Task Force (August 16). Chaired by County Supervisor Nora Vargas, this task force offers networking opportunities for the Reserve to highlight efforts, and to improve our approach with respect to Reserve management and environmental justice.

The Reserve Management Team collaborated with the TETRP team to provide a site visit for USEPA, September 16.

The Reserve Management Team worked with TRNERR staff to expand connection with local NGOs focused on connecting public with the Reserve and improving Reserve health. During this reporting period outreach efforts included the Spring Valley Clean-up Crew, and Outdoor Outreach.

The Reserve Management Team supported the Education Program to host celebrations for the 50th Anniversary of Border Field State Park (*see also Education*).

The Reserve Manager engaged in “Leaders for Outdoor Equity- a cohort-based program of Thrive Outside San Diego, that aims to build the next generation of land managers, conservationists, outdoor educators and recreational outfitters to promote more diverse and inclusive access to public lands. This program included a workshop series on historical and contemporary issues of exclusion and inequity as they relate to our public lands and highlights current efforts to address these issues. The workshop series was paired with seminars to develop transformational leadership skills of participants. Program content has been developed by Outdoor Outreach, The Nonprofit Institute at the University of San Diego, and the US Fish & Wildlife Service.

5. Oversight of Reserve Facilities and Public Access Opportunities

The Reserve Management Team worked with State Parks Administration staff, and State Parks maintenance crew, to manage and maintain the TRNERR headquarters and Reserve facilities.

The Reserve Manager continued collaboration with CA State Parks law enforcement and San Diego County Parks to ensure operational alignment with the new County campground in the Tijuana River Valley.

The Reserve Manager coordinated with CA State Parks Southern Service Center design team to further efforts focused on the repair of Monument Road in Border Field State Park.

6. Develop TRNERR's next set of 5-year evaluation metrics

The Reserve Management Team and Program Managers have reviewed and proposed updates to the 5-year evaluation metrics.

TASK: EDUCATION PROGRAM

Anne Marie Tipton, TRNERR Education Coordinator, California State Parks

1. Implementation of Education Programs

A. *Formal and Non-formal Teacher Training*

Neither Tijuana Estuary Explorers nor MARSH curriculum teacher trainings occurred during this period. Teachers who attended virtual programs were sent digital material ahead of their virtual programs to help prepare students.

B. *Student-centered Formal and Informal programs*

No in-person, student-centered programs were held during this time. Reserve Educators instead continued carrying out their 3 virtual programs through California State Parks, Parks Online Resources for Teachers and Students (PORTS). The Reserve delivered two high school level *Detecting a Changing Climate* (DACC), five *Salt Marshes and Climate Change* to middle schoolers, and 57 *Salt Marsh Secrets* to elementary students. The programs were mostly conducted as PORTS on-demand programs serving individual classrooms. A total of 2,630 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://www.ports-ca.us/PORTSon-demand/tijuana-estuary-natural-preserve

The education team got a new part-time member in September, Empress Holliday. She will also work at Silver Strand State Beach. At the Reserve, her duties include one day a week conducting PORTS elementary school programs and doing other education and interpretation.

C. *Interpretation*

Lunchtime Live, a weekly Facebook Livestream that began in April 2020, continued during this period. There were 24 programs delivered with a typical length of 10-25 minutes each and totaling 3,583 views. The program was designed to provide outreach and interaction with the public since in-person bird and nature walks had ceased. Even with ongoing docent walks, the series still has a regular following of watchers who engage with questions, comments, and suggest topics for future programs. All videos are captioned later and are made available on the Reserve's YouTube page.

Border Field State Park (BFSP) commemorated its 50th anniversary on August 21, 2021 with an in-person event with 100 people. There were six booths: Kumeyaay Native Californians, California State Parks Foundation, Friends of San Diego Wildlife Refuges, Gray Bears (retied BFSP employees), TRNERR Research and Restoration, TRNERR Stewardship and Marine Debris, and STQRY app self-guided tour. The opening remarks from Stan Rodriguez of the Santa Ysabel Iipai Nation, Imperial Beach Mayor Serge Dedina, and a remote address by the CA State Parks Director were livestreamed on Facebook. A STQRY app self-guided tour was developed and launched https://borderfieldsp.stqry.app. The content was derived from the Divided Together Podcast that premiered the following month.

Border Field State Park launched a new podcast series called "Divided Together" on California Native American Day, Sept. 24, 2021. Inspired by creating digital content for the Park's 50th anniversary celebrated on Aug. 21, 2021, the first episode is titled "Kumeyaay Nation Divided by the Border" which highlights the impacts the border has had on the Kumeyaay and the land they've inhabited for thousands of years. The Park is on ancestral land of the First People, the Kumeyaay. The other titles are "Scientists and Geographers Working Across Borders," "Indigenous Land Use Practices," and "Human Rights Along the Border." There are 729 downloads as of January 25, 2022.

The "Divided Together" podcast reveals topics that involve separation and unification related to the border featuring people with direct experience and knowledge. A new episode was released weekly. The podcast series features several episodes focusing on the various land use practices the Kumeyaay have used throughout time and how altering them has created an alarming impact; and scientists and geographers collaborating across the border to help preserve and study the land. The podcast series is available on the Tijuana River National Estuarine Research Reserve website (trnerr.org) as well as Spotify, Apple Podcasts, Google Podcasts, Stitcher, Podchaser, Pandora, iHeartRadio, and TuneIn.

The Interpretative Master Plan is still awaiting the final comments to be incorporated and approved by State Parks Interpretive Division.

On December 3, the Reserve Education Coordinator, with support of the Reserve's Education Specialist, participated in the California State Parks King Tide Facebook livestream that reached over 2,000 people. The EC focused on SWMP data and sea level rise.

Education Specialist E.Holliday conducted an in-person King Tide Hike on December 4, 2021 with 28 participants. The focus was the sentinel site program ad climate planning.

D. *Visitor Services*
The Tijuana Estuary Visitor Center reopened on June 23, 2021, after being closed for 15 months. Visitor Center attendance was 3,545 during this reporting period. Visitor Services Park Aide Kelley Hubbard started in August. She is working at the front desk, conducting scout and other programs, and cart and roving interpretation.

2. Production of Outreach Materials

Reserve Education Staff produced an e-newsletter every month of this reporting period including highlighting volunteers, other special events, and accomplishments. TRNERR volunteers were recruited to write species spotlights for the eNews as well as for social media posts.

3. Volunteer Capacity Building

Following COVID-19 restrictions, the first docent-led walks took place in July 2021. Since then, the Reserve has resumed our normal Saturday Nature Walks (2nd/4th) and Sunday Bird Walks (1st/3rd/5th). The Volunteer Coordinator and Education Specialist worked to plan and host Tijuana River Action Month together with the Stewardship and Coastal Training Programs and the Tijuana River Action Network partners (*see Stewardship*).

4. Environmental education and interpretive capacity and leadership roles

The Education Coordinator started planning San Diego Exhibit Experience Group meetings for the late winter. EC Tipton co-led a one-hour National Network of Ocean and Climate Change Interpretation (NNOCCI) “Bridging and Pivoting” training for 15 State Park Interpreters on November 10, 2021.

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 trainings in this reporting period, notably, CTP co-developed and facilitated the first California Shore & Beach Preservation Association (CSBPA) webinar series “The Changing Landscape & Future of California’s Shores and Beaches.” Two webinars were hosted in this reporting period: (1) Lessons learned on resilience and considerations for future sediment solutions (part 2); and (2) How do we improve coastal sediment management through coordination in California? These workshops revealed the need among members for additional training and technical assistance and in the next reporting period, CTP will convene a CSBPA working group to evaluate NOAA digital coast academy virtual trainings and develop a strategy.

Other trainings in this reporting period involved topics of green infrastructure, waste management, and other issues that face the Tijuana River Watershed.

Various technical assistance was provided to coastal decision-makers in this reporting period including facilitating meetings, providing survey and evaluation assistance, assisting organizations with grant writing, plan/policy revisions, and strategic/action planning. In this reporting period, CTP provided feedback on a market analysis for Silver Strand State Beach education program and participated in an evaluation of the University of Southern California Sea Grant Extension and Education program proposal. CTP also facilitated a session during the 2021 Coastal Dunes for Resilience Workshop on social, economic, and cultural considerations. A detailed technical assistance catalog by award year and performance period can be found here.

Additionally, based on the BEACON manager-scientist workshop delivered in the last reporting period, CTP supported the development and adoption of a Research Agenda that sets a trajectory for BEACON's science activities to include collaborative and interdisciplinary frameworks. This will guide the implementation of BEACON's Prop 68 project 'Regional Coastal Resilience Sediment Pilot Program' that builds on research and practice related to sediment management occurring at the Reserve. CTP is supporting other Prop 68 projects including 'Planning Regional Coastal Resiliency for California State Parks and Piloting in San Diego Coast District' and 'Establishing a San Diego Regional Coastal Resilience Roadmap to Enable Project-Based Action and Investment' in advisory roles.

The CTP Coordinator also continues to serve on the NERRS Science Collaborative advisory board and other system level working groups including on topics of plastics, human dimensions, equity, and disaster resilience.

2. Report training and technical assistance outcomes

In this reporting period, after training delivery, CTP administered post-workshop evaluations, collected, and analyzed data, and submitted into the performance monitoring database. A detailed technical assistance catalog by award year and performance period can be found here.

TASK: STEWARDSHIP PROGRAM

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

1. Habitats downstream of the Goat Canyon Sediment Basin protected from catastrophic sedimentation and trash inundation

Engineering/Environmental Resources Group Inc. exported approximately 20,000 cubic yards of sediment from the processing pad, and excavated approximately 20,000 cubic yards of deposition material from the Goat Canyon Sediment Basin in Fall 2021.

Assistant Reserve Manager continues working on the Nelson Sloan Quarry Restoration Project with State Coastal Conservancy and consultant (Dudek) on final design and

environmental review. This project will help with long-term stabilization of Goat Canyon activities (see also Oversight & Implementation). The Draft Environmental Impact Report was published on September 20, 2021, and the public review period ended on November 12, 2021.

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 the CA least tern and Western snowy plover in the dune habitat of the Reserve. Regular plover and tern monitoring will begin again in March 2022. This work is largely accomplished through a contract with a private consultant and through our partnership with the US Fish and Wildlife Service staff at Tijuana Slough National Wildlife Refuge.

Supported survey work for annual monitoring of CA gnatcatcher and least Bell's vireo in the Goat Canyon drainage and Bunker Hill. Monitoring will begin again in March 2022.

4. On-going restoration and enhancement projects continue trajectory toward healthy vegetation communities and integrate into functional ecosystem components with continued outreach opportunities
The Stewardship program continues to be down staff, the Stewardship Associate position has not been filled yet. The Assistant Reserve Manager also works as an Environmental Scientist for the Stewardship Program, however, is not funded by this award or counted as match.

Retired Annuitant Environmental Scientist continued maintenance of priority restoration sites.

Assistant Reserve Manager continued to work with Reserve Manager and Research Coordinator, SWIA Project Manager, USFWS, and project team to support the preparation of the joint EIR/EIS document for the Tijuana Estuary Tidal Restoration Program (TETRP) II Phase I. (*see also Research*)

The twelfth annual Tijuana River Action Month (TRAM) ran from September 18 through October 16 with a series of hybrid events. There were 19 events (including in-person clean-ups, Lunchtime Live, in-person and virtual workshops, and an art contest). TRAM is a series of education and stewardship events held during September and October to benefit the Tijuana River Watershed. For the Reserve, this was the first opportunity since Covid started to have a group volunteer event for Coastal Cleanup Day. Events in the US were done in partnership with TRNERR (cross-sectoral), CSP, USFWS, SWIA, Friends of Friendship Park – Binational Friendship Garden, I Love a Clean San Diego, Tijuana River Valley Equestrian Association, Surfrider San Diego - Clean Border Water Now, Wildcoast, San Diego City Councilwoman Vivian Moreno, and the Resource

Conservation District of Greater San Diego County – Tijuana River Valley Community Garden. Mexican partners included Proyecto Fronterizo de Educación Ambiental, Haciendo Eco, el Ayuntamiento de Tecate, Tecate Councilwoman Vásquez, Conalep Tecate, Rovak Waste Solutions, and Desembólsate BC.

CSP San Diego Coast District Natural Resources Staff continue work on a stewardship project focused on monitoring, 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. During this period perimeter fencing was installed around the project area and Natural Resources staff planted over 200 container plants to help restore coastal sage scrub habitat.

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.

In response to the COVID-19 pandemic, Reserve Manager continues to work with State Parks District staff to incorporate County and State guidelines in development of Public Safety closures and protocols for the Tijuana Estuary Visitor Center, grounds, and Border Field State Park.

State Parks maintenance staff worked to maintain public use facilities at Monument Mesa.

The Reserve Manager worked with the TRNERR Program Managers, and State Park District Chief Ranger, to improve communication around water quality issues and beach closures initiated by the San Diego County Department of Environmental Health.

TASK: INVASIVES

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

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

No actions during this reporting period. Treatment of ice plant is typically completed in January/February.

2. High Quality Habitat for Riparian Birds

CSP Retired Annuitant Environmental Scientist continued work to increase the footprint of primary treated areas and follow-up on previously treated areas. The main plants treated were castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*), giant reed (*Arundo donax*) and Tamarisk (*Tamarix ramosissima*) throughout the Goat Canyon drainage this period. Manual removal strategies, including hand pulling, saw, weed-wacker, and mower were used in addition to Roundup Pro Concentrate, and Pathfinder II, post-emergent, broad-spectrum herbicides.

Some annual forbs were mowed before herbicide treatment, as well as 3 to 5 acres of black mustard (*Brassica nigra*). Annual weeds were hand pulled around native plantings. Other plants treated included Russian thistle (Salsola tragus), crystalline iceplant (*Mesembryanthemum crystallinum*), mustard (*Brassica nigra*), globe daisy (*Glebionis coronaria*), stinging nettle (*Urtica urens*), bristly ox-tongue (*Helminthotheca echioides*), lens-pod white top (*Lepidium draba*) and fennel (*Foeniculum vulgare*). It was also learned that many of the invasive exotic plants are hybrids and that many of the scientific names are going to be modified.

Appropriate native plants including oaks, pines, cypress, willows, shrubs, and grasses were planted to maintain plant cover.

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.

Fourteen educators attended the fall 2021 hybrid Teachers on the Estuary training in October/November. There were two Teachers on Special Assignment (TOSAs) (one math, one science), 3 middle school, one informal, one PhD candidate, and seven high school teachers. The TOTE consisted of two virtual afterschool sessions and one in person day. Teachers also had an asynchronous assignment letting us know what materials they will be implementing in class per topic.

Research and CTP staff, including the Margaret Davidson fellow Nancy Torres, participated in the training. Nancy presented on her work and on equity in the outdoors. The San Diego County Office of Education science coordinator helped with planning, production of virtual sessions, and developing the asynchronous portion. The in person day covered Estuaries 101, data literacy, SWMP Scenarios, and a reserve tour to Border Field State Park along the border.

Here is some feedback from the evaluations:

“The background on the challenges facing the Tijuana River Estuary and the salt marsh were fascinating- especially due to the binational management. The data scenarios were so engaging.”

Gina, Hilltop High School

“Thank you for the meaningful experience. I appreciated the thoroughness of how all aspects of the topic and program was discussed over the 3-day training. Thank you for all you do 😊. I look forward to attending more trainings.”

Tina, Chula Vista Middle School

TASK: RESEARCH COORDINATION AND IMPLEMENTATION
Dr. Jeff Crooks, TRNERR Research Coordinator,
Southwest Wetlands Interpretive Association

1. Research by TRNERR staff increases local knowledge

We were able to perform the key activities of the Reserve, despite COVID-19 restrictions, and we made significant progress on the outcomes in this operations award. We were able to engage our volunteers during the busy fall sampling season, although not to the extent we had in previous years (and had adjusted our work program accordingly). We were also able to host a summer intern through the California State University COAST program, Alexa Buss (who worked remotely, but was able to join in on field work as well). Our Davidson Fellow, Nancy Torres, continue on with us. Both Alexa and Nancy assessed status and trends of pollution in the estuary (supported in part by the matching NFWF grant). Alexa also worked on community science, especially iNaturalist, as a research and monitoring tool.

2. The Reserve offers attractive opportunities for researchers

Several projects are underway in the Reserve, often with the Reserve as a collaborator. These are listed in the Research and Monitoring Database. In addition to the student work on pollution trends, other work conducted during this reporting period includes:

- The NCCOS Ecological Effects of Sea Level Rise (EESLR) project led by the State Coastal Conservancy and with TRNERR as a partner, was completed during this reporting period. This focused on assessing the response of Southern California marshes to climate change. The focus for the Tijuana Estuary was determining how habitats to be created as part of the Tijuana Estuary Tidal Restoration Program (TETRP) might respond to sea level rise and sediment input from the watershed, using the USGS WARMER model. Model results indicated that it would take 50 – 70 years of sea level rise for existing habitats to “naturally” convert without restoration, because of the significant amounts of sedimentation. Similarly, habitats created as part of TETRP would persist for decades. Model results, and the management implications, of those (i.e., the need for restoration) were presented by Kevin Buffington (USGS) and Dr. Crooks at the fall CERF meeting.

- The NCCOS Coastal Hypoxia Research Project, led by Scripps and with SWIA/TRNERR as a sub-awardee, continues. This work is also being conducted in partnership with researchers in the Biology Department at San Diego State University. This project is leveraging long-term TRNERR-based monitoring in both the Tijuana Estuary and Los Peñasquitos Lagoon. We retrieved the deployed mussel and oyster biosentinels in the Tijuana Estuary during this reporting period. These shellfish are wired to track shell gape and heartrate, and this information will be coupled with abiotic monitoring (including SWMP) to better understand the relationship between environmental conditions (such as hypoxia) and biological responses of individual organisms. This was used a pilot for the recently-awarded NERRS Science Collaborative grant (Luke Miller, SDSU, as PI), which will expand the use of these biosentinels to other contexts (e.g., aquaculture).

- A TRNERR-led project on habitat change in the Tijuana River Valley, with a focus on impacts of the invasive shot hole borer on riparian trees (with partial support from the US Navy and US Fish and Wildlife Service).
- A Scripps student, Natalie Grayson, is starting up a project looking at microbiota as indicators. She took some initial samples corresponding with the work of Nancy Torres, who is looking at organismal tissue and sediment contaminants.
- Research on approaches to dune restoration at Border Field State Park continues and includes the use of "biomimics" (small shims meant to represent structure of plants) and dune fencing.

In addition, Dr. Crooks is involved advising or supporting a number of graduate student research projects. Dr. Crooks is committee chair for four students at the University of San Diego. Two of these have successfully defended their thesis in an oral presentation and are preparing final written theses for submission. He is also involved in supporting students from SDSU, Scripps, UCLA, and UC Irvine.

3. Restoration offers opportunities for coupled science / management

Planning associated with the Tijuana Estuary Tidal Restoration Project (TETRP) has advanced during this reporting period. As highlighted above, a key component of this was assessing potential responses of proposed habitats to sea level rise, the results of which emphasized the need to move forward with this project (that is, we can't wait for sea level rise to do the work for us). We completed the internal reviews of the Draft EIR/EIS and are waiting for permissions to formally release this document in the spring. We also conducted pre-restoration monitoring in the TETRP footprint, focusing on vegetation and large fish/ invertebrates using minnow traps.
Fall sampling of vegetation in the South Bay Salt Ponds site in San Diego Bay was also conducted (with funding in part provided by the US Fish and Wildlife Service). We will be assessing trajectories of vegetation development in that restoration over the 10 years since completion.

4. TRNERR is used as a reference site

Fall reference site sampling of TRNERR by researchers at the University of California Santa Barbara was completed as part of the mitigation monitoring for the impacts of the San Onofre Nuclear Generating Station (SONGS). This included includes assessment of birds, vegetation, fish, invertebrates, and water quality (using data from TRNERR SWMP loggers).

5. Communication of key research findings and perspectives

In addition to the CERF meeting highlighted above, Dr. Crooks has continued to be involved in various steering committees and field trips. Activities during this reporting period include:

- California Estuary MPA Monitoring Project
- Los Peñasquitos Lagoon Restoration Planning (with separate funding)
- HiTIDER (History and Topography to Improve Decision-making for Estuary Restoration) - NERRS Science Collaborative project

- Field trips for students from the University of San Diego.

6. Reporting and Database Entry
Research projects were entered into the database.

TASK: IMPLEMENTATION OF THE SYSTEM-WIDE MONITORING PROGRAM

Dr. Jeff 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 address 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, NOAA NCCOS, and the National Fish and Wildlife Foundation.

We operate three stations in the Tijuana River Estuary, two of them formal SWMP and one is associated with TETRP (and is being maintained in accordance with SWMP protocols). One of these sies, 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. We also maintain three telemetered sites in Los Peñasquitos Lagoon, which are also being operated in accordance with SWMP protocols. This data is available at torreypines.trnerr.org.

These data are used for a variety of research and management efforts, including management of tidal inlets (as indicated by the extent of observed tidal action). Monitoring data are also being used to inform active restoration planning and post-construction monitoring, including TETRP, SONGS mitigation monitoring, 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. A (virtual) SWMP Data Management Committee meeting occurred during this reporting period.

2. Understanding of long-term vegetation dynamics and SSAM-1
We conducted annual vegetation monitoring in the fall at all of our sites, with the aid of volunteers. These sites include transects sampled using SWMP biomonitoring protocols as well as older methodologies (which started in the late 1980's). We began compiling SWMP biomonitoring data for use in the Science Collaborative Namaste project. We also are preparing the draft of our SSAM-1 plan for review.

3. Integration of monitoring with education and outreach programming
We conducted a well-attended TOTE training in the fall, which included both in-person and virtual activities. SWMP remains a centerpiece of TOTE activities (see Education program report for more details).

TASK: PROFESSIONAL DEVELOPMENT, TRAINING, PRESENTING

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

1. NERRs Integration and Leadership Development
Reserve staff attended the virtual Annual Meeting in the fall.

2. Staff Development
Meetings (such as CERF) have been virtual this year, so no travel funds have been used for this.

3. TRNERR Staff Program Support and Enhancement
Limited travel to field sites has occurred during the reporting period.

TASK: INVASIVE SPECIES - APPLICATION OF RESEARCH TO MANAGEMENT

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

1. Improved understanding and management of local invaders
SWMP biomonitoring transects continue to track invasive species, with a particular focus along the marsh / upland ecotone. We also are continuing long-term work on the invasive Kuroshio Shot Hole Borer (an ambrosia beetle) on riparian habitats in the valley (in part supported, with non-matching funds, by the Navy). iNaturalist is also being utilized as a tool to track biological invasions (including warm water species moving northward – or “tropicalization”).

Dr. Crooks is also adjunct faculty in the Department of Environmental and Ocean Sciences at the University of San Diego and advises several students who are working on invasive species. These include studies of invasive oyster impact in Los Peñasquitos Lagoon, effects of anthropogenic freshwater on the relative success of invasives vs. natives in Los Peñasquitos, and tissue contaminants in native and invasive snails in the Tijuana Estuary.

2. Improved regional, national, and international information sharing
Dr. Crooks is Co-President of The Society for the Study of Marine Bioinvasions, which hosts the International Conference on Marine Bioinvasions series. Unfortunately, we have had to postpone the meeting (again), which was to be in held in Annapolis in spring, 2022. We are planning for a 2023 meeting, as well as smaller, virtual opportunities in the interim.

Dr. Crooks also provides information on invasive species in the Tijuana Estuary and the region in general as part of field trips and presentations.

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

1. Successful implementation of Davidson Fellowship

Nancy Torres continues to progress with her work, focusing on sediment and tissue contaminants in the Tijuana Estuary. She has complied long-term data and conducted her fall sampling during this reporting period. She collected tissue from a wide range of species in the Reserve, both to understand their potential role as bioindicators and to identify potential food chain effects. This work is being done with input from the US Fish and Wildlife Service Contaminants Division. N.Torres also presented her work at the fall CERF conference, and prepared a (well-received) presentation for our fall TOTE workshops.