

Final Evaluation Findings

Elkhorn Slough
National Estuarine Research Reserve

July 2010 to July 2019

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Summary of Key Findings

The Coastal Zone Management Act requires the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic evaluations of the performance of states and territories with federally approved national estuarine research reserves. This evaluation conducted by the Office for Coastal Management examined the operation and management of the Elkhorn Slough National Estuarine Research Reserve for the period from July 2010 to July 2019. The evaluation focused on three target areas: restoration, community engagement, and program administration. The four sectors addressed by all of the national estuarine research reserves are research, training, education, and stewardship.

The findings in this evaluation document will be considered by the NOAA Office for Coastal Management in making future financial award decisions concerning the coastal program. The evaluation came to these conclusions:

Accomplishment: The Elkhorn Slough National Estuarine Research Reserve designed the large-scale Hester Marsh restoration project, completed the 66-acre phase 1, and raised funding to restore another 61 acres in phase 2. This project serves as an adaptation strategy to address projected sea level rise issues, restores wildlife habitat, and is doing ground-breaking research on the value of coastal wetlands and carbon sequestration. In addition, the reserve has become a valuable learning site for educators and students and a place for many to gain important field experience.

Accomplishment: The Elkhorn Slough Reserve has successfully partnered with local organizations to provide both formal and informal education opportunities for all levels for students.

Accomplishment: The Elkhorn Slough Reserve has revitalized its volunteer program to include a dedicated group of volunteers who provided much-needed support on the restoration and education programs.

Accomplishment: The Elkhorn Slough Reserve has worked closely with partners to plan for and execute projects within the reserve. The reserve has successfully leveraged the California Department of Fish and Wildlife and NOAA's investments with Elkhorn Slough Foundation funds and other grant awards to bring in several million dollars worth of private, state, and other federal funding over the period covered by this evaluation.

Accomplishment: The Elkhorn Slough Reserve has made many facilities improvements that have helped to increase the visibility of the reserve and improve its ability to better serve their constituents.

Accomplishment: Staff members of the Elkhorn Slough Reserve have sought out and taken leadership positions within various sectors of the National Estuarine Research Reserve System. Their engagement and leadership within their sectors have helped to move important national and system-wide initiatives forward and have contributed to the strength of the system as a whole.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve explore ways to document the process and methods used in the Hester Marsh restoration project. The lessons learned in developing and implementing this project could be valuable learning for others looking to do similar work.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve explore shoreline erosion issues and possible restoration activities in the Moss Landing Wildlife Area.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve look into the need for and feasibility of developing additional Spanish language materials in the visitor center and other programming at the reserve.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve complete the Coastal Training Program strategy as part of its management plan update.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve explore ways to streamline grant management functions to eliminate delays in billing and reimbursement.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve assess administrative and facility needs, including current staffing and future succession planning, to determine whether staffing capacity is sufficient.

Necessary Action: The Elkhorn Slough Reserve must submit final comments on its draft management plan to the NOAA Office for Coastal Management by June 30, 2020.

Conclusion: This evaluation finds that the State of California's Department of Fish and Wildlife is adhering to the requirements of section 312(a) of the Coastal Zone Management Act, 16 U.S.C. § 1458(a), in the operation of the Elkhorn Slough National Estuarine Research Reserve.

Program Review Procedures

The NOAA Office for Coastal Management evaluated the Elkhorn Slough National Estuarine Research Reserve in fiscal year 2019. The evaluation team consisted of Jean Tanimoto, evaluation team lead, Elaine Vaudreuil, site liaison, and Sarah van der Schalie, coastal management specialist, all from the NOAA Office for Coastal Management; and Chris Peregrin, manager, Tijuana River Research Reserve, California. The support of the Elkhorn Slough Research Reserve staff members was crucial in conducting the evaluation, and their support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to Mr. Stafford Lehr, Deputy Director, Wildlife and Fisheries Division, of the California Department of Fish and Wildlife on April 12, 2019, and published a notice of intent to evaluate the Elkhorn Slough Reserve in the *Federal Register* on May 24, 2019. The Elkhorn Slough Reserve posted a notice of the public meeting and an opportunity to comment in the *Santa Cruz Sentinel* on October 30, 2019.

The evaluation process included a review of relevant documents and a survey of stakeholders, which helped identify three target areas for the evaluation: restoration, community engagement, and program administration. A site visit was conducted from July 14 through 17, 2019, where the evaluation team held group discussions with stakeholders and program staff members. The evaluation team also discussed the target areas with reserve staff members who helped identify issues and workable solutions to maintain and improve the implementation of the reserve's programs. In addition, a public meeting was held on Wednesday, July 17, 2019, at 6:00 p.m. local time at the Castroville Branch Library, 11160 Speegle Street, Castroville, CA 95012, to provide an opportunity for members of the public to express their opinions about the implementation of the reserve programs.

Stakeholders and members of the public were also given the opportunity to provide written comments via email or U.S. mail through Friday, July 26, 2019. Three email comments were received from the public or interested parties, which are summarized in Appendix A.

Final evaluation findings for all national estuarine research reserves highlight the reserve's accomplishments in the target areas and include recommendations that are of two types:

Necessary Actions address programmatic requirements of the implementing regulations of the Coastal Zone Management Act and of the reserve's management plan approved by NOAA. These must be carried out by the dates specified. Failure to address necessary actions may result in a future finding of non-adherence and the invoking of interim sanctions, as specified in the Coastal Zone Management Act §312(c).

Recommendations are actions that the office believes would improve the program, but which are not mandatory. The reserve is expected to have considered the recommendations by the time of the next evaluation or by the dates specified.

Evaluation Findings

Target Area: Restoration

Restoration work and restoration science makes up a lot of the stewardship and research initiatives undertaken at the Elkhorn Slough Reserve. Historical changes that have affected the wetlands and hydrology, effects of sea level rise on the quality of existing wetlands, and the impact of non-native species, among other things, make restoration within the reserve a critical task. This target area discusses the restoration work and the research and community engagement around it.

Examples of Key Restoration Efforts

Elkhorn Slough Reserve has undertaken several restoration projects during the evaluation period. The goals of these projects were varied, but included the following: creating resilience to future sea level rise scenarios, habitat restoration, reducing tidal scour, understanding the role of salt marshes and carbon sequestration, and improving water quality filtering. Through this work, the Elkhorn Slough Reserve staff worked closely with partners and the community to develop restoration plans that included ambitious restoration work and rigorous scientific research. The plans incorporated input from all sectors of the reserve and looked to address both immediate and long-term issues. These projects also provided opportunities for hundreds of undergraduates and graduate students from nearby colleges and universities to gain valuable field experience, as well as for volunteers from the community to participate in activities. The reach of many of these projects has already been felt well beyond the site boundaries with several partners mentioning at the evaluation site visit that the work being done at the reserve will serve as a model for other large-scale restoration projects looking to create adaptation strategies to address sea level rise issues. The reserve's combination of land management and scientific research can also provide valuable resource information for other ecological reserves within the California Department of Fish and Wildlife in the management of their land resources.

The largest of the projects at the reserve is the Hester Marsh restoration. Although the Elkhorn Slough Reserve has extensive salt marshes, without restoration, sea level rise models predict that those salt marshes could be under water within 50 years. The Elkhorn Slough Reserve's Tidal Wetlands Program designed a project that would raise the level of former salt marsh in an effort to allow marsh plants to return, create wildlife habitat, and mitigate the impacts of projected sea level rise. The overall project will cover over 100 acres of salt marsh when completed. The initial phase has already completed 61 acres of marsh restoration and another 5 acres of transition zone and upland buffer.

The Hester Marsh project is also looking at the important question of how effective salt marshes are in sequestering carbon. Results of this work could impact the justification for and methods of coastal marsh recovery activities. A restoration project of this size with a commitment to long-term research and monitoring affords the reserve the opportunity to continue to not only learn lessons applicable to this site, but also to serve as a place for others undertaking similar projects to learn.

This project was a tremendous undertaking that incorporated input from more than 100 scientific advisors, environmental regulators, and community members. It also drew on all sectors of the reserve—stewardship, training, education, and administration—to develop plans for, file for, and receive permits, and begin implementation. Several evaluation site-visit focus group participants commented on both the thorough and inclusive nature of the planning for this project during the site

visit. NOAA recommends that the reserve consider documenting and sharing lessons learned from both the design and implementation of this project with others.

Before any soil got moved to begin the restoration project, the Elkhorn Slough Reserve staff did extensive research to determine the amount of soil needed to raise the salt marshes, necessary mitigation techniques to keep the soil free of invasive plants and contained in the appropriate places, and the plants they wanted to use to replant and repopulate the area. The staff conducted several scientific panels and input sessions to gather the information necessary to make those determinations. They also undertook a huge effort of growing a majority of the native plants used in the project. Partnering with the Elkhorn Slough Foundation, the staff grew and harvested grass seed on adjacent land owned as part of the foundation's land trust. Staff members and volunteers cultivated those seeds and other plants in the onsite nursery. Using heavy machinery, the marsh was filled in using soil available within the reserve, with carefully designed channels to let the tide carry water and pickle weed seeds to reestablish the marsh vegetation. Staff, partners, and community members were involved in a massive effort to replant five acres of grassland transition zone following a detailed planting scheme with many different experimental treatments meant to understand the best practices that can be used in the future. Ongoing monitoring of the project is happening as the reserve gets ready to implement phase 2 of the project, another 61 acres of restoration.

In addition, the Hester Marsh project is also looking into questions related to sea otter habitat. The Elkhorn Slough supports the highest density of Southern sea otters in California. The Hester Marsh area has been identified as important habitat for sea otter foraging and refuge. The restoration will double the available salt marsh area in the slough where mothers and pups spend much of their time.

Other restoration projects undertaken at the reserve include invasive species removal and oyster restoration. The reserve staff worked with partners to remove about 13 acres of non-native eucalyptus trees. The removal of these trees allows for space for native trees and plants to return to the area, creating habitat for sensitive species, and greatly enhances the view plane to be enjoyed by visitors and school groups. Reserve staff members are also doing experiments with bio char created from the trees in the Hester Marsh project, trying to determine whether adding it to the planting areas helps with native plant growth. This is a good example of how the reserve works across sectors to leverage expertise and enhance projects across the site.

Within the reserve, the native Olympia oyster reached the point of reproductive failure in 2012. Since then, reserve staff members have been working to understand the reasons for this and methods for restoring oyster habitat in an effort to increase the oyster population in the slough. The community also had a hand in contributing to this effort by participating in a volunteer day when site staff members led over a hundred volunteers in transplanting cultivated oysters in the restoration site. This effort has also led to the development of a native Olympia oyster collaborative, including participants from British Columbia in Canada down through California. This network of practitioners and researchers regularly shares information and best practices.

Moving forward, the reserve intends to implement phase 2 of the Hester Marsh restoration. Funding for this phase has already been secured and the reserve is in the process of finalizing permitting for the work.

During the evaluation site visit, there also was some discussion about future restoration work that might be possible within the site or adjacent lands. The Moss Landing Wildlife Area that sits on the north side of the slough was identified as a potential area to look at for shoreline erosion issues and restoration.

/Taking on additional responsibilities would allow Elkhorn Slough to expand its restoration work and manage the land, applying scientifically rigorous processes. The reserve should be mindful of taking on additional responsibilities in a resource-limited environment. The property is currently managed by the California Department of Fish and Wildlife.

Accomplishment: The Elkhorn Slough National Estuarine Research Reserve designed the large-scale Hester Marsh restoration project, completed the 66-acre phase 1, and raised funding to restore another 61 acres in phase 2. This project serves as an adaptation strategy to address projected sea level rise issues, restores wildlife habitat, and is doing ground-breaking research on the value of coastal wetlands and carbon sequestration. In addition, the reserve has become a valuable learning site for educators and students and a place for many to gain important field experience.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve explore ways to document the process and methods used in the Hester Marsh restoration project. The lessons learned in developing and implementing this project could be valuable learning for others looking to do similar work.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve explore shoreline erosion issues and possible restoration activities in the Moss Landing Wildlife Area.

Target Area: Community Engagement

The Elkhorn Slough Reserve does a considerable amount of community engagement. This comes in the form of formal and informal education programming, training, and working with volunteers and visitors at the reserve. This target area focuses on many of these aspects of the reserve's work.

Key Findings Related to Community Engagement

Integral to the mission of the Elkhorn Slough Reserve is communicating science and sharing experiences beyond the reserve boundary. Comments received from the evaluation survey as well from the evaluation site-visit focus groups revealed that one of the major strengths of the reserve is its ability to reach out and partner with many different communities, including academic, education, local volunteers, and other agencies and nonprofits. The reserve welcomes more than 30,000 visitors to the site each year and hosts a number of school groups and coastal training program trainings throughout the year. This engagement has opened up the reserve to local students and teachers, allowing them hands-on, experiential learning opportunities. The training and convening role that the reserve also plays brings together varied audiences to learn from and network with each other. Both the education and training programs at the reserve benefit from a strong research and stewardship program from which to draw information to develop into activities and curriculum. Many participants in the evaluation site-visit focus groups commented on the exceptional science being done at the reserve and the cross-sector approach to using that science to enhance the education and training programs.

The education program at the Elkhorn Slough Reserve works with over 8,000 K-12 students and teachers each year. It also provides a learning opportunity for over 400 college students a year to do research and gain field experience. The reserve does all of this with a relatively small staff and a group of dedicated volunteers. The staff and volunteers at the site work together to welcome students to the site to

participate in various programs, learning labs, and interpretive trails walks. The reserve is also a host to other partners that organize and implement their educational programs either in part or in whole at the reserve. The Elkhorn Slough Reserve has done an exceptional job in reaching out to the surrounding school districts and underrepresented and underserved communities.

Two examples of the range of education programming that occurs at the Elkhorn Slough Reserve are the Estuary Explorers Club and the Watsonville Area Teens Conserving Habitats (WATCH) program run by the Monterey Bay Aquarium. In the Estuary Explorers Club, first through fifth grade students from nearby Elkhorn Elementary school visit the reserve once a week for four years. The students participate in experiential learning activities, native plant restoration, and exploration of the natural areas of the Elkhorn Slough Reserve. Over the course of their time in the program, students get exposure to different aspects of the work done at the reserve, on both the stewardship and research sides. The program has been a success, receiving the 2019 Superintendent's Award for Excellence in Museum Education. This award is a collaboration between the California Association of Museums and the Office of the State Superintendent of Public Instruction. The Estuary Explorers Club helps to foster a sense of "ownership" in the reserve and a conservation ethic that students can carry with them into their careers and lives.

The Watsonville Area Teens Conserving Habitats (WATCH) program is a partnership between the Monterey Bay Aquarium, which develops and implements the program, and the Elkhorn Slough Reserve, which serves as the field site at which the programming takes place. Over 45 students from the Pajaro Valley, Watsonville, and Aptos high schools participate each year in this year-long program and get to use the reserve as a place to engage in inquiry-based learning with scientists to learn about environmental issues in their community. They also participate in habitat restoration efforts within the reserve. Students work to develop a field-based research project. Once their project is completed, they receive a scholarship and community service hours needed to graduate. The participant from the Monterey Bay Aquarium who attended the site-visit focus group commented that this program would not be as successful as it is without the partnership with the Elkhorn Slough Reserve. The infrastructure, stability of the staff and funding, and access to high-quality science and research are critical to a successful program, and that is what they find in their partnership with the reserve.

In terms of adult education and general public engagement, the reserve has worked with partners to provide opportunities for adults to experience the reserve. Elkhorn Slough Reserve works with the Grower-Shipper Association Foundation on the AgKnowledge program. Each year, community members, industry representatives, and policy makers who are participating in the program visit the reserve as part of their learning about the complex stewardship issues within the Monterey County agriculture sector. This program is an example of the kind of interaction with the adult population that occurs at the reserve. Comments received in the site-visit focus areas did touch on the opportunity for more adult learning engagements. One recommendation for making these engagements more accessible and fulfilling is to look into some Spanish language materials for the visitor center. Many of the community members surrounding the reserve are Spanish speakers, and inclusive materials may help to draw more visitors to the site and provide a richer experience for Spanish speakers.

The Elkhorn Slough Reserve has worked hard to increase access to the reserve in other ways. Donations to the visitor center provide for small grants to schools to fund buses for field trips to the reserve. Each year, over 40,000 students visit the reserve through this funding. Most of the schools receiving these funds come from North Monterey County. In addition to getting students to the reserve, the reserve staff has made improvements to the interpretive trails to make them more accessible to those with physical mobility challenges and also developed new signage that allows for self-guided learning.

Of note with regard to the reserve's ability to support many of its community engagement programs is the dedicated volunteer program. The evaluation site-visit focus group included volunteers who spoke about the rich and varied experiences at the reserve. Several commented on their appreciation for the opportunity to engage with the reserve and its visitors. They also commented directly about the professionalism of the education staff and the level of support and encouragement they received from them. At the evaluation site-visit public meeting, approximately 30 people were present, most of whom were volunteers at the reserve. All comments received that evening were positive and reflected the sense of pride and ownership that these volunteers felt for the site.

The Coastal Training Program works to address critical coastal resource management issues by providing relevant scientific information and access to technologies and skill-building opportunities for coastal decision makers and resource managers. Target audiences for these trainings include federal, state, and local agency staff members, public and nongovernmental resource management staff members, and environmental consultants. The trainings cover a wide range of topics, including habitat restoration, climate change, water quality, sensitive species, rangeland management, and technical and professional skill building. Over the course of the evaluation period, the reserve held approximately 167 trainings or events and served over 44,000 participants. The Coastal Training Program serves participants in near proximity to the reserve but also serves a broader regional and statewide mandate to support environmental stewardship, and participants often span those distances. This wide reach not only allows the Elkhorn Slough Reserve to communicate scientific information beyond the reserve boundaries, but it also affords the reserve staff the opportunity to interact with and partner with many participants and organizations throughout the state.

Feedback from the evaluation site visit recognized the integrated way that reserve staff members work together to deliver information. Participants were appreciative of the fact that the latest science coming out of the reserve was incorporated into coastal training programming. They also commented on the fact that the Elkhorn Slough Reserve's Coastal Training Program was a valued and trusted source of information, especially concerning sensitive species.

In the prior evaluation period, the Coastal Training Program founded the Central Coast Rangeland Coalition. During this evaluation period, Elkhorn Slough Reserve has served as the administrative hub for this network of land management professionals, which held approximately 21 events since July of 2010 and has served over 1,500 participants. This network, made up largely of land managers, consultants, and ranchers, met at least twice yearly to discuss management needs, with an emphasis on data-driven presentations and discussions. The reserve recently transitioned this administrative responsibility in 2018 to another partner but continues its engagement with the group.

In 2018, the Coastal Training Program had a staff transition, with a new Coastal Training Program coordinator coming on board. Since then, the reserve has continued to update and offer previously developed workshops. It has also devoted time to refining and investing in current and new partnerships and programming. As part of that process, the Coastal Training Program has been updating its Coastal Training Program strategy as part of the reserve's management plan update. Moving forward, the reserve is looking to develop an environmental leadership academy. The vision for this project would be to take a multi-dimensional approach to major environmental issues in the Monterey Bay region. The goals of the program would be build knowledge, create networking opportunities, and allow for more holistic approaches to environmental problem-solving. Evaluation site-visit focus group participants expressed support for this idea and were eager to support and participate in it.

Accomplishment: The Elkhorn Slough Reserve has successfully partnered with local organizations to provide both formal and informal education opportunities for all levels for students.

Accomplishment: The Elkhorn Slough Reserve has revitalized its volunteer program to include a dedicated group of volunteers who provided much-needed support on the restoration and education programs.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve look into the need for and feasibility of developing additional Spanish language materials in the visitor center and other programming at the reserve.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve complete the Coastal Training Program strategy as part of its management plan update.

Target Area: Program Administration

The State of California Department of Fish and Wildlife, as the reserve's state lead agency, and the Elkhorn Slough Foundation work in close collaboration to plan for and execute the work that they do to operate the reserve. This creates both unique advantages and challenges in the way the site is able to operate. This target area includes administrative processes, staffing, and facilities accomplishments and challenges.

Key Findings related to Program Administration

The Elkhorn Slough Reserve operates as a close partnership between the California Department of Fish and Wildlife and the Elkhorn Slough Foundation, as well as the California State Coastal Conservancy. Much of the work at the site is accomplished by the strength and coordination of this partnership. This partnership works successfully to apply for and administer grant funding, hire and manage staff and project work within the site, and serve as additional administrative support when needed. All partners involved agreed that the partnership between the state and the foundation has allowed for more responsive administration action and allowed staff members of the reserve to more efficiently execute their programs.

One of the biggest benefits that the partners have identified is the ability to leverage private, state, and federal funds through various grant opportunities, leading to support for several staff positions and program funds. An example of this would be the successful Tidal Wetland Program, which conducts a lot of the restoration and restoration science functions of the site, and is funded through grants that the Elkhorn Slough Foundation administers. Overall, the Elkhorn Slough Research Reserve leverages NOAA's initial investment through annual National Estuarine Research Reserve System funds into several million dollars' worth of state, private, and other federal funds each year.

Over the course of the evaluation period, the site has made several facilities improvements that have had a positive impact on the way the staff members work and their ability to serve their constituents. They have also planned future upgrades to enhance programming at the site. Included in these upgrades are a new entry gate that has helped to raise the visibility of the site in the community and

visitors' ability to easily find the site. It has also raised the awareness of the site itself as a neighbor in the community, leading to increased interest and connections.

The reserve successfully competed for NOAA construction funds to improve visitor services at the reserve. At the time of the site visit, the staff was overseeing the building of a new, covered outdoor classroom and an enhanced interpretive trail. The outdoor classroom will allow the site to almost double its meeting space on site and provide a place for school groups and partners to gather for learning and exchange. The interpretive trail improvements provide an opportunity for visitors to experience different habitats within the site, including those with mobility challenges. It also includes new signage that highlights different features of the site.

In addition, the reserve site was able to successfully compete for state funding to do general improvements to the site, including replacing roofs on several buildings, adding a backup generator for the water system, and making levee and trail repairs for public safety and accessibility to the site's different habitats.

All of these improvements allow for a greater visitor experience and more effective use of the site for programming, as well as addressing public safety and continuity of operations concerns.

In addition to the facilities improvements, the partnership between the Elkhorn Slough Reserve and the Elkhorn Slough Foundation has provided many opportunities for the reserve to extend its reach beyond the boundaries of the site. In addition to supporting the Elkhorn Slough Reserve administratively, the Elkhorn Slough Foundation also serves as a nonprofit land trust and, as such, protects lands in the reserve's watershed. Recent acquisitions made, for example in the Sand Hill area surrounding the reserve, have had direct impacts on water quality and nonpoint source pollution concerns in the slough. The Elkhorn Slough Foundation was able to acquire the land upslope from the reserve, remove plastic weed covering from former strawberry fields, and restore vegetation to reduce sediment washing into the slough. Monitoring within the reserve following this restoration has shown a decrease in sediment and nutrients into the slough. The foundation is continually looking for ways to acquire and improve or maintain properties adjacent to the reserve to contribute to the stewardship and restoration goals of the site.

Finally, the Elkhorn Slough Reserve has been very active in the National Estuarine Research Reserve System, regularly taking leadership positions in sector working groups, including the Sentinel Site Working Group, water quality trainings, and education working groups. They also work on projects that have national relevance like marsh resilience assessment and thin-layer placement and oyster restoration research, which are multi-reserve National Science Collaborative projects. The reserve's regular engagement and leadership in the system has contributed greatly to the overall strength of the system.

As much as there are many successes within this target area, challenges also surfaced through the evaluation process. Among them were vulnerabilities related to fiscal administration of grants and other funding, site-support staffing, and administrative requirements, including an updated, approved management plan.

As mentioned previously, Elkhorn Slough Reserve works to develop and maintain partnerships as a means to accomplishing its goals. With regard to program administration, the main partnership consists of the California Department of Fish and Wildlife (the site's state host agency), the California Coastal

Conservancy, and the Elkhorn Slough Foundation. A memorandum of understanding outlines the financial relationship between these three entities regarding the application and administration of Coastal Zone Management Act funds from NOAA. The California Coastal Conservancy, serving as fiscal agent on behalf of the State of California, is the organization that applies for and receives annual National Estuarine Research Reserve System operational funding from NOAA. The Conservancy subsequently awards the funding through its own authorities to the Elkhorn Slough Foundation for staffing and project work at the site. The California Department of Fish and Wildlife, as the reserve's lead agency, provides the required match for NOAA's Coastal Zone Management Act funds through salaries and other operating expenses.

During the site visit, the evaluation team had the opportunity to hear from the reserve, the California Coastal Conservancy, and the Elkhorn Slough Foundation about the status of this relationship. The partners generally agreed that the relationship among the partners was working. Under the current memorandum of understanding, the California Coastal Conservancy does not charge overhead for its role as the fiscal agent and does not anticipate changes in the near future to this arrangement. The California Coastal Conservancy cautioned, however, that providing this support to the site in acting as the fiscal sponsor and not charging overhead may not always be the case. The evaluation team does not consider this an immediate concern, but it is a vulnerability to be mindful of. At the time of the site visit, the partners are working on updating the current memorandum of understanding, and no concerns were raised in their ability to do so.

As the partner that receives the subaward of the NOAA funds to the Elkhorn Slough Research Reserve, the Elkhorn Slough Foundation plays a critical role in being able to conduct research, education, and training programs, as well as the overall functioning of the site. During focus group discussions related to this target area of program administration, representatives from the foundation mentioned that they often find themselves in the position of having to carry costs until they are able to receive reimbursement, sometimes in the amounts of several hundreds of thousands of dollars, because they can't submit invoices directly to NOAA. A question was asked whether this could be mitigated by receiving a direct award from NOAA to the foundation. NOAA and partners may be able to explore whether there are ways to streamline processing invoices and reimbursement of funds.

Over the course of the evaluation period, the Elkhorn Slough Reserve has been quite successful in competing for grant and foundation funding to support many of its programs. Because of the reserve's success, the staff and projects within the reserve have grown considerably over time. The state-supported administrative staff of the reserve, however, has not increased proportionate to the increased level of program activity. This fact was brought up in the evaluation site-visit focus group discussion as a pinch point that may warrant some attention. Currently, in addition to the reserve manager, there are administrative and facilities staff persons who are supported by the California Department of Fish and Wildlife, one focusing on business administration and the other on facilities support. These positions are used as the state match requirement for the NOAA cooperative agreement. As activities within the reserve have increased, the administrative and facility support needs have grown, and staff members have taken on additional duties to support these increased needs, which may not be sustainable in the long run. The evaluation team believes that the reserve may want to evaluate the administrative and facility needs, both current and future, to see if the current staffing is sufficient to meet the increased needs, or if additional capacity is needed in these areas. As part of a needs assessment of the reserve, succession planning for critical leadership positions should also be considered if retirements are anticipated in the next 5 to 10 years.

Finally, the reserve's most recent management plan expired in 2012. A current, approved management plan is a requirement of the National Estuarine Research Reserve System. At the time of the site visit, the Elkhorn Slough Reserve was working to address NOAA comments on its draft management plan. A complete revised draft must be received by the NOAA Office for Coastal Management by June 30, 2020.

Accomplishment: The Elkhorn Slough Reserve has worked closely with partners to plan for and execute projects within the reserve. The reserve has successfully leveraged the California Department of Fish and Wildlife and NOAA's investments with Elkhorn Slough Foundation funds and other grant awards to bring in several million dollars worth of private, state, and other federal funding over the period covered by this evaluation.

Accomplishment: The Elkhorn Slough Reserve has made many facilities improvements that have helped to increase the visibility of the reserve and improve its ability to better serve their constituents.

Accomplishment: Staff members of the Elkhorn Slough Reserve have sought out and taken leadership positions within various sectors of the National Estuarine Research Reserve System. Their engagement and leadership within their sectors have helped to move important national and system-wide initiatives forward and have contributed to the strength of the system as a whole.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve explore ways to streamline grant management functions to eliminate delays in billing and reimbursement.

Recommendation: The NOAA Office for Coastal Management recommends that the Elkhorn Slough Reserve assess administrative and facility needs, including current staffing and future succession planning, to determine whether staffing capacity is sufficient.

Necessary Action: The Elkhorn Slough Reserve must submit final comments on their draft management plan to the NOAA Office for Coastal Management by June 30, 2020.

Implementation of General Requirements

The reserve has the full suite of core positions on staff—manager (California Department of Fish and Wildlife), education coordinator (California Department of Fish and Wildlife), research coordinator (Elkhorn Slough Foundation), and Coastal Training Program coordinator (Elkhorn Slough Foundation). The reserve also has a stewardship coordinator, Tidal Wetland Program director, and many additional staff members supporting these programs.

The reserve has core facilities, including an administrative building, visitor center, laboratory and classroom space for research and education programs, maintenance building, an extensive network of trails, among other facilities. Many of these are aging and in need of maintenance or upgrades.

The management plan for Elkhorn Slough National Estuarine Research Reserve was last approved by NOAA in 2007 and is out of date. An updated plan is currently under review and revision. The Coastal Training Program strategy was due in 2017 and is being updated and integrated as part of the new management plan.

The reserve is compliant with implementation of standard System-Wide Monitoring Program requirements and consistently up-to-date with quality assurance and control and submittal of information to the Centralized Data Management Office. In addition, the reserve has completed (and NOAA has approved) its habitat maps and Sentinel Site plan, and implemented vertical controls and surface elevation tables per the plan.

The reserve also conducts the minimum of five Coastal Training Program workshops per year and Teachers on the Estuary (TOTE education) workshops.

Evaluation Metrics

Beginning in 2012, national estuarine research reserves began tracking their success in addressing three evaluation metrics specific to their programs. The evaluation metrics include a five-year target and provide a quantitative reference for each program about how well it is meeting the goals and objectives it has identified as important to the program.

Goals and Objectives are from the Elkhorn Slough Reserve Management Plan dated September 2006.

METRIC 1 – Research and Scientific Publications

Goal: National Estuarine Research Reserve System scientific investigations improve understanding and inform decisions affecting estuaries and coastal watersheds.

Objective: Improve understanding of the effects of climate change and coastal pollution on estuarine and coastal ecology, ecosystem processes, and habitat function.

Strategy: Elkhorn Slough Research Reserve research and stewardship staff members will conduct rigorous applied conservation research to examine threats to coastal ecosystem services and processes posed by climate change and coastal pollution, will investigate the success of potential strategies to improve recovery or resilience, and will disseminate the results in publications.

Performance Measure: Between 2012 and 2017, the number of articles co-authored by reserve staff members that are published in a peer-reviewed scientific journal.

Target: Between 2012 and 2017, five articles co-authored by reserve staff members that are published in a peer-reviewed scientific journal.

First Year Results: 1 article

Second Year Results: 1 article

Third Year Results: 3 articles

Fourth Year Results: 2 articles

Fifth Year Results: 5 articles

Cumulative Results: 12 articles

Discussion: The reserve had a very productive year 5 publishing articles based on research at the reserve, including research by university students. As a result, the reserve exceeded its five-year target by more than twice the number of publications anticipated.

METRIC 2 – Marsh Restoration and Beneficial Re-use of Sediment

Goal: Estuaries and coastal watersheds are better protected and managed by implementing place-based approaches at reserves.

Objective: Develop, demonstrate, and evaluate tools and practices at reserves that advance progress on habitat protection, water quality, and climate change impacts

Strategy: The reserve’s Tidal Wetland Project will secure and manage grant funding for the development of a science-driven tidal marsh restoration project that makes beneficial re-use of sediment for tidal marsh restoration. This will include development of the experimental design, development of engineering designs and permits, implementation of the first phase of construction for a tidal marsh and ecotone restoration project, and facilitation of collaboration among partners.

Performance Measure: By 2017, number of acres of tidal marsh restored.

Target: By 2017, 18 acres of tidal marsh will be restored through beneficial reuse of sediment.

First Year Results: 0

Second Year Results: 0

Third Year Results: 0

Fourth Year Results: 0

Fifth Year: 0

Cumulative: 0*

Discussion: *Construction for the Hester Marsh restoration project (phase 1) was completed in 2018, restoring a total of 66 acres. During the performance target period, the reserve completed the planning, design, fundraising, and the bulk of permitting and contracting phases, but the final construction was delayed until 2018. This project is cited as an accomplishment for the evaluation period.

METRIC 3 – Education

Goal: National Estuarine Research Reserve System education and training increases participants’ environmental literacy and ability to make science-based decisions related to estuaries and coastal watersheds.

Objective: Increase estuary literacy and promote active stewardship among public audiences through the development and delivery of tools and programs addressing climate change, habitat protection, and water quality.

Strategy: The Elkhorn Slough Research Reserve education team will collaborate with the Monterey Bay Aquarium on the WATCH program (Watsonville Area Teens for Conserving Habitats). The program supports predominantly Hispanic students from Pajaro Valley High School and Watsonville High School by mentoring students, supervising field studies and inquiry-based projects informed by the Elkhorn

Slough Research Reserve research and stewardship programs, and offering the use of monitoring supplies, microscopes in the learning laboratory, and other educational resources. The program is a project-based experiential learning environmental science program recognized by the University of California regents. A specific class at the high school functions as host for the program, and Elkhorn Slough Research Reserve serves as the study site for students to conduct research.

Performance Measure: Number of students who participate in the WATCH program between 2012 and 2017.

Target: Between 2012 and 2017, 200 students will participate in the WATCH program.

First Year Results: 45 students

Second Year Results: 40 students

Third Year Results: 40 students

Fourth Year Results: 37 students

Fifth Year Results: 44 students

Cumulative Results: 206 students

Discussion: 206 students from 3 participating high schools attended the Elkhorn Slough Research Reserve WATCH program between 2012 and 2017. The reserve exceeded the performance target by 6 students.

Conclusion

For the reasons stated herein, I find that the California Department of Fish and Wildlife is adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations in the operation of the Elkhorn Slough National Estuarine Research Reserve.

These evaluation findings contain one necessary action and six recommendations. The recommendations must be considered before the next regularly scheduled program evaluation, but they are not mandatory at this time. Program recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

This is a programmatic evaluation of the Elkhorn Slough National Estuarine Research Reserve that may have implications for the reserve's financial assistance awards. However, it does not make any judgment about or replace any financial audits.

signed by Jeffrey Payne

Jeffrey L. Payne, Ph.D.

Director

NOAA Office for Coastal Management

dated September 21, 2020

Date

Appendix A: Response to Written Comments

The NOAA Office for Coastal Management received a large number of comments at the site-visit public meeting, held on Wednesday, July 17, 2019, describing positive experiences with the reserve and appreciation for the volunteer opportunities available to the community. Many remarked about the active engagement of staff members with volunteers and expressed admiration for the level of science and research taking place at the reserve. NOAA thanks all who attended the public meeting for taking time to attend and comment to provide input on the implementation of the reserve's programs.

In addition, NOAA received three email messages with the following comments:

Shanta Keeling
Central Coast Water Board
San Luis Obispo, California

Comment: Thank you for the opportunity to provide comments about the Elkhorn Slough National Estuarine Research Reserve (ESNERR).

Staff at ESNERR have been a tremendous help in our effort to develop the [Elkhorn Slough Total Maximum Daily Load \(TMDL\) for biostimulatory substances](#). For example:

- Staff has provided a venue to host public meetings many times. They have been great hosts and have set up technology for presentations and remote access.
- Staff has provided invaluable technical input during stakeholder meetings, phone calls, and through written comments to technical documents.
- Staff has provided our agency (Central Coast Water Board) with field trip opportunities in Elkhorn Slough. These field trips, coupled with presentations, have been a great way to learn more about the Slough and ask questions. I must also state that the food they provided was amazing!
- Staff has provided support in the form of data and presentations to help further TMDL development.
- The website staff maintains is a valuable repository for important research which I access regularly.

In general, staff at ESNERR have been great to work with and we feel fortunate to have such a strong working partnership.

If you'd like to discuss any of my comments, or would like more information, please don't hesitate to contact me.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Keeling for her comments.

Dawn Hayes
NOAA's Monterey Bay National Marine Sanctuary
Monterey, California

Comment: It is my privilege to submit comments regarding NOAA's Monterey Bay National Marine Sanctuary (MBNMS) interaction with Elkhorn Slough National Estuarine Reserve (ESNERR). MBNMS is

the only NOAA sanctuary contiguous with a NERR nationwide and as such, we tend to have a good deal of collaboration.

As a former CTP Advisor, it has been my pleasure to see the program grow at ESNERR over the years. I feel the current Coastal Training Program Coordinator, Dan Brumbaugh is very in tune with his constituency and the coursework offered reflects this. Most recently, Dan has been networking with a variety of agencies at all levels, NGOs and universities to explore a leadership training group focused on marine issues. This would emulate similar leadership training programs in adjacent counties, but with a marine conservation focus. The agencies I've connected Dan to are very intrigued with this idea and are looking forward to upcoming brainstorm sessions. Any way to inform local leaders of the issues facing our watersheds, wetlands, and the marine environment is a win, and I believe this will be a highly sought-after program.

Reserve Manager Dave Feliz and Dan Brumbaugh serve on MBNMS' advisory council as the ESNERR primary and alternate. The council meets 6x/year and Dan's participation has considerably upped the presence of ESNERR at meetings (100% since his appointment). His participation has been valuable through presentations, his membership on the council's recruitment subcommittee, and he actively works as a consensus builder on the council.

In addition to participation on the advisory council, ESNERR staff (Kerstin Wasson) participates on the advisory council's standing working group, the Research Activities Panel (RAP). Kerstin is a valued member, bringing an expertise in wetlands biology, research and restoration to the RAP, who in turn advise the council, MBNMS superintendent Paul Michel and our staff.

The CTP has recently partnered with the sanctuary on a series of resource protection fronts including work with our Agriculture Water Quality Specialist on a healthy soils workshop (Dec 2018), as well as other intersections with land management groups and practices in addition to their participation in water quality science meetings and supporting workshops.

ESNERR and the CTP have been tremendous partners in protection of NOAA resources in Elkhorn Slough, at the reserve and extending into the main channel, which is under the jurisdiction of MBNMS. The program and its staff are a tremendous asset to MBNMS and NOAA.

If you have any further questions, please feel free to contact me via phone or email – my information is below,

Thank you for this opportunity to comment on a great program.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Ms. Hayes for her comments.

Andrew DeVogelaere
NOAA's Monterey Bay National Marine Sanctuary
Monterey, California

Comment: It is my understanding that you are in the process of evaluation ESNERR as part of the regular performance process under CZMA [the Coastal Zone Management Act].

I'm the Research Coordinator for the Monterey Bay National Marine Sanctuary (MBNMS) and work closely with the ESNERR, as the main channel of Elkhorn Slough is part of the MBNMS. I also serve on the Strategic Advisory Committee for the Hester Marsh restoration effort.

ESNERR is a fabulous and well-respected regional research partner for estuarine issues. We work together on invasive species sampling and erosion sampling. Dr. Kerstin Wasson serves on the MBNMS Research Activity Panel, and is a regular resource for conservation science information related to estuarine issues.

MBNMS also puts out a Condition Report before every one of our Management Plan updates. This is a large, detailed document that guides our new Management Plan, and ESNERR staff play a critical role as experts in estuarine science in helping us write this report. (See <https://montereybay.noaa.gov/research/techreports/tronms2015.html>)

The Hester Marsh restoration project should be a model for the nation. What they have done with collaborations, actual restoration, documenting what was done, and monitoring outcomes is spectacular.

I hope these few comments are of value in your review, and feel free to contact me for more information.

NOAA Office for Coastal Management's Response: The NOAA Office for Coastal Management thanks Mr. DeVogelaere for his comments.