

Engagement Strategy and Needs

This document includes the proposed engagement strategy and timeline for additional input. It also includes information on the input received in 2020 and resulting tabulated priorities.

For Questions, Comments, or Concerns about this approach or the included priorities please contact [Mike Molnar](#).

2021 NCCOS Needs Process and Timeline:

Annual Survey and Process:

- *October:* CSO works with NCCOS and OCM (as needed) to craft relevant request to CSO members
- *November:* CSO distributes a survey to determine state by state science needs (in line with NCCOS structure), including request for identification of potential correlating projects
- *December:* CSO aggregates collected science needs by state (and regional breakdown) and shares the results with key partners as needed for vetting
- *January:* Results are aggregated in a draft report, including:
 - Summary of nationally relevant projects which have potential for methods development or transferable results.
 - State and regional analysis
 - Other factors to consider?
- *February:* Draft report is shared with the CSO Executive Committee. Feedback and questions are collected and addressed.
- *March:* Final report is shared with OCM and NCCOS leadership. Results are presented at CSO's DC Meeting.
- *April-September:* consider updates to process, etc. as needed. Other actions to consider here?

Coastal Program Research Priority Needs - 2020

In furtherance of CSO working with NCCOS to better connect Coastal Zone Management Programs (Coastal Programs) with NCCOS resources, CSO conducted a survey to better understand the research needs of Coastal Programs. This CSO undertaking is in response to member request for increased engagement, and is meant to compliment the work that OCM performs to share Coastal Program priorities through the NOS chain of command to NCCOS. For reference, the NOAA NEERS office runs a similar effort, through the Science Collaborative, that can be found here [LINK](#). This document is a compilation of the current priority research needs, as identified by State and Territory Coastal Program staff. Coastal program staff provided information regarding priority research needs via survey, and will be updated on an annual basis. Each program was asked to identify their top five research priorities, and provide additional specificity regarding each item.

CSO sent the survey in follow-up to the NCCOS informational webinar on March 31, 2020. Respondents were given three weeks in which to respond to the survey. Not all programs responded to the survey, either due to lack of capacity or time, likely associated with the new reality of working in the COVID era. Priorities from eighteen Coastal Programs are included in this document.

Programs were asked to select their top five needs from the thirteen NCCOS Strategic Plan Sub-Priorities listed below.

NCCOS Strategic Plan Sub-Priorities/Table Key:

- A. Ecological and Biogeographic Assessments (assessing the spatial and temporal distributions of organisms, habitats, and the historical and biological factors that produced them),
- B. Habitat Mapping (mapping coastal, pelagic, and benthic habitats to inform decision making),
- C. Regional Ecosystem Science (producing data, tools, and predictive models that are applicable at the region scale),
- D. Coastal Aquaculture Siting and Sustainability (developing predictive models, data sets, maps, tools, and targeted research),
- E. Harmful Algal Blooms (developing detection tools and forecasts),
- F. Biological Effects of Contaminants and Nutrients (conducting national, long-term, or localized research to understand the effects of contaminants, nutrients, and hypoxia),
- G. Vulnerability and Risk Assessment (developing models and tools that integrate biological, hydrologic, physical, socioeconomic, and other factors to evaluate coastal resilience),
- H. Natural and Nature-Based Features (conducting research on natural and nature-based features),
- I. Climate Impacts on Ecosystem (conducting research on detecting and assessing change in coastal ecosystems),
- J. Restoration (developing scientific tools and methods to guide restoration of impacted habitats),
- K. Ecosystem Services Valuation (estimating the value of ecosystem services for use by coastal communities, planners, managers, and regulators),
- L. Assessing Human Use (assessing who, where, when, how and for what purpose people are using coastal and marine spaces),
- M. Assessing Vulnerability and Resilience (assessing community and ecosystem vulnerabilities and recovery potential).

The Table below provides a general overview of Program Needs by topic. Responses are grouped by region in an effort to present regional needs in a graphic manner. NOTE: Due to limited responses, no regional ranking analysis was conducted.

Program Research Priorities		NCCOS Sub-Priorities												
Region	Program	A	B	C	D	E	F	G	H	I	J	K	L	M
Pacific	Guam	X	X		X									
	American Samoa									X		X	X	X
West	Washington State		X			X	X	X		X				
	Oregon	X		X			X			X		X		
	California (Coastal Commission)							X	X	X		X	X	X
Great Lakes	Minnesota		X					X						X
	Ohio	X	X					X	X		X			
	Pennsylvania*					X	X	X		X				X
	New York*				X		X	X		X		X		
Northeast	Maine		X		X					X	X			X
	New Hampshire			X		X		X		X				X
	Massachusetts						X	X	X	X	X			
Mid-Atlantic	New Jersey	X	X	X						X				X
	New York*				X		X	X		X		X		
	Pennsylvania*					X	X	X		X				X
	Delaware						X			X	X	X		X
	Virginia	X	X	X						X				X
Gulf / SE / Carib	Louisiana	X	X	X					X				X	
	Florida			X		X	X				X			X
	Puerto Rico	X	X					X	X	X	X			
Total		7	9	6	3	4	7	9	5	14	6	6	4	8

*Note - Pennsylvania and New York are Bi-Coastal and reported in both regions, their priorities are only counted once in the tally. Due to limited responses, the SE/Caribbean combined with the Gulf - solving the issue with Florida being in more than one region.

The Letters (A-M) in the table above match with the 13 Sub-priorities listed in the current NCCOS Strategic Plan. The top ranked priorities, of programs responding, are:

- 1) (I) Climate Impacts on Ecosystem (conducting research on detecting and assessing change in coastal ecosystems) – 14 Programs ranked
- 2) (G) Vulnerability and Risk Assessment (developing models and tools that integrate biological, hydrologic, physical, socioeconomic, and other factors to evaluate coastal resilience) – 9 Programs ranked,
- 2) (B) Habitat Mapping (mapping coastal, pelagic, and benthic habitats to inform decision making) – 9 Programs ranked,
- 3) (M) Assessing Vulnerability and Resilience (assessing community and ecosystem vulnerabilities and recovery potential – 8 Programs ranked

The tables on the following pages include more details regarding Program needs in select categories.

Note: Program Priorities in the following tables are presented in order of Expressed Priority by each of the respective Coastal Programs. Responses presented as submitted with some minor formatting changes.

Individual Program Responses:

PACIFIC REGION
Guam
<p>A. Ecological and Biogeographic Assessments Our program will be starting work on the Guam Seashore Protection Plan. Understanding the geographic relationships of the benthos would be useful in informing our marine spatial plan.</p>
<p>B. Habitat Mapping Our benthic habitat map is over 15 years old and needs updating.</p>
<p>D. Coastal Aquaculture Siting and Sustainability The current leadership has expressed a commitment in supporting aquaculture development on Guam. However little has been done to scope out the practicability and viability of this industry.</p>
American Samoa
<p>M. Assessing Vulnerability and Resilience Need a current status of ecosystems identifying vulnerabilities to all coastal hazards to include pandemics and recovery potential.</p>
<p>K. Ecosystem Services Valuation Being able to determine the value of our ecosystems in monetary terms will provide a stronger position to strengthen the understanding of the value of the permitting program currently administered through the local CZM program.</p>
<p>L. Assessing Human Use This priority is a need to support and complete and processes or policies developed as a result of priority #1 and priority #2.</p>
<p>I. Climate impacts on ecosystem Further expands priorities 1-3 as listed.</p>
<p>Additional Comments: Vulnerability and Risk Assessment (developing models and tools that integrate biological, hydrologic, physical, socioeconomic, and other factors to evaluate coastal resilience)</p>

WEST COAST

Washington

I. Climate impacts on ecosystem

Cumulative/compounding impacts related to climate change and Ocean Acidification for different ecosystem aspects, both ecological and socioeconomic; Maps on baseline data (changes in temperature, dissolved CO₂, etc.) and changes over time, as well as predicative maps/models are necessary.

B. Habitat Mapping

While we have a lot of good baseline information, much of it needs to be updated. There are also significant data gaps for many coastal habitats. Only a small portion of the seafloor has been mapped off the Washington coast and we would like to see the mapping efforts continue so that we have a complete data set that can be used to identify unique and critical habitats that may need additional protection and management. Capturing changes in habitat over time is important and will help assess the ecosystem as whole.

E. Harmful Algal Blooms

Given the devastating nature of the 2016 HAB event, the fact that this past year's ocean temperatures were the hottest on record, and the difficult situation many shellfish growers are finding themselves in due to covid-19, trade war tariffs, and burrowing shrimp – this could be a major issue for crab fishermen / shellfish growers and coastal economies in the future. And similar to the pressing nature of climate change issues, HABs are also expected to increase in frequency and severity in the future. It seems like better forecasting and predicative models are a crucial step here.

G. Vulnerability and Risk Assessment

Methodologies for measuring the vulnerability of coastal communities

F. Biological Effects of Contaminants and Nutrients

In developing our state MSP Data Survey that highlighted case studies for offshore wind energy and offshore aquaculture – this seems like an area where more information is needed. There are some preliminary studies cited in our MSP, but we could benefit from more long-term, cumulative, and wide-scale studies on this. This information could directly relate to management decisions. It also has implications for other several other issues like HABs and human health concerns and so could be a good starting point for further research.

Additional Comments:

Support for developing ecosystem models and indicators would also be extremely valuable. Some work has been done and is modeling for two habitat types expected to be completed in the next year but there are other habitat types that we would like to model. Additionally, it would be useful to have access to expertise that can manipulate the models in the future.

Oregon

A. Ecological and Biogeographic Assessments

This work should be focused on the nearshore subtidal and intertidal rocky shore ecosystems, habitats, and species across the west coast.

I. Climate Impacts on Ecosystems

Climate impacts to the rocky intertidal and subtidal so that we can understand species sensitivities, impacts, and ecosystem shifts to our nearshore ecological systems.

K. Ecosystem Services Valuation

Focused on the nearshore values and benefits that our society gains from a healthy nearshore marine environment, with a focus on submerged aquatic vegetation.

F. Biological Effects of Contaminants and Nutrients

Focused on the benthic habitats of the outer continental shelf of Oregon, so that we can understand the impacts of hypoxia and harmful algal blooms on economically important species.

C. Regional Ecosystem Science

To understand the potential impacts of development on the outer continental shelf for uses like marine renewable energy or offshore aquaculture.

California Coastal Commission

G+H+I+M

G. Vulnerability and Risk Assessment

H. Natural and Nature-Based Features

I. Climate Impacts on Ecosystem

M. Vulnerability and Resilience

Highest priority areas of research straddle NCCOS priorities related to vulnerability, risk and assessing resilience (G, H, I, and M) - namely some of highest needs are related to understanding the vulnerability and the effectiveness of adaptation responses.

Some of the key questions we are trying to address include:

- 1) Development of new/improved modeling techniques to predict the effect of sea level rise (SLR) on (i) bluff retreat rates and (ii) beach and dune systems with both constrained and unconstrained profiles;
- 2) Detailed, localized studies of bluff and beach/dune response to SLR taking into account actual geology and shoreline profiles, on a regional or site-specific basis
- 3) A “triage” analysis of beach sustainability with SLR, taking into account backshore status (bluffs, armoring, etc.) – Where, and under what conditions, could beaches be maintained in the future, and where are they most likely to be squeezed out?
- 4) How to predict/model and monitor the effect of sea level rise on groundwater. Better understanding and modeling tools are needed in this space.

More specific topics/questions include:

- 1) Need for studies on the impacts of beach nourishment to supratidal, intertidal, and subtidal ecosystems; in particular: What indicators are worthwhile; how altering sand placement, sand thickness, sand grain size distribution, sand color, etc. all affect biological communities; how repeated nourishments and back-passing events potentially staff or reset recovery periods.
- 2) Living shorelines: designs for outer coast conditions that work, development of protection and ecological performance indicators and monitoring protocols, challenges with restoration vs. adaptation efforts (e.g., habitat conversions, establishing baselines).
- 3) Development of green/natural infrastructure engineering specifications, considering sea level rise.

K. Ecosystem Services Valuation

L. Assessing Human Use

Priority for combination of K. and L.

How can analysis of economic data help communities prioritize their adaptation needs in phased pathways? How do we ensure natural infrastructure is valued appropriately and factored in for the longer-term ecosystem benefits they provide and data is available to do the analysis at scale needed.

GREAT LAKES

Minnesota

G. Vulnerability and Risk Assessment

Vulnerability and risk assessments were a key component of the unfunded Great Lakes Coastal Resiliency Study, especially as they relate to coastal and near shore processes. It would be nice if we could still accomplish this work either on a state-by-state, lake-by-lake or regional basis. Currently, Minnesota does not have any coast specific vulnerability and risk assessments.

M. Assessing Vulnerability and Resilience

The Great Lakes Coastal Resiliency Study would have possibly addressed this through its final framework and matrix. Great Lakes states, including Minnesota, would benefit from such research and distillation of the results. It could take the models and make them actionable.

A. Habitat Mapping

Inclusion of this priority reflects needs brought up during the Minnesota workshop for the Great Lakes Coastal and Nearshore Habitat Assessment Project (final report in progress). In January 2020, partners identified a need for mapping the presence/absence of submerged aquatic vegetation. We would also benefit from vegetation density, heterogeneity, morphotype and spatial distribution data; all are currently absent. We also have physical data needs that relate to habitat. These include bottom ruggedness, bottom slope, connectivity of adjacent habitats, hydrogeofoms, relative exposure index, river substrate, and substrate composition, variability and distribution.

Ohio

G. Vulnerability and Risk Assessment

Require additional data collection/information on socioeconomic data related to coastal and ecological resiliency

H. Natural and Nature-Based Features

Applicability of Natural and Nature-Based Features to moderate and High-Energy Great Lakes Shorelines. Includes costs to construct and maintain these types of projects over the long term.

A. Ecological and Biogeographic Assessments

Includes nearshore and coastal habitat mapping and research to guide habitat enhancements that can be incorporated into existing or new shore protection structures

J. Restoration

A portfolio of pilot projects to test new restoration concepts and ideas. Tools and methods to effectively monitor and assess the performance of those pilot projects. Non-traditional project designs that significantly reduce costs to construct and maintain over the long term.

B. Habitat Mapping

An important component of Ecological and Biogeographic assessments.

Additional Comments:

Data and information to guide Regional Sediment Management. Assessments of coastal and nearshore sand resources including distribution, volume, littoral sediment transport volumes and direction, and identification of sand source and sink areas which may guide nearshore beach nourishment and placement options. Also, continuing research on beneficial uses of dredge material from Federal commercial and recreational harbors. Potential for habitat restoration (wetlands), nearshore placement (beaches), sediment processing (upland uses), and agriculture field placement (farm fields).

Pennsylvania * Note – this is a bi-coastal state – Great Lakes & Mid-Atlantic. Responses cover both areas.

G. Vulnerability and Risk Assessment

- Having tools available to us would help drive ability to assess overall vulnerability, as long as they brought us in line (more or less) w/ Ohio and New York.
- Coastal resilience and those resources/systems affected by climate change are the focus of state, interstate and federal agencies. We need a coordinated effort between these parties on the Great Lakes to arrive at data and recommendations that are useful and informs policy.
- Inland land use impacts may be considered here.
- Developed usable tools that can be applied by program staff without advanced training and tailored for unique coastal areas. Provide assistance on federal level to reach out and help state staff with developing these
- Vulnerability & Resilience important/priority for both of Pennsylvania's Coastal Zones

M. Assessing Vulnerability and Resilience

Vulnerability & Resilience important/priority for both of Pennsylvania's Coastal Zones

E. Harmful Algal Blooms

- Harmful algal blooms are proliferating and we need continually updated science to understand the changing variables in our freshwater coasts.
- Lake Erie already on this path but critically important. In estuary thoughts are mixed, some members of PDE STAC think emerging issue that needs attention - others think they have never been a real concern in estuary therefor not a high priority.
- HABs in Lake Erie are a continued and persistent issue that have been researched extensively, but should continue to receive attention due to its significant impact. More research into contributing factors, including SRP sources and implications with climate change.
- HABS research work is underway in Lake Erie and Presque Isle Bay, additional work is needed throughout the Lake Erie region

J. Climate impacts on ecosystem

- Elevated lake levels and coastal change is on the forefront of the Great Lakes states and communities. This same type of science, observations, modeling, and online viewing tools should be made available for the Great Lakes.
- The trajectory of where our ecosystems will be will inform current restoration planning and potential mitigative measures that can be taken.
- More information on Reliable SLR/lake level change, flooding, extreme weather models to predict affected areas; Strategies to address impacts of climate change
- This also ties in with some of the climate work we have been doing.

F. Biological Effects of Contaminants and Nutrients

- Ties into overall ecosystem health, which can then be tied to human health--making these connections is critical.
- Legacy contaminants of the estuary - many unknowns remain, emerging contaminants, nutrients always in the mix - especially Lake Erie but with warmer waters and desire to upgrade water quality standards also increasingly important in estuary.
- Information is needed on levels and sources of known and emerging contaminants to establish water quality criteria. In both coastal zones, but especially SEPA.
- This lines up with some of the work DRBC has been doing to improve the water quality in the DE.

Additional Information:

The PA Coastal Program ranked and commented all of the potential priorities. The following items were ranked as shown below (after the top 5 described above) with comments:

- 6. Habitat Mapping (mapping coastal, pelagic, and benthic habitats to inform decision making)
- 7. Restoration (developing scientific tools and methods to guide restoration of impacted habitats)
 - Site-specific habitat restoration is critical. As an overall strategy, I think we should act on a macro level when looking at policy, but on a micro level to implement change. Restoration at that level is easier to achieve (e.g., Cascade Creek).
 - Restoration tools for habitat of particular important in the SE part of the state.
- 8. Ecological and Biogeographic Assessments (assessing the spatial and temporal distributions of organisms, habitats, and the historical and biological factors that produced them)
 - Understanding the spatial distribution and locations of species better enables the environmental management and protection of the species
- 9. Regional Ecosystem Science (producing data, tools, and predictive models that are applicable at the region scale)
 - Acting regionally is critical. Funding will go this way as more and more people view the entire system as interconnected.
 - Regional ecosystem science gives the federal and state agencies the ability to contrast, compare, and identify priorities for science, policy, and funding decisions.
- 10. Ecosystem Services Valuation (estimating the value of ecosystem services for use by coastal communities, planners, managers, and regulators)
 - Legislators, public officials, and citizens need to be aware of the value of our coastal resources and how they contribute to the local and regional economies. This allows informed decision-making by all parties that accounts for environmental quality and economic influence.
 - Services for climate mitigation, stormwater management, physical resilience. Quantify to communicate value.
- 11. Natural and Nature-Based Features (conducting research on natural and nature-based features)
- 12. Assessing Human Use (assessing who, where, when, how and for what purpose people are using coastal and marine spaces)
 - Regarding assessing human use: Although not top ranked, NOAA's CCAP dataset is one of the few repeated and comparable temporally nationwide land cover datasets available. It is used by a number of organizations for their planning beyond coastal program 309 assessments. Continuing to do this on a timely and routine basis is integral.
- 13. Coastal Aquaculture Siting and Sustainability (developing predictive models, data sets, maps, tools, and targeted research)

New York * Note – this is a bi-coastal state – Great Lakes & Mid-Atlantic. Responses cover both areas.

G. Vulnerability and Risk Assessment

State Coastal Area

K. Ecosystem Services Valuation

Multiple thematic areas including coastal processes and relationship to determining cost/benefits of coastal erosion protection. Entire State coastal area.

D. Coastal Aquaculture Siting and Sustainability

Long Island Sound, East End Long Island, general Atlantic waters and offshore technology.

I. Climate impacts on ecosystem

Great Lakes - water levels, related physical changes and ecosystem impacts; Atlantic - migratory species, commercially important fish, water quality. Entire State - Harmful Algal Blooms.

F. Biological Effects of Contaminants and Nutrients

Additional Comments:

Multiple areas relate to coastal hazards / climate resiliency and risk. Understanding the incremental risk of hazards due to climate is important, as are tools for estimating risk, evaluating community resiliency across multiple dimensions (economic, social, environmental, etc.) and understanding incremental resiliency benefit of a proposed project or measure.

NORTHEAST

Maine

A. Habitat Mapping

A majority of the Maine coast and marine waters lack habitat-mapping information at a high resolution. While state and federal initiatives have been collecting data to fill this gap in recent years, these efforts should continue to be supported in order to inform coastal and marine planning and management.

I. Climate impacts on ecosystem

Species shifts in Maine waters are occurring and impacting fisheries. There is a need to monitor and model species shifts and the resulting impacts on Maine fisheries and ecosystem assemblages.

M. Assessing Vulnerability and Resilience

While multiple tools have recently been developed to assess land-based community climate vulnerability, more research is needed to understand the vulnerability of communities due to changing fisheries and of ecosystems due to changing climatic conditions.

J. Restoration

Specifically regarding tidal marsh restoration, more understanding is needed to understand whether marsh migration models will be realized on the ground, whether restoration modifications (e.g. thin layer deposition, ditch plug remediation) yield the desired impacts, and at what time scale.

D. Coastal Aquaculture Siting and Sustainability

Nearshore aquaculture leases are increasing in Maine, though many communities have been wary to have nearshore aquaculture citing concerns about increased nutrients and negative impacts to coastal ecosystems. Research and modeling at the local scale identifying impacts and benefits at the local-scale of specifically oyster and kelp aquaculture are needed.

Additional Information:

There are many on-going initiatives and research at the local, state, and regional federal level relating to these research priorities. Supporting existing and ongoing activities would build upon current work.

New Hampshire

C. Regional Ecosystem Science

Regional studies are more useful/transferable than national scale assessments, models, tools, etc., and there are not many groups that do them. Geographic focus areas of interest in New Hampshire include the Great Bay Estuary, Hampton-Seabrook Estuary, and Atlantic coastline.

G. Vulnerability and Risk Assessment

Coastal hydrodynamic flood risk modeling for all of New Hampshire that includes all significant physical processes that affect water levels (e.g., riverine flows, tides, currents, waves, winds, tropical and extra-tropical storm surge, sea-level rise, wave set-up, etc.), accounts for variations in topography, bathymetry, and land cover, and can simulate flow/flood control structures, etc. Desired outputs include: coastal flood exceedance probability and estimated flood depth maps.

I. Climate impacts on ecosystem

Understanding climate impacts (and impacts of land use change) on coastal habitats is a focus of the NH Coastal Program. The estuarine habitat focus areas of high interest include impacts on eelgrass, oysters, saltmarsh. We are interested in the ways physical and chemical changes will impact ecosystems and species as well.

M. Assessing Vulnerability and Resilience

A large part of our vulnerability to community and ecosystem impacts of environmental change lies in a lack of community understanding of the risks, and options to address and prepare for the future, including the risks of doing nothing. We need to focus considerable attention on working with communities to prepare them and equip them with the necessary tools to understand and plan for the future.

E. Harmful Algal Blooms

The development of tools and forecasts that focus on Pseudo-nitzschia species would be particularly helpful. Improving our understanding of, and capacity to predict, when these different species are producing biotoxins is critically important. Cell abundance alone is not a great predictor. This is a serious public health threat in the Gulf of Maine.

Massachusetts

I. Climate impacts on ecosystem

Additional data on both coastal and marine habitats impacted by climate change in Massachusetts and surrounding states and waters would support coastal resilience and ocean management planning. Specifically, an investigation of how sea level rise and altered wave conditions may impact nearshore benthic and shoreline environments is an area of need. Changes to this nearshore environment can affect vulnerability of coastal areas and habitat for some marine species.

G. Vulnerability and Risk Assessment

Current vulnerability models and risk assessment efforts do not adequately account for elevated landforms (e.g., coastal banks) or dynamic systems (e.g., barrier beaches).

F. Biological Effects of Contaminants and Nutrients

Climate related impacts such as sea level rise and increased coastal flooding are exposing septic systems on beaches and impacting oil and gas facilities in the coastal zone during coastal storm events. Research regarding the magnitude of the contaminant risk, hot spots, and potential impacts on ecosystem and human health would better define the magnitude of this issue area.

J. Restoration

Coastal restoration guidance for fringing salt marsh systems focused on estimating design life and accommodating changing conditions (e.g., sea level rise and increased freshwater inputs) would be helpful.

H. Natural and Nature-Based Features

Nature-based shoreline restoration projects are often proposed with rock or other structural elements (e.g., rock sills and sturdy drift fences). More research needs to be done on the impacts of these materials on sediment transport, scour, and movement of wildlife and marine species.

MID-ATLANTIC

New Jersey

A. Ecological and Biogeographic Assessments

With the increase in demands on the ocean, whether it is offshore wind energy or increases in shipping or fisheries, a better understanding of the ocean environment at the local, regional and basin level is necessary to ensure proper stewardship of resources.

I. Climate impacts on ecosystem

This is critical to add to the first priority, because management is challenged now by a rapidly changing environment and needs to be understood in the context of other management decisions, both at the ecosystem level and how that may impact human uses.

C. Regional Ecosystem Science

This aligns with the previous identified priorities, as the scale of the information is critical in understanding beyond state boundaries.

B. Habitat Mapping

Broad scale habitats need to be better understood.

L. Assessing Human Use

Interrelated to understanding and properly managing our uses and resources.

New York * Note – this is a bi-coastal state – Great Lakes & Mid-Atlantic. Responses included in Great Lakes Section, but cover both areas.

Delaware

I. Climate impacts on ecosystem

- Focus area of tidal wetlands and estuaries being inclusive of the continuum between upland forest to open water.
- Include boundary changes (i.e. species range shifts)
- Consider migratory species and match-mismatch events
- Use of sentinel site data, or continued establishment of sentinel sites and long-term observing networks
- Connect to losses on cultural and marine resources (loss of revenues)

K. Ecosystem Services Valuation

J. Restoration

- Consider all types of coastal ecosystems (tidal freshwater, forested wetlands, salt marsh, etc.)
- Consider ecosystem services gained/lost
- Better understand how a restored marsh compares in ecological function to a natural (not degraded) marsh and how long it would take for a restored marsh to function as a natural marsh
- Best practices and transparency on what could go wrong
- Consider cost and upkeep
- Frameworks to permitting and funding
- Blue carbon considerations (i.e. methane reductions, increased carbon storage, etc.)
- Phragmites management

F. Biological Effects of Contaminants and Nutrients

Focus area of tidal wetlands and estuaries being inclusive of the continuum between upland forest to open water.

- Include coastal acidification as one of the effects of nutrients
- Include emerging and legacy organic pollutants
- Consider synergistic effects
- Consider microplastics as a pollutant
- Assess ecosystem-level impacts
- Better advance/define/identify indicator species of watershed pollution

M. Assessing Vulnerability and Resilience

- Consider coastal squeeze
- Economic and cultural trade-offs of decisions
- Environmental Justice and Equity considerations

Additional Comments:

Natural and Nature based features

- Compare gained ecosystems services to natural marsh and built shoreline
- Better understand how a restored marsh compares in ecological function to a natural (not degraded) marsh and how long it would take for a restored marsh to function as a natural marsh
- Best practices and transparency on what could go wrong
- Include high and medium energy systems as well as tidal freshwater systems
- Gray/green hybrid infrastructure considerations
- Monitoring requirements for upkeep
- Regulatory frameworks

Vulnerability and Risk Assessments

Habitat Mapping

Virginia

A. Ecological and Biogeographic Assessments

This is especially needed for the Mid-Atlantic Ocean - an especially for marine mammals, seabirds and cold-water corals (both on the continental shelf and in the submarine canyons).

C. Regional Ecosystem Science

Predictive models that address potential impacts of offshore wind on marine life

B. Habitat Mapping

In the Mid-Atlantic Ocean

I. Climate impacts on ecosystem

In the Mid-Atlantic Ocean

L. Assessing Human Use

In the Mid-Atlantic Ocean - especially recreational uses

Pennsylvania * Note – this is a bi-coastal state – Great Lakes & Mid-Atlantic. Responses included in Great Lakes Section.

GULF / SOUTHEAST / CARIBBEAN

Louisiana

B. Habitat Mapping

For the 20 parishes within the Louisiana Coastal Zone

A. Ecological and Biogeographic Assessments

For the 20 parishes within the Louisiana Coastal Zone

H. Natural and Nature-Based Features

Helping to identify alternative nature based features that can work in different scenarios.

K. Ecosystem Services Valuation

For the 20 parishes within the Louisiana Coastal Zone

C. Regional Ecosystem Science

In Louisiana’s coastal zone, there are 2 distinct regions that function differently, have different issues, and provide different challenges. Southeast Louisiana is the deltaic plain, and in southwest Louisiana is the chenier plain.

Florida

M. Assessing Vulnerability and Resilience

Resilience studies should complement existing studies and seek to expand our knowledge base.

E. Harmful Algal Blooms

Effects of HABS on human health, water quality and within managed areas

C. Regional Ecosystem Science

Florida has large data sets in many areas but would like more predictive tools for that data.

J. Restoration

Florida is developing a sponge restoration coastal enhancement program strategy. NOAA research could incorporate state restoration strategies.

F. Biological Effects of Contaminants and Nutrients

Puerto Rico

J. Restoration

Biogeophysical assessments and criteria to conduct coral reefs and associated benthic communities restoration in light of current trends, habitat loss as well as SST and Ocean pH changes.

G. Vulnerability and Risk Assessment

Closely related to restoration/adaptation/building resilience. Updated benthic habitat models/maps depicting trends, vulnerabilities and levels of risk would enable PRCZM and PRCRCP to identify and prioritize candidate areas for interventions.

B+H+K

B. Habitat Mapping

H. Natural and Nature-Based Features

K. Ecosystem Services Valuation

A combination of b and h. Update and 3-D descriptions of benthic and coastal habitats in support of nature-based solutions to ameliorate coastal hazards, protect coastal communities, life, property, and critical infrastructure.

A. Ecological and Biogeographic Assessments

I. Climate impacts on ecosystem