Reserve System Management Plan Guidelines and Resources

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National Oceanic and Atmospheric Administration (NOAA)

NOAA Office for Coastal Management

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Acronyms

CE	categorical exclusion
CFR	Code of Federal Regulations
CTP	Coastal Training Program
CZMA	Coastal Zone Management Act
EA	environmental assessment
EIS	environmental impact statement
ENOW	Economics: National Ocean Watch
FEIS	final environmental impact statement
FONSI	Finding of No Significant Impacts
HVAC	heating, ventilation, and air conditioning
KEEP	K-12 Estuarine Education Program
LEED	Leadership in Energy and Environmental Design
LID	low impact development
MOU	memorandum of understanding
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NERRS	National Estuarine Research Reserve System
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NSC	NERRS Science Collaborative
PAC	Procurement, Acquisition, and Construction
PAR	photosynthetically active radiation
PEA	programmatic environmental assessment
PRISM	Parameter-elevation Regressions on Independent Slopes Model
SMART	specific, measurable, attainable, relevant, and time-bound
SOVI	Social Vulnerability Index
STICS	Spatial Trends in Coastal Socioeconomics
SWMP	System-Wide Monitoring Program
SWOT	strengths, weaknesses, opportunities, and threats
TOTE	Teachers on the Estuary
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

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Introduction

The National Estuarine Research Reserve System (NERRS or Reserve System) is a network of 29 areas representing different biogeographic regions and estuarine types within the United States that are protected for long-term research, monitoring, education, and coastal stewardship. Established by the Coastal Zone Management Act of 1972, as amended, the Reserve System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states.

As part of this partnership, federal regulations require reserves to have a NOAA-approved management plan that is updated every five years (15 C.F.R. Part 921). Reserve System management plans serve as the foundation and guide for reserve activities. NOAA works with each reserve to support the development and approval of its management plan, and to ensure compliance with federal regulations and alignment with national priorities and programs. These guidelines reflect the Reserve System regulatory requirements for management plans, as well as guidance for system-wide programs, and are not intended to create new requirements.

These guidelines are organized into two parts. **Part I** provides information about the process and timeline for writing a management plan and provides a suggested framework and preparatory steps for writing an integrated strategic plan as part of completing the management plan. **Part II** provides specific information required in each component of the plan, including questions to promote thinking about current status and opportunities, required and optional elements, case studies, references, tools, and resources.

Purpose of a Reserve Management Plan

Reserves must plan for the continued protection and use of the reserve for research, education, and public access, particularly when faced with anthropogenic and natural stressors. A comprehensive management plan provides a foundation for addressing the challenges of protecting and managing a reserve. Therefore, the purpose of a reserve management plan is to

- Provide the vision and framework to guide reserve activities during a five-year period;
- Present opportunities to discuss reserve niche and strategic collaborations with partners;
- Communicate how the reserve is addressing priority coastal management issues through its stated goals, objectives, and strategies;
- Highlight reserve priorities and staff capabilities to address those priorities;
- Demonstrate how Reserve System programs are locally relevant and nationally significant;
- Enable the reserve and NOAA to track progress and determine opportunities for growth;
- Position the reserve to acquire facilities construction and land acquisition funds; and
- Meet the regulatory requirements contained in 15 CFR 921.13.

These documents can also provide valuable information for other internal and external partner programs such as the National Estuary Program and the Coastal Zone Management Program. In some cases, they may also serve as required management documents for state or university agencies (e.g., if the reserve is also designated as a state-protected area).

Key Changes from 2013 Reserve Management Plan Guidelines

Several changes have occurred in recent years that warrant updating the guidance for developing reserve management plans: organizational changes at NOAA; development of a new strategic plan for the Reserve System; growth of the national system; and a desire to streamline management plans so they can be more readily updated on a five-year cycle. This updated guidance reflects the following:

- The merger of the Office of Ocean and Coastal Resource Management and NOAA Coastal Services Center to form the NOAA Office for Coastal Management;
- The 2016 designation of the He'eia Research Reserve in Hawaii, the 29th in the system;
- Completion of the *2017-2022 Reserve System Strategic Plan*, which outlines three focus areas: water quantity and quality, habitat protection and restoration, and environmental change. The standard description for each system-wide program has also been updated to reflect the new NERRS strategic plan goals and objectives;
- Updated guidance for sector-specific content, including merging coastal training program strategies into an expanded management section and clarification of required versus optional elements; and
- New NOAA guidance for implementing the National Environmental Policy Act, which affects certain elements of the management plan process, such as boundary expansions.

How to Use These Guidelines

These guidelines are organized into two parts.

Part I provides information to help reserves as they prepare to write or update their management plans, with particular focus on strategic planning. It includes questions to promote thinking about current status and opportunities. It also includes information about the process, timeline, and responsibilities for the reserve and NOAA in developing the plan. It is an **essential reference for new managers, for new reserves** developing their first management plan, or **for reserves planning a substantial revision** to the strategic plan element of their management plan.

For reserves doing a routine update of their plan, with no major organizational or other substantial changes since the last revision, the information in Part I on process, timeline, and roles will be most relevant.

Part II provides specific information to support development of each component of the plan and is an **essential resource for all reserves** developing or updating a management plan. It includes guidance on required and optional elements for each section of the plan, case studies, references, tools, and resources.

NOAA will use the required and optional elements described in this section as a guide when reviewing management plans. Each management plan revision should be a close collaboration between NOAA and the reserve. The revision process should begin with a discussion between the NOAA liaison and the reserve manager to discuss this guidance, the approach to the plan, and the timeline for completing the plan.

Components of a Management Plan

Reserve System federal regulations (15 C.F.R. Part 921.13) prescribe information that is required as part of each reserve's management plan. Management plans must describe the reserve's most pressing coastal management issues; goals, objectives, and actions for addressing those issues; plans for administration, research, education and interpretation, public access, construction, acquisition, and resource protection; and restoration and habitat manipulation, if applicable. They also must include a memorandum of understanding between NOAA and the state agency.

Required and optional components for management plans are listed below. Guidance for each required component can be found in Part II: Content of the Reserve Management Plan.

Required Components	Optional Components

• Executive Summary
• Introduction to the Reserve System
• Reserve Goals, Objectives, and Strategies
• Program Foundations*
  – Research and Monitoring Plan
  – Education and Interpretive Plan
  – Coastal Training Plan
• Administrative Plan
• Facility Development and Improvement Plan, including Construction Plan
• Resource Protection Plan
• Public Access and Visitor Use Plan
• Acquisition Plan
• Resource Manipulation Plan (If applicable)
• Restoration Plan (If applicable)
 	
Appendices:
• Memorandum of Understanding between State Host Agency and NOAA
• All current memoranda of understanding between Land Managers within the reserve
• Federal Consistency Determination
• Public Involvement and Comments
• Environmental Compliance Documentation
 	
* See "Reserve System Program Foundations" chapter for options regarding organization of this material.
	• Volunteer Plan
	• Vessel and Vehicle Plan
	• Communications Plan
	• Contingency or Hazard Response Plans
	• Special Area Plans

Figure 1, below, illustrates the relationship between reserve management plan components that is necessary to meet reserve target audience needs.

- "Introduction to the National Estuarine Research Reserve System" and "Introduction to the Reserve" provide context for all subsequent components of the plan.
- The reserve strategic plan, which includes reserve goals, objectives, and actions, is at the heart of the management plan.
- Reserve people (i.e., administration), infrastructure (i.e., facilities), and the management authorities that protect the reserve serve as foundations for establishing and accomplishing goals and objectives.
- Reserve research and monitoring, education, training, and stewardship sectors work together in an integrated fashion to support implementation of the strategic plan.
- Stewardship functions are captured within the research and monitoring, resource protection, public access, and land acquisition components, as well as in the optional restoration and resource manipulation components.
- The "Reserve System Program Foundations" component captures information for each system-wide program, including context, capacity, delivery, needs, and opportunities.

Finally, it should be noted that reserve programs operate within the context of the Reserve System and state agency priorities that are relevant to the reserve. Evidence of alignment with these priorities should be apparent throughout the plan.

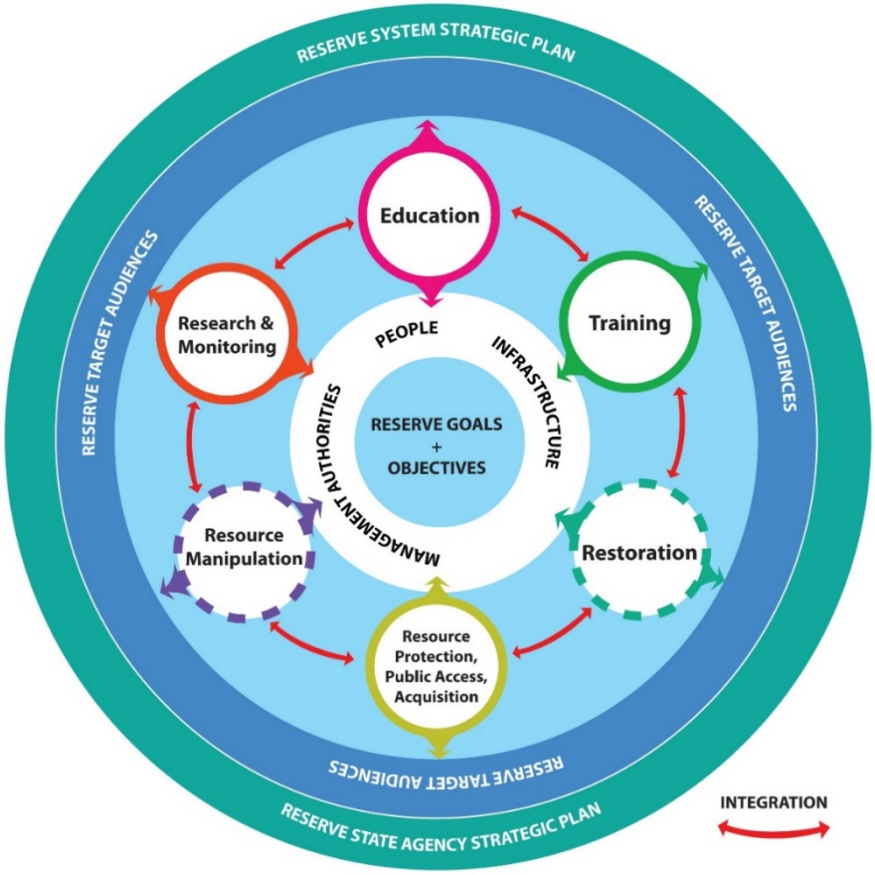

Figure 1: Relationship of Reserve Management Plan Components

Part I: Process and Approach for Developing or Revising a Reserve Management Plan

Part I provides information regarding the process, timeline, and approach for writing a management plan, including creating and implementing a strategy for plan revision, confirming priorities and achieving integration, engaging stakeholders, tips for writing the strategic plan component, and guidance and resources for considering climate-related impacts where relevant.

A process map and timeline is included that outlines steps and staff involved. Federal requirements include federal consistency, environmental compliance, public involvement, and the approval process. This section is a critical resource for reserve managers who have not yet led a management plan update, but it is also a helpful refresher for those who have already gone through this process.

The Process of Writing a Management Plan

Creating a Strategy for Plan Revision

Before beginning the management plan revision, reserves should have a strategy for

- Determining whether a routine update or major revision of the strategic plan and/or management plan is warranted;
- Determining or reviewing primary coastal management issues and reserve and program niche and impacts;
- Interacting with the public throughout the management plan revision process; and
- Identifying roles and responsibilities for completing the plan.

A minor or routine update may be appropriate if the reserve did a complete an update of its strategic plan as part of the management plan revision approximately five years ago. In this case, the reserve could focus on updating the existing management plan to reflect actions completed; new planned actions (including new facilities or acquisition projects foreseen in the next five years); or shifts to program activities or priorities based on recent surveys, evaluations, needs assessments, or feedback from advisory committees. For minor or routine updates, reserves should focus primarily on Part 2 of *Reserve System Management Plan Guidelines and Resources*, but also refer to the process guidance in Part 1 of these guidelines.

A major or comprehensive revision of the management plan would be appropriate if it has been approximately 10 years or more since the reserve last updated its strategic plan or if the reserve has experienced a significant change (e.g., new manager, organizational change between or within lead agency, or shift in state or agency priorities) that affects its strategic direction. In this case, a more robust strategic planning process that engages key stakeholders and staff would be warranted to affirm or refine the reserve's vision, mission, overarching goals, and objectives. The revision would also focus on updating the plan content to reflect actions completed, new planned actions, and any shifts resulting from recent surveys, evaluations, assessments, or advisory committee feedback. For a major revision, reserves should focus on Part 1 of these guidelines, as well as on Part 2.

The next section, "Adaptive Management Approach to Strategic Planning", provides a list of considerations to help guide reserves in identifying the coastal management issues relevant to the reserve that also support national priorities.

Managing the Process

Once the reserve has determined whether a minor update or major revision is warranted, its staff should determine how they will manage the process and what type of support may be needed. Reserves may develop their plans in-house or through a contract, or a combination of both. Each approach has advantages and disadvantages.

If reserves choose to develop the plan without outside support, they have complete control over the process and the quality. However, it is very time-consuming for the entire staff. To ensure a smooth process, reserves should assess whether their staff has the appropriate skills (writing, editing, project management, facilitation) and the time to dedicate to the project. The plan will benefit from a lead that establishes clear expectations and consistent writing assignments, and keeps the group working toward an agreed-upon timeline. If chapters are to be written (or updated) by separate staff members, establish a common outline for those chapters before beginning to write and make sure an editor or the plan lead will unify the document into a consistent style and voice.

Contracting out part or all of the process could save reserve staff time. Reserve staff members will still have to dedicate a lot of time to providing necessary content and perspectives. If the reserve is not satisfied with the contractor, the process could be expensive and unproductive. It is important to interview contractors ahead of time, be clear about what the reserve needs help with (is it facilitating the strategic thinking, writing, editing, graphical support, etc.), and make sure contractors have the expertise to support those needs.

Confirming Reserve Priorities and Niche

The first step in revising a management plan is to establish or update the priorities that reflect the reserve's unique niche and complement other management efforts in the area. To do this,

1. Review existing state or agency priorities, the *Reserve System Strategic Plan*, site-specific needs assessments, program strategies, site profiles, and other planning documents.
2. Use existing advisory groups or set up a Management Plan Advisory Group to ground-truth coastal management issues and niche.
3. Use surveys or focus groups with thought leaders, the surrounding community, key partners, and others to determine coastal management issues and niche.

Narragansett Bay Reserve: Finding Their Niche

At the start of their 2010 management plan development process, the Narragansett Bay Research Reserve conducted a survey of the public and ran a series of focus groups with key partners to provide input on the niche of the reserve in the watershed. For a description of the process and information about the questions the staff used, see the appendix in the reserve's 2010 management plan. (*coast.noaa.gov/data/docs/nerrs/Reserves_NAR_MgmtPlan.pdf*)

Planning Strategically

After identifying its priority issues and niche, the reserve should identify the desired impact reserve programs will make during the five years that the plan is in effect. Many tools are available to help organizations think strategically about where they want to be and what they want to change. Examples familiar to reserves include SWOT (strengths, weaknesses, opportunities, and threats) analysis, logic models, structured decision-making, and issue-based planning. NOAA encourages reserves to research different options for approaching strategic planning, and to choose one appropriate for the reserve. Basic steps in the process are included within the "Preparing to Write a Reserve Strategic Plan" section of these guidelines.

Reserve strategic planning processes should result in the development of goals that identify how the reserve will influence the priority coastal management issues of the local area by using and strengthening existing programs to address gaps and needs. The strategic plan component of the management plan should not be a list of current reserve activities. Reserves should articulate desired impacts and achievable actions using a set of goals, objectives, and strategies. This is often a challenging process, and may benefit from facilitation expertise. It is important to involve staff and key partners, as appropriate, in this process.

Padilla Bay Reserve: Program-Based Strategic Planning

The Padilla Bay, Washington, management plan is organized by foundational program chapters. Those chapters are linked to priority coastal management issues identified in the beginning of the plan through the use of tables, which show how the reserve's programs align to support its core goals and objectives, as well as the five coastal management issues identified as the focus for 2016-2020. (*coast.noaa.gov/data/docs/nerrs/Reserves_PDB_MgmtPlan.pdf*)

Achieving Integration

If reserve strategic goals are focused on the impact the reserve will have on priority coastal management issues in the next five years, those goals are likely to require the effort of many staff members in a coordinated way.

While NOAA regulations require plans for research, monitoring, and education, reserves are encouraged to create a strategic plan that shows how an objective is accomplished by multiple sector-specific actions or strategies. As long as actions are associated with a sector or multiple sectors, this approach meets the regulations. If reserves start with the goals related to the coastal management issues and then think about how foundational programs and staff support those goals, there is a higher chance of being able to illustrate connections between your coastal management issues and foundational programs.

South Slough Reserve: Issue-Based Strategic Planning

The South Slough, Oregon, management plan for 2017-2022 is organized around three priority issue areas: climate change, habitat protection, and invasive species. The three priorities are not sector based. Rather, the research, education, coastal training, stewardship, public involvement, and administration programs of the reserve work in a fully integrated fashion to address the reserve's priorities. Each of the goals, objectives, and actions outlined in the strategic plan has a symbol to indicate the lead or co-lead sectors for the item, with other programs contributing as well. (*coast.noaa.gov/data/docs/nerrs/Reserves_SOS_MgmtPlan.pdf)*

Engaging Stakeholders

It is important to involve key stakeholders in the management plan development and revision at appropriate stages throughout the process. Key stakeholders include the people who can help the reserve accomplish its goals, close working partners, groups that may be doing similar or related work, and the reserve's biggest supporters or detractors. Involving the reserve's existing advisory boards or creating new ones specifically for this task can help reserves refine their local role, engage the public, guide programs, tap into local expertise , and identify duplicative efforts or opportunities to partner and increase effectiveness. Be explicit with advisory board members about their role, time commitment, and how their input will be used.

Engaging staff throughout the management plan process is critical to success, not only in completing the document, but also in implementing the plan. Be clear about time expectations and deliverables with staff in the beginning of the process, use good facilitation to make sure staff views are heard and incorporated into the plan, and set up regular meetings or agreed-upon communication avenues to make sure everyone stays on track and is aware of new developments. Understanding the many demands upon staff time and creating incentives for participation will be important.

Public involvement is very useful in developing a management plan. Engaging the public throughout the process (e.g., a kick-off public meeting, a meeting to go over a draft, or a final public comment meeting) will ensure that people feel a part of the process and have an opportunity to comment on the direction of the plan as it evolves and becomes more detailed. The NERRS regulations provide for when formal public notice and opportunities to comment may be required for changes to management plans. (15 CFR 921.33). NOAA recommends that reserve staff members engage with NOAA early in the management plan revision process to determine what notice and comment opportunities may be required. If you anticipate that contentious issues may arise, NOAA should be informed. It may be helpful to engage a neutral facilitator or mediator who has experience with public conflict resolution.

Review and Approval Process

Timeline

Developing or revising a management plan should take no more than 12-18 months. Revised management plans should be approved by NOAA on or before the previous plan's expiration date, which is five years after the current plan's notice of approval in the *Federal Register*.

The illustrative timeline in the table below lists the steps for developing or revising the plan. Reserves are encouraged to develop a timeline for the management plan revision that includes these steps and any other steps needed to meet local and state requirements. A timeline template is available on the NERRS Intranet to help with this task. NOAA will be a partner in completing the management plan, so all correspondence and progress should be documented by both NOAA and the reserve to ensure continuity of operations, regardless of staff turnover.

The plan is considered complete and ready for approval after all NOAA comments on the draft have been addressed, as well as any public comments, if applicable. NOAA will then issue a *Federal Register* notice announcing the availability of the approved plan or send a letter of approval to the state lead agency, with a copy to the reserve. The official management plan approval date is the day that the *Federal Register* notice is published or the date NOAA signs the approval letter.

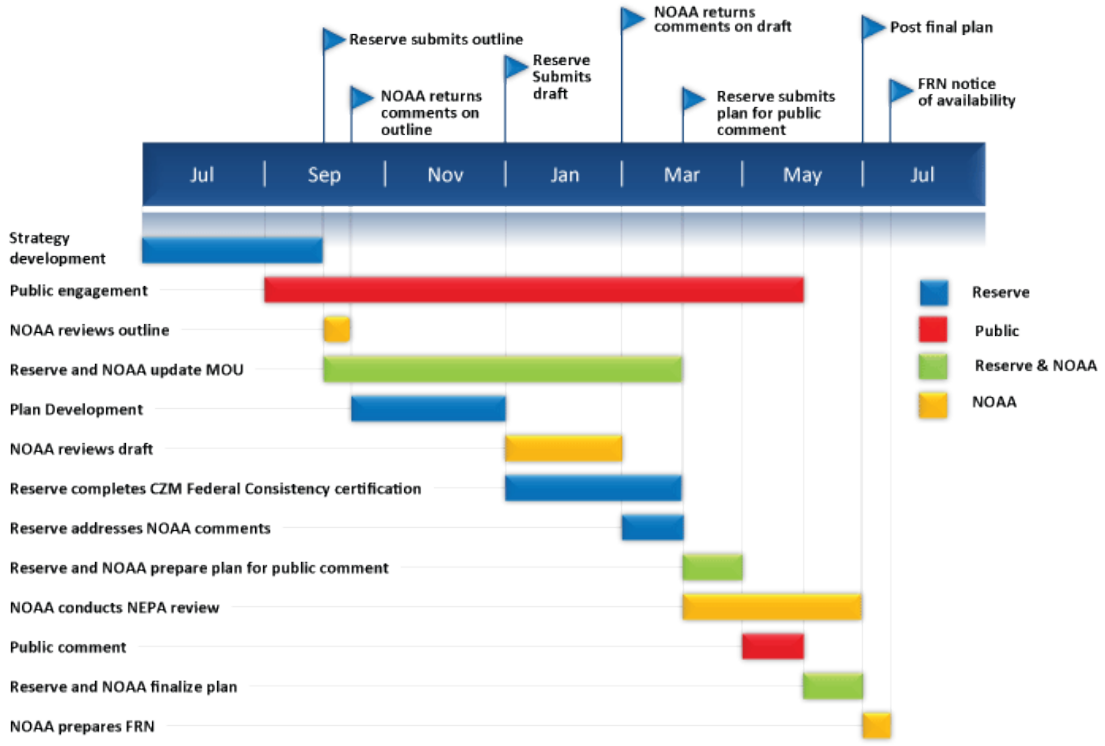

Figure 2: Timeline for Review and Approval Process

Table 1: Reserve Management Plan Development Timeline

Action	Reviewer	Time
SCOPING PHASE: Reserve discusses strategy for plan development and creates timeline for project with NOAA liaison	Reserve NOAA liaison	Variable: 12 to 18 months before expected completion date
Reserve submits outline or strategy and timeline to NOAA liaison	NOAA liaison	NOAA liaison will provide consolidated comments within two weeks of receipt of outline
Reserve involves stakeholders/public to inform plan contents (at discretion of reserve)	Reserve/stakeholders	Throughout the revision process
Reserve identifies all memoranda of understanding (MOU) that require updating and works with partners to update Note: the MOU between the state host agency and NOAA should follow the template (on the NERRS Intranet)	Reserve Program partners NOAA (if applicable): NOAA liaison will coordinate appropriate reviewers	Variable Note: MOUs can take several months to review due to legal review procedures
DRAFTING PHASE: Reserve develops/updates chapter content for the plan	Reserve Stakeholders (optional) NOAA liaison	Variable
Reserve consults with state coastal management program to identify applicable enforceable policies and consistency with those policies.	State coastal management program federal consistency representative	
Reserve submits drafts of chapters for preliminary NOAA feedback (optional)	NOAA liaison	NOAA liaison provides comments within two weeks per chapter submission
Reserve submits complete draft of plan to NOAA electronically	NOAA liaison NOAA sector leads for research and monitoring, education, training, and stewardship General Counsel/Oceans and Coasts	NOAA liaison will provide consolidated comments within two months of receipt of draft. Review of training chapter by Coastal Training Program Oversight Committee may require an additional 2-4 weeks, for a total of ~10-12 weeks.

Action	Reviewer	Time
Reserve submits complete draft to state agency for review, and incorporates changes into updated draft	State agency representatives	Variable
NOAA and reserve manager/staff discuss comments on plan and resolve outstanding questions and issues based on NOAA, state agency, and state coastal zone management plan reviews	NOAA liaison Reserve manager/staff	Variable
CLEARANCE AND APPROVAL PHASE: Reserve submits updated draft that addresses comments for NOAA clearance	NOAA liaison NOAA program lead	Variable
NOAA conducts National Environmental Policy Act (NEPA) analysis of plan and MOU and prepares NEPA documents	NOAA liaison Office for Coastal Management environmental compliance (NEPA) coordinator	Two to four weeks
NOAA formally submits a federal consistency determination to the state coastal management program	NOAA liaison Coastal Management Program representative	Three months
NOAA typically prepares a *Federal Register* notice providing a 30-day public comment period on the draft plan	NOAA liaison NOAA program lead	Two to four weeks
Reserve simultaneously prepares a similar notice for 30-day public comment period and posts draft plan to reserve website (posted draft must include MOU between NOAA and host agency)	Reserve manager/staff	Same week as above
Reserves are encouraged to hold a public meeting to brief stakeholders on the management plan, concurrent with 30-day comment period	Reserve manager/staff	One day

Action	Reviewers	Time
After the 30-day comment periods, reserve addresses all comments received and creates an appendix to plan that outlines how comments were addressed. NOAA amends, as applicable, the environmental compliance documentation	Reserve manager/staff NOAA liaison Office for Coastal Management NEPA coordinator	Reserve and NOAA work together to address comments within one month of receipt of comments
Reserve posts final plan on reserve website; NOAA posts final plan on NERRS website	Reserve manager/staff NOAA liaison	One day
NOAA finalizes NEPA documentation	Office for Coastal Management NEPA coordinator	Two weeks
NOAA prepares *Federal Register* notice announcing the approval of the plan and sends to *Federal Register* for publication	NOAA liaison NOAA division chief Office for Coastal Management director	Two to four weeks
NOAA notifies reserve and leadership of reserve's state host agency or university of the plan's approval	NOAA liaison NOAA program lead	One week

Following the Regulations

Specific requirements involved in revising a management plan include MOUs, NEPA, federal consistency, and the public involvement and plan approval processes, as follows:

Memoranda of Understanding

A memorandum of understanding is required between the state and NOAA to formalize the federal-state relationship and demonstrate the long-term commitment by the state to maintain and manage the reserve in accordance with Section 315 of the Coastal Zone Management Act, 16 U.S.C. 1461, and applicable regulations. The MOU should be reviewed periodically to ensure it is up to date. A template for the MOU between NOAA and the reserve host agency can be found in the "Management Plan" section of the NERRS Intranet.

Additionally, reserves must include all other necessary MOUs in the plan (15 CFR 921.13 (a)(11)). Examples include those agreements between the state agency and other entities that manage land within the reserve. These agreements should ensure that all lands within the reserve are managed for the purposes by which the reserve was established and management activities are coordinated.

Federal Consistency

Every reserve in a state that has a federally approved coastal management program must include in the final management plan a determination that the reserve's plan is consistent to the maximum extent practicable with that program (15 CFR 921.4(b), .13 (a), and .30(b)). To this end,

- Reserves are encouraged to work with their state's coastal management program during development of the plan to identify any state enforceable policies that apply to the reserve's proposed work and ensure that the plan is consistent to the maximum extent possible with the enforceable policies.
- After a complete draft has been submitted to NOAA for review, NOAA will formally initiate a federal consistency review by the state coastal management program. This may take the form of a negative determination if no coastal effects are foreseen, or a consistency determination if the revised plan includes activities that will affect any coastal use or resource of states with approved coastal management programs.

For additional information on federal consistency, please see *coast.noaa.gov/czm/consistency*.

Environmental Compliance

The National Environmental Policy Act (NEPA) requires federal agencies to undertake an assessment of the environmental effects of their proposed actions before making decisions. The NEPA review can result in one of three determinations:

(1) If the action does not have significant effects on the human environment, is not part of a larger action, and there are no extraordinary circumstances, it may qualify as a categorical exclusion (CE).
(2) If a CE is not applicable, then an environmental assessment (EA) may be prepared to analyze if the action would have significant effects. If the EA demonstrates that the action would not have significant effects, the decision-maker (Office for Coastal Management) must prepare a Finding of No Significant Impacts (FONSI).
(3) If significant environmental effects may or will occur, an Environmental Impact Statement (EIS) must be prepared.

In January 2017, NOAA issued new guidance for implementing NEPA (NOAA Administrative Order 216-6A), which included identification of a new categorical exclusion for certain research reserve management plan updates. This new categorical exclusion (A5) applies to "updates to existing NERR management plans, provided that the update does not change NERR boundaries or add or significantly change allowable uses, uses requiring a permit, or restrictions on uses." In order to apply this (or any other) CE, NOAA must also consider the presence of one or more extraordinary circumstances. An extraordinary circumstance is one in which a normally excluded action may have significant effects warranting additional NEPA review (NAO 216-6A Companion Manual, Section 4.A.). These include, but are not limited to, adverse effects on an area with unique environmental characteristics, highly controversial environmental effects, uncertain environmental effects, and adverse effects on protected species (e.g., Endangered Species Act). Presence of an extraordinary circumstance merely requires additional analysis to determine if an EA or environmental impact statement (EIS) needs to be prepared. Reserves should work with their site liaison and the Office for Coastal Management's Environmental Compliance Team early in the revision scoping process to

determine the appropriate level of NEPA review. Early coordination is especially important for reserves proposing a change to their boundary or significant changes to uses, or when the presence of extraordinary circumstances is likely to require an EA or EIS.

Because boundary changes or changes to allowable uses may require further NEPA review, such as development of an EA or EIS, NOAA's Office for Coastal Management determined that boundary expansions will generally be addressed outside of the management plan revision process. There may be some exceptions if the expansion area has already been the subject of NEPA analysis, for example, in the case of some in-holdings covered in the reserve's original Final Environmental Impact Statement (FEIS).

Please note that, even if a reserve's management plan revisions are categorically excluded from further NEPA review, there may be components of the plan that potentially require additional assessment if and when funded by NOAA. These include all construction activities (including trail development), land manipulation activities, invasive species control activities, restoration activities, land acquisitions, and certain research or monitoring activities, especially if they involve habitat disturbance or disruptions to the water column. Each operations, construction, and land acquisition award will be assessed for environmental compliance and may require additional topic-specific environmental assessments.

NOAA prepares a memorandum documenting the application of a CE. This memo will be completed by the Office for Coastal Management's Environmental Compliance Team during the final clearance review of the final management plan. If NOAA determines that additional NEPA review is required, the Office for Coastal Management will work with the reserve to prepare the necessary analysis, and prepare a public notice and comment plan. Preparation of an EA or an EIS should occur in parallel with the drafting of the management plan, and public notice of the EA can be accomplished using the existing public notice process required under the Reserve System regulations. Additional public notice opportunities are required for the scoping phase, and for the draft and final EIS/management plan. Additional resources on NEPA can be found at *nepa.noaa.gov*.

Public Involvement

Community members are important constituents and partners to reserves. When revising management plans, it is important to develop a public involvement strategy to engage the community in the reserve's work, seek their advice and expertise in its programming, and identify any potential conflicts. Ideally, public input would be sought at several points in the process of developing a management plan.

NERRS regulations provide that NOAA may require notice and comment before approving a boundary change or major change in a management plan and that NOAA will approve changes by publishing a notice in the *Federal Register* (15 CFR 921.33). NOAA will generally publish a notice of availability of each draft management plan in the *Federal Register* for a 30-day public review and comment period, but may opt not to do so in the case of a minor routine plan revision. If NOAA publishes a public notice, the reserve is responsible for publishing an equivalent notice in the local media to provide a concurrent 30-day public comment period on the draft plan. In the event an EIS is needed, public notice and comment is required for scoping and for the draft EIS. (15 CFR 1501.7; 15 CFR 1503.1).

Reserves are encouraged to hold a public meeting during the scoping phase or during the public comment period. If comments are received during the public review comment period, the reserve should address them, as is reasonable, in the plan. Response to these comments and a description of the public process should be included as an appendix of the final plan (see template in the "Management Plan" section of the NERRS Intranet).

Approval Process and Compliance

The plan is ready for approval after comments from NOAA and the public have been addressed. NOAA will issue a *Federal Register* notice announcing the availability of the approved plan. The publication date of this notice is considered the official approval date for the management plan. NOAA will also send a letter to the reserve and lead agency notifying them of the approval date. The plan is valid for five years from the approval date. The approval letter and *Federal Register* notice are filed at NOAA. Approved management plans should be made available on both the reserve's and NOAA's NERRS website.

Adaptive Management Approach to Strategic Planning

The Reserve System addresses complex coastal management issues by integrating and applying research, education, training, and stewardship expertise within the current network of 29 protected areas. With its current strategic plan (2017-2022), the Reserve System is focusing investment and expertise to address environmental change, water quality and quantity, and habitat protection and restoration challenges. These nationally significant issues require specific and strategic local response best achieved through adaptive management, whereby improved understanding of resources leads to improved management choices and ultimately improved protection of the resources. (Williams and others, 2009) This section describes the elements of adaptive management and its relevance for reserves when conducting strategic planning now and into the future.

What Is Adaptive Management?

Adaptive management is "a decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood," as defined by the National Research Council. It is a structured approach for improving resource management by learning from these outcomes. (Sexton and others, 1999)

> *"Ecosystems are not only more complex than we think; they're more complex than we can think."*
>
> – Egler

Why Is Adaptive Management a Good Choice for the Reserve System?

The Reserve System has a mandate to protect and preserve estuarine environments for specific purposes and is well suited and designed to monitor and apply knowledge in a long-term capacity to improve coastal management. The Reserve System's place-based network provides an ideal platform for iterative decision-making whereby clear objectives can be identified, monitored, and adapted. Furthermore, reserves are well suited to undertake this approach given the criteria and key elements discussed in the next section. We have a mandate, mission, and institutional capacity to address many of the pressing coastal issues, such as climate change, that create implicit uncertainty in environmental conditions and hence require a flexible approach to dealing with them.

> *"Knowledge has to be improved, challenged, and increased constantly, or it vanishes."*
>
> – Drucker

Key Elements of Adaptive Management

When applying an adaptive management approach, two key conditions should be met: (1) there must be a necessary mandate to take action in the face of uncertainty and the problem must be important enough to require action of some kind; and (2) there must be institutional capacity and commitment to sustain an adaptive program that includes long-term measurement and evaluation of outcomes. (Lee, 1993; Wilhere, 2002) In addition to these two overarching conditions, there are additional elements or conditions for adaptive management that must be in place to be successful. (Williams and others, 2009)

These include the following:

1. **Adequate baseline understanding and assumptions about the system** being managed as a foundation for learning. From this understanding, appropriate management objectives and actions can be determined.

2. **Clear and measureable management objectives** should be identified to measure progress and understand when it is appropriate to re-evaluate actions.

3. **Opportunities to select from a range of management actions** to meet objectives. The use of current information based on prediction rather than assumption to make these determinations is important in an uncertain environment. Actions should be multidisciplinary and participatory, and should be evaluated for impacts and consequences. Additionally, where feasible, it is important to explain uncertainty using testable models—conceptual, qualitative, or quantitative, depending on capacity.

4. **Mechanisms for incorporating learning to inform future actions** should be used throughout the process. This assumes that the process, institutions, and actions themselves are flexible enough to account for learning and the application of that knowledge. It is ideal when responses to management actions can be assessed before a decision about the next management action is made. Organizations must monitor, assess, and re-evaluate.

5. **Monitoring that can be established and maintained** to evaluate outcomes of actions. Adaptive management requires measuring the response to actions taken to determine if the program is on track to meet objectives or needs to re-evaluate actions.

In order to create informed objectives, it is important to understand the baseline conditions and actions that have brought the system to its current state. Reserves have resources (e.g., ecological characterizations, System-Wide Monitoring Program (SWMP) data and syntheses, and stakeholder information from education and Coastal Training Program activities) that provide a baseline of information to create measurable objectives, implement management strategies, monitor and assess their efficacy, communicate success or challenges, and re-evaluate to determine subsequent management actions. Flexibility is important in the decision- making process where management actions are re-visited in response to measured outcomes. (Doremus and others, 2001)

Linking Local and National Priorities in the Context of Adaptive Management

Using management plans and the concept of adaptive management is contingent on knowing the context of what you want to achieve in terms of the local reserve priorities and how they relate and contribute to the priorities of the state agency and the Reserve System. These priorities provide the context for reserve planning and contribute to work that is complementary, not duplicative, of other state and local programs. More information about defining the reserve's niche within the context of local, state, and national priorities is identified in the next section "Preparing to Write a Reserve Strategic Plan."

The questions below, as well as the information above on adaptive management, are good starting places to help the reserve conceptualize the scope and scale of the management plan and to begin preparing the reserve to identify niche, goals, and objectives.

- What are the expectations, mandates, and important goals of the state partner?
- What are the critical ongoing or existing local estuarine environmental issues that are not covered by the partner goals?
- What are the local emerging issues or threats that are likely to become increasingly important in the next five years?
- What science, education, training, stewardship, or leadership is needed to address the most pressing local issues relevant to the reserve?
- Who else is working on these issues near the reserve?
- What are the working relationships with key state programs such as the coastal management program on these issues?
- What topics and functions are appropriate for the reserve to work on, given staff strengths, limitations or constraints, infrastructure, resources, and state partner priorities?

Waquoit Bay Reserve: Aligning National and Local Priorities

The 2017-2022 *Reserve System Strategic Plan* describes three areas for strategic focus and investment, including water quality. For Waquoit Bay, this national priority is also a local priority, specifically nitrogen pollution. The communities surrounding Waquoit Bay are facing difficult decisions as they grow. Current septic systems are not doing a good enough job keeping nitrogen out of Cape Cod's waters; and this is leading to water pollution that threatens the environment, quality of life, and the livelihood of this tourist destination. Over the past 20 years, the Waquoit Bay Reserve has attracted researchers from around the world to study the sources and impacts of nitrogen in the bay through NERRS-funded research projects and reserve-led monitoring focused on this topic. Reserve-led research and synthesis of research has contributed to a wealth of information and new questions. Reserve K-12 education programs, community education programs, and the Coastal Training Program have focused on communicating the science of nitrogen pollution to the public and are focusing on what people can do as citizens or as decision-makers to be a part of developing or implementing the solution. Integrated work by staff at the reserve is addressing a locally important coastal management issue that contributes directly to the national priorities of the system. To learn more, visit *waquoitbayreserve.org*.

The current *Reserve System Strategic Plan* focuses its core strengths of research, stewardship, education, and training on three national priorities—environmental change, habitat protection and restoration, and water quality and quantity. Because of the state-federal partnership inherent in the Reserve System, management plans must articulate both how reserves address local coastal management issues and how local work also contributes to the national system.

Some of the Reserve System's strategic objectives will be achieved through coordinated national programs, like the System-Wide Monitoring Program. Others represent a collective vision for the work individual reserves do, such as implementing research projects that use reserves as sentinel sites for detecting and understanding the effects of climate on estuaries. It is unlikely that an individual reserve will address all of the objectives in the *Reserve System Strategic Plan*, but it is expected that a significant portion of the reserve's work contributes to the system-wide goals and objectives.

The following questions will help reserves align their plan to address goals and objectives within the *Reserve System Strategic Plan*:

- Which NERRS strategic plan objectives and strategies can the reserve address?
- How is the reserve addressing climate change, water quality, and habitat issues? How are national programs like SWMP, Coastal Training Program, KEEP, the NERRS Science Collaborative, and Davidson Fellowship contributing to filling the gaps, reducing stressors, and meeting the needs identified by the reserve? Could they better support local needs?

- What are the critical stressors, information needs or gaps, and so forth related to habitat, water quality, and climate at the reserve? What is the reserve's role in addressing those gaps, both as a whole and within the reserve's programs (research, education, training, and stewardship)?

Considering the Impacts of Climate and Non-Climate Related Stressors

An important component of adapting a reserve's management plan is considering how climate-related stressors and non-climate stressors may affect a reserve's ecosystem or programming needs over time. The following guidance and resources are offered to help with considering these stressors in long-term management, particularly in the context of facilities, land acquisition, resource protection, and restoration planning.

Historically, land acquisition, protection, and restoration planning looked at a variety of anthropogenic and natural stressors—such as development trends, land zoning, habitat condition, or invasive species—to support the prioritization process. Climate-related stressors had not been commonly factored into this process. Environmental changes can also affect choices when siting or designing facilities and selecting building materials. In 2010, NOAA developed the *Programmatic Framework for Considering Climate Change Impacts in Coastal Habitat Restoration, Land Acquisition and Facility Development Investments,* which sought to integrate climate considerations into new or updated acquisition plans that are part of reserve management plans.

Reserves are strongly encouraged to identify a set of climate-related considerations that are relevant in the prioritization of acquisition or restoration areas or for identifying shifts needed in protection of the reserve's resources. When factoring in climate stressors, the reserve should consider both short- and long-term impacts. Some examples of climate stressors used to develop criteria might include changes in relative sea or lake levels, changes in storm intensity, and changes in precipitation patterns. (*Guide for Considering Climate in Coastal Conservation, 2016*)

When identifying and describing climate and non-climate stressors, consider the following questions:

- What climate stressors are most relevant to the reserve? What are the potential short- and long-term impacts linked to the stressors? How will previously identified acquisition or restoration priorities be impacted by climate stressors? How can the reserve maintain the ecological unit with key acquisitions or restoration projects? What climate criteria are important to consider in prioritizing acquisition or restoration areas? Are there other climate change planning documents applicable to the reserve?
- What non-climate stressors are most relevant to the reserve? What are the potential short- and long-term impacts linked to the stressors or threats? How will already identified acquisition priorities be impacted by these stressors? What non-climate criteria are considered in the prioritization of acquisition areas?
- Are efforts already underway to address the impacts of climate change related to the reserve? If so, are they sufficient? If not, what additional data, information, or resources would be helpful or are needed?
- Are there crucial thresholds (e.g., changes in temperature, salinity, turbidity) that when crossed will adversely impact the reserve?

Table 2: Example Climate Stressor-Impact Links

Stressor	Short-term Impacts	Long-term Impacts
Sea Level Rise	Increased inundation, Increased coastal erosion, Changes in salinity, Functional changes in habitats	Disappearance of habitats, Change in species diversity, Functional change in habitats, Habitat migration
Storm Intensity	Increase in storm surge, Increased coastal erosion	Damage to key habitats, Changes in species diversity
Precipitation Patterns	Increased or decreased drought, Changes in salinity, Changes in sediment/pollutant loadings, Increased flooding	Changes in water quality, Changes in species diversity, Functional changes in habitats

In addition to impacts, reserves should value any potential ecological benefits derived from addressing climate and non-climate stressors. Benefits could include enabling shifts in habitat for species to adapt or creating a refuge for sensitive species, creating habitat migration corridors, and buffering storm or flood impacts. However, climate stressors should be evaluated over the longer term as well to determine if those ecological benefits will be helpful well into the future.

Examples of Prioritization Criteria for Climate Change Considerations

- Current degree of vulnerability of the area to locally relevant climate change impacts.
- Identification of, and exposure to, future climate stressors and impacts. This could mean a 30-year time horizon, but ideally a 50- or 100-year time horizon should be considered.
- Adaptive capacity of the area (i.e., ability to respond and adapt) to the identified climate stressors, such as
    - Connect habitats to allow for species migration range to adapt to changes in temperature, salinity, or other environmental conditions
    - Protect key ecosystem features that play a significant role in maintaining system functions and natural processes
    - Conserve habitat and species diversity
    - Reduce anthropogenic stressors to existing habitats and conservation values
- Elevation (e.g., subsidence, accretion), especially important in coastal areas impacted by sea level change

Examples of Prioritization Criteria for Non-climate Considerations

- Immediate threats of development
- Resilience of the area to anthropogenic impacts that could include:
    - Provide connectivity of habitats to allow for species migration (e.g. removing barriers)
    - Protect key ecosystem features that play a significant role in maintaining system functions and natural processes (e.g. natural shorelines)
    - Conserve habitat and species diversity (e.g. diversity 'hot spots')
- Exposure to invasive species impacts over time
- Existing zoning practices
- Visitor uses impacts

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Resources

U.S. Fish and Wildlife Service Training at National Conservation Training Center – Introduction to Structured Decision-making training course provides an introduction to structured decision-making in the context of natural resource management challenges. The training also provides hands-on experience with decision tools, decision trees, and multiple objective ranking techniques. Their Adaptive Management: Structured Decision-Making for Recurrent Decisions training course frames adaptive management within the context of structured decision-making, with an emphasis on information and tools to address uncertainty regarding responses to management actions and the value of reducing uncertainty to improve management.

Ecosystem-Based Management Tools Network – provides focus questions, suggested reading, case studies, approaches, tools, and links to other core elements of ecosystem-based management tools.

Adaptive Management: A Tool for Conservation Practitioners – provides steps in the process and principles of adaptive management.

Learning for Sustainability: Adaptive Management – Learning While Doing – provides information, guides, and selected readings on the use and application of adaptive management with uncertainty—including selections on adaptive management increasing resilience to climate change.

NOAA's Guide for Considering Climate Change in Coastal Conservation – provides a step-by-step approach for incorporating climate change information into new or existing conservation plans, with a focus on climate considerations and key resources specifically relevant to coastal areas.

NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer – shows how various levels of sea level rise will impact coastal communities. The tool covers coastal areas of the U.S., including U.S. territories, and addresses sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.

U.S. Climate Resilience Toolkit – outlines a five-step planning process for vulnerability assessments. This framework can help identify climate hazards and develop solutions to lower climate-related risks.

Preparing to Write a Reserve Strategic Plan

Strategic Planning Process

Strategic planning is a systematic process to assess an organization's direction and priorities. A good strategic planning process requires time and effort to gather and analyze data and trends to set a baseline of understanding; assess target audiences related to all program areas; identify organizational niche and priority goals, objectives, and actions; implement actions to meet objectives; and monitor and evaluate progress toward meeting objectives.

To create an effective strategic plan that meets coastal management needs, reserves must understand the social, economic, political, and cultural dynamics of the community in which the organization operates, and must engage all stakeholders.

Identifying Program Target Audiences

It is important to first identify the target audiences for a program's efforts. Target audiences may be within or outside the host agency and composed of individuals who have the ability to influence and support the reserve's major resource issues. Each program at the reserve should assess their target audiences by understanding their skills and needs, as well as the activities and products currently employed to serve that audience. It is important to understand emerging issues and needs that these audiences may need to address or influence. This step can be accomplished via formal needs assessments, focus groups, surveys, and so forth. Note: The state coastal management program is a key partner in identifying audiences and is an audience itself.

Assessing Skills and Capacities of Reserve Programs

The next step should be to assess reserve program capacities because this will affect what can be accomplished. One way to approach this step is via a SWOT (strengths, weaknesses, opportunities, and threats) analysis. Programs can answer certain questions to provide information about program expertise, contributions to target audiences, trends, and resources the program may need in the future to be successful (Mind Tools, 2009). Questions to inform this analysis:

Strengths: What are the reserve program's unique characteristics and resources? What does the target audience view as the program's main strengths? What trends can the program build on?

Weaknesses: What does the program lack that the target audience needs? What resources do reserve programs need to meet current target audience needs?

Opportunities: What could the reserve program offer that meets the needs of the target audience to effectively manage coastal resources? How are other programs addressing target audience needs?

Threats: Because of program weaknesses, what threatens reserve programs? What expertise do reserve programs lack to meet future target audience needs?

Table 3: SWOT Chart

	Helpful	**Harmful**
Internal	Strengths	Weaknesses
External	Opportunities	Threats

To complement this approach, NOAA has developed questions for each system-wide program to help identify strengths, weaknesses, and opportunities to then identify the niche for each program. Although the questions for each program are binned similarly and contain many of the same questions to provide a consistent approach, there are differences between the programs. Key documents for each program are suggested as references when considering these questions.

Research and Monitoring Program

Priority Issues – What are the priority coastal management issues for the reserve that the research program can address? How were these issues identified? Do they align with the broader issues being identified at the reserve for this plan? Do they align with the *Reserve System Strategic Plan*, SWMP plan, and other system-wide documents?

Priority Audiences – Who are the target audiences that interact with and benefit from the research program? How were these audiences identified? What do you know about the skills, abilities, and current level of knowledge of the target audiences?

Program Alignment and Delivery – How has or does the research program plan to adopt and adapt system-wide research and monitoring programs (e.g., SWMP applications and habitat mapping) to address the reserve's priority issues and reach target audiences? What major activities will the research program engage in to address the priority issues identified above within the next five years? How does the research program support and align with system-wide plans and efforts (e.g., SWMP Plan, Research and Monitoring Plan, Community Education efforts)? How does the research program currently support reserve, coastal management program, local community, and regional science priorities? How does the research program coordinate with and build upon other programs at the reserve and within the Reserve System (e.g., coastal training programs, education products or programs)?

Program Needs and Gaps – What are the major program needs and gaps that may or may not be addressed during the period of this management plan? How will these needs and gaps affect research programming and what are the consequent impacts to the research program?

Program Impacts – What are the major impacts and outcomes that program staff envision as a result of research and monitoring activities? How will human communities and natural ecosystems benefit from these activities?

Current and Anticipated Partnerships - Who are the program's partners and why does the reserve partner with them? Who does the program hope to partner with in the future? Does the program partner with NOAA offices? If so, please describe. If not currently partnering, are there opportunities to build partnerships?

Program Monitoring and Evaluation – How does the reserve evaluate the success of the research program? What are the program's expected outcomes?

Dissemination of Program Results – How will the reserve communicate program impacts and results? Keep in mind the current Reserve System Research and Monitoring Database provides a mechanism for developing a library of research projects and publications that can be shared. NOAA is also interested in knowing about other mechanisms (e.g., conferences, classroom modules, newsletters, social media, etc.) that can be used to disseminate program results and information beyond the audiences immediately involved in the project.

Supporting Documents:

For guidance, reserve research and monitoring program staff can refer to the following documents: 2017-2022 *Reserve System Strategic Plan*, *Research and Monitoring Plan*, *System-Wide Monitoring Program Plan*, *and Reserve System Sentinel Sites Program Guidance*, habitat mapping implementation protocols, and Coastal Management Program Section 309 Assessment and Strategies.

Education Program

Program Context – What is the setting and context in which the education program operates, including ecological and socioeconomic context? What is the geographic scope and service area of the program (e.g., which counties or school districts)? How are changes in demographics impacting programmatic decisions or opening new opportunities for programming? What has changed since the last update of this plan?

Priority Issues – What are the priority issues for the reserve (including emerging issues) that the education program can address? How were these issues identified (e.g., were any needs assessments or evaluation reports used)? Do these priorities align with the Reserve System Strategic Plan, K-12 Estuary Education Program, Community Education Framework, or NOAA Education Strategic Plan?

Priority Audiences – Who are the target audiences that interact with and benefit from the education program? How were these audiences identified? How do these audiences connect to the priority issues? What is the total population of the audience the program plans to target? What percentage of that population does the program plan to target within the next five years? Are underserved and underrepresented populations a target audience for education programs?

Program Alignment – How does the education program work with other sectors and the manager to achieve the reserve's goals and objectives? How does the education program integrate SWMP and other reserve research? How does the education program contribute to system-wide plans and efforts (e.g., SWMP, Research and Monitoring, Community Education)?

Program Delivery – What major activities will the program undertake that will address the priority issues identified above within the next five years? What type of programming will the program emphasize and why? (Type of programs: professional development programs, students programs, public programs, outreach programs, community education programs).

Program Needs and Gaps – What are the major program needs and gaps that may or may not be addressed during the period of this management plan? Which of the identified education needs are required to address issues in the next five years? If not addressed, how will these gaps affect education programming, and what are the resulting impacts to the education program?

Program Impacts – What are the major impacts and outcomes that will result from education activities? How will the program measure its success?

Current and Anticipated Partnerships – What is the niche that the program has carved out within the community? Reference any market analysis data or research done that confirms this niche. How does education work with and build upon other programs or initiatives within, as well as outside of, the Reserve System? Who are key Teachers on the Estuary (TOTE) partners? What is the nature of these partnerships (e.g., what role do partners play), and why does the reserve partner with them? What are the shared goals with these partners? Does the program want to expand any strategic or training partnerships? If so, with whom does the program hope to partner with in the next five years?

Program Monitoring and Evaluation – How does the program evaluate its success? What tools does the program use? How does the program use evaluation data, including performance measures, in programming and planning for TOTE or other education programming? What is the role of the reserve's advisory committee?

Dissemination of Program Results – How does the reserve plan to communicate program impacts and results? How does the program engage with education practitioners outside of the Reserve System to share results and experiences, and help advance the field of environmental education? Will the program publish results in journals, and if so, which ones?

Supporting Documents:
NOAA recommends the following documents for guidance: 2017-2022 *Reserve System Strategic Plan*; K-12 *Estuary Education Program (KEEP) Framework* document; *Teachers on the Estuary Program Description Community Education Framework Document*; *Education Sector Performance Measurement Guidance*; and the *NOAA Education Strategic Plan 2020- 2040*. All approved education program descriptions can be found on the Reserve System intranet. Additional Reserve System Guiding documents include the *System-Wide Monitoring Program Plan* and *Reserve System Sentinel Sites Program Guidance*. Coastal Management reference documents include the *Coastal Management Program Section 309 Assessment and Strategies*.

Coastal Training Program

Program Context – What is the setting and context in which the Coastal Training Program (CTP) operates, including ecological and socioeconomic context? What is the geographic scope and service area of the program?

Priority Issues– What are the priority issues (including emerging issues) for the reserve that the Coastal Training Program can address through training or technical assistance? How were they determined? For example, what conditions make these issues a priority? Were they identified through needs assessments?

Priority Audiences – Who are the target audiences that interact with and benefit from the CTP? How were these audiences identified? How do they link to the priority issues? What future audiences might become important over the next five years?

Program Alignment and Delivery – How does the CTP support and align with other sectors and the manager to achieve the reserve's goals and objectives? How does the CTP contribute to system-wide plans and efforts (e.g., Climate Change Implementation, SWMP, Research and Monitoring, Community Education)? What are the program's training delivery systems, including the approaches employed in training events? What additional training delivery systems might the program implement over the next five years?

Program Impacts – What are the reserve's training goals and objectives for the next five years? What major impacts and desired outcomes and impacts does the reserve anticipate from the CTP? How do these contribute to the reserve's goals and objectives?

Program Needs and Gaps – Does the CTP have the capacity it needs to meet its strategic objectives? If not, how might the reserve either increase capacity or reduce program commitments over the next five years? What are the major program needs and gaps that may or may not be able to be addressed during the period of this management plan? How will these needs and gaps affect potential programming and subsequent impacts? What training gaps are identified and required to address issues in the next five years?

Current and Anticipated Partnerships – How does the CTP work with and build upon other programs or initiatives within, as well as outside of, the Reserve System? Who are the program's key training partners? What is the nature of these partnerships (e.g., what role do partners play)? What are the shared goals? Does the program want to expand any strategic or training partnerships? If so, with whom does the program hope to partner with in the next five years?

Program Monitoring and Evaluation – How does the program evaluate coastal training? What tools does the program use to evaluate itself? How does the program use its evaluation data, including the CTP performance measures, in programming and planning for the CTP? What is the role of the CTP Advisory Committee?

Dissemination of Program Results – How does the program plan to market the reserve's training activities and communicate program results? Does the program use a newsletter or website to market training activities? Does the reserve use social media to communicate? Do training partners help advertise training opportunities?

Supporting Documents:

For guidance, reserve educational program staff can refer to the following documents: 2017-2022 *Reserve System Strategic Plan*, *Climate Change Implementation Plan*, *System-Wide Monitoring Program Plan*, *Reserve System Sentinel Sites Program Guidance*, and *Coastal Management Program Section 309 Assessment and Strategies*.

Developing Reserve Program Niches

Assessing the information above allows each program to develop its niche, which is the intersection where the capabilities and activities of the program are uniquely suited to meet the needs of the target audience. This information should be shared with all reserve staff members, ideally in a meeting where all programs are represented and can discuss how they can work together collectively.

Reserve Niche

The unique suite of functions the reserve provides to meet target audience needs that are not met by others.

Where's Stewardship?

Due to the complexity and variability of the ways that stewardship programs are focused and operated at each reserve, this program has not been identified as a system-wide program with a specific program niche as identified for research, education, and coastal training. Stewardship functions are included in the research and monitoring, resource protection, public access, and land acquisition components, as well as in the optional restoration and resource manipulation components of a management plan. The skills and assets of the stewardship staff are applicable and interrelated to all other components of reserve management. Figure 1, "Relationship of Reserve Management Plan Components," illustrates how the functions of stewardship are manifested in the planning paradigm. Reserves should answer similar questions for the stewardship program as those asked for research and monitoring, education, and training.

What about Other Programs?

In Part 1 of this guidance, NOAA is only providing thought questions for those system-wide programs with consistent processes, protocols, and evaluation mechanisms. However, NOAA recognizes that several other programs at reserves may also contribute to this strategic planning process. It is strongly advised that additional programs ask similar questions to determine each program's niche. The approach outlined above should be appropriate and flexible for each reserve's structure.

Developing the Reserve Niche

When each program understands its niche, these program characteristics can be integrated to develop the niche of the reserve as a whole. The programs' combined efforts meet the needs of a wider, more complete target audience. It is important to understand the unique role that the reserve will play in meeting target audience needs, as there may be several local providers offering similar products and services. It is beneficial to either collaborate with these organizations, or to focus unique skills and services of the reserve on meeting specific target audience needs.

Questions to inform niche development:
What will target audiences' needs be in the future? Which target audience needs can be filled by other organizations? Based on program strengths, which needs can the programs best meet? What are the unique products and services the reserve offers that the target audiences cannot get elsewhere?

NOAA's online resource "How to Write Your Strategic Plan," has details and a worksheet to help develop a niche and determine which needs of the target population can be uniquely met by the reserve and which can be met by other providers.

Developing Shared Vision and Mission Statements and Goals, Objectives, and Actions

Once a niche is determined, the reserve will develop shared vision, mission, goals, objectives, and actions, culminating in the strategic plan. Guidance is provided below for each of these strategic plan components.

Reserve Vision

A vision is a description of what an organization would like to achieve or accomplish. It is intended to guide current and future direction and so requires an understanding of the target population's needs, the organization's ability to meet those needs, and the outcomes required to move toward that vision. Vision statements are therefore very important. This guiding statement is best developed at a meeting where participating programs can engage in a conversation about their audiences, capabilities, and desired outcomes.

NOAA's online resource "How to Write Your Strategic Plan," along with guides on "Preparing to Writing Your Strategic Plan" and "Writing Your Strategic Plan," are helpful resources for developing a vision statement.

Reserve Mission

A mission statement is a one- or two-sentence description of an organization's core purpose, focus, and target population. It is a succinct statement that describes the organization and what it does or will do, for whom, and why. A mission is the cause, and the vision is the effect.

NOAA's "Writing Your Strategic Plan" guide is a helpful resource for developing a mission statement.

Reserve Goals

A goal is a broad statement of what the organization plans to do or enable in the future. Goals should advance the mission of the program. They may be written for a five-year time frame or longer, but ultimately, they should be written so that significant progress toward meeting them can be achieved. During a plan revision, it may be common for goals to remain the same, or to need only minor updates.

All reserve programs are encouraged to contribute their skills and expertise to developing and accomplishing reserve goals as part of an integrated strategic planning process.

Tips for Writing Goals:

- Goals describe a desired future state that the organization attempts to achieve.
- Goals should reflect conditions that can be changed and addressed via programs.
- Goals should be directional and leave room for continual improvement. Use words that identify improvement—increase, improve, reduce, and so on.

Example Goal Statements:

- Reduce the impact of watershed land use on reserve resources
- Improve natural biodiversity within the reserve
- Reduce the impact of invasive species and habitat loss on reserve biodiversity

Job Aid 2 in NOAA's "Writing Your Strategic Plan" guide is a helpful resource for developing goal statements.

Reserve Objectives

Objectives are specific statements of expected results that contribute to one or more goals. They are a measuring tool for progress toward the goals and therefore are the most important statements in strategic planning. Objectives establish the standards of achievement in terms of some measure of improvement in existing conditions. They should be results oriented and describe the desired changes in the target audience, resource, or organization. They should also be attainable and measurable within the time frame of the plan.

The reserve should be able to quantitatively measure progress based on these statements in a way that can be communicated to stakeholders and leadership. Each goal may have several objective statements. Writing strong objectives takes judgment and skill, and devoting the necessary time and effort pays off in better planning, better results, and effective evaluation of progress. Reserves should strive to create SMART objectives: specific, measurable, attainable, relevant, and time-bound. NOAA's quick reference on Writing SMART Objectives is a helpful resource.

Tips for Writing SMART Objectives:

- "Specific" means using strong action verbs to focus on what you want to do. Statements reflect clearly "what" needs to done, "why" it's important, "who" is doing it, and "when" it will be done.
- "Measurable" means ensuring that there is a quantitative way to measure the change the reserve wants to realize.
- "Attainable" means that they need to stretch the organization, but not so far that people lose motivation. They should be realized within the five-year period of plan.
- "Realistic" means having the appropriate resources, including the right people with the right skills, money, equipment, and capacity.
- "Time-bound" means they should create motivation and urgency to accomplish them within the five-year period of the plan.

Achieving objectives will likely require several skill sets, or sector skills, to accomplish. It is advisable and suggested that reserves designate one sector to take leadership for each objective, ensuring the coordination of integrated, multi-sector actions and evaluation of progress. It will be important for the objective lead to understand whether the actions are effective or alternatives are required. Certain actions may not yield the desired result and may need to be modified as understanding of an issue increases. Even if the reserve's goals have not changed, objectives may need to be reviewed and adapted over time. This is where adaptive management becomes important.

Table 4: Example Objective Statements

Who or What? ***Target***	**Change?** ***Action Verb***	**In What?** ***Expected Results***	**By When?** ***Time Frame***
Local community planners	improve	their capacity to write climate change adaptation plans	within 1 year
Watershed management plans	are developed to	coordinate conservation strategies focused on sustainable ecosystems	by 2023
Unauthorized activities	are reduced	on the trail system to promote safe user experiences	by 2024

Achieving objectives will likely require several skill sets, or sector skills, to accomplish. It is advisable and suggested that reserves designate one sector to take leadership for each objective, ensuring the coordination of integrated, multi-sector actions and evaluation of progress. It will be important for the objective lead to understand whether the actions are effective or alternatives are required. Certain actions may not yield the desired result and may need to be tweaked as understanding of an issue increases. Even if the reserve's goals have not changed, objectives may need to be reviewed and adapted over time. This is where adaptive management becomes important.

Reserve Actions

Actions should support achievement of the objectives. An action statement explains "how" an objective will be met. Actions may be undertaken by one or multiple sectors, but should be coordinated by the objective lead, so that as new information arises about the impacts of the actions, management decisions can be adjusted or maintained. Sector leads for each action should be indicated. Adaptive management focuses on learning and adapting, through partnerships of the reserve staff, resource managers, coastal decision-makers, and stakeholders, who learn together how to create and maintain sustainable resource systems. It is more than monitoring activities and changing direction when failure arises. When developing actions, several alternatives should be explored, the outcomes of these alternatives should be predicted based on the current state of knowledge, and then, using professional judgment, those actions that are predicted to be the most effective should be written into the plan. During the course of the plan, evaluation of results should be ongoing to adapt when necessary.

Tips for Writing Clear Actions:

- Actions describe how a program or reserve works and what it is working on.
- Actions describe collaborations and mechanisms for achieving work products.

Example Action Statements:

- Provide training to community planners on understanding vulnerability and developing adaptation plans focused on protecting resources within the reserve's targeted watershed.
- Partner with landowners within the reserve to identify existing conservation strategies, their compatibility with one another, and options for improvement.

- Coordinate with county land partners to place signs in high-traffic areas of the trail system to increase public awareness of authorized activities.

Performance Measures

Performance measures track if and how well a program is meeting its objectives and ultimately its mission. They provide data on trends and can inform future plans, policy, and program budgeting. They provide a quantitative means to communicate those trends and progress toward objectives to key audiences.

Reserves are required to report national performance measures developed to track Reserve System progress, as well as reserve-specific metrics for Coastal Zone Management Act (CZMA) program evaluations. While the system-wide measures and Section 312 metrics are the only performance measures required, reserves are also encouraged to develop site-specific performance measures and targets for reserve objectives to help quantify progress and facilitate communicating success to key stakeholders.

Tips for Developing Practical Performance Measures:
Performance measures should help the reserve understand the key benefits of their activities to specific audiences and should illustrate why the programs matter and to whom. It is important to have a baseline, set targets, and identify the unit of measurement and how it will be counted. If baseline data are not available, it may be more appropriate to collect data for a baseline than to establish measures, so that measures can be created in the future.

Table 5: Example Performance Measures

Objective	Strategy	Performance Measure	Target
Local community planners will improve their capacity to write climate change adaptation plans by 2025.	The reserve's Coastal Training Program will develop targeted workshops promoting the understanding and use of climate change science and monitoring, including information gained from the reserve sentinel site monitoring, to inform adaptation activities.	Number of new targeted workshops that build coastal decision-maker capacity and promote the use of recent research results that address climate change impacts and adaptation alternatives.	Ten workshops focused on building coastal decision-maker capacity to use and apply climate data and information to develop adaptation alternatives.

Resources

NERRS Management Plan Development Resources

The Office for Coastal Management has several resources to support management plan development:

- Technical support from reserve liaisons and technical services from the Learning Services division. Strategic planning, facilitation, and stakeholder engagement assistance are available each fiscal year, October to September, on a first-come, first-served basis. To request technical support from Learning Services, please send an email request to ocm.tms@noaa.gov.
- Resources complementing the management plan guidelines, which are available at Digital Coast Training (detailed below).

Strategic Planning

- Needs Assessment Guide – online resource that provides instruction and step-by-step guidance for people conducting a needs assessment
- Preparing to Write Your Strategic Plan (PDF) – provides tools to gather the information needed to assess the direction and priorities of an organization, and outline the foundational components of a strategic plan
- Writing Your Strategic Plan (PDF) – companion workbook that provides the framework to build organizational commitment and guide the development of the strategic plan
- How to Write Your Strategic Plan – online resource that provides a step-by-step process for developing a strategic plan
- Writing SMART Objectives (PDF) – provides guidance for writing a SMART objective for an outcome
- Guide for Planning for Meaningful Evaluation (PDF) – describes a seven-step process for planning a project or program evaluation
- Common Data Collection Methods for Evaluation (PDF) – provides a summary of the most common methods for collecting data needed for project or program evaluation

Stakeholder Engagement

- Introduction to Stakeholder Participation (PDF) – discusses some of the most important considerations for engaging stakeholders and offers a guide to some effective techniques
- Stakeholder Analysis Worksheet – worksheet to help identify an individual's or group's interest, position, or other special factors for consideration
- Introduction to Focus Groups (PDF) – introduces key elements and practices that will increase the success of a focus group effort
- Introduction to Survey Design and Delivery (PDF) – provides insight into the various types and methods of survey research
- Stakeholder Engagement Strategies for Participatory Mapping (PDF) – provides strategies for help facilitators engage stakeholders in the process of identifying their resources, perspectives, and priorities using maps

Facilitation

- Introduction to Planning and Facilitating Effective Meetings (PDF) – describes how to plan and conduct an effective meeting using the proper tools and techniques
- Facilitation Techniques – provides a list of key techniques facilitators use to lead successful meeting discussions
- How to Facilitate a Virtual Meeting – outlines strategies for creating virtual meetings that efficiently attain meeting objectives
- Process Agenda Template – provides guidance for facilitators and meeting leaders on creating a productive meeting agenda
- Techniques for Facilitating Virtual Meetings – offers time-tested strategies for planning and running effective virtual meetings
- Meeting Evaluation Template – provides a worksheet to use when gathering evaluation feedback from meeting participants

Part II: Content of the Reserve Management Plan

Part II provides specific guidance for developing content for each component of a reserve management plan. Each section also provides supporting references, resources, and case studies to help illustrate the content required for that component. Part II is a critical resource for all reserve managers when leading a management plan update. Each section contains a checklist of required and optional elements (optional elements indicated by ♦) and guidance to help you think through the type of information to include, both for required and optional elements. For optional content, it is ***not*** expected that reserves will necessarily answer every question.

The target length for a management plan is approximately 60-80 pages, not including appendices. The reserve may incorporate links to foundational documents within the plan to reduce the overall size of the plan and make it more reader-friendly.

Required components, and elements within components, may be organized to suit the reserve's needs. All required elements must be included in the plan and follow a logical order so that they can be easily identified and understood. The questions provided in each section are meant to guide development of the plan. Some may be easy to answer while others may prove more challenging. Certain elements, such as a restoration plan or resource manipulation plan, are required "if applicable." In other words, if the reserve plans to undertake habitat restoration or resource manipulation activities, these sections will be considered required components. Other optional elements, such as a volunteer plan, may be included if required by the lead agency or if helpful to the reserve for managing the site.

Elements within the "Program Foundations" component (i.e., research and monitoring, education, and training) may be organized in one chapter or included as separate chapters. The strategic plan should clearly identify which sector is leading an action, and it is also suggested that a sector be identified to lead each objective, coordinate multi-sector actions, and evaluate progress. Reserves may decide how information within the strategic plan and "Program Foundations" element is organized.

Please also refer to Part 1, "Following the Regulations," for information on procedural requirements for management plan updates, including public involvement, review for consistency with the state's coastal management program ("federal consistency"), as well as compliance with federal environmental laws and regulations. Also, the reserve and NOAA will need to review applicable memoranda of understanding and update these agreements as necessary.

Required and Optional Elements Checklist

♦ indicates an optional element

Executive Summary (target ~1-2 pages)
- __ **Plan purpose and scope**
- __ **Reserve context (location, acreage, state lead)**
  - __ **Boundary changes (if applicable)**
- __ **Coastal management issues and reserve goals**
- __ **Reserve programs overview**

Introduction to Reserve System (~3 pages)
- __ **Mandatory system-wide text**

Introduction to the Reserve (~5 pages)
- __ **History and local management**
- __ **Ecological attributes**
- __ **Social attributes**
- __ Archaeological and cultural resources ♦
- __ **Threats and stressors**
- __ **Boundary description and map(s)**
  - __ **Boundary map**
  - __ **Core and buffer**
  - __ **Land ownership**
  - __ **Habitat types**
  - __ **Land use type**
  - __ Targeted watershed map including land use and land cover♦
- __ **Boundary change(s) since last plan and GIS layers (if applicable)**

Reserve Strategic Plan (length variable)
- __ **Vision and Mission**
- __ **Priority coastal management issues**
- __ **Goals, objectives, and actions**
- __ Performance measures for each objective ♦

Program Foundations (~16-22 pages total)

Research and Monitoring Plan (4-6 pages)
- __ **Mandatory system-wide text**
- __ **Program context, capacities, and delivery**
- __ **Needs and opportunities**
- __ Research related objectives and actions♦
- __ Monitoring and evaluation strategies♦

Education/Interpretive Plan (4-6 pages)
- __ **Mandatory system-wide text**
- __ **Program context, priority issues and audiences**
- __ **Program capacity (staffing, resources, partnerships)**
- __ **Program alignment and delivery**
- __ **Needs and opportunities**
- __ Education-related objectives and actions♦
- __ Monitoring and evaluation strategies♦

Coastal Training Program (8-10 pages)
- __ **Mandatory system-wide text**
- __ **Program context, priority issues and audiences**
- __ **Program capacity (staffing, resources, partnerships)**
- __ **Program alignment and delivery**
- __ **Needs and opportunities**
- __ **Training-related objectives and actions**
- __ **Monitoring and evaluation strategies**

Administrative Plan (~ 5 pages)
- __ **Organizational framework and chart**
- __ **Staff roles, staffing needs and plan**
- __ **Strategic partnerships**
- __ **Advisory committees**
- __ **Administrative objectives and actions**
- __ Volunteer plan ♦
- __ Vessel and vehicle plan ♦
- __ Communication plan ♦
- __ Contingency or hazard response plan(s) ♦
- __ Special area plan(s) ♦

Facility Development and Improvement Plan, including Construction Plan (~5 pages)
- __ **Purpose of facilities**
- __ **Current facilities**
- __ **Map of facility locations**
- __ **Facility challenges and gaps**
- __ **Planned facilities and infrastructure**
- __ **Climate and non-climate stressors**
- __ **Facility project descriptions**
- __ Facility upgrades ♦
- __ Exhibits ♦
- __ Green Infrastructure ♦
- __ Operations and maintenance manual as appendix ♦
- __ Long-term facility plan as appendix ♦

Resource Protection Plan (~5 pages)
- __ **Management authorities**
- __ **Allowable and unallowable uses**
- __ **Uses requiring a permit**
  - __ Map of allowable uses ♦
- __ **Surveillance and enforcement capacities**
- __ **Resource protection challenges**
- __ Resource protection objectives and Actions ♦
- __ Monitoring and evaluation strategies ♦

Public Access and Visitor Use Plan (~5 pages)

__ **Current public access**
__ **Map of public access points**
__ **Public access challenges**
__ **Public access and visitor experience**
__ Public access objectives and actions ♦
__ Monitoring and evaluation strategies ♦

Land Acquisition Plan (~5 pages)

__ **Reserve acquisition context and values**
__ Prioritization process ♦
__ **Priority acquisition areas**
__ **Description of acquisition areas**
__ **Map of acquisition areas**
__ **Climate and non-climate stressors**
__ **Priority areas acquisition strategy**
__ **Tract acquisition strategy**
__ **Preferred methods for establishing State control**
__ **Fair market value estimates**
__ **Estimated acquisition timeline**
__ Potential acquisition partners ♦
__ Funding sources ♦

Resource Manipulation Plan, if applicable (~5 pages)

__ **Current and proposed resource manipulation activities**
__ **Map of manipulation activities**
__ **Climate and non-climate stressors**
__ **Current and potential partners**
__ **Permitting/approval requirements**
__ **Impacts of resource manipulation activities**
__ Monitoring and evaluation strategies ♦

Restoration Plan, if applicable (~5 pages)

__ **Priority restoration areas**
__ **Description of restoration areas/habitats**
__ **Map of restoration areas**
__ Climate and non-climate stressors ♦
__ **Prioritization process and criteria**
__ **Priority restoration project planning**
__ **Restoration project descriptions, if available**
__ **Acres and outcomes**
__ **Partners**
__ Monitoring and evaluation strategies ♦

Appendices

__ **Memorandum of Understanding (MOU) between State and NOAA**
__ **MOUs with Other Key Partners, if Applicable**
__ **Federal Consistency Determination**
__ **Response to Public Comments**

Executive Summary

The executive summary should provide an overview of the plan, and must identify all elements as stated in the *Code of Federal Regulations* 15 CFR 921.13. It should define the purpose and scope of the plan, describe reserve context, identify priority coastal zone management issues that the reserve will address, and provide a summary overview of the goals and objectives, as well as indicate the programs that will be used to address the goals and objectives.

Contents for This Section

Plan Purpose and Scope

This section should illustrate the purpose and scope of the plan and provide the national and local context for the plan. What this section should outline:

- The lifespan and geographic scope of the plan
- The priorities, general approach, and how the reserve will measure progress
- The intersection with state, regional, and local partner goals, plans, and programs

Reserve Context

This section should describe reserve location and administrative structure to provide a sense of place and context for reserve work. What this section should outline:

- Reserve designation date, acreage, general location, and lead state agency
- Primary influences on the reserve
- Reserve's role in addressing coastal management issues and context within system
- Boundary changes, if applicable, including acres added or removed, since the last management plan

Executive Summary

__ Plan purpose and scope
__ Reserve context
__ Designation date and acreage
__ State agency
__ Location of reserve
__ Boundary modification since last Plan (if applicable)
__ Priority coastal management issues
__ Reserve niche and goals
__ Reserve programs overview

Coastal Management Issues and Reserve Goals

This section should outline the priority coastal management issues the reserve is addressing, as well as identify the reserve's niche and goals.

Reserve Programs Overview

This section should provide a brief overview of reserve programs and how they will broadly contribute and coordinate to achieve the goals. (See Figure 1.)

Introduction to the National Estuarine Research Reserve System

This section includes information about the goals of the Reserve System, how reserves are designated and described, and how they work administratively as single units and as a system.

Contents for this Section

This section contains mandatory text that should be used verbatim in the plan to ensure a level of consistency when discussing the Reserve System. Please note that a higher resolution of the NERRS map is available for download on the NERRS Intranet.

(Mandatory Text Begin)

Introduction to the National Estuarine Research Reserve System

The National Estuarine Research Reserve System is a network of 29 protected estuarine areas that represent different biogeographic regions and estuarine types within the United States. Reserves are protected for long-term research, monitoring, education and coastal stewardship. The Reserve System, created by the Coastal Zone Management Act of 1972, currently protects over one million acres of estuarine lands and waters. The system is managed in accordance with federal regulations at 15 CFR Part 921.

Each reserve has a unique boundary based on the nature of its ecosystem. The boundaries include the land and water areas needed to protect an intact ecological unit. Reserves classify their land and water areas as either “core” or “buffer,” which determines the level of protection and the types of activities allowed within each area. Each reserve develops the programming most appropriate for its location while also delivering required system-wide programs focused on research and monitoring, education, training, and stewardship.

The Reserve System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. NOAA provides funding, national guidance, and technical assistance for reserve operations and system-wide programs, facilities construction and land acquisition, graduate fellowships, and collaborative science projects. The state partner manages the reserve on a daily basis and works collaboratively with local and regional partners. NOAA also leads projects that integrate data or support decision-making at the national level.

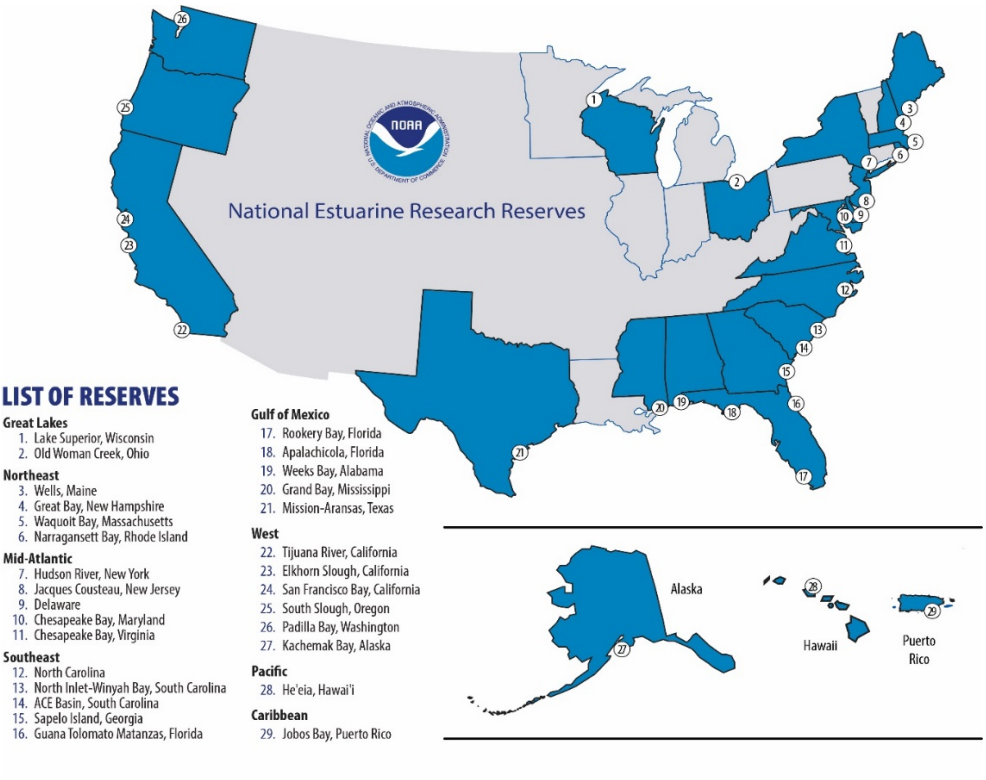

Figure X: National Estuarine Research Reserve System Map

Each reserve is required to develop a management plan that contains the goals, objectives, and strategies for that reserve. Management plans are updated every five years, and must be approved by NOAA. These plans enable the reserves and NOAA to track progress and realize opportunities for growth. Each plan describes how the reserve will carry out its foundational research, education, and training programs. Each plan also outlines administration, resource protection, public access, land acquisition, and facility plans, as well as restoration and resource manipulation plans if applicable. The plans also incorporate strategies designed to help the reserve contribute to the system's national goals. NOAA periodically evaluates reserves for compliance with federal requirements and their approved management plan.

The most recent strategic plan for the National Estuarine Research Reserve System can be found at *coast.noaa.gov/data/docs/nerrs/StrategicPlan.pdf*. It describes the following goals for the system.

1. **Protecting Places:** Enhance and inspire stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches.
2. **Applying Science:** Improve the scientific understanding of estuaries and their watersheds through the development and application of reserve research, data, and tools.
3. **Educating Communities:** Advance environmental appreciation and scientific literacy, allowing for science-based decisions that positively affect estuaries, watersheds, and coastal communities.

(Mandatory Text End)

Introduction to the Reserve

Reserves must be managed with an understanding of how the three sectors of influence (ecosystems, communities, and economies) intersect and impact coastal resources (Figure 3). It is important to provide context for reserve strategic actions by providing information about reserve ecosystems (ecological attributes) and reserve communities and economies (social attributes and cultural resources), as well as geographic and administrative context for the reserve. It is imperative to understand the inextricable link between natural resources and humans, as it greatly influences program management and decision-making.

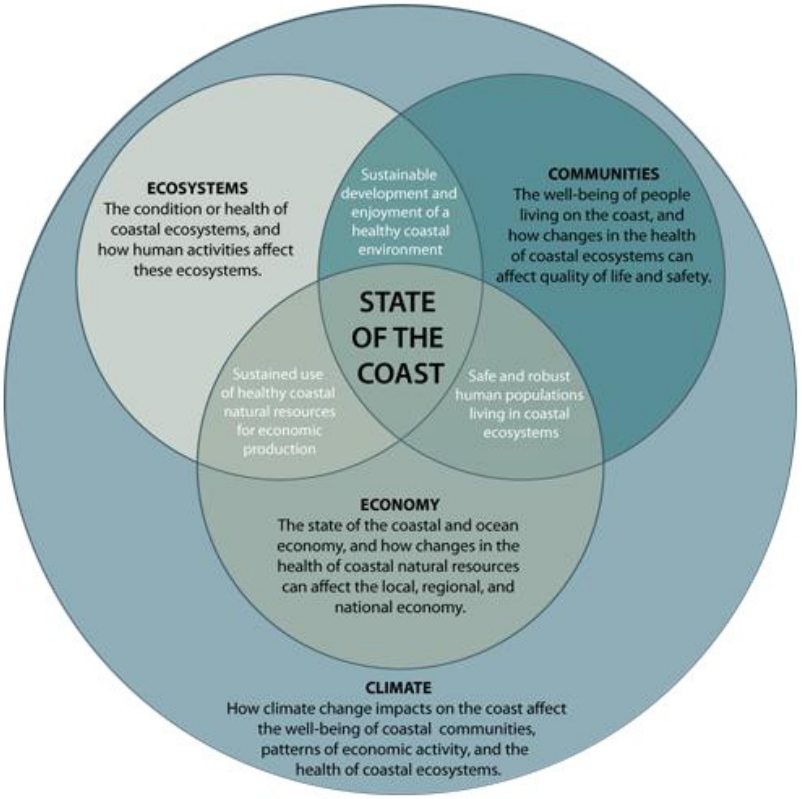

Figure 3: State of the Coast

By understanding the human context, we can better understand relationships between humans and natural resources and in turn use this information to develop a robust strategic plan.

It will also be important to understand threats and stressors facing the reserves and how these stressors may impact or alter these sectors and, hence, influence strategic planning and implementation of the plan.

The target length for this section is approximately five pages. It may include links to other documents, such as the reserve's site profile.

The purpose of this section is to provide

- An overview of history of reserve designation and general administrative structure;
- General and brief description of the reserve's ecological and social attributes to provide context for the plan;
- Description of climate and climate impacts to the extent possible; and
- Description of the reserve boundary, adjacent influences, and boundary expansion (if applicable).

Contents for This Section

History and Local Management of the Reserve

This section should describe the impetus for and parties involved in the designation, as well as brief overview of process and rationale used to designate lands included within the reserve. It should also describe the lands identified for protected status and any acquisitions made specifically during the designation process. This section should also include the general management structure for the reserve, the state agency and department responsible for management, and the relevant land management partners.

Ecological Characteristics

The description of the natural setting should provide a general overview of the location and extent of key physical and environmental characteristics of the reserve, including geography, geology, hydrology, biological resources, climate, and weather. It can be a very brief synopsis of the reserve's ecological characterization as described in the site profile, but should reflect any significant changes that have occurred since the site profile. A link to the site profile can be provided for more detailed information.

Geography and geology includes a general description of the topography and geomorphology that creates the unique reserve ecosystem, as well as geological setting and classification. Hydrology should be characterized by the average tidal conditions the reserve experiences, the major inputs of fresh and salt water to the estuary, and any water quality or quantity issues potentially affecting the reserve. The reserve's climate and weather should be characterized by the climate regime the estuary is situated in, key weather patterns (e.g., El Niño, hurricanes) that may influence the reserve, and weather trends the reserve experiences. Trends can be gathered from reserve SWMP data and may include average annual minimum and maximum air temperature range and average annual rainfall. The reserve's key habitats, based on the Reserve System habitat classification scheme, should be described.

A map should be included that identifies the habitats within the reserve boundary. The map should also outline the boundary of the reserve's targeted watershed. In this section, the reserve may also identify the most common or dominant animal and plant species, as well as key species of importance or concern, including those that may be endangered or threatened.

Introduction to the Reserve

♦ = optional element

__ History and local management
__ Ecological attributes
  __ Geomorphology
  __ Hydrology
  __ Climate and weather
  __ Key habitats and species
__ Social attributes
  __ Population demographics
  __ Jobs and employment trends ♦
  __ Value of ecosystem services ♦
__ Archaeological and cultural resources ♦
  __ Archaeological sites ♦
  __ Cultural sites or resources♦
  __ Value of resources♦
__ Threats and stressors
  __ Natural and anthropogenic
  __ Climate phenomena and impacts
  __ Reserve sensitivity and vulnerability to environmental change ♦
__ Boundary description
  __ Core and buffer rationale
  __ Boundary map
  __ Core and buffer
  __ Land ownership
  __ Habitat types (include map)
  __ Land use type (include map)
  __ Targeted watershed (include map that indicates land use and type)
  __ Boundary expansion rationale and GIS layers (if applicable)

Socioeconomic Attributes

Understanding the socioeconomic framework within and adjacent to the reserve will inform management of coastal resources and protect the reserve. At a minimum, the plan should include a brief description of population demographics and information about jobs and employment trends to provide an understanding of the socioeconomic framework within the reserve's targeted watershed or defined geographic area of interest. Population demographics can be characterized by population density, age, gender, ethnicity, education level, and housing information.

At their option, reserves may include additional information about ocean and coastal-related jobs, the value of ecosystem services, and social vulnerabilities. Ocean and coastal-related jobs can be described by reviewing jobs in ocean-related sectors as defined by Economics: National Ocean Watch (ENOW). Examples of social vulnerabilities include large populations of aged or low-income residents. Ecosystem service values can be described generally in terms of the benefits derived by people from natural resources in your reserve and within the reserve's sphere of influence, and how changes in the health and function of those resources affect those benefits. Please include specific examples if available.

Archaeological and Cultural Resources (Optional)

In addition to biological and social resources, the reserve may contain archaeological, cultural, and historical resources that provide information and research opportunities about past settlements. These resources provide a sense of place and historical context and should be identified and preserved.

If the reserve includes this section, it should provide a brief overview and description for the archaeological and cultural resources within the reserve, including the value and general location of these resources. If an evaluation of these resources has been done, please include information about priority sites and any efforts to protect them. Collaboration with the state archaeologist or state historic preservation office and state maritime archaeologist is recommended, if one exists.

Threats and Stressors

While reserves were designated under the premise that they are relatively pristine and representative estuarine ecosystems, they are and will likely be increasingly exposed to human and environmental stressors that must be understood in order to manage and adapt to changing conditions. This section should describe the primary stressors on the reserve.

NATURAL AND ANTHROPOGENIC STRESSORS (REQUIRED)

Natural and anthropogenic threats and stressors affect all reserve environments. Each reserve is subject to different stressors depending on their geographic location and relationship to urban and rural communities, as well as exposure to weather and climate-related hazards. This section should briefly summarize threats to both biological and social resources within and adjacent to the reserve. Threats such as sedimentation, nonpoint source pollution, invasive species, population growth, episodic storm events, flood exposure, and so on provide unique challenges and should be described thoroughly to provide background and focus for the reserve's strategic plan.

CLIMATE CHANGE PHENOMENA AND IMPACTS (REQUIRED)

Coastal societies and ecosystems are dependent upon unique resources and subject to hazards that may not affect inland landscapes. Understanding these dependencies and threats is critical to management

of these systems. Environmental changes interact with other stressors within natural and social systems, and may alter their effects.

This section should provide an overview of any expected environmental changes the reserve may face, as well as an overview of any significant impacts that may occur. For example, reserves should describe anticipated changes in flood exposure risk and assess potential impacts to human and ecological communities, as well as to infrastructure. Reserves should also assess anticipated land cover changes that may result from the effects of climate change, as well as the potential risk and impacts of other natural disasters on reserve resources.

For general information on climate stressors and expected changes and impacts that may result, please see section on Climate Data Sources, below. Reserves should use local data and information to support this section where possible.

RESERVE SENSITIVITY AND VULNERABILITY TO CLIMATE CHANGE (OPTIONAL)

As we try to understand and plan for the impacts of environmental changes on natural resources and communities, it is important to be aware of the general sensitivity, exposure, and adaptive capacity of our natural resources and the communities that depend on them. The Intergovernmental Panel on Climate Change defines vulnerability as a function of the sensitivity of a system to climate changes and its exposure to those changes. Reserves are encouraged to assess the ecological and social vulnerabilities of reserve ecosystems and communities.

> *"Not considering climate change in management is akin to traveling in unknown territory without a map—one is not likely to arrive at the desired destination."*
>
> *– Scanning the Conservation Horizon*

For those reserves that have completed or will complete a vulnerability assessment before the revision of their management plan, we encourage including a summary of the assessment. It may be included in the previous section on climate change phenomena and impacts, or as a separate section.

If reserves have not conducted a comprehensive vulnerability assessment of ecosystems and communities, existing data and information that describe natural resource sensitivity and exposure within the reserve should be included, as feasible. The report *Climate Sensitivity of the National Estuarine Research Reserve System*, which explores the biophysical and social sensitivity of reserves and related communities may be helpful.

Reserves with the capacity to do so are encouraged to conduct a vulnerability assessment before updating the management plan, as it will affect the scope and scale of research, education, and stewardship activities. For more information about the general process for conducting a vulnerability assessment, please see *Conducting a Reserve Vulnerability Assessment,* available in the "Management Plan" section of the NERRS Intranet. If a vulnerability assessment cannot be done before revising the management plan, it is advisable to identify this effort within the strategic plan, if feasible.

Reserve Boundary

This section should describe the reserve in the context of the state, region, and watershed. The reserve should identify the type of estuary it is (e.g., coastal plain, bar-built, deltaic system, tectonic, fjord) and the major physical attributes that define the reserve. If applicable, this section should also note if NOAA has approved any changes to the reserve boundary since the last management plan update.

CORE AND BUFFER

The plan should clearly define the reserve's boundary, which will encompass two areas: key lands and waters ("core area") and a buffer zone. The plan should include a map that shows the boundary along with the core and buffer areas. If a boundary change was approved before the management plan update, the map should be updated to reflect the new boundary, as well as core and buffer designations within the areas added to the boundary. The managing entities must establish adequate control over human activities occurring within all areas of the reserve boundary. (15 CFR 921.11(c)(3)) The core and buffer areas will likely require differing levels of control. This section should also briefly describe how core and buffer areas were determined, particularly for any newly added areas or modifications to previous core or buffer delineations.

The core and buffer designations should also be considered when proposing new habitat protection, restoration, or manipulations activities, or new facilities as part of the management plan. Designated core areas are considered so "vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the reserve or research on natural processes." Buffer zones protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. When determined appropriate by the state and approved by NOAA, the buffer zone may also include an area necessary for facilities required for research and interpretation. Additionally, buffer zones should be established sufficient to accommodate a shift of the core area as a result of biological, ecological, or geomorphologic change that reasonably could be expected to occur.

LAND OWNERSHIP AND TYPE

Land ownership and land use type should be described for all areas within the boundary. The number of acres should be attributed to each landowner. Federal lands already in protected status may not make up a majority of the key land and water areas of a reserve, per 15 CFR 921.1(g). Land use adjacent to the reserve should also be identified with a description of potential impacts and challenges. A map should be included that identifies land ownership within and adjacent to the reserve boundary.

TARGETED WATERSHED BOUNDARY

As a companion to the targeted watershed boundary map, this section should briefly describe the basis for defining the reserve's targeted watershed boundary. Targeted watersheds represent those watersheds that directly flow into and impact the habitats within reserves. For new reserves that have not yet established a targeted watershed boundary, reserve staff determine the size and area of the reserve's targeted watershed boundary, which represents the watershed basin within which land uses, and water quality and quantity affect reserve habitats.

Targeted watersheds can represent 1) U.S. Geological Survey Hydrologic Unit Codes that encompass the river systems directly flowing into the reserves; or 2) boundaries based on local knowledge. Targeted watershed boundaries usually, but not always, correspond to a 12-14 digit U.S. Geological Survey Hydrologic Unit Code. In some cases (e.g., Narragansett Bay NERR), the targeted boundaries may

correspond to the estuarine basin – the largest scale at which reserves are mapped – but in most cases, these are distinct boundaries.

BOUNDARY MODIFICATIONS

Reserves may wish to expand their management boundary from time to time for a variety of reasons, and less often may seek to remove an area from the existing boundary. For example,

- Reserves may expand their boundary to include those lands or waters that are necessary to protect the ecological units of the natural estuarine system for research purposes (e.g., expanding core area).
- Reserves may wish to incorporate areas adjacent to these key land and waters that are essential to maintain the integrity of the ecological unit (e.g., including additional buffer area), particularly if needed to enable habitat migration due to climate change.

Lands and waters proposed for addition through a boundary change must either be contiguous to the original boundary or the reserve must demonstrate how these areas are necessary for reserve research or education programs.

As of 2017, boundary changes will generally be handled outside of the management plan revision process because a reserve boundary modification will likely require the preparation of an environmental assessment or environmental impact statement under NEPA. Please refer to separate guidance for that process. Reserves planning to expand their boundary should discuss this with the site liaison to determine the optimal timing in order to reflect approved changes in subsequent updates to the management plan. Also, the reserve should provide information about the proposed change to the site liaison as the basis for discussion and to determine the type of review needed.

If a boundary change was completed since the last management plan, the reserve should

- Incorporate information about newly added or removed parcels into the overview of the reserve, boundary, and habitat maps, and relevant programmatic chapters;
- Include, as an appendix, any new or revised MOU needed between the state agency and the land managing partners, if different from the state agency, to affirm that the lands will be managed in accordance with Reserve System regulations; and
- Submit GIS layers for boundary changes to NOAA so that Coastal Change Analysis Program data can be updated, as well as the Centralized Data Management Office.

Resources

Natural Resources Data Sources

Benthic Cover data provide nearshore benthic habitat polygons derived from aerial optic or swath acoustic imagery as part of NOAA's Digital Coast (*coast.noaa.gov/digitalcoast/data/benthiccover.html*).

Coastal Change Analysis Program (C-CAP) data are a source of coastal land cover and change information, including inventories of intertidal areas, wetlands, and adjacent uplands, for use in GIS. Also see the C-CAP Land Cover Atlas to explore the data online and print summary data sheets.

Coastal Lidar provides data sets contributed by many different entities and groups, distributed in user-specified formats, resolutions, and datums as part of NOAA's Digital Coast. Also see the Topobathy Data Inventory to see where high-resolution elevation data are available for coastal and marine areas.

Data.gov provides geospatial data from several federal agencies applicable to understanding coastal biophysical landscapes.

National Estuarine Research Reserve Site Profiles characterize the environmental features, habitat types, species distribution, biological communities, and research available as well as research gaps for each reserve.

Climate Sensitivity of the National Estuarine Research Reserve System is a report that explains the extent of relative climate sensitivity in the reserves by looking at five factors: social, biophysical, and ecological sensitivity, and exposure to temperature change and sea level rise. High social sensitivity to climate change is indicated where there is higher employment within natural resource-dependent industries, lower per capita income and median home values, higher percentages of minority populations, and a higher percentage of individuals lacking a high school education. Biophysical sensitivity is based on the relationship between annual spring atmospheric temperature with rainfall data and water quality factors such as water temperature, dissolved oxygen, and pH.

Socio-Demographic Data Sources

There are several existing sources of information that provide socio-demographic information for reserve-targeted watersheds. While the targeted watersheds may not include all of the human communities that relate to or impact the reserve, they provide a standard database of information for reserves. Additional site-specific data are encouraged to complete a picture of the socio-demographic landscape appropriate for each reserve.

NOAA's Quick Report Tool for Socioeconomic Data provides easy access to economic and demographic data for multiple coastal jurisdictions. Information is derived from several key socioeconomic sources, including the U.S. Census Bureau, Bureau of Economic Analysis, Bureau of Labor Statistics, and Federal Emergency Management Agency's Hazus database.

Census data are available by state coastal zone boundary and include population, population density, race, sex, age, and household information. You can also clip this data by zip code.

National Center for Education Statistics allows users to view maps of states and school districts, while overlaying statistics on population and housing, race and ethnicity, economics, and social characteristics.

Bureau of Economic Analysis data are available for NERRS-targeted watersheds and include population, personal income, per capital personal income, and earnings by industry.

NOAA's Digital Coast makes available economic and demographic data for NERRS-relevant geographies including coastal zone boundaries, coastal shoreline counties, floodplains, and fixed distance areas from the coast.

National Ocean Economics Program coastal economy data are available for NERRS-targeted watersheds and include number and types of industries, numbers employed per industry, wages per industry, and gross domestic product per industry.

NOAA's Economics: National Ocean Watch (ENOW) describes six economic sectors that depend on the oceans and Great Lakes, including living resources, marine construction, marine transportation, offshore mineral resources, ship and boat building, and tourism and recreation. Annual time series data are available for 448 coastal counties, 30 coastal states, and the nation, derived from the Bureau of Labor Statistics and the Bureau of Economic Analysis. The economic indicators include establishments, employment, wages, and gross domestic product. Also see the ENOW Explorer for easy online exploration of the data.

NOAA's Coastal County Snapshots turns complex data into easy-to-understand stories and includes charts and graphs to illustrate relationships. The data are organized by coastal state and county and provide information on flood exposure, including county demographics, infrastructure, and environment within the flood zone; ocean jobs, including economic value of jobs depending on ocean and Great Lakes resources; and wetland benefits such as how they contribute to safer, cleaner, and more productive coastal communities.

Climate Sensitivity of the National Estuarine Research Reserve System is a report that explains the extent of relative climate sensitivity in the reserves by looking at five factors: social, biophysical, and ecological sensitivity, and exposure to temperature change and sea level rise. High social sensitivity to climate change is indicated where there is higher employment within natural resource-dependent industries, lower per capita income and median home values, higher percentages of minority populations, and a higher percentage of individuals lacking a high school education. Biophysical sensitivity is based on the relationship between annual spring atmospheric temperature with rainfall data and water quality factors such as water temperature, dissolved oxygen, and pH.

Climate Data Sources

Climate Wizard provides a user-friendly way to access leading climate change information and visualize the impacts anywhere on Earth. The user can choose a state or country and can assess how climate has changed over time and project what future changes are predicted to occur. You can view historic temperature and rainfall maps, view future predictions of temperature and rainfall, and download climate maps.

NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer shows how various levels of sea level rise will impact coastal communities. Visuals and the accompanying data and information cover sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.

PRISM climate mapping system (the Parameter-elevation Regressions on Independent Slopes Model) is a unique knowledge-based system that uses point measurements of precipitation, temperature, and other climatic factors to produce continuous, digital grid estimates of monthly, yearly, and event-based climatic parameters. PRISM data are recognized worldwide as the highest-quality spatial climate data sets currently available.

Sea Level Rise Affecting Marshes Model simulates the dominant processes involved in wetland conversions and shoreline modifications during long-term sea level rise. It is a complex decision tree incorporating geometric and qualitative relationships used to represent transfers among coastal classes. The process accounts for inundations, erosion, overwash, saturation, and accretion. It is applied to 26 land categories derived from the National Wetlands Inventory and covers a span from dry land to open water. The model incorporates Intergovernmental Panel on Climate Change projections as well as fixed rates of sea level rise to create sea level rise scenarios.

U.S. Global Change Research Program provides regional and sectoral climate change information and data, as well as a resource library for better understanding of climate science and climate impacts.

WorldClim is a set of global climate layers (climate grids), including past observed data, past modeled data, and future modeled data with a spatial resolution of a square kilometer. They can be used for mapping and spatial modeling in a GIS or other computer programs.

The Strategic Plan: Adaptive Management through Issue-Based Planning

Per the *Federal Code of Regulations* 15 CFR 921.13 (a)(1), management plans are required to identify management issues, reserve goals and objectives, and actions for meeting the goals and objectives. These items should be embodied in the strategic plan element of the management plan. The strategic plan will provide direction and structure for the reserve to take cohesive action toward meeting objectives over the next five years. This section outlines the elements of the strategic plan; these include vision, mission, coastal management issues, goals, objectives, and actions. There should be a clear link between the issues outlined and the goals and objectives created to address them. The objectives will form the basis for evaluation of progress and success, and the actions will inform how the plan is implemented. Examples, resources, and case studies are provided to support the reserve strategic planning process.

Part I of these guidelines provides direction and advice on a process for developing many of the elements within the strategic plan. Please refer to Part I before crafting the strategic plan.

Contents for this Section

Reserve Strategic Plan

♦ = optional element

__ Vision
__ Mission
__ Priority coastal management issues
__ Reserve goals, objectives, actions
__ Performance measures for each objective ♦

Reserve Vision

The reserve vision statement is the overarching description of what the reserve would like to achieve or accomplish. Vision statements should be forward looking and reflect how the reserve wants to be distinguished.

Example: We envision ecologically vibrant and resilient estuaries cherished and supported by their surrounding communities – San Francisco Bay Reserve, 2018-2023.

Reserve Mission

The reserve mission statement should describe the reserve's core purpose and focus, the reserve's reason for existence. This is a short static statement written in the present tense that describes the organization's unique contributions.

Example: To promote and practice informed stewardship of upland and aquatic resources to conserve the area's natural biodiversity and cultural resources through applied research and education – Apalachicola Reserve.

Reserve Coastal Management Issues

This section should succinctly summarize the most pressing and pertinent coastal management issues facing the reserve. Priority issues need to be identified in order to develop relevant goals and meaningful objectives. This section should also include reserve issues that relate to one or more of the issue areas identified in the *Reserve System Strategic Plan*.

There are many ways to determine the reserve's primary issues. These include research findings, needs assessments, focus groups, surveys, and so on. Part I of this document provides guidance on identifying and selecting reserve priority issues, and important information about stressors on the reserve to consider as described in the plan's "Introduction to the Reserve." It is beneficial to involve all reserve staff members in the process of engaging stakeholders and identifying the most pressing issues the reserve will address.

Reserve Goals

The reserve should include a set of goals that outline what the organization plans to do or enable in the future. Goals should advance the reserve's mission, address the most pressing coastal management issues based on the reserve's niche, and be supported by the reserve's programs. A manageable number of goals, approximately 3-6, should be included to capture the breadth and depth of the reserve's niche. Goals may be written for a five-year timeframe or longer, but ultimately, they should be written so that significant progress toward meeting them can be achieved within the five-year management plan timeframe. When revising the plan, it may be common for goals to remain the same, but objectives and actions to change given the amount and type of progress made toward that goal.

Part I of this document encourages integrated strategic planning in which multiple programs contribute to the development and achievement of goals. See Part I for tips on writing goal statements.

Example: Increase and improve scientific knowledge of the San Francisco estuary ecosystem – San Francisco Bay Reserve, 2018-2023.

Reserve Objectives

Reserves should include a set of objectives that advance progress toward each of the reserve's goals over the next five years. Each goal may have several objective statements. Objectives should be results oriented and describe the desired changes in the target audience, resource, or organization within the time period of the plan. The reserve should be able to quantitatively measure progress based on these statements, which can then be communicated to stakeholders and leadership. For more information and resources on creating reserve objectives, see Part I.

Examples: Full implementation of System-Wide Monitoring Program (SWMP) elements enhances capacity to collect monitoring data by 2019; data and knowledge of reserve sites are interpreted within a regional and national context by the end of 2021 – San Francisco Bay Reserve, 2018-2023.

Reserve Actions

Reserves should identify actions that support achievement of their objectives. Action statements explain "how" an objective will be met. When developing actions, several alternatives should be explored and the outcomes of these alternatives should be predicted based on the current state of knowledge. Then, using professional judgment, select those actions that are predicted to be the most effective to include in the plan. Evaluating results should be ongoing during the course of the plan in order to adapt when necessary. More information and resources for creating actions can be found in Part I.

Examples:

- Provide training to community planners on understanding vulnerability and developing adaptation plans focused on protecting resources within the reserve-targeted watershed.
- Partner with landowners within the reserve to identify existing conservation strategies, their

compatibility with one another, and options for improvement.
- Coordinate with land partners to place signs in high-traffic areas of the trail system to increase public awareness of authorized activities.

Performance Measures for Each Objective (Optional)

Reserves are required to track national performance measures developed to track Reserve System progress, as well as reserve-specific metrics for CZMA program evaluations. While the system-wide measures and Section 312 metrics are the only performance measures required, reserves are also encouraged to develop site-specific performance measures and targets for reserve objectives to help quantify progress and facilitate communicating success to key stakeholders.

Please briefly summarize the national performance measures, the reserve tracks, and how these measures are used to inform management of reserve programs. Reserves are also encouraged to identify the measures selected as metrics for CZMA 312 program evaluations, noting that they are updated every five years.

Reserve System Program Foundations

Each reserve contributes to Reserve System-wide programs and priorities, as well as defines local programs and priorities to address site-specific needs and issues. It is important to understand the key elements of system-wide programs that contribute to national and local efforts. Information about these programs has historically been included in management plans in a variety of ways; this section offers a consistent approach.

Specifically, this section provides a standard format for describing the system-wide programs, including mandatory text and considerations for information on program context, capacity, delivery, needs, and opportunities. The guidance in this section outlines elements that must be addressed for the plan to meet NERRS system-wide requirements, as well as optional elements may be included if they are helpful to the reserve in managing program operations.

Part I's "Assessing Skills and Capacities of Reserve Programs" discusses how reserves may conduct program SWOT analysis. Information within each program category—context, capacity, delivery, needs, and opportunities—should be readily available if the programs undertake a SWOT analysis. Reserves should try to supply all of the information described below to the best of their ability. This information should provide readers a clear picture of program capacities and focus, as well as how the program is supporting achievement of reserve goals and objectives. Together they create a complete picture for how the system works nationally and locally.

While stewardship is a sector program at many reserves and there are national efforts to support stewardship functions, this section concentrates on those sectors with system-wide programs. Foundational capacities for stewardship vary across sites and will be captured within research and monitoring, as well as the resource protection, land acquisition, public access, and visitor use components, and if applicable, the restoration and resource manipulation components.

Each program description can be organized in separate chapters or be combined into a single "Program Foundations" chapter. If reserves choose to create a sector-based strategic plan (i.e., sector-based goals), each of these descriptions should be included with that sector-based goal chapter.

Contents for this Section

Research and Monitoring

The target length for this section is approximately 4-6 pages, including the mandatory system-wide text. It may include links to other documents, such as the reserve's site profile or sentinel site plan.

MANDATORY SYSTEM-WIDE TEXT (REQUIRED)

(Mandatory text begin)

Reserves are created to provide a stable platform for long-term research on estuarine conditions and relevant coastal management issues. The System-Wide Monitoring Program (SWMP) delivers standardized measurements of short-term variability and long-term changes in water quality and biological systems, and maps land use and land cover characteristics across all reserves. The effort is focused on three ecosystem characteristics: abiotic characteristics (water temperature, salinity and quality, and weather); biotic characteristics (habitat types and species); and watershed and land use characteristics (land cover and elevation changes). Reserve-generated data meet federal geographical data standards and are available via the Reserve System's Centralized Data Management Office. Reserves also serve as sentinel sites for observing how coastal habitats respond to changing water levels. This program is guided by the *reserves' System-wide Monitoring Program Plan,* the *Reserve Habitat Mapping and Change Plan,* and *Sentinel Sites Guidance.*

The Reserve System also supports applied research through its Science Collaborative program and the Margaret A. Davidson Graduate Fellowship program. The Science Collaborative funds competitive research projects that engage end-users in the project design and address system-wide NERRS research and management needs. The goal of the Davidson Fellowship is to build the next generation of leaders in estuarine science and coastal management. The fellowship provides opportunities for graduate students to conduct research within a reserve under the guidance of a mentor who also supports their professional development.

The *Reserve System Strategic Plan* outlines research objectives to maintain and expand biophysical and socioeconomic monitoring to track environmental change, increase the use of collaborative research to address decision-maker needs, and ensure that scientific, education, and management audiences can use the data, research results, and tools developed by the system.

(Mandatory text end)

RESEARCH PROGRAM CONTEXT (REQUIRED)

This section should describe the following aspects:

- **Setting and context** – the geographic scope of the reserve's research program (i.e., where are research projects primarily conducted, what are the primary habitats that are studied?), as well as major existing and potential partners and collaborators in the research community surrounding the reserve.

- **Priority Issues** – what major research issues and the questions will the reserve address in the next five years, and if appropriate, how these align with the *Reserve System Strategic Plan*; as well as, the major outcomes of the reserve research and monitoring program, including the contributions that will be made to the scientific or management community.

- **Priority Audiences** – the target audiences for the data and information from research at the reserve, including state partners, the academic community, and educators and trainers.

RESEARCH PROGRAM CAPACITY (REQUIRED)

This section should describe the staff, facilities, infrastructure, etc., that currently support both the reserve's research and monitoring program (which includes mapping) and the partners that the reserve works with to accomplish its research and monitoring objectives. This should include the primary research and monitoring staff listed above in the administrative plan, as well other reserve staff who support specific research and monitoring programs and projects. Also, please identify the opportunities and challenges facing the reserve research and monitoring programs over the next five years, in terms of capacity to implement these programs.

RESEARCH AND MONITORING PROGRAM DELIVERY (REQUIRED)

This section should briefly describe the following:

- How the reserve will implement the required (core) elements of SWMP. In addition to the staff roles described above under program capacity, please describe other resources, including infrastructure, outside funding, and partnerships, that will support the implementation of the reserve's core monitoring program (e.g., Research coordinator will…, SWMP tech will… GIS specialist will…, Partner A will…, Reserve funding will support X, Funds from partnership A will support Y);
- How additional reserve monitoring and research activities, including any associated system-wide programs such as sentinel sites and other applications of SWMP, will be implemented. Please briefly describe the roles of reserve staff, and any resources, including infrastructure and partnerships, that will support the implementation of these programs;
- How reserve research and monitoring objectives will be met by Reserve System national programs (e.g., the Science Collaborative and the Davidson Fellowship); and
- How the research and monitoring program will support other functions at the reserve.

RESEARCH FUTURE NEEDS AND OPPORTUNITIES (REQUIRED)

In this section, please list any additional research needs and priorities identified by local stakeholders, and whether the reserve is projected to have the capacity in the next five years to meet those needs.

RESEARCH-RELATED OBJECTIVES AND ACTIONS (OPTIONAL)

If the reserve includes this section, please list other objectives from the reserve's strategic plan that depend on research and monitoring, and briefly describe the research or monitoring activities that will advance those objectives.

MONITORING AND EVALUATION STRATEGIES (OPTIONAL)

Describe any activities that will be undertaken to evaluate the effectiveness of the reserve's research and monitoring program.

Education

The target length for this section is approximately 4-6 pages, including the mandatory system-wide text. It may include links to other documents, such as the reserve's education strategic plan or needs assessments.

MANDATORY SYSTEM-WIDE TEXT (REQUIRED)

(Mandatory Text Begin)

The Reserve System seeks to enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation. The Reserve System increases estuary literacy among students, teachers, and the public through the K-12 Estuarine Education Program (KEEP) and Conservation Action Education programs.

The K-12 Estuarine Education Program helps educators bring estuarine science into the classroom through hands-on learning, experiments, fieldwork, and data explorations using grade-appropriate lessons, activities, and videos. Reserves also offer teacher development programs that use established coastal and estuarine science curricula aligned with state and national science education standards. Teachers on the Estuary (TOTE) workshops give teachers the opportunity to explore coastal habitats and conduct field investigations, learn how to integrate local and national monitoring data into the classroom, and gain hands-on experience using estuary education resources.

As part of the Conservation Action Education program, reserves conduct formal and informal education activities and outreach activities that target culturally diverse audiences of educators, students, and environmental professionals; people who use these natural resources for work or play; and the public. Reserves integrate research and monitoring into their educational and outreach efforts, providing a multi-faceted, locally focused approach aimed at engaging the community.

The *Reserve System Strategic Plan* outlines education objectives designed to increase the public's awareness of and participation in stewardship activities; improve educators' and students' understanding and use of the Reserve System and NOAA resources for place-based and inquiry-based learning; and grow and motivate the next generation of coastal professionals through access to programs and facilities that facilitate research, resource management, and educational opportunities.

(Mandatory Text End)

EDUCATION PROGRAM CONTEXT (REQUIRED)

This section should describe:

- **Setting and Context** – the setting and context in which the education program operates, including the geographic scope and service area of the program, as well as ecological and socioeconomic context. If this information is present elsewhere in the management plan, it may be referenced. Outline any changes in demographics that impact programmatic decisions or open new opportunities for programming. Describe what has changed since the last update of the management plan.

- **Priority Issues** – the priority issues, including emerging issues, the education program can help to address. Reference any needs assessments or evaluation reports you used to define these priorities. Please also describe how these priorities align with and support the 2017-2022 *Reserve System Strategic Plan*, K-12 Estuary Education Program, Community Education Framework, and NOAA Education Strategic Plan.

- **Priority Audiences** – the target audiences for reserve education programming, identifying population and reach, and reasons they were selected. Incorporate the pie charts and trends graphs from the Knack Database that synthesize type of audiences served. To the greatest extent possible, link audiences to priority issues. Describe any future audiences that might become important over the next five years. Map the total population of the audience you plan to target and percentage of that population you plan to target within the next five years.

EDUCATION PROGRAM CAPACITY (REQUIRED)
This section should describe the following aspects:

- **Internal and External Resources** – program's staffing, including a description of the internal and external resources available to support the education program, and in particular the Teachers on the Estuary workshops; whether the education program has the capacity it needs to meet all strategic objectives; and any plans to either increase capacity or reduce program commitments over the next five years.

- **Strategic Partnerships** – how the program works with and builds upon other programs or initiatives at the reserve and within the Reserve System (e.g., specific reserve research programs or products); how the program works with external programs and initiatives outside the Reserve System; what niche (market segment) the reserve has carved out within the external Reserve System education community; and community and vision for strengthening or sustaining those partnerships and collaborations. Reference any market analysis data or research the program has done that confirms the niche. Highlight specific partnerships (current and anticipated) that help to implement the Teachers on the Estuary Program.

EDUCATION PROGRAM ALIGNMENT AND DELIVERY (REQUIRED)
This section should describe the following:

- What major activities the education program will implement and what methodologies will it employ;
- How the education program will support or be supported by other programs at the reserve;
- How the education program will deliver and disseminate results;
- The major impacts or outcomes the education program wants to achieve; and
- What behavior change the reserve wishes to influence.

EDUCATION FUTURE NEEDS AND OPPORTUNITIES (REQUIRED)
This section should describe the following:

- A summary of the education needs identified via assessment or by local stakeholders;
- The nexus between those needs and projected capacity in the next five years; and
- The limitations and future opportunities of the education program.

EDUCATION-RELATED OBJECTIVES AND ACTIONS (OPTIONAL)

If the reserve includes this section, please list the education objectives from the reserve's strategic plan, as well as education actions that will advance those objectives.

MONITORING AND EVALUATION STRATEGIES (OPTIONAL)

This section should describe

- How the reserve evaluates education program activities, including the tools used to evaluate the program and how evaluation data are used, including the education performance measures, in programming and planning for the education program; and
- The role of the Education Advisory Committee. Please include, as an appendix, a current advisory group membership list, including roles and responsibilities.

Training

In 2019, the NERRS Coastal Training Program (CTP) sector decided to eliminate the requirement for a stand-alone coastal training strategy, and instead, merge the content into the training section of the reserve's management plan. As such, the content and target length for this section differs from the other foundational program sections.

The target length for this section is approximately 10-11 pages, including the mandatory system-wide text. It may include links to other documents, such as the reserve's coastal training strategy (if separate) or training needs assessments. The sequence of content is flexible, provided that all required elements are addressed.

MANDATORY SYSTEM-WIDE TEXT (REQUIRED)

(Mandatory text begin)

The Coastal Training Program provides up-to-date scientific information and skill-building opportunities to coastal decision-makers on relevant coastal management issues. Target audiences may vary for each reserve, but generally include local elected or appointed officials, managers of both public and private lands, natural resource managers, coastal and community planners, and coastal business owners and operators. They may also include such audiences as farmers, watershed councils, professional associations, recreation enthusiasts, researchers, and more.

The place-based nature of reserves makes them uniquely positioned to deliver pertinent information to these audiences. Each reserve conducts an analysis of the training market and assessment of audience needs to identify how best to deliver relevant training on priority issues to their area.

Partnerships are integral to the program's success. Reserves work closely with a host of local partners, as well as several NOAA programs, to determine key coastal resource issues and the appropriate target audiences and expertise needed to deliver relevant and accessible programs. The *Reserve System Strategic Plan* outlines coastal training objectives designed to ensure that coastal decision-makers and environmental professionals understand and effectively apply

science-based tools, information, and planning approaches that support resilient estuaries and coastal communities.

(Mandatory text end)

COASTAL TRAINING PROGRAM CONTEXT (REQUIRED)
This section should describe the following aspects:

- **Ecological and Socioeconomic Setting and context** – the setting and context in which the CTP operates, including ecological and socioeconomic context, as well as the geographic scope and service area of the program. If this information is present elsewhere in the management plan, such as the Introduction to the reserve, it may be referenced.

- **Priority Issues** – what priority issues, including emerging issues, the Coastal Training Program can address through training or technical assistance. Include a description of the conditions that make these issues priorities, and reference relevant needs assessment results.

- **Priority Audiences** – who are the target audiences that interact with and benefit from the CTP and how were these audiences identified. To the extent possible, link audiences to priority issues. Describe any future audiences that might become important over the next five years.

- **Alignment within the Reserve** – how the CTP works with other sectors and the manager to achieve the reserve's goals and objectives and how it contributes to system-wide plans and efforts (e.g., climate change implementation, SWMP, research and Monitoring, community education).

COASTAL TRAINING PROGRAM CAPACITY (REQUIRED)
This section should describe the following aspects:

- **Capacity** – the program's staffing, including a description of the internal and external resources available to support coastal training; whether the CTP has the capacity it needs to meet its strategic objectives; and any plans the program might have to either increase capacity or reduce program commitments over the next five years.

- **Strategic Partnerships** – how the program works with and builds upon other programs and initiatives at the reserve and within the Reserve System (e.g., specific reserve research programs or products); how the CTP works with external programs and initiatives outside the Reserve System; and any plans the program may have for expanding strategic partnerships during the next five years.

- **Training Partnerships** – who the program's key training partners are and the nature of these partnerships (e.g., the roles of key partners, shared goals), noting which partners are on the CTP Advisory Committee, and with whom the program hopes to partner during the next five years. Focus on key partners and their roles. A complete list of partners can be included as an appendix.

COASTAL TRAINING PROGRAM DELIVERY (REQUIRED)
This section should describe the following:

- Target audiences that interact with and benefit from the CTP, including how these audiences were identified. Please link audiences to priority issues;
- Any future audiences that might become important over the next five years;
- Training delivery systems, including the approaches employed at training events;
- What additional training delivery systems might be implemented over the next five years; and
- The program's marketing strategy and marketing vehicles (e.g., social media, newsletters, etc.)

COASTAL TRAINING FUTURE NEEDS AND OPPORTUNITIES (REQUIRED)
This section should describe

- How the program addresses training needs on an ongoing basis (e.g., through engagement with the CTP Advisory Council). Describe any emerging issues or training needs that the program anticipates in the next five years.

TRAINING RELATED OBJECTIVES AND ACTIONS (REQUIRED)
This section should describe the following:

- The training program's goals and objectives in a five-year timeframe (*Note:* the objectives should be SMART – Specific, Measurable, Audience-directed, Realistic, and Time-bound statements);
- The desired impacts of the training program; and
- How the CTP supports and contributes to the goals and objectives of the reserve and of the Reserve System (as set forth in the reserve's strategic plan).

MONITORING AND EVALUATION STRATEGIES (REQUIRED)
This section should describe:

- How the reserve evaluates coastal training, including the evaluation tools and data used (e.g., CTP performance measures) in programming and planning for the CTP; and
- The role of the CTP advisory committee. Please include, as an appendix, a current Advisory Group membership list and roles and responsibilities.

Administrative Plan

The administrative plan is a required element of a management plan and should outline staff roles in administration, research, education, and surveillance and enforcement, per the *Federal Code of Regulations* 15 CFR 921.13 (a)(2). The administrative plan should outline the means and support necessary to implement the goals and objectives of the reserve. It should provide an overview of the organizational and administrative framework that governs management of the reserve, address the roles and responsibilities of staff, as well as identify strategic partnerships and advisory committees.

Specifically, the administrative plan should include an organizational framework, a staffing plan, a description of strategic partnerships and advisory committees, and objectives and actions for the next five years. Optional elements could include a volunteer plan, vessel and vehicle plan, communications plan, and information about administrative initiatives of the state and reserve that impact the future of reserve operations.

The target length for this section is five pages. It may include links to other documents, as appropriate.

Contents for this Section

Organization Framework and Management Authorities (Required)

This section builds on the "Introduction to the Reserve" component to provide more information about the state agency administrative structure and management authorities. This section should highlight the mission of the agency and why it is an appropriate match to host the reserve. An organizational chart outlining the current location of the reserve within the state agency aligned with NOAA's management structure should be included. Additionally, an organizational chart of the reserve should be included.

If applicable, this section should capture any changes in the host agency since the last approved management plan (or since designation, if this is a reserve's first plan) and the reasons for those changes. It should also include any relevant information about state law, codes, or management authorities that impact the administration of the reserve.

Administrative Plan

♦ = optional element

__ Organizational framework
__ Organizational charts
__ Current staffing and needs
__ Strategic partnerships
__ Advisory committees
__ Administrative objectives and actions
__ Volunteer plan ♦
__ Vessel and vehicle plan ♦
__ Communications plan ♦

Current Staff and Needs (Required)

This section should clearly outline the number of staff members employed to support reserve programs, as well as their roles and responsibilities, particularly staff roles in administration, research, education and administration, and surveillance and enforcement. Indicate if employees are full-time, part-time, or

seasonal and the location of their primary office. Include an administrative chart to visually represent the reserve's staff positions, administrative structure, and oversight. If applicable, indicate strategies to secure state funding for core staff positions.

Include detailed information about anticipated staffing needs to better support the mission of the reserve and projected program developments. Outline the roles and responsibilities of these anticipated positions and the goal-based justifications, and reference any supporting documents that recommend these staffing needs (i.e., internal reviews and evaluations findings). If available, include information on how these future positions would be funded.

Strategic Partnerships (Required)

The administration of a reserve occurs through a collaborative process involving a variety of agencies and organizations at various levels of engagement. Strategic partnerships are those that leverage specific resources to carry out core functions of the reserve and are often associated with facilities, enforcement, or staffing. This section should not be an exhaustive list of all reserve partnerships, but instead briefly describe key partnerships. If applicable, this section could include information about the reserve's Friends group, in particular the role and responsibility of the group in supporting the mission of the reserve.

All memoranda of understanding between the reserve and land-holding or management partners should be included in the appendix of the management plan. If there is a need to compile a complete list of all organizations that the reserve current partners with, it should also be included as an appendix.

Advisory Committees (Required)

Reserve advisory committees are composed of local community stakeholders and assist in guiding the policies and management of the reserve. This section should detail the roles, membership, and expectations of the reserve's advisory committee. For example, do committee members provide feedback and recommendations on the site's management and implementation strategies; assist in seeking support for reserve programs; represent the interests of users of the reserve and its products, discuss relevant issues with the community and so on. If applicable, provide information about sub-committees or task forces and their relationship to sector-specific advisory committees.

Additional information about the advisory committees (optional) could include the following:

- How members are appointed and how long they serve;
- General meeting structure (i.e., open to the public) and frequency of meetings;
- How decisions are made (i.e., consensus); and
- Information about the general composition of the committee by
    - a list of the specific organizations and users represented on the advisory committees or
    - a list of members and affiliations from a past year.

Objectives and Actions (Required)

Reserves should identify objectives and actions for the administrative plan that ensure the reserve has the adequate administrative, operational, and financial capacities to implement its goals effectively. Reserves should clearly describe how these objectives and actions help meet its overall goals and objectives. Administrative objectives help in managing the reserve by addressing its operational needs and plans to maintain and train staff, maintain vessels and facilities, complete administrative processes, and work in the community through strategic partnerships and advisory committees. Actions should be designed to effectively and efficiently use existing administrative, infrastructure, fiscal, and human resources.

Hudson River Reserve: Administrative Goal and Objectives

The Hudson River management plan developed several operational goals and three administrative objectives to support the reserve. The reserve's administration plan outlines strong, relevant activities that will help the reserve achieve its administrative objectives. Reserves may choose to develop an administrative goal within their strategic plan, or they can simply list objectives within their administration plan that directly support objectives within the strategic plan: *coast.noaa.gov/data/docs/nerrs/Reserves_HUD_MgmtPlan.pdf*.

Because the administrative objectives and actions likely support achievement of all of the reserve goals and objectives, they do not need to be integrated into the strategic plan. Many reserves find it difficult to merge these types of objectives with programmatic objectives because they are central to supporting the entire plan. However, reserves may choose to integrate these objectives and actions into their strategic plan if administrative issues are a central focus for the next five years. If included in the strategic plan, this section can simply reference the administrative objectives actions in the strategic plan chapter.

Optional Plans That Support Programs and Their Management

The following plans are all optional possible additions to your management plan. You may decide which, if any, to include. There are no required elements for these plans; the following are suggestions on how you might structure them should you choose to include them.

VOLUNTEER PLAN (OPTIONAL)

Volunteers are an invaluable resource for reserves. A volunteer plan is helpful when it comes to building a volunteer program that helps reserve programs meet their goals and objectives and strengthens connections with the community. The considerations below can help with developing a volunteer plan.

Planning for Volunteers

Running an effective volunteer program takes time and effort, so it is critical to have a clear picture of what needs can be met with support from volunteers and how the reserve will support the volunteers. First, assess and identify needs that can be filled by volunteers. Next, identify and plan for the number of volunteers that the reserve can adequately monitor and support. Determine who will train, mentor, and oversee volunteers for each of those functions. Identify or establish policies and administrative procedures so that everyone is clear about what needs to happen before a volunteer can begin and

while working. It will be important to create and market clear position descriptions, including qualifications, purpose, time frame, expected outcomes, and evaluation criteria (if applicable). If volunteer hours will be used as match for grant awards, identify policies and procedures to track and account for those hours.

Recruiting and Organizing Volunteers
Once the reserve determines the functions that can be performed by volunteers, it is time to recruit, screen, interview, and place volunteers in appropriate positions aligned with their ability, expertise, and interest. Organizing teams of volunteers for certain areas can be useful for managing volunteers and provides them a network of people with similar interests to maintain engagement and give support to each other. It will be important to provide an orientation on the reserve as a whole, as well as the specific duties and protocols the volunteers will perform, so that volunteers can feel safe and productive when performing their duties.

Supervising, Evaluating, and Retaining Volunteers
Once trained and performing duties, volunteers must receive proper supervision, support, and evaluation of efforts. Supervising volunteers takes time and attention to ensure they are effective, safe and happy. Outline steps for gauging success (e.g., mechanisms for giving and receiving feedback), evaluating whether the complement of volunteers continues to be suited to the reserve, and determining where adjustments may be needed. It will also be important to recognize the contributions of volunteers, as this helps to strengthen the bond with the reserve and foster continued contribution.

VESSEL AND VEHICLE PLAN (OPTIONAL)

A fleet of vehicles and vessels can be critical to supporting reserve objectives and activities. A fleet infrastructure plan could help determine when craft need to be repaired or replaced, overseeing maintenance and repair work, procuring new craft and associated equipment, training staff in the proper use and safety protocols for each type of craft and associated equipment, and keeping required records for all fleet craft. If applicable, please identify policies for vehicles, including hybrids and additional energy-saving plans.

COMMUNICATION PLAN (OPTIONAL)

You can develop communication standards for your office (e.g., how your materials look; processes; overarching messages), but when it comes to reaching out to a specific audience to obtain a measurable result, developing a communication plan is a good approach. Consider creating one for each of your main objectives. Examples include increasing participation in educational programs, or expanding interactions with local officials on environmental matters. The notes below provide tips for communication plan development.

Objectives and Target Audiences
Developing clear objectives, preferably objectives you can measure, is a critical component. Think about who you want to reach and what you want them to do as a result of receiving this information. Writing this down will help you better articulate the approach and the messaging.

Designating a primary audience, and developing a communication strategy for that audience in particular, is also important. Secondary audiences can come into play, but it is far better to design your communication plan for one audience. Trying to please all often ends up pleasing none, yet once you

develop a plan for a particular audience, it should be relatively easy to modify that plan for secondary audiences.

Approach
Determine what methods will be used to reach the target audience. What communication vehicles are they most likely to see and respond to? Who will be involved in the creation and delivery of outreach materials? Create a laundry list of options, then home in on those you believe will deliver the best return on investment.

Key Messages, Tactics, and Costs
Messages should be clear, benefit-oriented, and written so that target audiences will understand and relate. Remember to present the information the audience is interested in, not the information you wish they were interested in. The messaging sweet spot is where audience needs and interests intersect with what the reserve has to offer. Keep the messaging simple and clear.

Timeline and Evaluating Success
Identifying tangible measures of success is preferred—a percentage change in audience behavior, for instance, or increased financial support. Soliciting audience feedback regarding the product and the approach is always illuminating.

CONTINGENCY OR HAZARD RESPONSE PLAN *(OPTIONAL)*

Each reserve varies in the type and degree of exposure to a variety of hazards. It could be helpful to include a section that briefly describes the types of hazards that may likely affect the reserve, and whether the reserve has contingency or response plans in place. If so, it would be helpful to reference, and link to, those plans.

SPECIAL AREA PLANS *(OPTIONAL)*

In addition to their designation as a research reserve, a number of reserves are also part of other federal, state, or local special area designations, such as a National Wildlife Refuge, state ecological reserve, or special area management plan, for example. It could be helpful to include a section that briefly summarizes any additional special area designations that apply to the reserve; the federal, state, or local partners that are involved with each; and what, if any, additional management plans or policies govern those areas.

Facility Development and Improvement Plan

The facilities plan is a required element of a management plan per the *Federal Code of Regulations* 15 CFR 921.13. In addition, 15 CFR 921.21 specifies that the NOAA-approved management plan must include a construction plan and public access plan before any award funds can be spent on construction activities. Therefore, planned facilities, facility upgrades, other infrastructure improvements, or exhibits must be listed in this section if the reserve wishes to seek funding support for them through the Reserve System's Procurement, Acquisition and Construction (PAC) program.

Reserve facilities provide functional space for reserve work and programming and serve as the face to the public, providing venues for learning and serving as a learning tool themselves. Reserve facilities must face all of the pressures that come with working and building in the coastal zone, including withstanding storms, surge, erosion, and elements of wind, salt, sand, and humidity, among others.

Facility Development and Improvement Plan

♦ = optional element

__ Purpose of facilities
__ Current facilities
__ Map of facility locations
__ Facility challenges and gaps
__ Planned facilities, facility upgrades, other infrastructure and exhibits
__ Climate and non-climate stressors
__ Facility/infrastructure descriptions
__ Operations and maintenance manual as appendix ♦
__ Long-term facility plan as appendix ♦

Additionally, a changing climate is expected to exacerbate these pressures, resulting in increased erosion, frequency, and intensity of storm events and associated surge, sea-level rise, and associated saltwater intrusion. These challenges require reserves to build facilities that are better able to withstand these pressures and serve their intended purpose for the life cycle of the structure. NOAA is encouraging reserves to build new and improve existing facilities and other infrastructure so that they are sustainable and resilient.

The document *Planning for Sustainable Facilities* (available on the Reserve System Intranet) provides information on how to assess vulnerability of potential investments, principles for sustainability and resilience, including examples and options, and sustainable building codes and rating systems. It provides considerations, references and resources to help reserves think about how to incorporate sustainable principles into facility planning. Please note that the supporting material for this guidance is more robust than other plan elements because it also supports planning requirements for the document *NOAA Programmatic Framework for Considering Climate Change Impacts in Coastal Habitat Restoration, Land Acquisition, and Facility Development Investments*.

This plan should discuss the reserve's philosophy on sustainable and resilient building, purpose and description of existing facilities and other critical infrastructure, facility challenges and gaps, and plans for new facilities, facility upgrades, and exhibits. The plan could also address green infrastructure improvements that currently or could in the future provide resilience or sustainability values to the reserve. Like the administration plan, facilities support reserve operations and the reserve staff's ability to meet objectives and actions within the strategic plan. Reserves may either choose to craft specific objectives for this plan that do not need to be incorporated into the strategic plan, or they may simply

identify facility priorities. Either approach is acceptable, but there should be a clear link between facility plans and the achievement of reserve goals and objectives.

The target length for this section is five pages. It may include links to other documents, as appropriate.

Contents for this Section

Purpose of Facilities and Construction Principles (Required)

This section should briefly describe the overall purpose and vision for what the facilities within the reserve boundaries will help achieve. Reserves may see themselves as centers for regional excellence in providing services, they may be local experts with a lower profile, they may have facilities that showcase sustainable building approaches and practices, or they may implement infrastructure projects that demonstrate the value of green infrastructure. Green or sustainable building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life cycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. Building in this way reaps not only environmental, but economic and social benefits.

This section should describe the principles that the reserve ascribes to, as well as the state laws, regulations, and initiatives that support sustainable building. The facilities prioritized in this plan should cross-walk with the programmatic priorities within the reserve plan.

In addition, this section should also describe how the reserve facilities and other infrastructure projects enhance hazard resilience. Other infrastructure projects could include small-scale habitat restorations and nature-based activities that enhance the resilience of reserve facilities. However, if a nature-based project is included as an element of a facility plan, it must be included in the habitat manipulation chapter, as well and be evaluated based on ecological impacts.

Description of Current Facilities (Required)

This section should briefly describe each existing facility on the reserve campus, including stationary and traveling exhibits, and trails. This section should also include maps depicting the following:

- The location of all current facilities, reserve monitoring and research infrastructure, and green infrastructure demonstrations (e.g., living shorelines); and
- Small-scale infrastructure, including boardwalks, boat ramps, docks, and historic or culturally significant structures.

The description for each major facility identified in the corresponding infrastructure map should provide this information:

- The purpose of the facility;
- Where it is located (reference the corresponding map);
- When it was constructed or updated;
- What components are within the facility (if applicable); and
- How the facility is used and by whom (e.g., what reserve components and activities take place in the facility).

If applicable, include

- Any available data on visitor use and capacity for the facility;
- How the facility employs sustainable or resilient building principles or techniques; and
- Whether there are plans to upgrade the facility to improve sustainability and operational efficiency. If so, please describe these plans generally in this section, but more specifically in the "Planned Facilities and Facility Upgrades" section as appropriate.
- Please provide photos for major facilities.

Facility Challenges and Gaps (Required)

This section should describe the current gaps in facilities needed to support programmatic activities or reserve operations as demonstrated through some form of needs assessment (e.g., what staff, visitor, or stakeholder needs are not currently being met). These needs should be grounded in data—e.g., current and projected capacity, visitor use, functional needs—that identify the challenges that, if overcome, support the reserve's vision. These needs should be consistent with elements of a standard reserve and sustainable reserve guidelines. (Dewberry Design, 2004) Much of this data may come from the needs and gaps information identified in the "Program Foundations" section.

This section should describe which facilities and infrastructure have been identified as needing repair, and whether current environmental and power systems within the facility are in need of upgrades to make them more sustainable or resilient. Can the reserve increase operational efficiency and reduce resources to meet those needs? In addition, this section could also describe the projected challenges that existing facilities and other reserve infrastructure will face, whether from age, use, natural or anthropogenic stressors, including climate impacts.

Planned Facilities and Infrastructure (Required)

This section should describe the facility or infrastructure projects that the reserve wants to undertake during the period of the management plan that meets the identified needs stated above. A project needs to be identified in this section if the reserve wishes to seek NERRS Procurement and Acquisition (PAC) funding for it. Detailed explanation of these facilities and infrastructure must include, at a minimum, a general description, desired time frame for construction, and general cost estimate. They should also include considerations for siting (if applicable), anticipated sustainable or resilient design principles, and other relevant characteristics. Please refer to information generated from the "Introduction to the Reserve" component to inform development of this section.

CLIMATE AND NON-CLIMATE STRESSORS

In order to effectively plan for new facilities or the most appropriate facility upgrades, reserves need to consider siting for optimal sustainability, survivability, and accessibility while also thinking hard about projected use and utility for staff and partners. Hence, part of planning for future facilities or other infrastructure should include the following:

- Identification of the projected climate change impacts that will affect the investment. Stressors and their subsequent impacts that should be addressed include changes in precipitation, air temperature, change in sea level or lake level, and changes in storm frequency and intensity. Please refer to *Summary of Observed and Projected Regional Climate-Related Changes* and *Summary of Climate Change Phenomena with Observed and Projected Changes* (available on the NERRS Intranet), as well as local information relevant to understanding infrastructure sensitivity, exposure, and vulnerability. Climate data and scenario tools focusing on sea level change can be

found in the "Introduction to the Reserve" resources section and in *Planning for Sustainable Facilities (*also available on the NERRS Intranet).

- Identification of the life span of the project based on these scenarios and projected utility. It is the responsibility of project principals to identify the methods used to determine the life span of the project based on scenarios and expected utility of the structure. However, a 30-year life span is suggested for all major facilities.

- Gauging the extent to which the projected impacts will affect project objectives and benefits over the life span of the project. By reviewing all of the factors above, determine the risk and appropriate investment for long-term facility projects, as well as potentially shorter-term upgrades and improvements in existing facilities.

- Making determinations about the extent of the climate impacts over time based on one or more climate change scenarios. We advise applying a multi-scenario analysis based on recommendations outlined by the National Research Council, the U.S. Global Change Research Program, and the Intergovernmental Panel on Climate Change.

FACILITY PROJECT DESCRIPTIONS

Identify each project in order of priority and describe why the project is a priority for the reserve. In order to describe these projects accurately, pre-work and planning will likely be a necessity. If the reserve has already developed a facility master plan, please draw from that master plan. For each major project (e.g., headquarters building, visitor center, lab), describe the following:

Required:

- Purpose and estimated life of the facility.
- Proposed timeframe for construction—this can be an estimate.
- General cost estimate for each proposed facility, which includes associated costs for environmental assessment, if applicable.
    - *Please note:* An environmental assessment will need to be prepared if the project occurs on undisturbed land or if it is expected to have significant effects on the environment. Each project will be evaluated individually.

Optional:

- Elements of the project that support Reserve System sustainable building principles (below), including sustainability or resilience goals or targets.
- Description of associated signage or exhibits that describe the sustainable principles and features of the building, if open to the public.
- Elements of the project that incorporate green infrastructure or hazard resilience.
- As able, forecasted maintenance costs and state capacity to support these costs.

For proposed minor construction projects (e.g., small pier, storage shed, nature trails), please include sufficient detail to begin the initial phase of planning.

The Reserve System sustainable building principles are discussed in detail, along with examples, in *Planning for Sustainable Facilities*. The reserve's sustainable building principles were adopted from "Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings" set forth in *Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding* (2006).

Reserve System Sustainable Building Principles

- Integrated design and sustainable siting
- Water efficiency
- Energy efficiency
- Materials and resource conservation
- Indoor environmental quality
- Operational efficiency

Integrated Design and Sustainable Siting

All projects should use a collaborative, integrated planning and design process that starts at the earliest stages of the design process, includes a variety of expertise relevant to each stage, and maintains an integrated project team throughout all stages of the project considering the life cycle of the project. The reserve should explore whether there are constraints, such as local ordinances, that may make sustainable building challenging.

Mission-Aransas Reserve: Building Sustainably on the Texas Coast

In 2011, the Mission-Aransas Reserve celebrated the opening of its new Estuarine Research Center on the University of Texas Marine Science Institute campus—the culmination of a collaborative, interdisciplinary design process. A team of engineers, architects, and reserve staff designed and constructed a headquarters and research facility to withstand harsh coastal conditions (i.e., high winds, salt, torrential rains, and storm surges) and meet specific sustainability goals.

To address conditions on the coast, the facility was designed to sacrifice the ground floor, housing non-critical building functions, provide an exterior rated to handle 130mph winds, and, using concrete additives, prevent chloride penetration, to name a few. In addition, the grounds are being irrigated by air-conditioning condensate and rainwater captured from the roof to reduce impacts on municipal water systems. During construction, 83 percent of the construction waste was recycled, and 82 percent of the materials used originated in Texas.

In 2017, Category 4 Hurricane Harvey put these sustainable design and resilience features to the test. The placement of solar panels on the roof to offset future energy costs had unintended consequences. Hurricane force winds tore panels off the roof, allowing water to infiltrate and compromise the building.
Also, pea gravel from roofs of older surrounding buildings became airborne projectiles impacting glass of the facility's windows and doors. This highlights the value of hurricane impact-rated doors and windows.

Throughout the project, the reserve found that building sustainably with low-carbon footprints is difficult to do on the coast. However, commitment from all the partners to sustainable designs and practices was critical to achieving a facility that is durable, versatile, and sustainable. For more information, contact the Mission-Aransas Reserve.

The coastal zone presents a harsh environment for facilities, and climate change will present new and exacerbate existing stressors. When identifying potential sites for future facilities, reserves should account for climate change impacts and natural hazards, as well as elements such as natural light, habitat preservation, runoff, and factors affecting accessibility. Other considerations to inform siting include state and local considerations for reserve facility siting, options to protect existing native habitat or restore a site with native species, options to address stormwater discharges on the site, including use of low impact development practices, and proximity to community features and transportation.

Water Efficiency

Water is a precious commodity. Where availability is limited and puts a strain on infrastructure, reserves must look for ways to decrease the amount of water used and increase dependence on water that is collected, used, purified, and reused on-site. Consider what water-saving mechanisms the reserve can employ as much as is feasible, such as incorporating xeriscaping and water catchment systems. Is the design strategic in its use of turf areas as part of the facility landscaping? How will efficient irrigation systems and schedules be incorporated? What other practices can be incorporated to further reduce water use?

Energy Efficiency

Buildings in this country use a significant amount of energy, most of which is produced from nonrenewable, fossil fuel resources that are contributing to greenhouse gas impacts. When designing new or upgrading existing facilities, it is important to ensure that an integrated project team and process are used to identify opportunities to increase energy efficiency of heating, cooling, and lighting systems. Reducing energy demand often requires a team, including a variety of building experts, to be effective.

Great Bay Reserve: Stepping Out on Geothermal and Solar

The Great Bay Reserve broke new ground for the New Hampshire Public Works Department as the first state facility to install a geothermal system. Due to the department's lack of experience and the fact that it had to go with the lowest bidder, who then subcontracted out various parts, the system was delivered with multiple challenges that required time and money to fix. A key lesson here is to do as much homework as possible to make up for the experience your agency may lack. While states must follow certain contracting rules, at a minimum, try to ensure that there is one company, ideally one with local expertise, to manage the entire project to ensure a seamless product and installation. On the flip side, the solar roof was a great success because they hired a local contractor who designed and installed the system. The bid process was a success as well, since they bid for solar with a roof component vs. bidding for a building with a geothermal component. The reserve is already seeing about 20 percent energy saving. The roof is projected to last about 40 years, almost twice that of an asphalt roof. Beyond energy and materials savings, staff and visitors love coming to a green building. For more information, contact the Great Bay Reserve.

MATERIALS AND RESOURCE CONSERVATION

Preventing and recycling waste reduces depletion of natural resources, creates less pollution by reducing manufacturing and transportation-related emissions, uses less energy and water compared to many virgin material product-manufacturing processes, and reduces greenhouse gasses by using less energy for manufacturing and transportation. It is important to purchase products and employ processes that do not pollute or unnecessarily contribute to the waste stream, do not adversely affect health, and do not deplete limited natural resources.

When planning for new facilities or upgrades, it is important to consider how to manage construction waste, evaluate environmental trade-offs for materials and resources, and consider use of recycled materials, deconstruction assemblies, or renewable, locally produced and low energy materials as much as possible.

INDOOR ENVIRONMENTAL QUALITY

Indoor environmental quality encompasses indoor air and water quality, aesthetics, ergonomics, acoustics, lighting, and electromagnetic frequency levels. It is important to value decisions about these items and engage building occupants in making these decisions, as well as allow for personal control of these items where practicable.

When planning for new facilities or upgrades, it is important to consider how best to reduce pollutants inside the facility, ensure healthy air and water quality for occupants, and achieve a productive work environment.

OPERATIONAL EFFICIENCY

Operational efficiency will be a direct result of taking all other sustainable building principles into account for new buildings. A whole building design approach ultimately yields the best returns in reduced impact to the environment, efficient operation, and effective work environment.

When planning for new facilities or upgrades, it is important to identify operational efficiency targets and a schedule for assessing those targets, especially for energy and water efficiency; develop an operations and procedures manual to care for the systems appropriately; and identify personnel to monitor and maintain the facility.

Facility Upgrades (Optional, or If Applicable for PAC)

A reserve may identify facility upgrades in the plan if planning to seek future NERRS acquisition and construction (PAC) funding for such projects. However, all reserves should try to evaluate where sustainability and hazard resilience can be improved for each reserve facility or other important infrastructure. Where possible, audits to assess water and energy inefficiencies should be performed to understand usage and options for minimizing usage. This information should directly inform efforts to address the Reserve System sustainable building principles.

To inform this section, the reserve may wish to consider the following:

- The most significant energy and water sinks at the reserve;
- Actions that can be implemented to reduce energy and water usage, and how much improvement can be achieved with these upgrades;
- Actions that can be taken to address the other sustainable building principles, including exterior work associated with landscaping and xeriscaping;

- How the reserve will evaluate the efficacy of the improvements over time; and
- How the reserve will maintain upgrades and ensure systems and improvements remain efficient.

Exhibits (Optional, or If Applicable for PAC)

A reserve may identify exhibits in the plan if planning to seek future PAC funding for such projects. Reserve exhibits provide important passive and active learning opportunities for a variety of visitors about the dynamic processes and benefits of estuaries, as well as the pressures estuaries are under and what the public can do to protect these resources. Exhibits should be theme based, address reserve priority issues, and convey the reserve's key messages. Exhibits should be evaluated periodically to determine how to incorporate new information and best engage audiences.

This section should include a general description and cost estimate for new exhibits and exhibit upgrades based on some form of needs assessment. When possible, use sustainable materials and, where applicable, discuss sustainable building principles.

Additionally, interpretive materials and signage can be found both inside facilities and outside within demonstration sites, land trails, water trails, amphitheaters, etc. Consider the range of experiences available to visitors, and provide description of planned outdoor interpretive materials and exhibits. Cost estimates should be included, and these activities should also be based on projected visitor use needs and impacts.

Green Infrastructure (Optional)

A reserve may identify green infrastructure in the plan if planning to seek future PAC funding for such projects. However, all reserves should consider where green infrastructure can be incorporated to provide critical values and services (e.g., storm water retention, energy dissipation during extreme storms) that support reserve habitats and infrastructure resilience and sustainability. This information should directly inform efforts to protect existing reserve infrastructure from climate-influenced impacts.

To inform this section, the reserve may wish to consider the following:

- The types of green infrastructure that could enhance the sustainability and resilience of existing reserve infrastructure;
- The values or benefits the implementation of targeted green infrastructure elements offers the reserve;
- How the reserve could use the identified projects as tools to enhance its key programmatic capabilities; and
- How the reserve will monitor the long-term effectiveness of green infrastructure projects.

References

Dewberry Design Group Incorporated (2004). *National Estuarine Research Reserve System Standard Reserve*.

Dewberry Design Group Incorporated (2004). *National Estuarine Research Reserve Sustainable Design Guidelines*.

Resource Protection Plan

The resource protection plan is a required element of a management plan per the *Federal Code of Regulations*, 15 CFR 921.13. The Reserve System regulations (15 CFR 921.1) specify that

- Reserves shall be open to the public to the extent allowed by state and federal law;
- Multiple uses are allowed to the degree compatible with reserve purpose and use levels prescribed in the management plan; and
- The management plan shall identify uses requiring a state permit, as well as areas where uses are encouraged or prohibited.

Protecting the resources of the reserve serves as the foundation for all programmatic efforts and is central to the success of the reserve. It is important for reserves to protect the ecological unit representative of key land and waters within each biogeographic region and maintain it in the face of human and natural stressors that are continually increasing.

This plan should provide a description of the authorities that protect the reserve, allowable and unallowable uses per those authorities, uses requiring a permit, and surveillance and enforcement strategies to ensure appropriate use of the reserve.

The target length for this section is five pages. It may include links to other documents, as appropriate.

Contents for this Section

State Management and Statutory Authorities (Required)

The protection of the reserve relies on state management and regulatory authorities. This section should describe all authorities (federal, state, local, and tribal, if applicable) related to the protection and use of reserve resources. It should include a complete description of rules and regulations that govern access and activities on reserve property, and where possible, identify when these were developed. It should also identify key partners in developing and upholding these authorities.

Allowable and Unallowable Uses (Required)

This section should describe all allowable and unallowable uses within the reserve, based on the above-mentioned authorities, and where they may or may not occur respectively. A table that summarizes these uses and a map showing where uses are located are encouraged. Please identify which, if any, uses require a permit and permit requirements. Please also note how this information is communicated to users of the reserve. Pre-existing uses that occurred before designation should be discussed and evaluated if those uses are still occurring to determine compatibility with intent of reserve.

Resource Protection Plan

♦ = optional element

__ Management authorities
__ Allowable and unallowable uses
__ Map of allowable uses
__ Surveillance and enforcement capacities
__ Resource protection challenges
__ Resource protection objectives and actions ♦
__ Monitoring and evaluation plan strategies ♦

Reserves may also choose to include an explanation of the rationale for determining which uses are allowed or not allowed or why there are restrictions in certain areas, and whether there are additional policies in development that may limit access in certain areas, and if so, when these are likely to be implemented.

Surveillance and Enforcement Capacities (Required)

This section should describe what agencies are responsible for surveillance and enforcement of rules regarding use within the reserve boundary and what personnel and strategies will be dedicated to enforcing the management authorities to ensure appropriate uses of the reserve. The plan should clearly outline how violations to specific uses will be addressed via the enforcement network with jurisdiction over these resources. (For example, is there a clear line of communication between applicable reserve staff and enforcement officials?) Key partnerships and other landowner protection plans that support the management and protection of the reserve should be described and included within an appendix if directly protecting reserve lands. In this case, please describe what role these partners play.

Resource Protection Challenges (Required)

Maintaining adequate control of reserve resources can be challenging for a variety of reasons. This section should identify activities or uses occurring outside reserve boundaries that impact or may potentially impact reserve resources. It should describe how existing authorities and processes protect the reserve and how the reserve interfaces with these uses, e.g., the reserve may be involved in reviewing permits for certain activities that may impact the reserve.

Objectives and Actions (Optional)

Like the administrative plan, this plan provides a foundational capacity to support the overarching goals and objectives within the strategic plan and be supported by other program efforts. If applicable, the reserve can decide to incorporate specific objectives related to resource protection within the strategic plan, or they can stand alone as foundational to all other elements within the strategic plan.

Monitoring and Evaluation Strategies (Optional)

If included, this section should describe how the reserve plans to monitor whether resources are adequately protected. Consider addressing the following questions: What resource indicators does the reserve use to ensure ecosystem health? How will the reserve monitor allowable and unallowable uses and adjust strategies to ensure protection? What are the frequency, timing, and location of those monitoring activities? How does the reserve detect change in both resource and social indicators?

Public Access and Visitor Use Plan

The public access plan is a required element of a management plan per the *Federal Code of Regulations* 15 CFR 921.13. Public access can be defined as the ability of all members of the community to pass physically and visually to, from, and along the ocean shore, other waterfronts, and over public lands. The ability to enjoy the oceans, bays, and rivers is directly related to the ability to reach them. A public access plan must try to allow for the long-term public use and enjoyment of the water and shoreline while minimizing damage to the resources. Depending on the geographic proximity and current access available to visitors, reserves may want to consider topics such as public transit, bike trails, ADA accessibility for all visitor facilities, and signage to ensure that visitors can locate accessible areas and follow necessary rules for using resources wisely.

This plan should discuss public uses, opportunities, and challenges within the reserve. Objectives and actions should support public access and positive visitor experiences while maintaining adequate long-term protection of reserve natural and cultural resources.

Contents for this Section

The following are key elements to be included within this section of the management plan. Reserves should address each element below to the best of their ability given the unique stage and nature of the reserve. The target length for this section is five pages. It may include links to other documents, as appropriate.

Public Access and Visitor Use Plan

♦ = optional element

__ Current public access
__ Map of public access points
__ Public access challenges
__ Public access and visitor experience opportunities
__ Public access objectives and actions ♦
__ Monitoring and evaluation strategies ♦

Current Public Access (Required)

This section should include general information about where and how visitors, researchers, and other interested parties can access the reserve. It should include, for example information about the days and hours of operation; whether, or under what circumstances, the reserve charges fees; the number and type of trails or access points; and whether there are any restrictions or limitations for access (e.g., seasonal, accessible or not for persons with physical disabilities, etc.). It should also include a map of trails and water access points and summarize which public uses are permitted on trails or access points (e.g., whether pets, fishing, boating, swimming, etc. are allowed). If the reserve has historical or cultural areas of significance, please note whether access is permitted in these areas, or if there are restrictions that need to be heeded within them.

This section should also describe the rationale for the current public access structure, for example, what purpose the access points serve and for what target audiences. Where possible, include all relevant information and data that support acceptable limits for public access or carrying capacity. Carrying capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions in the reserve. Visitor experience includes the perceptions, feelings, and reactions a person has while visiting the reserve. If the reserve has any statistics regarding current attendance records, visitor use impacts, or results of carrying capacity studies, it can be helpful to include them, but is not required.

Public Access Challenges (Required)

This section should include an overview of challenges to providing public access and maintaining adequate control and protection of natural and cultural resources. Studies on carrying capacity and surveys on visitor use can serve as foundations for future action. Please note whether the reserve is experiencing challenges in terms of the number of visitors that can be accommodated based on staff availability, facilities or parking capacity, or ensuring adequate protection of natural resources. If so, please note what specific impacts the reserve has seen from these challenges (e.g., are there particular species of concern potentially impacted by large groups visiting the reserve at particular times of the year, i.e., breeding season, growing season?). Looking to the future, please note if the reserve anticipates these impacts to be exacerbated, whether by changes in demographics or climate change impacts that are predicted. Does the reserve expect those changes to impact planning for the future? If so, please describe how these impacts may potentially change the nature of access in certain areas.

Public Access Opportunities and the Visitor Experience (Required)

While balancing information from current uses and challenges, this section should describe the future opportunities to increase or decrease access to specific areas of the reserve.

Questions to inform this section include: Who are reserve future target audiences? What has been learned since the last management plan that provides input for this plan? What specific access policies will impact education, stewardship, research, and monitoring programs? Is the reserve trying to increase, reduce, or limit public access and visitor use, and why? What are the primary themes that communicate the significance of the reserve to visitors? What strategies does the reserve implement to ensure that those interpretative themes are communicated (e.g., producing materials in other languages or accessible formats)? How does the reserve connect outdoor visitor use experiences to indoor exhibits?

Objectives and Actions (Optional)

If applicable, this section should provide an overview of the reserve's strategic plan objectives and actions that relate to public access and visitor use. It will be important to consider the role of education, interpretation, and outreach in managing public access and visitor use.

If applicable, discuss indicators and procedures for monitoring and evaluating these actions to determine if public access should be altered in the future.

Monitoring and Evaluation Strategies (Optional)

If included, this section should describe how the reserve plans to gauge whether public access is being adequately addressed. Consider addressing the following questions: How does the reserve determine whether public access facilities are under- or over-utilized? How do you determine whether public access is negatively impacting the environment? How do you gauge whether visitors are satisfied with their experience at the reserve?

Resources

NOAA's Managing Visitor Use in Coastal and Marine Protected Areas Course – Provides participants with tools to identify and define unacceptable visitor use impacts to natural resources and visitor experiences. Participants of this course will be able to understand the human dimensions of coastal and

marine management, apply recreation and visitor use management planning frameworks, identify visitor use issues, including visitor-resource and visitor-visitor impacts, craft a clear problem statement, develop measurable indicators for monitoring impacts and management and set standards for impact acceptability, and implement visitor use monitoring methods and management strategies and tactics.

Managing Visitor Impacts in Parks: A Multi-Method Study of the Effectiveness of Alternative Management Practices – Provides recommendations for outdoor recreation management within protected areas such as parks.

Monitoring and Management of Recreation in Protected Areas: The Contributions and Limitations of Science – Provides examples of significant contributions of science to visitor monitoring and management. It covers the related scientific purposes of explanation, causation, prediction, and assessment.

Land Acquisition Plan

The land acquisition plan is a required element of a management plan per the *Federal Code of Regulations*, 15 CFR 921.13. Estuaries, and their associated habitats, offer numerous and diverse benefits to society and natural systems. Some of these benefits include storm buffers to protect property from hurricanes, nurseries for commercially important marine species, and areas to enjoy for recreation and aesthetics. However, human development has significantly eliminated or degraded the habitats that provide these values.

To address the conservation of the reserve's key habitats, the Reserve System regulations require that the management plan identify ecologically key land and water areas for acquisition, prioritize these areas according to their relative importance for specific values, and describe strategies for establishing adequate long-term state control over these areas. In addition, the acquisition plan must identify land ownership within the reserve boundaries, including publicly owned land, the acquisition methods that will be used (e.g., fee simple or less-than-fee simple), and estimated cost and timeframe.

Acquisition projects must be listed in this section if the reserve wishes to seek funding support for them through the NERRS Procurement, Acquisition, and Construction (PAC) program.

The target length for this section is five pages. It may include links to other documents, as appropriate.

Contents for this Section

Acquisition Context and Values (Required)

As context for identifying acquisition priorities for the next five years, this section should summarize progress toward acquiring previously identified priority areas, particularly for any key land and water areas of the reserve, including how much has been protected since the last management plan update and how much remains to be protected. In addition, this section should describe the other ecological, historical, conservation, cultural, recreational, and other values that are important when considering future acquisitions. These values should be connected to the reserve's management plan goals and objectives. Where feasible, it should consider the impact of climate and non-climate stressors over time (e.g., the need to plan for wetland migration), using guidance provided in Part 1. This section should also include a map of the current ownership within the reserve's boundary.

Priority Acquisition Areas (Required)

The acquisition plan must describe priority areas targeted for potential future acquisitions. Priority acquisition areas do not need to be at the parcel level, but at a level appropriate for the reserve. There should be sufficient detail that a PAC merit reviewer could determine whether a proposed acquisition project addresses a priority area identified in the reserve's management plan.

Priority acquisition areas should derive from the acquisition values described in the previous section. For example, they could include areas identified for acquisition at the time of the reserve's designation that have not yet been protected, unprotected in-holdings within a reserve, or lands needed to support the reserve's research, education, or training programs. They could also derive from the assessment of climate and non-climate stressors. For example, if the need to plan for wetland migration is driving the need for additional acquisition, these migration areas could be identified as priorities for acquisition.

Note: Where there is sensitivity to identifying individual parcels, the reserve may choose not to do so, but rather may group parcels together into tracts or subareas for the purpose of creating an acquisition strategy.

PRIORITIZATION PROCESS AND CRITERIA

The NERRS regulations (§921.13) state that an acquisition plan should rank the ecologically key land and water areas according to their relative importance. Ranking priority tracts targeted for acquisition provides reserves the opportunity to efficiently allocate limited acquisition resources to land or waters that best support ecological functions or programmatic goals and objectives laid out in the management plan. The reserve may include a table or list of the ranked areas in the plan or, instead, include a description of the process and criteria used to prioritize areas, along with any additional factors that influenced the selection of these areas.

Reserves should include, where feasible, criteria that incorporate climate and non-climate factors into the prioritization process. These criteria are typically created by the reserve staff with input from partners and the reserve advisory board and are linked tightly to objectives within the reserve strategic plan. Benefits of creating criteria include these items:

- Helping reserve managers, staff, and partners visualize conservation priorities;
- Providing a strategic approach to conserving ecosystem functions and services;
- Improving ecosystem and community resilience to climate and weather impacts;
- Leveraging partners in support of reserve priorities; and
- Improving the management of investment risks.

DESCRIPTIONS OF PRIORITY ACQUISITION AREAS

The description of each priority area should include key habitats, existing ecological value, and proposed value to the reserve's ecological unit or programming. A map should be included of all acquisition areas, within the context of the reserve boundary, to understand if priorities are adjacent to existing reserve boundaries (core or buffer) or connected to the reserve via water corridor. Each target acquisition area description must be sufficient to reference when developing potential land acquisition grant applications.

In addition to describing the ecological or programmatic value of priority areas, the reserve may also opt to include information about important non-ecological acquisition values, such as cultural resources, access pathways, consumptive and non-consumptive recreation uses, historic structures, and so forth.

Priority Areas Acquisition Strategy (Required)

Once priority acquisition areas have been determined, the reserve should consider how it will acquire lands and waters within a priority acquisition area. A reserve's acquisition strategy should provide information about existing state processes the reserve uses to acquire land, how the appropriate level of protection or control is determined for each area, estimates of fair market value, acquisition timeline (as feasible), and potential partners and funding sources.

TRACT ACQUISITION STRATEGY (REQUIRED)

The reserve should briefly describe the strategy or process it uses to acquire lands or protect them over the long term once the opportunity arises, including, as applicable, any required state level acquisition strategies. This strategy or process may vary significantly from reserve to reserve depending on the state or the reserve's organizational structure. For example, some reserves may rely heavily on existing state land acquisition programs, such as Florida Forever or Alabama's Forever Wild, while others may rely primarily on land trust partners for their acquisition programs. Some reserves may use a combination of the two.

This section should also discuss coordination with other relevant conservation plans linked to reserve landowning partners. At the reserve's option, this section could also describe whether the reserve's strategy includes pursuing funding from complementary federal and state acquisition programs for coastal wetlands, migratory bird or endangered species habitat, or agricultural lands, such as those described under the "Tools and Resources" section below.

Land acquired with Reserve System acquisition funds must be added to the reserve boundary, whereas lands acquired with other funding sources do not necessarily need to be added. For this reason, it would also be helpful to describe how the reserve determines whether newly acquired or protected lands should be incorporated into the reserve boundary. The reserve should also evaluate the level of capacity needed to provide ongoing management oversight and stewardship for new lands being considered for acquisition.

PREFERRED METHODS FOR ESTABLISHING STATE CONTROL (REQUIRED)

According to Reserve System regulations, a reserve must establish adequate state control over new areas acquired for inclusion into the reserve boundary. Specifically, per 15 CFR 921.13,

> In selecting a preferred method(s) for establishing adequate state control over areas within the proposed boundaries of the reserve, the state shall perform specific steps for each parcel determined to be part of the key land and water areas (control over which is necessary to protect the integrity of the reserve for research purposes), and for those parcels required for research and interpretive support facilities or buffer purposes.
>
> A. Determine, with appropriate justification, the minimum level of control(s) required [e.g., management agreement, regulation, less-than-fee simple property interest (e.g., conservation easement), fee simple property acquisition, or a combination of these approaches]. This does not preclude the future necessity of increasing the level of state control;
>
> B. Identify the level of existing state control(s);
>
> C. Identify the level of additional state control(s), if any, necessary to meet the minimum requirements identified in paragraph (a)(7)(i)(a) of this section;
>
> D. Examine all reasonable alternatives for attaining the level of control identified in paragraph (a)(7)(i)(C) of this section, and perform a cost analysis of each; and,

E. Rank, in order of cost, the methods (including acquisition) identified in paragraph (a)(7)(i)(D) of this section.(ii) an assessment of the relative cost-effectiveness of control alternatives shall include a reasonable estimate of both short-term costs (e.g., acquisition of property interests, regulatory program development including associated enforcement costs, negotiation, adjudication, etc.) and long-term costs (e.g., monitoring, enforcement, adjudication, management and coordination). In selecting a preferred method(s) for establishing adequate state control over each parcel examined under the process described above, the state shall give priority consideration to the least costly method(s) of attaining the minimum level of long-term control required.

As a result, the reserve will need to identify the methods or mechanisms a state proposes to use to establish adequate long-term state control over areas targeted for acquisition. These strategies may be stated generally, as they may be applied to all acquisition areas; however, if knowledge of a particular strategy is applicable to specific smaller areas or tracts, then that should be identified.

Some of the acquisition mechanisms potentially available to reserves include the following:

- **Fee Simple Acquisition** – absolute title to land, free of any conditions, limitations, restrictions, or other claims against the title, which one can sell or pass to another by will or inheritance. A fee simple title has a virtually indefinite duration.
- **Conservation Easement** – a legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs. Examples of acquired easement rights include riparian, subsurface mineral, agricultural, residential development, viewshed, and groundwater.
- **Donation** – an outright donation of land to a trust or federal, state, or local governments that may provide the donor with a charitable income tax deduction and a reduction in the value of one's taxable estate.

Mission-Aransas Reserve: Stewardship Considerations at Fennessey Ranch

As part of the designation of the Mission-Aransas Reserve in 2006, a conservation easement was acquired on a private working ranch that allows multiple uses, including hunting, fishing, nature tours, and cattle ranching, among others. Supporting these diverse business ventures, the ranch includes diverse habitats from freshwater wetlands, riparian corridors, and coastal prairie. All these habitats support a wide range of fauna and flora, including over 400 species of birds.

The conservation easement provides the legal foundation for the collaborative management of the property between the reserve and the property owners. A joint management plan was developed that allows for the generation of revenue from compatible uses and ensures that the conservation values of the ranch will continue to support wildlife, biodiversity, and reserve research and education opportunities well into the future. For more information: *www.missionaransas.org*

FAIR MARKET VALUE ESTIMATES (REQUIRED)

Reserves should look at the fair market value of any property interest within the prioritized acquisition areas. Ownership and fair market values of tracts can be stated in general terms within the plan. It is recommended that individual tract ownership not be identified.

Estimated Acquisition Timeline (Required)

The plan should include a schedule estimating the time required to complete the process of establishing adequate state control over parcels within priority acquisition areas.

Potential Acquisition Partners (Optional)

If feasible, the reserve can identify potential acquisition partners, such as interested land trusts, state land management agencies, municipalities, local governments, and reserve Friends groups. Examples of local, regional, or national land trusts that have partnered with reserve acquisitions include the Conservation Fund, the Nature Conservancy, Weeks Bay Foundation, and Elkhorn Slough Foundation. Partners can be valuable assets to a reserve by providing real estate expertise, conducting due diligence such as property surveys and appraisals, contacting willing sellers, offering financial and legal assistance, and in some cases, buying and holding a property until the state can take title. Acquisition partners may also continue to play a role in ongoing stewardship of properties or monitoring conservation easements.

Weeks Bay Reserve: Leveraging Partners to Acquire Land

In 2010, a diverse partnership secured the acquisition of 820 contiguous acres of forested wetland habitats adjacent to the Weeks Bay Reserve. A diverse coalition contributed to the success of the project, including the Conservation Fund, Weeks Bay Foundation, Baldwin County Commission, Alabama Forever Wild through the Alabama Department of Conservation and Natural Resources, and NOAA.

To acquire the property for conservation purposes, the Alabama Department of Conservation and Natural Resources brought together funding from different sources, including NOAA, Forever Wild, and the Coastal Impact Assistance Program. Working with the department, the local and national land trusts became the contracting entity with the willing seller. In that role, they researched the title and completed an appraisal of the property. Without the contributions of the various partners, the reserve would have not been able to acquire property. The resulting federal, state, local, and land trust partnership has made a significant contribution to the conservation of coastal habitats and contributes to improved public access, water quality, and opportunities for research and education. These partnerships led to the largest addition to the reserve since its designation in 1986.

Funding Sources (Optional)

If feasible, the reserve can identify potential sources of acquisition funds. These could include potential sources of matching funds. Funding sources could be federal, state, foundation, or private. Common examples of funding sources are provided in the “Tools and Resources” section.

Tools and Resources

NOAA's Guide for Considering Climate in Coastal Conservation provides a step-by-step approach for incorporating climate change information into new or existing conservation plans, with a focus on climate considerations and key resources specifically relevant to coastal areas.

NOAA's Sea Level Rise Viewer shows how various levels of sea level rise will impact coastal communities. The tool covers coastal areas of the U.S., including U.S. territories. Visuals and the accompanying data and information cover sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.

Funding Opportunities

NOAA's National Estuarine Research Reserve System PAC (Procurement, Acquisition, and Construction) – Grants to state host agencies of reserves to support land acquisition for projects identified in approved reserve management plans.

U.S. Department of Agriculture Forest Legacy Program – Grants available to help landowners, state and local governments, and private land trusts identify and protect environmentally important forestlands that are threatened by present and future conversion to non-forest uses. The Forest Legacy Program is designed to protect both traditional uses of private lands and the public values of America's forest resources.

U.S. Fish and Wildlife Service's North American Wetland Conservation Act Program – Grants are available to fund conservation of wetlands and wetland-dependent fish and wildlife (waterfowl) through acquisition, restoration, or enhancement. Grants may be provided directly to state, local governments, and nonprofit organizations. This program strongly prefers to fund diverse conservation partnerships.

U.S. Fish and Wildlife Service's Coastal Wetland Conservation Grant Program – Grants are awarded to Great Lakes and coastal states and trust territories for projects that restore, acquire, manage, or enhance coastal lands and waters. Projects must provide for the long-term conservation of such lands and waters and the fish and wildlife dependent on them. The Coastal Grants Program gives priority to the restoration of barrier islands-associated maritime forest, coastal wetlands ecosystems, endangered species, and anadromous fish species, and to the building of financial and cooperative, private, and governmental partnerships.

U.S. Fish and Wildlife Service's Endangered Species Recovery Lands Program – Grants are provided to states and territories for acquisitions of habitat that supports approved recovery plans.

U.S. Department of Agriculture's Grant Programs: The Department of Agriculture has a number of cost-share and grant programs that involve acquisition of conservation easements, including the Conservation Reserve Program and Agricultural Conservation Easement Program.

> The Conservation Reserve Program, within USDA's Farm Service Agency, provides farmers enrolled in the program with a yearly rental payment (for 10-15 year contract periods) to remove environmentally sensitive land from agricultural production and plant species that will re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife

habitat.

The Agricultural Conservation Easement Program, within the Department of Agriculture's Natural Resources Conservation Service (NRCS), provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits through conservation easements. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect, and enhance enrolled wetlands. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments, and nongovernmental organizations protect working agricultural lands and limit non-agricultural uses of the land.

Resource Manipulation Plan

The resource manipulation plan is only required for a management plan when resource manipulation activities are occurring within the buffer areas of the reserve (per the *Federal Code of Regulations*, 15 CFR 921.13). Resource manipulation can occur only in the reserve buffer and refers to long-term pre-existing (before designation) manipulation for reasons not related to research or restoration. Most often, resource manipulation is occurring for the benefit of human communities. Examples of resource manipulation activities include regulation of water flow, sediment management, timbering, or aquaculture. These activities should be reviewed to ensure they are not preventing the reserve from serving its designated purpose.

Resource Manipulation Plan
(If applicable)

♦ = optional element

__ Current and proposed resource manipulation activities
__ Map of manipulation activities
__ Permitting/approval requirements
__ Climate and non-climate stressors
__ Current and potential partners
__ Impacts of activities

Monitoring and evaluation strategies ♦ If included, the target length for this section is five pages. It may include links to other documents, as appropriate. This plan should identify and describe priorities for resource manipulation, influence of stressors on these activities, requirements for conducting them, justification for continuing them, and resources and partners devoted to them.

Contents for this Section

Current and Proposed Resource Manipulation

This section should describe the reserve's current or planned resource manipulation activities, describe how each activity supports the reserve's management plan goals and objectives, and justify why the activities are not detrimental to reserve resources. In addition, expected outcomes of the resource manipulation activities should be described generally. Outcomes could be ecological, social, or economic in nature and should not be detrimental to the ecology of the reserve. Given that reserves have limited resources, the reserve should prioritize what activities they will implement or continue over the five-year management planning period.

It will be helpful to reference local, state, or federal priorities or plans that support these activities and are important to the reserve. A reserve boundary map should be provided that spatially references the current and planned resource manipulation activities (to depict the scale at which they are occurring) and key resources or habitats important to these manipulations.

Factoring Non-Climate and Climate Stressors into Resource Manipulation Planning

The reserve should consider stressors that may impact resource manipulation activities, including climate considerations that factor into prioritizing these activities. As possible, consider whether these impacts may be beneficial or harmful to key reserve resources or habitats, and whether resource manipulation activities will enhance resilience to climate stressors.

When available, incorporate down-scaled climate model information and other climate trend information to support the prioritization process. Incorporating these considerations into the

prioritization process will help the reserve create a matrix of place-based climate-related impacts to reserve resources or habitats associated with resource manipulation activities.

Current and Potential Partners

Briefly identify reserve partners that support current or planned resource manipulation activities. Partners may be key players in achieving successful activity outcomes.

Permitting or Approval Requirements

The reserve should briefly describe any permits or other regulatory or administrative requirements for current and proposed resource manipulation activities within reserve boundaries. Permits or regulatory requirements will vary based on each activity; they may include a mix of state and federal permitting or regulatory requirements. As an example, a permit could include an incidental take permit or harassment authorization issued by the U.S. Fish and Wildlife Service (USFWS) for certain species. If the reserve is not the primary party responsible for land stewardship or management, those entities should be included in the development of the proposed activity.

Impacts of Resource Manipulation Activities

When resources are manipulated by human activity, opportunities exist for unintended ecological disturbance. The reserve should consider whether manipulation activities have the potential to negatively impact key land and water areas or habitats, and whether they are occurring in areas considered for future core area expansion. These activities should be closely monitored for intended and unintended consequence to ensure that key reserve resources are protected.

Monitoring and Evaluation Strategies (Optional)

If included, this section should describe how the reserve plans to monitor whether the objectives of the resource manipulation activity are being met and if there are any positive or unforeseen impacts from the manipulation strategy.

Restoration Plan

The restoration plan is a required element of the management plan if the reserve is intending to perform restoration activities within reserve boundaries, per the *Federal Code of Regulations*, 15 CFR 921.13. Most reserves have habitats that are in less than pristine condition due to land use or climate-related impacts. Restoration offers the opportunity for reserves to return habitat to its natural functioning, and in doing so, inform the practice of restoration through a hypothesis-driven restoration design.

> *"Here is the means to end the great extinction spasm. The next century will, I believe, be the era of restoration in ecology."*
>
> – E. O. Wilson

Restoration planning should take advantage of the full suite of reserve programmatic capability to the extent possible and address climate and anthropogenic stressors in considering the resilience, and hence prioritization, of restoration activities. Within the Reserve System, reserves span the spectrum of restoration needs from relatively intact systems with no readily apparent need for restoration, to those altered where restoration may be the only way to achieve original function. The level of detail and priorities identified in this plan will depend on where a reserve is along this continuum.

If included, the target length for this section is five pages. It may include links to other documents, as appropriate. This plan should describe restoration priorities, the process for determining those priorities, the influence of stressors on the priorities, project details (if available), and a monitoring strategy. Background on restoration ecology and the Reserve System's *Restoration Science Strategy* are provided as context for the plan contents section.

What Is Restoration Ecology?

Restoration ecology is the scientific study and practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action, accomplished within a short time frame using targeted actions to achieve relatively self-sustaining ecological conditions. The Society for Ecological Restoration defines ecological restoration as an "intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability." (Society for Ecological Restoration, 2004) The practice of ecological restoration encompasses a wide scope of projects such as restoration of hydrology, shoreline erosion control, reforestation, local seed sourcing, removal of non-native species, re-vegetation of disturbed areas, stream bank modifications, reintroduction of native species, and habitat and range improvements for targeted areas within reserves.

What Is Restoration Science in the Reserve System?

In 2002, a multidisciplinary group of Reserve System staff members and outside restoration experts developed the *Restoration Science Strategy*, which takes advantage of the unique capabilities of the Reserve System. The goal of the strategy is to "provide the scientific bases and technical expertise to restore, enhance, and maintain estuarine ecosystems by developing and transferring effective approaches to identify, prioritize, restore, and monitor degraded or lost coastal habitat."

The strategy identifies a number of overarching restoration-related questions that the Reserve System is

poised to address through an inquiry-based approach to restoration. Questions posed by the plan include the following:

- Once habitats and functions of value in estuaries are degraded, is this reversible and how? Can these functions be reversed to a pre-existing condition? Are all functions restorable? Or is "restoring" to a future condition more appropriate?

- What is the importance of topographical complexity to restoration? What is the relationship between topographical complexity and biodiversity? What is the relationship between habitat structure and function?

- What do you monitor at an individual reserve that would help measure the cumulative benefit of many restoration projects? How long should projects be monitored to ensure long-term success? What steps should be involved in restoration projects? What level of effort is appropriate? What are the trade-offs between tremendous effort up front and small efforts over a longer period?

Additional considerations include ecosystem services. Considering the value of coastal resources and potential climate impacts and other stressors' effects on these values, how can ecosystem services be maintained or enhanced to increase resilience of habitats and communities? What services are most beneficial to the reserve and surrounding natural and human communities? How will climate impacts generally be factored into restoration decisions?

The strategy promotes collaboration among reserves to address many of these questions and, hence, contribute to scientific literature and policy development. The Reserve System can play a national role by developing innovative technology and methods of evaluating restoration performance, serving as local reference sites, translating and transferring restoration information, providing scientific and technical advice to support policy and regulatory decisions, and building support for regional science coordination. A reserve's restoration plan should not only focus on restoring habitat in the reserve, but explore what roles the reserve's restoration or other on-site capacity can play in promoting the priorities of the Reserve System's *Restoration Science Strategy*.

Reserves should follow the guiding principles for restoration set forth within the strategy:

- Preservation and conservation of existing habitat must occur along with restoration.
- Reserve participation is voluntary and additional funding is required for implementation.
- Reserves will not support habitat manipulation that causes adverse impacts.
- A partnered approach with science and management organizations or professional.
- Integrated application of research, education, and stewardship capacities.
- Science activities will be subject to a peer-review process.

Contents for this Section

Priority Restoration Areas

When identifying restoration areas, it will be important to develop criteria that help the reserve identify those areas most important to ensuring the integrity of the reserve's ecological unit. It will also be important to consider what condition the area should be restored to in order for it to be the most sustainable (e.g., to a pre-existing state or to a new condition?). Reserves might also consider what restoration projects could inform broader stakeholder or partner needs, or what restoration-related science questions can be informed by an inquiry approach to restoration projects at the reserve.

Restoration Plan (If applicable)

♦ = optional element

__ Priority restoration areas
__ Description of restoration areas/habitats
__ Map of restoration areas
__ Climate and non-climate stressors
__ Prioritization process and criteria
__ Priority restoration projects
__ Acres and outcomes
__ Partners
__ Monitoring and evaluation strategies ♦

Description of Restoration Areas

A description of each priority habitat identified for restoration should be included to indicate why the restoration is needed to protect and maintain the ecological unit of the reserve. Additionally, the ultimate ecological condition, or general outcome, of each area should be described. A map should be included of all areas targeted for restoration. Refer to the Reserve System habitat classification system, as appropriate, to describe current and project future habitat states.

Factoring Climate and Non-climate Stressors into Restoration Planning

As part of the process of prioritizing restoration areas, it will be important to factor in climate and non-climate stressors to determine timing and challenges for restoration efforts. To do this, consider what stressors will impact the success and resilience of the reserve habitats identified for restoration. For example, will these areas be vulnerable to climate impacts such as changes in local water levels, inundation patterns, temperature changes, soil moisture changes, precipitation patterns, and storm intensity or pattern?

Reserves' understanding of anthropogenic drivers on their habitats and ecosystems varies considerably. In some cases, a reserve may have the ability to control those impacts or stressors. In those instances, the reserve should incorporate controls in project designs. Some potential non-climate stressors to consider include land use impacts such as sediment and nutrient loading, as well as physical barriers to habitat migration such as dams, roads, and levees.

Determining Restoration Priorities

Given limited resources, it will be important to determine what criteria and processes are in place to prioritize restoration activities. It is advised that the plan outline the process the reserve will take to develop and apply identified criteria for determining restoration priorities. Criteria can be ecological and logistical in nature.

For example, the reserve may want to consider ecological criteria that address the following questions: Are there threatened and endangered species that need to be protected? Are there needs to buffer resources from storm surge? Are there rare fauna or flora communities that need to be protected?

What areas are important for ensuring habitat resilience in the face of key climate and anthropogenic stressors? Is there any information lacking that would impede restoration success?

The reserve may also want to factor in logistical criteria that address the following questions: Is there available funding to conduct the project and ensure maintenance and monitoring? Can permits be obtained? Are partnerships required to ensure project success? Are those partners committed to the project? Are volunteers integral to the success of the project?

Priority Restoration Project Planning

Where enough detail is available, it is advised that project-level information be included to leverage funding opportunities and share ideas with partners. Basic details for each project should include a description of the project, the intended outcome, the affected acreage, partners involved, and monitoring strategy, and a site map noting the area to be restored in the context of the reserve boundary. Additionally, please note how local and regional policy makers, scientists, and restoration practitioners have been or will be involved in the design or implementation of the project. To the extent possible, restoration projects should include a restoration science element that links to the Reserve System's *Restoration Science Pla*n. A restoration science element may include reference site data and restoration-specific questions that can be examined within the context of the restoration project.

Please describe how reserve programs and assets will support the project; note how System-Wide Monitoring Program data will be used, and how Coastal Training Program and education program staff will be involved in project development, communication of results, and resulting best management practices.

Reserves may also be engaged in projects by serving as a reference site and not an active area for restoration. Please note where this is occurring and if restoration practitioners in the area are using SWMP data.

Elkhorn Slough Reserve: Hester Marsh Tidal Wetland Restoration Project

The Elkhorn Slough Reserve is restoring over 100 acres of salt marsh by adding sediment to a subsided marsh to make it more sustainable in the face of sea level rise. The reserve's Tidal Wetland Program spent much of 2014 planning for the restoration, then began fundraising and securing permits to move forward with phase 1 of the restoration in 2018 and phase 2 in 2020. They enlisted help from a group of scientists with expertise in marsh elevation, both locally and worldwide, to answer critical questions on the marsh elevation, slope and tidal channel configuration. Reserve staff also propagated thousands of native plants to re-vegetate the ecotone transition and upland buffer. The planting is using an experimental design to test the success of various planting configurations.

For more information: *elkhornslough.org/tidal-wetland-program/tidal-marsh-restoration-project*

Monitoring and Evaluation Strategies (Optional)

If included, this section should describe how the reserve plans to monitor and evaluate the success of habitat restoration projects over the long term. The monitoring and evaluation strategy may consider such questions as these: Has habitat function and structure been established to meet targets? Has biodiversity been established to meet targets? Were methods used appropriate for meeting targets? Were new protocols used and, if so, were they effective in meeting targets?

References

Clewell, Andre, John Rieger, and John Munro (2005). *Society for Ecological Restoration International: Guidelines for Developing and Managing Ecological Restoration Projects*.

Reserve System *Restoration Science Plan and Implementation Strategy* (2002). Available via Reserve System Intranet on the "Restoration" topical page under the "Stewardship" sector (under "Policy and Planning" tab).

National Marine Fisheries Service (2010). *Guidelines for Incorporating Sea Level Rise into Restoration of Tidal Wetlands in the Northeast*. Available via Reserve System Intranet on the "Restoration" topical page under the "Stewardship" sector (under "Policy and Planning" tab).

Tools and Resources

Planning for Sea Level Rise in the Northeast: Considerations for the Implementation of Tidal Wetland Habitat Restoration Projects Workshop Report (2011). NOAA's Restoration Center, Northeast Region.

Society for Ecological Restoration Reports and Publications (website): https://www.ser.org/page/SERDocuments

Appendices for the Management Plan

The following outlines mandatory and program-specific appendices to include in the management plan. The reserve may also include additional appendices at its discretion, including any required by the state lead agency.

Mandatory Appendices:

The reserve must include the following as appendices in the management plan:

- Memorandum of understanding between state host agency and NOAA (template available)
- Other memoranda of understanding between land managers within the reserve (include all)
- Federal consistency determination (provided by NOAA)
- Public involvement and comments (template available)

Program-specific Appendices:

- List of Education Advisory Committee members, roles, and responsibilities
- Complete list of coastal training partners (optional)
- List of Coastal Training Advisory Committee members, roles, and responsibilities
- Landowner protection plans, if any, that support management and protection of the reserve

Optional Appendices:

The reserve may, but is not required to, include the following as appendices to the management plan:

- Facilities operations and maintenance manual
- Long-term facility plan

Appendices

Please see the "Management Plan" section of the NERRS Intranet (under "Policy and Planning" tab) to access the latest version of the following resources. In some cases, a direct web link is provided.

Templates:

1. Memorandum of understanding template
2. Notice of availability of opportunity for public comment template
3. Response to public comments template

Resources for Assessing and Planning for Environmental Change:

- Conducting National Estuarine Reserve Vulnerability Assessment
- Climate Sensitivity of the National Estuarine Research Reserve System (2013)
- Planning for Sustainable Facilities
- Summary of Climate Change Phenomena with Observed and Projected Changes (2013)
- Summary of Observed and Projected Regional Climate-Related Changes (2013)
- State Climate Summaries (2017) (available at: *statesummaries.ncics.org*)