

Tijuana River National Estuarine Research Reserve (TRNERR)

Program Manager Reports

Report Period: January 1, 2019 through June 30, 2019

TASK: REFUGE REPORT

Brian Collins – USFWS - Refuge Manager

WILDLIFE

Terns and Plovers

The avian species nesting season is winding down for some species, but our beaches still host new nests of western snowy plovers and we still share our beaches with adults, chicks and fledglings of California least terns. This year, this area was one of low productivity for fish eating birds in relation to other years. In general, terns were late to start nesting and showed low colony attendance in the early stages of the season. We have had **148** least tern nests established so far this season and **46** snowy plover nests. Productivity estimates will be available later in September.

Light-footed Ridgway's rails

Refuge staff continue to collaborate as part of the Light-footed Ridgway's Rail (LFRR, Clapper Rail) Zoological Propagation Team. We are working closely this season to transform this program to both make it more sustainable and repeatable by others and to open a new chapter on recovery work for the species since recent events such as the mouth closure of the Tijuana Estuary in 2016 demonstrated that the threats facing these birds are changing and may present novel challenges to land managers.

The Zoological Propagation Team is composed of representatives of the United States Fish and Wildlife Service (USFWS) including the Carlsbad Fish and Wildlife Office (CFWO) and San Diego National Wildlife Refuge Complex (SDNWRC), United States Geological Survey (USGS), CDFW, the Light-footed Clapper Rail Study and Management Team, Living Coast Discovery Center (LCDC), SeaWorld San Diego (SWSD), and San Diego Zoo Global (SDZG, Safari Park).

Program partners are actively coordinating on several incipient scientific studies aimed at expanding our understanding of the status of the species, its migration, survival and dispersal capabilities, its population structural status based on a genetics study and model, and models of habitat structural viability across the species' range in California. All studies will be structured so they may be expanded to include rail habitats in Baja California, Mexico.

These incipient studies include:

The development of a **parallel monitoring protocol** based on those adopted by the national USFWS Inventory and Monitoring Program that will be compatible with the North American Marsh Bird Monitoring Protocol (Conway 2011). This protocol will be adapted for the purpose of used in comparison to ongoing call count surveys developed and implemented by Zembal et al.

A **dispersal and migration study** of wild caught birds in parallel with a post-release study tracking zoologically bred birds using Lotek Solar PinPoint ARGOC-GPS satellite transmitters.

Estimations of home range size of wild and captive-bred rails in the wild using adaptive localized convex hulls (aLoCoH) (Getz et al. 2007).

A study **assessing genetic diversity and connectivity** among light-footed Ridgway's rail populations in southern California.

We anticipate releasing young rails bred within this program at the Tijuana Estuary sometime in September 2019.

Pacific Pocket Mouse

Refuge staff are working with staff members from USFWS, CDF&G, USGS, the San Diego Zoo's Conservation Biology Institute and the San Diego Natural History Museum in evaluating various sites for potential reintroduction of the Pacific Pocket Mouse (*Perognathus longimembris pacificus*) into its former range. This is a critically endangered species whose phylogenetic type specimen was collected in the Tijuana River valley in the 1800's. The species is presently extirpated from this area.

The Tijuana Slough NWR is one of the sites being evaluated for feasibility to conduct a reintroduction experiment.

PUBLIC USE PROJECTS

Imperial Beach Boulevard Enhancement Project

The city of Imperial Beach is working on the redevelopment of I.B. Blvd. Refuge and State Parks staff have been working closely with the city on this project. The Refuge has agreed to allow for some of the improvements, that the city will build and maintain to improve public access and non-motorized transportation along this corridor, to extend onto federal lands on the Tijuana Slough National Wildlife Refuge. We have memorialized that agreement in a Refuge Special Use Permit (#TJS 19002) and have conducted analyses and administrative actions including a NEPA (National Environmental Policy Act) Categorical Exclusion and Environmental Action Memorandum for Imperial Beach Boulevard Improvements (August 15, 2018), a National Historic Preservation Act, Section 106 Historic Property Identification Report, and an Endangered Species Act Section 7 biological evaluation in order to help the City expedite the project. Construction for the section between 3rd and Seacoast is expected to begin later this month. We continue to collaborate on landscape designs and interpretive elements.

Seacoast Drive Interpretive Plaza

Design and illustration work continues on the small interpretive plaza that is planned for an existing small overlook on Seacoast by Oneonta Slough. We expect project completion by winter 2020.

Deck Replacement

The two level plastic deck near the corner of 3rd and I.B. Blvd will be replaced soon. Project is in the final engineering phase and is fully funded.

A new plaque honoring Patricia and Mike McCoy has been installed at the northern junction of the McCoy trail.

Southern Border Fuels Initiative

The San Diego NWR Complex recently received funding for two invasive species control projects with funding coming from the Department of Homeland Security. One project is on Tijuana Slough NWR, the other along the Sweetwater River at San Diego NWR. The Tijuana Slough project site includes approximately 205 acres of riparian habitat located within the boundaries of the Tijuana Slough National Wildlife Refuge.

Work will be conducted under the Southern Border Fuels Management Program, a collaboration between the U.S. Border Patrol and the U.S. Fish and Wildlife Service. The riparian habitat within areas of the Tijuana River and its associated tributaries is infested with a range of invasive tree and shrub species. The presence of these invasive plants increases the risk for wildfire; adversely affects habitat quality for riparian nesting bird species, including the federally endangered least Bell's vireo (*Vireo pusillus belli*); and impairs access and visibility in the area for Refuge and Border Patrol operations. Removing invasive plants from this area will open areas within the riparian corridor for reestablishment of native species, including mulefat (*Baccharis salicifolia*), willows (*Salix* sp.), and cottonwoods (*Populus fremontii*), reduce the risk of wildfire, and improve habitat for the least Bell's vireo.

The overall goals of the project are to reduce the risk of wildfire; improve habitat for riparian nesting bird species including the federally endangered least Bell's vireo; mitigate safety risks to FWS staff and Border Patrol personnel; and improve access and visibility for Refuge and Border Patrol operations.

YCC

We have the pleasure of hosting another Youth Conservation Corps group doing summer work on our Refuges this season. They will be here working with us until the end of next week.

Our YCC group leader this year is Jessica Looney. Jessica has worked previously at the Living Coast Discovery Center and has an extensive background in animal husbandry, biological monitoring (including at Ding Darling NWR in Sanibel Florida), is trained as a docent and volunteer with experience at the Living Coast, the San Diego Bay NWR, and the Tijuana Estuary. She is very familiar with our coastal ecosystems and is very excited to be working with us. YCC Crew members include Joseph Jones, Lilly McLane, Diego Romero, Evan Hernandez-Cervantes, Montserrat Urbina, and Parisa Vega.

ONGOING PROJECTS

Refuge staff continue to be central to not only the day-to-day management of our public lands, but also to promoting and facilitating scientific studies with multiple partners. Major Restoration and Remediation projects are in various phases of development including the Tijuana Estuary Tidal Restoration Program, the Otay River Estuary Restoration Project, and a CERCLA action on three operable units with the Sweetwater Marsh Unit of San Diego Bay NWR aimed at the goal of remediating historical contamination on the Refuge. The Comprehensive Environmental Response, Compensation, and Liability Act -- otherwise known as CERCLA or Superfund -- provides a Federal "Superfund" to clean up uncontrolled

or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment

TASK: OVERSIGHT AND IMPLEMENTATION OF RESERVE OPERATIONS

1. Coordinated Implementation of Reserve Programs

The Reserve Manager continued working with TRNERR staff toward the development of the Reserve's Comprehensive Management Plan- with focus on the Strategic Plan and the chapter elements. Through this reporting period, Lorena Warner-Lara, Assistant Reserve Manager, took a lead role in coordinating efforts- a task that has previously been managed by Dani Boudreau in the Coastal Training Program (see also *Comprehensive Management Plan*).

The Reserve Manager participated in the NOAA and NERRA annual Program Managers meetings in Washington DC March 12-14.

The Reserve Manager participated in the NERRS managers summer virtual meeting on June 17.

The Reserve Manager worked 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 worked with the Assistant Reserve Manager and the Program Managers to finalize and submit the updated 312 Evaluation Metrics.

The Reserve Manager continued attending regular SWIA Board Meetings.

2. Management of Reserve Budget

The Reserve Manager continued work with the Assistant Reserve Manager, Program Managers, and CA State Parks Administration staff to manage the NOAA Operations Budget.

The Reserve Manager worked with the Assistant Reserve Manager and TRNERR Program Managers to develop the FY19 NOAA Operations request.

The Reserve Manager continued work with the Assistant Reserve Manager and CA State Parks Administration staff to manage the CA State Parks Operations Budget. This reporting period constituted the bulk of purchasing and encumbering for the FY18 fiscal year.

The Reserve Manager continued work with the Assistant Reserve Manager and CA State Parks Administration staff to manage the Nelson Sloan Quarry Restoration grants administration process. The Nelson Sloan Quarry project is funded through two separate grants from the State of California. Establishment of these grants has posed some administrative challenges, including the development of new funding pathways, and alignment of these grants within the State of California's new financial management system- "Fi\$Cal." During this award period invoicing and payment pathways were formalized between consultant and relevant State Park offices, collaboration with San Diego County

Water Authority increased around project schedule and billing, and the \$250k grant from the CA Coastal Conservancy was finally executed.

The Reserve Manager continued work with the TRNERR Stewardship Associate, TRNERR Coastal Training Program Coordinator and TRNERR Binational Liaison, and SWIA Executive staff to coordinate budgets for two current grants through NOAA's Marine Debris program. The Goat Canyon Sediment Basin funding is used as a matching grant source and the tasks of these programs are aligned and coordinated to support a more-comprehensive effort toward the management of cross-border pollution.

3. Protection and Restoration of the Tijuana River Valley

The Reserve Manager worked with the TRNERR Stewardship Associate to manage Goat Canyon Sediment Basin maintenance activity associated with the fall 2018 basin excavation (see also *Stewardship*). The Reserve Manager worked with the TRNERR Stewardship Associate, CA State Parks contracts department, and CA State Parks Southern Service Center to update and advertise the competitive bid contract for the fall 2019 basin clean-out effort (see also *Stewardship*).

The Reserve Manager worked 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 initiate on-the-ground studies and design work for the completion of the final design and environmental review for the Nelson Sloan Quarry Restoration Project.

The Reserve Manager continued work with the TRNERR Research Coordinator, SWIA Project Management, and project consultants to further the design for the Tijuana Estuary Tidal Restoration Program. This project seeks to restore roughly 80 acres of salt marsh within the Reserve (see also *Research*).

The Reserve Manager continued engagement as a local stakeholder with USEPA and North American Development Bank/Border Environment Cooperation Commission to initiate a diagnostic study of the water and wastewater infrastructure on the US-Mexico border in the Tijuana River Watershed. This effort seeks to identify issues with this infrastructure that contribute toward cross-border pollution, and to prioritize improvements that will ultimately resolve the wastewater and freshwater discharges into the Tijuana River. During this award period, the study was completed and presented to the stakeholders on June 5, 2019. The next step will involve the convening of a stakeholder's meeting to solidify priority investment request.

The Reserve Manager continued engagement as a local stakeholder with the US International Boundary and Water Commission for initial development of a feasibility study for sediment and solid waste capture infrastructure on the main channel of the Tijuana River adjacent to the International Border. During this award period, this effort was brought to 60% drawings that outline various options for in-line and off-line facilities.

The Reserve Manager continued work to coordinate awareness of a locally generated proposal by SurfRider, which seeks to design infrastructure to capture and treat wastewater, and to capture and remove sediment and solid waste from the Tijuana River in the main channel near the International Border. The proposal seems to share objectives and design

concepts with the USIBWC feasibility study and therefore offers opportunity for collaboration.

The Reserve Manager continued work with TRNERR Program Managers to contribute as stakeholders in an effort led by the County of San Diego to produce a report that outlines primary cross-border pollution issues and proposes priority projects to resolve these issues. This effort is tasked to the County of San Diego by the CA State Legislature through Senate Bill 507. The effort is currently in the 'strategies development' stage.

The Reserve Manager continued work with the Assistant Reserve Manager, TRNERR Program Managers, and CA State Parks leadership to review to understand details and follow progress on the proposal by the County of San Diego to develop a campground in the Tijuana River Valley. The proposal includes roughly 80 campsites, including equestrian camping, tent camping, and yurt-style facilities, as well as a nature center and a horse activity center. The western-most portion of the proposed campground would be located within the TRNERR boundary. During this award period, the Reserve Manager hosted a visit by CA State Parks leadership to learn more about project details, with specific focus on how the proposal may integrate with State Parks and Reserve operations.

The Reserve Manager worked with the TRNERR Research Coordinator 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.

The Reserve Manager continued coordination of information to CA State Parks leadership regarding the lawsuits against the US International Boundary and Water Commission, by local jurisdictions and the State of CA San Diego Regional Water Quality Control Board.

The Reserve Manager continued to connect with US Department of Homeland Security, Customs and Border Protection, as active projects and proposals for additional Border Infrastructure are moved forward. Adjacent to the Reserve, the primary Border Fence has been replaced. Replacement of the secondary Border Fence (replacement of existing 18-foot fence with new 30-foot fence) and construction of additional fence and other infrastructure is underway. Waiver from environmental compliance is anticipated for all projects. All projects are on extremely rapid timelines.

The Reserve Manager continued work with the TRNERR Stewardship Associate, TRNERR Coastal Training Program Coordinator and the TRNERR Binational Liaison to coordinate the NOAA Marine Debris 2016 and 2018 grant efforts with existing Goat Canyon Sediment Basin operations.

The Reserve Manager continued collaboration with the Tijuana River Valley Recovery Team (TRVRT). In light of the existing litigation around cross-border pollution, the TRVRT has been working toward a new focus that recognized the influence of this litigation on the collaborative process and future goals; this focus is being redefined through an updated charter. During this reporting period, the San Diego Regional Water Quality Control Board initiated the formal process to develop Total Maximum Daily Loads for fecal indicator bacteria and solid waste, with a public scoping meeting held at TRNERR.

The Reserve Manager and the TRNERR Research Coordinator worked with Government Analysts Office to transfer information about the Tijuana River, and the management niche of TRNERR. GAO requested this information in response to the lawsuits against USIBWC. Information transfer included a river valley tour on February 7, 2019.

The Reserve Manager worked with CA State Parks staff and Scripps researcher Mathew Pendergraft to facilitate access and use of Monument Mesa as a research site focused on bio-aerosols.

The Reserve Manager participated in a 1-day workshop in Tijuana hosted by 4Walls International and the Ocean Conservancy focused on the development of the Border Impact Bond- a social impact bond that seeks to reduce pollution in the Tijuana River Valley through infrastructure and program development funded by the bond. The concept is in early development, and leans upon work by FloodRISE and SedRISE efforts supported by TRNERR, as well as the annual Goat Canyon Sediment Basin maintenance information.

4. Development of TRNERR Partnerships

The Reserve Manager continued work with USFWS, SWIA, and CA State Parks staff to initiate the process of evaluating our working agreements for TRNERR. This effort aligns well with the update to the TRNERR Comprehensive Management Plan, and the topic is moving forward in that context.

The Reserve Manager continued working with CA State Parks, CA Coastal Commission, and TRNERR staff, on plans to repair the flooding damage to Monument Road- the primary vehicular access road through the Reserve. Although the Project faces some significant challenges (cost, development in sensitive habitat) it also presents a great opportunity for collaboration and partnership development between Coastal Zone Managers and National Estuarine Research Reserve staff on a tangible project that seeks to improve environmental quality, increase coastal access, and develop facilities resilient to sea level rise. Conversations continue to link this effort with a similar road improvement project in SF Bay NERR, to showcase the challenges and opportunities around projects seeking to maintain infrastructure and access in coastal areas vulnerable to flooding.

The Reserve Manager continued work with the Assistant Reserve Manager on community outreach for the Nelson Sloan Quarry Restoration Project, and the development of a multi-jurisdictional operations agreement for long-term management of this project. The Nelson Sloan Quarry Restoration Project offers a great opportunity for development of TRNERR partnerships, as it will allow for a cost-effective location for the placement of sediment dredged from flood control channels, retention basins, and restoration projects in the river valley. These management actions are shared across city, county, state, and federal entities in the Tijuana River Valley; development of a shared-use agreement will require close partnership and collaborative efforts. During this reporting period, significant advances in partnership development were centered around a multi-agency meeting on January 11, and public/agency site visit as part of the TRNERR Trails Committee meeting on June 4, and collaboration with the USFWS regulatory office.

The Reserve Manager continued work with CA State Parks law enforcement to respond to a growing interest in public demonstrations on the International Border.

The Reserve Manager worked with the Assistant Reserve Manager and TRNERR core staff to support the quarterly TRNERR Advisory Council meetings. During this award period, advisory council meetings were held on February 5 and May 7. Presentations included:

1. Goat Canyon Sediment Basin Study- Dr. Trent Biggs, SDSU Geography, provided an overview of accomplishments from the EPA Study and ongoing work.
2. Plans for Tijuana River main channel infrastructure.
 - a. Dawi Dakhil, IBWC, shared an update on the feasibility study for sediment basins
 - b. Patrick Martin, SD Surfrider, presented Surfrider's plan for sediment, trash and solid
3. Nelson Sloan Quarry- Lorena Warner-Lara, TRNERR, updated the group on the Nelson Sloan Quarry Restoration Project
4. Tijuana Estuary Tidal Restoration Program (TETRP)- Dr. Jeff Crooks, TRNERR, provided an update on TETRP

The Reserve Manager delivered a presentation to San Diego City Council, Environmental Subcommittee, on February 14, providing an overview of the TRNERR program and additional details related to cross-border pollution control.

The Reserve Manager supported the quarterly International Boundary and Waterway Citizen Forum meetings at the Tijuana Estuary.

The Reserve Manager worked with State Parks staff to welcome Dr. Doug George, newly hired coastal specialist for CA State Parks. Doug will be based out of Sacramento and will support coastal management programs for the Department- we are excited to connect him with the NERRS.

The Reserve Manager welcomed the CA State Water Quality Control Board of Directors at Border Field State Park, and provided a brief overview of the TRNERR role in managing water quality and controlling pollution.

The Reserve Manager worked with the Coastal Training Program to support a semester-long University of San Diego class in Industrial Hygiene/Engineering with focus on the Goat Canyon Sediment Basins- increasing efficiency of operation. The program is hoped to develop into a consistent university offering.

The Reserve Manager and TRNERR Program Managers welcomed NOAA West Coast Director Becky Smyth to TRNERR on March 25.

The Reserve Manager continued efforts to connect the Reserve program with the California-Mexico Border Relations Council, and Cal EPA. During this reporting period, the Reserve Manager delivered a presentation to on TRNERR activities at the March 27 council hearing in San Diego, when the Council welcomed new CalEPA Director Jared Blumenfeld.

The Reserve Manager and Assistant Reserve Manager collaborated with Doug Gibson, Director of the San Elijo Lagoon Conservancy, to initiate greater information exchange related to lessons learned with the San Elijo Lagoon restoration project.

5. Oversight of Reserve Facilities and Public Access Opportunities

The Reserve Manager continued collaboration with the CA State Parks design office (Southern Service Center) State Park leadership, and CA Coastal Commission to further plans for repairs to Monument Road- the primary vehicular access road through the Reserve. The Project is in the preliminary planning phase.

The Reserve Manager worked with the TRNERR Stewardship Associate and the CA State Parks maintenance program to continue maintenance and improvements to Reserve signage focused on flooding issues on the Reserve access roads and trails.

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

The Reserve Manager worked with CA State Parks Maintenance Chief and CA State Parks Administration staff to hire a new Park Maintenance Supervisor that will address maintenance needs for the region. Please welcome Park Maintenance Supervisor Enrique Mendibles. Enrique comes to us with a long history of State Park maintenance experience from San Diego Coast out to the Cuyamaca, and has over three years of direct experience working with TRNERR.

The Reserve Manager worked with CA State Parks Maintenance Chief and CA State Parks Administration staff to hire a new Park Maintenance worker that will address maintenance needs for the region. Please welcome Park Maintenance Worker Felipe Coronado. Felipe comes to us with a history of State Park maintenance experience from San Diego Coast, and has over two years of direct experience working with TRNERR.

The Reserve Manager worked with CA State Parks Administration to rehire seasonal Park Maintenance Aid Ricardo Nogales. Ricardo worked with TRNERR last season and returns this season to work on a year-round status with primary focus being TRNERR grounds.

TASK: EDUCATION PROGRAM

1. Development and Implementation of Education Programs

1. Formal and Non-formal Teacher Training

Reserve Education staff helped to train 19 State Park Interpreters at Skills for Interpreting to Children in January. We demonstrated our Explorers elementary program, reviewed best practices for teacher training, and let them know more about the NERRS.

Three elementary teachers attended Tijuana Estuary Explorers teacher training in March.

We trained 15 instructors from the YMCA Camp Surf in Imperial Beach so that they would know more about estuarine ecology and our operations.

The Reserve research coordinator and education staff trained 27 middle school and 10 high school teachers here in our training center on two separate occasions. The science coordinator from the San Diego Unified School District asked us to train their teachers on data literacy and phenomena-based instruction. This was the first time we did this sort of training. One of the science coordinators from the San Diego County Office of Education who collaborated with us for the Climate TOTE, Crystal Howe, joined us in this as the Data Literacy portion was similar to the content in the Climate TOTE.

2. Student-centered Formal and Informal programs

We had 14 elementary and 3 high school programs the first half of the year. Mueller Middle Charter School had to cancel their 4 field trips in late January due to rain. The constant of rain definitely resulted in lower than normal numbers.

The Education Coordinator presented the *Game of Futures* dice climate adaptation game to 25 students from the Sweetwater High School District's Sweetwater Showcase in May. This game has students guess what the sea level and wave impacts will be on their coastal property and then the dice determines the actual impact.

Junior Rangers have been averaging five students a week but we had up to 11 some weeks.

3. Volunteer Capacity Building

The education and volunteer staff trained 13 docents and volunteers in the two day Information Ambassador training in April. Docents need to continue their training with other elements including the self-guided modules. The EC conducted one interpretive tour training for four docents.

4. Interpretation and Community Education

We had a huge turnout, 90 people, at the annual King Tide Hike on Martin Luther King Day (January 21). It might have been because there had been large waves over washing the berm at the end of Seacoast Drive in the weeks prior to the tour. Most of the content of this tour is about the Sentinel Site monitoring.

Education and research staff and docents worked at the **San Diego Science Expo** at Petco Park on March 2 where we had a mudflat invertebrate core sample activity, salt marsh superheroes, and plant diorama. Post doc Kellie Uyeda also developed a fishing activity for the toddlers in attendance and they loved it. Over 710 people came by our booth and children enjoyed all of our activities.

Thirty people participated in a *Border Bioblitz* on March 2 which was a program initiated by San Diego State University professors and supported by the stewardship staff.

San Diego was a part of the international City Nature Challenge *iNaturalist* bioblitz the weekend of April 26-29. The Reserve was one of the sites hosting the Nature Challenge. Staff helped people capture species using *iNaturalist* on trails on the April 27 from 10:00am -1:00pm and the Nature Walk docent encouraged their attendees to capture photos during their tour the same day.

The Reserve, with Reserve Manager and the Education Coordinator, was the only outside Border Patrol entity at the *Bring Your Child to Work Day* in April with over 100 children and agents. This was the first time we were invited.

On Saturday, March 23, 63 guests joined us to celebrate this year's World Migratory Bird Day at the South Bay National Wildlife Refuge with our FWS partners. The City College Chapter of Audubon volunteered at each activity. Participants experienced people banding, habitat restoration, bird related crafts, how to make a sound map by listening to bird calls, and viewing birds with spotting scope.

Topics at the Speaker Series included *Animal Tracking*, *Coastal Pollution*, and *Beach Replenishment*. The last two programs were especially popular because they are very relevant locally.

5. Visitor Services

We had 4,823 visitors come to the Visitor Center from January to June. The attendance at the Visitor Center in 2018 was 900 less than the year before and the first half of 2019 was 496 less than last year. Perhaps the big rain year and the continuous coverage of sewage crossing the border from Mexico resulted in lower numbers. The Interpretive Master Plan off-site surveys that will be conducted in the summer of 2019 may shed light on this factor.

2. Production of Outreach Materials

The education staff produced an e-newsletter every month of this period including highlighting volunteers and other special events and accomplishments.

TASK: COASTAL TRAINING PROGRAM

1. Continue to deliver training and technical assistance to decision-makers on issues related to marine debris

During this reporting period, CTP staff has increased participation in a binational dialogue to identify joint cooperative opportunities on transboundary issues in the Tijuana River Watershed (TRW), focusing on solid waste, water quality and sediment in accordance with the Minute 320's general framework. CTP has also implemented jointly identified cooperative measures and strategies to ensure bidirectional communication during the planning and implementation stages.

In its role on the Los Sauces Council Board (includes representation of Mexican agencies, NGOs, academia and private sector), CTP is providing technical assistance with strategic/action planning and facilitating access to environmental and geographic data to support the Board's efforts.

CTP staff conducted regular meetings with government agencies in Tijuana that make decisions related to the TRW, organized and conducted tours and field experiences in the watershed and represented TRNERR's binational interests at meetings and speaking engagements in both sections of the watershed. In this reporting period, a topic of great interest to decision-makers continues to be environmental impacts of plastic pollution and plastic bag regulations, particularly among the municipality of Tecate, Baja California (in learning from advances made in the municipality of Tijuana).

2. Analyze data from training needs assessment to underserved decision-maker audiences and deliver first training

As outlined in the previous progress report, needs assessment participants indicated their interest in receiving training in areas of climate change science, communication, vulnerability assessments, planning for climate change and adaptation strategies and implementation. Detailed data from the needs assessment can be accessed [here](#).

Due to the results of the needs assessment, it was determined that the first training will be related to green infrastructure. In this reporting period, CTP has coordinated with NOAA's Office for Coastal Management Learning Services division to secure their training. As the local host, CTP has provided the trainer with local resources and materials and has participated in designing a tailored delivery for the intended audience. Due to a municipal and state political transition, the training is scheduled for February 2020 to maximize impact among new staff and decision-makers. Additionally, in order to engage the new government representatives, CTP will update the contact information database for audience identification.

3. Continue to provide technical assistance to the TETRP Science Advisory Team

CTP has been partnering with TRNERR's Research Program to deliver a Tijuana Estuary Research Symposium in August 2019. NOAA's NCCOS has funded three projects at the Reserve: (1) SedRISE; (2) Marshes on the Margin (MOM); and (3) Coastal Hypoxia Research Project (CHRP). These projects are relevant to the TETRP Science Advisory Team (SAT) as they inform efforts related to TETRP. Thus, the objectives of the symposium include:

1. NCCOS project teams and advisors/TRNERR stakeholders (including the SAT):
 - receive updates on research underway;
 - better understand TRNERR's primary management needs; and
 - continue to inform NCCOS projects and explore opportunities for collaboration
2. Advance the concept of triggers, and identify key variables (indicators) to track
3. Develop research needs that can be used to inform TRNERR Research Program, including new Davidson Fellowship

CTP has provided technical assistance in developing the process agenda for the symposium and will facilitate the event. A tour for elected officials will follow in coordination with NCCOS and OCM staff.

4. Continue to provide strategic CTP technical assistance and workshop/training

CTP delivered training (see performance-monitoring database) and technical assistance this reporting period. Of note, there were a number of presentations at the National Adaptation Forum (April 2019) by CTP staff, including a training session on psychosocial resilience among environmental professionals, related to the Adaptive Mind Project.

CTP continues to serve on the California Integrated Regional Water Management Disadvantaged Community project team that is focusing on the water capture and re-use opportunities in the City of Imperial Beach and within Reserve boundaries. The CTP Coordinator also serves on the public health Advisory Committee for this project, as well as

the NERRA and NERRS Science Collaborative boards. In March, CTP Coordinator attended the NERRA Board Meeting in Washington, D.C. There, the CTP Coordinator also participated in the National Socio-Environmental Synthesis Center (SESYNC) [pursuit](#), “Advancing the Science of Knowledge Use” and a resulting publication in currently in review.

TASK: STEWARDSHIP PROGRAM

1. Goat Canyon Sediment Basins are maintained

The 2019 State contract for maintenance of the Goat Sediment Basin was awarded to Engineering/Remediation Resources Group, Inc. (ERRG). Work will begin this August/September to excavate 20,000 cubic yards of deposition material from the basins, and haul 25,000 cubic yards of material off-site.

2. Sensitive plant and animal species habitat protected

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

3. Critical monitoring needs identified to maintain habitat health and monitor

The Stewardship Program facilitated continued monitoring of California gnatcatcher, least Bell’s vireo, California least tern, and Western snowy plover in the Reserve. The State contract for California gnatcatcher and least Bell’s vireo surveys were awarded to Blackhawk Environmental for the 2019 survey season. Regular plover and tern monitoring began in March 2019 and will continue until September 2019. 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

Stewardship staff participated in CSP’s Early Detection Rapid Response and Management Unit Inspections during spring 2019. Staff surveyed the trails at Border Field State Park for priority weed species and created maps to guide management decisions.

Projects to capture and remove debris from high priority land-based hot spots before it enters the Tijuana Estuary and Pacific Ocean is funded through the FY18 Community Based Marine Debris Removal Grant (NOAA Marine Debris Program). Through this grant clean-up of marine debris within and adjacent to the Tijuana River NERR is accomplished through management of the Goat Canyon Sediment Basin and associated debris capture infrastructure, and through community-based clean-up efforts planned with Tijuana River Action Month (TRAM). Building off the success and lessons learned from trash boom clean-out implemented by our 2014 NOAA Marine Debris award, and trash boom improvements implemented with our 2016 NOAA Marine Debris award, CSP will continue system maintenance and improvement to increase trash capture efficiency.

Stewardship staff assisted the Reserve Manager with creating a solid waste clean out and trash characterization study from behind the Upper Trash Boom in Goat Canyon Sediment Basin in order to quantify, sort and recycle material to the extent possible. A contractor will provide labor, equipment and supplies to sort solid waste by resin code, remove, and recycle from the Trash Removal Zone. Work will begin in August 2019. Stewardship staff also coordinated Tijuana River Action Network meetings with various land managers and

public stakeholder groups in May through July. Members met for monthly updates about projects in the River Valley and to coordinate Tijuana River Action Month (TRAM). TRAM is a month long community-based clean-up and outreach event within and adjacent to the Tijuana River NERR. It will run from September 14 - October 5 this year.

5. Identify public access and safety issues within the Reserve

TRNERR Advisory Council and Trail Committee meetings were held with various land managers and public stakeholder groups to gain consensus on the public trail system in the Tijuana River Valley, including Border Field State Park and the Tijuana River NERR.

Stewardship staff worked with Reserve Manager, TRNERR staff, San Diego County Department of Environmental Health, and CSP Health and Safety Officer to implement additional interpretive signs related to access and safety issues within the Reserve.

TASK: INVASIVES

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

CSP staff member, Greg Abbott, treated 418 colonies of ice plant (*Carpobrotus edulis*) throughout the dune systems at Border Field State Park. This compares to 2018 when there were too many colonies to count, 375 colonies treated in 2017, 310 colonies treated in 2016, 500 individuals treated in 2015, 886 ice plant individuals treated in 2014 and 1,600 in 2013. The work was completed on two different dates in January using a glyphosate-based nonselective herbicide.

2. High Quality Habitat for Riparian Birds

CSP staff members, Greg Abbott and Bronti Patterson, primarily treated castor bean (*Ricinus communis*) and giant reed (*Arundo donax*) throughout the Goat Canyon drainage this period. Roundup Pro Concentrate, a post-emergent, broad-spectrum herbicide, was used. Annual weeds were hand-pulled around native plantings: Russian thistle (*Salol tragus*), crystalline iceplant (*Mesembryanthemum crystallinum*), mustard (*Brassica nigra*), globe daisy (*Glebionis coronaria*) and stinging nettle (*Urtica urens*).

TASK: TEACHERS ON THE ESTUARY

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.

Five high school and two middle school educators attended the two-day *Teachers on the Estuary* (TOTE) Training on May 16-17, 2019. The purpose of the training is to make educators familiar with National Estuarine Research Reserve educational resources and experience, in the field, what the Reserve biologists and ecologists do every day. The training is co-led by the Education and Research Coordinators. Other staff from research, coastal training program, and education also led sessions. Teachers from both the Sweetwater and San Diego Unified Districts attended the training.

TASK: COMPREHENSIVE MANAGEMENT PLAN

1. Reserve Updates Comprehensive Management Plan

Assistant Reserve Manager and CTP worked together to facilitate CMP staff leads to finalize a draft of the CMP's Strategic Plan for distribution to the TRNERR Advisory Council and NOAA Program Liaison. A retreat is scheduled for August for lead authors to share progress, discuss status, and develop an implementation plan for completion of the remaining chapters.

TASK: RESEARCH: COORDINATION AND IMPLEMENTATION

1. Research by TRNERR staff increases local knowledge

The Reserve's research program continues to advance our basic ecological understanding of the Reserve's ecosystems, as well as combining sound science with management. As part of this, we are facilitating and participating in a number of collaborative activities supported by external funding. In order to ensure that this research at the Reserve informs management, we are planning a workshop to bring together local stakeholders and the project teams from a number of large research projects. Attending this meeting will be representatives of:

- NCCOS – given their funding of two Ecological Effects of Sea Level Rise (EESLR) and one Coastal Hypoxia Research Program (CHRP) projects
- SedRISE, looking at changing patterns of sedimentation, led by UC Irvine
- Marshes on the Margins, which is developing modelling approaches for anticipating changes in coastal wetlands, led by the California Coastal Conservancy
- Causes and Consequences of Hypoxia in Low-Inflow Estuaries, led by Scripps
- Dune Restoration at Border Field State Park, funded by USC Sea Grant and Ocean Protection Council

In order to maintain connections with local universities, Jeff maintains Adjunct status at both Scripps (University of California San Diego) and the University of San Diego (USD). Jeff is currently advising 3 graduate students at USD.

2. TETRP offers opportunities for coupled science / management

We have selected a consulting firm (AECOM) to prepare the environmental documents for TETRP. The Research program is working with this firm to provide information necessary for these documents, including habitat maps and results of species surveys and monitoring.

Also, as part of the TETRP pre-restoration monitoring, we are maintaining a YSI datalogger at the restoration site (although it is not yet part of our formal SWMP). We also conduct bi-monthly minnow trapping, and are beginning to plan for the fall sampling.

3. Understanding restoration success at the South Bay Salt Ponds

Initial planning is underway for Year 8 post-restoration monitoring of the South San Diego Bay salt ponds. We also continue to monitor fish and invertebrates at the site with minnow traps (bi-monthly).

4. TRNERR is used as a reference site

Annual reference site monitoring associated with the San Dieguito Lagoon restoration (part of San Onofre Nuclear Generating Station mitigation) will occur in the fall.

5. Research informs climate resilience understanding, adaptation and monitoring

We continue to explore biotic responses to the remarkably warm waters that have been present in Southern California for the last several years. We have recently published a paper on responses to this marine heatwave, in collaboration with colleagues at the Monterey Bay NMS and Elkhorn Slough NERR. This work highlights the value of long-term monitoring programs at these sites. The reference is:

Lonhart, SI, R Jeppesen, R Beas-Luna, JA Crooks, and J Lorda. 2019. Shifts in the distribution and abundance of coastal marine species along the eastern Pacific Ocean during marine heatwaves from 2013-2018. Marine Biodiversity Records 12:13.

We also continue work with the Batiquitos Lagoon Foundation and California Department of Fish and Wildlife to do scenario planning for that northern San Diego County Lagoon (with separate funding). We are preparing a final report from this, building off lessons at TRNERR and CURRV.

6. The Reserve offers attractive opportunities for researchers

A number of research projects by a variety of researchers are underway in the Reserve. Some newer work includes:

- Study of microbiology and chemical compounds in coastal water and aerosols (Scripps)
- Habitat suitability for potential re-introduction of the Endangered Pacific Pocket Mouse to the Tijuana River Valley (USGS and San Diego Zoo)
- Sampling of sediments associated with Goat Canyon storm flows (SDSU)
- Characterization of changes in the Tijuana Estuary over the Holocene, using sediment cores (Scripps, Dennis Gallegos)
- Water quality in Southern California during south swell events (Southern California Coastal Water Research Project)
- Assessment of endocrine-disrupting compounds in the Tijuana Estuary (SDSU Dept of Public Health)
- Microbiology of transboundary flows (SDSU Dept of Public Health)

7. Communication of key research findings to broad audiences

Jeff presented research results in a variety of venues over the reporting period. These included:

- UCLA Wetlands Symposium
- Field trip and radio interview for Minnesota Public Radio station
- Field trip for USFWS Aquatic Invasive Species Coordinators
- Field trip for students at the Center for American Progress
- Field trip for students at the New York International House
- Field trip for State Parks Oceanography Program and Scripps

8. Ensure TRNERR representation in regional science-driven management efforts

Jeff represented the Tijuana River NERR in the following regional efforts during this time period:

- Tijuana River Valley Recovery Team
- City of San Diego's Wetlands Advisory Board
- San Diego Bay Living Shorelines / Native Oyster Restoration Project (Port of San Diego and State Coastal Conservancy)

9. Reporting and Database Entry

Research projects are updated in the database on an ongoing basis.

TASK: IMPLEMENTATION OF SWMP

1. High quality meteorological and water quality data

SWIA and TRNERR leverage partnerships to operate a monitoring program that address issues relevant to the Reserve and region. Our partners and funders include California State Parks, USFWS, State Coastal Conservancy, and Los Peñasquitos Lagoon Foundation. We maintain two official SWMP stations in the Tijuana River Estuary and two in South San Diego Bay. We also maintain three telemetered sites in Los Peñasquitos Lagoon, and one non-telemetered site associated with TETRP, which are being operated in accordance with SWMP protocols.

The Research Coordinator also serves as Chair of SWMP Oversight Committee, and attended the CDMO Data Management Committee meeting in January.

2. Understanding of long-term vegetation dynamics

Our GIS staff are preparing vegetation maps and assessing long-term changes in vegetation in both Tijuana Estuary and Los Peñasquitos Lagoon. We were scheduled to do another round of RTK elevations on the vegetation transects, but because of the government shutdown shipping of the NERRS RTK equipment was delayed until after our sampling window closed (due to the bird nesting season). In the interim, we have been working with California State Parks, who were able to purchase an RTK unit for our use. We are currently working on getting the license to operate the radio associated with this.

3. Integration of monitoring with education and outreach programming

We conducted a two-day TOTE training in the spring, and SWMP data form the core of the curricular elements for this. We conducted two additional teacher trainings / professional development opportunities that utilized SWMP data.

TASK: PROFESSIONAL DEVELOPMENT, TRAINING, PRESENTING

1. NERRs Integration and Leadership Development

This activity did not occur during this reporting period.

2. Staff development

This activity did not occur during this reporting period.

3. CZMA Integration and Leadership Development

This activity did not occur during this reporting period.

4. TRNERR Staff Program Support and Enhancement

Travel to local meetings and field locations were supported.

TASK: INVASIVE SPECIES - APPLICATION OF RESEARCH TO MANAGEMENT

1. Improved understanding and management of local invaders

Japanese oysters (*Crassostrea gigas*) continue to be an important component of intertidal assemblages throughout San Diego. One USD student, advised by Jeff, worked on the demography of the invasive oyster, comparing it to that of the native oyster. That student did his thesis defense in May, and is finalizing his thesis. We will be preparing a publication on that work in the near future.

Jeff also has a new student starting up at USD, who will be examining the invasion of the horn snail, *Batillaria attramentaria*, in the Tijuana Estuary. This snail is increasing in abundance in the estuary, and appears to be outcompeting the native horn shell snail.

We also continue to support work on the invasion of the Kuroshio shot hole borer in the Tijuana River Valley, including mapping extent of impact. We also are using vegetation mapping to identify heavily-invaded areas to target for restoration (e.g., in TETRP).

2. Improved regional, national, and international information sharing

Jeff is the Co-President of the Society for the Study of Marine Bioinvasions, and has begun planning for the next meeting, in 2021, to be held the Washington, D.C. area. As noted earlier, Jeff also hosted a visit from Invasive Species Coordinators from the USFWS.

TASK: MANAGEMENT PLAN UPDATE (RESEARCH)

1. Management Plan Update

The Management Plan is moving forward, and are completing the draft of the Strategic Plan and continuing to develop the individual chapters.