

2024 Tools Café Descriptions



Gulf of Mexico Open Data Platform

Presenter: Drew Stephens, The GIS Institute

WEB: <https://gmod-portal-gomalliance.hub.arcgis.com/>

OVERVIEW

The Gulf of Mexico Open Data Platform (GOMOD) includes a comprehensive map of extent for priority habitats across the entire Gulf of Mexico, curated theme maps, a data explorer, and access to a suite of regional data tools developed by the Gulf of Mexico Alliance (GOMA).

INTENDED AUDIENCE

GOMA has developed an overarching strategy for regional data sharing aligned with priority issues identified by GOMA Teams. GOMA has developed GOMOD to make it easier for the GOMA community to discover, explore, and access data across the Gulf.

MAIN USE

Currently, there are numerous data catalogs that point users to available Gulf of Mexico datasets, but there is no one source that allows users to visualize information from multiple providers. GOMA has developed this site to make it easier for users to discover, explore, and access data for the Gulf of Mexico region.

GEOGRAPHY & SCALE

Gulf of Mexico region.

ACCESSIBILITY

Online at <https://gmod-portal-gomalliance.hub.arcgis.com/>

ArcGIS Living Atlas

Presenter: Keith VanGrafeiland, Esri

WEB: <https://livingatlas.arcgis.com/>

OVERVIEW

ArcGIS Living Atlas of the World is the foremost collection of geographic information from around the globe. It includes maps, apps, and data layers to support your work.

INTENDED AUDIENCE

The Living Atlas is available to everyone.

MAIN USE

The Living Atlas of the World, available through ArcGIS Online, provides easy access to one of the largest, highest-quality collections of ready-to-use geographic information that has ever been assembled. This collection is available from any device, anywhere, at any time and is constantly growing and changing as maps, apps, and layers are added or updated by Esri and the ArcGIS user community. One of the primary goals of the Living Atlas is to make the best information easy to discover and use. Users can explore, grab content, and become inspired with products offered through ArcGIS Online.

GEOGRAPHY & SCALE

Global.

ACCESSIBILITY

Online at <https://livingatlas.arcgis.com/>

Development of a Water Quality Data Portal for Graphing and Long-Term Statistics

Presenter: Jeremy Cothran, University of South Carolina and the NERRS Centralized Data Management Office

WEB: https://floridaapdata.org/do_analysis.php

OVERVIEW

The Florida Aquatic Preserves data portal brings together continuous water quality data from forty-one stations across the state. The water quality webpage provides graphing overlays by query parameter and date range as well as associated long-term, statistics for several time periods criteria (daily, weekly, monthly) from a given database of high frequency, continuous water quality parameters.

INTENDED AUDIENCE

Interested members of the public, conservation organizations, academic and research institutions, environmental non-profits, governmental agencies, and students.

MAIN USE

The Florida Aquatic Preserves data portal brings together continuous water quality data from forty-one stations across the state. The data portal provides access to over eight million data records, going back over 20 years, with interactive graphing overlays by query parameter and date range, as well as associated long-term statistics for several time periods (daily, weekly, monthly) from a database of continuous water quality parameters, including salinity, temperature, dissolved oxygen, pH, and turbidity. The data portal's graphing displays, temporal summaries, and data export features provide managers, researchers, and decision makers with access to data and tools to make visual inferences about spatial and temporal patterns of Florida's water quality events with respect to local events and other coastal ecosystem monitoring data.

The data portal was developed by NOAA National Estuarine Research Reserve System Centralized Data Management Office, University of South Carolina, and the Florida Department of Environmental Protection, Office of Resilience and Coastal Protection to establish a statewide data collection and dissemination framework for Florida's continuous water quality monitoring, aligning the aquatic preserves program with the National Estuarine Research Reserves nationwide system.

GEOGRAPHY & SCALE

Florida.

ACCESSIBILITY

Online at https://floridaapdata.org/do_analysis.php

High Resolution Coastal Land Cover for the Nation

Presenters: Dave Stein¹, Kyle Barnes¹, Nate Harold¹

¹ NOAA Office for Coastal Management

WEB: <https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>

OVERVIEW

NOAA will highlight its current work to produce high resolution land cover for all coastal areas of the nation, and our goals to work in collaboration with other federal agencies, regional groups, and states to make those products available nationally.

INTENDED AUDIENCE

Natural resource managers, GIS analysts, and state and local governments.

MAIN USE

NOAA's Office for Coastal Management will highlight its current work to produce high resolution (1-meter) land cover for all coastal areas of the nation. The primary uses of these data are to understand current land cover patterns and past change trends that are essential to comprehensive management, assessment, and future planning. For more than two decades, NOAA's Office for Coastal Management has been producing consistent, accurate land cover and change information for the coastal U.S through its Coastal Change Analysis Program (C-CAP). Based on Landsat imagery, these products have been updated every 5 years. Dates range back to at least 1996, with some locations that have coverage for the full Landsat time series. In recent years, NOAA has been working to establish an operational higher resolution land cover product line at one meter, bringing the national C-CAP framework to the local level with the goal of supporting more site-specific applications. This work has been possible because of the wealth of available imagery, lidar, and ancillary data, as well as improvements to production flows seen in distributed or cloud-based processing and more advanced artificial intelligence classification techniques. Data of specific relevance to this conference includes 1-meter impervious, canopy, and water mapping coast-wide and three pilot projects that are being conducted in the Gulf of Mexico Region, including Tampa Bay, Houston-Galveston, and greater New Orleans. This demo will highlight NOAA's current work, NOAA's longer-term vision, and provide a venue to discuss opportunities for interested partners to leverage this data.

GEOGRAPHY & SCALE

U.S. Coastal Watersheds, Pilot locations in Tampa Bay, Houston-Galveston, and New Orleans. C-CAP products at 1-meter resolution.

ACCESSIBILITY

Online at <https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>

Gulf Literacy Principals

Presenters: Tina Miller-Way¹, Dani DiIullo², Alma Robichaux³

¹ MS/AL Sea Grant

² LA Sea Grant

³ GOMA Education & Engagement Program Coordinator

WEB: N/A

OVERVIEW

The GOMA Education and Engagement Team seeks input on Gulf of Mexico Literacy Principles.

INTENDED AUDIENCE

Scientists, researchers, state and federal agencies, educators, planners, and all other stakeholders of the Gulf of Mexico will be asked for input on The Gulf of Mexico Literacy Principles.

MAIN USE

These Principles help to guide future research and education in the Gulf of Mexico. A Gulf of Mexico literate person:

- Understands the Essential Principles and Fundamental Concepts about the functioning of the Gulf;
- can communicate about the Gulf of Mexico in a meaningful way; and,
- is able to make informed and responsible decisions regarding the ocean and its resources.

GEOGRAPHY / SCALE

Gulf of Mexico region.

ACCESSIBILITY

This tool is in development.

Oyster Resource and Recovery Center

Presenters: Ellis Chapman¹, Toi R. Tippin¹

¹ Harte Research Institute at Texas A&M University-Corpus Christi

WEB: <https://www.hartheresearch.org/project/oyster-resource-and-recovery-center>

OVERVIEW

The Oyster Resource and Recovery Center (ORRC) will consist of a virtual training facility and will provide workshops in business development, preparation of oyster hatcheries and farm management, as well as development of undergraduate, graduate, and non-academic workforce internship programs with TAMU-CC and other academic institutions.

INTENDED AUDIENCE

Individuals interested in working on an oyster farm or starting their own oyster farm.

MAIN USE

An online training program for oyster aquaculture that includes modules about the oyster hatchery & nursery, oyster farming, and business planning. ORRC is a free, online program with internships at local farms after course completion. Since oyster farming in Texas is relatively new, the program

places focus on this area but can be applicable to oyster farming in general. Modules offered in English and Spanish.

GEOGRAPHY & SCALE

Texas.

ACCESSIBILITY

Online courses in development.

CPRA's Master Plan Data Viewer & Master Plan Data Access Portal

Presenter: Ashley Cobb, Louisiana Coastal Protection and Restoration Authority (CPRA)

WEB: <https://mpdv.coastal.la.gov/>; <https://mpdap.coastal.la.gov/>

OVERVIEW

The Master Plan Data Viewer (MPDV) is an interactive companion to Louisiana's 2023 Coastal Master Plan, projecting coastal change over 50 years and projects' potential impacts to address land loss and coastal flood risk. The Master Plan Data Access Portal (MP-DAP) enables online visualizations and download access to the modeling data sets used to develop the 2023 plan.

INTENDED AUDIENCE

The MPDV is primarily designed for coastal Louisiana residents, as well as local planners, parish/municipal officials, floodplain managers, emergency managers, other state agencies, and community groups. The MP-DAP is intended for researchers, academics, and practitioners.

MAIN USE

The MPDV was updated with 2023 plan information to provide insight into current and future land change, vegetation type, flood depths, economic and structure damage, and 2023 Coastal Master Plan Projects. This interactive tool displays projected flood risk and land change data that helps viewers visualize what change might look like over time over the next 50 years in their communities and across the coast. The data viewer also provides detailed information about recommended protection and restoration projects.

Additionally, the viewer's style and functionality has also been improved. One significant improvement to the user experience is that the landing screen offers the option to take a Guided Tour to help first-time users understand the nature of Louisiana's coastal crisis, learn more about their current and future coastal flood risk, and what implementation of the 2023 Coastal Master Plan would accomplish. The Explore feature allows users to go directly to the data/outputs. Additional functionality includes increased search bar capabilities and map export functions for printing.

The MP-DAP builds off the MPDV and is intended for those who already have a good grasp on the types of master plan data and their application. The portal allows researchers, academics, and practitioners to dig deeper into the data and select a variety of variables for online visualization. These images can be exported, or users can download the data and create graphics to meet their specific needs.

GEOGRAPHY & SCALE

Coastal Louisiana.

ACCESSIBILITY

The tools are available online and new for the 2023 MPDV, on mobile phones and tablets.

Gulf TREE

Presenter: Andrew Medhurst PLACE:SLR / Mississippi State University Extension

WEB: gulftree.org

OVERVIEW

Gulf TREE is decision-support search engine designed to help users identify the best and most appropriate climate tools for their needs.

INTENDED AUDIENCE

Gulf TREE is designed to support coastal decision makers and practitioners looking to incorporate climate resilience into their work.

MAIN USE

Gulf TREE features a filter-based search engine that can connect users to over 100 different climate resilience tools based on the type of tool you're looking for. Gulf TREE primarily includes existing tools from throughout the Gulf of Mexico as well as several national-level tools. Gulf TREE is available online at GulfTREE.org and is free to use for all users.

GEOGRAPHY & SCALE

Gulf of Mexico region.

ACCESSIBILITY

Online at gulftree.org.

Southeast Conservation Blueprint

Presenters: Adam Malcomb¹, Louise Vaughn¹

¹ U.S. Fish and Wildlife Service, Southeast Conservation Adaptation Strategy

WEB: <https://secassoutheast.org/blueprint>

OVERVIEW

The Southeast Conservation Blueprint is a living spatial plan to achieve the Southeast Conservation Adaptation Strategy vision of a connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people across the Southeast and Caribbean.

INTENDED AUDIENCE

For use by any conservationist, including Federal, State, and Local agencies, Tribal nations, private organizations, nonprofit organizations, academic institutions, and private landowners.

MAIN USE

The Southeast Conservation Blueprint is a living spatial plan to achieve the Southeast Conservation Adaptation Strategy vision of a connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people across the Southeast and Caribbean. The Blueprint identifies priority areas based on a suite of natural and cultural resource indicators representing terrestrial, freshwater, and marine ecosystems using a consistent approach across its entire geography. A connectivity analysis identifies corridors that link coastal and inland areas and spans climate gradients. Because the Blueprint is a living plan, it continues to evolve with improvements to underlying data, changing on-the-ground conditions, and input from partners.

GEOGRAPHY & SCALE

The Blueprint spans 15 states of the Southeast, Caribbean territories, and Atlantic and Gulf marine waters.

ACCESSIBILITY

Online as a web viewer and a data download package which includes underlying components.

Remora: A Mobile Phone App to Track Use and Refusal of Single-Use Plastic

Presenters: Shannon Gowans¹, S. Nicole Schaal¹

¹ Eckerd College

WEB: Getremora.org

OVERVIEW

Remora is a free mobile phone application to track single-use plastic use and refusal before it enters the waste stream and potentially contributes to plastic marine debris. Data generated via the app is available upon request for science and policy research.

INTENDED AUDIENCE

The general public is the intended audience of app users, however academic researchers, government policy makers, NGO's and lobbyists interested in plastic consumption and reduction are the intended audience for the database.

MAIN USE

Logging of single-use plastic uses and refusals by app users increases awareness, individual accountability, and commitment to reduction over the long-term. The app fosters long-term pro-environmental behavior change. Data generated by the community of app users can be used to inform changes in packaging materials by corporations or promote new sustainability policies that reduce availability of unnecessary single-use plastics, thus hindering consumption and amplifying pro-environmental behavior change across the entire population. Remora builds a database of plastic uses and refusals by plastic type, and georeferenced location (zip code or GPS coordinate of business locations); while anonymized, the data is also linked to an individual's demographic information, leading to a nuanced understanding of plastic consumption.

GEOGRAPHY AND SCALE

Global.

ACCESSIBILITY

Currently the app is available for download for both Android and iPhone (free download from app stores or at getremora.org) only within the United States.

SEACAR Data Discovery Interface

Presenter: Dr. Shawn Landry, University of South Florida Water Institute

WEB: <https://data.florida-seacar.org/>

OVERVIEW

The Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR) is a collaborative process identify and assess ecological indicators and to develop a decision support tool to better understand the status of Florida's coastal managed areas. The SEACAR Data Discovery Interface (DDI) provides access to data from over 200 monitoring programs.

INTENDED AUDIENCE

Local, state and federal natural resource managers, data providers, researchers and partners interested in the assessment of ecological indicators within coastal ecosystems.

MAIN USE

The SEACAR DDI provide access to information about monitoring programs collecting data associated with coastal habitats, including: coastal wetlands, submerged aquatic vegetation, coral and coral reefs, oysters and oyster reefs, nekton communities and water quality measurements. The DDI allows searching and filtering by habitat, indicator and geographic area to find relevant programs, and then to download data that has been standardized by parameter, units, etc. The DDI is also a tool that program managers can use to share information and data associated with their own programs.

GEOGRAPHY AND SCALE

The geography is currently limited to the Office of Resilience and Coastal Protection managed areas within the State of Florida.

ACCESSIBILITY

Online at <https://data.florida-seacar.org/>

NOAA Gulf of Mexico Data Atlas: Updated Interactive Map Viewer & Data Access for the Gulf Ecosystem

Presenters: Heather L. McCullough¹, Julie A. Bosch¹

¹ NOAA National Centers for Environmental Information

WEB: <https://gulfatlas.noaa.gov>

OVERVIEW

The Gulf of Mexico Data Atlas is an online, interactive data and map tool that allows users to view a large, growing collection of ecosystem-related datasets. It was developed in 2011 by the National Centers for Environmental Information (NCEI) and the Gulf of Mexico community.

INTENDED AUDIENCE

Gulf of Mexico community.

MAIN USE

The Gulf of Mexico Data Atlas is an online, interactive data and map tool that allows users to view a large, growing collection of ecosystem-related datasets. Initially developed in 2011 by the National Centers for Environmental Information (NCEI) and the Gulf of Mexico community, the Atlas provides over 200 map layers in over 60 subject areas resulting from collaborations between over 30 federal, state, non-governmental, and academic partners. Thematically, the Atlas provides long-term assessments of physical, biological, environmental, economic and living marine resource characteristics in the Gulf of Mexico, describing baseline conditions to inform restoration and monitoring efforts. Although some data updates have been made over the years, a major revision of the Atlas interface, expanded data collections and data access capabilities are now underway. Each

map layer includes a descriptive summary authored by subject matter experts, as well as metadata and map service resources. We invite the community to test, interact with, and provide feedback on the revised Gulf of Mexico Data Atlas, the inclusion of “new” datasets, and other data that would be beneficial to add. Like the original Atlas, NCEI seeks to further develop this new Atlas with input from, and to meet the needs of, the Gulf of Mexico community.

GEOGRAPHY & SCALE

Gulf of Mexico region.

ACCESSIBILITY

Online at <https://gulfatlas.noaa.gov>

Oil and Gas Industry Metocean Data: The BSEE/NTL Open Data Repository

Presenters: Sandeep Jilla¹, Felimon Gayanilo¹

¹ GCOOS/HRI Texas A&M University-Corpus Christi

WEB: <https://ntl.gcoos.org/>

OVERVIEW

Online near real-time data portal to the data shared by the oil and gas industry through the Department of Interior, Bureau of Ocean Energy Management (BOEM), and Bureau of Safety and Environmental Enforcement (BSEE) issued Notices to Lessees and Operators (NTL). Raw and processed data are distributed via Web Accessible Folder (WAF) and ERDDAP endpoints.

INTENDED AUDIENCE

The data portal was designed and deployed to aggregate and disseminate the region’s near real-time oceanographic data to provide timely information about the environment of the United States portion of the Gulf of Mexico and its estuaries to assist decision-makers, including researchers and hydrodynamic modelers, government managers, industry, military, educators, emergency responders, and the general public interested in environmental monitoring.

MAIN USE

The Gulf of Mexico Coastal Ocean Observing System (GCOOS), one of 11 Regional Coastal Ocean Observing Systems nested in the U.S. Integrated Ocean Observing System, developed and maintains a centralized data repository for the Gulf of Mexico. The data currently collected are from voluntary local (regional) data providers, observing assets of the oil and gas industry operating in the Gulf, and federal observing facilities in the Gulf of Mexico.

In 2020, GCOOS took the responsibility of the NOAA National Data Buoy Center to collect and distribute oceanographic data from the oil and gas industry platforms. BOEM/BSEE issued NTLs that stipulate the requirement to provide oceanographic data. To date, GCOOS is monitoring 141 stations, and 47 of which are actively providing data in near real-time. GCOOS provides a Web Accessible Folder (WAF) and ERDDAP data services to distribute the self-describing netCDF data. The raw and text-formatted (CSV) data are also distributed. The data and products from the data repository are licensed under the Creative Commons 0 or CC0 (<https://creativecommons.org/public-domain/cc0/>), giving data users free access and reuse of the data and products served from GCOOS facilities. Attribution to GCOOS and their partners is not required but encouraged.

GEOGRAPHY & SCALE

Gulf of Mexico region.

ACCESSIBILITY

Online at <https://ntl.gcoos.org/>

Gulf of Mexico Coastal Ocean Observing System (GCOOS): Tapas for Tools Café

Presenters: Chris Simoniello^{1,2}, Jorge Brenner^{1,2}, Felimon Gayanilo^{1,3}, Hannah Dillahunt^{1,2}, Tuomo Saari^{1,2}, Sandeep Jilla^{1,3}, Uchenna Nwanko^{1,2}

¹ Gulf of Mexico Coastal Ocean Observing System Regional Association

² Texas A&M University

³ Texas A&M University-Corpus Christi.

WEB: <https://gcoos.org/>; <https://habscope.gcoos.org/>; <https://gandalf.gcoos.org/>;
<http://data.gcoos.org>

OVERVIEW

The Gulf of Mexico Coastal Ocean Observing System (GCOOS) will demo many applications at the Tools Café, including Offshore Wind Suitability, red tide risk communication, and living marine resource management applications related to the U.S. Marine Biodiversity Observation Network and Animal Telemetry Network.

INTENDED AUDIENCE

Decision-makers, researchers, resource managers, oil and gas industry, the military, educators, emergency responders, and the general public interested in environmental monitoring.

MAIN USE

GCOOS, one of 11 Regional Coastal Ocean Observing Systems nested in the U.S. Integrated Ocean Observing System, developed and maintains a centralized data repository for the Gulf of Mexico. In addition to the data portal, GCOOS develops products needed by users for the purposes of detecting and predicting climate variability and consequences; preserving and restoring healthy marine ecosystems; ensuring human health; managing resources; facilitating safe and efficient marine transportation; enhancing national security; and predicting and mitigating against coastal hazards. During the Tools Café, the GCOOS team will show tools in our collection including: 1) The Offshore Wind Suitability tool that extends to the GoM the current ESRI OSW Suitability Modeler focused on the East Coast and that allows users to factor a variety of data sets (e.g., oceanographic, environmental, and economic) into siting OSW suitability; and 2) Educational posters developed in partnership with artists and companion G6-12 lessons to support red tide risk communication and living marine resource management related to the U.S. Marine Biodiversity Observation Network and Animal Telemetry Network. GCOOS maintains data services, including ERDDAP, Direct Access and RESTful, and Web Accessible Folders (WAF) to serve data and products.

GEOGRAPHY & SCALE

Gulf of Mexico region.

ACCESSIBILITY

Online at <https://creativecommons.org/licenses/by/4.0/legalcode>

USGS Total Water Level and Coastal Change Forecast Viewer

Presenters: Justin Bircher¹, Alex Seymour¹

¹ USGS St. Petersburg Coastal and Marine Science Center

WEB: <https://coastal.er.usgs.gov/hurricanes/research/twlvviewer/>

OVERVIEW

The USGS Total Water Level and Coastal Change Forecast Viewer is a platform for displaying and downloading real-time forecasts of hourly total water level (including tide, surge and waves) and coastal change along US open ocean sandy coasts.

INTENDED AUDIENCE

The tool was co-designed with NOAA National Weather Service Forecasters but can be used by coastal planners and managers, policymakers, academic researchers and the public.

MAIN USE

The main function of the Total Water Level and Coastal Change Forecast Viewer is to plot six-day forecasts of hourly total water levels including tide, surge and wave runoff at hundreds of sites along the US East and Gulf Coasts. Users click on interactive maps to zoom into their location of interest to see beach profiles and view predicted coastal impacts. Users can also download forecasts and beach morphometrics for current and past forecasts through an API. These forecasts can be used to understand the timing and duration of high-water level events and their associated impact to features of human and ecological interest such as coastal roads, parking lots, and critical nesting habitats.

GEOGRAPHY

The current geographic coverage is open-ocean sandy beaches along the US Atlantic and Gulf Coasts. Some Gulf coastlines (South TX and LA) are in development along with the West coast, AK, and PR. Forecasts are available at an alongshore resolution of 500-1000 meters.

ACCESSIBILITY

The tool is available online at <https://coastal.er.usgs.gov/hurricanes/research/twlvviewer/>

Data is available to download through a programmatic

API: <https://coastal.er.usgs.gov/hurricanes/research/twlvviewer/apidocumentation.html>

GRIIDC Data Management System

Presenter: Rosalie Rossi, Harte Research Institute for Gulf of Mexico Studies at Texas A&M University - Corpus Christi

WEB: griidc.org

OVERVIEW

GRIIDC is a multidisciplinary data repository that stores and shares data generated by Gulf of Mexico researchers. GRIIDC's mission is to ensure a data and information legacy that promotes continual scientific discovery and public awareness of the Gulf of Mexico ecosystem.

INTENDED AUDIENCE

Those interested in turning their data into citable research products or discovering data for reuse; Gulf of Mexico Research Initiative (GoMRI) funded investigators and administration; National

Academy of Sciences Gulf Research Program funded investigators and administration; RESTORE Act Centers of Excellence funded investigators and administration; Harte Research Institute for Gulf of Mexico Studies funded investigators and administration; academic researchers; natural resource managers; policy makers; emergency responders; non-governmental organizations; and the general public.

MAIN USE

This tool was initially designed to manage and distribute data generated by Gulf of Mexico Research Initiative (GoMRI) funded projects. The data management applications that assist with planning, documenting, and submitting data to GRIIDC are designed for investigators and data managers. GRIIDC issues a DOI for discrete data packages that provides researchers with a citable reference for their efforts. The system allows data submissions to be tracked through the data package workflow by both investigators and program administration via the dataset monitoring application. The GRIIDC search and dataset landing pages are designed for anyone who is interested in obtaining data about the Gulf of Mexico, including academic researchers, natural resource managers, policy makers, emergency responders, non-governmental organizations, and the public. The GRIIDC program is also developing new partnerships to continue our mission of ensuring a data and information legacy that promotes continual scientific discovery and public awareness of the Gulf of Mexico ecosystem. Potential partnerships with research institutions, oil and gas industry, and others will allow more investigators to use these tools to manage and share their data using the GRIIDC system.

GEOGRAPHY & SCALE

The tool is focused on Gulf of Mexico data; however, limited datasets are available related to other locations including the North Sea and the Pacific Coast of North America.

ACCESSIBILITY

This tool is available online only.

AI-enabled Enterococcus Predictor for Texas Coastal Ocean Beach: ePredictor

Presenters: Sathwika Edama¹, Felimon Gayanilo¹

¹ Harte Research Institute, Texas A&M University-Corpus Christi

WEB: <https://enterococcus.today/>

OVERVIEW

Online and mobile tools to graphically view the enterococcus counts as they are reported from various field stations spread around the Texas coastline, and a 15-day prediction forward of the count using variants of the Long Short-term Memory (LSTM) model. The AI/ML models were derived from data collected since 2009.

INTENDED AUDIENCE

Beachgoers in Texas.

MAIN USE

U.S. EPA Act of 2000 requires states with beaches to cooperate with the EPA to monitor the level of bacteria that impact water quality and issue swimming advisories when threshold levels are violated. In Texas, this monitoring system is operated by the Texas Beach Watch Program (TBWP) under the Texas General Land Office (TGLO). Two main methods for assessing water quality are culture-based assays and rapid detection methods (quantitative polymerase chain reaction or qPCR)

for Enterococcus (EPA 2012). The former method can take 18-96 hours to yield results. For users of the coastal waters, the delay can mean the information is obsolete by the time reports are available. For qPCR, results can be obtained in less than six hours, but the analysis is costly and requires PCR expertise, which is not readily available.

The ePredictor is a product of a TGLO-funded project to use AI/ML to predict the counts based on the data collected in several sampling sites since 2009. The current application is for 15 of these sites and is projected to be extended to all 170 sampling sites in Texas to accelerate both the quantification of coastal ocean bacteria and the dissemination of results to relevant agencies and the public. Several Recurrent Neural Network Long Short-term Memory (LSTM) algorithm variants were developed and applied. These models included but were not limited to: (i) sequential model, based on coder-decoder approach, the Univariate Multi-Step LSTM, (ii) Multi-variate Multi-Step LSTM incorporating not only the count but salinity and water temperature measures, (iii) dense layered LSTM, (iv) Bi-directional Encoder Representations from Transform (BERT), and (v) LSTM-based sequential model enhanced with Facebook's Prophet that can also assimilate salinity and water temperature values. The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were computed for each of the 13 models to evaluate performances.

AI-enabled predictors and the publication of predicted values come with risks. The predicted results need to be assessed by subject matter experts to develop a sound forecast. A registered account is required and may be obtained from the TGLO-Beach Watch Program to access the live predicted values, decades of data reported, and data generated for ingestion by the various AI/ML models.

GEOGRAPHY & SCALE

Texas.

ACCESSIBILITY

Online at <https://enterococcus.today/>

Mote Marine Laboratory's Beach Conditions Reporting System (BCRS)

Presenters: Aspen Cook¹, Lauren Burk¹

¹ Mote Marine Laboratory

WEB: www.visitbeaches.org

OVERVIEW

The Beach Conditions Reporting System (BCRS) is a volunteer-based program providing free access to regularly updated conditions reports via website, mobile application, email subscriptions, and an automated hotline. In addition to conditions reports, the website and mobile application also host a community reporting feature, local resource links, and educational materials.

INTENDED AUDIENCE

Our audience is anyone who visits, works, or recreates in or near coastal waters.

MAIN USE

This decision-making tool is available to the public for free via website (visitbeaches.org) and mobile application (BCRS - Mote Marine Laboratory) with the goal of protecting public safety and enhancing beach-goer experience by promoting informed decision-making. Data collected through the BCRS is also shared with local, state, and federal government agencies to aid in forecast

modeling and resource management. Currently, the BCRS includes regular conditions reports from over 60 locations across 5 states (NC, SC, FL, AL, and TX) and growing.

GEOGRAPHY & SCALE

Alabama, Florida, North Carolina, South Carolina, and Texas.

ACCESSIBILITY

Online at www.visitbeaches.org

Gulf Coast Monitoring and Assessment Portal (GCMAP)

Presenters: Jacob Howell¹, Randy Clark², Sarah Hile¹, Asmita Shukla¹, Bethany Pertain¹

¹ CSS, Inc./NOAA NCCOS (Affiliate)

² NOAA NCCOS

WEB: N/A

OVERVIEW

The Gulf Coast Monitoring and Assessment Portal (GCMAP) was designed to improve discovery and accessibility of existing monitoring data and ensure collected information supports management decision-making. The portal currently contains programmatic metadata from water quality, habitat, and living marine resource monitoring programs as well as mapping programs.

INTENDED AUDIENCE

GCMAP was designed to be used by monitoring practitioners and resource managers within the public, private, and academic spheres.

MAIN USE

GCMAP is a publicly accessible and georeferenced inventory of monitoring program metadata. The tool is intended to increase accessibility and discoverability of monitoring data that has been or is being generated across the Gulf of Mexico by being a one-stop-shop for water quality, habitat, and living marine resource monitoring and mapping information.

GEOGRAPHY & SCALE

GCMAP's area of interest is the entire Gulf of Mexico region from the coastal zone out to the EEZ.

ACCESSIBILITY

Currently, the first iteration of GCMAP is available online. A new version will be made available online in the future with the inclusion of living marine resource monitoring programs in the inventory.

GeoCoast Tools: A visualization suite for coastal inundation

Presenters: John Cartwright¹, John van der Zwaag¹

¹ Mississippi State University

WEB: <http://geoproject.hpc.msstate.edu/GeoCoast/>

OVERVIEW

GeoCoast Tools is a suite of web applications that gives users multiple methods to interactively explore the effects of inundation along the Gulf Coast. The tools utilize maps, 3D models, and

panoramic imagery to provide both realistic and schematic visualizations of the impacts of sea level rise and storm surge.

INTENDED AUDIENCE

GeoCoast Tools are intended to be used by local and state decision makers, coastal residents, educators, and students.

MAIN USE

GeoCoast Tools are a suite of web applications that allow users to visualize the effects of sea level rise and storm surge along the Gulf Coast including the impact to buildings, critical infrastructure, and transportation. GeoCoast Tools include GeoCoast3D, GeoInundation, GeoPanorama, and GeoLiDAR.

GeoCoast3D is a 3D map-based application that uses digital elevation model (DEM) data and 3D buildings generated from LiDAR data collected along the Gulf Coast in 2015. The data is combined with sea level rise data and storm surge hindcast model data to visualize the impacts to buildings and roads. Routing and service area tools allow users to examine the impact on transportation and emergency services.

GeoInundation is a 3D interactive visualization of inundation from sea level rise or storm surge at several locations along the Gulf Coast.

GeoPanorama is a 360° panorama viewer for several locations along the Gulf Coast. Users can visualize the impact of sea level rise and storm surge at those locations.

GeoLiDAR is also a 3D map-based application that allows users to explore the LiDAR data for the coastal counties of Mississippi in combination with 3D buildings and NOAA sea level rise data.

GEOGRAPHY & SCALE

GeoCoast Tools provides visualizations of the Gulf Coast from the state-wide scale down to street level.

ACCESSIBILITY

Online at <http://geoproject.hpc.msstate.edu/GeoCoast/>

Geospatial Resilient Economic Development (GeoRED)

Presenters: Diana Del Angel¹, Jessica Magolan¹, Brach Luper¹, Christine Hale¹, James Gibeaut¹
¹ Harte Research Institute for Gulf of Mexico Studies at Texas A&M University-Corpus Christi

WEB: Geored.org

OVERVIEW

The Geospatial Resilient Economic Development (GeoRED) platform is designed to assist Texas Coastal Bend communities in smart growth practices by providing regional hazard and economic development data. The website houses several geospatial tools under the resilience themes: hazard impacts, social vulnerability, economic development, and environmental resilience.

INTENDED AUDIENCE

Texas Coastal Bend communities seeking to become more resilient with a suite of geospatial tools that display hazard impacts and economic development data. The tool, launched in the Fall of 2023, encourages the use of GIS mapping and analysis for more holistic risk assessment, social, economic, and ecological resilience planning, and community partnerships.

MAIN USE

A region's social, ecological, and economic prosperity depends on its ability to prevent, withstand, and quickly recover from major disruptions. This has become clear in the Coastal Bend, a region of the Texas Coast that is still recovering from Hurricane Harvey but is also on the precipice of major industrial growth (e.g., port expansion, desalination, carbon capture, and sequestration).

The Regional Resilience Partnership (RRP) – a formal partnership of the Harte Research Institute for Gulf of Mexico Studies (HRI) at Texas A&M University-Corpus Christi and the Coastal Bend Council of Governments – built a hyper-local GIS platform called the Geospatial Resilient Economic Development (GeoRED) tool. The GeoRED platform will house available data in separate viewers for users to narrow their data searches to either 1) Hazard Response and Planning, 2) Social Vulnerability, and 3) Economic Development and 4) Environmental Resilience. The geospatial tools feature various ESRI visual products, such as Story Maps, Dashboard, and Experience applications, allowing users to interact with data. The modules are pre-populated with data noted as important to decision-making by experts engaged throughout the GeoRED development process. GeoRED aims to deliver functionality to users with a wide range of GIS experience levels.

GEOGRAPHY AND SCALE

Coastal Texas.

ACCESSIBILITY

Online at Geored.org

FishLAT (Fisheries Location Assessment Technology)

Presenters: Ami Everett¹, Amber Sparks¹, Emily Hazelwood¹

¹ Blue Latitudes LLC

WEB: www.fishlat.com

OVERVIEW

Fisheries Location Assessment Technology (FishLAT), is a web app-based spatial planning tool that identifies and assesses the impacts that the removal, reefing, or installation of offshore energy infrastructure will have on the marine ecosystem and ocean stakeholders.

INTENDED AUDIENCE

Regulatory agencies, operators, fisheries stakeholders, and the public can use FishLAT to interact with platform-specific ecological and fisheries data in the Gulf of Mexico.

MAIN USE

FishLAT, Fisheries Location Assessment Technology, is a web app-based spatial planning tool that identifies and assesses the impacts that the removal, reefing, or installation of offshore energy infrastructure will have on the marine ecosystem, and the stakeholders that rely on its health. FishLAT integrates fisheries and ecological data to create a comprehensive ecosystem-based approach to offshore energy planning. Additionally, users may request a full report for a platform, which will include an evaluation of that platform's suitability as a reef site compared to surrounding habitats and other platforms. FishLAT's data sources consist of the most recent scientific studies, open and closed-source data, and industry knowledge - uniquely integrated and modeled to provide data transparency and a data-driven resource to engage stakeholders and complete environmental assessments.

GEOGRAPHY & SCALE

Currently, FishLAT is focused in the Gulf of Mexico where offshore oil and gas development and decommissioning has some of the highest occurrence rates in the world. However, FishLAT's framework is being designed with global expansion in mind, so that data from any region and from a variety of marine energy structure types can be easily integrated.

ACCESSIBILITY

Online at www.fishlat.com

Gulf of Mexico Avian Data Monitoring Portal

Presenters: Jon Wiebe¹, David Hewitt², Jessica Henkel³

¹ Louisiana Department of Wildlife and Fisheries

² U.S. Fish and Wildlife Service

³ The Water Institute

WEB: avianmonitoring.com

OVERVIEW

The Gulf of Mexico Avian Data Monitoring Portal is a publicly available website that allows users to explore and download colonial waterbird aerial survey data collected from 2010-2021. The portal includes a geospatial dashboard that allows users to explore data by geographic areas, year, watershed and/or species.

INTENDED AUDIENCE

Researchers, natural resource managers, and the general public can access the survey data.

MAIN USE

One of the principal means by which the Deepwater Horizon (DWH) Regionwide Trustee Implementation Group (TIG) monitors shrub- and select ground-nesting waterbird species is through aerial photographic nest surveys. Surveys are carried out from a fixed-wing aircraft, with two photographers taking contextual habitat photographs as well as individual nesting colony photographs. Nests are then manually dotted (i.e., counted) on individual photographs and assigned to species and the nesting status, allowing for the enumeration of nests and nesting pairs by species within a defined area. This data will be critical for future evaluation of nesting waterbird species distribution trends, relative abundance, nest abundance, and breeding status in the Gulf of Mexico.

To fully leverage the utility of the data generated by this project, the Gulf of Mexico Avian Data Monitoring Portal has been developed through funding from the Louisiana and Regionwide TIGs. This portal, which is publicly available online at avianmonitoring.com, includes a geospatial dashboard powered by Environmental Systems Research Institute (Esri) Enterprise Geographic Information Systems (GIS) software linked to a Web Mapping Service (WMS). The dashboard ingests the intersected multiyear dataset and displays important data-driven components as visualizations including a graphical depiction of species counts by year as well as counts of total nests and total birds observed. The dashboard can be interactively modified by query selection. The data portal also allows users to download the full datasets, high-resolution images and geodata.

GEOGRAPHY & SCALE

Aerial surveys began in 2010, resulting in seven years of data, with the survey range varying from across the northern Gulf of Mexico to only the Louisiana coast.

ACCESSIBILITY

Online at avianmonitoring.com.

GulfSeeLife

Presenter: Richard Buchholz, University of Mississippi

WEB: www.gulfseelife.org

OVERVIEW

GulfSeeLife is a natural history and community science app used to document and monitor changes in coastal populations of coastal and marine organisms. Users can submit observations of species, get help identifying species and build a customizable data collection platform.

INTENDED AUDIENCE

GulfSeeLife is designed for use by the general public, school teachers and scientists who want to participate in an online community that shares their appreciation for understanding and sustainably managing coastal and marine organisms and their habitats.

MAIN USE

GulfSeeLife is designed to engage Gulf coast residents and visitors in identifying, documenting and studying coastal and marine organisms. GulfSeeLife users can a.) upload photos, measurements, GPS location and other data regarding specimens they have observed or photographed, b.) use the species identification wizard to help them 'key out' species of the most common fishes, plants, invertebrates, birds and mammals, and vote on the species identification of the photos submitted by other users, c.) track reports of species of interest seasonally and regionally, d.) learn more about the biology of coastal species, and e.) and participate in community science projects that use a customizable project platform to allow collection of many types of data in the field. Teachers can use private projects in GulfSeeLife to facilitate STEM learning by children in a protected, interactive online environment. Users can also check the weather forecast, access fishing regulations and quickly find contact information to report injured animals and catastrophic pollution.

GEOGRAPHY & SCALE

The most commonly encountered beach, marsh and marine species in the northern Gulf of Mexico are included.

ACCESSIBILITY

GulfSeeLife is a free app available for iPhone, iPad, Android phones and as a web portal at www.gulfseelife.org

Coastal Resilience - Homeowner Handbook Mobile Application

Presenters: Brian Sherwood¹, Roy Carrell¹, Michael Christopher²

¹ Office of Information Technology, Mississippi Department of Marine Resources

² Elemental Methods, LLC

WEB: <https://www.gulfcoasthomeownershandbook.org>

OVERVIEW

The Homeowner’s Handbook mobile application is designed to be an easy-to-use reference for both homeowners and renters, providing coastal residents access to the information you need easily and in one place. This will allow you to take action and reduce the risk of experiencing loss or damage from a natural disaster and learn what to do if you do have damage after a disaster.

INTENDED AUDIENCE

The handbook covers essential information on emergency preparedness, evacuation planning, flood/wind insurance, and steps to protect life and property for coastal residents in the five Gulf of Mexico states (Texas, Louisiana, Mississippi, Alabama, Florida).

MAIN USE

The original set of Homeowner Handbooks were developed in 2010 as a project of the Gulf of Mexico Alliance (GOMA) Coastal Community Resilience (CCR) Team, a partnership of federal, state, and local organizations that share a vision for healthy and resilient communities. The handbooks were designed specifically for homeowners in the Gulf of Mexico coastal states, to promote individual resilience; thereby creating a fortified community.

In 2023, the “Homeowner Handbook” mobile application was developed to expand the reach and usability of the tool by incorporating mobile technology and taking advantage of the proliferation of smartphone use in the United States. The implementation of the “Homeowner Handbook” on smartphones provides new opportunities to reach and assist the public and communities in preparing for and responding to disasters. Customizable electronic checklists allow users to create and update preparation checklists for multiple situations and properties. Immediate access to preparation status allows users to constantly plan, monitor, and progress in completing their tasks. An online weather data feed allows users to monitor current conditions and alerts for their geographic areas. The incorporation of electronic messaging in the application allows communities to have constant contact with the public. Community administrators can provide information and assistance in preparing the public for impending disasters, in addition to providing guidance and assistance after disasters. Targeted messages can be transmitted to large and small segments of the affected communities.

GEOGRAPHY & SCALE

Gulf of Mexico states.

ACCESSIBILITY

Online at <https://www.gulfcoasthomeownershandbook.org>

MultiscaleDTM: Multiscale Geomorphometric Analysis of Bathymetry and Elevation Data in R

Presenters: Alexander R. Ilich¹ (ailich@usf.edu), Benjamin Misiuk², Vincent Lecours³, Steven A. Murawski¹

¹ College of Marine Science, University of South Florida, St. Petersburg, Florida, USA

² Department of Oceanography, Dalhousie University, Halifax, Nova Scotia, Canada

³ Geography Program, Université du Québec à Chicoutimi, Chicoutimi, Quebec, Canada

WEB: <https://ailich.github.io/MultiscaleDTM/>

OVERVIEW

MultiscaleDTM is a free, open-source R package that allows for the calculation of features from bathymetry and elevation surfaces at multiple spatial scales from each of the five major terrain attribute groups: slope, orientation, curvature, relative position, and roughness.

INTENDED AUDIENCE

This tool is designed for scientists who would like to use terrain attributes (e.g. slope, curvature, roughness) in their analyses.

MAIN USE

MultiscaleDTM is a package for the R programming language that allows for the calculation of terrain attributes from topographic surfaces at multiple spatial scales. Terrain attributes are measures that quantitatively describe the shape and character of the earth's surface. These measures can be directly calculated from topographic maps such as bathymetry and elevation surfaces. These measures fall into five major thematic groups: slope, orientation, curvature, relative position, and roughness.

These attributes can be used in a wide variety of scientific endeavors including but not limited to species distribution modelling, habitat characterization, geomorphology, and engineering. Scientists however may find calculating these measures a daunting task and may choose a sub-optimal set of terrain attributes since the measures are often spread across many different software environments, some of which can be expensive or extremely specialized, and because the terminology in the field can be overwhelming, confusing, and at times even contradictory. This software aims to lower the barrier of entry by bringing together a diversity of measures across all major thematic groups of terrain attributes into a single, free, open-source environment with consistent syntax and with documented descriptions of the various measures. Moreover, the software also includes a 3D visualization tool to aid in the understanding of the meaning of various terrain attributes.

GEOGRAPHY & SCALE

The tool is best suited for local or regional studies utilizing projected (e.g. UTM) data, but some functions can operate on data spanning larger spatial extents that must be represented with geographic coordinates (i.e. latitude and longitude). The spatial scale at which the terrain attributes are calculated is a parameter that is set by the user. This provides flexibility for the user, allowing them to choose the scales best suited to their specific problem and facilitates multiscale modelling.

ACCESSIBILITY

Online and available for download at <https://ailich.github.io/MultiscaleDTM/>. It is designed to be free, transparent, flexible, scientifically rigorous, and easy to use.

Mechanistic modeling for optimizing estuarine habitats and assessing risks for restoration projects

Presenter: Eldon C. (Don) Blancher, Moffatt & Nichol

WEB: <https://www.epa.gov/ceam/aquatox#nearshore>

OVERVIEW

Application of the USEPA mechanistic modeling framework AQUATOX in estuarine habitat restoration will be demonstrated.

INTENDED AUDIENCE

Natural Resource Managers; NRDA practitioners; Academics

MAIN USE

AQUATOX is a mechanistic ecosystem model developed by the USEPA (version 3.2 October 2018) that has been used for baseline habitat productivity and injury estimates for the Deepwater Horizon Incident. The application described during the Tools Café is for the calibrated oyster reef study for Cedar Point, Alabama and was presented during a previous Tools Café for demonstrating baseline ecosystem services (supporting).

GEOGRAPHY & SCALE

The model has worldwide applications and has been used throughout North America, Europe and Asia.

ACCESSIBILITY

AQUATOX is an open source modeling framework that has worldwide use and available from the USEPA website (<https://www.epa.gov/ceam/aquatox>). Numerous study files, including the oyster reef study (Pass Christian, MS) for the northern Gulf Coast is included with the installation files. Numerous other resources are included including Model documentation and user manuals, training materials and references.