MARCO

MID-ATLANTIC OCEAN DATA PORTAL

RESOURCES FOR
REGIONAL OCEAN PLANNING

2020 Work Plan

UPDATED MARCH 2020

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Introduction

This document provides an overview of anticipated work to be conducted by members of the Mid-Atlantic Ocean Data Portal development team (Portal Team) in 2020. It assumes funding and staffing at current levels and reflects data priorities and expected updates and maintenance schedules that will likely need to be continued beyond the calendar year. The plan covers a broad range of priorities ranging from map data additions to functional improvements to stakeholder engagement activities.

This work plan also includes the recently funded commercial fisheries data project that is being conducted by the Mid-Atlantic Regional Council on the Ocean (MARCO) and the Northeast Regional Ocean Council (NROC). Per the federal budget enacted by Congress for fiscal year 2019, the National Oceanic and Atmospheric Administration (NOAA) is providing approximately $135,000 to MARCO and similar funding to eight other regions throughout the U.S. to improve regional data sharing efforts. MARCO is pooling its funding with NROC and collaborating with the fishing industry to develop updated fisheries data products for the North Atlantic, which will be available via both the Mid-Atlantic and Northeast Ocean Data Portals.

While this document provides a roadmap for 2020 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 creation of new wind areas), 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 Portal Team currently consists of:

- John Bognar, Rutgers University Center for Remote Sensing and Spatial Analysis
- Ryan Hodges, Ecotrust (developer)
- Richard Lathrop, Rutgers University Center for Remote Sensing and Spatial Analysis
- Tony MacDonald, Monmouth University Urban Coast Institute
- Nick Napoli, MARCO (Portal Team lead)
- Jim Trimble, Rutgers University Center for Remote Sensing and Spatial Analysis
- Karl Vilacoba, Monmouth University Urban Coast Institute (project manager and communications lead)

Part I: Data Priorities

Outlook for 2020: A major emphasis of 2020 work activities will be the improvement of the Portal's fishing data. The most recent Vessel Monitoring System (VMS) data covers 2016 and Vessel Trip Report (VTR)/Communities at Sea data covers 2015. The most current fishing data on the Portal is the 2017 Automatic Identification System (AIS) fishing vessel transit counts. The Mid-Atlantic and Northeast Ocean Data Portal teams will pool matching $135,000 federal grants in an effort to produce new commercial fishing data that can help inform analysis on compatibilities/conflicts with offshore development. The funding will allow MARCO and 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 will solicit feedback on a number of existing and proposed fisheries data products and will understand what new products need to be developed in order to better represent fishing activity.

One of the most popular upgrades of 2019 was the creation of a long-discussed slider and animation tool, which has improved the user experience for viewing time series maps. The tool debuted as part of the release of the 2016 and 2017 monthly AIS vessel transit count datasets, and was later used to create shifting fish species maps and other draft products on the Staging site. The Portal Team will continue applying this feature to new and existing map data and will treat the creation of monthly sliders as a standard step in the rollout of future AIS maps.

The following is an overview of planned data additions and enhancements in the year ahead. "External Dependencies" 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.

2020 DATA PRIORITIES AT A GLANCE

Theme	Layers	External Dependencies	Update Frequency
Administrative	1. CZM Boundary 2. US Coast Guard sectors 3. Congressional Districts 4. Review of federal data providers for additional options	1. MC service 2. USCG, NE Portal service 3. TBD 4. MC/BOEM/others TBD	1. Automatic update via MC services 2-3. TBD 4. Annual
Fishing	1. VMS updates 2. VTR updates 3. Communities at Sea/VTR animations 4. Management areas update 5. Charter/party boat VTRs 6. Lobster/shrimp VTRs 7. Other fisheries data – as identified through stakeholder and regional input in partnership with NROC and RODA	1. NOAA/NMFS 2. NOAA/NMFS 3. None, if 2015 or earlier 4. NOAA/NMFS 5. NOAA/NMFS 6. NOAA/NMFS 7. Likely NOAA/NMFS; possibly state fishery agencies and MAFMC	1. Preferably annually; at least very two years 2. 3-5 years 3. 3-5 years 4. As designations change 5.TBD 6. TBD 7. TBD
Marine Life	1. Fish Shifting species products created through VACZM/TNC contract effort 2. Aquaculture 3. Northeast Regional Fish Habitat Assessment 4. Marine life sliders/animations 5. MDAT marine mammal, fish, bird updates 6. Sea turtle, migratory birds, and other marine life tracking data 7. Canyon coral data 8. Marine mammal strandings 9. Marine mammal, benthic habitat, and pelagic habitat data in the context of wind energy development	1. NOAA/NMFS – NEFSC 2. States 3. NOAA/Monmouth steering committee effort 4-5. Duke/MDAT 6. NEFSC/USFWS/BOEM via NE Portal service; additional datasets TBD 7. MARCO/NOAA (Tim Shank) 8. States/NGOs/TBD 9. The Nature Conservancy	1. Decadal 2. 1-2 years 3. TBD 4-5. 3-5 years 6. TBD 7. N/A 8. TBD 9. TBD
Maritime	1. Federal + state sand presence 2. New submarine cable infrastructure and proposed actions 3. Revised shipwreck density map 4. Offshore discharge flow/outfall positions update	1. BOEM/MMIS 2. Data from developers (Subcom, et. al) 3. NOAA 4. MC/EPA 5. USCG, MC 6. USCG 7. USACE/BOEM/TBD	1. BOEM service 2. ongoing 3. 3-5 years 4. 3-5 years 5. 1-2 years 6. Ongoing 7. TBD

	5. AIS annual data updates and monthly sliders; investigate draft requirements data 6. USCG proposed actions 7. Beneficial sediment reuse 8. Evaluate options for regional marine debris data 9. Safety and security zones	8. TBD 9. USCG	8. TBD 9. TBD
Oceanography	1. Updated ocean acidification data 2. MARACOOS oceanography layers (currents, etc) 3. Fronts/NPP updates 4. Fronts/NPP sliders (through time and new summary products) 5. Historical paths of hurricanes/trop storms 6. Evaluation of options for harmful algal bloom/marine stressors data	1. MACAN 2. MARACOOS 3. None 4. None 5. NOAA/TBD 6. NOAA/TBD	1. Ongoing 2. 1-2 years 3. Annual 4. 1-2 years 5. TBD 6. TBD
Recreation	1. New products derived from AIS data (e.g. whale watching, SCUBA, fishing)	1. USCG, MC	1. 1-2 years
Renewable Energy	1. Updated federal and state offshore wind lease and wind energy area boundaries 2. New layers and reorganization of theme to reflect advancement of projects (permitting, construction, design of power cable routes, etc.)	1. BOEM/MC and state partners 2. BOEM/MC/states	1. Ongoing 2. Ongoing
Security	1. Naval offshore wind compatibility assessment update 2. Maintenance of existing layers and additions in consultation with Navy	1. DOD 2. Navy	1. As areas change 2. Ongoing
Socioeconomic	1. Updated ocean economics/ENOW data	1. NOAA	1. 3-5 years
Basemaps	1. Greyscale basemap and evaluation of additional options	1. None	1. 3-5 years

Administrative

- **CZM Boundaries** and **Coast Guard Sectors**: These maps have been discussed as useful additions for ocean planning purposes. A Marine Cadastre (MC) service for the CZM layer has been added to the Staging site and will be reviewed with the states before moving to the live site. The team will incorporate a service from the Northeast that shows the Coast Guard Sectors.
- **Congressional Districts**: A federal service was briefly added in 2019, but a closer examination determined it to be out of date. Options will be explored for a service that is kept current to reflect the latest election results.
- **Federal data options**: A sweep of prominent federal map data providers (e.g. Marine Cadastre, MMIS, NOAA Digital Coast) will be conducted to seek any layers that could add value to the Portal. This step was taken in early 2019 and led to the addition of popular layers like the U.S. Historic Lighthouses, Wrecks & Obstructions, and NCEI bathymetry maps.

Fishing

- **Vessel Monitoring System**: The most current VMS fishing layers summarize activity for a two-year period running from 2015-16. As summarized above, through the Portal's federally-funded collaboration with NROC and RODA, work will focus on adding products reflecting fishing activity in the most current years possible. Dependent on feedback from the industry, new products are likely to be created using VMS as well as existing products will be updated with current years.
- **Communities at Sea/VTR**: The Portal's Vessel Trip Report (VTR) data, or Communities at Sea maps, show areas with the highest concentrations of fishing activity by gear type (including by individual ports) for several time intervals. The most current maps cover the 2011-15 timeframe. These data may be updated with recent years or new maps using VTR data will be developed based on feedback from the fishing industry as part of the joint project with NROC and RODA.
- **Communities at Sea Animations**: With the completion of a time slider tool, work will focus on applying the capability to the CAS data to show changes over time. Users would be able to compare how fishing by gear type has evolved from the 1996-2000 period through 2011-15.
- **Management areas update**: The team will consult NMFS regional office, fishery management councils, and others to ensure the current layers are up to date and replace/retire them as needed.
- **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. Users can click individual ports for summaries of how many trips emanated from the site, the number of customers/fishers, and

more. The team will seek feedback from the industry as part of the joint project with NROC and RODA and publish the data, if appropriate. Recreational fishing data are a major need, as the current Recreational Fishing map, consistently among the Portal's top 20 most activated, summarizes data from 2000-2009.

- **Lobster/Shrimp VTRs**: Draft VTR/Communities at Sea maps showing lobster and shrimp fishing reported via VTRs in the Mid-Atlantic and Northeast will be reviewed with the fishing industry. Based on industry input, additional data will be considered for these fisheries, including data collected at the state level.
- **Other Fisheries Data**: Through the federally-funded partnership with NROC and RODA, outreach will be conducted with fishing stakeholders to determine potential new fishing products/data sources to supplement or replace those outlined above. Some new products may be developed in 2020. It's likely the project will result in data products that will take much longer to develop.

Marine Life

- **Fish Shifting Species**: In 2019, Virginia CZM Program contracted with The Nature Conservancy to develop a set of maps that indicate the habitat shifts of fish in the Mid-Atlantic and Northeast. Drafts were completed in late 2019 and will be published early this year.
- **Aquaculture**: A set of state-by-state maps depicting areas with aquaculture activities will be created in collaboration with each state.
- **Northeast Regional Fish Habitat Assessment**: NOAA Fisheries and Monmouth University recently commenced work on a research project that will develop habitat use models for a diverse group of commercially and ecologically important fish species across the Northeast and Mid-Atlantic continental shelf.
- **Marine Life Sliders**: Many datasets created through the MDAT effort (marine mammals, birds and fish) depict distributions by seasons or months. The team will explore the feasibility of applying the slider tool to these datasets, enabling users to view them as animations or easily toggle through them.
- **Sea Turtle and Migratory Bird Data**: The Northeast Portal Team is currently working with the U.S. Fish & Wildlife Service and the NEFSC to develop map products based on those agencies sea turtle and migratory bird tracking data. Since these products span both the Northeast and Mid-Atlantic regions, they will be added to the Portal when ready. Additional efforts to incorporate tracking and telemetry data products into the Portal will be considered.
- **Canyon Corals**: The team is awaiting the delivery of data from NOAA's Tim Shank showing the location of coral species observed in Mid-Atlantic canyons during a recent expedition. Once received, the data will be evaluated for the feasibility of creating a regional map layer.
- **MDAT Fish/Marine Bird/Marine Mammal Distribution Products**: These datasets produced by the Marine Life Data and Analysis Team (MDAT) cover

long time periods, but must be updated on an approximately 3-5 year basis to ensure their accuracy.

- **Marine Mammal Strandings:** Team will investigate options for creating map products visualizing data (i.e. concentrations of animals located by species, timeframes) collected by marine mammal stranding organizations and agencies.
- **Marine Mammal, Benthic Habitat, and Pelagic Habitat Data:** Through grants from the Gordon and Betty Moore Foundation and the Virginia Coastal Zone Management Program, The Nature Conservancy is developing a peer-reviewed 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. This tool will include updated marine mammal, benthic habitat, and pelagic habitat data and these datasets will be added to the Portal where appropriate and feasible.

Maritime

- **Sand Borrow Sites**: BOEM launched a Marine Minerals Information System last year containing dozens of map layers related to offshore sediments. The Portal ingested a handful of data layers from MMIS in early 2019; the Sand Resources layer showing areas in state and federal waters where there is a likelihood that some usable sand resource exists will be added this year, along with any others identified as useful for ocean planning.
- **Submarine Cables**: In 2019, the Portal partnered with private sector developers to create a map showing the locations of submarine cables built since 2016 (the last year the federal NASCA layer was updated). Additional lines will be added as data becomes available. In an effort to improve public awareness and outreach, the team is also in discussions with developers about adding data for proposed lines.
- **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, which was added from Marine Cadastre last year.
- **Offshore Discharge**: The Marine Cadastre team is in the process of creating a new map layer showing points where wastewater is discharged offshore. When complete, this map will replace the Offshore Discharge layer, which was created by CRSSA in 2012 and may be out of date.
- **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 ensure AIS maps are regularly updated with both annual maps and monthly maps presented with the new slider/animation feature. Team will also investigate whether vessel draft info can be derived from data.

- **USCG Proposed Actions**: The Coast Guard has expressed interest in using the Portal as a stakeholder outreach tool for proposed actions. The team worked with the agency to produce layers showing proposed new anchorage areas and study areas for active Port Access Route Studies (PARS). Collaboration will continue this year.
- **Beneficial Sediment Reuse**: Options will be evaluated for regional data showing areas where dredged materials can be reused for beach nourishment and coastal protection projects.
- **Marine Debris**: Options will be evaluated for regional data depicting marine debris concentration issues.
- **Safety & Security Zones**: The Coast Guard has expressed interest in developing a new map showing maritime Safety & Security zones as designated by USCG. The Portal Team will work with USCG to determine the best options for developing and maintaining this map.

Oceanography

- **Updated Acidification Data**: The team will work with MACAN as it continues to deliver map data related to coastal and ocean acidification in the Mid-Atlantic. There are currently seven Acidification Monitoring Locations maps in Marine Planner.
- **MARACOOS Oceanography**: The Portal Team and MARACOOS successfully partnered last year to produce monthly slider maps showing average sea surface temperatures along the East Coast. The collaboration will continue this year to create new long-term data layers, including seasonal currents, that summarize MARACOOS' real-time data. Team will evaluate whether options exist for maps showing changes in SST over time.
- **Fronts and NPP**: The Portal houses a collection of seasonal Fronts Probability and Net Primary Productivity maps spanning from 2010 through 2019. Users have requested that layers showing averages for each season be produced and the slider/animation tool will be applied to the maps to provide a glimpse at how these processes change over time.
- **Coastal Storm Paths**: Users have expressed interest in seeing maps depicting historical paths of hurricanes and tropical storms added to Marine Planner. Existing products available via NOAA will be evaluated for inclusion.
- **Harmful Algal Blooms**: Users have expressed interest in seeing maps depicting harmful algal blooms or other marine stressors added to Marine Planner. Existing products available via NOAA will be evaluated for inclusion.

Recreation

- **Recreational Data**: The team will explore options for further breaking down AIS vessel transit count data into new categories that represent recreational activities (e.g. whale watching cruises, SCUBA trips, sightseeing tours).

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.

Security

- **Wind Compatibility Assessment**: The Department of Defense has displayed a new wind compatibility assessment map at BOEM hearings that takes into account the potential impact of turbine heights on air traffic monitoring from land. The team will work with its federal partners to obtain clearance to post this map.
- **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 MC.

Socioeconomic

- **ENOW Updates:** The Portal's Ocean Economics GDP layer is based on NOAA ENOW Explorer from 2016. This layer will be updated with more recent data when available.

Basemaps

- **Greyscale Option**: A greyscale basemap will be added to the list of options. The team will also explore other basemaps for inclusion in the portal.

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 these 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.

Upgraded Tools and Capabilities

The coming year presents a rare opportunity to modernize the Portal's outdated technology stack. Marine Planner is currently built on OpenLayers 2, a version of the open source system that was last upgraded in 2013. The Portal Team has sought to upgrade to a newer version since 2016, but the move has been cost-prohibitive.

Ecotrust was recently contracted by the West Coast Portal Team to upgrade its equivalent of Marine Planner, which was also built on an old OpenLayers version. The West Coast Portal Team has agreed to share the coding necessary for that transition, via Ecotrust, with the Mid-Atlantic Team in exchange for some of the custom coding produced for the Mid-Atlantic Portal in recent years. This arrangement would reduce the cost of updating the Portal from a figure in the $100,000-$150,000 range to the ~$20,000 range – a savings of perhaps 80-90 percent. In addition to improving the site's performance and security, the newer version of OpenLayers would unlock new possibilities on the tool creation and site administration sides.

In 2018 and 2019, the Portal Team conducted multiple in-person training sessions with state agency staff and solicited participants' input on what kinds of improvements/changes they'd like to see made to the site. Team members also spend a significant amount of time presenting or hosting booths at conferences, responding to inquiries, and engaging stakeholders in the identification of data or functionality needs. Based on these trainings and discussions, we have compiled the following priority list of enhancements to be considered in 2020 based on funding levels. The list is ranked with "High Priority" and "Medium Priority" improvements (lower priorities have been documented, but it is assumed that there is likely not enough funding to implement all of the changes listed here). 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.

HIGH PRIORITY

Stack Update: OpenLayers 5.x, Django 2.x, Python 3.x

Critical upgrade required for several of the other proposed updates, and to take advantage of any other upgrade performed for the West Coast Ocean Data Portal. This will also result in a performance boost and more maintainable code with up-to-date documentation.

Decouple Staging and Production Servers

Remove "Staging" from the database used by "Production" and implement a clean solution to craft what is wanted on the Staging site and instantly/seamlessly update Production from Staging when the time is right.

Streamlined Layer-Picker Loading Strategy

Faster page-load for the map and re-caching. Substantially reduce the delay caused by more layers being added.

Improved WMST (Time) Slider Logic

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

Improved Caching Logic

Audit site for bottlenecks in performance, review caching algorithms, and refine the strategies.

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.

MEDIUM PRIORITY

Expanded Drawings Tool

With the Drawings tool in MyPlanner, users currently may only draw, save, and share polygons with descriptions. These will report their area, and nothing else. Enabling users to draw and share points & lines would allow for different types of data and maps to be compiled from user input, and would report coordinates and lengths, respectively. (Note: A Linear Measurement tool was created in 2019, but those lines can't be saved.) The tool can also be upgraded to allow changes to the fill color, line color, and line-width of drawings. May need to be re-written if implemented on OpenLayers 2 then migrated to OpenLayers5.

Private Groups

Currently users can join and create public groups for sharing drawings around certain data types. Private groups would allow organizations to do this work without having to make their work/data public, and enable them to selectively add users using IDs and either passwords or group moderators. No assurances of anonymity would be given, and we would retain the right to view their data and close their group if needed. We should develop a code of conduct to back up those actions.

MyPlanner Tool Buttons

Create buttons in the Top-Right of the mapping tool (alongside the buttons for printing, short URLs, etc.) to quickly take logged-in users into the Drawings and Bookmarks workflow.

New Ocean Story Layout Options

Identify specific 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 "map", and offering new widgets for inserting content, data, and other media.

Interactive On-Screen Map Tool Tutorial

Expose a "Tutorial" tab that can direct users to a number of different on-screen interactive tutorials including general map use, drawing, bookmarks, groups, and sliders.

Enable Meaningful Feature Name for "Selected Feature" Information Panel

Clicking on features for certain layers currently results in pop-up windows letting you know about the area or point that you clicked on. Currently that report has a header of "Feature #1", or a larger number if you clicked overlapping features. This upgrade would

allow site administrators to indicate which value of the feature's report is the "name" of the feature, and place that in the header instead. Dependency: May need to be re-written if implemented on OpenLayers 2 then migrated to OpenLayers5.

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.

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 2019 and projected for the 2020 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 MARCO and the OMDT. When these targeted data sets are not available through existing credible, authoritative sources, 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 2019 include the Offshore Energy Projects (active wind energy), Submarine Cables (telecommunications), and the continued development of Communities at Sea commercial fishing dataset. These 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 2020, 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 2019, 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. For example, Ecotrust played a major role in the import of Duke University's Marine Life Library, and in 2019, to integrate Duke's revised 2.1 Marine Life data into the Portal.

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 2019, 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. As of 2019, all work is currently performed on the Portal 'Staging' or 'Sandbox' working sites for data review before pushed to the public Portal application. In 2020, Ecotrust will decouple the Staging and Production servers, thus revising and implementing the workflow to Sandbox > Staging > Live Production. Staging will be the primary and final location for data review. Once approved, these data and metadata appear in the Portal viewer and data catalog, respectively.

Enhanced Visualization/Slider Tool

Animation capability was developed by Ecotrust for the Portal application in 2019. CRSSA activities in 2019 included the creation of animations using the Portal administrative tool for datasets such as the annual and monthly AIS data, commercial fishing VTR/Communities at Sea, and oceanography Net Primary Productivity, Fronts, and Sea Surface Temperature. Also in 2019, sliders were produced (draft as of this writing) for the shifting species animations by Chris Bruce of the The Nature Conservancy. Due to the number of data layers in these animations, Ecotrust developed a coding solution for the Technical Team to automate the data import and slider production process not only for the shifting species data, but for any large datasets to improve efficiency.

Systems Administration/Server

In March of 2019, CRSSA installed and configured a new ArcServer machine hosted and maintained on the Rutgers network. This move had two primary goals: 1) to reduce the monthly costs of running web mapping services for the Portal, and 2) to increase map service performance. Map services began transitioning to the new Rutgers hosted server starting in April 2019, initially with the commercial fishing VTR/Communities at Sea data. Map service transition continued through the summer and in September 2019, the previous server located on Amazon Web Services (AWS) was decommissioned. The increase in performance of the new server has allowed continued transition of older map formats and the ability to host new data, such as the historic fish species data and future projections created by The Nature Conservancy.

CRSSA is currently working with Ecotrust to determine if the servers hosting the front- and back-end capabilities of the Portal could benefit from moving to a different web hosting platform. One of the possible locations is on the Rutgers University network, but this will require evaluation for both cost savings as well as ease of use, specifically for the Ecotrust development team.

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 coordinates quarterly calls with state and federal partner members of the Ocean Management Data Team, or 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 2020.

Part IV: Communications and Outreach

The Portal experienced a banner year in terms of traffic – including a 62 percent increase in layer activations from the previous year – and high-profile use examples. Where only a few years ago there was difficulty in finding users willing to be profiled in case studies materials or Ocean Stories features, the Portal team easily assembled a panel of experts at the 2019 Mid-Atlantic Ocean Forum demonstrating how they've used the site for their projects. The panel included representatives of a variety of sectors/industries, including offshore wind development, commercial fishing, state governments, the Coast Guard, and whale watching.

One of the most important roles the Portal continues to play is as a neutral source of information that supports deliberations on a range of management and regulatory actions, including offshore wind planning, electric transmission and telecommunications cable alignment, and waterways management alternatives and studies. The feedback generated through the use of the portal in these venues and through related discussions will play a strong role in guiding data development and releases in 2020 and beyond.

Tools and Activities

Training Sessions & External Engagement

The Portal team fielded nearly two dozen requests for demonstrations and trainings in 2019, with sessions in all five Mid-Atlantic states. These engagements have been highly 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 and resources permit.

MARCO state staff members have indicated that with a fresh round of state training sessions recently completed, the priority for in-person demos/presentations/exhibits in the states should be high-visibility conferences. Portal Team members will work with the states and Ocean Mapping Data Team members to identify these opportunities, with examples to include:

- The Mid-Atlantic Ocean Forum, to be held in New York City in May
- The Maryland State of the Coast event in the summer (location TBD)
- Delaware Coast Day, annually held in Lewes in the fall
- The New Jersey State League of Municipalities Conference, held annually in November, Atlantic City

The Portal has also seen increased popularity as a classroom tool, leading to requests for demonstrations at University-level and high/middle school functions. It is anticipated that a team member will once again participate in an annual professional development course for New York City K-12 teachers hosted by the Wildlife Conservation Society at its New York Aquarium or Bronx Zoo facilities.

The Portal Team will work with MARCO, NROC, RODA, and others to facilitate, organize or participate in the commercial fishing outreach as needed. The portal team will also 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.

Portal Blog

The News page (portal.midatlanticocean.org/news/), commonly known as the "Portal blog," has grown into a key on-site tool for keeping audiences engaged and informed. 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.

Webinars

Like the in-person training sessions, the Portal's "How Tuesday" webinar series has been a successful vehicle 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 Learn how to use the Portal's tools page, where they can live on 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 2020:

- A "Portal 101" session for users of all levels
- A lesson on using the Portal's advanced tools, timed to when upgrades to the drawings and bookmarks tools tool are complete (see Part II)

- Webinar highlighting new maps depicting shifting fish species
- A joint webinar with MARACOOS highlighting oceanography data
- A joint webinar with the Coast Guard providing a tour of proposed new anchorage areas, PARS study areas, etc. on the Portal
- A webinar dedicated to offshore wind data

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 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. Seek unique story angles that can provide human dimensions to map data. Stories that will be produced in 2020 include, but are not limited to:

- **Mid-Atlantic Canyons**: Story would provide an educational tour of some of the smaller canyons in the region. Piece would be based on report by and interview with NOAA researcher Tim Shank and include photos/videos of recent expedition, funded in part by MARCO.
- **Charter Boat Interview**: A profile of a veteran charter boat operator who recently launched an old-time riverboat to conduct tours in northern New Jersey waters.

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

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.

Twitter and E-List Blasts

Now with approximately 600 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. The account is monitored daily and tweets are posted multiple times per week.

The communications lead frequently uses hashtags to tie messages to larger conversations and trending topics. The #MondayMapDay hashtag – which was created by the communications lead and is now used by other accounts – is used at the beginning of each week to share a Portal map online and has been successful in attracting new followers.

The team maintains a Campaign Monitor account to produce an electronic newsletter 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.
- Evaluate needs for new pages and site organizational changes.

Case Studies

As part of the 2018 Portal redesign, a new Case Studies page was created with examples of how the Portal is being used to make decisions, solve problems and improve projects throughout the Mid-Atlantic. These examples are typically documented in the form of single-page fact sheets that can serve as leave behinds for meetings with decision makers (the list also contains links to Ocean Stories that serve as good case studies). These case studies will be expanded in 2019 to include new stories that demonstrate the Portal's utility.

Other Miscellaneous Tasks

- Fielding questions from the public submitted through the Portal's online for 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. Assist with basic MARCO web IT issues, sourcing/posting of new images, loading videos to YouTube/posting to site.
- 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 are some Google Analytics figures summarizing traffic on the Portal for the one-year period running from November 1, 2018, through October 31, 2019.

Top Layers & Themes of 2019

November 1, 2018-October 31, 2019

(Source: Google Analytics)

Top 20 Most Activated Layers

1. BOEM Active Renewable Energy Lease Areas
2. Artificial Reefs
3. BOEM Wind Planning Areas
4. Unsurveyed area (avian, annual)
5. BOEM Identified NY Bight Call Areas
6. Danger Zones & Restricted Areas
7. Regional Bathymetry
8. Wind Speed
9. All Vessel Transit Counts (2017)
10. BOEM Identified NY Bight Draft Wind Energy Areas of Recommendation (11/14/2018)
11. Party & Charter Boat
12. Fathom Lines
13. NYS Identified Wind Energy Area of Consideration
14. Wrecks and Obstructions
15. All Vessel Transit Counts (Feb 2017)
16. Benthic Habitats (North)
17. Cargo Vessel Transit Counts (Feb 2017)
18. Deep Sea Corals (Observed)
19. Scallop 2015-2016 (<5 knots)
20. Bottom Trawl > 65 ft 2011-2015

Most Activated Themes

1. Fishing
2. Maritime
3. Marine Life
4. Renewable Energy
5. Oceanography
6. Administrative
7. Recreation
8. Fishing - Communities at Sea (by Port)
9. Security
10. Marine Life Library (Species Specific)
11. Socioeconomic