

**Coastal Training Program Strategy  
for the  
San Francisco Bay National Estuarine Research Reserve  
2013-2018**

Prepared for:



National Oceanic and Atmospheric Administration  
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Office of Ocean and Coastal Resource Management  
Estuarine Reserves Division

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## **1. Introduction**

This document details the program strategy for the San Francisco Bay National Estuarine Research Reserve's Coastal Training Program (CTP) for 2013-2018. Developed with input from partners, other NERR sectors, and members of the CTP Advisory Committee it is intended to serve as a broad orientation to the next several years of CTP program development. Building on the program's successes and lessons learned, the plan outlines both the national and local context in which the CTP operates, describes the priority training needs and audiences that the CTP targets, and summarizes key milestones for planned program expansion.

## **2. Social and Ecological Context of the SF Bay NERR**

The San Francisco Bay National Estuarine Research Reserve (SF Bay NERR) is a partnership among the National Oceanic and Atmospheric Administration (NOAA), San Francisco State University (lead state agency), California State Parks, Solano Land Trust and the Bay Conservation and Development Commission, and it was established for long-term research, education and stewardship of the San Francisco Bay. Two of the tidal wetlands left in the San Francisco Bay Estuary are protected as part of the SF Bay NERR: China Camp State Park in Marin County and Rush Ranch Open Space Preserve in Solano County. As historic wetlands, these habitats have been largely protected from development and alteration and are heavily utilized as reference sites against which enhanced, restored, or created wetlands are evaluated (Goals Project 1999, May 1999, Simenstad et al. 1999, Simenstad et al. 2000).

San Francisco Bay is the largest estuary along the West Coast of the US. The drainage basin of the estuary's freshwater sources, the Sacramento and San Joaquin Rivers, encompasses approximately 1,600 square miles, drains more than 40% of the state (60,000 square miles and nearly half of the state's total runoff), provides drinking water to millions of Californians and irrigates nearly 5 million acres of farmland. In the early 1800's, the Bay covered almost 700 square miles, and the Sacramento-San Joaquin River Delta was a network of 80 atoll-like islands, hundreds of miles of complex channels, and vast expanses of marsh. The estuary once supported 190,000 acres of highly productive tidal marsh, but now only 16,000 acres of this historic tidal marsh remain (Goals Project, 1999).

A diverse set of land use patterns make up the San Francisco estuary. The entire region encompasses approximately 4.4 million acres of land, of which 26.0% is urbanized, 21.4% is used for agriculture, 27.8% is rangeland, 21.8% is forest land and 2.4% is wetlands. While Contra Costa, Alameda, Santa Clara and San Francisco counties are highly urbanized directly on the shoreline, Napa, Sonoma, Solano and San Mateo county are all characterized as highly rural, or including a diverse array of rural and urban features (ABAG, 2010).

The San Francisco Bay Area is home to diverse populations, a booming economy and fragile ecosystems, all of which contribute significantly to the culture, values and politics of communities situated here. The SF Bay NERR sites are situated within a highly urbanized estuary that is the 5<sup>th</sup> most populous metropolitan area in the United States. Over seven million people reside in the Bay Area, and it encompasses 101 cities and towns, including San Francisco, San Jose and Oakland, and nine counties. The region also supports the nineteenth largest economy in the world, and is one of the largest business centers on the West Coast. In addition, the San Francisco Bay Area has incredible ecological richness in close proximity to its urban core. Approximately 90 percent of California's remaining wetlands are located in the San Francisco Bay Area, (Ekstrom and Moser, 2012). Climate change is creating pressing challenges for both the fragile and highly impacted ecosystems across the region as well as for communities as they grow and plan for the future.

The two Reserve sites bracket a substantial portion of the salinity gradient within the estuary from predominantly brackish marsh at Rush Ranch to the salt marsh of China Camp. Threatened, endangered and rare species of plants and animals that occur within the Reserve boundaries include: soft bird's beak, Suisun Marsh aster, Suisun thistle, Delta tule pea, Olympia oyster, California black rail, California clapper rail, Chinook salmon, steelhead trout, Sacramento splittail, Delta smelt, and salt marsh harvest mouse.

The Reserve's CTP engages directly with communities and organizations to provide cost-effective, high-quality learning opportunities to coastal professionals. Training programs and technical assistance products are developed to address the greater San Francisco Bay Area's pressing ecosystem and community issues and are designed to foster open, multidisciplinary communication and real-world problem solving. The CTP Coordinator also works with scientists to help translate the information needs of decision makers and resource managers into actionable research projects. This program works collaboratively with sectors within the Reserve, and a diverse array of partners regionally and statewide. Together with the Elkhorn Slough and Tijuana River Reserves, the Coastal Training Program provides a broader presence in California by working with a number of state and regional partners to maximize the reach and impact of CTP programming.

### **3. Integration with Reserve Goals and Management Plan Objectives**

SF Bay NERR Vision Statement: "We envision vibrant estuaries cherished by their communities throughout the nation."

SF Bay NERR Mission Statement: "The mission of the Reserve is to improve understanding and stewardship of San Francisco Bay, with a broader relevance to ecosystems beyond the Golden Gate."

The SF Bay NERR completed its Management Plan for 2011-2016 in December 2010. Although many major issues affect North California's estuaries and San Francisco Bay in particular, the Management Plan focuses programmatic efforts on four critical issues that

affect the Reserve's ability to conserve ecological communities in support of the Bay's growing population:

- Climate change
- Species interactions
- Water quality
- Habitat restoration

The Coastal Training Program supports the goals and objectives laid out in the SF Bay NERR Management Plan. Appendix C lists the Reserve management actions and objectives that are linked to CTP. Some examples of CTP contribution to the Reserve management actions are listed below.

### SF Bay NERR Management Plan Goals, Objectives and Actions

Climate Change Goal 2: Increase knowledge and understanding of effects of climate change on the Bay and other northern California estuaries and coastal habitats.

Objective 2: Coastal land managers, local governments, and other interested coastal decision makers who make use of Reserve training resources will better understand the observed and predicted effects of climate change on the Bay Area's natural and human systems.

*Objective 2, Action 1: Action 1: CTP Coordinator will develop and deliver programming about anticipated climate change impacts to natural coastal systems and to coastal communities.*

*Objective 2, Action 3: CTP Coordinator will work with both signatory and other partner organizations to develop and/or distribute management tools such as vulnerability assessment worksheets; presentations; model ordinance language; case studies; and other informational products.*

These particular actions are a high priority for CTP. Providing high quality programming is a central aspect of the CTP mission. At the SF Bay NERR, climate change is an especially high priority, as many human and natural communities are at high risk of future impacts. As a result, CTP is focusing on climate change for training topics and technical assistance. Specifically, developing trainings that focus on climate change impacts and associated response strategies is a focus for the program (see Priority Coastal Issue #1). Similarly, CTP is working with partners to develop informational and outreach materials to support training and technical assistance. These materials will be distributed through the Reserve website and through local professional networks.

Habitat Restoration Goal 1: Improve knowledge and understanding of strategies for effective habitat restoration within Reserve sites and the region's estuaries and coastal watersheds.

Objective 2: Land managers, restoration practitioners, and restoration scientists that participate in Reserve training opportunities will have a greater understanding of best practices of restoration and will be better prepared to implement those practices.

*Objective 2, Action 2: CTP Coordinator will offer workshops, field trips, and other*

*professional sharing networks to improve transfer of knowledge between scientists and restoration practitioners.*

CTP is involved in a number of activities to support this action. First, CTP works closely with partners and through needs assessments to develop trainings on habitat restoration-related topics that are of high priority for Bay Area audiences, and that serve to transfer knowledge between scientists and restoration practitioners. In addition, CTP is a member of the Bay Area Ecosystems Climate Change Consortium (BAECCC), a collaborative group focused on sharing information among scientists and managers.

#### **4. Coastal Training Program Outcomes, Objectives and Strategies**

Objective 1: For each CTP training event over the next five years, 80% of participants in training indicate intent to apply natural and social science-based information in coastal decision-making.

**Strategy 1A:** Conduct formal and informal needs assessments to determine priority training needs of target audiences regarding priority training issues and delivery methods.

**Strategy 1B:** The CTP will coordinate with the Advisory Committee and other key partners on priority training needs of target audiences.

**Strategy 1C:** The CTP Coordinator will evaluate trainings and will integrate feedback when applicable to future trainings.

**Strategy 1D:** The CTP Coordinator will stay engaged with the national NERRS network and other CTP Coordinators to remain informed of successful training formats, methods and providers.

Objective 2: The CTP will provide technical assistance and at least five training workshops per year on priority coastal issues to target audiences during the strategic planning period of 2013-2018.

**Strategy 2A:** The CTP will engage with Advisory Committee members annually to maintain and foster collaboration and to provide latest science and information on priority coastal issues.

**Strategy 2B:** When applicable to training topics, collaborate with the Research Coordinator and Education Coordinator to present the most current research available.

**Strategy 2C:** The CTP Coordinator will communicate and collaborate with NERRS staff to remain informed of emerging issues and decision maker needs.

**Strategy 2D:** The CTP Coordinator will conduct needs assessment on an as-needed basis to identify priority training topics and technical assistance needs for key CTP audiences.

Objective 3: For each CTP training event over the next five years, at least 90% of the participating coastal decision-makers will report that their knowledge of priority coastal issues has increased as a result of attending the training event.

**Strategy 3A:** Conduct formal and informal needs assessments to determine priority training needs of target audiences regarding priority training issues and delivery methods.

**Strategy 3B:** The CTP will coordinate with the Advisory Committee and other key partners on priority training needs of target audiences.

**Strategy 3C:** The CTP Coordinator will evaluate trainings and will integrate feedback when applicable to future trainings.

**Strategy 3D:** The CTP Coordinator will stay engaged with the national NERRS network and other CTP Coordinators to remain informed of successful training formats, methods and providers.

## **5. Priority Coastal Issues for CTP and Role of Advisory Committee**

As a result of Reserve priorities and priority needs of training audiences in the San Francisco Bay Area as identified through Advisory Committee feedback and ongoing formal and informal needs assessments, CTP is focusing in on two priority coastal issues: climate change, sea level rise and coastal hazards; and habitat protection and restoration.

### Priority Coastal Issue #1 Climate Change, Sea Level Rise and Coastal Hazards

The San Francisco Bay region is working to become more resilient to climate change and sea level rise in particular through local, regional and statewide planning and policy efforts. However, many barriers exist to successful adaptation planning in the region, including lack of capacity, unclear policy guidance, the need for more training and other challenges (Finzi-Hart, J.A., et al, 2012). A lively community of practitioners in the region exists, and an engaged audience for training and technical support. CTP has played a lead role in utilizing needs assessment and partner feedback to consistently deliver climate change-related trainings that are highly tailored to target audiences throughout the region.

In addition, CTP supports a number of climate change planning and outreach efforts within the region, including “Our Coast, Our Future” (OCOF), the California King Tides Initiative (CKTI) and the Bay Area Sentinel Sites Cooperative. OCOF is a NERRS Science Collaborative funded joint endeavor of the Gulf of the Farallones National Marine Sanctuary, Point Blue Conservation Science (formerly PRBO Conservation Science), the U.S. Geological Survey, Coravai LCC, the SF Bay NERR and the National Park Service. The OCOF tools provide the capability to model the critical full range of vulnerabilities from sea level rise and storm hazards, including factors such as water levels, wave heights, flooding, and erosion, which are not available in most other datasets.

The California King Tides Initiative (CKTI) is a public engagement and education campaign established in 2010. The organizing partners are CKTI include The California Coastal Commission, California Coastkeeper Alliance, Gulf of the Farallones National Marine Sanctuary, the Thank You Ocean Campaign, San Francisco Bay Conservation and Development Commission, the Tijuana River NERR and the SF Bay NERR. SF Bay NERR CTP has played a pivotal role since its founding, and continue to provide support to CKTI. Members of the public are asked to participate by sharing photographs of the king tides (highest tides of the year) via social media. CTP’s primary role in the CKTI is to support facilitation of the organizing partners, conduct outreach activities that are

aligned with CTP and larger SF Bay NERR management objectives and to coordinate across reserve sectors when appropriate.

Another piece of climate-related work that CTP works to support is the Bay Francisco Bay Area Sentinel Sites Cooperative. This Cooperative will provide information to San Francisco Bay Area communities and resource managers and planners who need to address challenges such as storm flooding local sea level rise, degraded water quality, and wetland loss.

By working across partnerships and projects, CTP is able to maximize its impact given its limited staff and funding. For example, when needs assessment results and Advisory Committee feedback on training priorities overlap with key priorities for the Bay Area Sentinel Sites Cooperative, CTP is able to serve both needs simultaneously. Similarly, by engaging with partners through OCOF, the CTP coordinator is able to communicate about programs, collect feedback on high priority training topics and learn about leading edge science that could be integrated into future trainings.

Some of the thematic areas covered by climate change-focused CTP workshops include: Tools, data and techniques for integrating social, scientific and technical information into climate change planning processes, including understanding local climate change science and impacts; Vulnerability assessment frameworks and adaptation strategies; Strategies for effective community engagement and communication, including conflict management, stakeholder engagement and community involvement; Analyzing, interpreting and applying scientific information to land use decisions; Providing support for “soft skills” capacity building such as project planning, program evaluation and management plan development.

Target Audience: city, county and regional planners, engineers, flood control managers, natural resource managers, landscape architects, restoration and land managers, scientists and researchers, consultants, disaster and emergency response managers, interpreters and educators, coastal managers, training and outreach professionals, non-profit and advocacy groups.

Anticipated Partners: NOAA Coastal Services Center, San Francisco Bay Conservation and Development Commission, California Coastal Commission, Gulf of the Farallones National Marine Sanctuary, Bay Area Ecosystems Climate Change Consortium, California Coastal Conservancy, San Francisco Estuary Partnership, Elkhorn Slough NERR CTP, Tijuana River NERR CTP, San Francisco Bay Joint Venture, California State Parks, Solano Land Trust, San Francisco State University/Romberg Tiburon Center for Environmental Studies

Training Delivery System: The primary training format will be in person, 1-2 day workshops held in a classroom style setting in the San Francisco Bay Area. Additional training formats will include field-based workshops within the region. CTP will also produce written documents to provide technical assistance to the training audience, including white papers and case studies of local climate change planning efforts.

## Priority Coastal Issue #2: Habitat Protection and Restoration

As a highly urbanized estuary, the San Francisco Bay Area greatly values its natural ecosystems that support sensitive and endangered species, critical habitats and ecosystem services that sustain healthy communities. The SF Bay NERR Reserve sites, China Camp in Marin County and Rush Ranch Open Space Preserve in Solano County, have been largely protected from development and alteration and are widely recognized for their expansive tidal marshes and undeveloped adjacent uplands. These sites have long been a focus of environmental and ecological research, providing important baseline data and serving as reference areas for the evaluation of restored, enhanced, or created wetlands around the estuary. The Reserve staff work collaboratively with our partners and other scientists to strengthen and coordinate research within the Reserve, ensure results from research inform management, and engage communities with science and the estuary.

CTP works to support active research on SF Bay NERR sites by, when applicable, translating that research to the larger management community through training and outreach. For example, the Reserve is actively involved in two NERRS Science Collaborative proposals that are being managed by Matt Ferner, SF Bay NERR Research Coordinator. As primary components of both projects, the research findings and management implications will be communicated out to the region through a CTP workshop for a broad audience. The SF Bay NERR staff is achieving sector integration goals and maximizing the impact and relevance of the SF Bay NERR to the region by working closely together when appropriate.

Hosting high-quality workshops and providing technical assistance on a broad array of topics related to habitat protection and restoration is a high priority for CTP. Training topics are identified through regular communication with the CTP Advisory Committee, formal and informal needs assessments, and feedback from other key partners. Some of the thematic areas covered by these workshops include: Interpreting and implementing laws and regulations including permit streamlining across agencies and regulatory compliance; Ecosystem management techniques for addressing species-specific concerns, specifically invasive species management, and best practices for threatened and endangered species; Habitat restoration techniques, including restoration of native plants and shorelines with a special focus on wetlands.

Many of the topics and themes covered by this priority coastal issue overlap with the climate change issue. CTP finds that an interesting training nexus for the program is training on tidal marsh restoration and climate change – including emerging restoration techniques, marsh response to climate change, and design consideration related to sea level rise.

Target audience: city, county and regional planners, engineers, flood control managers, natural resource managers, landscape architects, restoration and land managers, scientists and researchers, consultants, disaster and emergency response managers, interpreters and



educators, coastal managers, training and outreach professionals, non-profit and advocacy groups.

Anticipated partners: NOAA Coastal Services Center, San Francisco Bay Conservation and Development Commission, California Coastal Commission, Gulf of the Farallones National Marine Sanctuary, Bay Area Ecosystems Climate Change Consortium, California Coastal Conservancy, San Francisco Estuary Partnership, Elkhorn Slough NERR CTP, Tijuana River NERR CTP, San Francisco Bay Joint Venture, California State Parks, Solano Land Trust, San Francisco State University/Romberg Tiburon Center for Environmental Studies

Training Delivery System: The primary training format will be in person, 1-2 day workshops held in a classroom style setting in the San Francisco Bay Area. Additional training formats will include field-based workshops within the region. CTP will also produce written documents to provide technical assistance to the training audience, including white papers and case studies of local climate change planning efforts.

#### Advisory Committee

The CTP Advisory Committee was established several years ago, and has remained a lively advisory body. In preparation for this document, informational interviews were conducted with all Advisory Committee members to update representation, better understand synergies between partners, and to discuss potential collaborations for future trainings. A current list of Advisory Committee members and contacts can be found in Appendix B.

Advisory Committee members have a number of roles and responsibilities in relation to CTP. First, they serve as important connecting points between CTP and the organizations they represent. Advisory Committee members provide feedback on training ideas, connect SF Bay NERR staff with resources at their organization, co-sponsor trainings or other CTP projects when appropriate and support outreach and dissemination of CTP-related information.

Rather than meeting regularly, Advisory Committee members have an ongoing collaboration with CTP. The CTP Coordinator stays in regular (quarterly) contact with Advisory Committee members to update them of upcoming trainings and CTP-related projects, get feedback, brainstorm future ideas and to work as a sounding board and feedback mechanism for keeping CTP highly responsive and in tune with Bay Area audience needs.

## **6. Monitoring and Evaluation Tools**

A vibrant training provider market already exists in the Greater Bay Area. These training providers range from environmental nonprofits working with rural community leaders, to state regulatory programs providing city planners with non-point source pollution prevention tools, to university extension programs offering certification in a range of coastal management-related professions. Despite these myriad offerings, market analyses indicate that there is a niche for the CTP in providing low-cost, timely, scientifically

sound and relevant programming that has been developed to meet the specific information needs of various professional sectors.

The SF Bay NERR CTP has conducted several market analysis and needs assessments, many in collaboration with Elkhorn Slough NERR CTP, including the following:

- Climate Change Adaptation Training Needs Assessment, August 2013
- Land Managers Needs Assessment Web Survey, March 2012
- Planning for Salt Marsh Sustainability in Central California, February 2012
- Bay Area Planners' Coastal Training Needs Assessment, December 2010
- Coastal Training Program Market Analysis, October 2007

In developing this program strategy, informal interviews were conducted with all of the key partnerships of CTP during Fall 2012. In addition, the SF Bay NERR worked as a partner on a University of Southern California Sea Grant needs assessment of coastal planners in California on climate change adaptation planning, entitled "Rising to the Challenge: Results of the 2011 California Coastal Adaptation Needs Assessment." Finally, the overall programmatic focus identified in the SF Bay NERR Management Plan informs the focus of CTP. All of these studies, reports and findings play an integral role in informing the priority training themes for the SF Bay NERR CTP.

Monitoring and evaluation will be ongoing to ensure that the Coastal Training Program is effective in its selection of topics, audiences, and delivery methods. Achievement of short-term outcomes will be measured through participant evaluation surveys and other assessment techniques. Achievement of mid- and long-term outcomes will be measured through focus groups and interviews six months or more after participation, longitudinal research, and external program evaluation. In addition, the CTP coordinator will ensure ongoing reporting to the National Performance Measure Database.

Programs have been developed in a variety of formats ranging from seminars, hands-on skill training, participatory workshops, lectures, and technology demonstrations. Participants benefit from opportunities to share experiences and network in a multidisciplinary setting, often with a reserve-based field activity. Complementary information is available through the CTP website, and future plans include incorporating social media features, archived presentations, and streaming content.

## **7. Training Development, Outreach Methods and Staffing and Infrastructure Support**

Developing more robust programmatic and technology infrastructures will improve and expand program delivery capabilities. As its core mission, the CTP will continue to provide decision makers with access to the most up-to-date science in the format that is best for that audience, whether that format is field-based training, printed materials, facilitated discussions, online modules, or classroom-style workshops. CTP events will range from 4 hours to as long as a week and involve anywhere from 10 to 100+ participants.

Training and workshop outreach will be conducted through the SF Bay NERR website. CTP uses MailChimp and EventBrite as platforms for marketing and outreach via email and web to audiences. These services provide the benefit of being able to track responses, people following the CTP email list, and to keep our subscription list lively and up-to-date. Finally, SF Bay NERR CTP shares email outreach with its partner, Elkhorn Slough CTP. Through sharing email contacts, both programs are able to expand their reach and support each others' work. CTP partners also support event outreach through posting upcoming events on websites and email newsletters. When relevant, the CTP Coordinator also provides outreach for upcoming trainings and other events at meetings, conferences and other forums.

The SF Bay NERR CTP strives to collaborate regionally with the two other NERRs in California: the Elkhorn Slough NERR and the Tijuana River NERR. Each Reserve serves the needs of local audiences, but CTP Coordinators have found overlap in audience needs across the state. When relevant, these programs will deliver trainings together, support larger scale CTP collaborative efforts and share information and resources across Reserves. In order to achieve these ends, the three California CTPs have established monthly conference calls to link efforts, leverage local partnerships and support more effective coordination on a statewide basis on training and capacity building for coastal managers.

One full-time Coastal Training Program Coordinator currently staffs the program. The CTP is actively seeking grant funding for salary support of both the CTP Coordinator and also a part-time Assistant Coordinator (not currently funded).

Office space is provided at San Francisco State University's (SF State) Romberg Tiburon Center for Environmental Studies (RTC) in Tiburon, CA. RTC is a field campus of SF State and a research facility focused on marine and estuarine science. A lively campus, many faculty labs are hosted at the facility where active research on a broad range of topics is ongoing. In addition to office space, the SF Bay NERR has conference rooms, research laboratory and additional office space for interns. The RTC campus also includes the Bay Conference Center and Ohrenshall Guest House that provides training facilities and accommodations for trainers and participants. Facilities are also available at the Rush Ranch component of the Reserve, including a classroom and guesthouse for trainers and participants.

## Appendices

### Appendix A: References

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**Appendix B: SF Bay NERR Coastal Training Program Advisory Committee Contacts**

NOAA Coastal Services Center	Rebecca Lunde
Bay Conservation and Development Commission	Sara Polgar
California Coastal Conservancy	Amy Hutzel
California State Parks	Bree Hardcastle
Elkhorn Slough and Tijuana River NERR Coastal Training Program	Grey Hayes, Kristen Goodrich
SF State/Romberg Tiburon Center	Aimee Good
Solano Land Trust	Ben Wallace

**Appendix C: SF Bay NERR Management Plan Goals and Objectives Related to CTP**

***Climate Change Goal 1: Increase knowledge and understanding of effects of climate change on Reserve sites.***

*Objective 1: Land managers and scientists working in the Reserve will have increased access to data illustrating short- and long-term variability of key climate change parameters such as sea level rise, marsh surface elevation, estuarine salinity, precipitation, wildlife response to climate change and vegetation community change.*

Action 2: RC, CTP Coordinator and EC will collaborate with scientists working within the Reserve to post research summaries and updates on the SF Bay NERR website, including summaries of trends in marsh elevation and other monitoring data, such as wildlife response to climate change.

Action 6: CTP Coordinator will work with land managers to identify their needs and priorities for increased data access related to environmental and ecological change detection within the Reserve.

***Climate Change Goal 2: Increase knowledge and understanding of effects of climate change on the Bay and other northern California estuaries and coastal habitats.***

*Objective 1: Reserve staff will facilitate partnerships that increase knowledge of climate change effects and adaptation strategies for the Bay Area.*

Action 1: Reserve staff will participate in regional climate change research coordination efforts, such as the Bay Area Ecosystems Climate Change Consortium, including CTP assisting with development of trainings and Reserve Manager, with input from the Reserve staff, representing the Reserve.

RC will conduct or encourage research on physical and biological linkages among the Bay, the Pacific Ocean and regional estuaries.

Action 3: CTP Coordinator will participate in national Climate Training Workgroup to develop additional training programs and funding sources.

Action 4: CTP Coordinator will assess and communicate regional coastal decision makers’ informational needs to Reserve’s RC, the NERRS research community, other research institutions, and other NOAA offices as appropriate.

*Objective 2: Coastal land managers, local governments, and other interested coastal decision makers who make use of Reserve training resources will better understand the observed and predicted effects of climate change on the Bay Area's natural and human systems.*

Action 1: CTP Coordinator will develop and deliver programming about anticipated climate change impacts to natural coastal systems and to coastal communities.

Action 2: CTP Coordinator will develop and/or provide access to documents about climate change impacts on Reserve's website.

Action 3: CTP Coordinator will work with both signatory and other partner organizations to develop and/or distribute management tools such as vulnerability assessment worksheets; presentations; model ordinance language; case studies; and other informational products.

*Objective 3: Science teachers who participate in Reserve trainings will better understand potential local effects of climate change on habitats and species within their own communities, and will have access to lesson plans designed to aid teaching about these effects in their classrooms.*

***Species Interactions Goal 1: Increase knowledge and understanding of animal and plant species distributions and abundances within Reserve sites.***

*Objective 1: Reserve scientists will have access to lists of species present within the Reserve, and will know present distribution patterns for some species.*

Action 7: Reserve Manager, RC, EC and CTP Coordinator will seek funding to support biological monitoring within the Reserve.

*Objective 2: Scientists and land managers who participate in Reserve programs will better know how to conserve and protect rare, threatened, and endangered species that occur within the Reserve sites.*

Action 2: In coordination with RC, CTP Coordinator will develop field and classroom based trainings related to identification, ecology, handling, and management of listed species.

***Species Interactions Goal 2: Increase knowledge and understanding of invasive species within the Reserve, the greater Bay Area, and other regional estuaries and coastal habitats.***

*Objective 2: Reserve scientists and land managers will exchange information about invasive species projects and needs through increased development of informational products, including written summaries, tools, workshops and fliers.*

Action 1: RC, EC and CTP Coordinator will collaborate with scientists working within the Reserve to create and post research summaries and updates, including invasive species research, on the SF Bay NERR website.

Action 2: CTP Coordinator will develop field and classroom-based trainings related to identification, ecology, handling, and management of listed species found in Reserve sites.

Action 3: EC and CTP Coordinator will create and disseminate flier(s) for scientists working at Reserve sites to educate them about their role in invasive species detection and prevention.

Action 4: RC and CTP Coordinator will create and promote list of research needs that can

be used as project ideas for Graduate Research Fellows, graduate students, and other interested scientists; and as the basis for response to requests for proposals from funders such as NOAA, the Delta Science Program and the California State Coastal Conservancy.

***Species Interactions Goal 3: Improve understanding and ability of partners to respond to resource management issues within the Reserve sites.***

*Objective 1: Staff from California State Parks and Solano Land trust will have increased understanding of important resource management issues facing the sites, such as grazing, controlled use of fire, and visitor use impacts.*

RC will encourage and/or facilitate research that targets specific resource management issues affecting the sites.

Action 2: RC and CTP Coordinator will create list of research needs that can be used as project ideas for Graduate Research Fellows, graduate students, and other interested scientists; and as the basis for response to requests for proposals from funders such as NOAA, the Delta Science Program, and the California State Coastal Conservancy.

Action 3: CTP Coordinator will offer training(s) and create and distribute tool(s) to help increase land managers' knowledge and ability to respond to resource management concerns.

*Objective 2: Visitors to Reserve sites who participate in a guided tour or substantially interact with Reserve interpretive exhibits will better understand specific resource management issues and how their actions influence the environment.*

Action 3: EC and/or CTP will create informational fliers about resource management topics relevant to the Reserve and the target audience.

***Water Quality Goal 1: Improve knowledge and understanding of trends in water quality parameters within the Reserve sites.***

*Objective 2: Interested parties, including scientists, land managers, science teachers, and commercial and recreational users of the Reserve, will have improved access to and understanding of water quality data collected within the Reserve.*

Action 1: RC, CTP Coordinator and EC will collaborate with scientists working within the Reserve to post research summaries and updates on the SF Bay NERR website.

Action 2: CTP Coordinator will determine potential end-users of system-wide monitoring data and assess barriers to their ability to access and use available data.

***Water Quality Goal 2: Increase understanding of the effects of land-use on nutrient and contaminant levels within the estuary.***

*Objective 1: Reserve scientists will have improved understanding of impacts of local land use on nutrient and contaminant levels within the Reserve.*

Action 3: EC and CTP Coordinator will assess the need for meeting(s) and/or trainings related to best management practices of horses/livestock in coastal areas for local ranchers, land managers, and residents.

Action 4: CTP Coordinator will participate in groups that examine linkages between land use and water quality (such as the California Water and Land Use Partnership), and work with these organizations to deliver training and technical assistance programs.

***Habitat Restoration Goal 1: Improve knowledge and understanding of strategies for effective habitat restoration within Reserve sites and the region's estuaries and coastal***

**watersheds.**

**Action 2:** RC, EC and CTP Coordinator will collaborate with scientists working within the Reserve to post research summaries and updates on the SF Bay NERR website, including summaries of relevant restoration research.

*Objective 2: Land managers, restoration practitioners, and restoration scientists that participate in Reserve training opportunities will have a greater understanding of best practices of restoration and will be better prepared to implement those practices.*

Action 1: RC will encourage and/or facilitate restoration research designed to determine best practices within the Reserve sites and communicate those practices through the CTP.

Action 2: CTP Coordinator will offer workshops, field trips, and other professional sharing networks to improve transfer of knowledge between scientists and restoration practitioners.

***Habitat Restoration Goal 2: Provide or assist with obtaining technical expertise and funds to conduct restoration projects within or in support of the Reserve sites.***

*Objective 1: Reserve scientists and managers will have increased access to expertise and funds necessary to restore tidal marsh habitat within the Reserve sites.*

Action 2: Reserve Manager, RC, and CTP Coordinator will seek funding opportunities to support restoration projects within the Reserve sites.

*Objective 3: Visitors to the Reserve that participate in guided programs or substantially interact with interpretive exhibits will have increased support for restoration of critical habitats.*

Action 4: CTP Coordinator will work with Subtidal Habitat Goals partners to develop training and technical assistance programs to communicate the latest knowledge about subtidal habitat restoration and management.