

Overview of U.S. Geological Survey Hydrologic Monitoring in South Florida and Tools to View and Access Data

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USGS Caribbean-Florida Water Science Center

Types of monitoring:

- Discharge
- Water levels: surface water and groundwater
- Water quality: sensors, field measurements, samples
- Evapotranspiration
- Assessments/Summaries of conditions

Monitoring in South Florida

- Freshwater supply for 7 million
- Water management
- Everglades restoration
 - Removing barriers to flow
 - Redistributing freshwater
 - Water quality
- Evapotranspiration
- Minimum flows to estuaries
- SWI
 - Water supply
 - Includes FPL Turkey Point
 - HDD connate water
- SW/GW interaction studies
- HABs
- Seepage barriers
- Storm Surge

Surface water monitoring

USGS
science for a changing world

National Water Information System: Mapper

USGS Home
Contact USGS
Search USGS

Help Info

Sites Map

Search

Surface-Water Sites

- Active Sites
 - Any data
 - Instantaneous data
 - Daily data
 - Water-quality data
 - Peak data
 - Measurements
 - Annual Report
- Inactive Sites
 - Any data
 - Instantaneous data
 - Daily data
 - Water-quality data
 - Peak data
 - Measurements
 - Annual Report

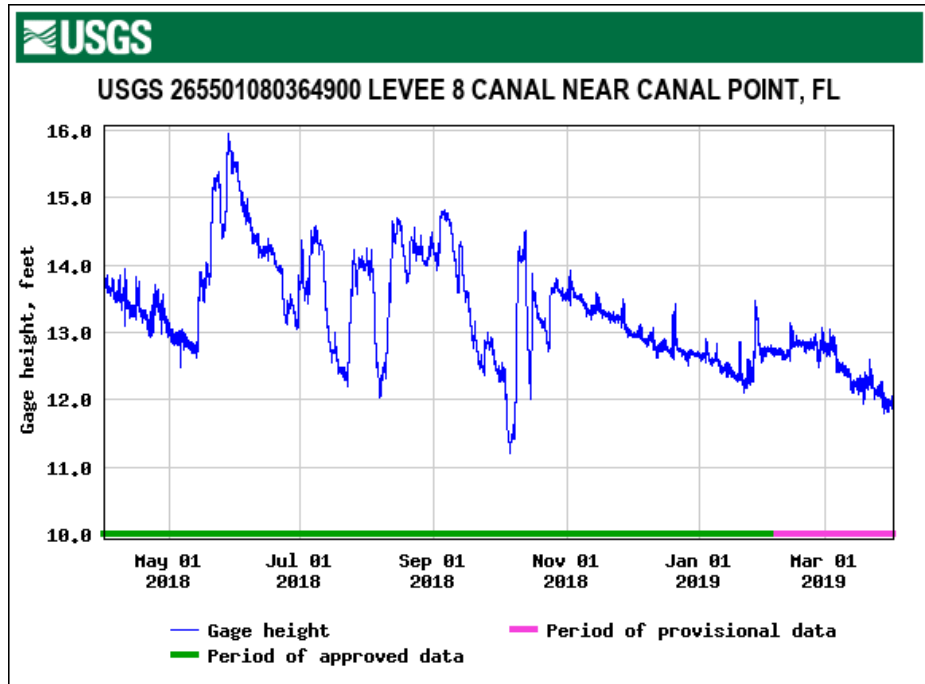
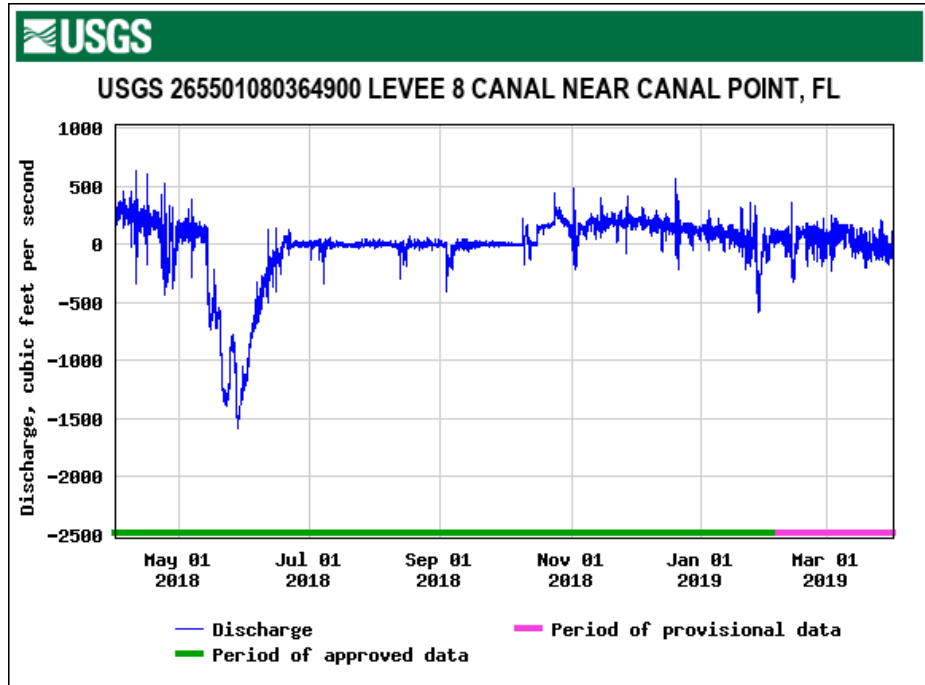
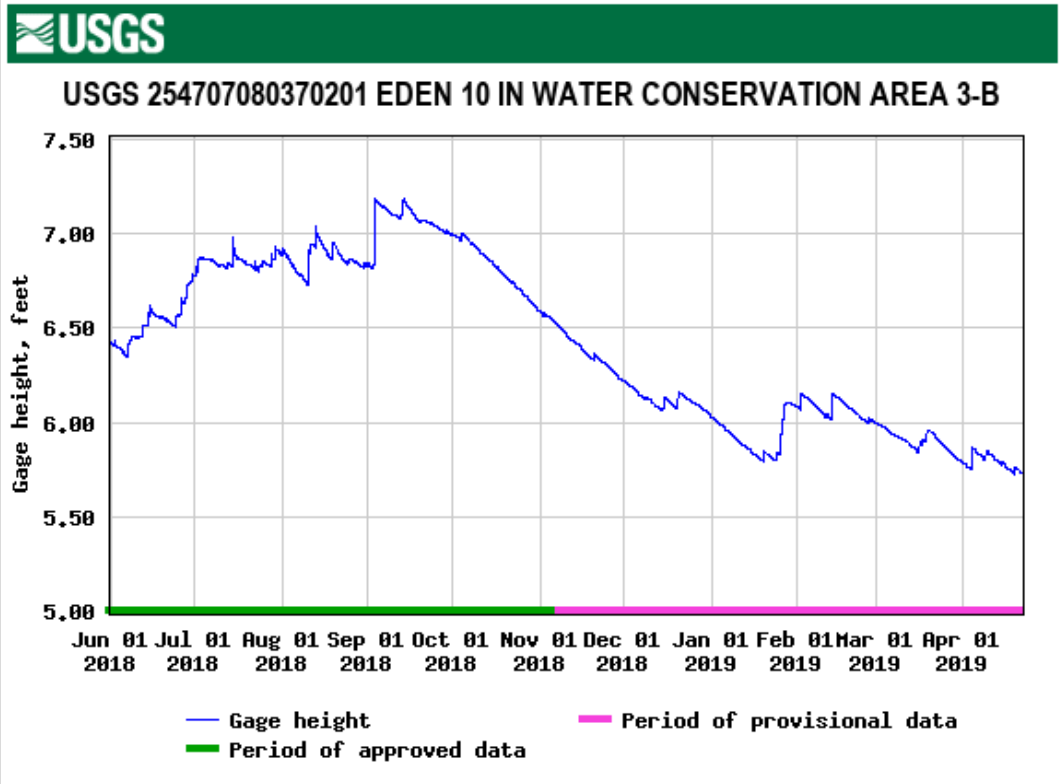
Legend:

- Groundwater Sites
- Springs
- Atmospheric Sites
- Other Sites

Map showing South Florida with monitoring sites. Major cities labeled include Port Charlotte, Cape Coral, Fort Myers, Lehigh Acres, Immokalee, Naples, Homestead, Belle Glade, Jupiter, West Palm Beach, Boca Raton, Pompano Beach, Fort Lauderdale, Davie, Plantation, Coral Springs, Hollywood, Miami Beach, Miami, Hialeah, Pembroke Pines, and Davie. Major roads shown include 41, 31, 80, 29, 27, 818, 821, 27, 1, 441, and 72. Landmarks include Lake Okechobee, Big Cypress National Preserve, and Everglades National Park. An inset map shows the location of the study area within the state of Florida, with Tampa and Orlando also labeled. A scale bar indicates 0, 10, and 20 miles. Coordinates are -82.256, 26.411. Sources: Esri, HERE, Garmin, USGS, Intern...

Site Information





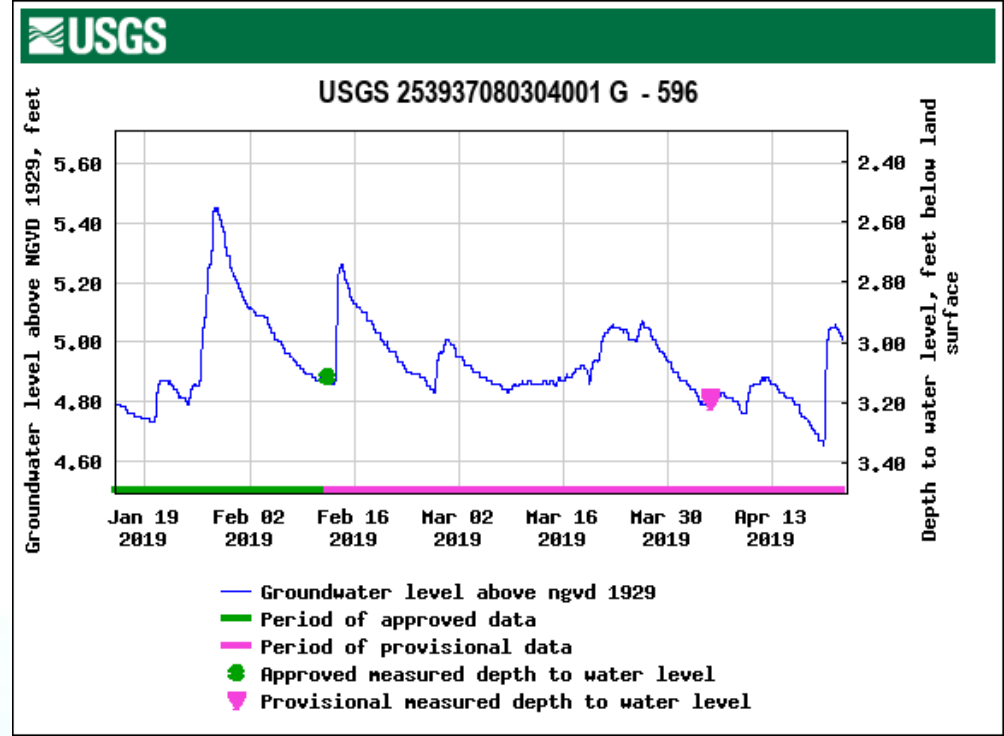
Groundwater monitoring

The image shows a screenshot of the USGS National Water Information System: Mapper interface. At the top, the USGS logo is displayed with the tagline "science for a changing world". To the right, there are links for "USGS Home", "Contact USGS", and "Search USGS". Below the logo, the title "National Water Information System: Mapper" is shown, along with "Help" and "Info" buttons.

The main interface is divided into several sections:

- Sites / Map:** A tabbed interface with "Sites" selected.
- Search:** A search bar with a magnifying glass icon.
- Surface-Water Sites:** A category selection button.
- Groundwater Sites:** A category selection button, currently active.
- Active Sites:** A list of filters for active sites, including "Any data", "Instantaneous data", "Daily data", "Water-quality data", "Measurements", and "Annual Report".
- Inactive Sites:** A list of filters for inactive sites, including "Any data", "Instantaneous data", "Daily data", "Water-quality data", "Measurements", and "Annual Report".
- Legend:** A legend at the bottom left showing symbols for "Springs" (purple dot), "Atmospheric Sites" (blue dot), and "Other Sites" (green dot).

The central map displays the state of Florida with numerous red dots representing groundwater monitoring sites. Major cities and locations labeled include Port Charlotte, Cape Coral, Fort Myers, Lehigh Acres, Immokalee, Bonita Springs, Naples, Belle Glade, Jupiter, West Palm Beach, Boca Raton, Pompano Beach, Fort Lauderdale, Davie, Plantation, Hollywood, Pembroke Pines, Miami, and Miami Beach. The map also shows major highways (e.g., 17, 31, 80, 29, 27, 818, 41, 1) and natural features like Lake Okechobee, Big Cypress National Preserve, and Everglades National Park. A scale bar at the bottom left indicates 0, 10, and 20 miles, with coordinates -82.366, 27.220. An inset map at the bottom right shows the location of the main map area within the state of Florida, with Miami highlighted. The text "Sources: Esri, HERE, Garmin, USGS, Intern" is visible at the bottom right of the map area.



Water quality monitoring

USGS
science for a changing world

National Water Information System: Mapper

USGS Home
Contact USGS
Search USGS

Help Info

Sites Map

Search

Surface-Water Sites

- Active Sites
 - Any data
 - Instantaneous data
 - Daily data
 - Water-quality data
 - Peak data
 - Measurements
 - Annual Report
- Inactive Sites
 - Any data
 - Instantaneous data
 - Daily data
 - Water-quality data
 - Peak data
 - Measurements
 - Annual Report

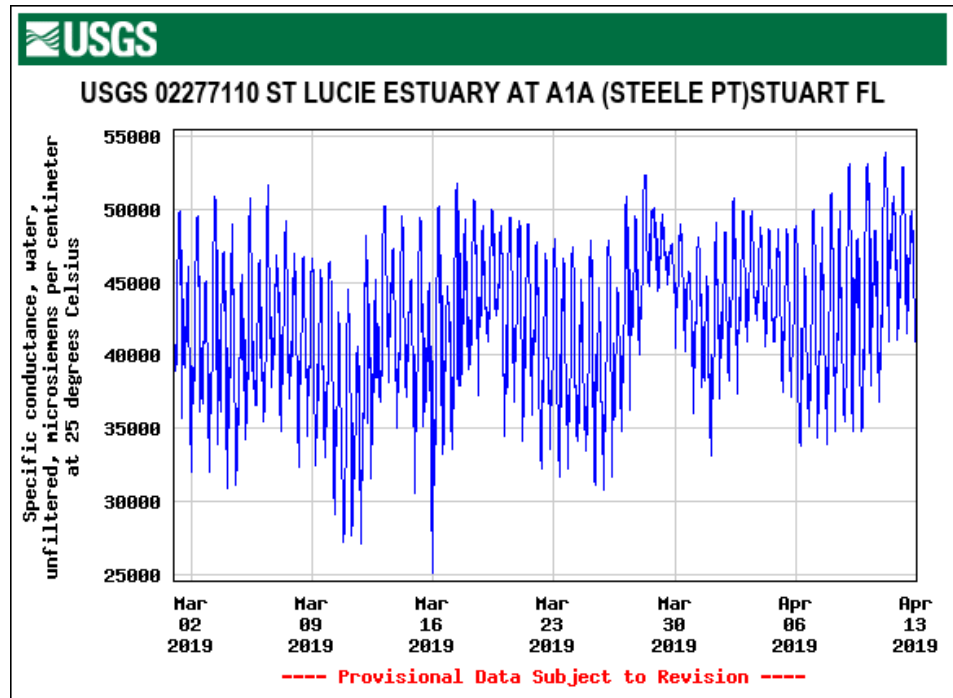
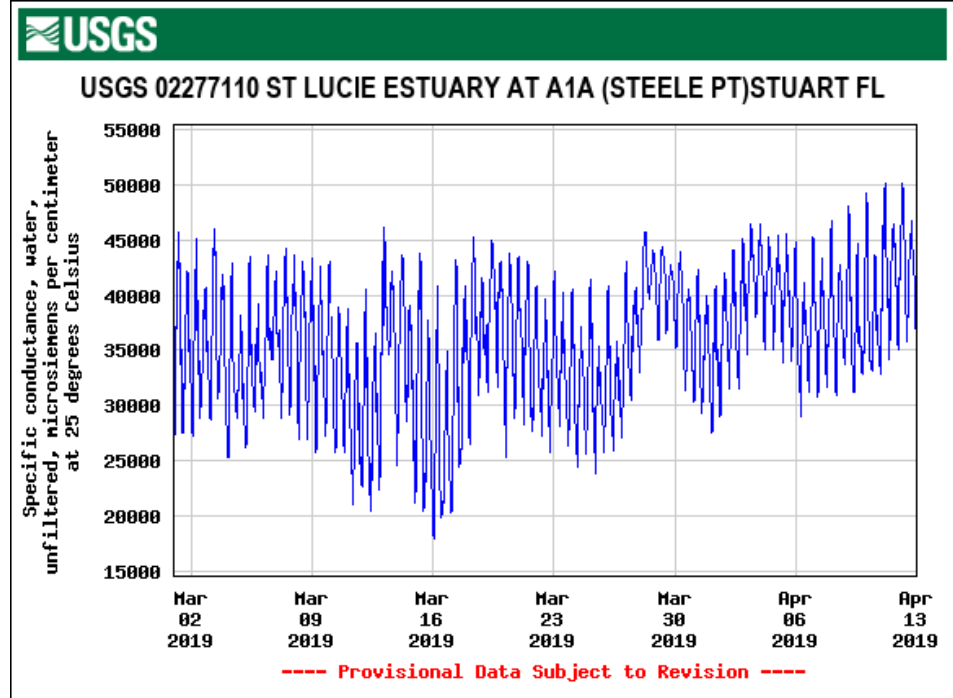
Groundwater Sites
Springs
Atmospheric Sites
Other Sites

Port Charlotte, Cape Coral, Fort Myers, Lehigh Acres, Immokalee, Naples, Big Cypress National Preserve, Homestead, Berglades National Park, Belle Glade, Coral Springs, Plantation, Davie, Pembroke Pines, Hollywood, Miami, Miami Beach, Hialeah, Fort Lauderdale, Pompano Beach, Boca Raton, West Palm Beach, Jupiter

Scale: 0 10 20mi
-81.454, 25.088

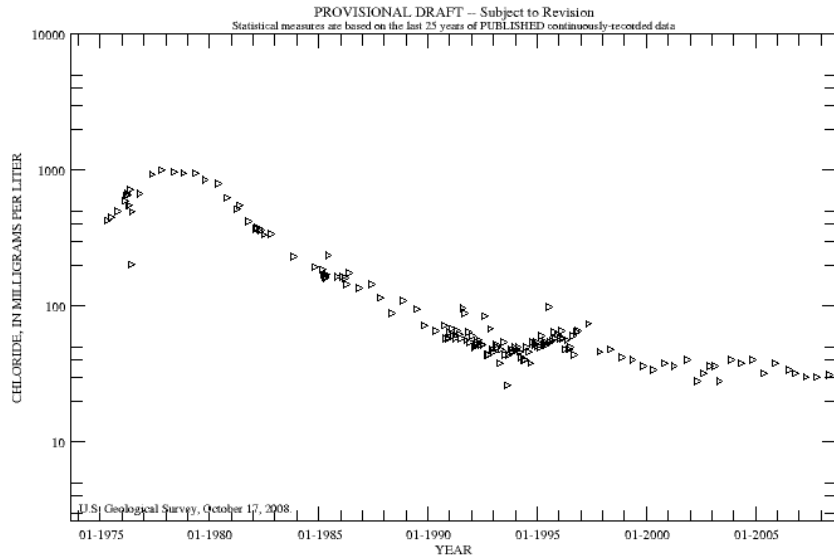
Sources: Esri, HERE, Garmin, USGS, Intern

Site Information

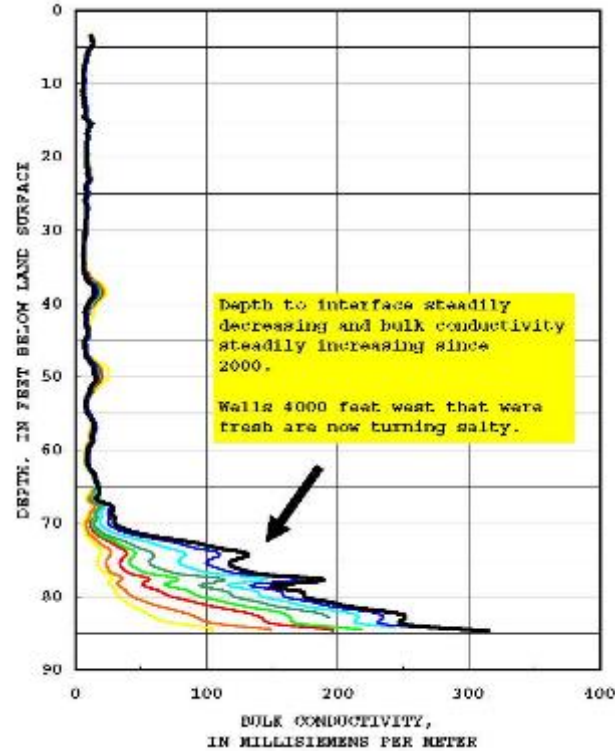


Salt Water Intrusion

Chloride measurements from the past 25 years at G - 571 (254841080164401)



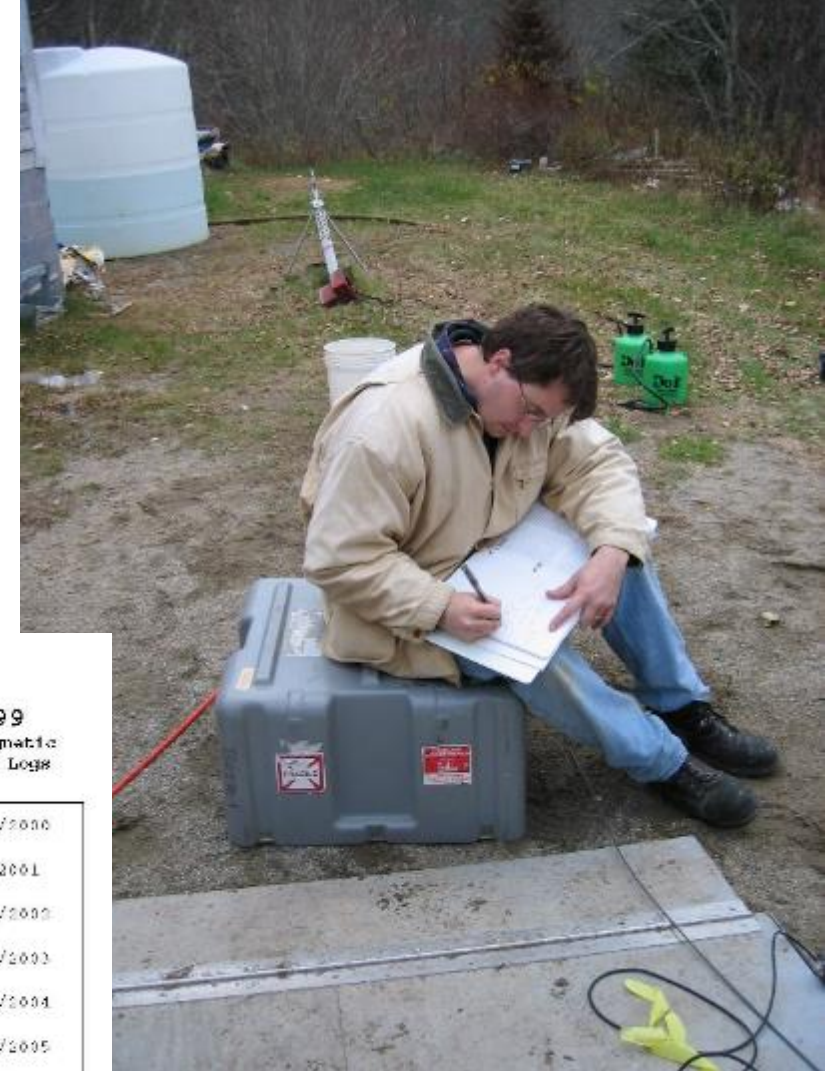
▶ ▶ ▶ Chloride concentration



G-3699
 Electromagnetic
 Induction Logs



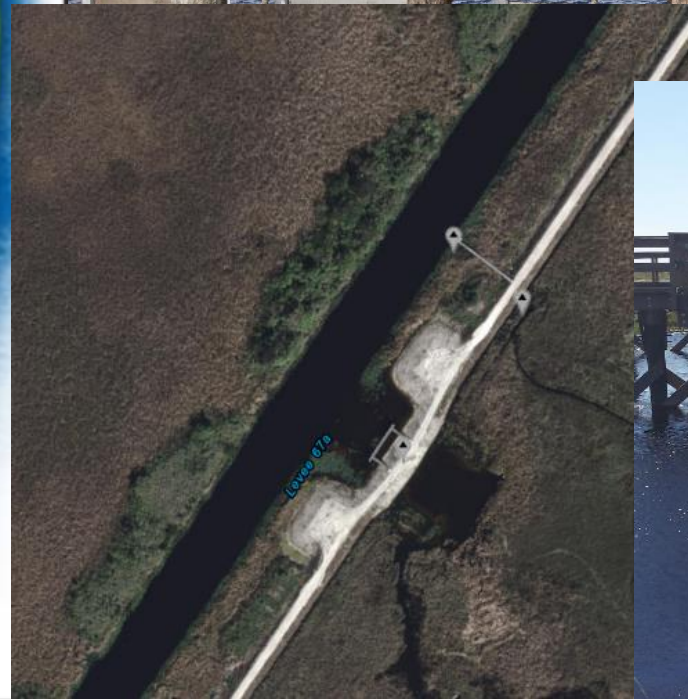
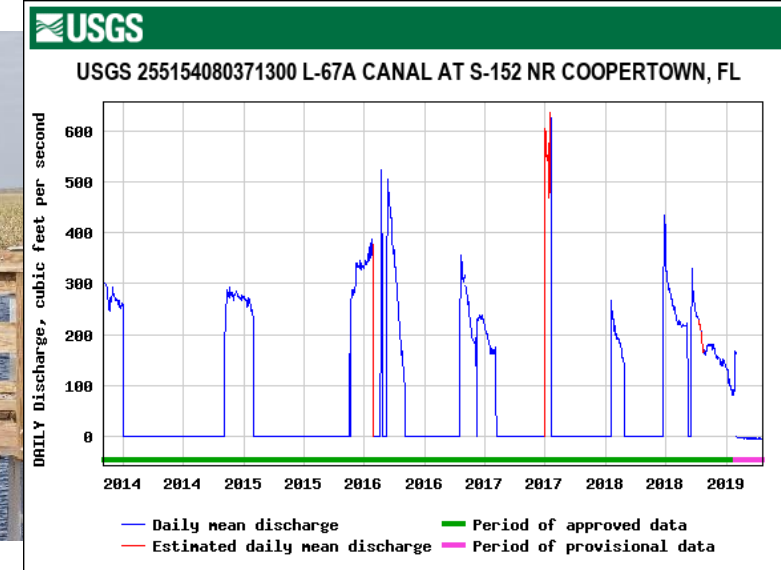
PROVISIONAL DATA



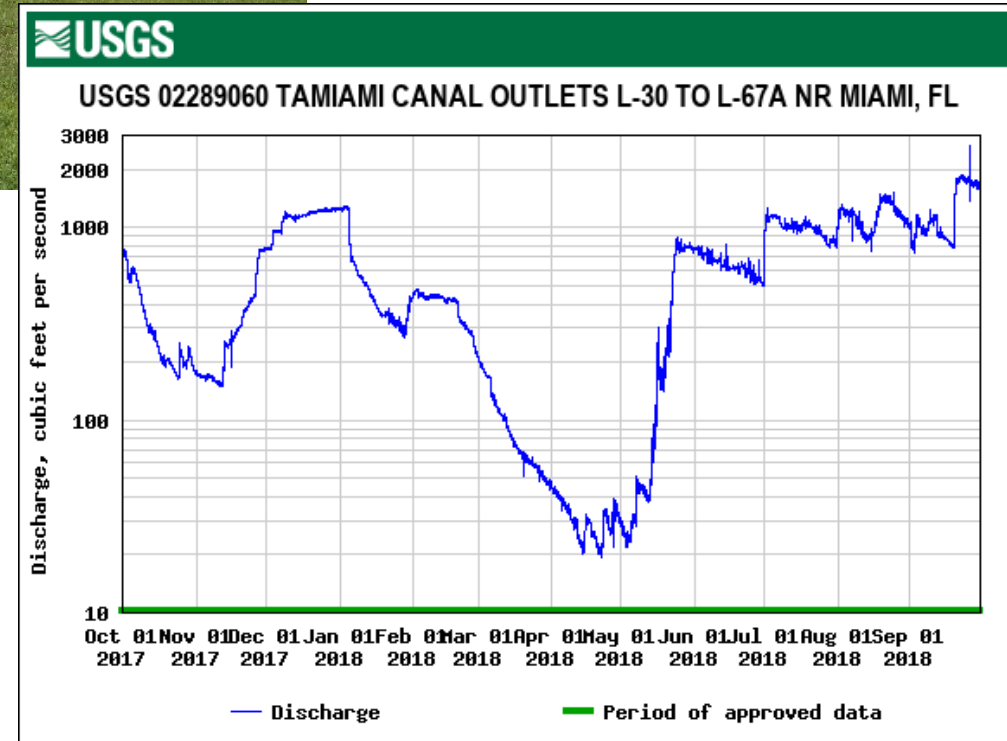
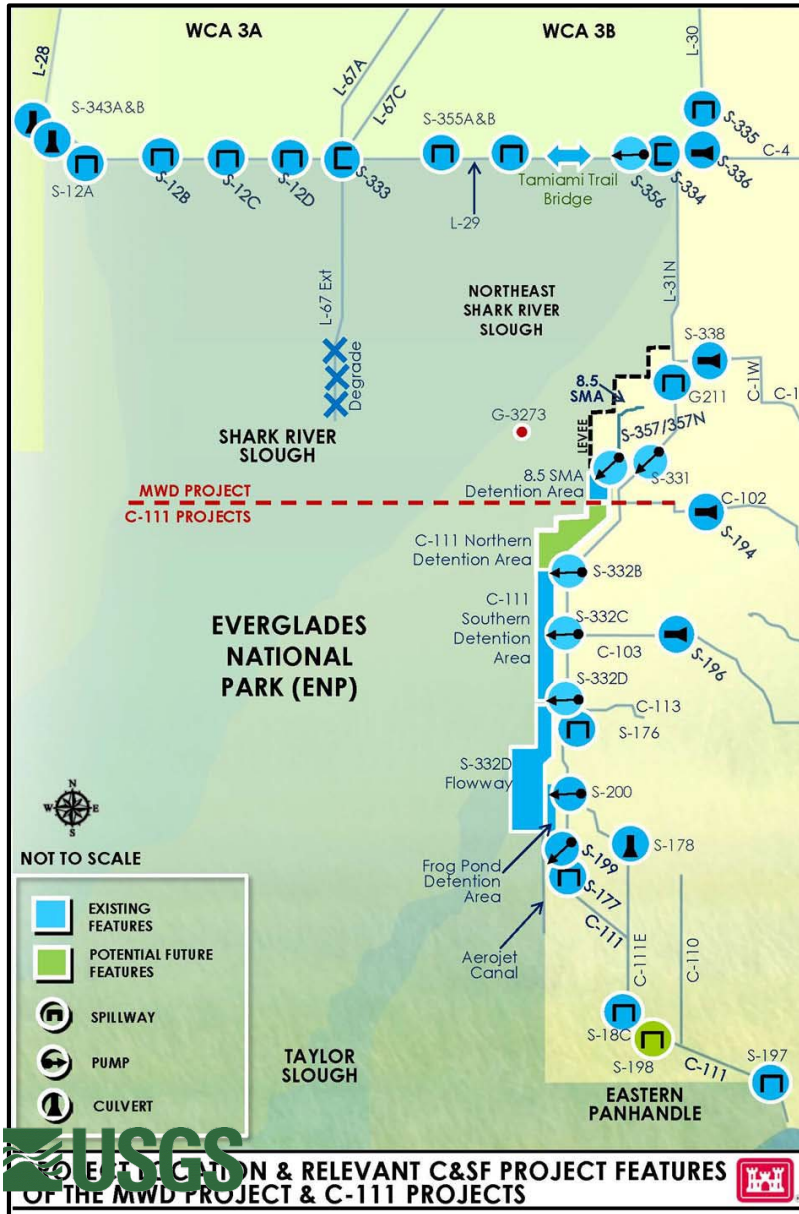
SW/GW interaction studies



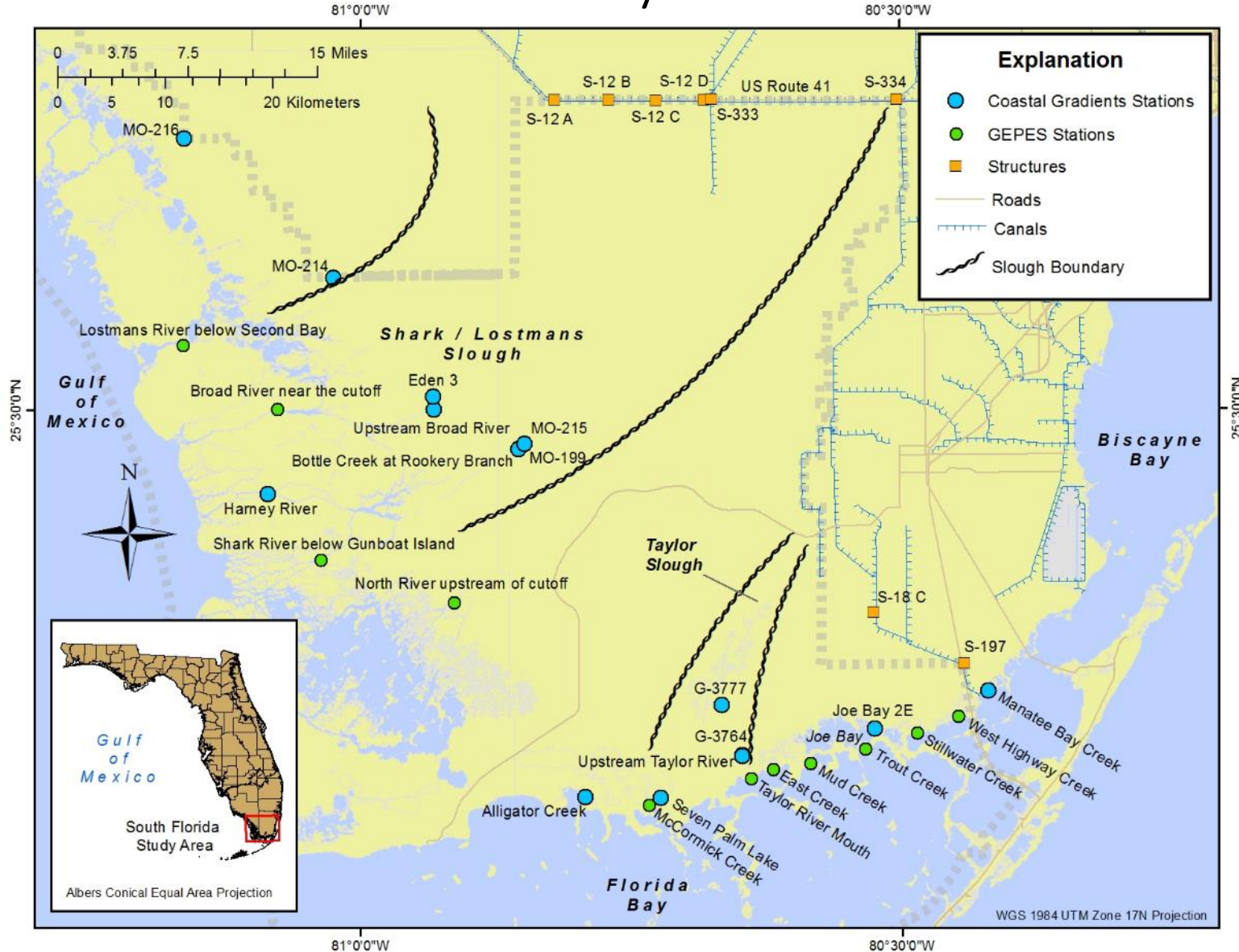
Everglades: removing barriers to flow and rehydrating



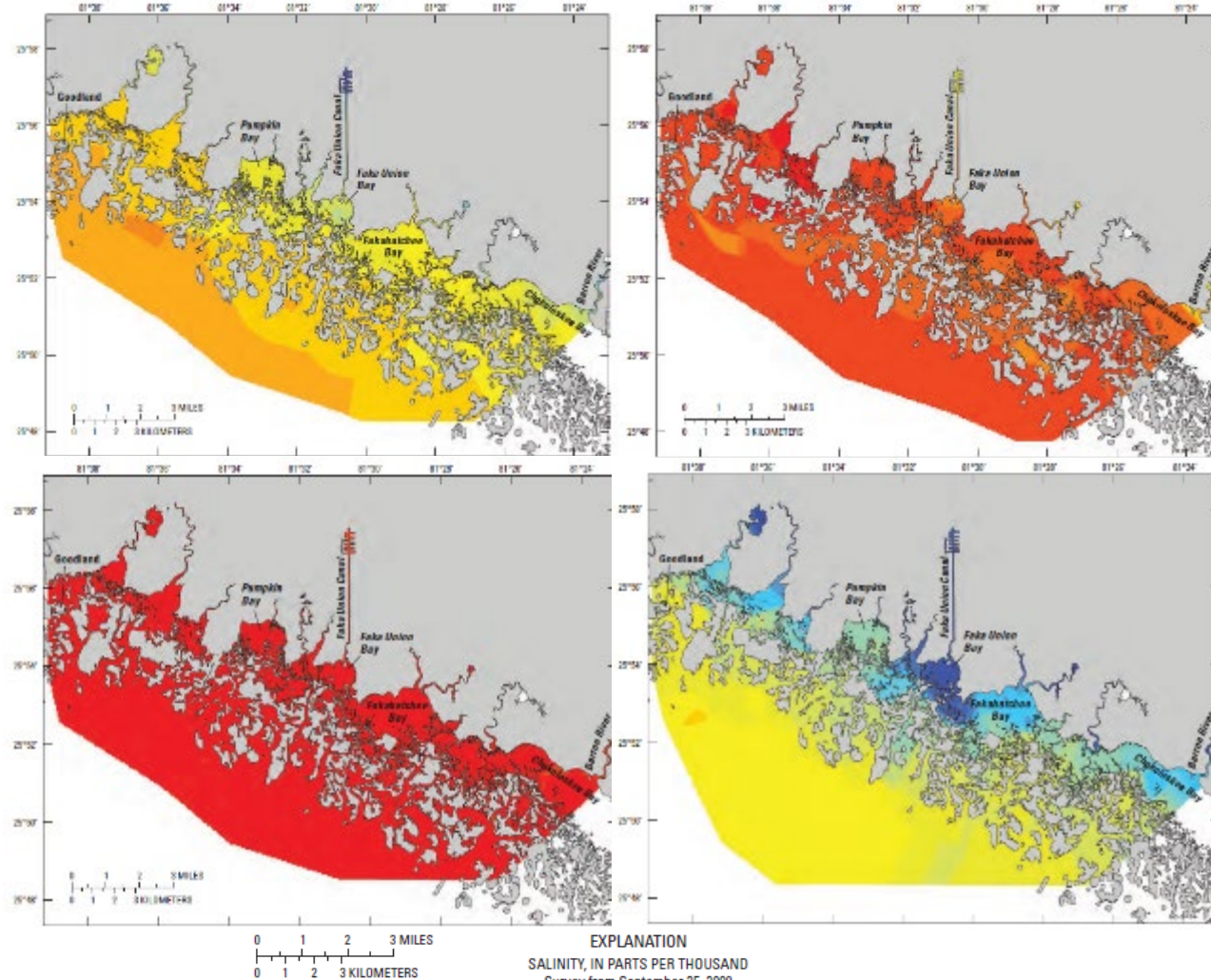
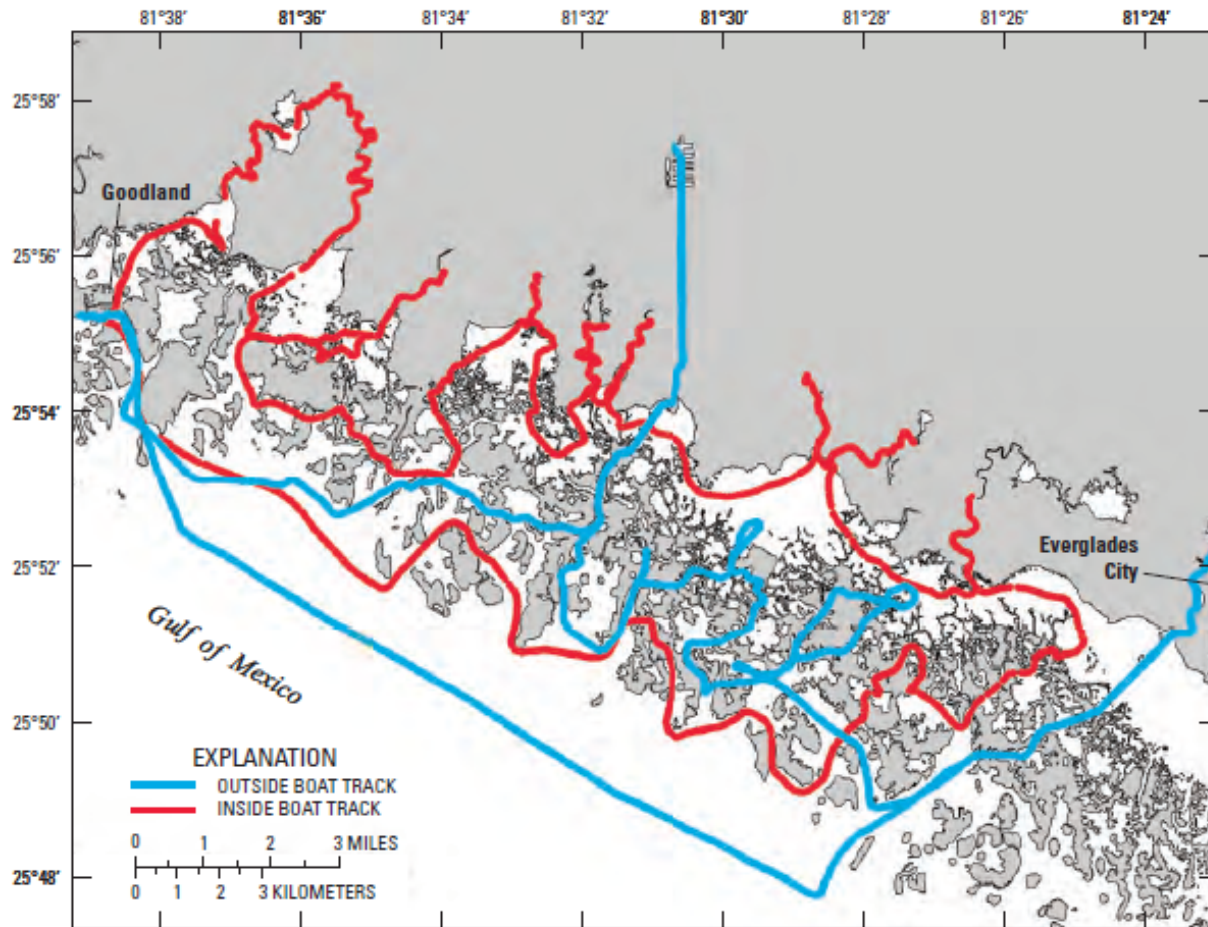
Everglades: distributing flow



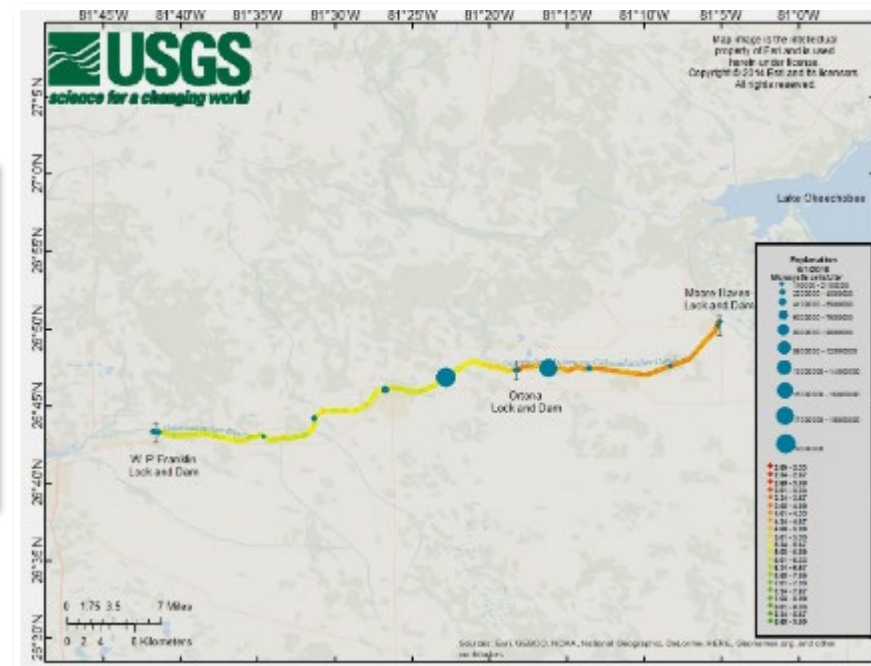
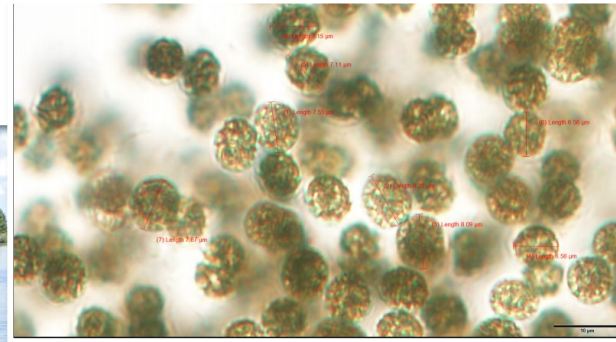
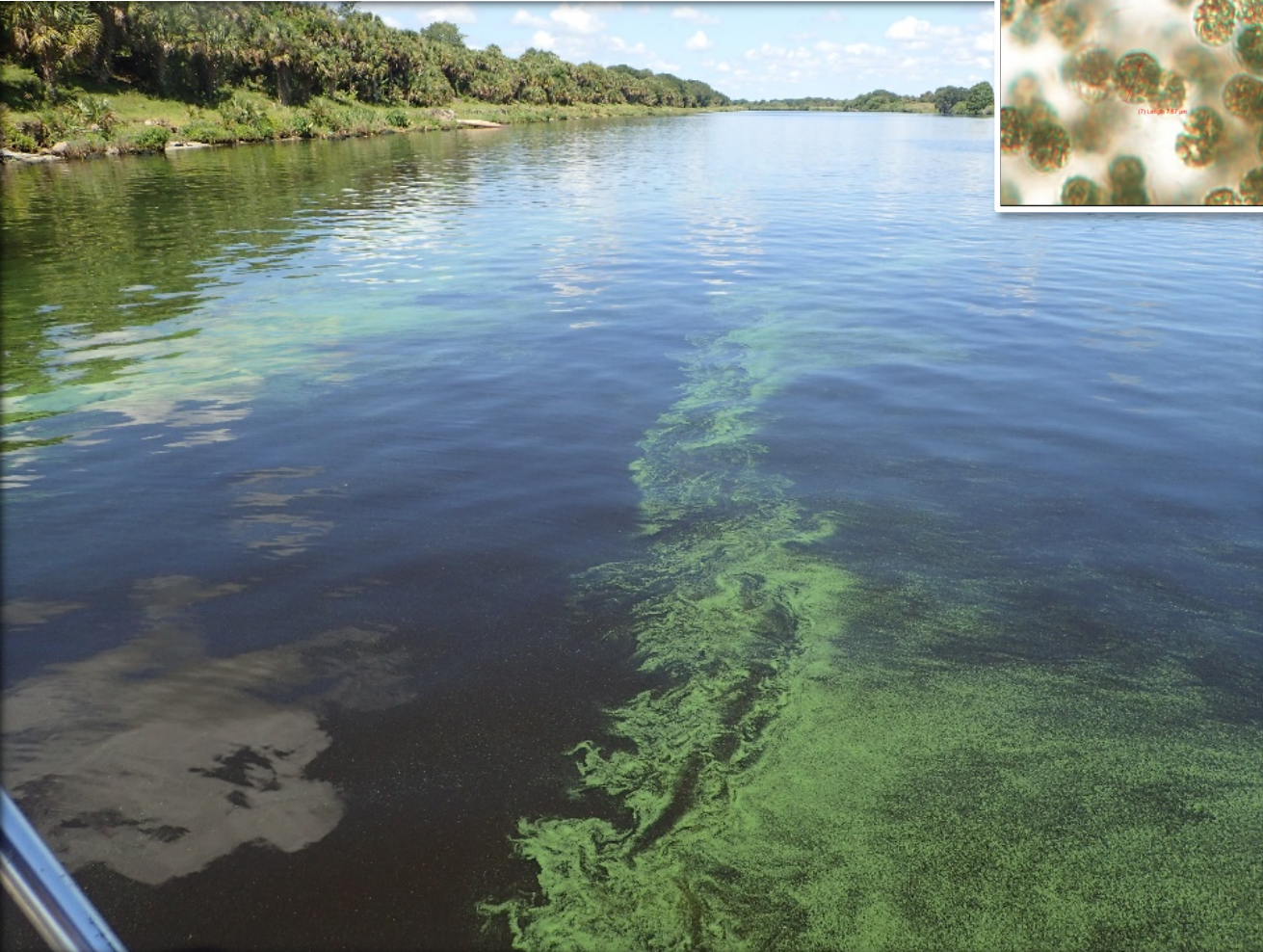
Coastal Gradients to Florida Bay



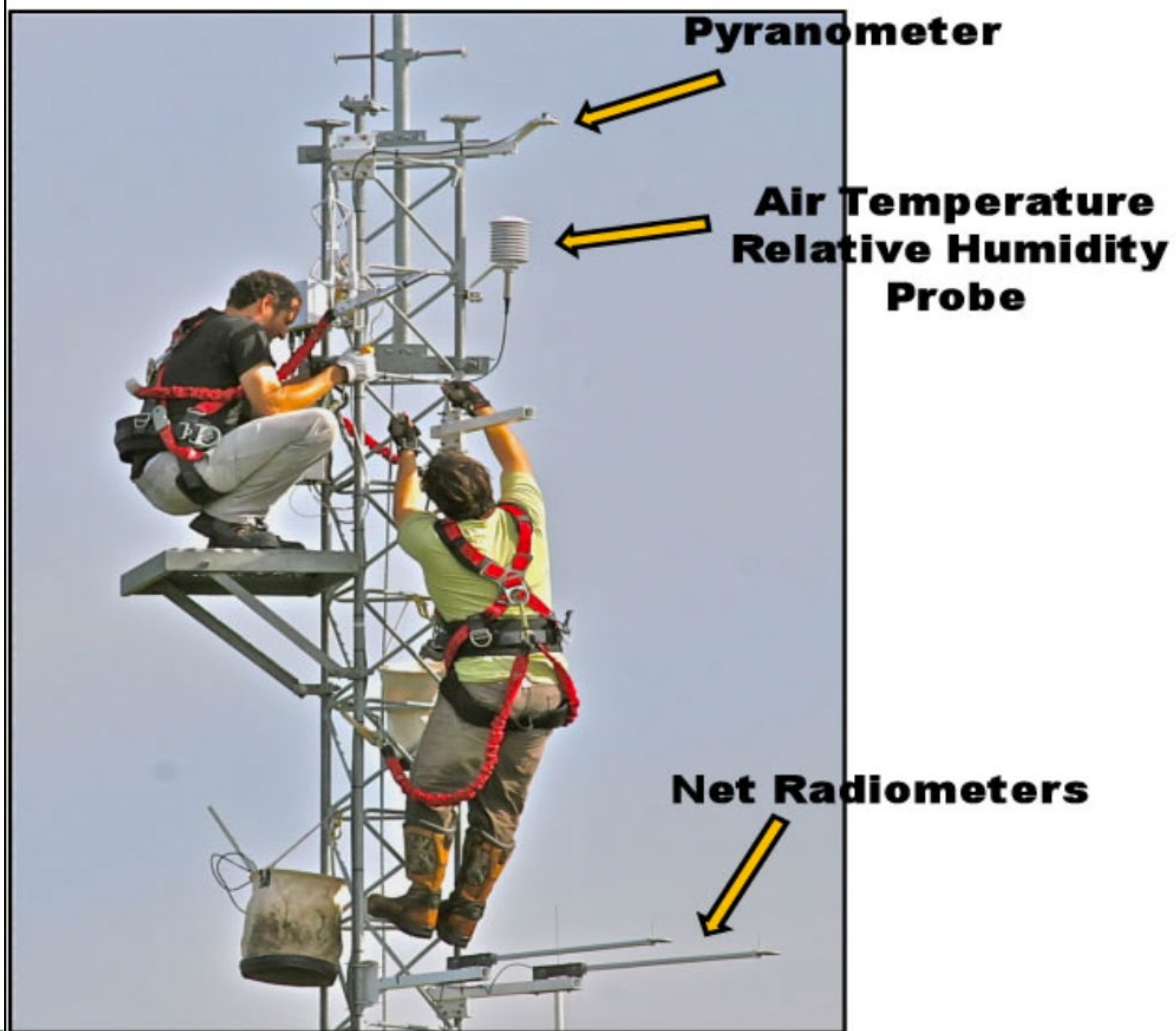
Everglades Restoration: Ten Thousand Islands



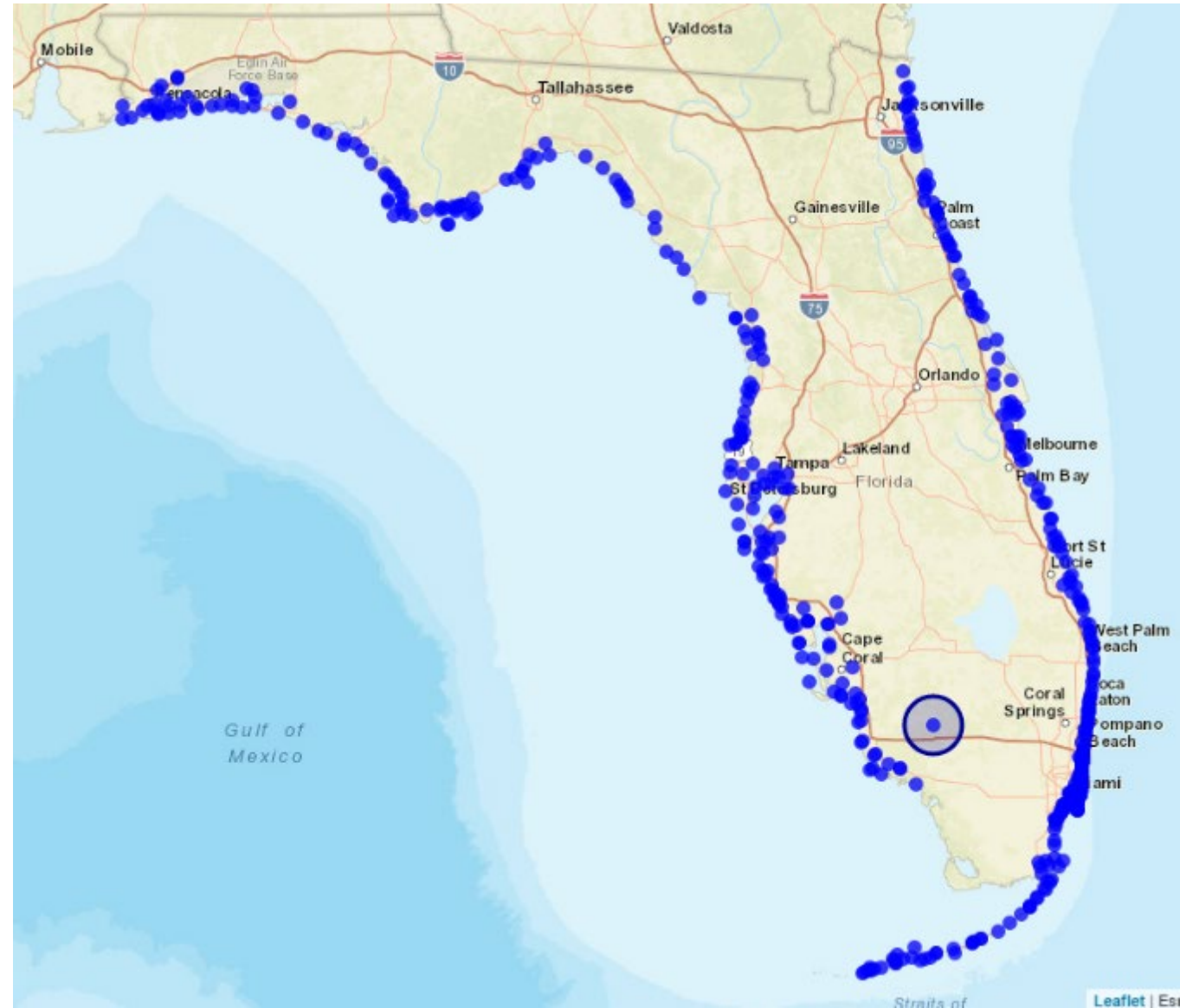
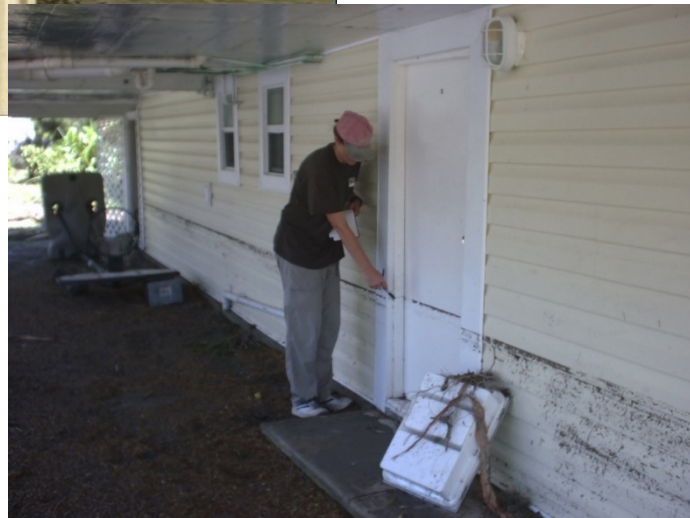
Lake Okeechobee HABs



Evapotranspiration monitoring



Storm-tide monitoring



Accessing Data – national websites

- NWIS Mapper
- Water Services
- Water Watch
- Water Quality Watch
- Groundwater Watch
- Water Alert
- Water Now
- Flood Event Viewer

NWIS Mapper

- Map view
- Surface water, groundwater, springs, atmospheric stations
- Access data at active and inactive stations
- Several ways to search
- Create ESRI ShapeFiles, KMLs, tables of sites

The screenshot displays the NWIS Mapper interface. On the left, there is a search panel with the following options:

- Search by Street Address:** Enter Street Address
- Search by Place Name:** Enter Place Name
- Search by Site Number(s):** Enter Site Number(s)
- Search by State/Territory:** Select an Area
- Search by Watershed Region:** Select a Region

Below the search panel is a legend with the following categories:

- ▲ Surface-Water Sites
- Groundwater Sites
- Springs
- Atmospheric Sites
- Other Sites

The main map area shows a detailed view of the southern part of Florida, including Lake Okeechobee and the Big Cypress National Preserve. Numerous grey triangle markers represent water sites. Major cities like Fort Myers, Naples, Miami, and West Palm Beach are labeled. A scale bar at the bottom left indicates 0, 10, and 20 miles. An inset map at the bottom right shows the location of the current view within the state of Florida. The bottom of the interface features a 'Site Information' panel.

Water Watch

- Map view
- Real-time surface water flows
- Current and historical conditions
- Focus on sites currently in drought or flood
- Animated time series

WaterWatch

Search WaterWatch ...

Home

Special Features

Current Streamflow

Flood

Drought

Past Flow/Runoff

Animation

Toolkit

Toolkit (internal)

Annual Summaries

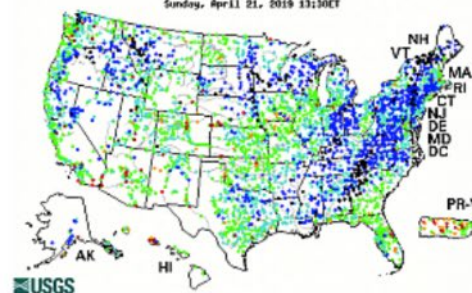
Data Services

Additional Information

About WaterWatch

Current Streamflow

Sunday, April 21, 2019 13:30ET



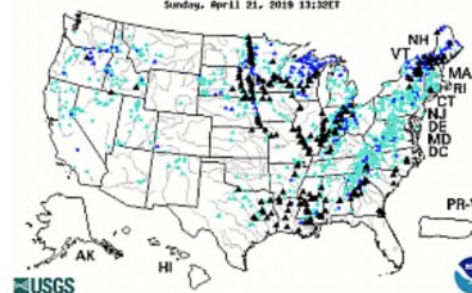
Drought

Saturday, April 20, 2019



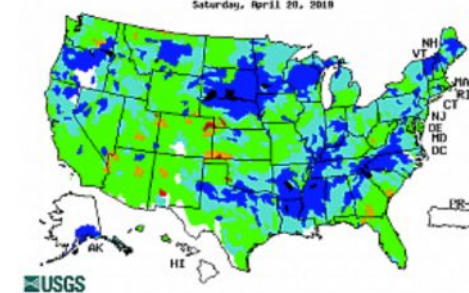
Flood

Sunday, April 21, 2019 13:30ET



Past Flow/Runoff

Saturday, April 20, 2019



Search USGS streamgage

Water Quality Watch

- Map view of active sites
- Real-time parameters
- Animated time-series

Home

About USGS WaterQualityWatch

Current RTWQ Maps

State:

Measurement:

Map of all USGS Water Data

RTWQ FAQ

State Links to Surrogates and Reports

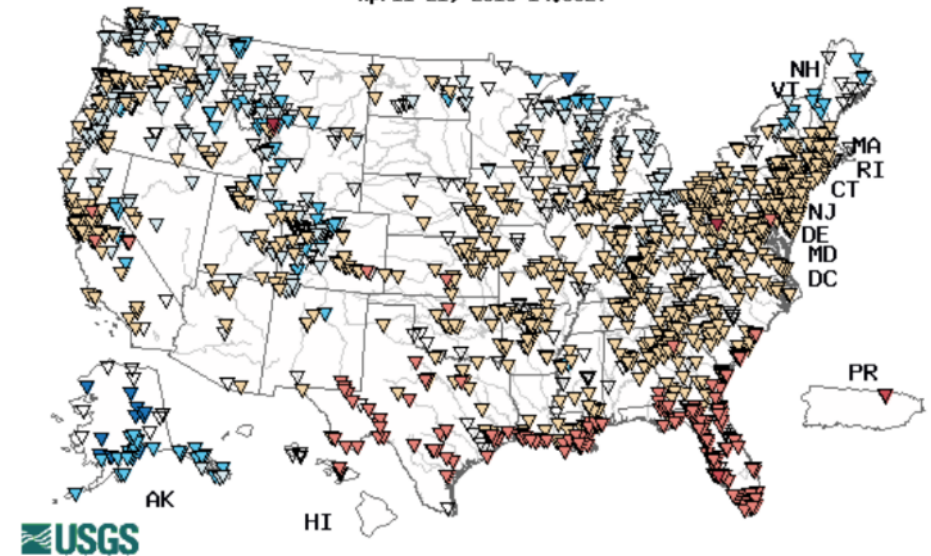
Technical Resources

Other Links

Search USGS Publications

Real-Time Water Temperature, in °C

April 21, 2019 14:30ET



Explanation							
<1	1-4.9	5-9.9	10-19.9	20-29.9	30-35	>35	No Data

[Temp](#) [Cond](#) [pH](#) [D.O.](#) [Turb](#) [Nitrate](#) [Disch](#) [Chlorophyll](#) [Surrogates](#)

* Site operated on a seasonal basis or currently is not operating.
No values are available for the last 6 hours.

The "Real-time" map tracks short-term changes (over several hours) of water quality. Although the general appearance of the map changes very little from one hour to the next, individual sites may change rapidly in response to major rain events or to reservoir releases. The data used to produce this map are [provisional](#).

Animate national map by current [Month](#), or [last 12 months](#)

[Accessibility](#) [FOIA](#) [Privacy](#) [Policies and Notices](#)

[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)
URL: <http://waterwatch.usgs.gov/wqwatch/?pcode=00010>
Page Contact Information: sbrady@usgs.gov
Page Last Modified: Mon 9 June 2014

Groundwater Watch

- Map view
- Real-time and discrete groundwater level data



USGS Home
Contact USGS
Search USGS

Groundwater Watch

Latest News...

USGS Groundwater Watch

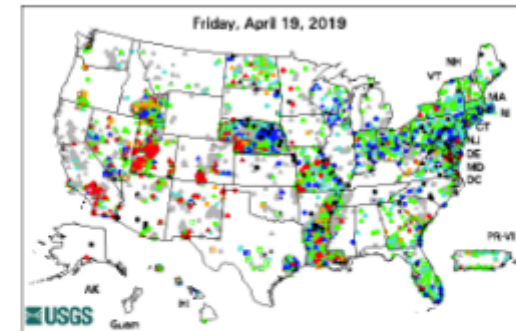
The USGS has a distributed water database that is locally managed. Surface water, groundwater, and water quality data are compiled from these local, distributed databases into a national information system. The groundwater database contains records from about 850,000 wells that have been compiled during the course of groundwater hydrology studies over the past 100 years. Information from these wells is served via the Internet through NWISWeb, the National Water Information System Web Interface. NWISWeb provides all USGS groundwater data that are approved for public release. This large number of sites is excellent for some uses, but complicates retrievals when the user is interested in specific networks, or wells in an active water-level measurement program.

These "groundwater watch" web pages group related wells and data from these active well networks, and provide basic statistics about the water-level data collected by USGS water science centers for Cooperative Programs, for Federal Programs, and from data supplied to us by our customers through cooperative agreements.

Groundwater Watch is maintained by the [Office of Groundwater](#).

National Networks

Active Groundwater Level Network



National Aquifer Composite Hydrographs



Climate Response Network



Water Alert

- Several ways to find sites of interest
- Subscribe to receive email or text from select real-time data
- User chooses threshold or other criteria for notification



The screenshot shows the USGS WaterAlert website. At the top left is the USGS logo with the tagline "science for a changing world". To the right is a banner image of people kayaking on a river. In the top right corner, there are links for "USGS Home", "Contact USGS", and "Search USGS". Below the banner is a blue navigation bar with the "WaterAlert" title and "Help" and "Info" buttons. The main content area is divided into two panels. The left panel, titled "Select Location", has tabs for "Sites" and "Map". It contains several search options: "News" (updated September 30, 2013), "Search by Street Address" with an input field and a green arrow button, "Search by Place Name" with an input field and a green arrow button, "Search by Site Number(s)" with an input field and a green arrow button, "Search by State/Territory" with a dropdown menu showing "Select an Area", and "Search by Watershed Region" with a dropdown menu showing "Select a Region". Below these are links for "Select Data Type", "About WaterAlert", "How To Use WaterAlert", and "Related Information". The right panel is a map of North America showing a dense distribution of black dots representing monitoring sites across the United States. The map includes labels for "CANADA", "MEXICO", "Gulf of Alaska", "Hudson Bay", "Pacific Ocean", "Atlantic Ocean", "Caribbean Sea", "Vancouver", "Toronto", "Chicago", "New York", "Los Angeles", "San Francisco", "Mexico City", "VENUEZUELA", "BOGOTA", "COLOMBIA", and "PERU". A scale bar at the bottom left of the map shows 0, 500, and 1000 miles, with coordinates "-129.838, 67.828". An inset map in the bottom right corner shows the location of the main map area within the Western Hemisphere. The map is credited to "Esri, HERE, Garmi".

Water Now

- Send email or text to receive current real-time data
- Any parameter

USGS - science for a changing world

USGS Home
Contact USGS
Search USGS

[version 1.0]

USGS WaterNow

Home Contact USGS Water home

Search USGS Water Sites:
Google Custom Search Go

WATER DATA FOR THE NATION

National Water Information System
View current and historical streamflow, ground-water level, and water-quality data
Data by State...

Today's Water Conditions
View comparisons of current and historical conditions using maps

USGS

- ◆ Streamflow
- ◆ Flood and high flow
- ◆ Drought
- ◆ Ground water levels
- ◆ Surface water quality

WATER SCIENCE SPECIALTIES

- ◆ Surface Water
- ◆ Ground Water
- ◆ Water Quality
- ◆ Water Use

WATER SCIENCE BY STATE

USGS Water Science Centers are

News updated Jul 2, 2014

USGS WaterNow – Current-conditions for water data directly to your mobile phone or email

Send an email or text message containing a USGS current-conditions gaging site number and quickly receive a reply with its most recent observation(s).

How to use WaterNow

- **Text Message (SMS)**
Send a text message to WaterNow@usgs.gov containing the USGS Site Number of the gage you want to query (optionally add parameter codes to customize your query). You will receive a response within a few minutes. All query options are listed below:

Getting Started: What you need to know

- 1. The USGS Site Number:**
This is a unique number that identifies a USGS gage or well site where you want to obtain data.
- 2. The Parameter Code (optional):**
Needed only if you want other than the latest observations for flow (00060) and/or stage (00065), such as depth to water level (72019).

All data types are represented by their respective 5-digit parameter codes. Simply include the parameter code(s) of your choice in your email or text message.


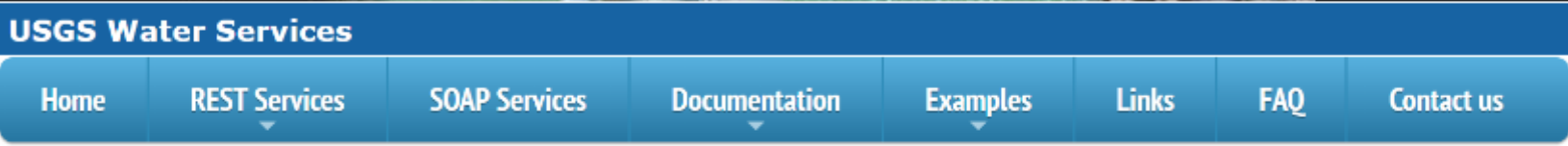

Some commonly available parameters:

Streams,	00060 Flow, ft ³ /s
Springs	00065 Stage, ft
	72019 Depth to water level, ft
	72020 Water level elevation, ft NVGD
Wells	62611 Water level elevation, ft NAVD
	00065 Stage, ft
Lakes	72020 Water level elevation, ft NVGD
	00010 Water temperature, °C

Water Services

- Retrieve data from active and inactive stations
- One site at a time or multiple sites
- Manual or automate retrieval





USGS Water Services

This site serves [USGS water data](#) via

automated means using [web services](#) and [extensible markup language \(XML\)](#), as well as other popular media types. Services are invoked with the [REST](#) protocol. These services designed for high fault tolerance and very high availability.

Water Service Shortcuts

- > [Instantaneous Values Service](#) for **real-time** data and historical data since October 1, 2007
- > [Site Service](#)
- > [Daily Values Service](#)
- > [Groundwater Levels Service](#)
- > [Water Quality Service](#)
- > [Statistics Service](#)
- > [Frequently Asked Questions](#)
- > [Writing Fault-Resistant Code](#)

Service Example

This example uses a USGS water web service, as well as [AJAX](#), [JSON](#) and [jQuery](#) Web 2.0 technologies.

USGS Site No. [Find sites](#)

USGS Parameter

Service Highlights

USGS Statistics Web Service

Retrieve daily, monthly or annual statistics for sites. Statistics are provided on approved data only for time-series sites. Statistics are available for any parameter on these sites with approved data. This service is an initial beta release. A full version of the service is planned for release in the summer of 2014. [Learn more](#) and [test the service](#).

USGS Instantaneous Values Web Service

Need current data? Try this service! Retrieve current streamflow and other real-time data for one or multiple sites, using sets of flexible, predefined filters, since October 1, 2007. Data are available in [WaterML](#), [JSON](#) and in a tab-delimited format with more formats, like Microsoft Excel, to come. [Learn more about the web service](#) or [test the web service](#).

USGS Site Service

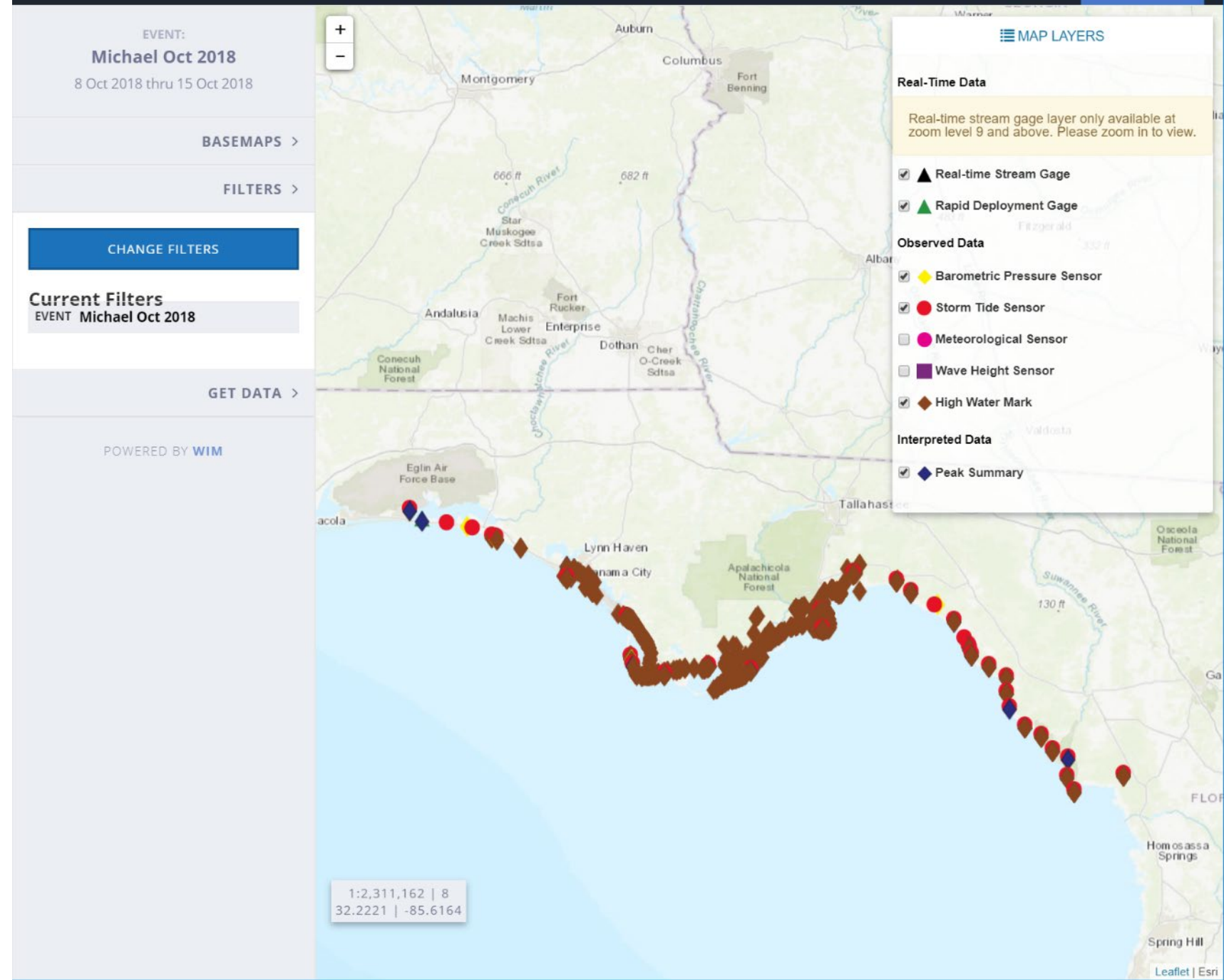
Need USGS water site data? A [rich new site service](#) is now

Water Services News

January 23, 2018 - Government has reopened
23 January 2018 18:00:00 GMT

Flood Event Viewer

- Data from extreme events
- Access to time-series data, highwater mark

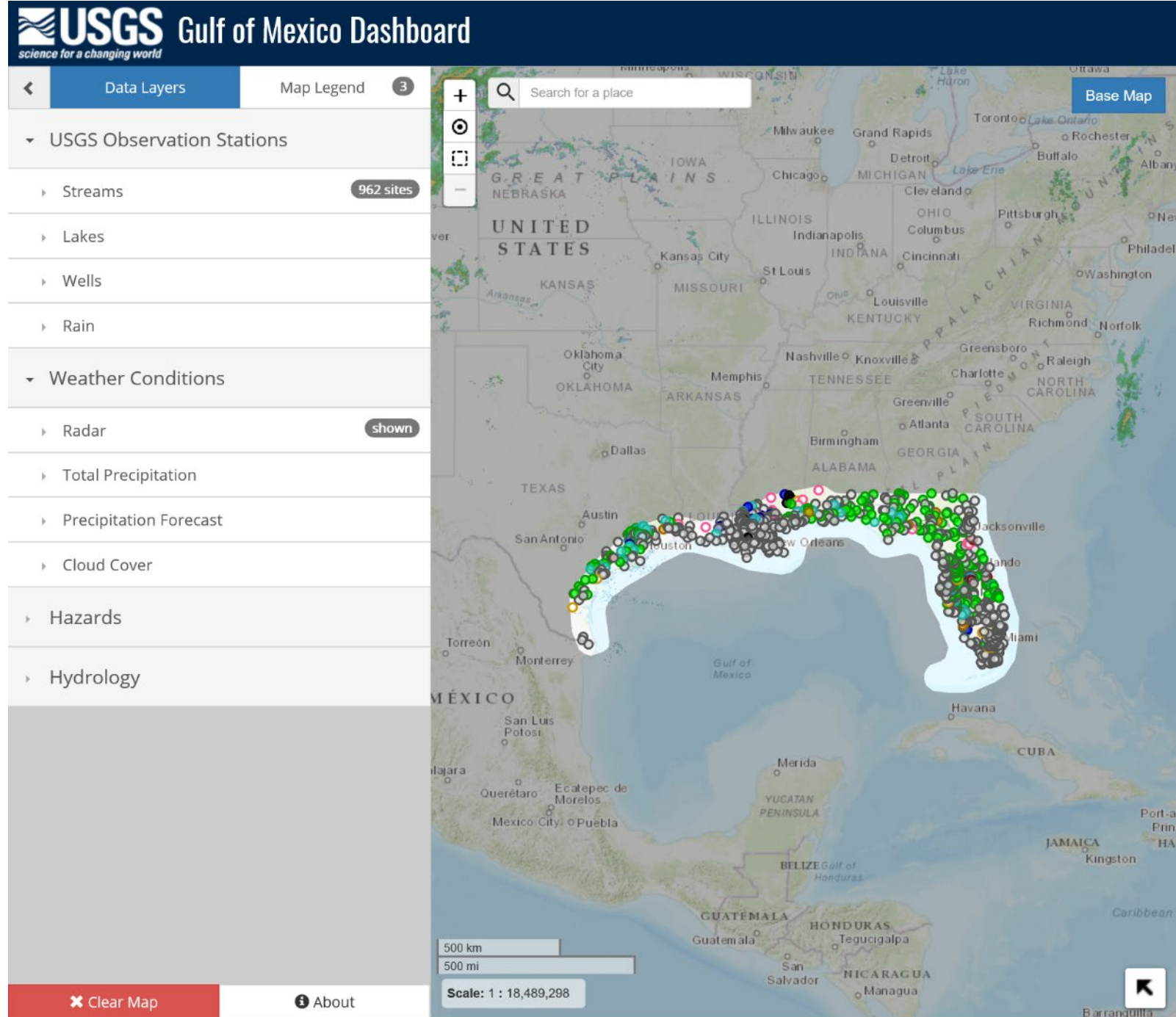


Accessing Data – local websites

- Gulf of Mexico Dashboard
- Water Level and Salinity Analysis Mapper
- EDEN
- Science Base
- Water Science Center webpage
- SOFIA

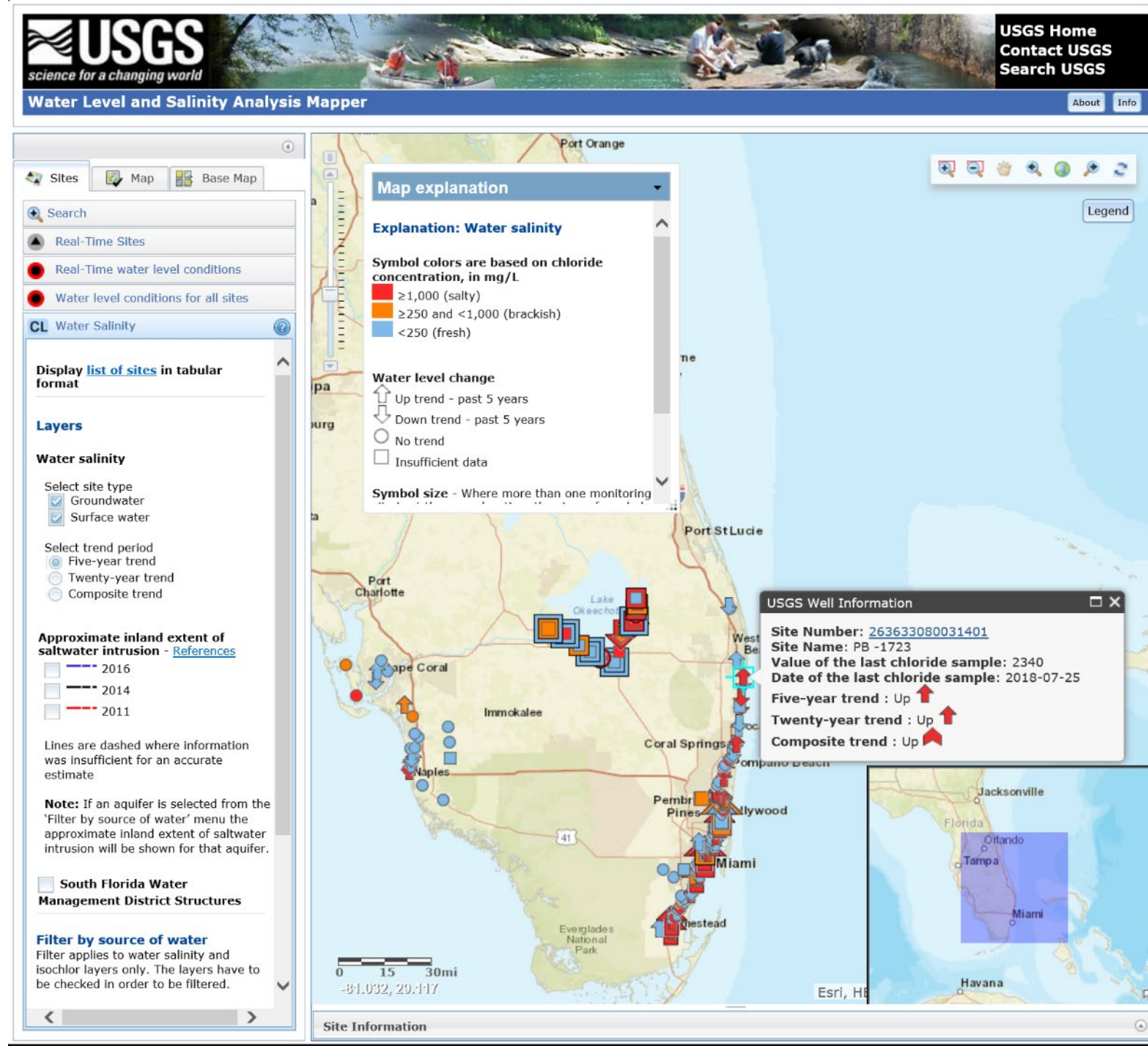
GOM Dashboard

- Display real-time conditions
- Weather conditions overlaid



Water Level & Salinity Analysis Mapper

- Displays current groundwater levels and chloride data and trends
- Access period of record of active stations
- Select by aquifer



EDEN

- Displays maps of water level surfaces and depths in the Everglades
- Access to water level data, DEMs, and much more



Providing real-time hydrologic tools for biological and ecological assessments for adaptive management

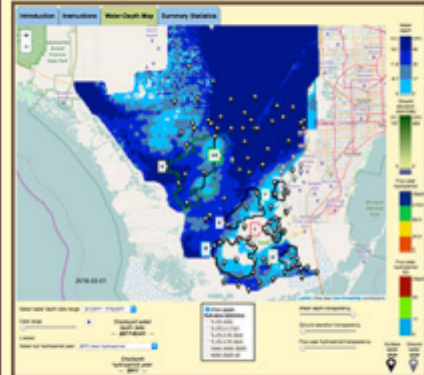
What's New @ EDEN

- [2018 Q2 Provisional Water Surfaces](#)
- [2018 Q1 Provisional Water Surfaces](#)
- [2017 Q4 Provisional Water Surfaces](#)
- [2017 Q3 Provisional Water Surfaces](#)

To be notified when major updates or additions are made to the EDEN site, enter in your email address below:

EDEN Announcements

Cape Sable Seaside Sparrow (CSSS) Viewer Updated (March 2017)



Newly added features include a new expanded subarea A sparrow habitat ("AX"), new daily statistics (mean water depth and water depth standard deviation), new display surfaces (4 year hydroperiod and hydroperiod standard deviation), new annual summary statistics (4 year hydroperiod and hydroperiod standard deviation), and some fun new widgets: check out the popup statistics graphs on the Summary Statistics tab linked to the column headers.

Take a look at the updated [CSSS Viewer!](#)

The Everglades Depth Estimation Network (EDEN) is an integrated network of water-level gages, interpolation models, and applications that generates daily water-level data and derived hydrologic data across the freshwater part of the greater Everglades landscape. The Comprehensive Everglades Restoration Plan (CERP) through the U.S. Army Corps of Engineers and U.S. Geological Survey Greater Everglades Priority Ecosystem Sciences provides support for EDEN and for the goal of providing consistent, documented, and readily accessible hydrologic and ground-elevation data for the Everglades.



For more information:

USGS Fact Sheets on EDEN: "[The Everglades Depth Estimation Network \(EDEN\) for Support of Ecological and Biological Assessments](#)" and "[Everglades Depth Estimation Network \(EDEN\) Applications: Tools to View, Extract, Plot, and Manipulate EDEN](#)"

- Home
- Data
 - Water Levels (Gage)
 - Water Surfaces
 - Water Depth
 - Ground Elevation (DEM)
 - EDEN Grid
- Explore and View EDEN (EVE)
 - Cape Sable Seaside Sparrow (CSSS) Viewer
 - Coastal EDEN
 - Daily Water Level Percentiles by Month
- Meteorologic
- Benchmarks
- EDENapps
 - Introduction
 - DataViewer
 - xyLocator
 - TransectPlotter
 - Depth&DaysSinceDry
 - GridtoNetCDF
 - NetCDFtoGrid
- Information
 - Learn About EDEN
 - Data Use & Citation
 - Publications
 - Newsletter
 - EDEN Personnel
 - Contacts



Thank you!

