CHNEP WATER ATLAS: *AN INTERACTIVE HABITAT & ESTUARIES REPORT CARD*

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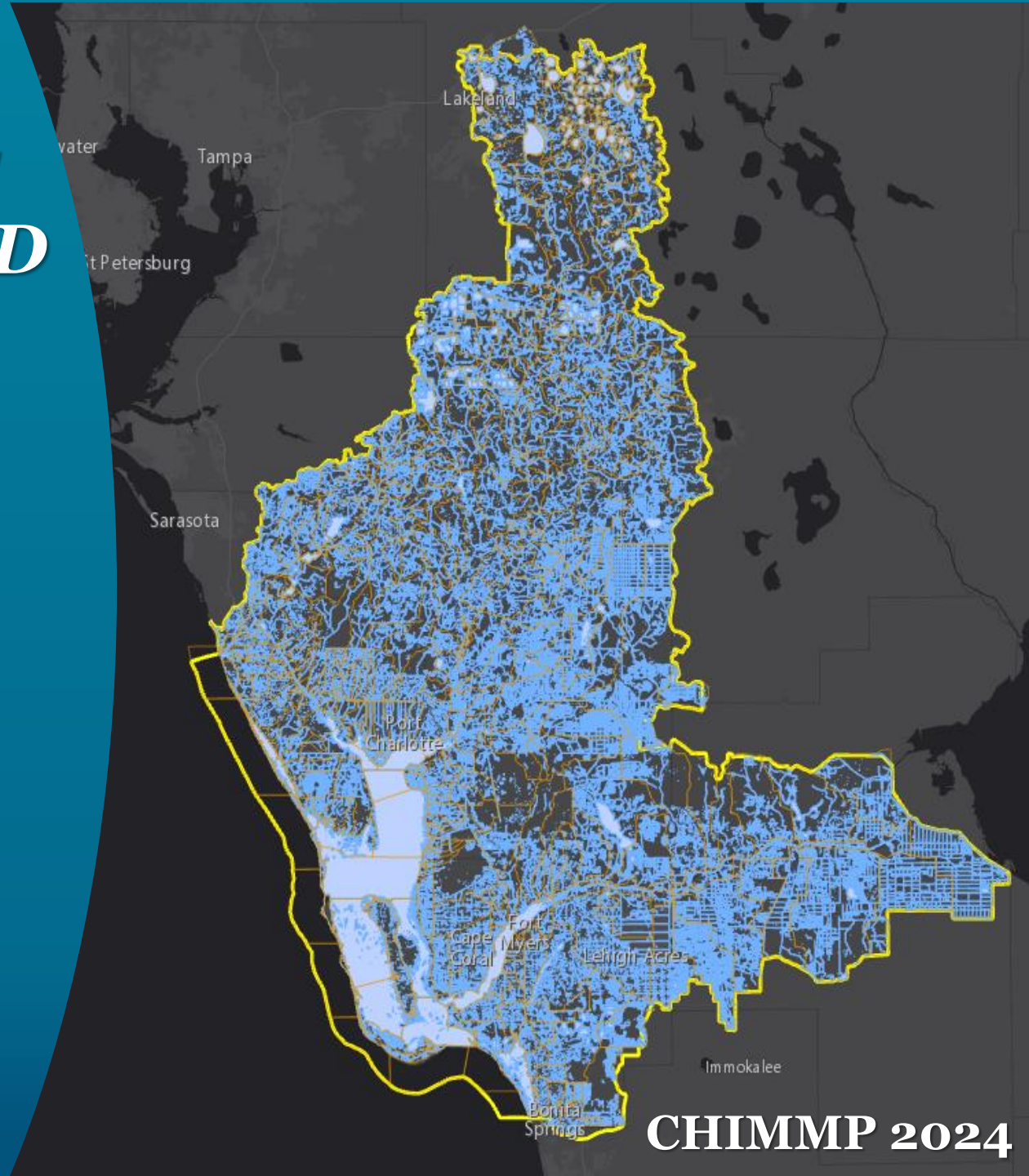
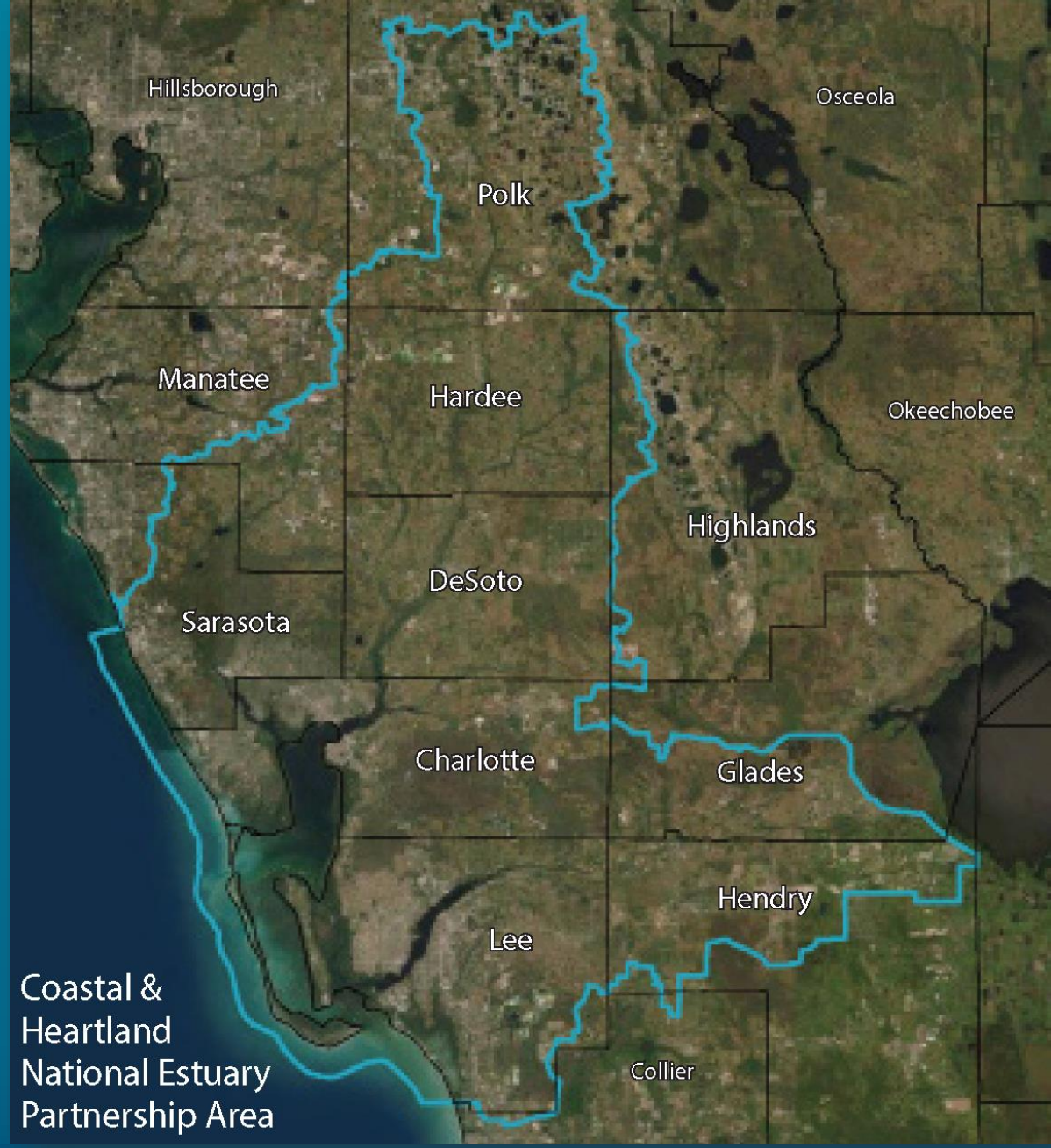


CHIMMP 2024

WHERE WE WORK

- **CHNEP area encompasses 5,416 sq. miles (8 basins)**
- **Part of the US EPA's National Estuary Program**
- **Comprised of Local, state and federal govt. as well as NGOs from 10-county area of Central and Southwest Florida**
- **Inland and coastal Communities incl. 10 counties and 25 cities**



WHAT WE DO

CHNEP is:

- **Public-private partnership**
- **Consensus-based science**
- **Non-regulatory**
- **Regional Collaboration and Planning**
- **Citizen-supported**

The 5-year Strategic Plan for the Partnership region:

Water Quality Improvement

Hydrological Restoration

Fish, Wildlife & Habitat Protection

Public Engagement

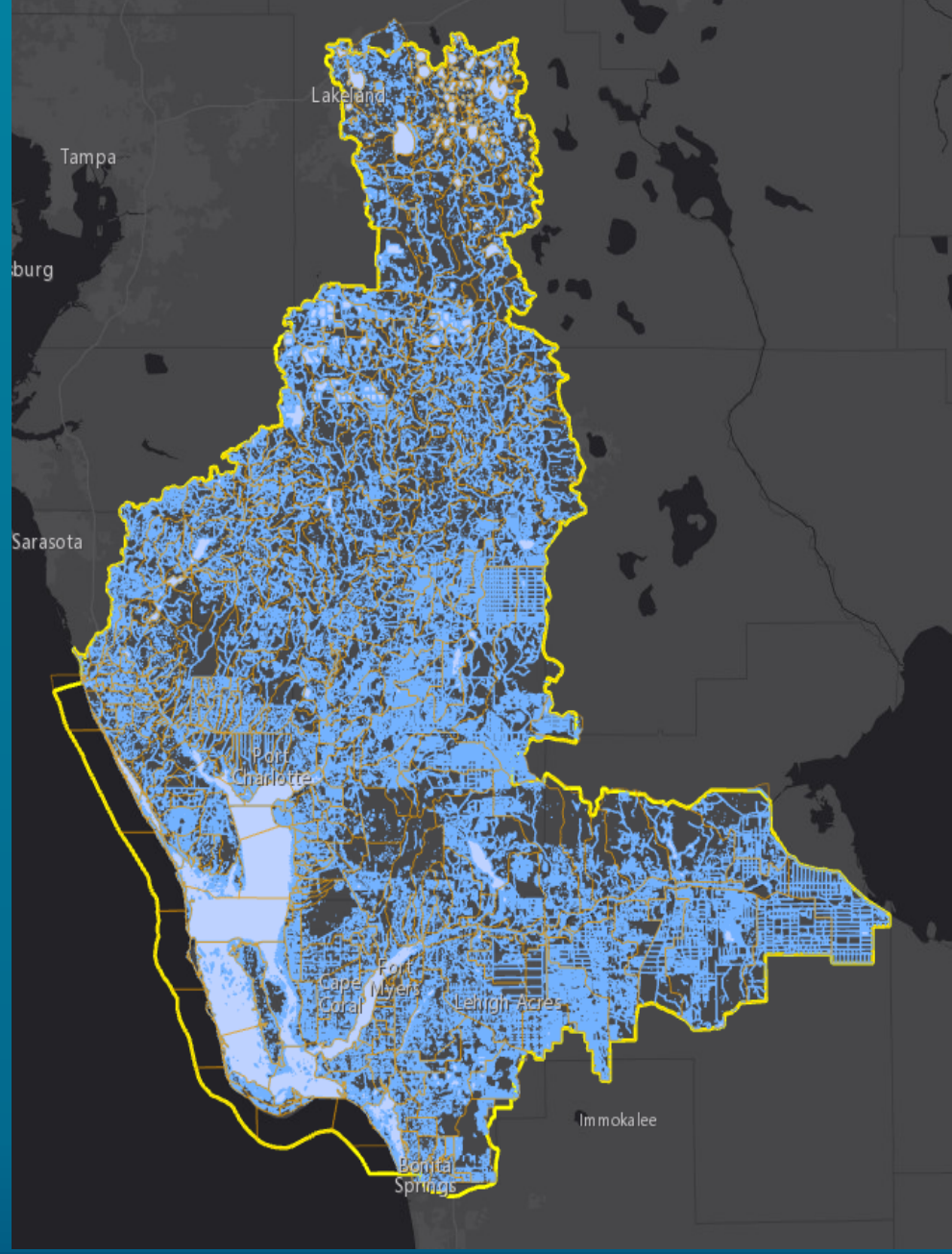
Uniting Central and Southwest Florida to Protect Water and Wildlife

MEETING GOALS

- **VISION: An informed, engaged public making choices and taking actions that increase protection and restoration of estuaries and watersheds.**

- **OBJECTIVE: Translate water quality data collected by local programs into actions aimed at protection and restoration.**

- **STRATEGY: The CHNEP Water Atlas is a publicly accessible online tool providing regional water and habitat resources and information about the historical and current conditions of our watersheds and ecosystems.**

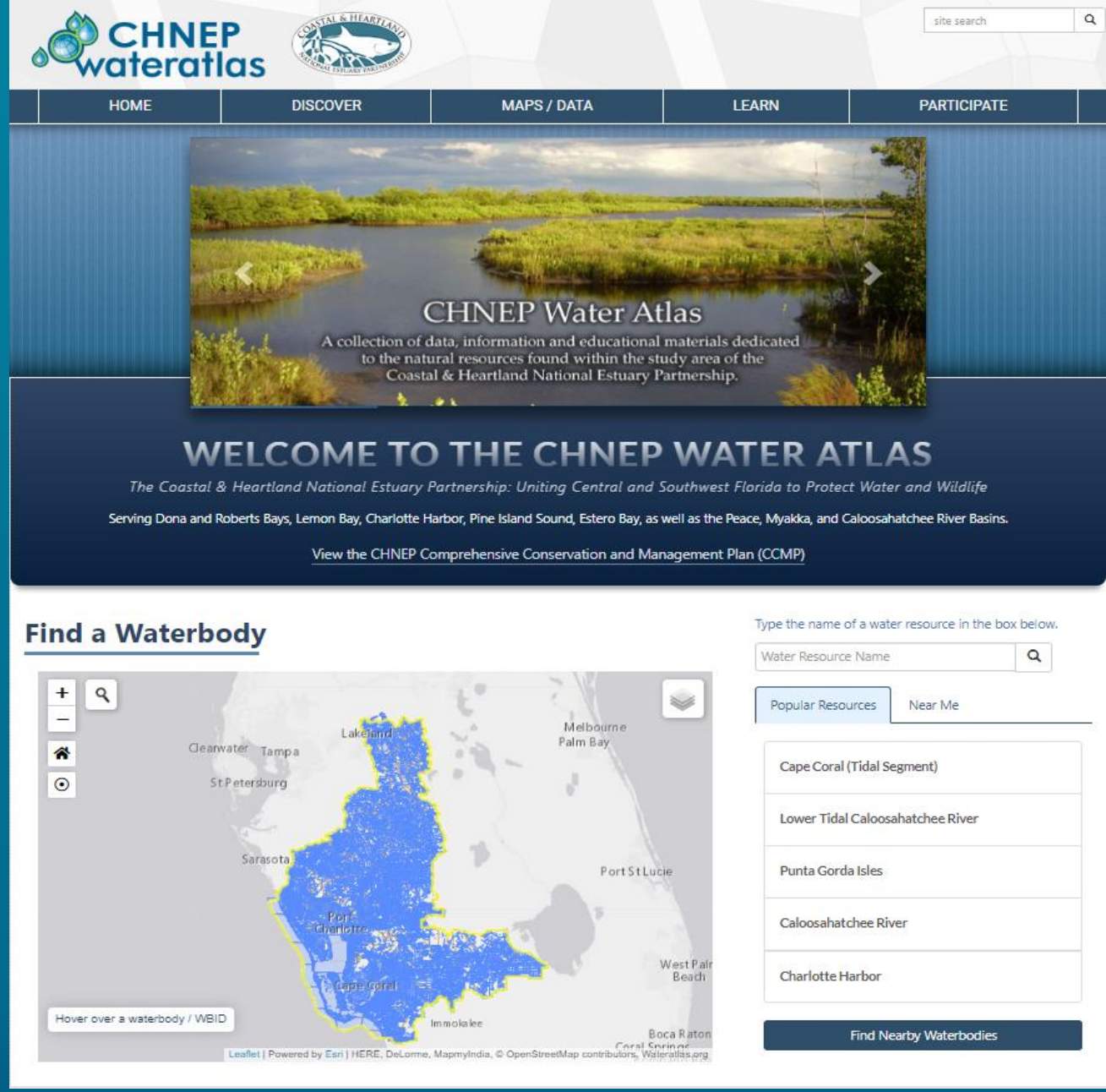


CHNEP WATER ATLAS

Web-based resource center for:

- **Scientists;**
- **Local resource managers;**
- **State agencies;**
- **Interested community members;**
- **Decision makers.**

User-friendly, one-stop shop for water quality, flow, and habitat data featuring interactive maps, graphs and charts, and easy-to-understand explanations of environmental science.

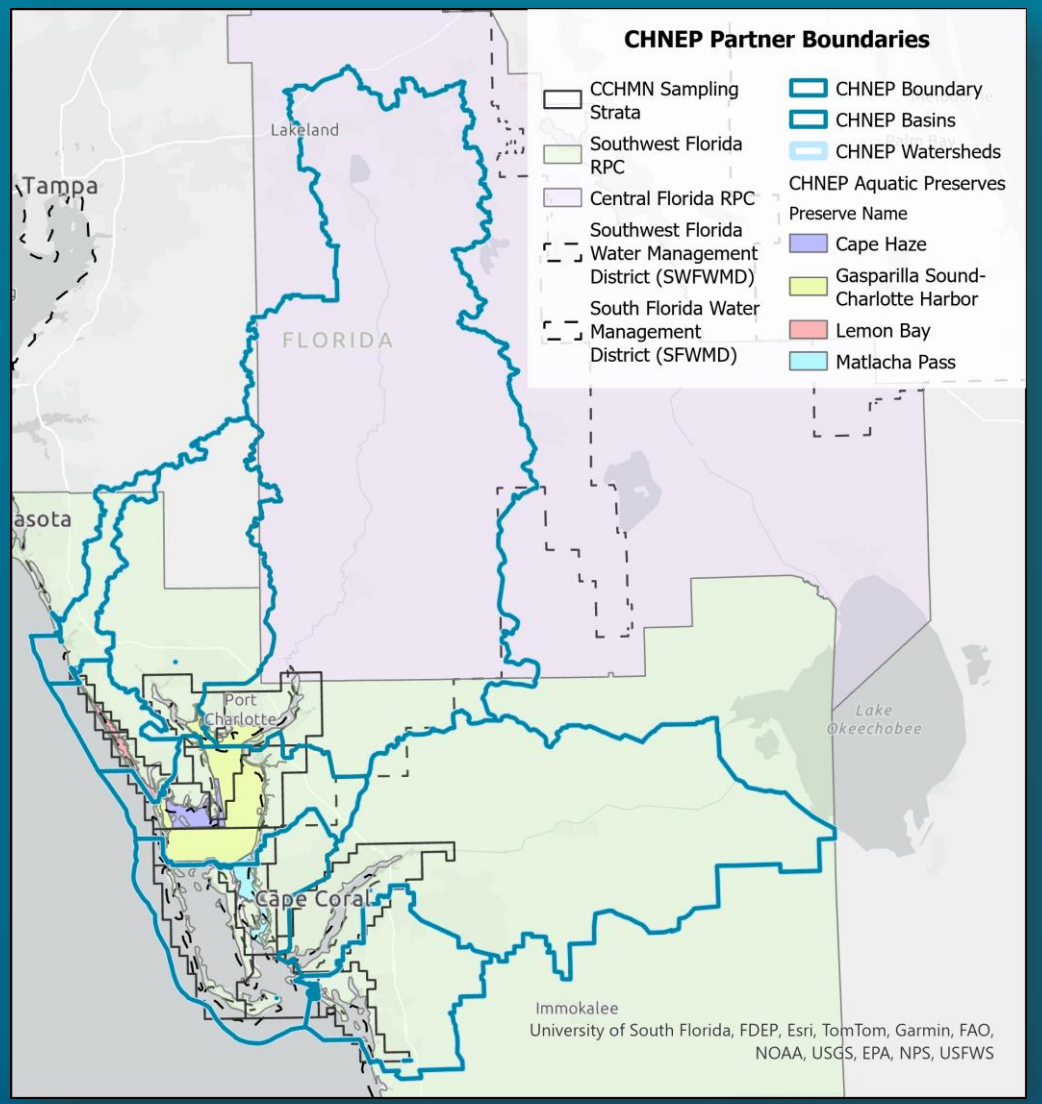


Uniting Central and Southwest Florida to Protect Water and Wildlife

BREAKING OUT OF SILOS

- The Partnership covers several different management and research boundaries, including:
  - 10 counties
  - 2 Water Management Districts
  - 2 Regional Plannings Councils
  - 4 aquatic preserves

- CHNEP Water Atlas tools and data were operating in isolation on individual webpages
  - Water Quality Dashboard
  - Seagrass pages
  - Habitat Restoration Needs
  - Clam and Oyster Habitat Suitability



BREAKING OUT OF SILOS

WATER QUALITY DASHBOARD

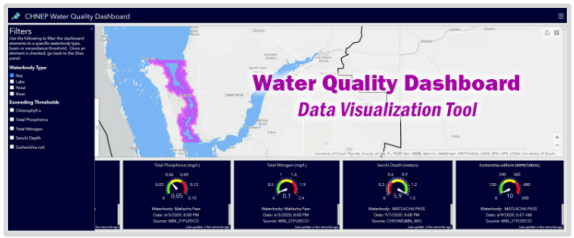
Current water quality conditions for inland and coastal waterbodies

This dashboard measures the most current water quality data against water quality standards for Chlorophyll *a*, Phosphorus, Nitrogen, *E. coli* bacteria, and Secchi Depth water clarity (separated by fresh and marine water quality standards outlined in Florida Administrative Code 62-302). It provides a snapshot of how a waterbody is doing, with the colors on the dials representing the current state of the water quality based on the last data point reported with green meaning good condition, yellow meaning fair as water quality is approaching unsafe threshold, and red meaning poor as the water is above the safety threshold. For additional water quality data and more detailed analysis of a specific lake, river or bay visit the home page of the Water Atlas.

The results displayed on the Dashboard are for information only and have no regulatory authority. They are not an assessment of waterbody impairment, which is done solely by the Florida Department of Environmental Protection, which continually collects and assesses water quality and biological data statewide to determine water quality and ecosystem impairment (https://floridadep.gov/dear/watershed-assessment-section).

Usage notes: Zoom in completely on the desired waterbody before selecting to ensure the correct waterbody is selected. If you have trouble viewing dials or latest values, refresh the page and re-select the desired waterbody.

Open the CHNEP Water Quality Dashboard



Legend

- Good — Good condition as water quality is in safe range
- Poor — Poor condition as water quality is above safety threshold

Tips

- Zoom in completely on the desired waterbody before selecting to ensure the correct waterbody is selected.
- If you have trouble viewing dials or latest values, refresh the page and re-select the desired waterbody.

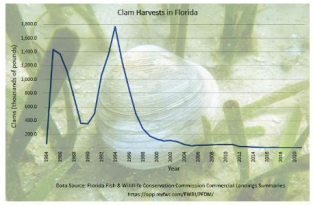
The southern hard clam (*Mercenaria campechiensis*) and the northern hard clam (*M. mercenaria*) are both found in the Gulf of Mexico. The southern species is native while the northern species is likely a product of aquaculture introduction. When abundant, hard clams have an important role in estuaries as filter feeders transferring energy throughout the food web. The feeding activity of hard clams reduces phytoplankton and turbidity, which benefits seagrass by increasing water clarity ultimately provides habitat and a food source for marine life. Hard clams are becoming less abundant in most areas of the Gulf of Mexico and resource managers are investigating techniques to effectively restore natural populations along the Florida coast.

Summary

Clam Restoration in the Charlotte Harbor Estuary

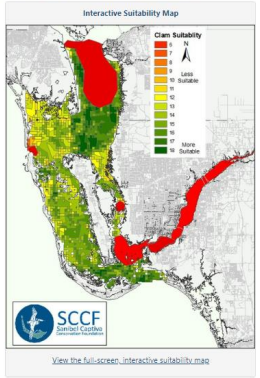
The hard clam has been harvested by man from the Charlotte Harbor Estuary since at least 300 – 500 AD. Since the mid-twentieth century, over-harvesting, water quality changes, habitat loss and ecosystem disturbance has drastically reduced the abundance of hard clams in Southwest Florida. In fact, the Charlotte Harbor Estuary is a home for clam farm leases in Pine Island and Gasparilla Sounds. Farmers are often faced with an inability to market their clams due to red tide, fishery closures and other natural events. During these instances, the farmed clams are still viable and could be used to help regional restoration efforts by relocating them to suitable areas for their long-term survival and natural propagation.

A Charlotte Harbor Estuary clam restoration study group was formed to address the potential of using unmarketable hard clams for restoration efforts. The study group consists of clam farmers and scientists from Florida Department of Environmental Protection (FDEP), Florida Fish and Wildlife Commission (FWC), and Sanibel Captiva Conservation Foundation (SCCF). The goal of the project was to identify and rank 10 potential clam restoration sites within the Charlotte Harbor Estuary which provide optimum habitat suitability with minimal logistical challenges.



Suitability Map

This interactive map shows combined suitability factors with aggregated suitability scores for each pixel. The dark green areas indicate predicted most suitable habitat while the red areas predict unsuitable habitat. This map will be used to survey potential clam restoration sites located within habitat predicted to be suitable.



View the full-screen, interactive suitability map

WATER QUALITY TRENDS

Explore short- and long-term trends for those water quality parameters that are most useful in evaluating the extent of nutrient pollution.

Use the map to choose a water quality parameter, time period, and geographic area. The map will show a summary of the results of a Seasonal Kendall Tau statistical analysis for trend[1]. Each icon displayed on the map represents one monitoring station; it shows whether the data collected there for the selected water quality measure shows a statistically significant trend, and if so, whether it was increasing or decreasing, weak (<10% change/year) or strong (>10%/year). Clicking on an icon will open a popup with a trend graph. Click on the "View full details" link in the popup to see a full page of information about the station, data, and trend, and to download a printer-friendly version.

Data is presented and analyzed here in two ways:

1. Stratum: 60 randomized samples are collected each month to capture representative water quality conditions across 10 waterbodies throughout the CHNEP area over multiple years. These waterbodies are the 'stratum'. This data is collected by partners in the Coastal Charlotte Harbor Monitoring Network (CCHMN).
2. Fixed Station: Individual stations where samples have been collected in the same location over multiple years and are representative of water quality conditions at that station. CHNEP's county and municipal partners and established volunteer programs listed below collect this data.

Learn more

Total Nitrogen - Period of Record (All Available Data)

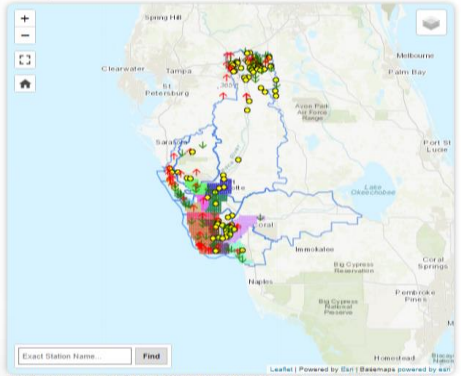
The map below shows the trend being experienced at the long-term monitoring stations spread throughout the CHNEP area.

View Data Details

Water Quality Parameter: Total Nitrogen

Time Period: Period of Record (All Available Data)

Zoom To: Zoom to a Basin or Stratum



Note: Trends were prepared on October 9, 2023 using the latest available data. Results presented replace all previous editions.

Download Trend Analysis Output

You can download raw data for your own analysis by clicking on the link below. The data is formatted as a **ZIP file** containing raw and calculated data, methods documentation, and an **R script**.

Download | View archived analyses

Note: Trends were prepared on October 9, 2023 using the latest available data. Results presented replace all previous editions.

Map Legend

- Increasing Trend, Larger Rate — Declining
- Increasing Trend, Smaller Rate — Declining
- No Trend
- Decreasing Trend, Smaller Rate — Improving
- Decreasing Trend, Larger Rate — Improving
- CHNEP Basin Boundary
- CHNEP Sampling Strata

Contacts

For more information, please contact the Coastal & Heartland National Estuary Partnership:

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Documents

For more information, please see the documents below:

- Water Quality Data Analysis Report for the Coastal & Heartland National Estuary Partnership (2013)
- Techniques of Trend Analysis for Monthly Water Quality Data (1982)
- Statistical Methods for the Analysis of Lake Water Quality Trends (1993)
- Seasonal Trend Analysis of Monthly Water Quality Data
- Statistical Analysis for Monotonic Trends
- EnvStats: Package for Environmental Statistics, Including US EPA Guidance
- Millard SP (2013). EnvStats: An R Package for Environmental Statistics. Springer, New York. ISBN 978-1-4614-8455-4
- CCHMN 2019 Standard Operating Procedures (includes Strata information)

Trend Analysis Process Overview

This page displays the results of a statistical ten-year trend analysis developed to use selected water quality parameters from the Water Atlas. In addition to a summary visualization of the trend results, it also provides a compiled data set, and explanatory digital documents that will be valuable to natural resource managers as they attempt to characterize and react to water quality conditions and trends. The statistical analytical techniques employed by this tool were modified from the approach used by Janicki Environmental, Inc. in the 2013 Water Quality Data Analysis Report for the Coastal & Heartland National Estuary Partnership.

The Seasonal Kendall Tau test for trend available in the EnvStats R package is used as the statistical approach[1]. The model employs techniques to account for seasonality, autocorrelation and duplicate sampling, in an effort to detect statistically significant trends in the data. Analysis was performed on a suite of water quality measures for each of approximately 900 monitoring sites. For each site/water quality measure, the analysis determined whether a statistically significant trend was detected, and if so, whether it was increasing or decreasing, weak (<10% change/year) or strong (>10%/year).

The amount of nutrients entering a water body has important effects on water quality. Plants and animals that live in lakes, rivers and estuaries use these nutrients, especially nitrogen and phosphorus, to grow and survive. However, when excessive amounts of nutrients enter the water, negative impacts can occur, such as algal blooms that block sunlight for submerged plants and trigger events that deplete the oxygen in the water and result in fish kills. The indicators shown here are those most valuable in assessing the health of our waterways relative to nutrient pollution.

1. Millard SP (2013). *EnvStats: An R Package for Environmental Statistics*. Springer, New York. ISBN 978-1-4614-8455-4, https://www.springer.com

Seagrass Home
- Dona & Roberts Bay Basin
- Lemon Bay Basin
- Myakka River Basin
- Peace River Basin
- Gasparilla Sound-Cape Haze Basin
- Charlotte Harbor Basin
- Pine Island Sound-Matlacha Pass
- San Carlos Bay Basin
- Tidal Caloosahatchee River Basin
- Estero Bay Basin

CHNEP Area Interactive Map

Summary

Florida seagrass beds are an extremely valuable natural resource. Seagrasses are flowering plants that grow underwater in shallow coastal and brackish waters. They provide food, habitat and nursery grounds for several marine species, including many economically important fish and shellfish species. Additionally, seagrasses play a role in carbon sequestration, nutrient cycles, stabilizing sediments, and maintaining coastal biodiversity.

Seagrass is recognized by state, federal, and local agencies as critical habitat. Estuary specific restoration and water quality goals have been established to support seagrass recovery. Over 2.2 million acres of seagrass have been mapped in estuarine and nearshore Florida waters. ***Given the value of seagrass beds, many agencies in Florida now monitor and track the health and status of seagrasses regularly.***

Use the navigation bar on the left to view seagrass data and analyses in selected basins or visit the interactive mapper to view historical seagrass acreage and recent seagrass loss throughout the entire CHNEP area.

COASTAL & HEARTLAND NATIONAL ESTUARY PARTNERSHIP

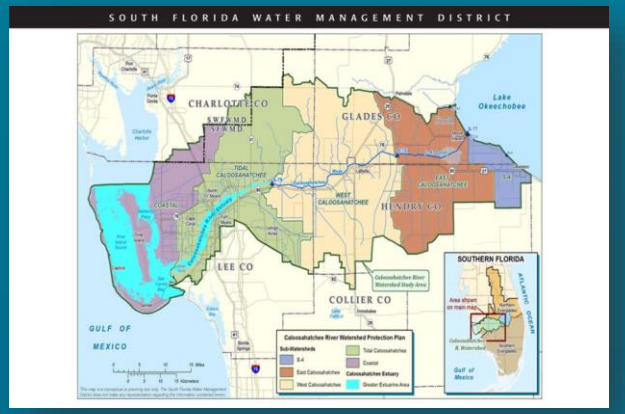
Uniting Central and Southwest Florida to Protect Water and Wildlife

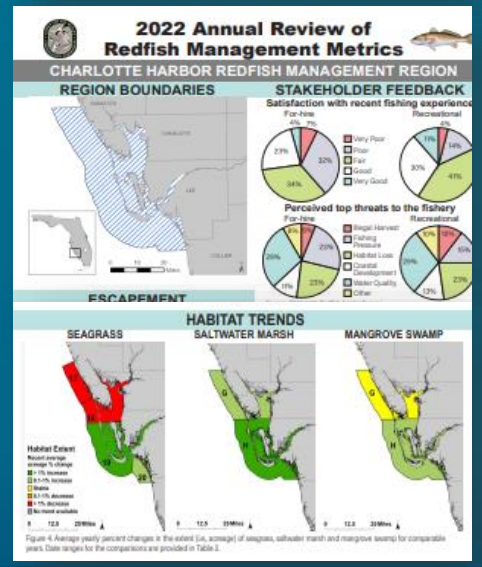
TOOLS FOR MANAGEMENT PARTNERS

- **CHIMMP report: “Cooperation is necessary among federal, state, and local governmental agencies and nonprofit groups to coordinate connectivity.”**
- **What are metrics used by stakeholders to measure water quality and habitat health? (research scientists, agencies, local govts., NGOs)**
- **Data needed to be organized in a way used by management agencies. WMDs, FDEP, FWC etc.**

SWFWMD

SFWMD



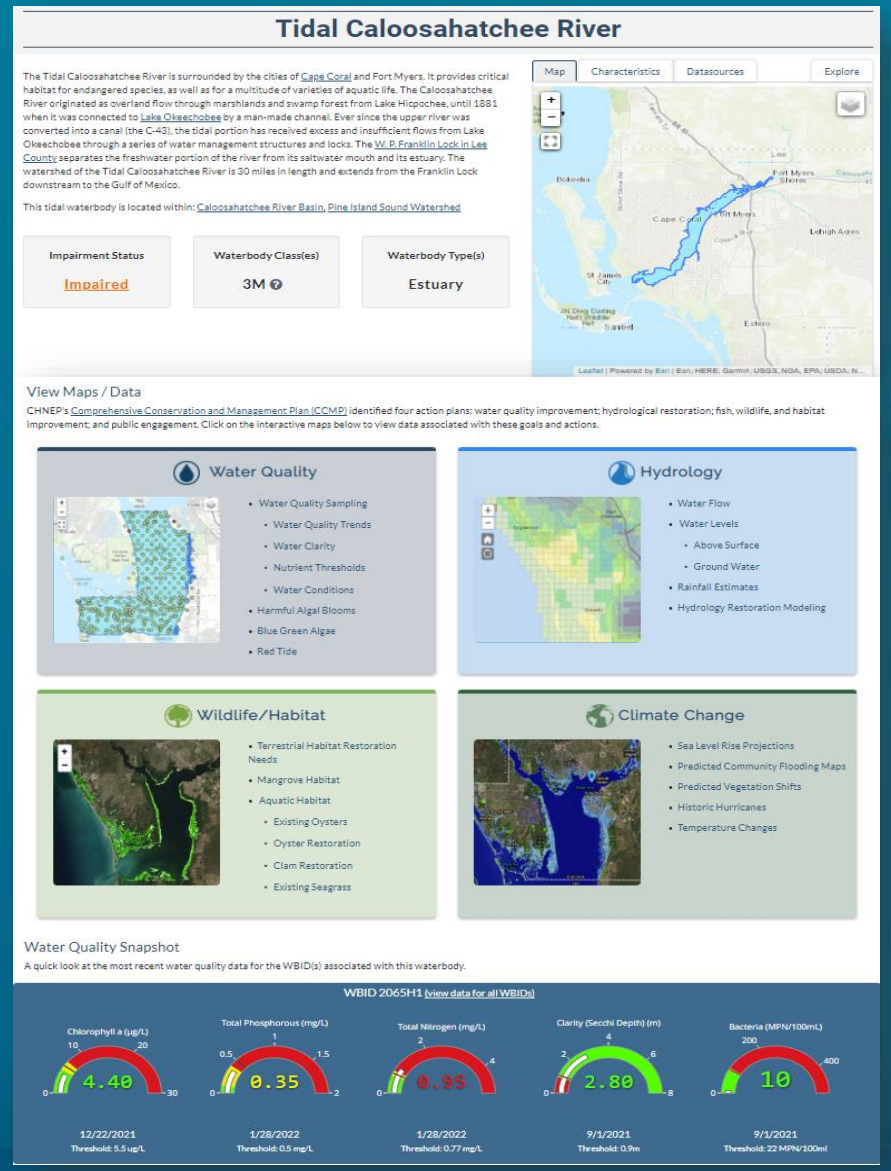


FWC

FDEP

INTERACTIVE ESTUARIES & HABITAT REPORT CARD

- **Bringing all data collected by partners in one place to give holistic management picture**
  - ➢ **Water Quality**
  - ➢ **Hydrology**
  - ➢ **Wildlife/Habitat**
  - ➢ **Climate Stressors**

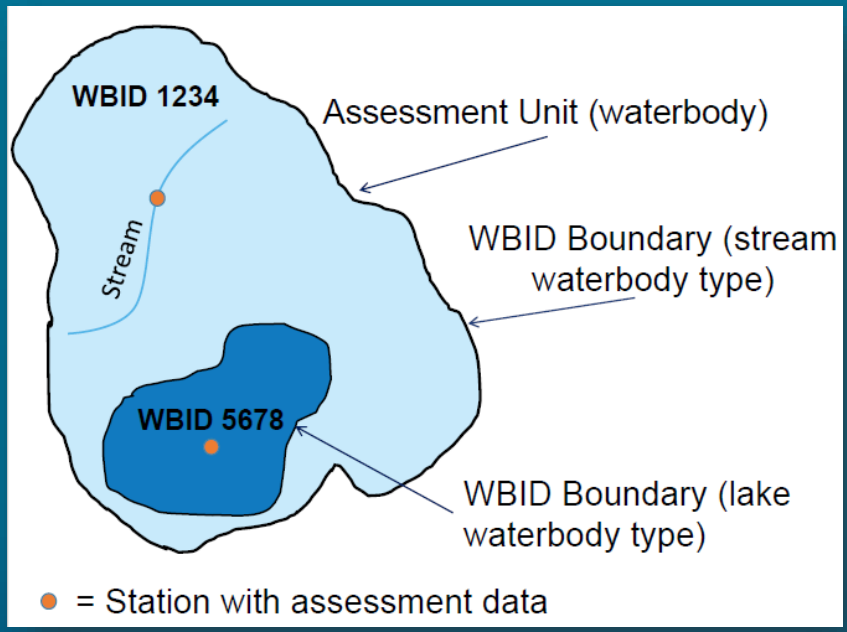


WATER QUALITY ASSESSMENT

The FL Dept. of Environmental Protection (FDEP) Water Quality Assessment Program establishes water quality standards and impairments on behalf of EPA.

Water quality status and trends are essential to identify sources of pollutants, examine pollutant load limits, and evaluate effectiveness of management practices.

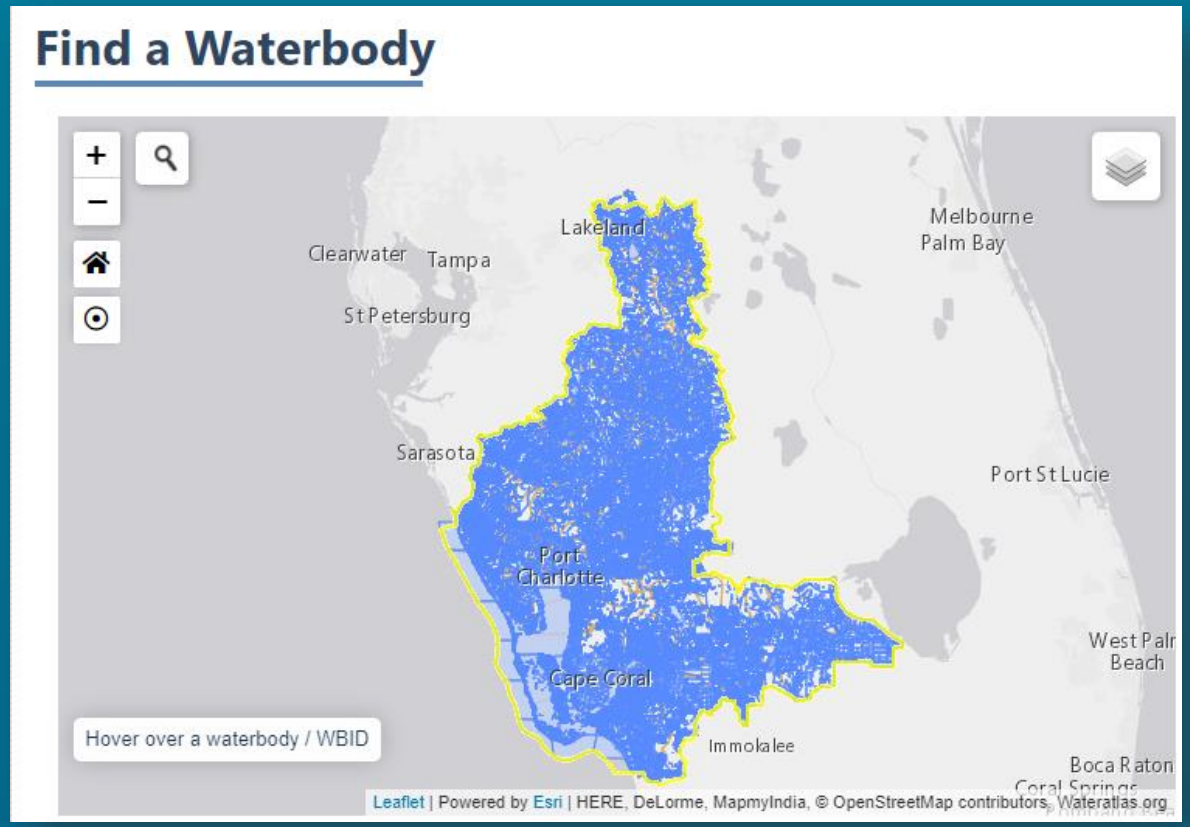
- **FDEP's Water Body Identification Number (aka WBID) is an assessment unit. Each WBID is intended to represent a waterbody or an area of homogenous water quality.**
- **Annual impaired waters assessments are done at the WBID level and needed management actions will be determined based on these assessment results.**



ORGANIZING DATA TO GUIDE MANAGEMENT

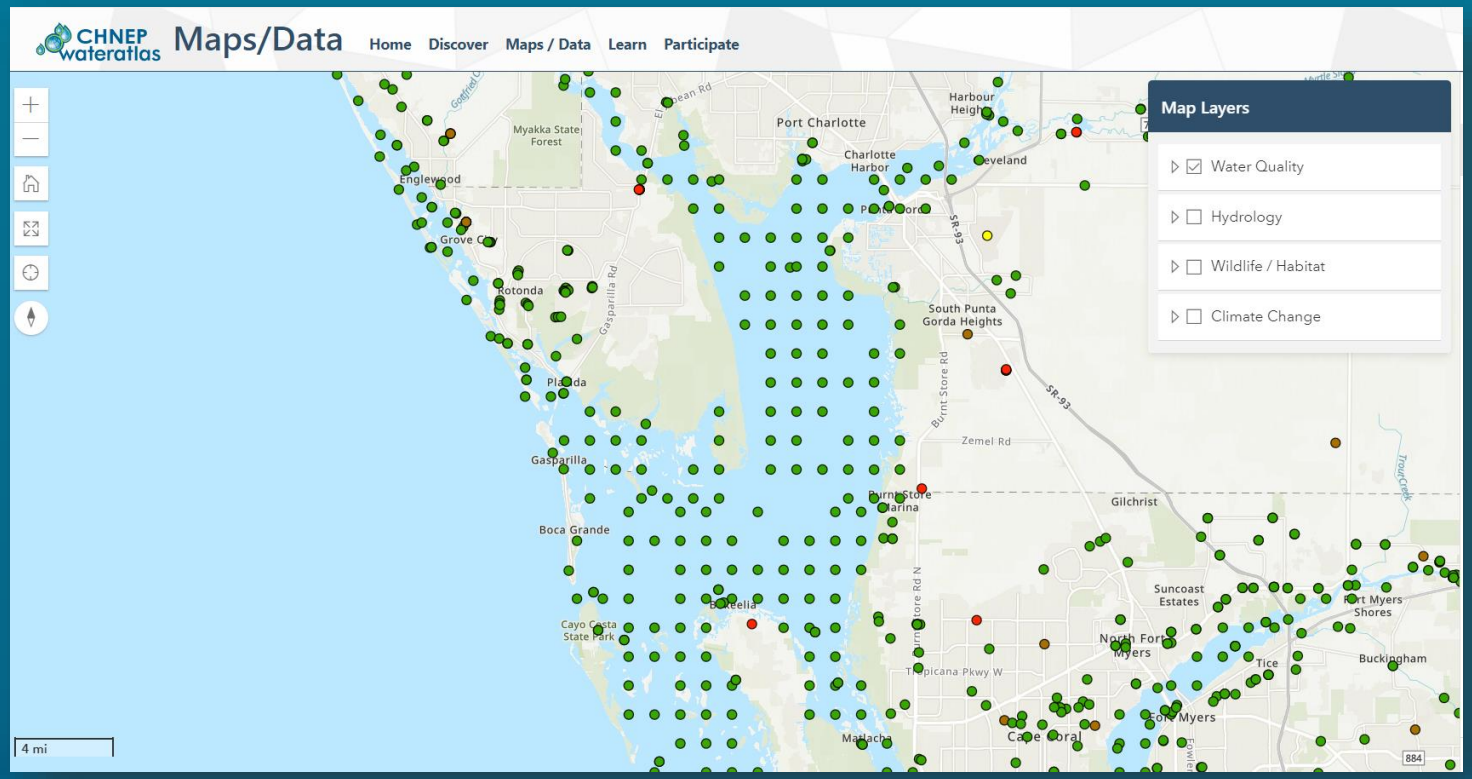
- **CHNEP Water Atlas waterbodies were reorganized to align with FDEP WBIDs. Management agency (FDEP) uses this scale to identify sources of pollutants, examine pollutant load limits, and evaluate effectiveness of management practices.**

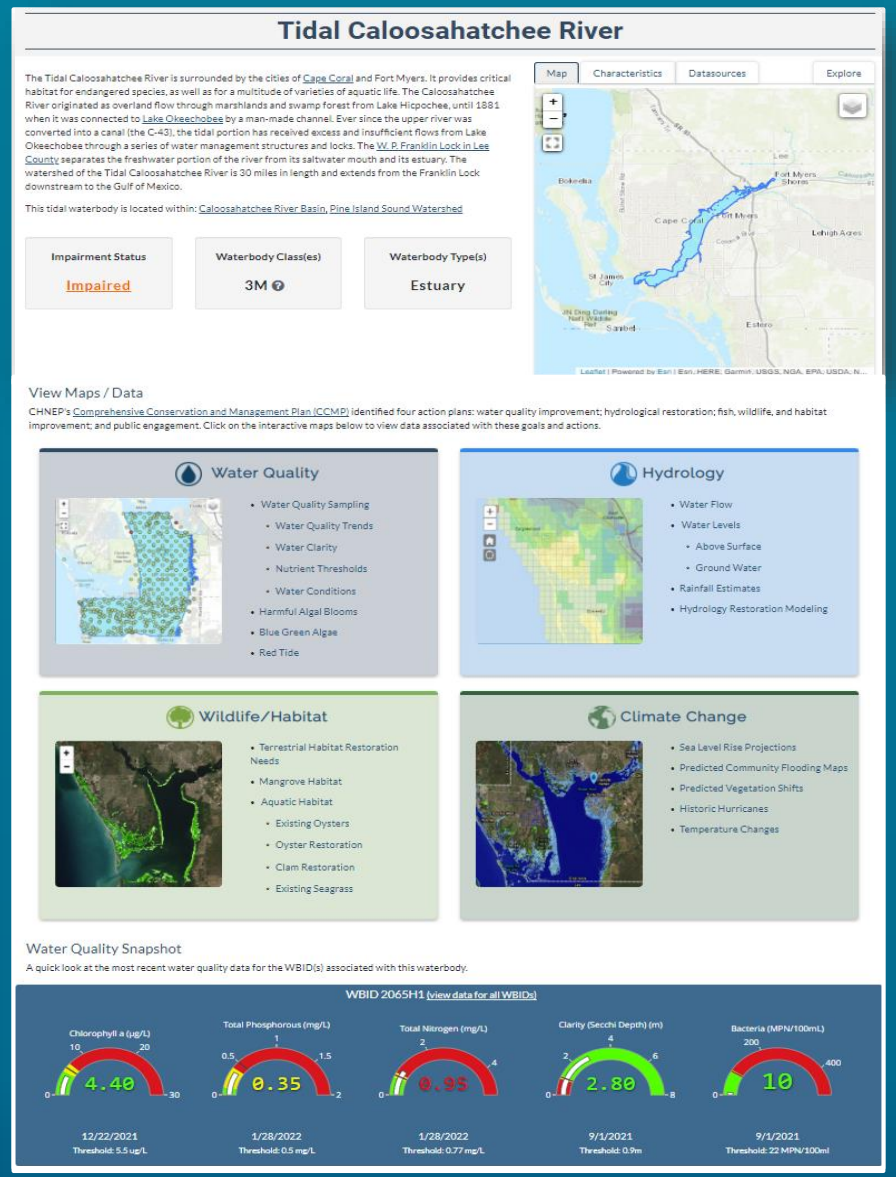
- **Users can access pages for individual waterbodies – including lakes, ponds, bays, rivers, and streams to view associated water quality data and impairment status.**



WATERBODY PAGES

- **Waterbody Pages presented with associated FDEP WBIDs and appropriate impairment criteria and explanation, WQ Dashboard dials, and all associated data in 4 interactive maps**





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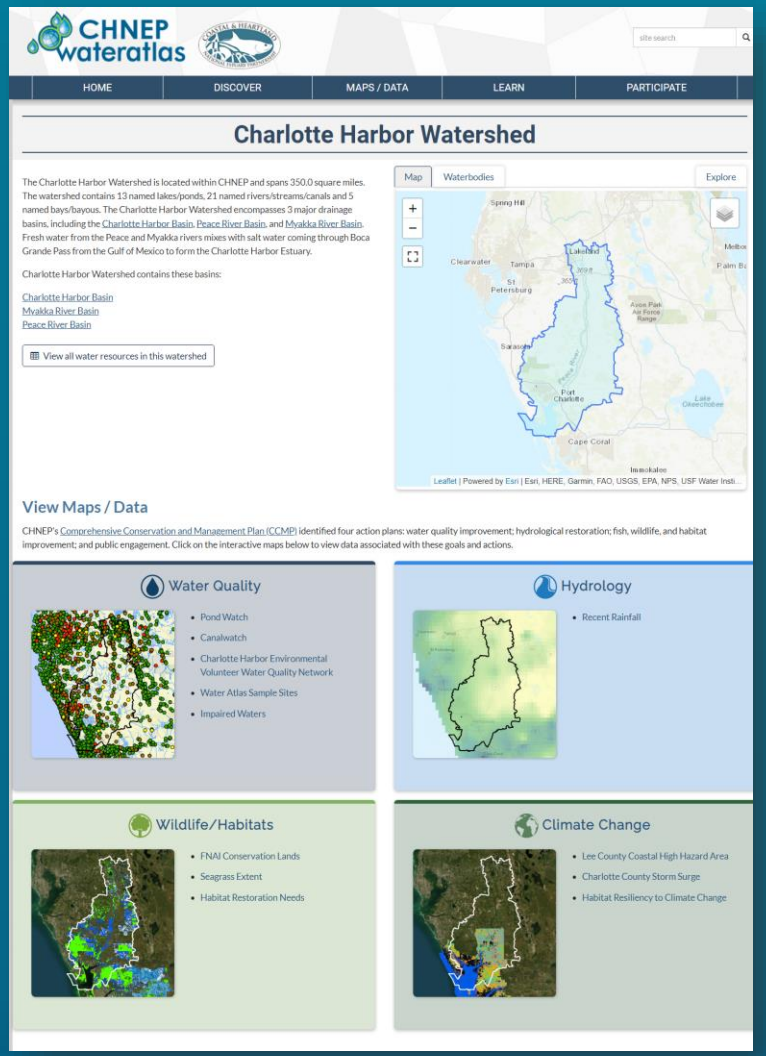
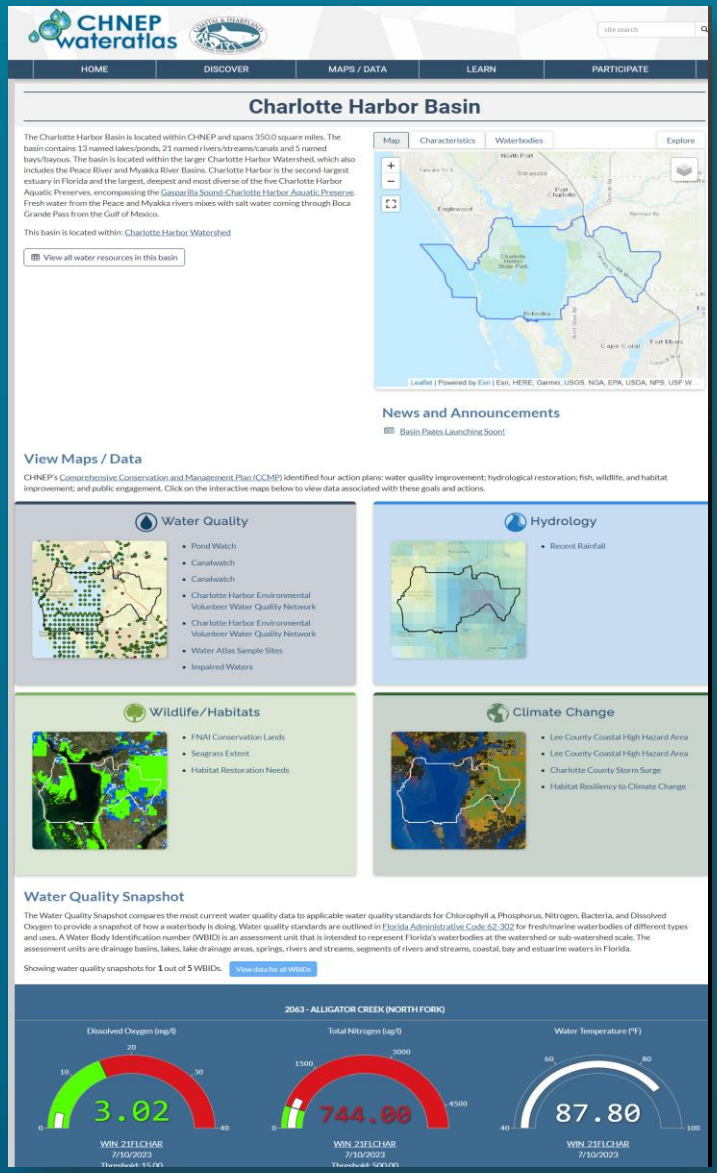
BASIN & WATERSHED PAGES

- Waterbody pages will link to Basin and Watershed pages Waterbodies.
- These pages align with how Management Plans from other agencies and partners aggregate data.
- Each Basin and Watershed age is presented with associated data in 4 interactive mappers





MEETING THE GOALS OF CHIMMP

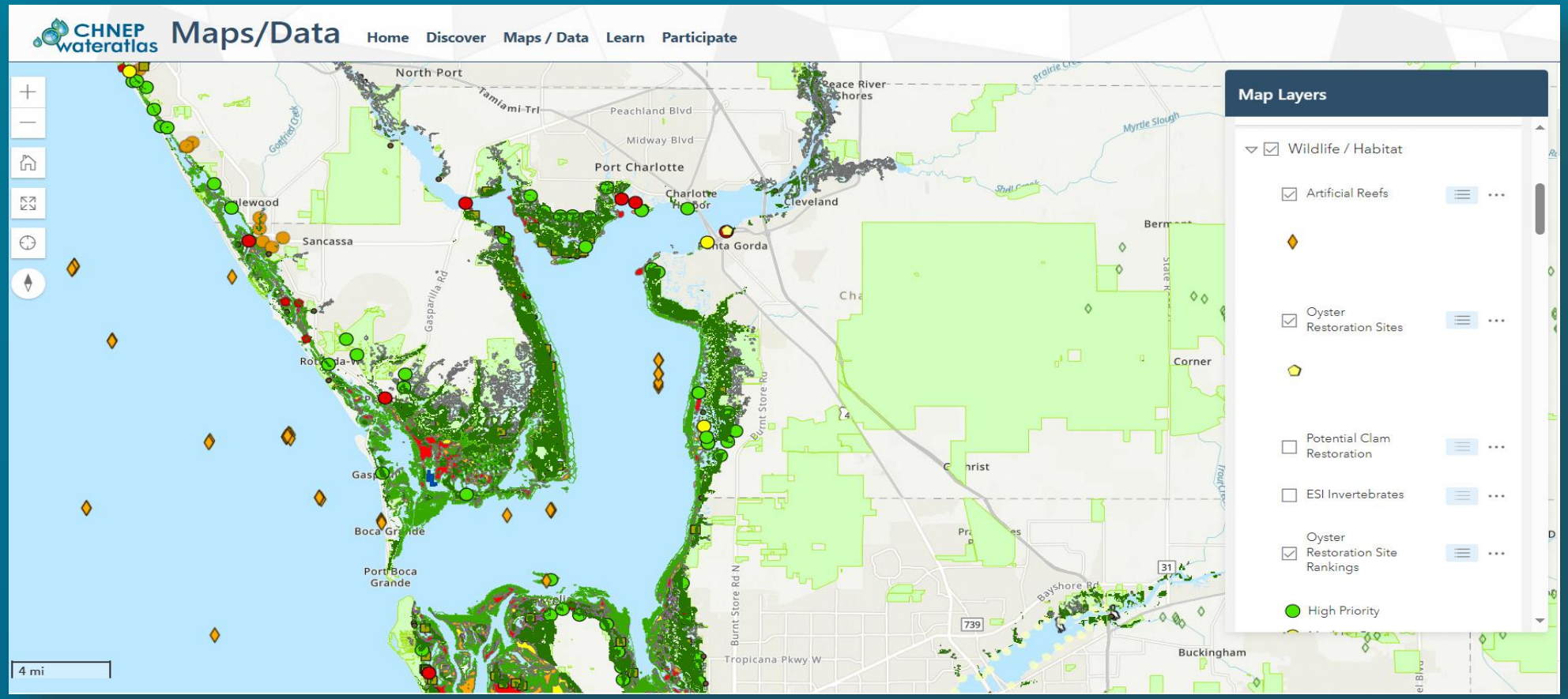
From CHIMMP report:

A coordinated statewide mapping and monitoring program was deemed necessary to better understand and protect Florida's vulnerable coastal habitats and the numerous species that depend upon them.

The goals of CHIMMP include bringing together representatives from mapping and monitoring programs across the State to increase communication, minimize duplicate efforts and identify data gaps, needs, and priorities

Coastal wetland monitoring programs…vary widely in methodology. Monitoring over long-time scales is increasingly important due to regional uncertainties as to how coastal wetland vegetation and substrate accretion will respond to sea-level rise, altered freshwater hydrology, and other disturbances.

INTERACTIVE WILDLIFE & HABITAT MAP

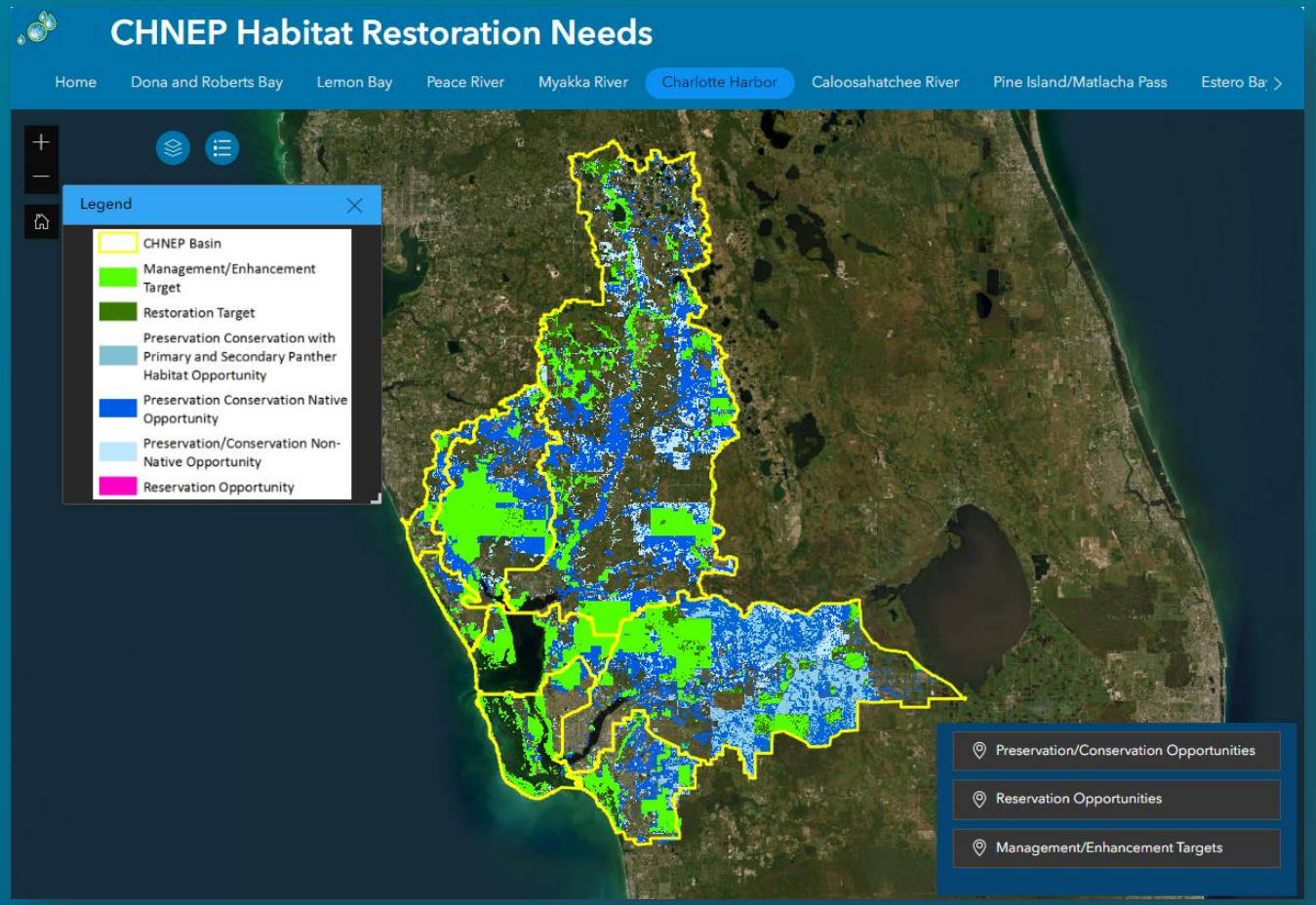


- **Additive to existing efforts (ex: CHIMMP Reports): Sought to combine all publicly available mapping data that captures large-scale changes in habitat extent, as well as smaller-scale species shifts gathered by on-the-ground monitoring.**

HABITAT RESTORATION NEEDS

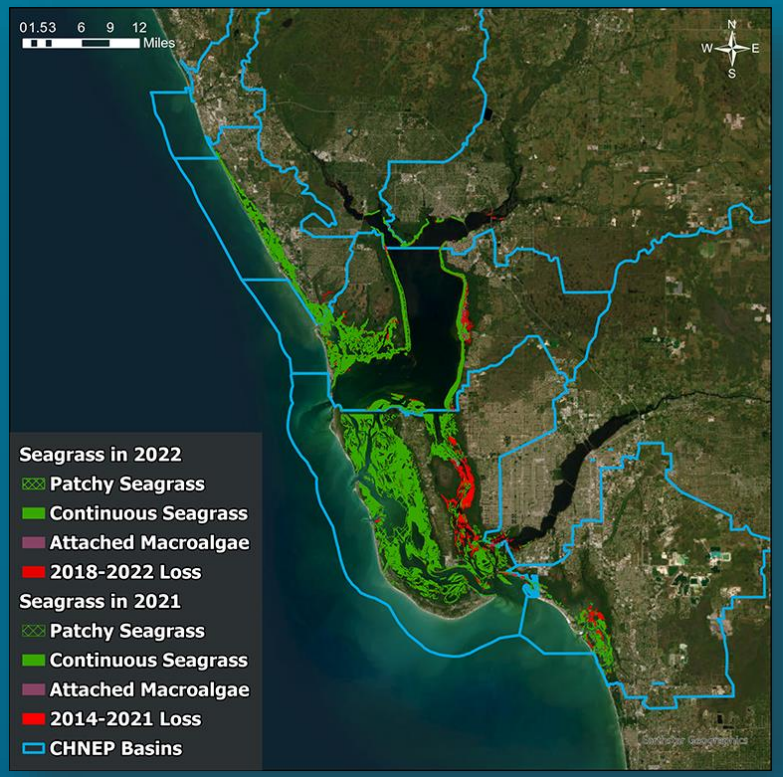
Habitat Restoration Needs Report Maps & Landing Page

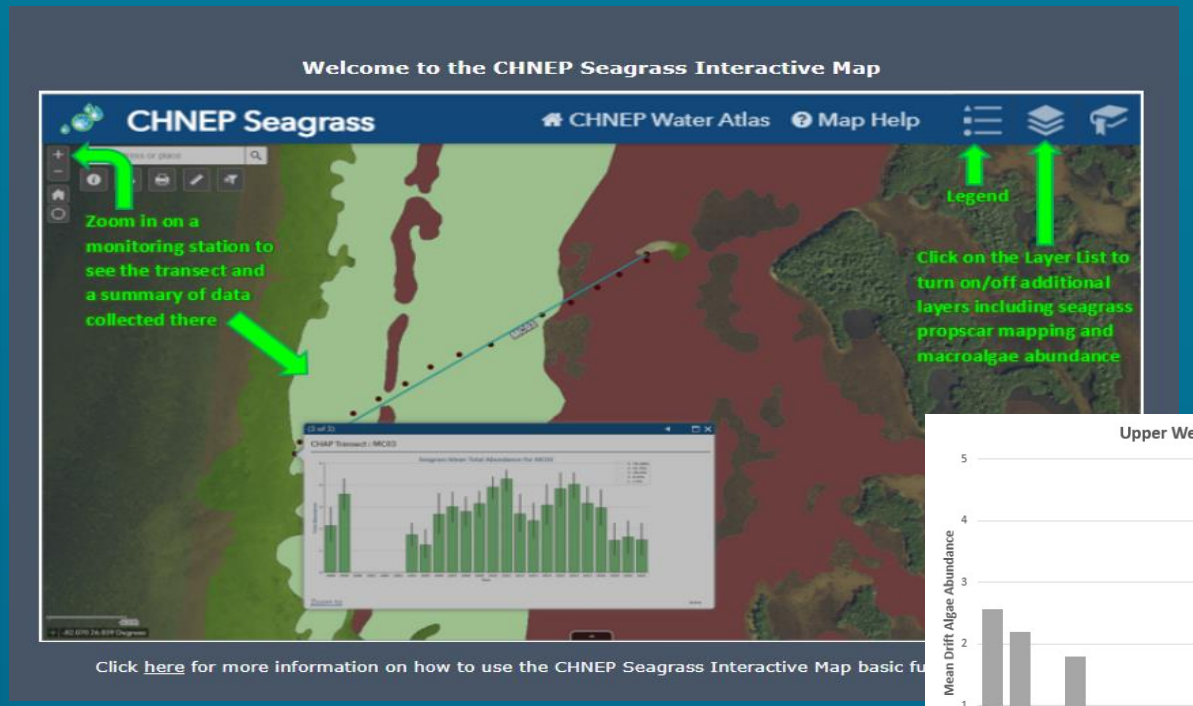
- Map of potential preservation/ conservation and reservation opportunities, as well as management/ enhancement and restoration targets by basin
- Recommendations for coastal wetlands
- Includes habitat change analysis and habitat migration model results

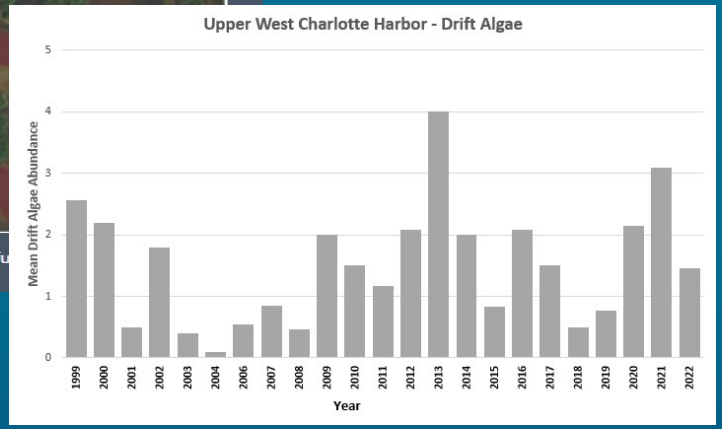


SEAGRASS & ALGAE

Maps of seagrass presence/loss, propscar studies, macroalgae, and seagrass transects. Also acreage and transect graphs, algae and epiphyte graphs (Sources: SWFWMD, SFWMD, FDEP, SeaGrant)

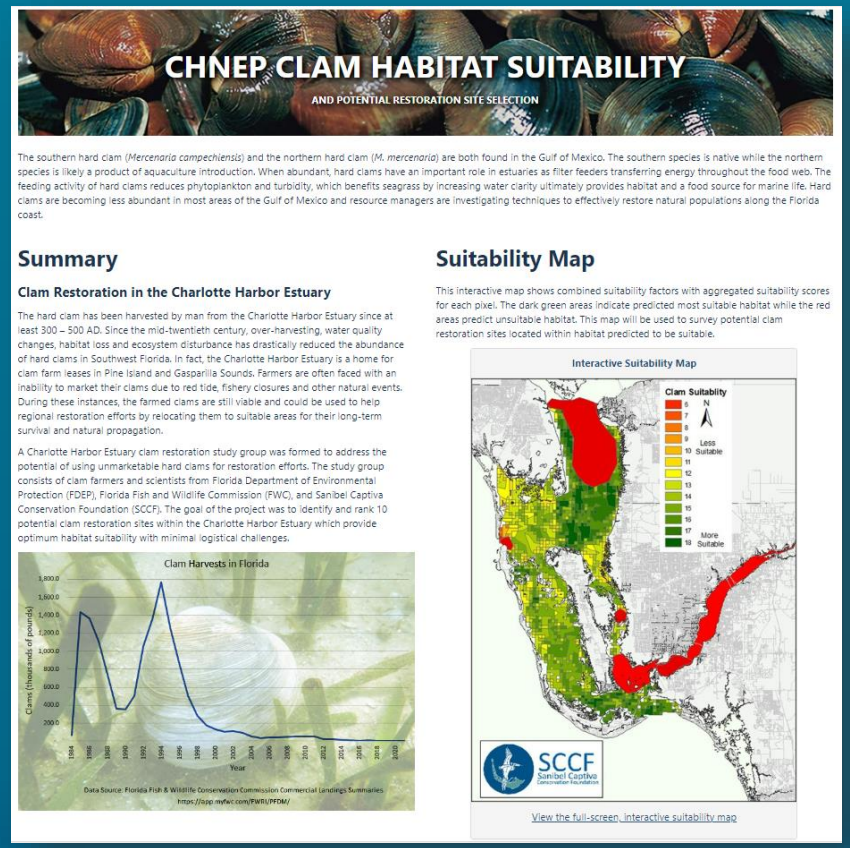


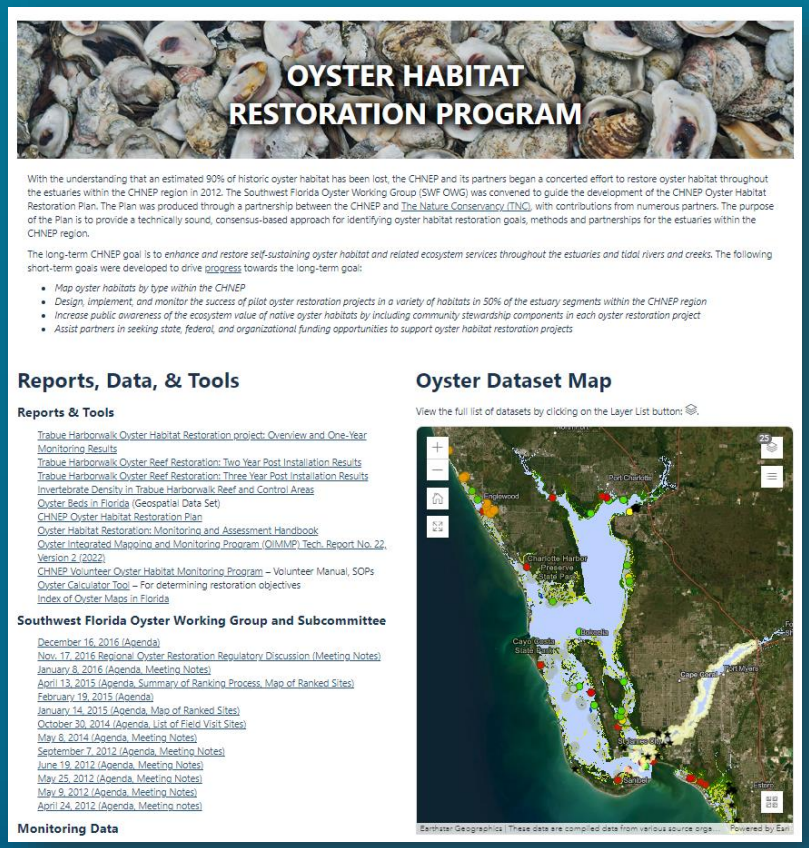




OYSTERS & CLAMS

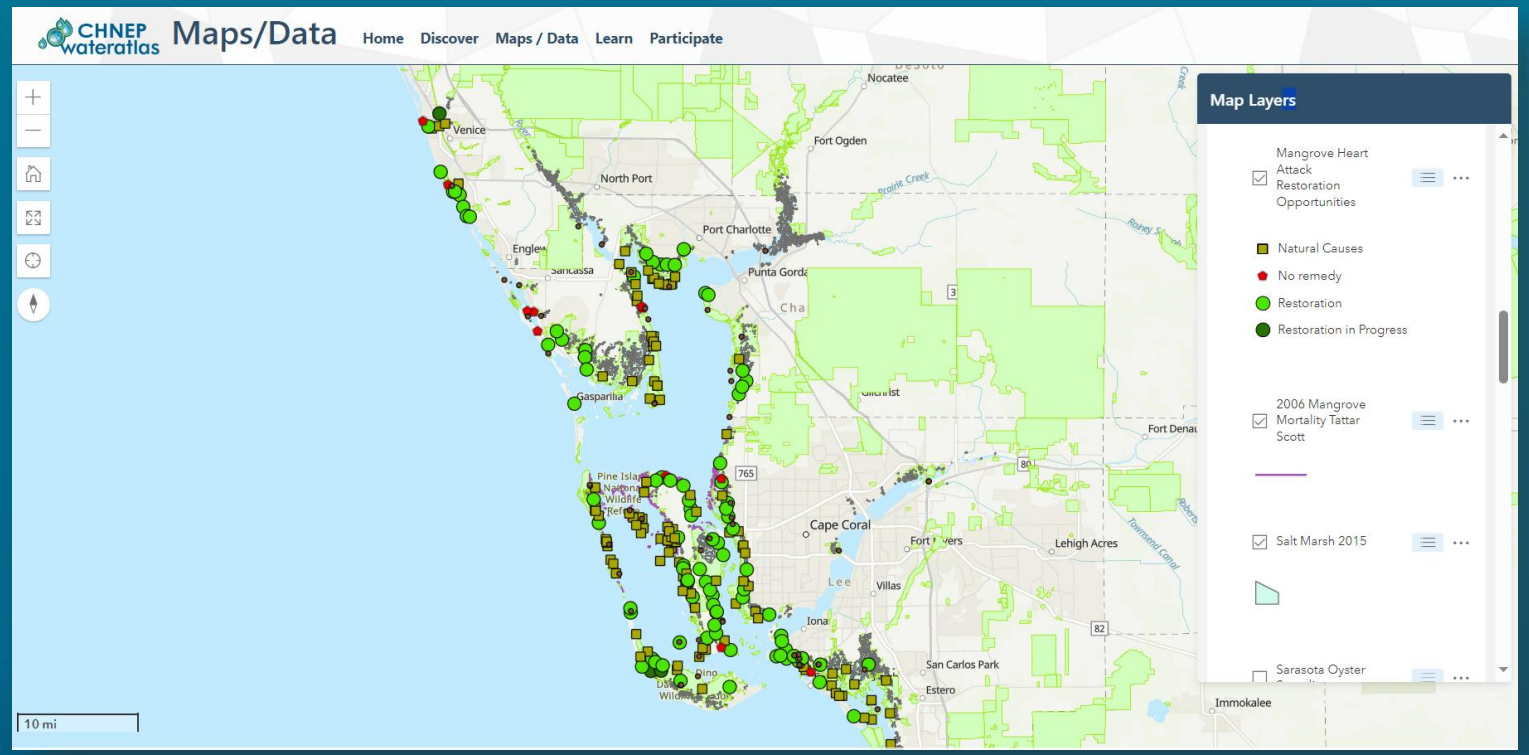
- **Maps of restoration projects as well as restoration suitability and ranked priority sites (Sources: CHNEP SWFL Oyster Working Group (OWG), SCCF, FWC, FDEP Aquatic Preserves)**



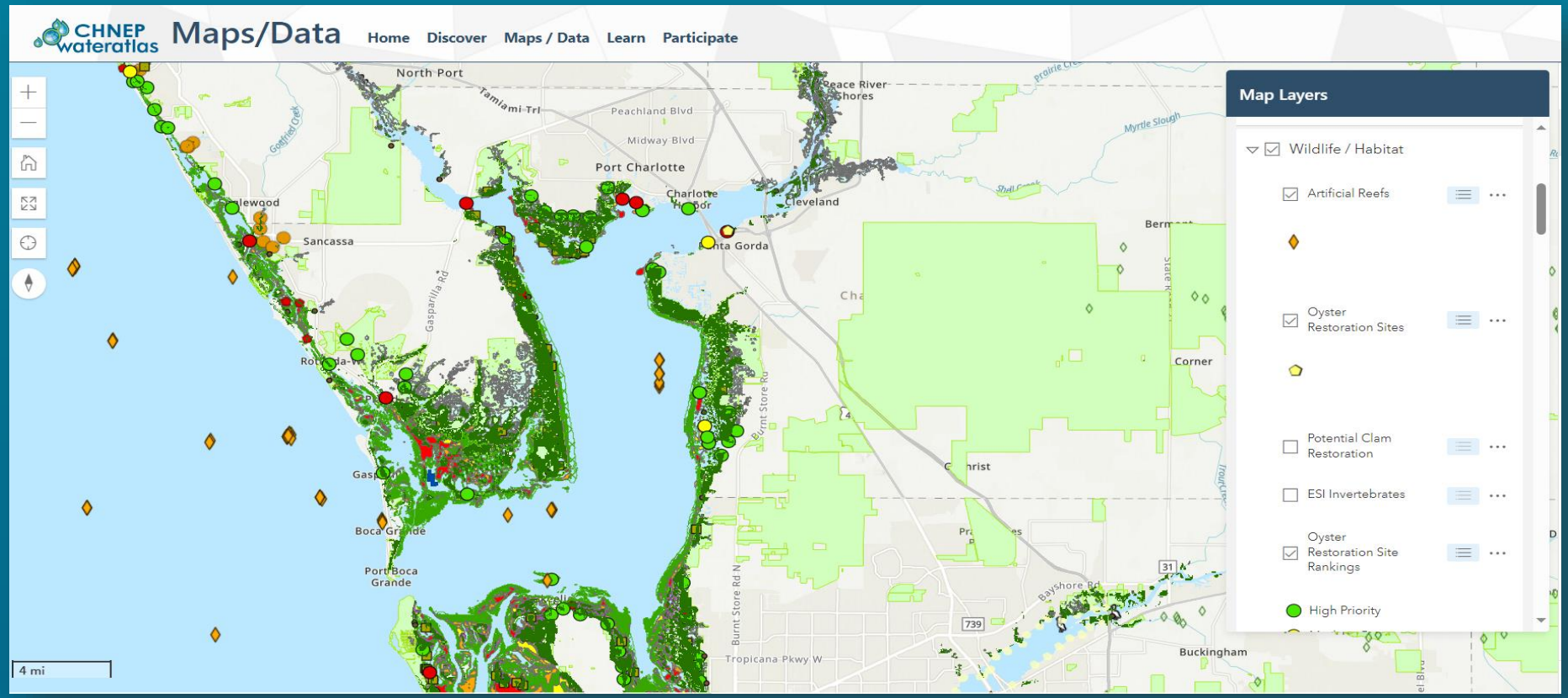


FUTURE WORK: MANGROVES & SALT MARSH

- **Based on partner resource needs: Landing page for mangrove restoration prioritization and salt marsh studies and data. Available data already on full habitat mapper (Sources: Mangrove Heart Attack, FWC, FDEP, SCCF, others???)**



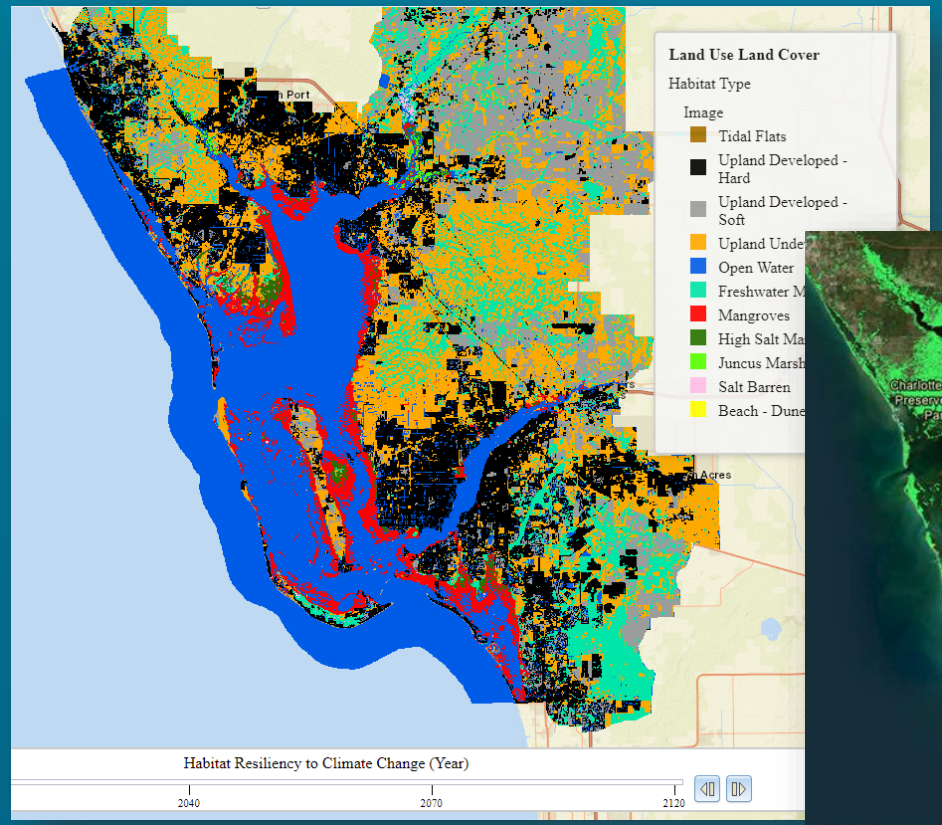
INTERACTIVE CLIMATE DATA MAP

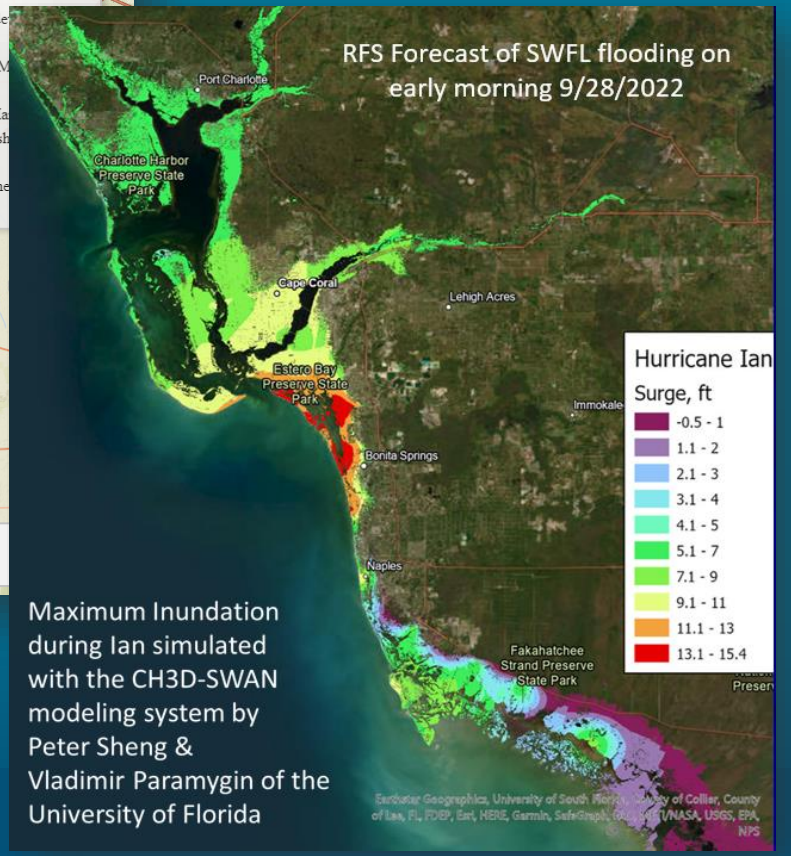


- **Additive to existing efforts: Sought to combine all publicly available climate data: Sea Level Rise Projections, Predicted Community Flooding Maps, Predicted Vegetation Shifts, Historic Hurricanes, Temperature Changes, Rainfall, EVT, Saltwater Intrusion**

HABITAT RESILIENCY TO CLIMATE CHANGE & ACUNE MODELS (ACCELERATED SLR)

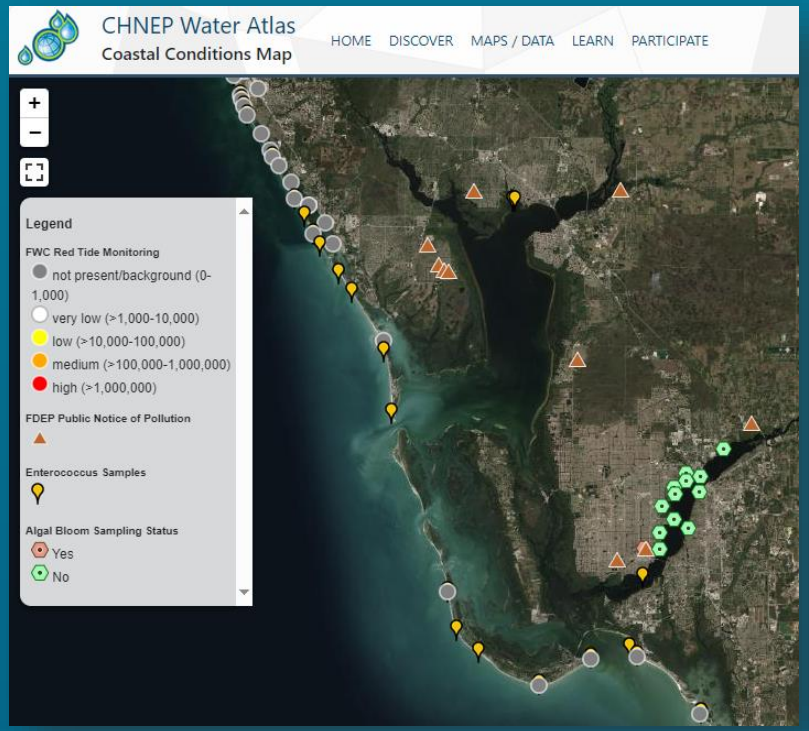
- **Habitat evolution model developed to predict changes in vegetative communities caused by accelerated SLR**
- **ACUNE coastal vulnerability assessment tool developed to understand how saltwater intrusion will impact habitats and communities**

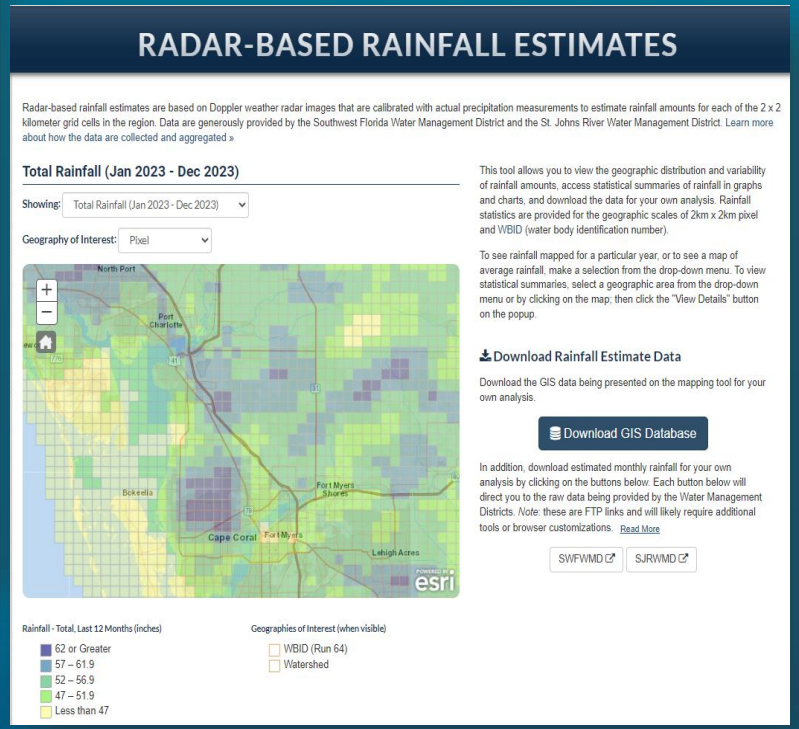


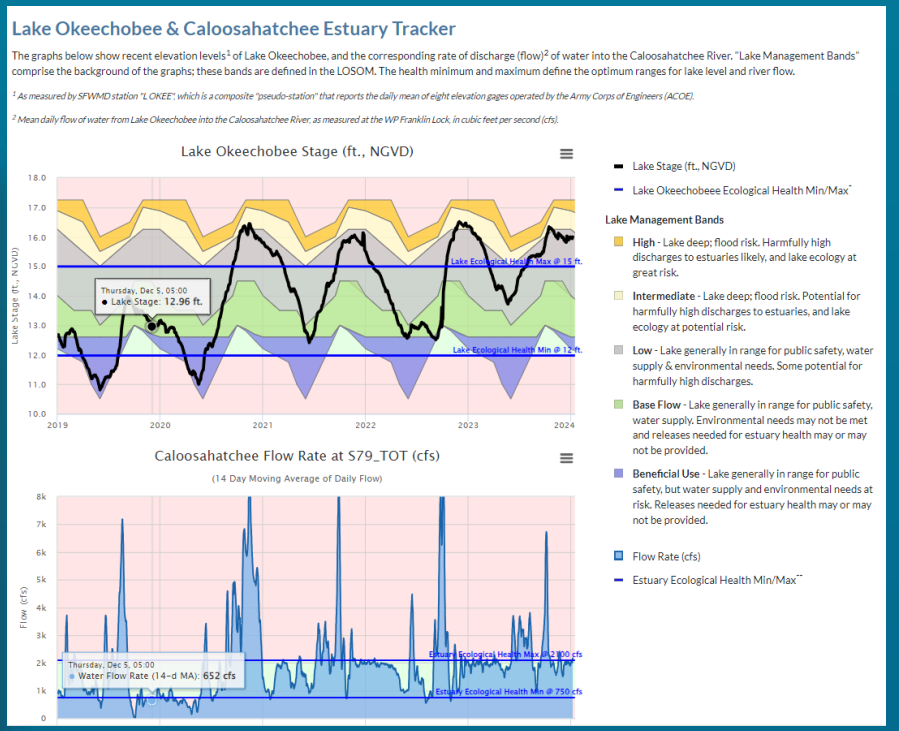


ALTERED PRECIPITATION, WATER QUALITY AND HYDROLOGY

- **Maps of water quality information related to red tide, blue-green algae, fecal bacteria, and wastewater spills. Maps of rainfall estimates & freshwater flows**



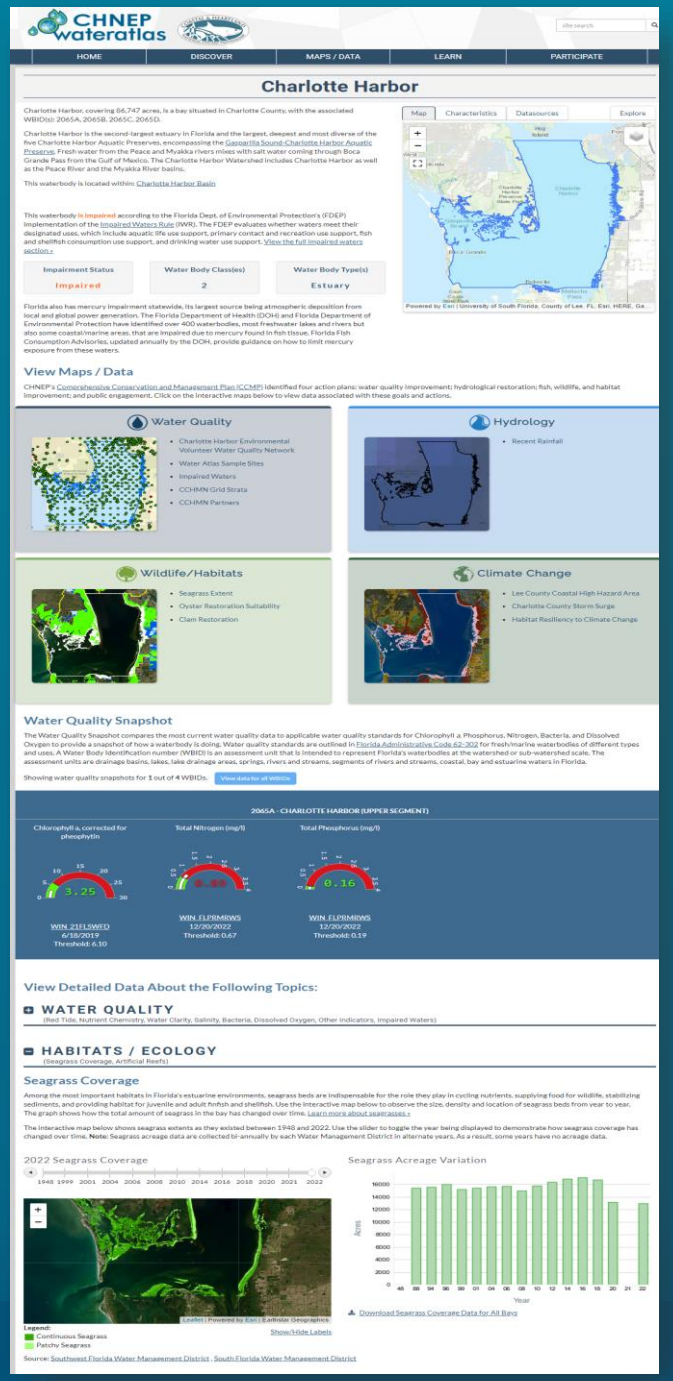




INTERACTIVE ESTUARIES & HABITAT REPORT CARD

- **CHNEP Strategic Plan and tools (ex: Water Atlas) designed to support partners shift toward collaborative efforts focused consistent messaging, and holistic-adaptive management strategies.**

- **Bringing all data collected by partners in one place to give holistic management picture. Water Quality**
  - **Hydrology**
  - **Wildlife/Habitat**
  - **Climate Stressors**



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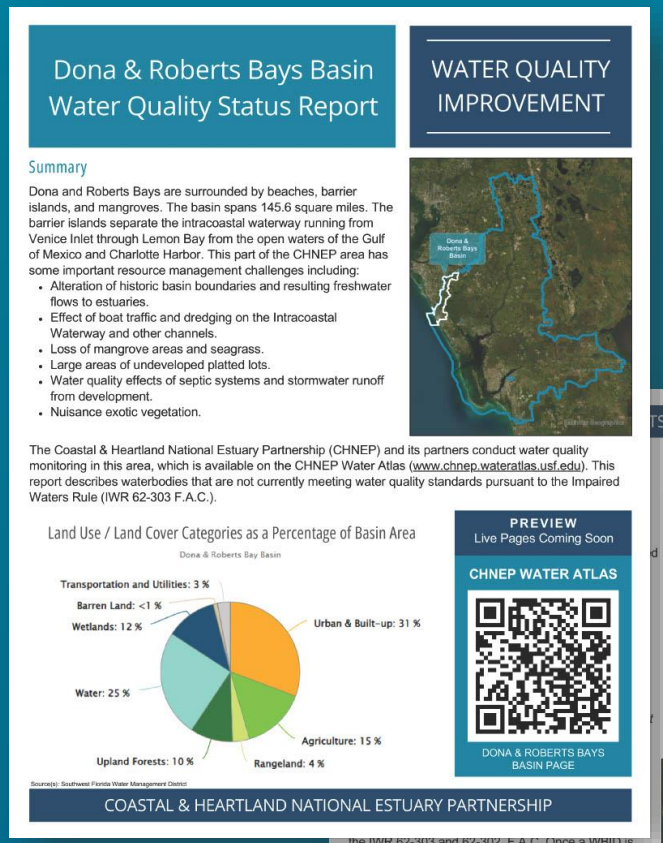
HOLISTIC MANAGEMENT APPROACH

- **FWC State Wildlife Action Plan: "Evaluating the status of each habitat identified in the Action Plan is essential for measuring the success of habitat-based conservation actions." In 2022, FWC adopted a more holistic management approach for sportfish focused on smaller regions, in which management decisions are informed by 6 metrics: escapement, relative abundance, habitat, harmful algal blooms, fishing effort, and stakeholder feedback.**
- **2020 SWFWMD Charlotte Harbor SWIM Plan Update includes the following quantifiable objectives for the three major focus areas: Water Quality, Hydrologic Restoration, and Natural Systems Protection and Restoration.**
- **Lake Okeechobee System Operating Manual (LOSOM): "The Caloosahatchee River and its estuary require regular, adequate and appropriate levels of freshwater flow from the Lake to maintain proper salinity in its tidal reach for maintaining conditions for its aquatic life."**

FINAL THOUGHTS/ RECOMMENDATIONS

- Please visit the CHNEP Water Atlas (chnep.wateratlas.usf.edu/) for data and mapping relevant to your work.
- Need partners to continue to share relevant studies, maps and data so that the CHNEP Water Atlas is an effective monitoring and planning tool.
- CHNEP produces and updates Water Quality & Seagrass Fact Sheets by basin as additional communication tool for partners and the public. (Contributors: FDEP, SWFWMD, SFWMD, Counties for their use)
- Other recommendations for future efforts?


Dona & Roberts Bays Basin Water Quality Status Report

WATER QUALITY IMPROVEMENT

Summary

Dona and Roberts Bays are surrounded by beaches, barrier islands, and mangroves. The basin spans 145.6 square miles. The barrier islands separate the intracoastal waterway running from Venice Inlet through Lemon Bay from the open waters of the Gulf of Mexico and Charlotte Harbor. This part of the CHNEP area has some important resource management challenges including:

- Alteration of historic basin boundaries and resulting freshwater flows to estuaries.
- Effect of boat traffic and dredging on the Intracoastal Waterway and other channels.
- Loss of mangrove areas and seagrass.
- Large areas of undeveloped platted lots.
- Water quality effects of septic systems and stormwater runoff from development.
- Nuisance exotic vegetation.

The Coastal & Heartland National Estuary Partnership (CHNEP) and its partners conduct water quality monitoring in this area, which is available on the CHNEP Water Atlas (www.chnep.wateratlas.usf.edu). This report describes waterbodies that are not currently meeting water quality standards pursuant to the Impaired Waters Rule (IWR 62-303 F.A.C.).

Land Use / Land Cover Categories as a Percentage of Basin Area

Dona & Roberts Bay Basin

Transportation and Utilities: 3 %
Barren Land: <1 %
Wetlands: 12 %
Urban & Built-up: 31 %
Water: 25 %
Agriculture: 15 %
Upland Forests: 10 %
Rangeland: 4 %

PREVIEW
Live Pages Coming Soon
CHNEP WATER ATLAS
DONA & ROBERTS BAYS BASIN PAGE

COASTAL & HEARTLAND NATIONAL ESTUARY PARTNERSHIP

TS BAYS BASIN UPDATED 11/1/23

the IWR 62-303 and 62-302, F.A.C. Once a WBID is verified impaired, it is to be placed on a schedule for TMDL development. TMDLs are waterbody-specific pollutant limits aimed at restoring attainment of water quality standards.

The following WBIDs are currently not meeting water quality standards for nutrients:

- Cow Pen Slough
- Curry Creek (Freshwater Portion)
- Dona Bay
- ICWW (Sarasota County Near Venice)
- Lyons Bay Canals
- Roberts Bay

Pink areas are verified impaired for nutrients on the map to the right. No TMDL development has yet occurred at the state level for nutrients within the Dona & Roberts Bays Basin.

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THE POWER OF PARTNERSHIP

Thank you to our partners!
CHNEP Management Conference Members from the Technical Advisory Committee and Habitat Conservation Subcommittee, CHNEP Program staff, the U.S. Environmental Protection Agency, and the University of South Florida Water Institute