Step 4: Implementation

**Implementation** of adaptation options, whether its new regulations, processes, actions, or adjusting existing management activities.
Step 4: Implementation

Learning Objectives

• Understand how to move from planning to action – you know what needs to be done, so how do you do it?

• Explore how to leverage case studies, planning documents, and experts to implement your desired actions.
Implementation: why haven’t we seen more?

Field is in its “infancy”

There are real (and perceived) obstacles
Implementation: strategies for success

- Identify thresholds to trigger specific actions using “leading indicators”
- Create a timeline of actions to implement
- Find partners to share the work and the costs
- Identify obstacles ahead of time and strategies how to overcome them
- Integrate climate adaptation extensively throughout existing management practices and processes (mainstreaming adaptation!)
Implementation using “leading indicators”

**Action** that may be triggered: breaching of lagoon mouth

**Indicator:** water quality hits a certain threshold (nutrients, temperature)

**Leading indicators:**
Information collected prior to a management decision that is meant to trigger a specific action
Implementation using time-defined actions

Adaptation Strategy: Restore estuarine habitat vulnerable to sea level rise

Example only. Not based on specific output of GFNMS work.
Implementation using partners

- will depend on the actions needed to implement the adaptation strategy
- will depend on who may be affected by the strategy or have an affect on the strategy (the “players”)
- may change over time as actions change
- may change over time as threshold are triggered and what we choose to do changes
Explicitly documenting what you need for implementation, identifying where potential barriers may arise, and identifying strategies for overcoming those barriers can help you to overcome obstacles.
Implementation: MPA Toolkit

Adaptation Actions Table

In the table below, information is organized by habitats/locations and potential climate stressors. The table lists actions/options with supporting case studies, tools and resources. You can browse the table or use the search function. The table identifies adaptation actions that can address specific climate stressors and impacts for a habitat or location. Terms are meant to align with and support the use of the North American Marine Protected Area Rapid Vulnerability Assessment Tool.

Letter codes in parentheses after entries indicate resource focus or stages in the Adaptation Ladder of Engagement.

Resource focus: Habitat/ecosystem (H), Species population (S), Infrastructure (I), Cultural (C), Policy (P), Other (O)

Adaptation Ladder of Engagement: 1.) Awareness (AW), 2.) Assessment (AS), 3.) Planning (PL), 4.) Implementation (IP), 5.) Integration (IT), 6.) Evaluation (EV), 7.) Sharing (SH)
Implementation: MPA Toolkit
Implementation: MPA Toolkit

The Toolkit provides a wealth of documents, case studies, guides and tools to inform your adaptation work, which can be overwhelming when starting out. Here are resources the project team considers great starting places. These resources are also foundational to every step of the Adaptation Ladder of Engagement. The list is curated and does not necessarily represent the full portfolio of what is available. It is a list of foundational resources upon which to build your adaptation work or provide a more comprehensive, high-level view of adaptation from start to finish.
**Implementation: MPA Toolkit**

![Experts in Marine and Coastal Protected Area Adaptation](cake.png)

<table>
<thead>
<tr>
<th>Management/Policy/Legal/Planning</th>
<th>Office of National Marine Sanctuaries, NOAA Silver Springs, Maryland USA</th>
<th>Can assist with legal &amp; policy planning, analysis and development, strategic communications, and stakeholder engagement. Support Availability: Limited, Internal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lauren Wenzel</td>
<td>Acting Chief Policy and Planning Division</td>
<td></td>
</tr>
<tr>
<td><a href="mailto:Lauren.wenzel@noaa.gov">Lauren.wenzel@noaa.gov</a></td>
<td>Languages: EN</td>
<td></td>
</tr>
</tbody>
</table>

*Overview, About, Using the Toolkit, Tools, Experts*
Step 5: Monitoring & Evaluation

**Monitoring and evaluating** your adaptation actions to determine what is/is not working
Step 5: Monitoring & Evaluation

Learning Objectives

- Understand how to develop a plan to monitor and evaluate the efficacy of your actions
- Explore strategies for successful monitoring and evaluation efforts.
Monitoring & Evaluation

Climate changes

Tracking changes in climate stressors (e.g., pH, salinity)

Climate impacts

Documenting the condition of and tracking changes in marine and coastal resources (e.g., reduced abundance, range shifts)

Adaptation actions

Tracking and evaluating whether your adaptation actions are having their intended effect (e.g., reduced vulnerability, desired outcomes or goals met)
Table 11.1. Steps for designing and implementing climate change adaptation monitoring. Most projects will be concurrently engaged in several steps during the design and implementation phases.

<table>
<thead>
<tr>
<th>Steps in Monitoring Design</th>
<th>Outcome or Information Gained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Articulate goals and objectives</td>
<td>Focus; define what’s in or out of scope; identify “why” and “for whom”</td>
</tr>
<tr>
<td>2. Compile and assess existing information</td>
<td>Opportunities to use existing data and partnerships; identify gaps in existing programs; identify known trends or issues</td>
</tr>
<tr>
<td>3. Conceptual models and interactions</td>
<td>Identify known relationships and uncertainties in understanding and/or data gaps; identify key drivers, stressors, and responses; develop communication aids</td>
</tr>
<tr>
<td>4. Identify, prioritize, and select indicators (targets)</td>
<td>Identify high-ranked indicators; needs for research or monitoring; select list of indicators for further development</td>
</tr>
<tr>
<td>5. Sampling design and methods</td>
<td>Establish efficient, defensible, and repeatable monitoring design and protocols</td>
</tr>
<tr>
<td>6. Data management, analysis, and reporting</td>
<td>Create process to ensure efficient data quality, availability, and relevance; create outputs designed to increase likelihood that data will be used to inform the right decisions at the right time</td>
</tr>
</tbody>
</table>

From Stein et al. 2014
### Exercise 5. Monitoring & Evaluation

**Habitat:**

<table>
<thead>
<tr>
<th>A. Strategy</th>
<th>B. Desired outcome(s) (once implemented, what should your strategy achieve?)</th>
<th>C. Monitoring parameter &amp; method</th>
<th>D. Red flag indicator (identify a threshold that indicates the strategy is diverging from the desired outcome)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and protect refugia</td>
<td>50-70% of identified refugia protected by 2030</td>
<td>Biodiversity (e.g. species richness) using transects</td>
<td>Biodiversity declining by XX% within refugia</td>
</tr>
</tbody>
</table>
Monitoring & Evaluation: why haven’t we seen more?

Just like Implementation:

Field is in its “infancy”

There are real (and perceived) obstacles
Monitoring & Evaluation: strategies for success

✓ RESULTS: Identify indicators and track periodic targets along the way to meeting a desired outcome

✓ FLEXIBILITY: Be adaptive and willing to change focus

✓ INTEGRATION: Find ways to use existing MPA monitoring efforts

✓ LEARNING: Share information and experiences with stakeholders and partners
RESULTS: Identify indicators and track periodic targets along the way to meeting a desired outcome

*Desired outcome:* Reduce *urban heat island effect* (provide shading and cooling)

*Indicators:* # of trees planted, degree change in land surface temperature

- Trees planted
- 5 years post-planting: 0.5°C decline
- 10 years post-planting: 1.0°C decline
Monitoring & Evaluation: strategies for success

✓ FLEXIBILITY: Be adaptive and willing to change focus

*If your actions are not having their intended effect, what will you do differently?*

<table>
<thead>
<tr>
<th>Desired Outcome</th>
<th>Red Flag Indicator</th>
<th>Potential Actions</th>
</tr>
</thead>
</table>
| Tidal marsh vegetation is on trajectory toward reference marsh condition | Vegetation deviates significantly (30-50%) from trajectory after colonization elevations are achieved | • Active revegetation  
• Increased invasive species control  
• Study causes of slow vegetation establishment  
• Review sediment dynamics |
Monitoring & Evaluation: strategies for success

✓ INTEGRATION: Find ways to use existing MPA monitoring efforts to tell you something about climate

What are you currently monitoring and what can it tell you about climate change?

<table>
<thead>
<tr>
<th>Monitoring Indicator</th>
<th>What Can it Tell You About Climate Change?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment delivery (i.e. meeting BMPs)</td>
<td>Increased sediment delivery could indicate an increase in the frequency of extreme precipitation events</td>
</tr>
</tbody>
</table>
Monitoring & Evaluation: strategies for success

✓ INTEGRATION: Find ways to use existing MPA monitoring efforts to build support for climate adaptation actions

Documenting what roads look like throughout the year: coastal flooding

Raising or relocating vulnerable roads while simultaneously restoring salt marsh
## Monitoring & Evaluation: MPA Toolkit

### Adaptation Actions Table

In the table below, information is organized by habitats/locations and potential climate stressors/impacts, followed by suggested actions/options with supporting case studies, tools and resources. You can browse the table or use the search function to find suggestions for adaptation actions that can address specific climate stressors and impacts for a habitat or location. Terms are meant to align with and support the use of the North American Marine Protected Area Rapid Vulnerability Assessment Tool.

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**Show** 10 entries

### Climate Stressors & Impacts

<table>
<thead>
<tr>
<th>Habitats/Locations</th>
<th>Stressors: Category</th>
<th>Actions/Options</th>
<th>Case Studies</th>
<th>Tools &amp; Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beach/Dune</td>
<td>- Sea level rise</td>
<td>Anticipate and facilitate inland/upland migration (e.g., buffers, setbacks, open space/conservation easements, land acquisition, remove/modify barriers)</td>
<td>Coastal Zone Management for SLR in Malibu, California: City’s land-use implementation plan requires setbacks and other measures for all new development. (I) (IP)</td>
<td>Adaptation Toolkit: Sea level rise and coastal land use: Explores 18 different land-use tools that can be used to preemptively respond to the threats posed by sea-level. (I)</td>
</tr>
<tr>
<td></td>
<td>- Storm</td>
<td></td>
<td>State and counties adopting shoreline setback rules due to SLR in Hawaii. (I) (IP)</td>
<td>Case Studies of Natural Shoreline Infrastructure in Coastal California: Reviews natural infrastructure approaches to adapt to SLR in California using a series of case studies. (H,I)</td>
</tr>
<tr>
<td></td>
<td>- Storm severity/frequency</td>
<td></td>
<td>Responding to Climate Change in New York State: Suggestion of using rolling easements to move structures out of flood-prone areas. (I) (PL)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Wave action</td>
<td></td>
<td></td>
<td>Puget Sound Feeder Bluffs: Coastal erosion as a sediment source and its implications for shoreline management (H,I)</td>
</tr>
</tbody>
</table>
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The Experts List is a list of climate adaptation practitioners who can be contacted for questions or guidance. These are experts who have kindly offered a limited amount of free advice to support climate vulnerability assessments, adaptation planning and implementation work for marine and coastal protected areas. If listed, please first contact the experts listed within your agency or organization.