

North American Marine Protected Area Rapid Vulnerability Assessment Tool



Goals of this Project

- 1 - Develop a common tool for the rapid assessment of marine/coastal habitat vulnerability to climate change (based on existing North American material) that can be applied at various scales (locally at MPA sites and across the Pacific coast seascape)
- 2 - Pilot the application of the tool with regionally-grouped sites, gathering comparable data and identifying actions to address vulnerabilities of the sites
- 3 - Develop a plan for collaborative action related to species that the sites have in common (shared species)



What is a Rapid Vulnerability Assessment?



Vulnerability Assessments are used to evaluate how climate change will affect your MPA in order to improve management approaches for long-term success.

A Rapid Vulnerability Assessment (RVA) is a modified version of this process that is:

- Simple
- Focused on your interests
- Feasible to undertake based on what you already know
- Feasible to undertake with the team you already have
- Creates a product to apply to your management activities

Goal of the Tool: Allow your MPA to be climate savvy as quickly as possible.

Why do you need a vulnerability assessment? (rapid or otherwise)



What you need to use the RVA tool



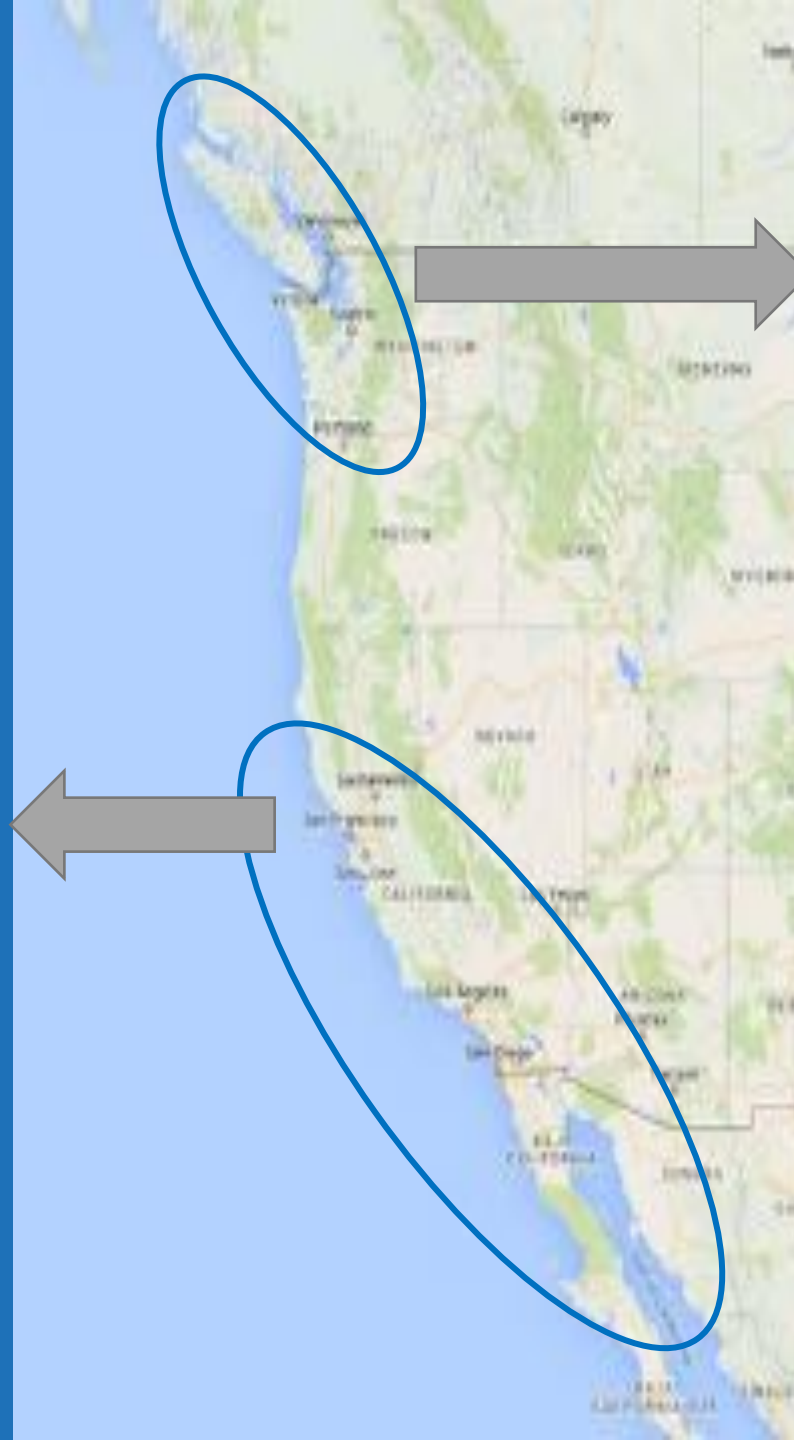
- An interest in learning how climate change is affecting the site being evaluated,
- Knowledge of the site being evaluated (habitat types, basic ecological information, existing threats, management mechanisms),
- Awareness of relevant climate impacts and access to basic climate information to support your understanding, and
- A day to spend applying that to the RVA tool.

Tip: The goal of an RVA is to use what you have and what you know to get you informed and started on a path to climate savvy management.

Regional Vulnerability Assessment Workshops

North Central
Coast Workshop
(late fall 2016)

Isla de Guadalupe
Biosphere Reserve,
Channel Islands National
Park, El Vizcaino
Biosphere Reserve and
Partners



Pacific Northwest
Workshop
(late Fall 2016)

Olympic Coast National
Marine Sanctuary,
Olympic National Park,
Pacific Rim National Park
and Partners

The RVA Tool



Step 1

Define the scope of the vulnerability assessment



Step 2

Construct the assessment matrices



Step 3

Undertake the assessment



Step 4

Adaptation strategy development



Step 5

Create your own narrative vulnerability assessment report

North American

Marine Protected Area

Rapid Vulnerability Assessment Tool



User Guide

Commission for Environmental Cooperation



Tip: After you learn to use the RVA tool it can be modified to explore many facets of your MPA.



Step 1

Define the scope of the vulnerability assessment

Goal of this step: Define the scope and initial parameters of the rapid vulnerability assessment you aim to undertake.

Activity: Identify habitats to consider, significant climate change related variables, relevant non-climate stressors, and the timescale in which you are interested.

Box 1. What habitat types are you considering for this assessment?

Select	Habitat Type
	Beach and dunes
	Cliffs and rocky shore
	Rocky intertidal
	Soft bottom intertidal and mudflats
	Estuary/wetland
	Pelagic
	Kelp forest
	Seagrass
	Coral reef
	Mangrove/Coastal Forest
	Deep seafloor, canyon
	Ice/Snow
	Other:

Box 3. What climate change variables are likely to affect these habitats?

Habitat		
		Climate Stress
		Increased water temperature
		Sea level rise
		Diminish dissolved oxygen
		Altered currents
		Altered upwelling/mixing
		Altered precipitation patterns
		Ocean acidification
		Turbidity
		Wave action/coastal erosion
		Salinity
		Storm severity/frequency
		Harmful algal blooms
		ENSO/PDO
		Other:

Box 4. What non-climate stressors currently affect these habitats?

Habitat			Box 4. What non-climate stressors currently affect the habitat?
			Non-climate Stressor
			Land-source nutrient pollution
			Land-source non-nutrient pollution
			Marine-source pollution and spills
			Development/population growth
			Harvest
			Aquaculture
			Invasive species
			Disease
			Tourism/Recreation
			Transport
			Extraction (mining, oil & gas)
			Energy production
			Overwater/underwater structures
			Roads/armoring
			Dredging
			Boat groundings
			Noise
			Researcher disturbance
			Altered sediment transport
			Other:

Box 2. What timescale are you interested in assessing?

Select	Timescale
	Near term (present to 10 years)
	Medium term (next 50 years)
	Long term (next 100 years)
	Very long term (> next 100 years)



Step 2

Construct the assessment matrices

Goal of this step: Set priorities for your vulnerability assessment and explore the vulnerability assessment components.

Activity: Transfer the information from Step 1 onto the worksheets you will employ to complete the vulnerability assessment.



Olympic Coast National Marine Sanctuary.



Step 3

Undertake the assessment

Goal of this step: Apply your local knowledge to consider the implications of climate change for your site by habitat.

Activity: Describe and evaluate how climate and non-climate stressors will affect your site's vulnerability.

Table 1. Vulnerability Assessment

Location:		Habitat Type:				Timescale:	
1 Climate Stress	2 Indicate the observed or projected direction and magnitude of this stress, as well as any specific relevant details	3 Anticipated effects on this habitat type (Highlight any important features that might be affected)	4 Likelihood	5 Consequence (Table 2)	6 Risk (Figure A)	7 Adaptive Capacity (Table 3)	8 Vulnerability Level (Figure B) & Key Drivers

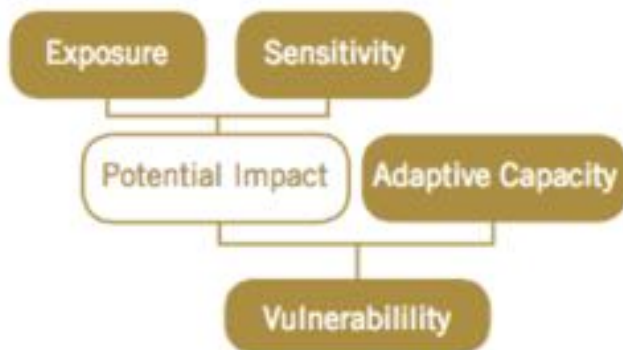


Step 3

Undertake the assessment

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Standard Vulnerability Assessment Model (IPCC)



Rapid Vulnerability Assessment Model

Almost certain
(>50% probability)

Likely
(50/50 probability)

Possible
(less than 50%
but not unlikely)

Unlikely
(probability low
but not zero)

Rare
(probability very low,
close to zero)



Step 3

Undertake the assessment

Table 2. Consequences

Location:	Habitat Type:		Timescale:		
Ⓐ Non-climate stressor	Ⓐ How does this stressor affect this habitat type?	Ⓑ Will climate change make this better or worse? (+/-)	Ⓒ What is the combined impact of this non-climate stress and... [Insert your three climate stresses here]		
Consequence: Assess the consequence of the direct effect of the climate stress in tandem with existing non-climate stressors on this habitat type. (Negligible, Minor, Moderate, Major, Catastrophic)					

Catastrophic

(Habitat will cease to exist or have its function permanently altered.)

Major

(Key species or functions may be dramatically altered, such that value is undermined.)

Moderate

(Species numbers may decline, function may be diminished, such that habitat is seen as degraded but still present.)

Minor

(Habitat will continue to function but activities such as recovery will be impaired.)

Negligible

(Habitat and its key components will not be visibly or functionally affected.)



Step 3

Undertake the assessment

Table 1. Vulnerability Assessment

Location:		Habitat Type:				Timescale:	
Climate Stress	Indicate the observed or projected direction and magnitude of this stress, as well as any specific relevant details	Anticipated effects on this habitat type (highlight any important features that might be affected)	Likelihood	Consequence (Table 2)	Risk (Figure A)	Adaptive Capacity (Table 3)	Vulnerability Level (Figure B) & Key Drivers

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(Habitat will continue
to function but activities
such as recovery will
be impaired.)

Negligible
(Habitat and its key
components will not be
visibly or functionally
affected.)

Likelihood	Consequences				
	Negligible	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Low	Low	Low
Unlikely	Low	Low	Moderate	Moderate	Moderate
Possible	Low	Moderate	Moderate	High	High
Likely	Low	Moderate	High	High	Extreme
Almost certain	Low	Moderate	High	Extreme	Extreme

Table 3: Adaptive Capacity Assessment of Habitat

Step 3 Undertake the assessment



<p>Assess status and condition of each factor of Adaptive Capacity for this habitat. Rate on a scale from 1-5 (5=Superior, 4=Good, 3=Fair, 2=Poor, 1=Critical) [If your answers vary by stressor, consider evaluating the habitat for each stressor separately.]</p>		
Ecological Potential	Habitat (and stressor if applicable):	Rationale:
Extent, Distribution & Connectivity		
Past Evidence of Recovery		
Value/Importance		
Physical Diversity		
Biodiversity		
Keystone & Indicators Species		
Other:		
Ecological Potential Average		
Social Potential		
Organization Capacity		
Staff Capacity (training, time)		
Responsiveness		
Stakeholder Relationships		
Stability/Longevity		
Other:		
Management Potential		
Existing Mandate		
Monitoring & Evaluation Capacity		
Ability to Learn and Change		
Proactive Management		
Partner Relationships		
Science/Technical Support		
Other:		
Social Potential Average		
Combined Potential Average		
Adaptive Capacity		

5
Superior
(This factor exemplifies the ideal condition)

4
Good
(This factor does a better than adequate job but could use improvement)

3
Fair
(This factor is adequate but could be easily improved)

2
Poor
(This factor is not adequate, but it provides modest function)

1
Critical
(This factor is not functional or does not exist)

Convert average to adaptive capacity rating: Low = 1 – 2.3; Moderate = 2.4 – 3.6; High = 3.7 – 5



Step 3

Undertake the assessment

Figure 3. Vulnerability = Risk x Adaptive Capacity

Risk	Adaptive Capacity		
	Low	Moderate	High
Low	Low	Low	Low
Moderate	Moderate	Moderate	Low
High	High	Moderate	Moderate
Extreme	High	High	Moderate

If likelihood or consequence is:

- **High** then it is playing a role in increasing vulnerability, and there is opportunity to reduce whichever is high in order to develop adaptation strategies.
- **Low**, then it may not play a role in increasing vulnerability, and likelihood may not be reducible through adaptation strategies.
- **Moderate**, then it might be playing a role in vulnerability, especially if it may interact with another factor. There may be an opportunity to reduce likelihood or consequence in order to develop adaptation strategies.

Table 1. Vulnerability Assessment

Location:		Habitat Type:				Timescale:	
Climate Stress	Indicate the observed or projected direction and magnitude of this stress, as well as any specific relevant details	Anticipated effects on this habitat type (Highlight any important features that might be affected)	Likelihood	Consequence (Table 2)	Risk (Figure A)	Adaptive Capacity (Table 3)	Vulnerability Level (Figure B) & Key Drivers



Step 3

Undertake the assessment

Figure 3. Vulnerability = Risk x Adaptive Capacity

Risk	Adaptive Capacity		
	Low	Moderate	High
Low	Low	Low	Low
Moderate	Moderate	Moderate	Low
High	High	Moderate	Moderate
Extreme	High	High	Moderate

If adaptive capacity is:

- **Low**, then it is playing a role in increasing vulnerability, and increasing adaptive capacity is an opportunity when developing adaptation strategies.
- **High**, then it may not play a role in increasing vulnerability, and there may be no opportunities to increase adaptive capacity as an adaptation strategy.
- **Moderate**, then it might be playing a role in vulnerability, and increasing adaptive capacity may provide an opportunity to develop adaptation strategies.

If there is a need to work on adaptive capacity, it will be important to go back to Table 3 and assess whether ecological, social or a combination of both potentials, are at cause in order to target adaptation strategies effectively.

Table 1. Vulnerability Assessment

Location:		Habitat Type:				Timescale:	
Climate Stress	Indicate the observed or projected direction and magnitude of this stress, as well as any specific relevant details	Anticipated effects on this habitat type (Highlight any important features that might be affected)	Likelihood	Consequence (Table 2)	Risk (Figure A)	Adaptive Capacity (Table 3)	Vulnerability Level (Figure B) & Key Drivers



Step 4

Adaptation strategy development

Goal of this step: Generate and evaluate adaptation strategies and implementation

Activity: Based on the vulnerabilities identified, develop management responses to reduce those vulnerabilities, and explore implementation considerations.

Table 4: Strategy Development

❶ Vulnerability	❷ Strategies	❸ Cost (H/M/L)	❹ Cost (H/M/L)



Step 5

Create your own narrative vulnerability assessment report

Goal of this step: Help internalize and communicate your plan.

Activity: Transfer the results of the table to a narrative format to more easily share your plan.

The [_____] assessed the vulnerability of
MPA name

[_____] from [_____] Habitat type Climate stresses

over the next [_____] Timescale. Climate change stressors are
expected to [_____] Projected or observed effects.

Existing non-climate stressors in this habitat include [_____] Non-climate stressors.

[_____] Effects of non-climate stressors. They currently affect the system by
[_____] Effects of non-climate stressors.

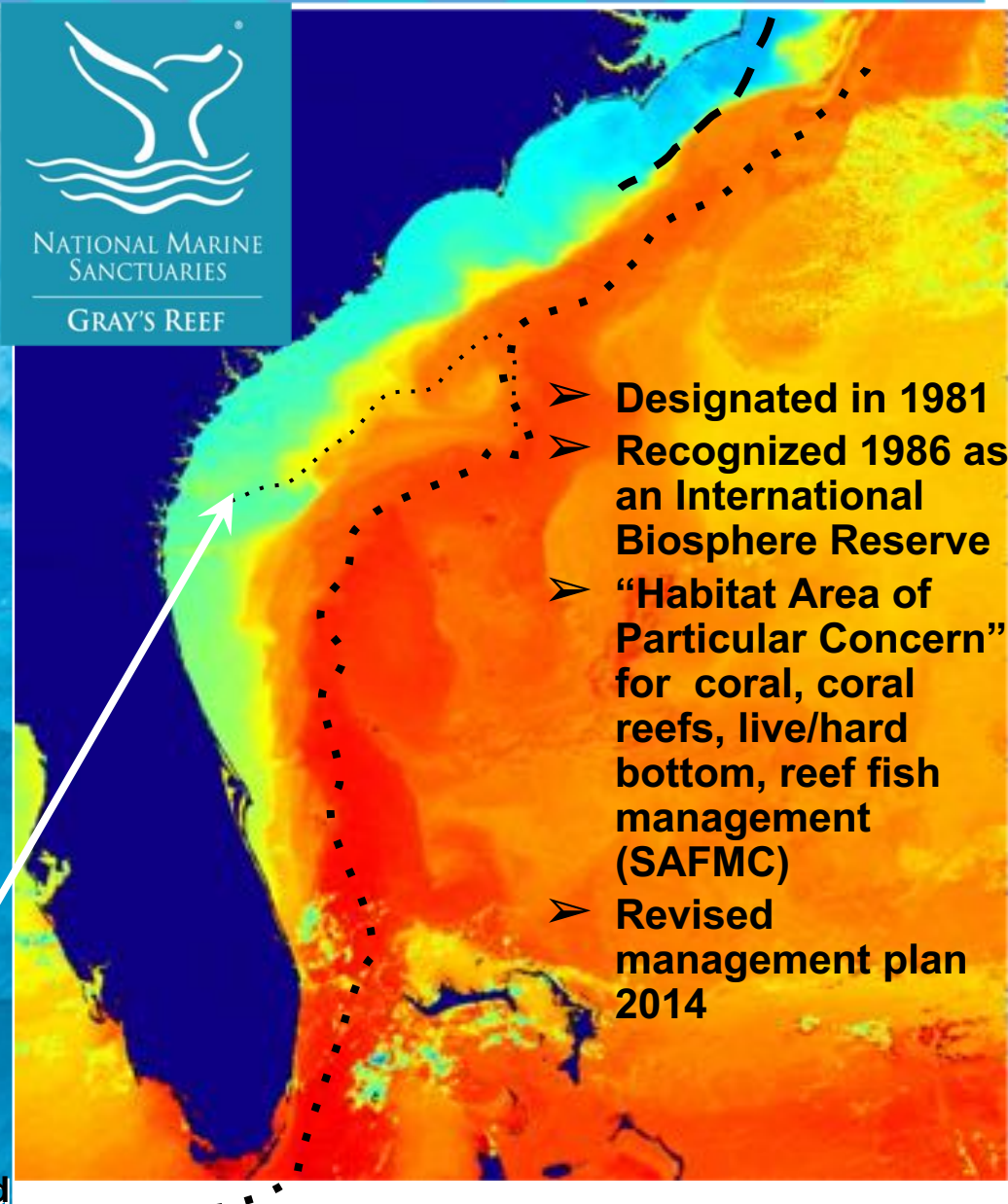
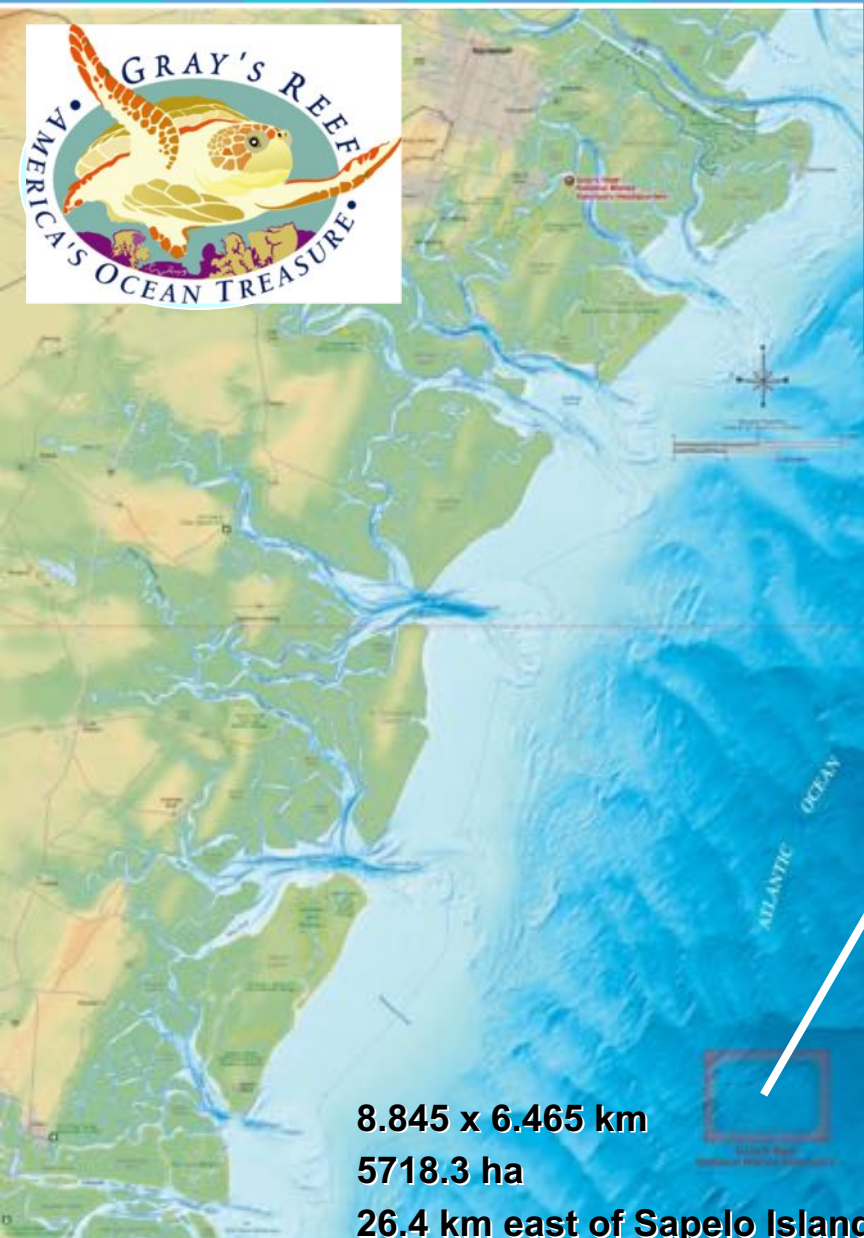
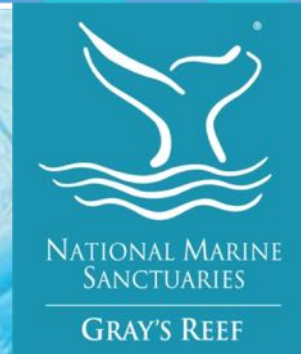
[_____] Effects of non-climate stressors. Climate
change may interact with these non-climate stressors by [_____] Examples of interactions.

Vulnerability was identified as being greatest due to [_____] Climate stresses with highest vulnerability ratings.

[_____] Drivers: high likelihood of change,
[_____] high consequences or low adaptive capacity. Particular vulnerabilities of concern related to
[_____] include example of an effect of climate stress on the habitat, this could include an interaction with a included non-climate stressor.

[_____] Adaptation strategies that might reduce this vulnerability. Adaptation strategies that might reduce this vulnerability
[_____] adaptation strategy. In order to implement
this strategy, we will need [_____] List partners, funds, mandate or other features that will be needed to bring about implementation,
[_____] or indicate that it could be done internally with resources already on hand.

Gray's Reef National Marine Sanctuary



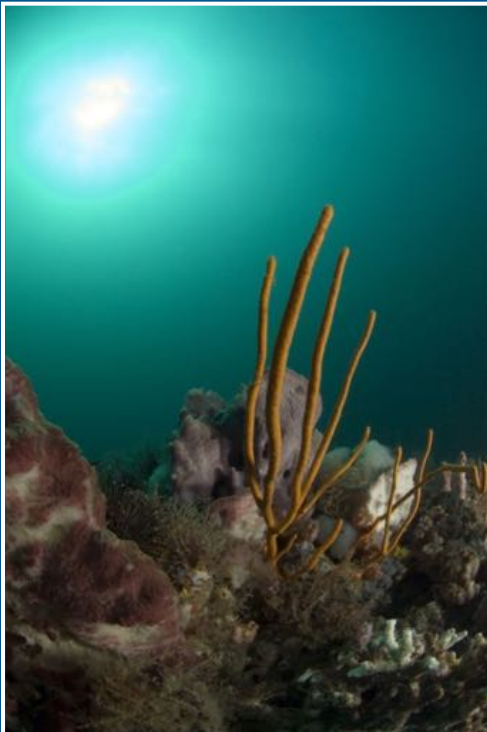
Live-bottom Reef



Gray's Reef National Marine Sanctuary

“Natural Heritage, Zoned (With No-Take Area), Permanent, Year-Round, Ecosystem” Marine Protected Area (NOAA)

- *Restrictions on anchoring, collecting, some types of fishing (no spears), discharge, disturbance, explosives, construction*
- *Closed Area: no fishing or diving*





GRAY'S REEF NATIONAL MARINE SANCTUARY



Participants:

NOAA GRNMS
NOAA NCEI
NOAA OPR
NOAA Fisheries
NPS
SC DNR
GA DNR
UGA
Pew
TNC



Workshop take-aways and feedback

Increased storms and increased temperature were 2 most critical drivers of change for Gray's Reef

Opportunities for further collaboration: climate change education, proactive management of invasive species, post-storm damage assessment, and enhanced communication up the coast as species ranges shift

Recommended changes to worksheets and process for future application at NMS sites

The meeting was effective. Adaptation strategies have been proposed, and all of the work will help GRNMS engage in climate science, illustrating climate effects on sanctuary resources, and potentially raising awareness of these issues with stakeholders. I could see the value of the process repeating at other sanctuaries. Thanks for a productive meeting.

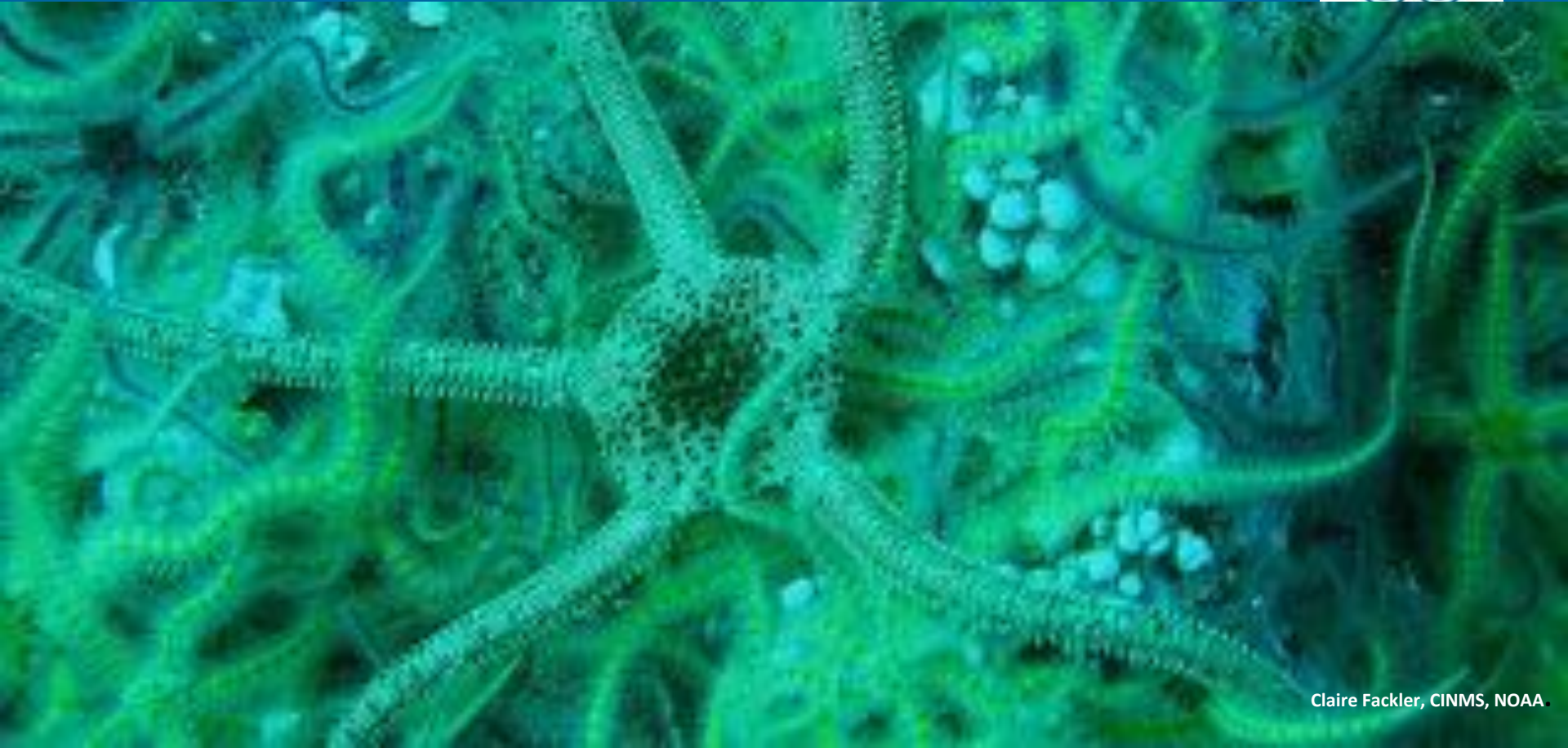
Workshop a good use of your time? 4.6/5.0

Efficacy of RVA tool: 4.6/5.0

Efficacy of introductory material: 4.9/5.0

The workshop was so valuable that I will hope to use the things that I learned during the process at our agency

Questions and Answers



Claire Fackler, CINMS, NOAA

Goal: To make sure you understand the process. Feel free to make suggestions of how this tool might be improved to help you!

Questions and Answers



Didn't get to your question during the webinar?

Contact us directly:



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