2022 Work Plan

JANUARY 2022

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Introduction

This document provides an overview of work to be conducted by members of the Mid-Atlantic Ocean Data Portal development team (Portal Team) in 2022 in consultation with the Mid-Atlantic Regional Council on the Ocean's (MARCO) Ocean Mapping & Data Team (OMDT) and the MARCO Board. The plan covers a broad range of priorities including map data additions, tool and site enhancements, GIS database management and stakeholder engagement activities. The fluidity of budget assumptions at the time this document was drafted presented a challenge. Given that additional funding was possible through legislation proposed in Congress, the document attempts to present a menu of items that could be accomplished with level funding along with a list of further improvements that could be made should additional funding be realized.

The Portal continued to see a healthy growth in traffic in 2021, with the number of users increasing 13% over the record year that preceded it. Beyond analytics, the Portal continued to grow in influence as a tool for informing regional ocean planning. Notably, the Portal served as a hub for public engagement on a series of routing measures recommended in the U.S. Coast Guard's Port Access Route Study (PARS) reports for the Northern New York Bight, New Jersey Coast/Delaware Bay, and Chesapeake Bay approaches. Federal Register notices for these studies encouraged the public to learn more about them on the Portal and the site was cited frequently by industry representatives and stakeholders as they submitted comments to the Coast Guard.

While this document provides a roadmap for 2022 based on the best information available today, a project of this kind requires ample flexibility to account for unforeseen developments including regulatory decisions (e.g., the advance of wind farm proposals), changes in funding availability, and regional data requests with high urgency that can alter schedules or the team's workflow. The team has limited capacity, but will work to meet these challenges to the best of its ability. The OMDT membership list is available here. The Portal Team currently consists of:

- John Bognar, Rutgers U. Center for Remote Sensing & Spatial Analysis (CRSSA)
- Avalon Bristow, Mid-Atlantic Regional Council on the Ocean (MARCO)
- Corrie Curtice, Duke University Marine Geospatial Ecology Lab (marlne life data manager)
- Jeff Herter, New York Department of State
- Ryan Hodges, Ecotrust (developer)
- Richard Lathrop, Rutgers University CRSSA
- Tony MacDonald, Monmouth University Urban Coast Institute (UCI)
- Nick Napoli, MARCO (Portal Team lead)
- Jim Trimble, Rutgers University CRSSA
- Karl Vilacoba, Monmouth University UCI (project manager)

Part I: Data Priorities

<u>Outlook for 2022</u>: A major emphasis of 2022 work activities will be the improvement of the Portal's fishing and marine life data. The most recent Vessel Monitoring System (VMS) data covers 2016 and Vessel Trip Report (VTR)/Communities at Sea data covers 2015. Per the federal budget enacted by Congress for fiscal year 2019, the Mid-Atlantic and Northeast Ocean Data Portal teams pooled matching federal appropriations beginning in 2020 in an effort to produce new commercial fishing data that can help inform analysis on compatibilities/conflicts with offshore development.

The funding allowed MARCO and the Northeast Regional Ocean Council (NROC) to conduct outreach to government agencies and the fishing industry with the assistance of the Responsible Offshore Development Alliance (RODA). Through this outreach, the Mid-Atlantic team solicited feedback on a number of existing and proposed fisheries data products to understand what new products were needed to better represent fishing activity. Among the outcomes of these discussions, the Portal Team expects to update its VMS fishing maps current to the year 2019 this year and add a series of VTR-derived products produced by NOAA. It will also debut Communities at Sea maps showing party and charter boat activity to replace a recreational fishing layer that is based on 2000-09 data, yet is one of the most frequently activated layers on the Portal. Discussions are also taking place with the originator of the Communities at Sea methodology about the possibility of creating maps that extend the datasets to 2016-20.

Federal funding awarded through NOAA in 2020 has also positioned the Portal Team to improve its marine life data, including map layers first created by the Duke University-led Marine Life Data Team (MDAT) in 2017. In 2021, the Marine Life Library's fish species group models were updated to reflect more years of federal trawl data so they now cover a full decade (2010-19). The data will be widened in 2022 to span 40 years (from 1980-2019), with decadal maps produced for the 80s, 90s and 2000s, and five-year maps for 2010-14 and 2015-19. Work has begun to produce higher-resolution versions of the MDAT's North Atlantic Right whale models, with that data in turn used to update the existing marine mammal group maps. Also in 2022, a Northeast Regional Fish Habitat Assessment team is expected to complete a project that will develop maps modeling habitat use by several commercially and ecologically important fish species, while the work of the recently formed Regional Wildlife Science Entity may yield additional map data.

The following is an overview of planned data additions and enhancements in the year ahead. "External Dependencies/Sources" refer to data providers and other outside organizations whose collaboration is essential for developing products. "Update Frequency" is a suggested maintenance schedule for data, provided here as an indication of potential data needs/work focus beyond this annual plan period. Further explanation of individual data items follows the table.

The table initially presents a list of map layers for each Marine Planner theme that may advance with level funding. For some themes, a secondary "Also Possible" list is provided with items that may advance if additional funding is available.

2022 DATA PRIORITIES AT A GLANCE			
Theme	**Layers**	**External Dependencies/Sources**	**Update Frequency**
Administrative	1. Proposed offshore projects or agency actions 2. Tribal territories 3. Tribal EPA RTOCs 4. Reservation boundaries 5. Tribal leaders directory 6. Congressional districts 7. Review of federal data providers for new and useful options	1. Various 2. Native Land Digital 3. EPA 4. Census 5. BIA 6. MC service or other TBD 7. Marine Cadastre (MC)/BOEM/others TBD	1. TBD 2. Auto updates via service 3. 1-2 years 4. Auto updates via service 5. 1-2 years 6. TBD 7. TBD
Fishing	1. VMS 2017-19 updates 2. Potential reorganization of all data by fishery 3. NOAA recreational and commercial fishing footprint 4. Communities at Sea/VTR party/charter boat 5. Management areas update 6. Shrimp VTRs 7. Artificial reefs **Also Possible** 1. Begin development of VMS 2020-21 products 2. 2016-20 updates to Communities at Sea data	1. NOAA/NMFS 2. None 3. NOAA/NEFSC 4. NOAA/NMFS 5. NOAA/NMFS 6. NOAA/NMFS 7. MARCO States	1. 2-4 years 2. Ongoing 3. At least every two years 4. 3-5 years 5. As needed 6. 3-5 years 7. 1-2 years

Marine Life	1. Marine mammal strandings 2. MDAT marine mammal and fish model updates 3. Northeast Regional Fish Habitat Assessment 4. Aquaculture 5. Deep sea coral data feature service 6. Updates to sea scallop average abundance and biomass 7. Tagged black-capped petrel 8. NARW aerial survey transects 9. RWSE Products 10. Coastal wetlands **Also Possible** 1. Sea turtle models from NEFSC and Navy 2. New/updated avian models from BOEM/FWS 3. Marine life project management; coordination with RWSE and federal funded projects modeling/observing marine life	1. NOAA/state stranding centers 2. Duke/MDAT 3. MAFMC/NEFMC 4. MC or states 5. NOAA 6. Northeast Portal 7. USFWS or BOEM? 8. New England Aquarium 9. RWSE/TBD 10. MC	1. TBD 2. 3-5 years 3. TBD 4. TBD 5. Automatic update via NOAA service 6. 3-5 years 7. 3-5 years 8. 3-5 years 9. TBD 10. Auto via service
Maritime	1. Offshore wind ports 2. Evaluation of Port Facilities maps 3. AIS data (2021) 4. USCG proposed areas and studies 5. Consolidated submarine cables map 6. New submarine cable infrastructure and proposed actions 7. Extended shipwreck density map 8. Aids to Navigation update 9. Anchorage Areas update 10. Coast Guard incidents 11. Ferry terminals and routes	1. TBD 2. Port authorities, USACE, MPOs 3. USCG, MC 4. USCG 5. Data from MC, MARCO and developers 6. Data from developers 7. NOAA 8. MC 9. MC 10. USCG 11. USDOT	1. 1-2 years 2. 3-5 years 3. 1-2 years 4. Ongoing 5. TBD 6. Ongoing 7. 3-5 years 8. Auto update via service 9. Auto update via service 10. TBD 11. Auto update via service
Oceanography	1. MARACOOS oceanography layers TBD 2. Fronts/NPP updates	1. MARACOOS 2. NOAA CoastWatch	1. TBD 2. 1-2 years

Recreation	1. Whale/dolphin watch areas 2. SCUBA diving areas 3. Coastal recreation areas (parks, reserves, water trails, boat launches) **Also Possible** 1. Areas of concentrated charter and pleasure boat activity	1. Industry/tour operators 2. Industry 3. NPS, states	1. 2-5 years 2. 2-5 years 3. 2-5 years
Renewable Energy	1. Updated federal and state offshore wind lease and wind energy area boundaries 2. New layers and organization of maps to reflect advancement of projects (permitting, construction, design of power cable routes, etc.) 3. Data gathered and made available by wind developers	1. BOEM/MC and state partners 2. BOEM/MC/states 3. Industry	1. Ongoing 2. Ongoing 3. TBD
Seafloor Habitat	1. Updated regional bathymetry 2. Seabed Forms 3. Soft sediments by grain size 4. Identify and integrate existing sand resources data from federal and state sources **Also Possible** 1. Determine potential to model or compile a map of sand resources from seafloor data 2. Navigation & restoration projects requiring sand resources	1. TNC 2. TNC 3. TNC 4. BOEM, USGS, NOAA, States	1. 5 years+ 2. 5 years+ 3. 5 years+ 4. 5 years+ TBD
Security	1. Naval offshore wind compatibility assessment update 2. Danger Zones update 3. Maintenance of existing layers and additions in consultation with Navy	1. DOD 2. MC 3. Navy	1. TBD 2. Auto via service 3. Ongoing
Socioecon	1. MARCO blue economy report map products 2. eNow Census updates	1. Middlebury Institute 2. NOAA	1. TBD 2. TBD

Water Quality	1. Wastewater outfall 2. Ocean acidification monitoring updates 3. MARCO marine debris/balloon litter updates 4. Harmful algal blooms/marine stressors data	1. MC 2. MACAN 3. MARCO 4. NOAA/TBD	1. Auto via service 2. Ongoing 3. TBD 4. NOAA/TBD

Administrative

- **Proposed Offshore Projects or Agency Actions**: With the success of the Portal-Coast Guard collaboration to build awareness of the East Coast PARS studies, discussions with the OMDT in 2021 explored the possibility of adding maps depicting proposed projects, actions or management alternatives from additional agencies that are noticed via the Federal Register or the USACE public notices. The team will examine options for data types and sources that would be of interest and help users submit informed feedback during comment periods.
- **Tribal Territories**: The nonprofit Native Land Digital agreed to share maps showing historic tribal territories and languages for the Portal. In consultation with OMDT, additional maps were drafted showing EPA Regional Tribal Operations Committee regions, Bureau of Indian Affairs Tribal Leaders Directory, and a Census-derived service was added showing reservation boundaries. These additions will be announced and rolled out early in the plan's coverage period.
- **Congressional Districts**: A federal service was added in 2020, but will need to be updated/replaced based on recent elections and the redrawing of districts in advance of the 2022 elections.
- **Federal data options**: A sweep of prominent federal map data providers (e.g. Marine Cadastre, BOEM MMIS, NOAA Ocean Reports Tool) will be conducted to seek new and useful layers. This is a step taken early each year.

Fishing

- **Vessel Monitoring System**: The most current VMS fishing layers summarize activity for a two-year period running from 2015-16. Through the Portal's federally funded collaboration with NROC and RODA, new products reflecting revised fishing activity in 2015-16 and new activity from 2017-19 will be added this year. Requests will be filed to acquire 2020-21 VMS data and begin development.
- **Reorganization of Theme by Fishery**: The team will explore a suggestion by industry stakeholders that the Portal's fishing theme be reorganized by fishery rather than data type. For example, a Scallop or Squid dropdown could be created with all VMS and management areas maps pertaining to that fishery.

- **Fishing Footprint Areas**: Feedback from fishing stakeholders led to the recommendation that the Portal incorporate VTR-based recreational and commercial fishing footprint data [posted online by NOAA](). Discussions with users and OMDT will determine what portions of this extensive data collection will be used and what types of maps will be created.
- **Management areas update**: The team will consult the NMFS regional office, fishery management councils and others to ensure the current layers are up to date and replace/retire them as needed. The project with RODA has provided recommendations for publishing and maintaining fishing management areas on the Portal.
- **Charter/Party Boat Data**: In 2019, the team created a series of draft VTR-based maps (modeled after the Communities at Sea products) that show popular areas for charter/party boat fishing trips. The team received positive feedback from the industry in 2020 as part of the joint project with NROC and RODA. These maps will be published as a replacement for the existing Recreational Fishing map, which summarizes data from 2000-09.
- **Shrimp VTRs**: Draft VTR/Communities at Sea maps showing shrimp fishing reported via VTRs in the Mid-Atlantic and Northeast were reviewed with the fishing industry in 2020. Based on industry input, these maps will be published this year.
- **Artificial Reefs:** The Portal's Artificial Reefs layer is periodically updated with input from MARCO state staffs and the OMDT. Updates are needed to reflect expanded reef footprints off the New Jersey coast and possibly other areas.

Marine Life

- **Marine Mammal Strandings**: The Portal Team acquired two decades of marine mammal stranding data from NOAA in 2021 and created multiple draft products in consultation with the OMDT and experts on the topic. They include maps showing points where stranding were reported in five-year windows, stranding locations by species and the number of strandings off the coast of each county from Maine through Virginia. The team plans to confer with NOAA on its draft maps, assemble any necessary metadata, and release these maps in 2022.
- **MDAT Marine Mammal and Fish Model Updates**: The Duke University-led Marine Life Data and Analysis Team (MDAT) has begun work to produce a new version of the North Atlantic right whale model that will increase its spatial resolution to 5KM from 10KM. All other species group models that include right whales (e.g. All Cetaceans, Baleen Whales) will be updated to reflect the new data. Work has also commenced to produce fish maps that span further back in time and model distributions of fish that are most vulnerable to submarine cable projects. Spring and fall maps for All Fish Species, Demersal Fish, Diadramous Fish and Forage Fish will be created for 1980-89, 1990-99, 2000-09, 2010-14 and 2015-19. (These maps are currently only available for 2010-19.)

- **Northeast Regional Fish Habitat Assessment**: A team with researchers from NOAA Fisheries, NEFMC, the MAFMC, Monmouth University and others are working on a project that will develop habitat use models for commercially and ecologically important fish species across the Northeast and Mid-Atlantic continental shelf. The project will continue through 2022; the Portal Team will work with the researchers to incorporate map products from this project when ready.
- **Aquaculture**: The team will continue to explore options for adding aquaculture data on the Portal. Possibilities include incorporating a new national map of state and federal lease areas under development by the Marine Cadastre team or creating a single regional map or a set of state-by-state maps depicting areas with aquaculture activities in collaboration with each state.
- **Observed Corals**: The team made significant improvements to its corals and canyons data in 2020. Among them, the existing observed corals map was replaced with new data now being updated quarterly by NOAA. Upgrades to the Portal's technology stack have made it possible to directly ingest this feature service.
- **Sea Scallops**: The Portal's Sea Scallop Average Abundance (SMAST) and Sea Scallops Biomass, Meat Weight in KG (NEFSC) will be supplemented with new versions showing recent data.
- **Tagged Black-Capped Petrel**: Maps showing migration patterns for the black capped petrel are being produced for the Northeast Portal and will be added to the MARCO Portal.
- **North Atlantic Right Whale Migration Areas**: These maps are being created by the Northeast Portal Team based on aerial survey transects coordinated by the New England Aquarium.
- **Regional Wildlife Science Entity (RWSE) Products**: The Portal Team will work with this recently formed entity, comprised of representatives from MARCO, NROC and CSSF, to incorporate data products that are produced through its efforts. This includes data and maps characterizing:
  - Historical and ongoing marine life monitoring efforts, such as through acoustics, telemetry, photography, and aerial surveys
  - Areas that are under surveyed,
  - Proposals for future marine life monitoring
  - Ongoing deliberations about where future effort should be allocated (such as those maps and data that are developed through using the Groups feature).
- **Coastal Wetlands:** The Marine Cadastre team is currently working on a new coastal wetlands map. When ready, the team will review it with the OMDT and determine whether it should replace the existing Estuarine Wetlands layer that is based on USFWS data.

Maritime

- **Offshore Wind Ports**: Per an inquiry by the MACO offshore wind work group, the Portal will explore the possibility of creating a map that shows areas where turbines and associated infrastructure will be handled.
- **Evaluation of Port Facilities Maps**: The Portal's Port Facilities (Areas and Points) maps were created in 2013. The team will evaluate these maps to determine whether they need replacement, updates or should be retired.
- **New Submarine Cable Infrastructure and Proposed Actions**: The Portal Team works with private sector developers to create maps showing the alignments of submarine telecom and power cables. New data will be added as data become available. Discussions with developers have also centered on the possibility of adding proposed/draft alignments to bolster public outreach and awareness.
- **Shipwreck Data**: The Shipwreck Density layer will be expanded to cover state waters, including major bays and rivers. The map will be based on data presented in the Wrecks and Obstructions layer/AWOIS database.
- **2021 AIS**: Consistently among the most frequently used data layers on the Portal, the AIS vessel transit count maps should be updated on an annual or semi-annual basis. The team will work with the Marine Cadastre, Northeast and federal agencies to create 2021 annual and monthly maps presented with the Portal's slider/animation feature.
- **USCG Proposed Studies and Areas**: The Portal Team partnered with the Coast Guard to produce several maps in 2021 showing routing measures recommended by multiple Port Access Route Study (PARS) reports. These maps will be updated and replaced as needed to support public outreach and analysis by users.
- **Consolidated Submarine Cables Map**: The Marine Cadastre team has begun work on a new map that would combine the existing NASCA cables layer (last updated 2015), NOAA charted cables layer (2012), and other known maps of cables that have been constructed more recently. The Portal Team will contribute data including its maps showing Mid-Atlantic telecom cables built since 2016 and the Virginia wind energy power cable.
- **Anchorage Areas**: The Marine Cadastre team is in the process of updating its nationwide Anchorage Areas map. The Portal Team will replace its current map with this and retire its Chesapeake Bay anchorages layer (which automatically activates as a companion layer) when it's complete.
- **Aids to Navigation**: Updates are underway to the Marine Cadastre's AtoNs map, which will replace the Portal's current map when complete.
- **Coast Guard Incidents:** The Coast Guard is considering the development of maps for its own GIS site that contain information about incidents such as emergency calls, spills and rescues. The Portal team will monitor for updates and will confer with the OMDT about adding any such data.

- **Ferry Terminals and Routes**: Per the request of users, these two layers produced by the U.S. Department of Transportation will be added.

Oceanography

- **MARACOOS Oceanography**: MARCO signed a memorandum of understanding in 2021 that ensures a continued partnership to create map products for the Portal based on real-time data from MARACOOS. In the fall, the organizations successfully created a slider showing average monthly sea bottom temperatures. The Portal Team and MARACOOS will convene this year to discuss new possibilities for data products.
- **Fronts and NPP**: The Portal houses a collection of seasonal Fronts Probability and Net Primary Productivity maps spanning from 2010 through 2019. These maps will be updated to reflect the most recent seasons available.

Recreation

- **Whale/Dolphin Watch Areas**: Under the auspices of the MACO Non-Consumptive Recreation Work Group, the Portal Team began work in 2021 on a map showing key areas for Mid-Atlantic whale and dolphin watch tours. A meeting was held with tour operators in the fall to gather input on a draft map created with AIS tracks from major vessels. A new version that uses the tracks to create broader watch zones will be created in 2022 in consultation with the operators.
- **SCUBA Diving Areas**: In an effort similar to the whale/dolphin watch mapping effort, the team will engage SCUBA industry stakeholders and the states, and study existing data sources to create a map showing important areas for divers off the Mid-Atlantic Coast.
- **Coastal Recreation Areas**: The team will seek data from the states and NPS for features such as parks, reserves, water trails and boat launches along the coast.

Renewable Energy

- **Wind Areas:** The team will work with BOEM and the states to update the Portal with new and updated federal/state wind lease and planning area boundaries expeditiously to help inform the public on pending issues.
- **Reorganization/Expansion/Project Tracking**: In late 2019, the team began reorganizing its Renewable Energy theme to account for some wind projects graduating from the earliest planning stages to levels where they are permitted, under construction or operational. The availability of more specific information on project specs, such as power cable routes or project envelopes, has prompted

the need for additional data layers. This work will continue in 2020 as more details on Mid-Atlantic projects emerge.
- **Data from Wind Developers:** Offshore wind companies with interests in the Mid-Atlantic have been conducting intensive research on the ocean floor, ocean conditions, marine life and more within potential wind farm areas. The Portal Team will stay engaged with these users and partner with them to load relevant data on the site when available and in consultation with the OMDT.

Seafloor Habitat

- **Regional Bathymetry, Seabed Forms, Soft Sediments by Grain Size:** Through grant support from the Virginia Coastal Zone Management Program, The Nature Conservancy developed a decision support tool to help contextualize siting of wind energy projects and avoid and monitor potential negative environmental impacts of these projects in the Northeast and Mid-Atlantic. As part of the project, the TNC team created updated versions of these three maps which date back to the Portal's inception. The Regional Bathymetry layer remains a top 10 most activated layer each year.

Security

- **Wind Compatibility Assessment**: The Department of Defense has displayed an updated wind compatibility assessment map at public hearings that takes into account the potential impact of turbine heights on air traffic monitoring from land. Inquiries have been made to obtain this data, but it has not yet been released. The team will continue to work with DoD to obtain clearance to post this map.
- **Danger Zones & Restricted Areas**: The Marine Cadastre team is in the early stages of reviewing this map for potential updates or changes. The Portal team will monitor its development and incorporate it when ready.
- **Security Data**: The team will continue to maintain and update its security map layers as needed in consultation with the Navy/Department of Defense and Marine Cadastre.

Socioeconomic

- **Blue Economy:** MARCO commissioned Charles Colgan of the Center for the Blue Economy at the Middlebury Institute of Monterrey to conduct an economic analysis report for the region last year. It is anticipated that the report will produce maps related to the ocean's economic importance that can be incorporated into the Portal.
- **eNow:** The NOAA eNOW-based Ocean Economics GDP map on the Portal may be updated in the near future to include the latest Census data.

Water Quality

- **Wastewater Outfalls:** The Marine Cadastre team is in the process of creating a new map layer showing the locations of wastewater outfalls, pipes and facilities along the coast. When complete, this map will replace the Offshore Discharge layer, which was created by Rutgers in 2012 and may be out of date.
- **Updated Acidification Data**: The team will work to meet MACAN's needs as it continues to deliver map data related to the development of a coastal and ocean acidification monitoring network in the Mid-Atlantic.
- **Harmful Algal Blooms:** Users have expressed interest in seeing maps depicting harmful algal blooms or other marine stressors added to Marine Planner. The availability of products available via federal or other sources will be investigated for inclusion.
- **MARCO Marine Debris/Balloon Litter:** The existing maps showing the volume of litter recovered during MARCO-initiated beach sweeps will be updated to include statistics from 2022 cleanups.

Part II: IT Support and Application Development

Tech Support and Maintenance

The Portal's maintenance and software management needs are handled by Ecotrust, of Portland, Oregon. Ecotrust participates in the Portal Technical Team's bi-weekly calls and other meetings as necessary to keep the team up to date with project status, plan and discuss strategies, lend expertise when appropriate, and stay informed of issues identified by both the team and users. Ecotrust is on call throughout the week as the first line of defense in the event of site outages; problems with the site's Open Layers, Django and Wagtail software; or other technical issues that arise. This work includes dealing with identified priority bugs, shortcomings in the user interface or user experience for both general users and administrators, performance issues, and site uptime.

Ecotrust is also the lead for planned system upgrades and maintenance. Taking advantage of its West Coast location, the staff often handles significant system work at times that are after hours in the Mid-Atlantic, ensuring the least level of disruption to users. In the year ahead, Ecotrust and the Portal Team will also work together to maintain the Mid-Atlantic Ocean Data Portal Management Guide, which serves as the manual for making changes and additions to the Portal through Wagtail and Django. As the developer for the West Coast Ocean Data Portal, Ecotrust also fosters collaboration between the two teams, including the sharing of coding and best practices that can enhance each site and yield cost efficiencies.

Upgraded Tools and Capabilities

Several long-awaited functional upgrades came to fruition last year after the outdated version of the Portal's OpenLayers technology stack was replaced by the most current version. Following significant testing and bug fixes, the Portal's Staging and Productions servers were decoupled, the ability to ingest feature services from sites such as the Marine Cadastre was coded in, and new privacy options were introduced for Groups users. The more secure and modern back end will unlock new possibilities on the tool creation and site administration sides in 2022. Several of the enhancements listed in this section were made possible as a result of this transition. They are ranked in priority levels that were set based on input from users and OMDT members.

The Portal Team has conducted numerous training sessions with state and federal agency staff, consultants, educators, NGOs and others in recent years and solicited the

participants' input on improvements/changes they'd like to see made to the site. Team members also spend a significant amount of time presenting at conferences, responding to inquiries, and engaging stakeholders in the identification of data or functionality needs. Based on these trainings and discussions, as well as consultations with Ecotrust, we have compiled the following list of enhancements to be considered in 2022 based on funding levels. The list includes "Planned Improvements" that the team anticipates can be implemented at current funding levels and "Additional Improvements" which may be possible in the event new funding becomes available. As is the case with the data priorities in Section 1, these targets may change based on the needs that arise over the course of the year.

PLANNED IMPROVEMENTS

Improved Search Tool

The Portal's current search tool logic, not updated since the site's relaunch in 2015, will be enhanced to generate more thorough results, including from the Data Catalog pages

Feature Service Possibilities

With the Portal now able to ingest feature services, the developer will explore potential options for taking advantage of these more dynamic data streams, such as the ability for administrators to alter the appearance of maps without re-hosting the data.

Django Admin 'Smart Layer Input' Upgrades

Upgrades will be pursued for modernizing the forms used by administrators for incorporating map data to enable options such as easier transfers of layers between the Staging and Production sites and greater flexibility for controlling the attributes which show when users click on screen for pop-ups.

Edit Bookmarks

Users can currently edit saved Drawings but not bookmarked maps.

Ability to Import KMLs and Shapefiles

The developer will explore the feasibility and security risks associated with providing users a method for importing or overlaying KML files or Shapefiles in Marine Planner.

Improved WMST (Time) Slider Logic

Improved speed, reduced load for adding sliders/animations based on WMST technology to the map.

ADDITIONAL IMPROVEMENTS

New Ocean Story Layout Options

Identify upgrades to create more dynamic/compelling Ocean Stories. This may include switching to a vertical map split, control over how much of the screen is occupied by the map, and offering new widgets for inserting content, data, and other media. Additional upgrades may include Active Tab buttons that link map layers to related Ocean Stories.

Improved Printing Support

When using the print button on Marine Planner, the legend currently cuts off at the bottom of the page if there are too many items to fit in the box.

User-Defined Cartography

Users would be able to define and apply fill and stroke colors to their MyPlanner drawings. These style choices could then be captured in bookmarks to be shared. With further effort additional enhancements could be made, including generating an updated legend based on user styles or identifying Portal-provided layers that users could also apply custom styles to.

Design Updates

Overhaul of look/feel of Portal styles/layouts, including to make more mobile friendly.

Organize Shared MyPlanner Contents by Group

Bookmarks and Drawings currently list in alphabetical order in Groups and MyPlanner. Registered users would be able to view their contents organized under the group(s) they belong to.

Layers Appear in Data Catalog Alongside their "Companions"

Currently companion layers are not available via the Data Catalog unless they also serve as independent layers, associated with a visible category. This upgrade would allow "companion-only" layers to appear beside their associated layers under those layers' categories. This will Include a checkbox for administrators to choose if they want this behavior on any given layer.

Improved Admin Form for Managing WMST (Time) Layers

The current WMST form identifies what values are available for the time field, but lists them as very verbose and difficult to understand timestamps. This upgrade would replace this with an optional drop-down box using human-readable options.

Tutorial Tab Tool

A button on the bottom of the Marine Planner screen would launch a window that provides users a quick start guide for key capabilities.

Expanded Basemap Options

This may include more pre-defined options beyond those currently offered, supporting user-defined external sources or even allowing users to apply their own styling to OpenStreetMap data.

Layer Load Status

For layers that have long load times (such as data sliders), Marine Planner would display the load status percentage. (Currently shows spinning wheel)

Zoom Level Warning

Address when user's zoom is not within valid zoom levels for activated layers.

Server Password Bypass

Enable the Staging and Sandbox sites to ingest password-blocked layers from test servers (for example, MDAT or Northeast Portal).

Password Blocked Layers

Enable administrators to block draft map layers on Portal servers with passwords.

Realtime Data Support

Implement capacity to display live data from buoys, vessels, etc. as needed

Portal Reports

Identify key issues and incorporate existent data sources so that user drawings could run some spatial analyses and report additional metrics. Currently, polygons report area, lines report length and points report coordinates.

Quality Assurance/Control

When map layers or Portal contents are edited by administrators, keep detailed records on what was changed, when, and by whom. Allow changes to be previewed and reviewed by other administrators prior to being published on the portal.

Automated Data Catalog

Move from a 100% manual custom-built data catalog to an automated catalog system that regularly scans and harvests records from trusted GIS data sources for available layers.

Smart Layer Record Entry

Improved data management process: as administrators configure layers the form will reconfigure and pre-populate itself as much as possible to streamline the process and reduce potential for error.

Part III: Data Production and Systems Administration

The Grant F. Walton Center for Remote Sensing and Spatial Analysis (CRSSA), Rutgers University, has been on the Portal Team since its inception, and continues to provide support for the site's operations through data development/management, IT/web services/server management, technical operations and advisory roles. The following outlines CRSSA's roles and responsibilities during 2021 and projected for the 2022 time period.

Data Production and Management

CRSSA's geographic information systems (GIS) database development and management for the Portal, can be categorized into the following: 1) in-house data production; 2) management of in-house published web services and their source GIS data; 3) external/existing web service preparation for Portal integration, 4) publishing data layers to the Portal viewer and data catalog, and 5) enhanced visualization/slider.

In-House Data Production

CRSSA actively participates on the Technical Team, working in coordination with team members to develop data development actions to meet Portal goals as identified by the OMDT and approved by MARCO. When these targeted data sets are not available through existing authoritative sources or in web service format from the data originator, CRSSA has developed, processed, and published these data sets in-house in coordination with the Technical Team and data sources.

Examples of in-house data publishing activities in 2021 include Artificial Reefs: New York Proposed Expansions and New Sites layer in cooperation with the New York State Department of Environmental Conservation (NYSDEC), Marine Debris Balloon Monitoring Survey locations data collected by the participating MARCO states in coordination with the marine debris working group, and various layers in support of the Indigenous Nations, Communities & Cultures data. Also, the Portal continued its coordination with the U.S. Coast Guard by publishing USCG-supplied GIS data of Proposed Anchorage Areas and Port Access Route Studies (PARS) in support of public comment periods for Federal Register announcements. The Nature Conservancy (TNC) also worked with the Portal Team in 2021 to publish Marine Mammal Strandings locational point data originally supplied by NOAA's Marine Mammal Strandings Program (currently in draft review as of this writing) as well as updates to existing benthic data maps.

CRSSA will continue to publish these types of data in 2022 in coordination with Portal partners for various Portal themes and efforts.

The above geospatial datasets are developed and prepared for visualization through cartographic representation in geographic information systems software (Esri ArcGIS is utilized by the CRSSA team). Other production tasks include the composition and/or assembly of data layer descriptions and metadata documentation, reviewed by the source organization for completeness and presentation.

Management of In-house Published Web Services and GIS data

These in-house produced data are then published to web services utilizing ESRI's ArcServer application so the data can be ingested into the Portal. Web services published to the Portal server, along with their associated GIS data, are managed, maintained and updated by CRSSA. From the source data to the published services, these data are inventoried for the purpose of both an active or longer term/legacy database, as well as primarily to revise in-house published data when necessary as identified by the Technical Team. In 2022, this inventory will continue with planned data activities.

External/Existing Web Service Preparation for Integration

In addition to in-house produced and hosted data, external web services are a vital data source for the Portal. CRSSA works with the Technical Team in evaluating these services for integration and display as needed. There are a variety of external web services sources visualized on the Portal, primarily, as of 2022, from federal (e.g. NOAA and BOEM), university (e.g. Duke University), and from the Northeast Ocean Data Portal. As with in-house data production, ancillary information such as data layer descriptions, metadata documentation, and data source links are assembled.

For bulk imports of large sets of external web services (e.g. Marine Life Library), Ecotrust has developed codes/scripts to facilitate this import process. CRSSA and the Technical Team works with Ecotrust during this process to assist as needed. An example of previous efforts is the import of Duke University's Marine Life Library, and subsequent updates into the Portal (2019, 2020, 2021).

Publishing Data Layers to the Portal Viewer and Data Catalog

For both in-house and external web services to be integrated into the Portal viewer and data catalog, the data layers must be prepared for visualization on the Portal platform. As of 2022, CRSSA is primarily responsible for this role utilizing the web interface administrative tool developed and actively maintained by Ecotrust. Entries to be populated include the web service links, data descriptions, source/originator links, and other associated text. All work is currently performed on the Portal 'Staging' or 'Sandbox' working sites for data review before being pushed to the public Portal

application. Staging is the primary and final location for data review. Once approved, these data and metadata appear in the Portal viewer and data catalog, respectively.

Sliders and Animations

The Portal's slider and animation tool is a feature that enables the user to easily click, follow, activate, and control layers in the Viewer's Active tab. The team will continue to apply this capability to temporal datasets in 2022, including the AIS 2021 Monthly Transit Count maps for each vessel class (All Vessels, Cargo, Passenger, Tanker, Tug/Tow, Pleasure Craft/Sailing, Fishing, and Other).

CRSSA activities in 2021 included the creation of the following sliders: AIS 2020 Monthly Transit Counts, the 2015, 2016, and 2017 Percent Seabed Habitat Disturbance Monthly Data Sliders, and the MARACOOS Bottom Temperature Monthly Slider.

Systems Administration/Server

CRSSA maintains an ESRI ArcGIS Server on the Rutgers University network for in-house published web services and GIS data. The web services are published using ArcGIS Server's map service capabilities, which allows maps, features, and attribute data to be available inside many types of client applications.

There has been a trend to start making GIS data available as feature services, which allow for editing of GIS data and the ability to manipulate layer symbology and attributes. Some federal and state agencies have begun to publish select data in this format. To utilize those data, Ecotrust has added the capability for the Portal to ingest feature services for display and use. In 2021, the Portal was able to display BOEM Renewable Energy feature services which were previously published in-house using available downloadable data. Additionally, CRSSA upgraded its server capabilities in 2021, and may start to provide feature service access to specific GIS layers based on stakeholder feedback.

CRSSA collaborates with Ecotrust to continually improve the capabilities of both the front- and back-end of the Portal application. For their part, Ecotrust actively responds and acts to improve the Portal's administrative tool under their scope of work for the Portal Project, as well as other customized and rapid tool fixes as needed.

Coordination/Planning Calls

Much of the work described throughout this document is coordinated through bi-weekly Portal Technical Team calls, as well as regular interaction via email and calls as needed. The team also helps MARCO's Ocean Mapping Data Team (OMDT) Leader coordinate quarterly calls with state and federal partner members of the OMDT. Members of the Portal Team also hold a monthly call with their counterparts from the Northeast Portal and the Marine Cadastre to discuss matters of shared interest. Portal

team members collaborate in producing the agendas, notes and minutes for the Tech Team and OMDT calls, and expect to continue these interactions in 2022.

Part IV: Communications and Outreach

The COVID-19 pandemic has been disruptive in terms of eliminating opportunities for in-person demonstrations at conferences, kiosks at public events and trainings for agency staffs. Yet throughout 2022, the Portal Team was highly active in its communications work, delivering dozens of online trainings and presentations via virtual platforms. Although the pandemic appears to be on the wane, it is anticipated that engagements will remain predominantly virtual for at least the first half of 2022. The feedback generated through the use of the Portal in these engagements will continue to play an important role in guiding data development and releases this year and beyond. The Portal team will work with partners at the federal, regional, and state level to communicate and engage with the stakeholders and communities across the Mid-Atlantic.

Training Sessions and External Engagement

The Portal's training sessions have been effective both in building a community of practitioners and collecting feedback/observations that help the team plan and prioritize improvements. The team will continue to accommodate these requests, whether online or in person, as time, resources and safety considerations permit.

Portal Team members will work with the states, Ocean Mapping Data Team (OMDT), federal agency partners, and regional partners such as MARACOOS to identify opportunities to show the Portal at conferences and events, with possible examples to include:

- The 2022 Mid-Atlantic Ocean Forum, to be held virtually in the spring
- Delaware Coast Day, annually held in Lewes in the fall, and the N.J. Sea Grant Consortium's Ocean Fun Days, held at Sandy Hook in the summer (both depending on state of pandemic)
- Wildlife Conservation Society training for NYC school teachers, typically held in spring or summer

The team will seek to have a presence at state or agency meetings related to ongoing management or regulatory actions, especially those that are using the Portal. Finally, opportunities will be sought to place team members on panels that can reach strategically important new user groups and enter the Portal for notable awards.

Webinars

The Portal's "How Tuesday" series and topical webinars with partners have been successful vehicles for instructing practitioners and engaging new users. These sessions can offer beginner-focused overviews of the site or specialized sessions about new features and products geared toward industry sectors, governments, working groups. Recordings are posted to the Webinars page, Portal Blog and in some cases, the How to Use the Portal's Tools page, where they serve as educational resources for those who couldn't attend.

Webinar topics frequently revolve around the release of new data and tools. The Portal may offer these and other webinars TBD in 2022:

- A "Portal 101" session for users of all levels
- A How Tuesday focused new tribal data with guest speaker(s) from Native Land Digital
- Fishing data webinars timed with the rollout of products created through the MARCO/NROC/RODA collaboration
- Webinars for other high priority data updates identified in this work plan
- A follow-up webinar with Coast Guard personnel on actions/data related to PARS and proposed anchorages

Portal Blog

The News page (portal.midatlanticocean.org/news/), commonly known as the "Portal blog," is a key tool for keeping audiences engaged and informed. Content produced in this section also significantly improves the site's overall search engine visibility. As a matter of practice, all significant data additions, new/improved tools or other important developments are promptly reported in this section.

Typical topics include announcements and instructional guidance for new data and tools; MARCO news with Portal implications; a dedicated page with links to press releases from partner agencies (states, NOAA, BOEM, et al) related to ocean planning; recordings of How Tuesday webinars; links to news articles about Portal; stakeholder profiles and other articles relevant to audience.

Ocean Stories

Part story map platform and part digital magazine, the Ocean Stories section is a unique public outreach tool for the Portal. The stories and their signature scrolling data map feature have been effective for reaching non-traditional users, such as K-12 students and professionals in the industries that are profiled. The Portal's migration to OpenLayers 6 (discussed in Part II) may open the doors to dynamic new layout options that will make this feature more engaging for users.

The team will pursue story topics that fill gaps in terms of unrepresented users, highlight new data products and promote case studies showing people who have used the Portal to solve problems or aid decisions, and seek unique story angles that can provide human dimensions to map data. Stories that may be produced in 2021 include, but are not limited to:

- **DEIJ Features**: To further progress on the Diversity, Equity, Inclusion and Justice goals established by the Mid-Atlantic Committee on the Ocean (MACO) and MARCO, efforts will be made to identify stories featuring BIPOC ocean users and influential figures.

- **Historic Tribes of the Mid-Atlantic**: Taking advantage of the new maps produced by Native Land Digital, this story would provide a historic tour of the peoples who once lived in the coastal areas of the MARCO states.

- **Hudson Canyon Feature**: A team member will seek opportunities to ride along on a party boat trip to one of the East Coast's legendary fishing spots, interviewing the captain and passengers (depending on pandemic/safety considerations and travel funding availability).

Older Ocean Stories will be maintained and edited to include updated information and new layers that help tell the story as they become available.

Twitter and E-List Blasts

With over 700 followers, the Portal's Twitter account is used to promote new features, upcoming webinars, events with Portal Team presence and respond to questions from users. Tweets from the Portal account garnered 60,000 impressions in 2021. The account is monitored daily and used strategically to tie messages to larger conversations through the use of trending hashtags.

In 2021, the Portal's mail list was migrated to MARCO's Constant Contact account as a cost-saving measure. The team produces electronic newsletters on an approximately quarterly basis to registered users and other subscribers. These email blasts are one of the Portal's most effective means for sharing details about upcoming webinars, links to blog posts about new data, MARCO ocean planning events and more. The communications lead will maintain the e-list, add new registered Portal users and those who provide contact information (via sign-up sheets at Portal kiosks, etc.) on a rolling basis.

Page Improvements and Maintenance

In addition the activities outlined above, the communications lead will conduct general maintenance of the site's editorial content and pages. Typical tasks include:

- Regular additions to the Calendar page with Portal/MARCO events and other events relevant to Portal community.
- Keep informational pages such as Data Catalog and Needs & Priorities up to date as new Portal products come online.
- Periodically add content to Case Studies page, including fact sheets, Ocean Stories, etc. that demonstrate how the Portal has been used to assist work and solve problems.
- Evaluate needs for new pages and site organizational changes.

Portal Instructional Resources

A frequent piece of feedback from in-person training sessions is how useful the [How to use the Portal's tools](#) page is for those who need a quick primer on performing a task or locating data. This page must be updated continually with new instructional content about the latest data and tools and to account for old assets that become outdated.

The team will produce videos, written guidance, diagrams, fact sheets, and other appropriate resources geared toward instructing people to use the portal. An emphasis will be placed and making these materials simple enough for any lay user to follow.

Other Miscellaneous Tasks

- Fielding questions from the public submitted through the Portal's online form and email account, portal@midatlanticocean.org.
- Troubleshooting calls and share-screen sessions with users as needed.
- Development and editing of content on the MARCO website related to the Portal and ocean planning.
- Staffing Portal kiosks at MARCO events and other conferences.

Analytics

The Portal's traffic on Google Analytics will be monitored for trends and spikes in use that may inform the team's work. The following page contains some Google Analytics figures summarizing traffic on the Portal for the one-year period running from November 1, 2020, through October 31, 2021.

Top Layers of 2021
November 1, 2020-October 31, 2021
(Source: Google Analytics)

1. BOEM Active Renewable Energy Lease Areas
2. BOEM Active Renewable Energy Leases
3. Artificial Reefs
4. BOEM Wind Planning Areas (3/29/2021)
5. BOEM Active Renewable Energy Lease Areas by Lease Number and Company
6. BOEM NY Bight Proposed Wind Energy Areas for 2021 Lease Sale
7. BOEM NY Bight Proposed Transit Corridors (2.44 nautical mile width)
8. Unsurveyed area (avian, annual)
9. Regional Bathymetry
10. Offshore Wind Energy Technology Zones
11. South Fork Wind Farm Proposed Cable Route
12. Danger Zones & Restricted Areas
13. Party & Charter Boat
14. Wrecks and Obstructions
15. All Vessel Transit Counts (2019)
16. BOEM Wind Planning Areas
17. Virginia Research Lease Areas
18. Routing Measures
19. Submarine Canyons
20. Anchorage Areas
21. Scallop 2015-2016 (<5 knots)
22. Anchorage Areas - Lower Chesapeake Bay Anchorages (6/29/2020)
23. Essential Fish Habitats
24. NCEI Topographic and Bathymetric Mosaic
25. Surfclam/Ocean Quahog 2015-2016 (<4 knots)