



## Annual MBON All Hands Meeting

October 22, 2021  
11:00am – 3:00pm ET

### Notes

**Overall meeting goal:** Advance the development of a MBON that addresses needs for biodiversity information for effective management and policy-making and supports ecosystem services and human well-being.

**MBON Background:** <http://marinebon.org>  
**Overview of MBON** [products](#)

[All Hands Meeting Agenda](#)

[Collaborative Notes](#)

[Main Session Recording](#)

[Main Session Chat Log](#)

### Meeting objectives:

- Demonstrate benefits of biodiversity monitoring.
- Inform MBON teams and participants on progress in key areas that support biodiversity research and applications ('Omics/Environmental DNA, Animal Tracking/Acoustics, Remote Sensing/Seascapes, Biodiversity and Ecosystem Function, Data Management).
- Share successful user engagement stories to advance a sustainable MBON.
- Network and partner to advance long term biodiversity monitoring, data sharing, and information product development across existing MBON projects and more broadly as a national model.
- Share examples and ideas for outreach graphics.

### Participants (also linked [here](#)):

Clarissa Anderson	Cara Estes	Jason Landrum	Mitchell Roffer
Chris Beaverson	Miguel Figuerola	Diana LaScala-Gruenewald	Digna Rueda-Roa
Ben Best	Katie Fillingham	Fernando Lima	Henry Ruhl
Mathew Biddle	Jennifer Fisher	Natalie Low	Jeffrey Runge
Jonathan Blythe	Keith Gaddis	Luke McEachron	Chris Simoniello
Christina Bonsell	Matt Galaska	Megan McKinzie	Kris Sarri
Jennifer Brown	Jacqueline Grebmeier	Monique Messie	Moritz Schmid
Ali Burgos	Neil Hammerschlag	Bob Miller	David Siegel
Chris Caldow	Lis Henderson	Enrique Montes	Woody Turner
Gabrielle Canonico	Russ Hopcroft	Stephanie Moore	Nicholas Weidberg

Francisco Chavez	Tom Hourigan	Jackie Motyka	David Wetthey
Cathy Coon	Katrin Iken	Franz Mueter	Sally Woodin
Lee Cooper	Kym Jacobson	Frank Muller-Karger	Kristen Yarincik
Robert Cowen	Peter Kalmus	Aimee Neeley	Riley Young Morse
Seth Danielson	Lee Karp-Boss	Margaret O'Brien	Sam Zeman
Lynn deWitt	Maria Kavanaugh	Daniel Otis	Maury Estes
Jennifer Dorton	Chris Kelble	Dan Pendleton	Bill Woodward
Emmett Duffy	Li Kui	Jim Price	Anna Bolm
Adrienne (?)	Dylan Pugh	Jacoby Baker	Justyna Nicinska
Laura Lorenzoni	Laura Rogers	Mitchell Roffer	Nathan Truelove
Nick Adams	Sebastian DiGeronimo	Su Sponaule	+3 unidentified phone numbers

### **Opening Plenary**

- **Objectives and Expected Outcomes - Frank Muller-Karger**
  - Interested in having this network grow, both nationally and internationally. Meeting will focus on application into collection, and vice versa. Tools in standardizing data.
  - Want to hear stories of engagement with users and open the door for additional partnering. Advance MBON through the UN Ocean Decade – everything we are doing is relevant to the UN Ocean Decade; we stood up through MBON the Marine Life 2030 programme, so that we can partner with these other networks. This is much bigger than MBON. UN Ocean Decade is looking for projects now through a new call. Looking for people to join Marine Life 2030.
  - How can we strengthen our partnerships, through MBON and through the UN Ocean Decade?
- **IOOS Marine Life Program – Gabrielle Canonico**
  - IOOS is interested in expanding its marine life observing. Focus and interest in understanding where the animals are, how many, movement, etc., and why.
  - Marine life observations are needed for understanding ecological change, describing change, adaptation strategies, etc. There is a gap in our capabilities, and we recognize that.
  - President's budget – the vision: to ensure long-term, sustained marine life observation capability. \$15M to IOOS for grants to external partners that expand the collection of marine life observations, support analysis of marine life data and information products, and forecast the implications of climate change on living resources and ecosystems. \$2M to IOOS for staffing and capacity (e.g., establishing a Marine Life Data Assembly Center).
  - Strong regional needs that we know about, but also strong national priorities and needs (i.e., weather). We have similar needs for coordination of marine life information. Thinking about a program that balances national and local stakeholder needs. How do we bring this together in a coordinated marine life program?
  - Critical components: support existing and new base level observational efforts; expand existing national capacity to a dedicated and scalable state of the art, operational Marine Life Data Assembly Center (DAC); add management and dedicated data handling positions; continue the interagency competitive NOPP process to award new and

innovative marine life observing capabilities while building upon and leveraging the IOOS regional observing, data, and prediction systems.

- FY22 funding categories: data wranglers, new deployments, NOPP Marine Life NOFO, Marine Life DAC, NCEI archival support, develop data products with partners, global activities.

- **A Vision for MBON Sustainability: The Value of Partnership for Coordinated Biodiversity Monitoring – Kris Sarri (National Marine Sanctuary Foundation)**

- Challenges:
  - Congress does not understand what marine life is; it is hard to value what you cannot see. Speak up and tell your stories!
  - Engage broadly with partners. Think outside the box.
  - Do business differently – work with Traditional Knowledge and Indigenous communities. This is a priority for the current administration.
  - What is your elevator pitch?
- The policy landscape for this work is very rich (e.g., 30X30 initiative). A policy window is opening up. The downside is that being terrestrial beings, it is harder to get people to pay attention to the importance of the marine side. The data and the work you are all doing is really going to underpin the 30X30 effort.
- Youth especially are waking up to the fact that we are in a climate crisis. Can't necessarily see the changes in the marine environment which presents a challenge.
- Plastics – people really understand that plastics use is impacting the ocean. Getting people to understand that we are pushing on the ocean's limits is key.
- Need for data – if we are going to have good policy about marine conservation planning, we need data. Help us to use the ocean for things we value as a society but sustainably. This is a huge challenge.
- This is another reason to consider new partnerships, particularly with industries (wind, etc.)
- Doing business with Indigenous communities is going to require long-standing relationships, building trust, etc.
- Consistent messaging across the board is also key.
- [Marine Biodiversity Dialogues](#) (Emmett Duffy, Smithsonian) – sponsored by National Marine Sanctuary Foundation (NMSF) and Lenfest Ocean Program. Working on a quantitative assessment framework for marine biodiversity that is time bound and can use existing data. Developing the manuscript now.

- **Discussion**

- Jonathan Blythe: What is the terrestrial counterpart to plastics? Can we connect the two?
- Kris Sarri: How do we take the lessons learned from these breakthrough issues and translate it to the work we do? Breakthrough with storytelling, getting people to understand that they can have an impact.
- Frank Muller-Karger: Ultimately everything comes down to life and the diversity of life. Have to put life in the middle of the equation. That message is something I'd like to refine.
- Example: Harrison Ford – climate solution has to have biodiversity at the heart of it.

- Lee Karp-Boss: Raising awareness raises anxiety, and they shut down. How do we present the challenges in a way that makes people want to engage rather than feel hopeless?
- This group would be interested in connecting with Capitol Hill Ocean Week (CHOW) on this. “Sea the Future” is the next CHOW theme. What do we need to keep moving forward?
- Some incredible legislation passed 50 years ago that maybe couldn’t be passed now. But we need these significant changes to be made for the ocean to thrive.

### **Ideas and Opportunities Emerging from MBON Working Groups**

- **X-MBON Environmental DNA Working Group - Francisco Chavez**
  - This working group discusses ideas, knowledge, and standards for environmental DNA, as well as how to improve throughput scale and become operational.
  - Keenly aware of users, to include harmful algal blooms, ocean acidification, endangered and invasive species, environmental impacts (oil and gas, wind power generation), fisheries, sanctuaries, and global and environmental change.
  - Working closely with the MBON Data Management and Cyber Infrastructure Working Group and OBIS; getting ready to provide eDNA information on a regular basis, and the sanctuaries will be the first customer.
- **BioSound and BioTrack Working Groups - Neil Hammerschlag**
  - BioSound: focused on biological sounds and anthropogenic noise. Goal is to streamline, standardize, and visualize metrics derived from soundscape monitoring useful to biologists and managers related to biodiversity.
    - Can we derive biodiversity metrics from measurements of biological soundscapes? Also trying to understand the ecological relationships between biological and anthropogenic sound. Use MBON data sets and their relationship to the soundscape. Can they be used to validate?
    - Next steps – continue to solicit future speakers, individual monitoring efforts, and seeking case studies.
    - SanctSound website launch in 2022.
  - BioTrack: focused on acoustic and satellite animal tracking. Goal is analysis and visualization of metrics useful for stakeholders and managers to create MBON-ATN biodiversity data processes and products, establish linked research priorities/activities, and increase participation in the group.
    - Key issues and next steps - identifying and organizing stakeholders, BioTrack proof of concept project in WNA, GoM, Caribbean (website, data management plan, 500+ satellite tags, 23+ species, 19+ collaborators).
- **Remote Sensing Working Group – Maria Kavanaugh (summary posted by Maria in chat)**
  - MBON remote sensing tracks: plankton groups, foundation species, higher trophic levels (SDMs), and pelagic habitat extent and diversity.
  - Remote sensing working group members integrate instrumentation (traditional and new technology), models, and ecological time series (context, mechanism, and partnerships).
  - Provide validation, depth information, and increased taxonomic resolution.
  - Indices used for marine ecosystem management: National Marine Sanctuaries, fisheries management, Integrated Ecosystem Assessment, and global indicators EBVs and EOVs.
  - PACE/SBG Application Readiness: engage early, listen, and be ready for diverse needs.

- Indices also used for innovative science and trans-sector science (e.g., academic-agency partnerships with IFCB). Science as stakeholders. How do we continue innovation and PACE/SBG preparation? Focused X-MBON studies across working groups?
- **Biodiversity and Ecosystem Function Working Group - Jeffrey Runge ([Notes](#))**
  - Biodiversity and Ecosystem Function Working Group met three times since February 2021. Goal of meetings is to discuss next steps for MBON to strengthen collaboration to meet partner information needs.
  - Top three biodiversity issues:
    - Measurement and interpretation of biodiversity data. Development of biodiversity baselines for characterization of ecosystem health: identification of key species, characterization of trophic levels and functional traits measurement through standardized use of imaging technology to assess biodiversity across MBON projects, development of functional traits (e.g., size, lipid concentrations) as leading indicators of ecosystem function, for example shifting trophic efficiencies and linkage.
    - Dissemination of information, including infographics. Development of clear and understandable ways to use MBON DMAC capabilities to disseminate MBON data. Development of infographics and other ways to interpret and present understanding of biodiversity information partners and other users.
    - Connection. Sustain and expand opportunities for connection with partners to address specific biodiversity applications at the regional level, engaging sociologists, involving managers, participation in preparatory meetings for regional NOAA IEAs.
  - Have moved into discussing partner information needs. Wondering about catalyst funding from MBON to make progress on actions?
- **Data Management and Cyber Infrastructure (DMAC) Working Group - Mathew Biddle**
  - Goal is to focus on data management, documenting, and accessibility: how can we implement interoperability, data archival, and publication standards for marine and coastal biodiversity observations? What are the best practices for formatting data?
  - Convergence of best practices for data formatting, data interoperability, data archival, and interconnectedness of databases.
  - Started MBON dataset registration to identify all the types of data being collected throughout the lifecycle.
  - Data flow diagrams - how data should move from raw into data views.
  - Next steps – connect with users; what are the products, and how can data management help create them? Also connecting with other MBON working groups and projects.
- **Discussion**
  - Mitch Roffer: How do we better integrate these groups, to provide a better integrated product for users?
  - Francisco Chavez: Have working group datasets go into the same location as a start. At the project level, integration is happening, how do you integrate over the country? Slowly!
  - Jeffrey Runge: Have working group leaders get together to discuss how to integrate. Some of this might need someone to be in charge to see progress (human and funding resources probably needed).

- Neil Hammerschlag: Sampling protocol across MBON might not be the same, would be value in comparing regionally.
- Chris S: Would it make more sense to find the user first? Then bring the data and information together to address that challenge?
- Neil Hammerschlag: Yes, but also would be helpful to coordinate and streamline at the point of data collection even through individual projects and regions to be truly integrative.
- Woody Turner: Could look at doing this at some level in the next call. To have standards determined could take a year or so. Maybe something to consider going forward. Similar to airborne and others. Standards are important, but may need a strong lead to get people to use them?
- Bob Miller: Integration through synthesis across sites, DMAC Working Group essential to ensure integration.
- Entire projects are funded to do this. DMAC should take advantage of EDI; great resource for us to take advantage of so we don't reinvent the wheel.
- Mathew Biddle: This is what we are trying to do with DMAC. More focused on management than protocols but want to get DMAC people embedded into other working groups to have integration. Concepts will be similar across all groups.

#### **Breakout Sessions: Collective Benefits of Biodiversity Monitoring**

- **Goal:** Demonstrate benefits of biodiversity monitoring.
- **Objective:** Strategy for user engagement and implementation ideas.
- **Breakout Group Questions:**
  - Are you doing something for a user that they will want to continue or expand beyond the life of the project?
  - Give specific examples of applications or needs - who is the user, where is the site, what is the need, what MBON approaches were used, what is the product or application?
  - "Next steps" for MBON (technologies, data synthesis, applications, steps to solicit or identify management gaps and key services to users and unmet management needs).
  - How should MBON move toward operational model?
  - Template for report:
    - Top 1-3 examples for applications of biodiversity information (include key steps that made this a success if already underway).
    - Priority users that MBON needs to engage.
    - Next steps to meet the data needs and for cross-WG work.
- **Breakout Session #1 Summary – Jennifer Dorton ([Google Doc Notes](#))**
  - Need ten years or more of data to make decisions, so we may not have the volume of data that we need at this time.
  - Example: MBON in Southern California working with National Marine Sanctuaries on Channel Islands Conditions Report. [Sanctuary Conditions Report](#) was an effective way for the California MBON to work with the sanctuaries.
  - Other partners: BOEM (Alaska), Regional Fishery Management Councils.
  - Produce raw data, but that may not always be what an agency needs/gets into a decision-making pipeline.
  - Value of the biodiversity approach of the MBON is collecting information across species. May not be useful to all, but valuable for understanding ecosystem function nonetheless.

- Being resources (funding) limited sometimes means being selective in which user groups to work with. But one user group that we may not always value as much but should be working with is the research community.
- IPCC Report; lots of opportunities for MBONs to monitor change and develop baselines. Work with researchers to collect data for the long term.
- Focus on data management and data standards to move toward integration. MBON could work together on this. Some type of data integration project?
- Francisco Chavez: Many of us built MBON on existing projects.
- Though MBON doesn't have a long window, you can string together data from these sites.
- Recognize that it takes a lot of work to create products/information from data.
- Still a question about how the level below phytoplankton are impacting trophic levels above it, primary production getting to the fisheries. MBON could contribute?
- **Breakout Session #2 Summary – Henry Ruhl ([Google Doc Notes](#))**
  - Examples: eDNA and harmful algal bloom work in Arctic MBON, sharing information with local communities, Gulf of Maine MBON and right whales, central Florida MBON.
    - Multi-tiered sharing of information (e.g., coastal and Indigenous communities in Alaska MBON, sanctuary conditions reports, fisheries), to include the general public (e.g., infographics).
  - Role of MBON in pushing new technologies and methods, transition from research to operations? Work on the digestion and translation of information to users.
  - How do we transition things that are happening in MBON projects into longer term operations? Is there potential for a cross-MBON project that is beyond the working groups?
  - Jonathan Blythe: ICAMS and USGCRP – in Alaska, work would not have been possible without an existing monitoring network to plug in the biodiversity piece. Arctic example relevant for climate change. Each region has its own networking to do, necessary to develop for successful regional MBONs.
  - Ben Best: ERDDAP, MBON Pole-to-Pole. Consistent reporting to attend to research needs by having an extractor-type service.
  - Frank Muller-Karger: I'm curious about this idea that we can do something beyond the working groups. What are we missing? How can we do it differently? What is the extra resource we would need to act on them?
  - Enrique Montes: Funding support and addressing the issue of scales. Seascape framework, one meter resolution will only be possible with funding. Not clear how these proposals would support these kinds of activities.
  - West Coast has longer term monitoring in the rocky shores, generating same output for four sanctuaries using marine rocky shores data. Applicable if we can get that kind of data coming in a regular frequency. Looking at new forms of observing through eDNA and sound is valuable, but we are under utilizing the ongoing data that is currently being collected/monitoring. Help end users understand what metrics are most useful to understand what is currently happening. What are the metrics at the community scale, species scale, etc. that tell us how the biodiversity is changing in a way that informs management?
- **Breakout Session #3 Summary – Clarissa Anderson ([Google Doc Notes](#))**

- Plankton imaging, California getting close to full network of twelve IFCBs on piers and moorings, supported by DMAC backbone that we could potentially integrate. Supported by Axiom, could be nice overlap.
- MPA tools that were developed with CENCOOS and indicator tools that draw from Seascapes.
- Automated tools and infographics for conditions reports, include feedback loops that improve co-development.
- Sanctuaries are interested in biodiversity, need baseline information. Effective to partner with regional associations to support work, leverage funding, outreach and engagement.
- If we want to push the MBON/RA collaboration, need more funding to improve bandwidth. Helps with data management, but also translation to what we are doing on the Hill. The more we can impart the benefits of MBON, the better for all of us.
- Push data to RAs to broaden discovery.
- Need to bring biological data to the users and keep that goal in perspective.
- Emphasize adaptability and client-driven objectives.
- Challenges – users don't know what they need until we should them products. Emphasize need for dialogue with users.
- Readiness levels, especially for models.
- Do we need to do better with the data standards and matching them to the user community?
- Need for integrating datasets, indicator needs scoping workshops.
- Co-development of sustainable synoptic and time series indicators that maintain taxonomic resolution, ecological resolution, optical rigor – need to address the underlying reasons for change. How do we communicate that?

## Discussion

- What are folks' vision for an operational MBON? What do people think of when we think of operational in the context of MBON?
- Gabrielle Canonico: Documenting how we see the future of MBON in some sort of strategic document.
- Chris Kelble: Struggle with operational for MBON. MBON at times comes across as doing a lot and it is resource limited. As we think about operationalizing something like this, we have to think about what MBON is and is not. Not sure it is possible to operationalize in the form it is currently in.
- Frank Muller-Karger: EOVS debate - can you operationalize internationally? Can we provide a model for that in the U.S.? I think there would be opportunity to implement. How do we walk into an operational system that can absorb these kinds of products and put them out to the public? There are things happening, but we need to do it in our own country.
- If want something to be sustainable in the long term, need to take a critical look at the components.
- Ben Best: How do we go from raw sensing to management? What happens in between? How do we narrow the window to be responsive to an ever-changing situation? Phased approach?
- Physical oceanography, it took 10, 20, 30 years to become operational. Opportunity for MBON to continue to be a research program while designating a small number of observations that we are almost ready to collect in a routine way.
- Clarissa Anderson: Need to get realistic about the funding part of this. If we can be more pragmatic, then can you work on the sustained funding?



- MBON does the R&D?
- Jonathan Blythe: Ocean Info Hub – DMAC should look at this. Being developed by IOC. If that is consistent with our needs, perhaps we could copy that.
- Francisco Chavez: Regional approach, another that is more like an ARGO program that does something specific.
- Jeffrey Runge: Keep it to routine observations that contribute to research to understand change, eDNA, imaging of functional traits, visual understanding and using AI techniques.
- Woody Turner: Could NASA, NOAA, BOEM come together to work on products at regional and national scales? (Action for the SOST Biodiversity IWG to take on?).
- Gabrielle Canonico: Is there something we can do to build out linkages between government, industry, etc? We need to approach this as a whole community – sometimes non-Federal partners have a seat at the table when government agencies do not.