

What MPA planners and managers should do about climate change right now – Additional responses

Jeffrey Carter of Rookery Bay National Estuarine Research Reserve

This list isn't completely comprehensive. Of course, depending on available resources (funding, staffing, etc.), the ability of various MPA's to do all this will vary greatly.

- Assess needs for both natural managed areas and their local communities and related built infrastructure
 - Identify and define how said natural areas support and protect local human communities
 - Write a good comprehensive management plan
- Identify who your audience is (e.g., define social-science connections) then establish good lines of communication and messaging with all partners, as well as with local communities, local businesses (e.g., fishermen, ecotour operators, fishing guides, etc.), decision-makers, and citizenry, and also provide educational and training opportunities. Said communication must also be translated to appropriate messages for all respective end-users.
- Ensure that all natural resource management activities are guided by good science
- Map your terrestrial vegetative habitat resources
- Map your submerged habitat resources
- After mapping, perform habitat change analysis to see how ecosystems are responding and moving due to sea level rise and climate change
- Identify vulnerabilities through an assessment
- Establish infrastructure to assess impacts from climate change and in particular sea-level rise (vegetative transects with surface elevation tables and vegetative monitoring lots)
 - Establish good vertical control related to all monitoring infra-structure
- Identify habitat areas in need of restoration
 - Identify funding opportunities to get restoration projects shovel-ready (planned, designed, and permitted). Shovel-ready projects are usually first to be considered for funding and provide strongest proposals.
- Consider and look at opportunities to define ecosystem-services as related to restoration and other natural resource management activities
- Consider doing carbon feasibility studies as related to restoration efforts
- Establish partnerships with entities (local botanical gardens, etc.) to assist in prioritization of species of flora to be targeted for seed collection and banking of related genetic material
 - These genetic materials to be used to preserve genetic species threatened by climate change, sea-level rise, and erosion etc.
 - They will also be used to propagate threatened plant species and other species to utilize for re-introduction of flora during efforts to assist

landward migration of coastal habitats in response to sea-level rise and climate change

- As previously mentioned, ensure good science-to-management feedback loop. Identify research questions that need answering as related to effects of climate change and sea level rise
 - Identify research partners (other govt agencies, universities, non-profits, etc.) to assist in answering prioritized research questions... then let the science inform your natural resource management activities.

All these activities and more are needed to be fully prepared for not just reacting to climate-change and sea level rise... but also being PROactive as related to readiness for quick response to ever-changing environmental conditions... especially in our coastal zone areas.

Mary Collins of the Center for Large Landscape Conservation and the IUCN WCPA Connectivity Conservation Specialist Group's Marine Connectivity Working Group (MCWG)

Increasingly, incorporating marine connectivity conservation is recognized by scientists and managers for the added value it brings to resilience, both functional (species, genes) and structural (habitats, abiotic). Planning and managing for maximum resilience are fundamental to protection success with respect to climate change impacts. Connectivity conservation can occur at all scales and therefore is applicable for all MPAs.

My work with MCWG and partners has expanded on this growing field, with resources published in 2021 for MPA personnel and policy makers. The [Marine Connectivity Conservation 'Rules of Thumb' for MPAs and MPA Networks](#) offers a checklist for best practices to date, and the [Marine Connectivity Case Studies](#) offers on-the-ground examples of these best practices applied at a range of protection scales internationally.

Johnny Reker of the European Environment Agency (EEA)

From my own experience:

- I was responsible for the LIFE Blue Reef project in Kattegat, Denmark. It aimed at restoring cavernous reefs 12 km from the coast. Four years after restoration, we had [300-600% increase in biomass of commercially exploited fish, crayfish, seaweeds, and invertebrates with increase in diversity as well.](#)
- From EEA, we look now towards solutions that rebuilds resilience step by step. This includes removal of pressures from specific areas, i.e., address the

cumulative pressures from sources other than climate change to rebuild resilience vs climate change. A number of the products of this work are available [here](#) under 'Further reading'.

Brian McHattie of Parks Canada

Here at Parks Canada, we've developed an Adaptation Framework and have applied it to the question of how biodiversity will be affected at Fathom Five National Park / Bruce Peninsula National Park (sister parks in Tobermory, Ontario). We're still working through the recommendations in addition to all of the work here. Certainly, it will be helpful as we write our new park management plan.

Don Piper of OceanForesters

MPA managers should consider installing a matrix of Ocean Foresters *Lifeboats* to provide zero cost Carbon removal, environmental monitoring and security, and abundant seafood and jobs for local fishers. See oceanforesters.org and [our proposal for MPA managers](#) for more detail.

Mark Monaco of NOAA National Ocean Service

[NOAA CoRIS - A Reef Manager's Guide to Coral Bleaching](#) describes actions managers can take in coral ecosystems with respect to coral bleaching.

Sarah Shoffler of NOAA Fisheries

Ask the indigenous/Native American communities what should be done.

Jeff Miller

I have worked with the National Park Service, duty stationed in Virgin Islands National Park for >25 years. I've headed up the Caribbean part of the South Florida-Caribbean Inventory and Monitoring Program of NPS. We have quantified and observed historic, catastrophic declines in coral communities over this time period. We are frequently asked "what can be done about it". Whether the change is being driven by storms,

disease, anchoring, visitation, or onshore development, climate change affects either the driver or the system's ability to respond/recover.

Many turn to restoration as the answer. But my belief is that it plays a role, but it is by far not the only action. You can spend \$1M growing coral, and if a yacht drops an anchor on your million-dollar coral, they're dead.

Outreach isn't as splashy, but with proper outreach, maybe your zillion dollar outplanted corals have a chance to adapt and survive.

How do you get the MPA or (in our case) NPS use rules and regulations to visitors? How do they know they are in a MPA? How do they know what they can do in an MPA?

I've developed a [product that can use a Google Earth app on tablets or phones \(or PC\)](#) that uses real-life icons to provide information to the boaters on visitor use regulations. Scroll down to the Interactive Marine Users Map.

I've developed a similar product for Buck Island Reef National Monument, but it isn't posted on their website yet. I am not a programmer or even a GIS specialist, but this has been found to be useful at getting information to boaters and visitors who may never come to land prior to visiting the MPA or park.

Mark Capron of OceanForesters

MPA planners and managers can immediately start planning MPAs that are 80% MPA and 20% aquatic foods ecosystems (by area). Our [proposed program for the UN Ocean Decade](#) explains Aquatic Foods Ecosystems in detail. Highlights include:

- After the initial investment to build a few aquatic foods ecosystems (AFEs), profits from sustainable food production motivate the local community to establish, maintain, and fund the associated MPA. For example, the entire community of Punta Abreojos, Baja, Mexico has been managing their reefs as a natural AFE for decades. Punta Abreojos' financial success is demonstrated by their ability today to send their children to college and is celebrated in a 2017 [National Geographic article 'Baja California's Recipe for Saving Fishing Communities'](#).
- MPAs that substantially increase photosynthesis and shell formation (ecosystem restoration over the no-MPA situation) may be able to claim substantial carbon dioxide removal with C sequestration.
- MPAs can adapt to climate change by planning "biodiversity conservation with livelihoods". That is proactive management of the species in the MPA ecosystem. For example, if disease is killing all your sea stars (which eat sea urchins) you

could harvest a lot of sea urchins in a few months. Over the long-term, increase the population of lobsters and sea otters (that also eat sea urchins). Without proactive management, you have some version of the kelp barrens and zombie sea urchins, potentially for many years.

Mike Gawel

Preserve species diversity under climate change threats by:

- 1) Monitoring and identifying which species are threatened most (e.g., corals sensitive to bleaching from elevated sea temperatures)
 - 2) Culturing threatened species (e.g., in-reef coral nurseries)
 - 3) Planting cultured products in sustainable habitats.
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David Dow

I feel that there is need to engage diverse stakeholder groups in the dialogue on ocean wind farm location/construction in US Federal jurisdictional waters to avoid lobbying/litigation opposing this type of renewable energy source. The Martha's Vineyard 1 wind farm provides a good case study.

Phyllis Ha (Personal opinion)

There is a lot to learn. I think a good one thing for planners is to try to understand greenhouse gas (GHG) emissions commitments and methods for mitigating/controlling GHG.

Josep Lloret of the University of Girona

I would say that the first thing is making sure that the rush for offshore wind farms does not affect the biodiversity and landscape/seascape in MPAs. There are many concerns regarding the establishment of offshore wind farms close to MPAs in the Mediterranean Sea. We are building a case study with this example.

Bruce Potter of Island Resources Foundation

Strong suggestion to sign up with the [Smithsonian Environmental Research Center](#), one of the lesser known Smithsonian labs, devoted mostly to wetlands issues, and host to some of the the [longest-running climate change experiments](#) (some 50 years old). It is located on the Chesapeake Bay of the East Coast of the US, just south of Annapolis, Maryland.

Joseph Ierna of Ocean CREST Alliance

The main focus of all MPA practitioners should be to design, develop and operate Blue Economy.

We do not have time to continue talks and continue to put actions off for a later date. We need to implement actions now.

With all MPA's the type and degree of Blue Economy will differ, but the results are the same. We create the much-needed funding to operate and bring success. Whether it is a No Take MPA or a Multi-Use MPA, they all require large amounts of cash, manpower, and technology to manage and operate. And the most sustainable means of long-term success of the MPA is through operating a Blue Economy system in the area.

As an expert, with a proven track record, in operating a financially sustainable MPA, I would be happy to consult governments, private and public entities on "how to" make their MPA financially and environmentally sustainable.

The time for action is NOW!