# 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

**U.S. Department of the Interior**
**U.S. Geological Survey**

# Types of monitoring:

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

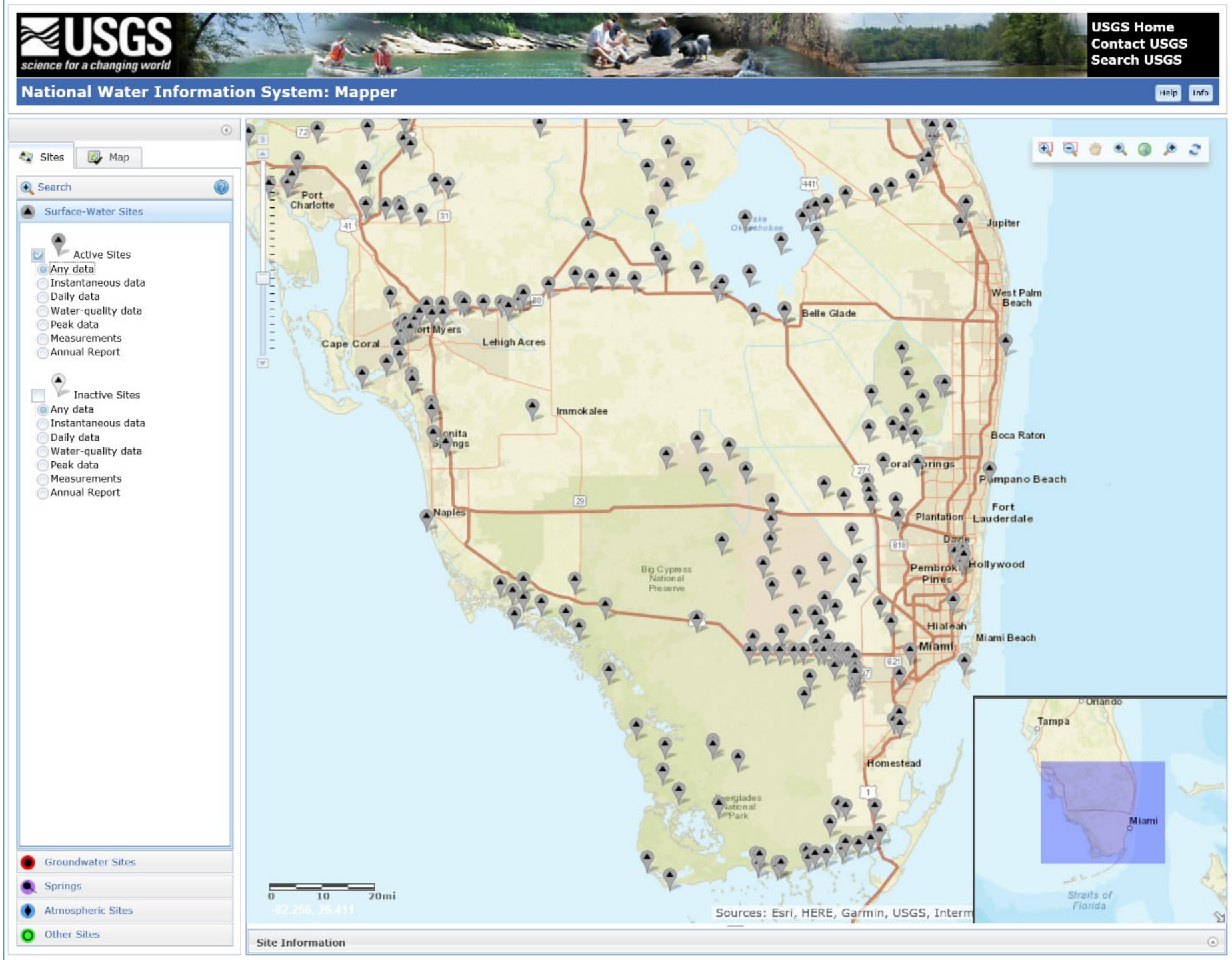
USGS

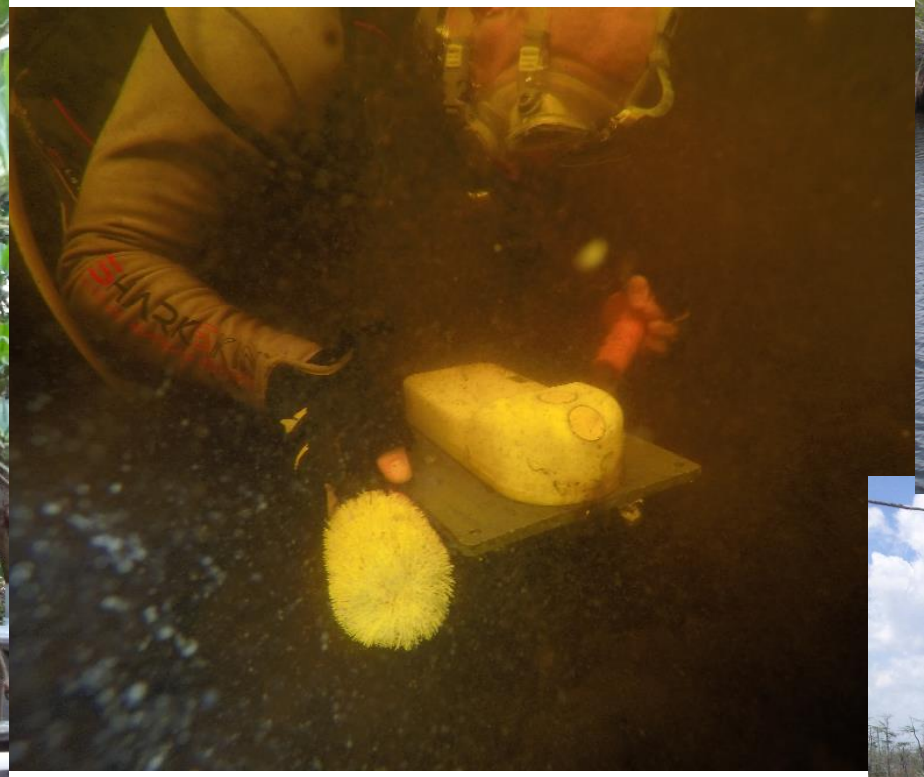
# Monitoring in South Florida

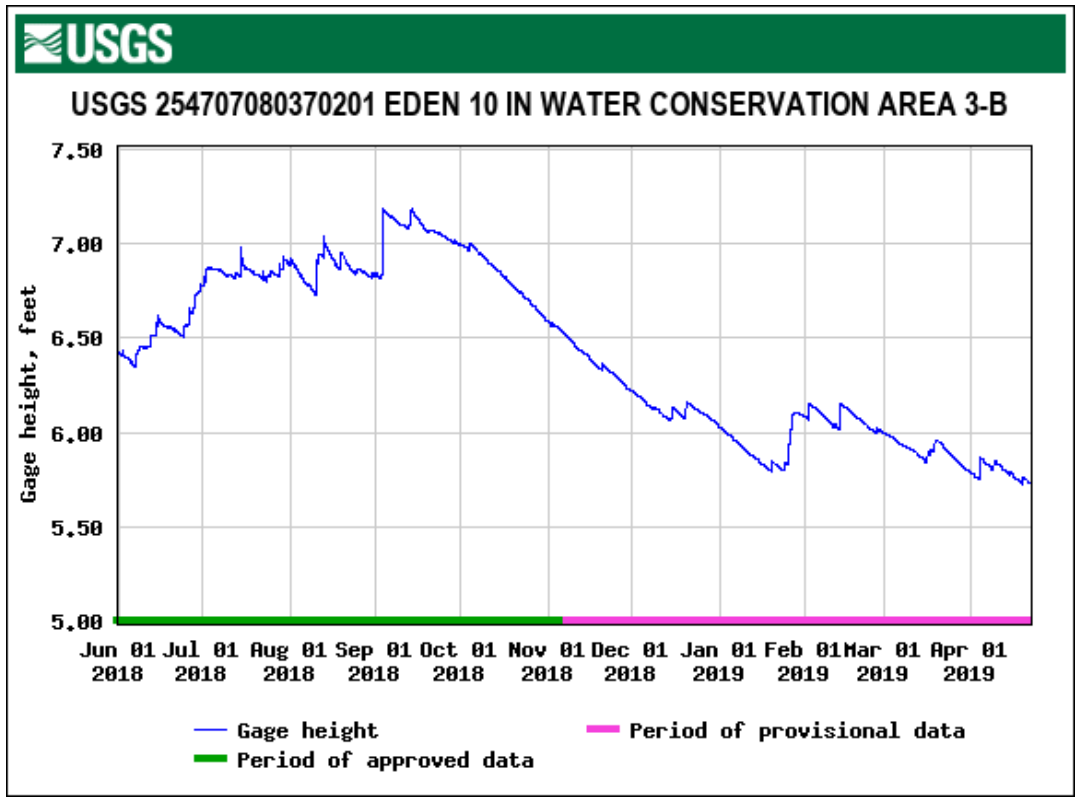
- Freshwater supply for 7 million
- Water management
- Everglades restoration
  - Removing barriers to flow
  - Redistributing freshwater
  - Water quality
- Evapotranspiration
- Minimum flows to estuaries
- SWI
  - Water supply
  - Includes FPL Turkey Point
  - HHD connate water
- SW/GW interaction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

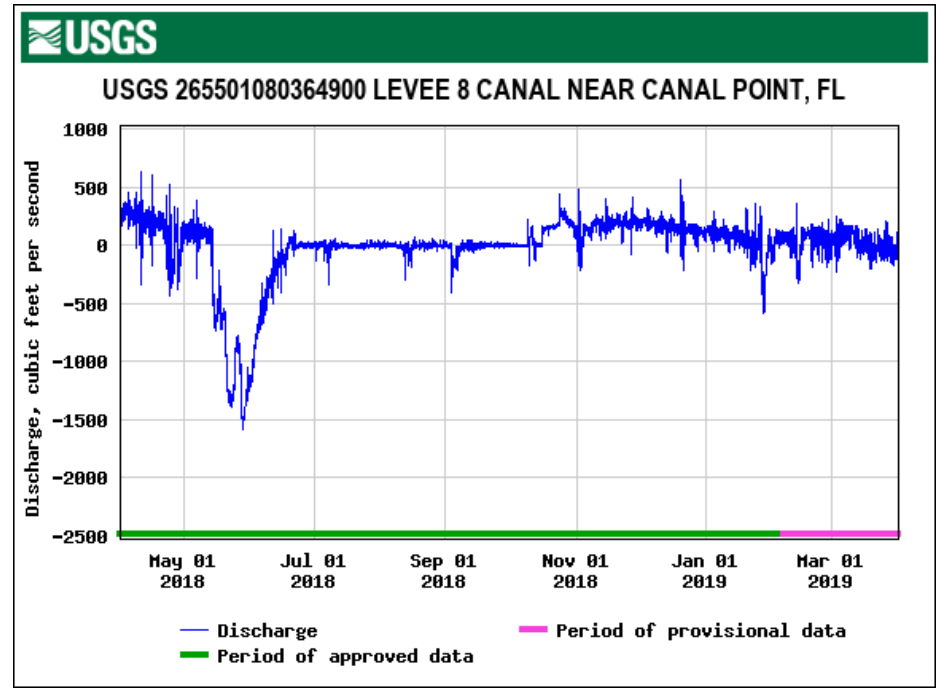
USGS

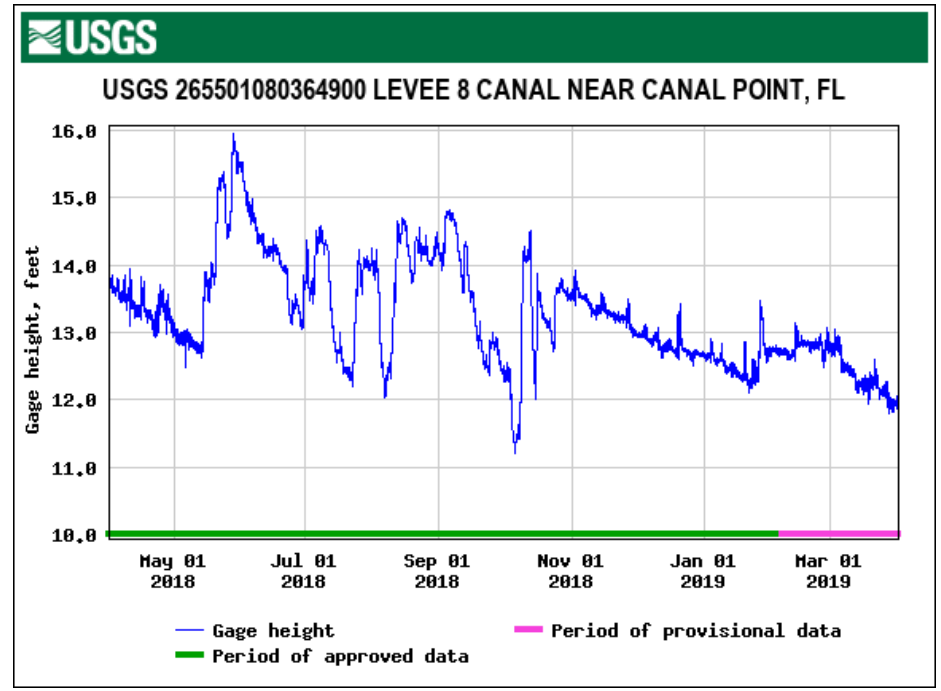
# Surface water monitoring



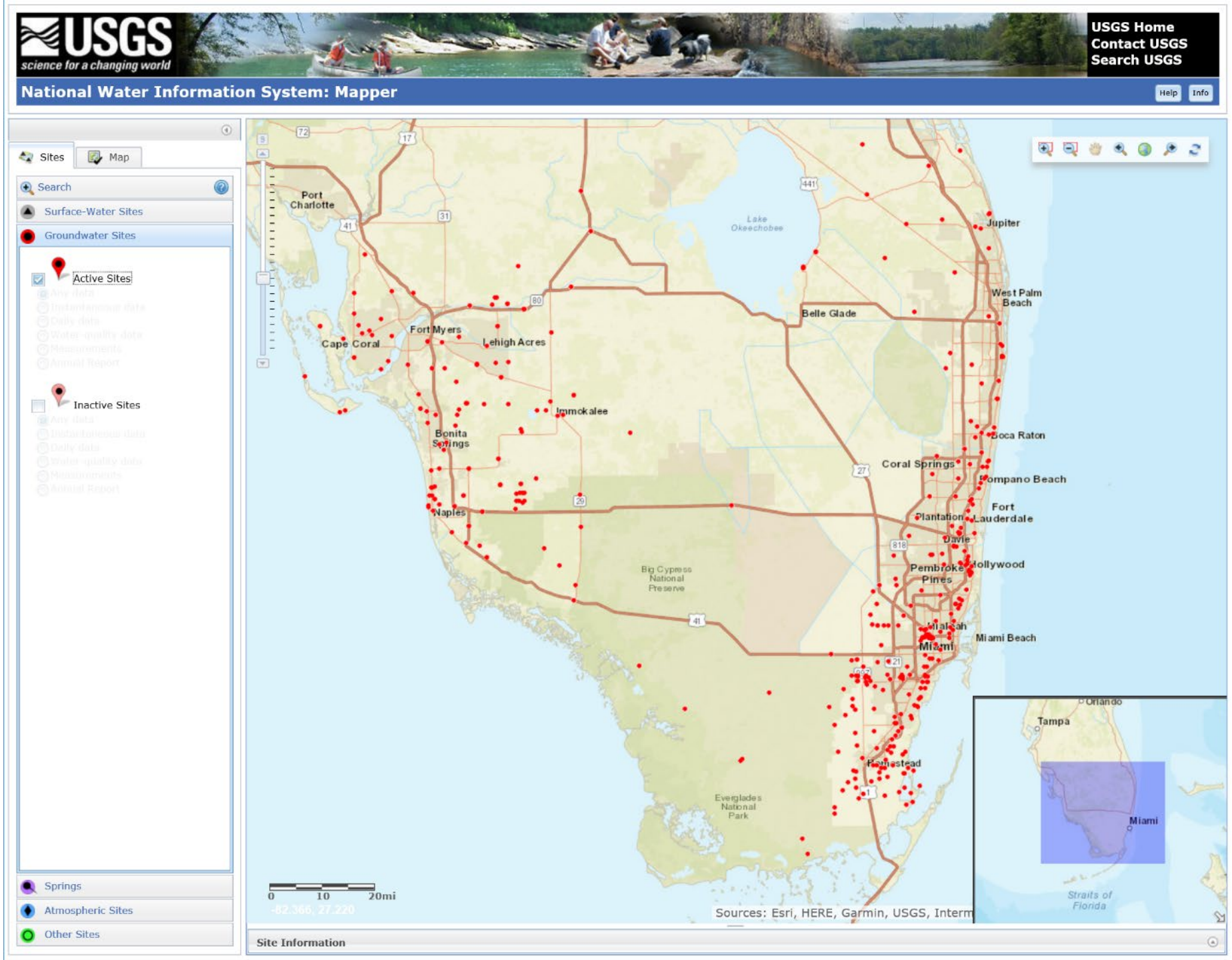


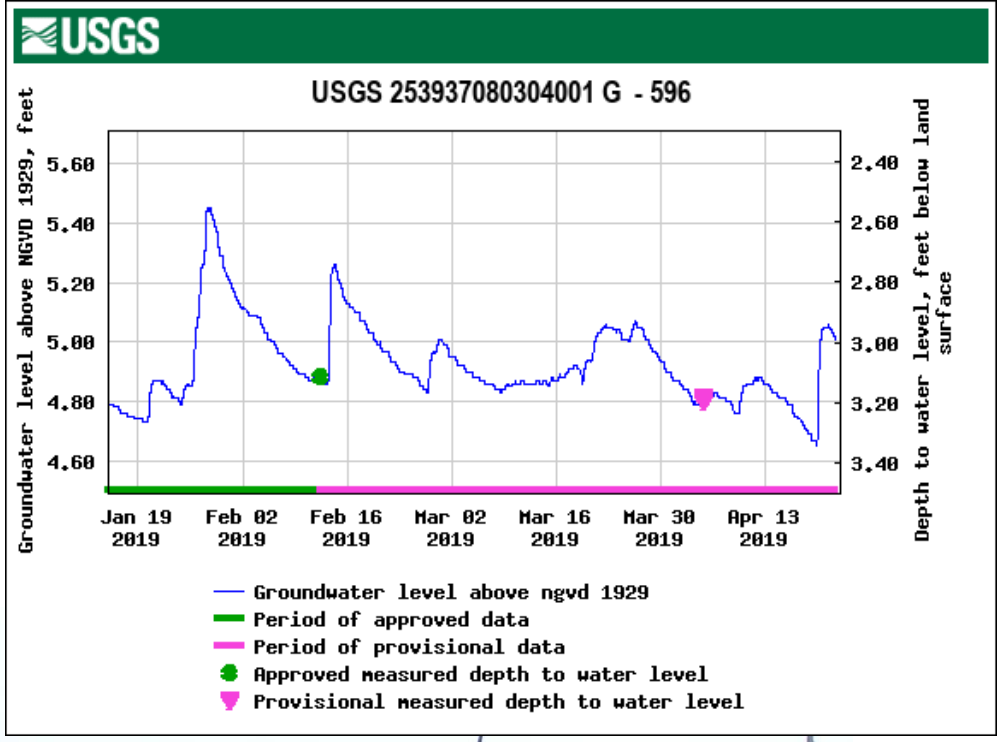

USGS
USGS 254707080370201 EDEN 10 IN WATER CONSERVATION AREA 3-B
Gage height, feet
7.50
7.00
6.50
6.00
5.50
5.00
Jun 01 2018
Jul 01 2018
Aug 01 2018
Sep 01 2018
Oct 01 2018
Nov 01 2018
Dec 01 2018
Jan 01 2019
Feb 01 2019
Mar 01 2019
Apr 01 2019
Gage height
Period of provisional data
Period of approved data


USGS
USGS 265501080364900 LEVEE 8 CANAL NEAR CANAL POINT, FL
Discharge, cubic feet per second
1000
500
0
-500
-1000
-1500
-2000
-2500
May 01 2018
Jul 01 2018
Sep 01 2018
Nov 01 2018
Jan 01 2019
Mar 01 2019
Discharge
Period of provisional data
Period of approved data

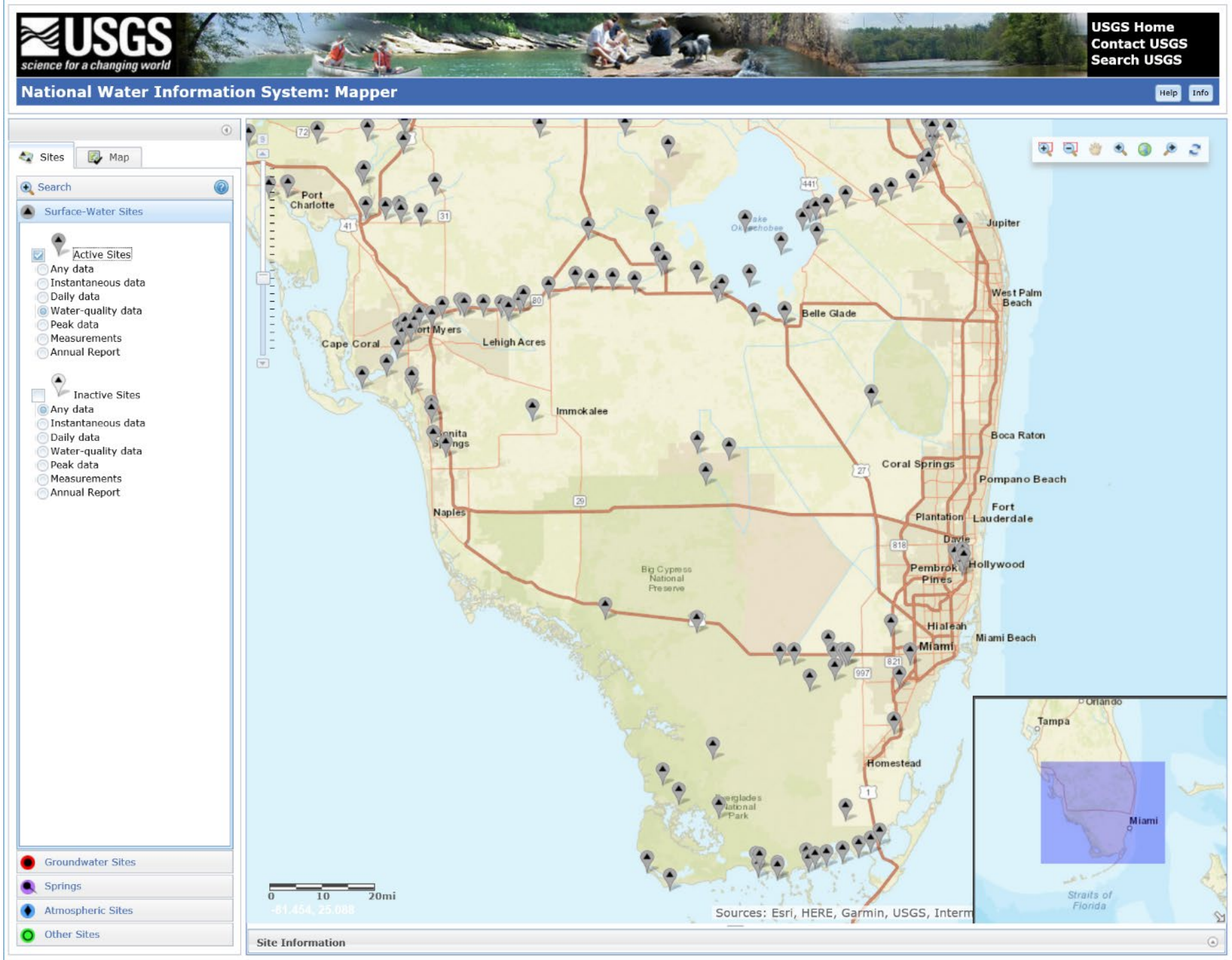

USGS
USGS 265501080364900 LEVEE 8 CANAL NEAR CANAL POINT, FL
Gage height, feet
16.0
15.0
14.0
13.0
12.0
11.0
10.0
May 01 2018
Jul 01 2018
Sep 01 2018
Nov 01 2018
Jan 01 2019
Mar 01 2019
Gage height
Period of provisional data
Period of approved data

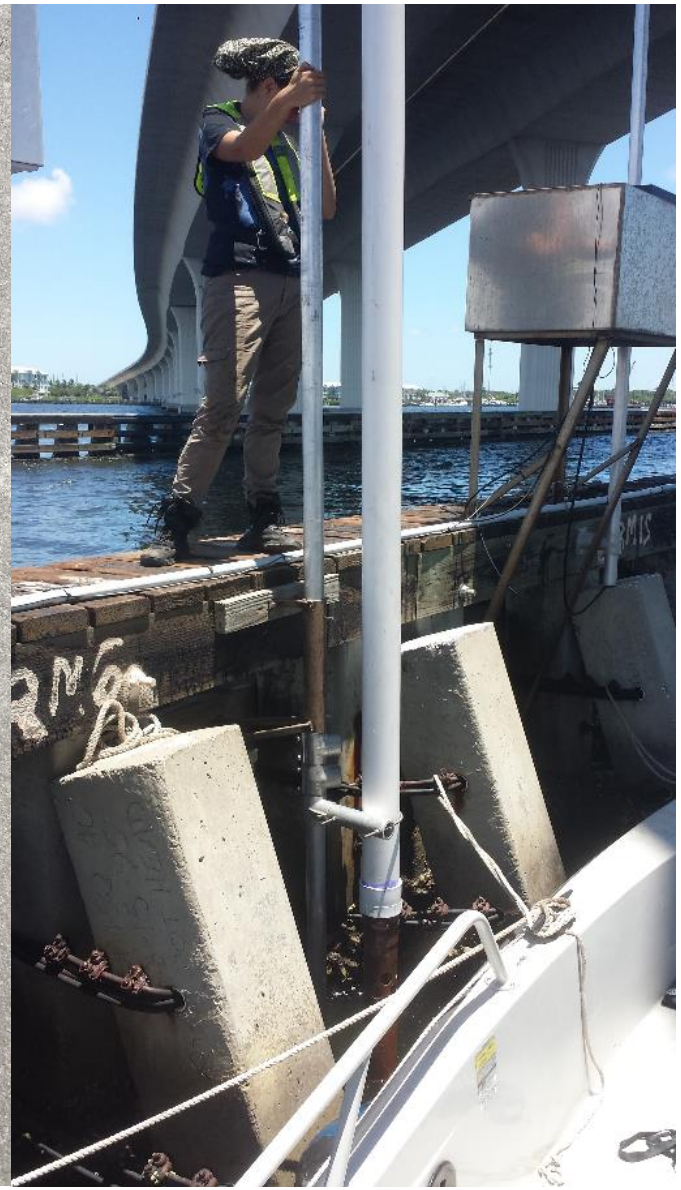
# Groundwater monitoring

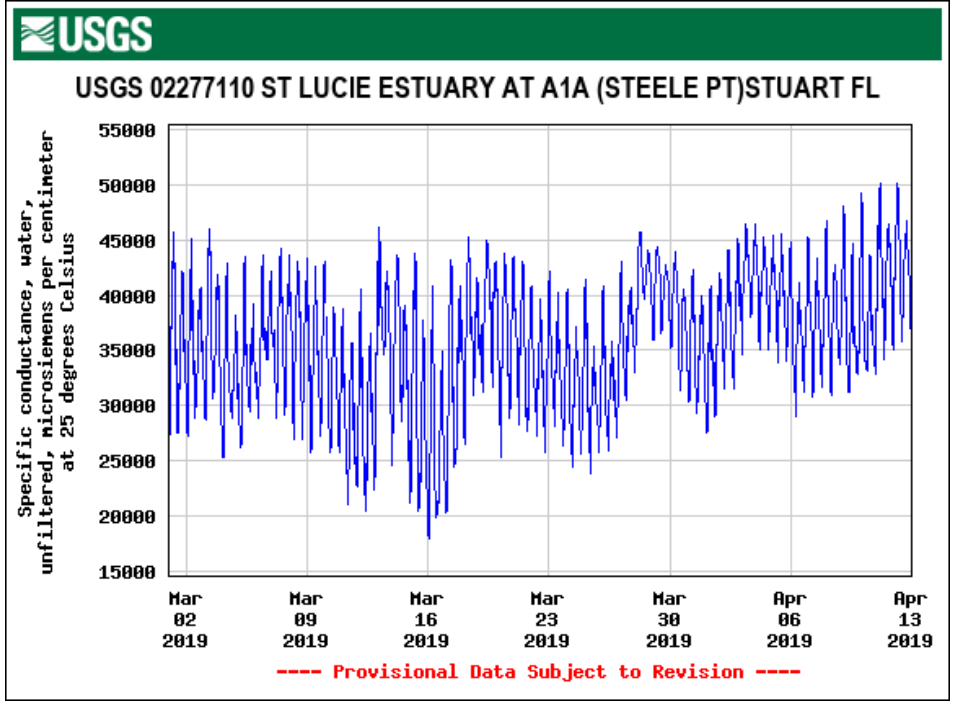


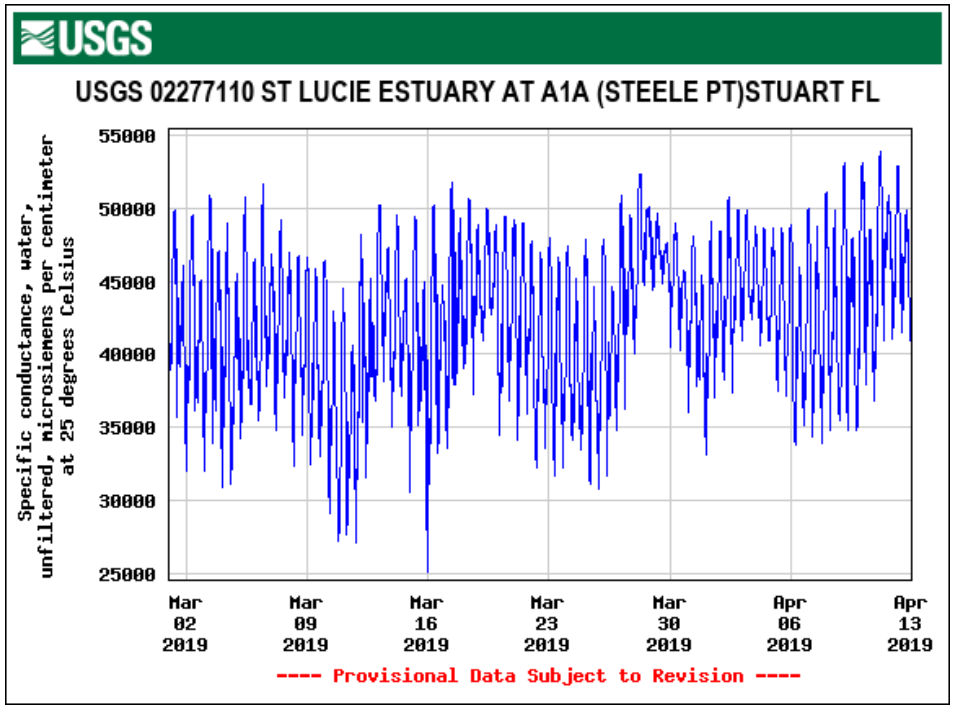

USGS
USGS 253937080304001 G - 596
Groundwater level above NGVD 1929, feet
5.60
5.40
5.20
5.00
4.80
4.60
Depth to water level, feet below land surface
2.40
2.60
2.80
3.00
3.20
3.40
Jan 19 2019
Feb 02 2019
Feb 16 2019
Mar 02 2019
Mar 16 2019
Mar 30 2019
Apr 13 2019
Groundwater level above ngvd 1929
Period of approved data
Period of provisional data
Approved measured depth to water level
Provisional measured depth to water level

# Water quality monitoring

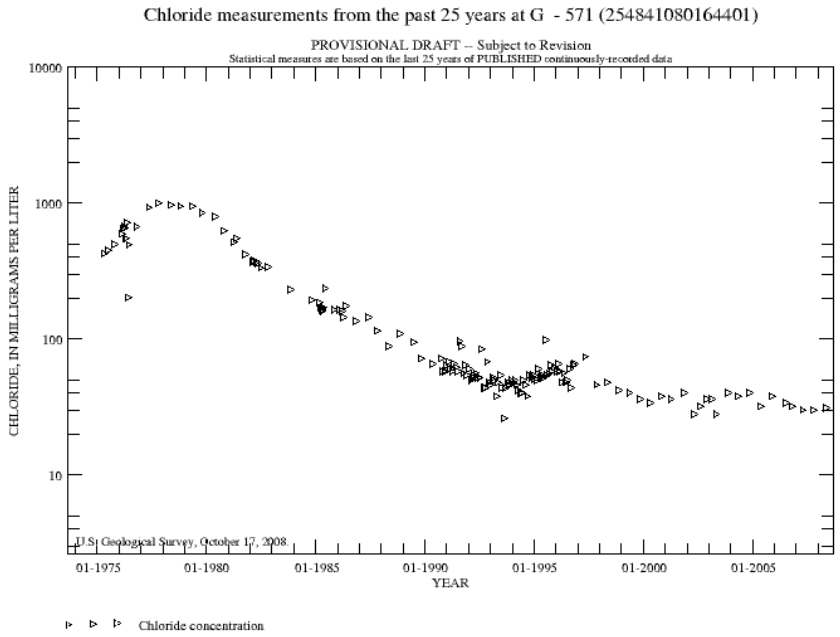


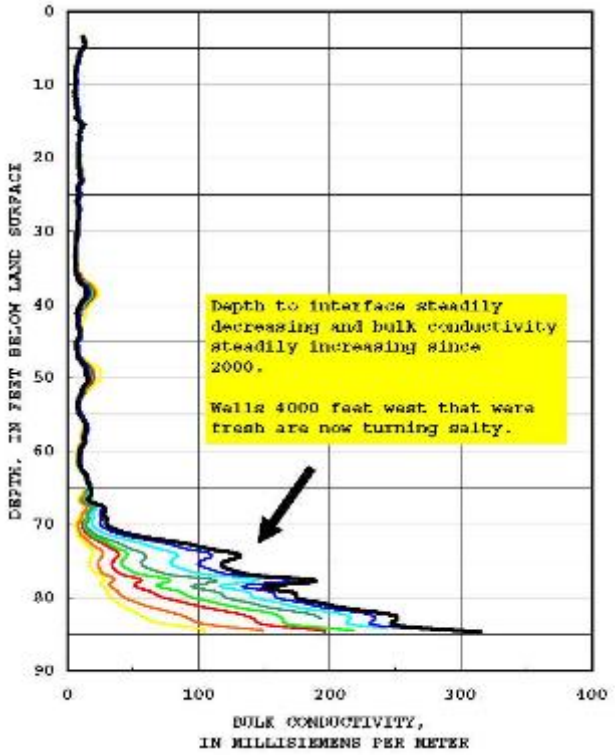


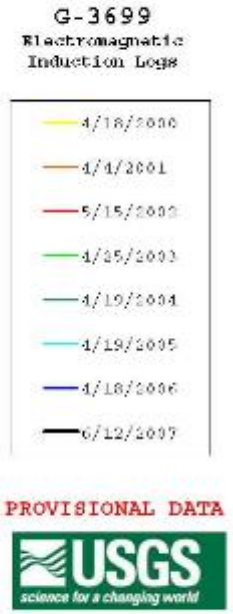

USGS
USGS 02277110 ST LUCIE ESTUARY AT A1A (STEELE PT)STUART FL
Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius
55000
50000
45000
40000
35000
30000
25000
20000
15000
Mar 02 2019
Mar 09 2019
Mar 16 2019
Mar 23 2019
Mar 30 2019
Apr 06 2019
Apr 13 2019
---- Provisional Data Subject to Revision ----


USGS
USGS 02277110 ST LUCIE ESTUARY AT A1A (STEELE PT)STUART FL
Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius
55000
50000
45000
40000
35000
30000
25000
Mar 02 2019
Mar 09 2019
Mar 16 2019
Mar 23 2019
Mar 30 2019
Apr 06 2019
Apr 13 2019
---- Provisional Data Subject to Revision ----

# Salt Water Intrusion




PROVISIONAL DATA

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# SW/GW interaction studies

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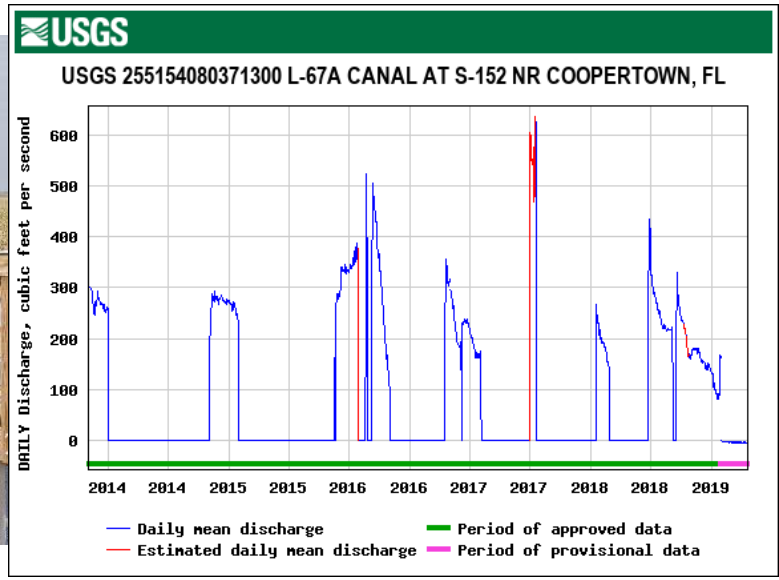
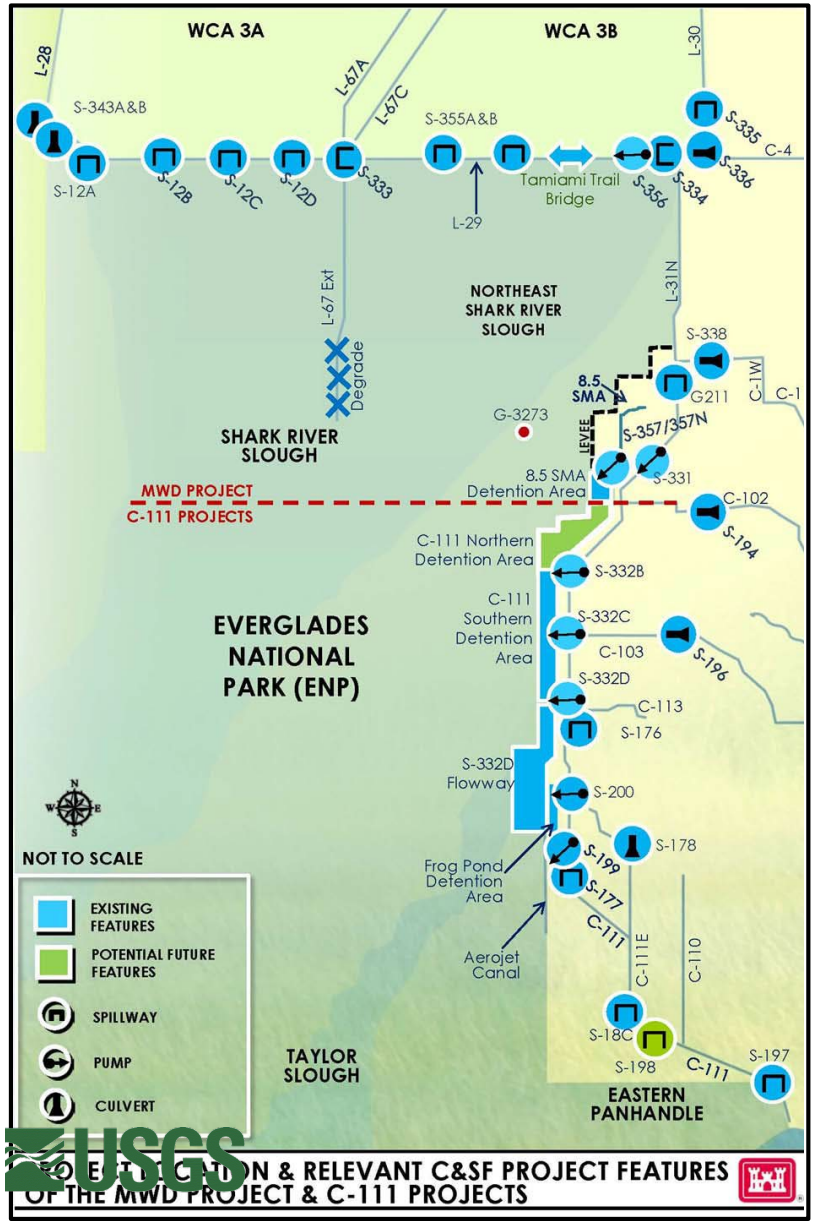
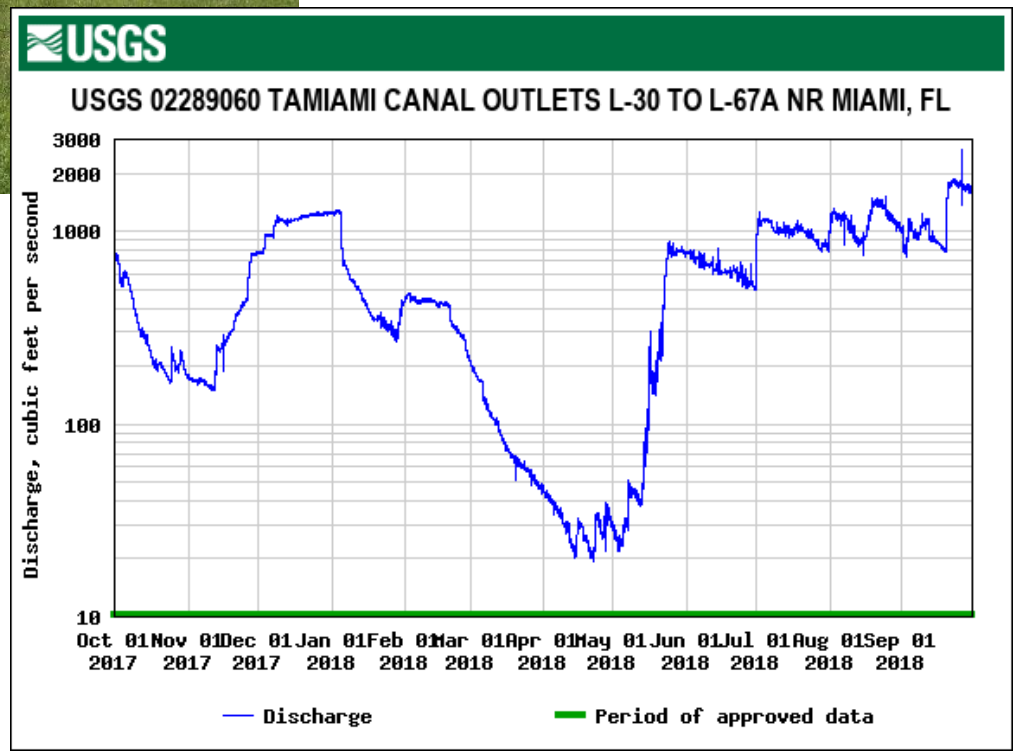
# Everglades: removing barriers to flow and rehydrating

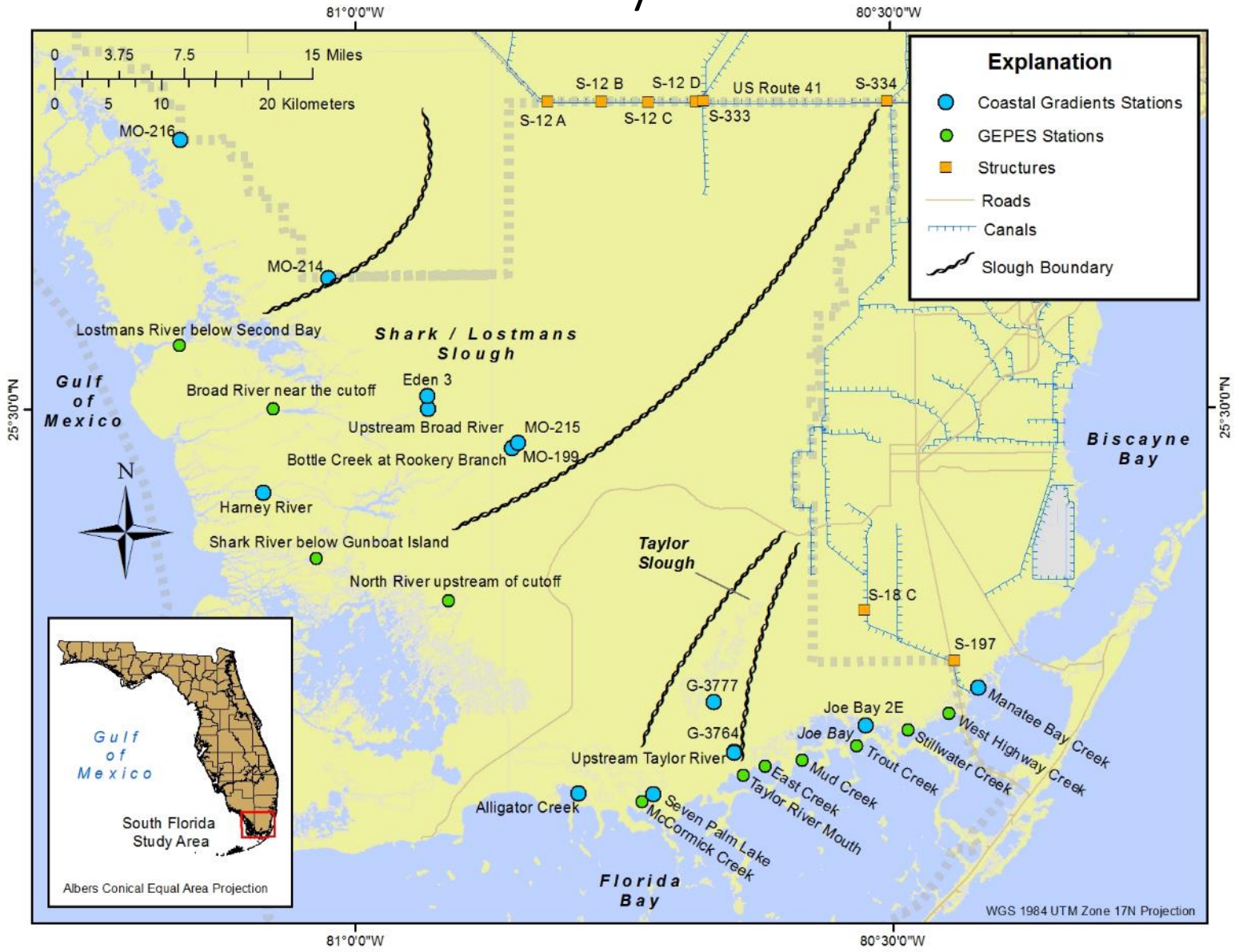


# Everglades: distributing flow

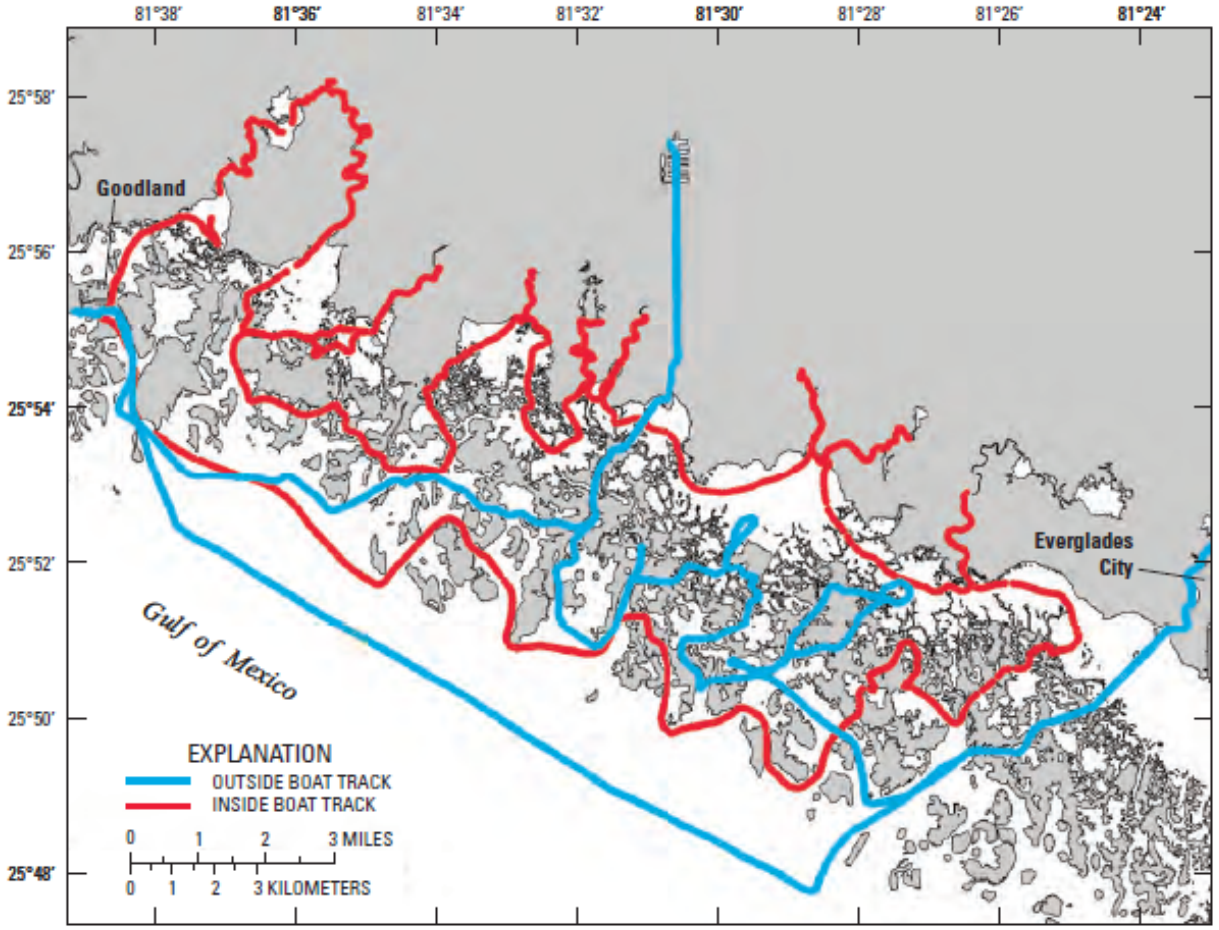


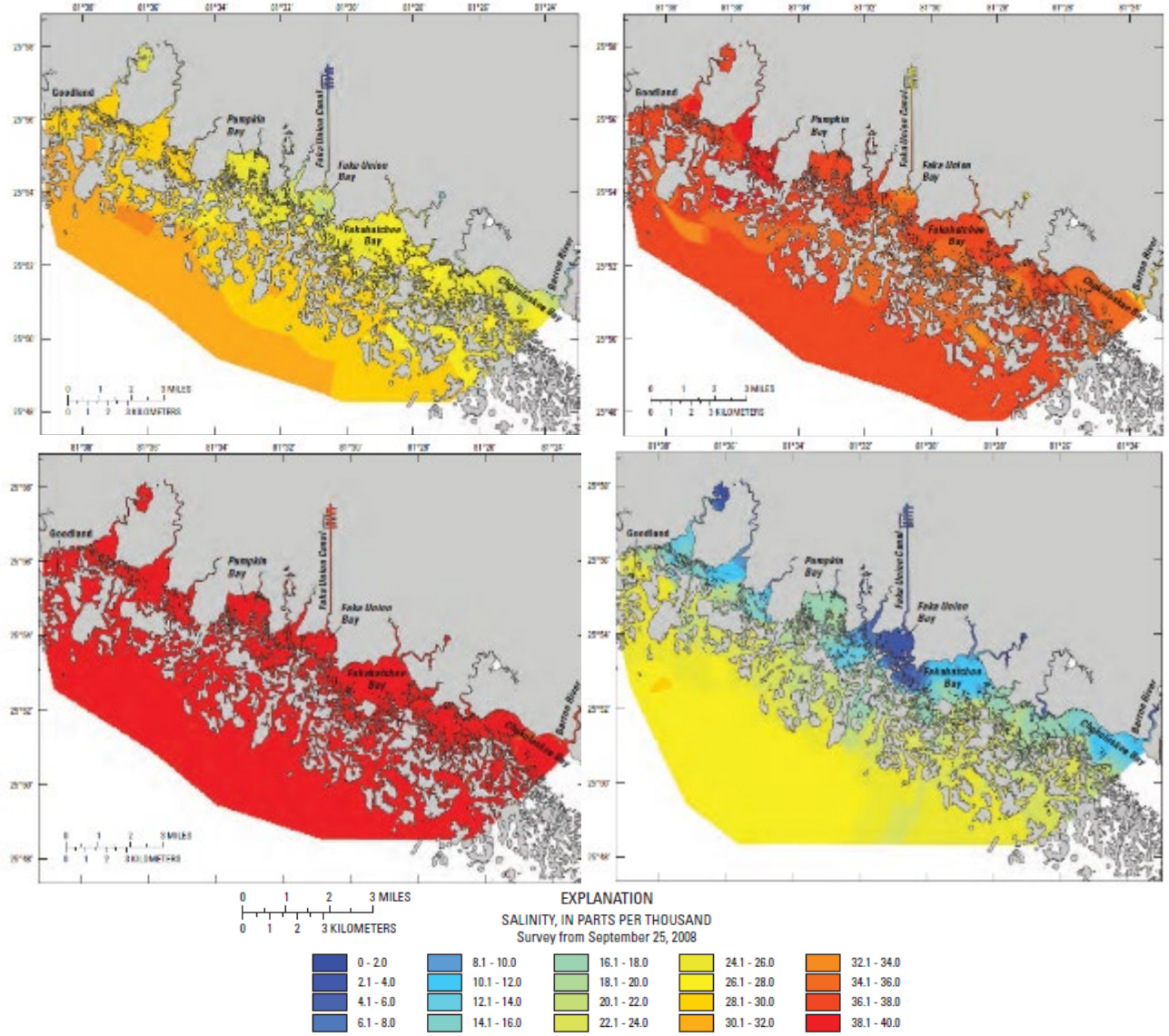


# Coastal Gradients to Florida Bay



# Everglades Restoration: Ten Thousand Islands

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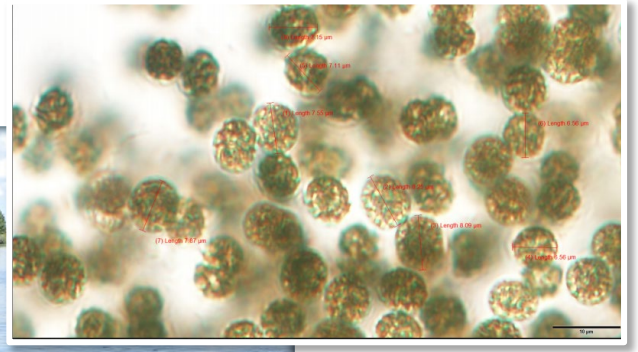
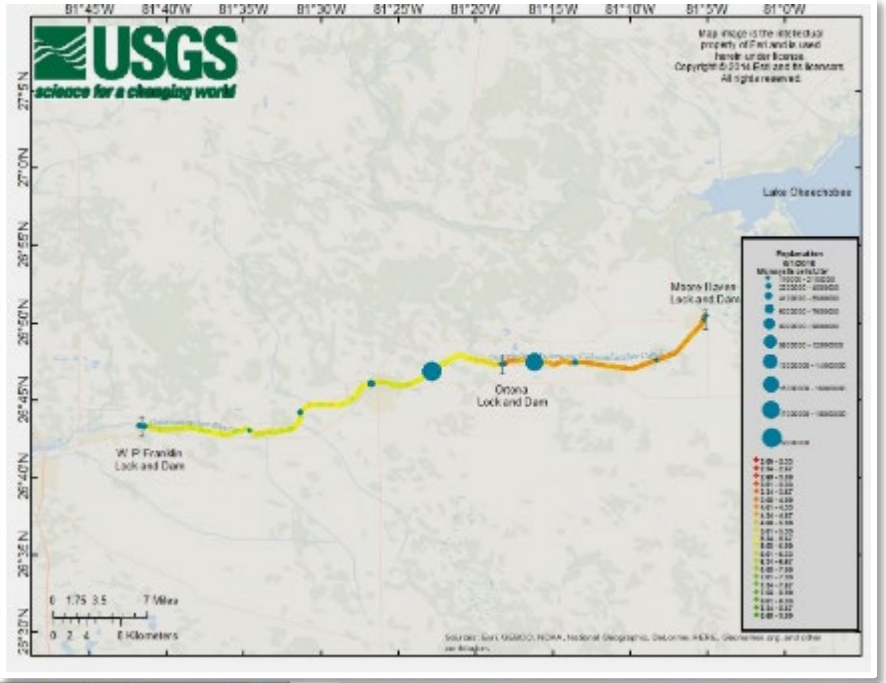
# Lake Okeechobee HABs





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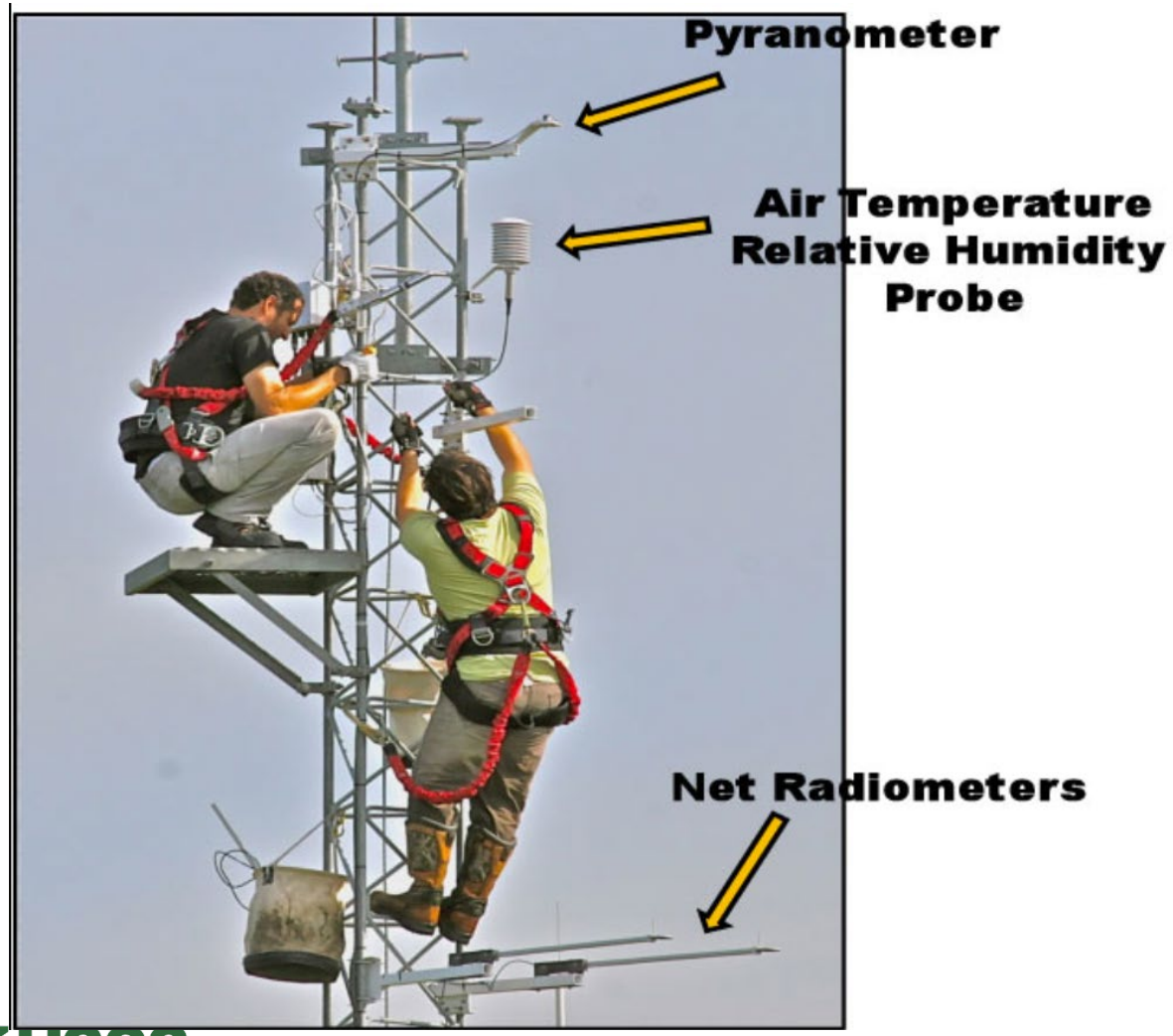
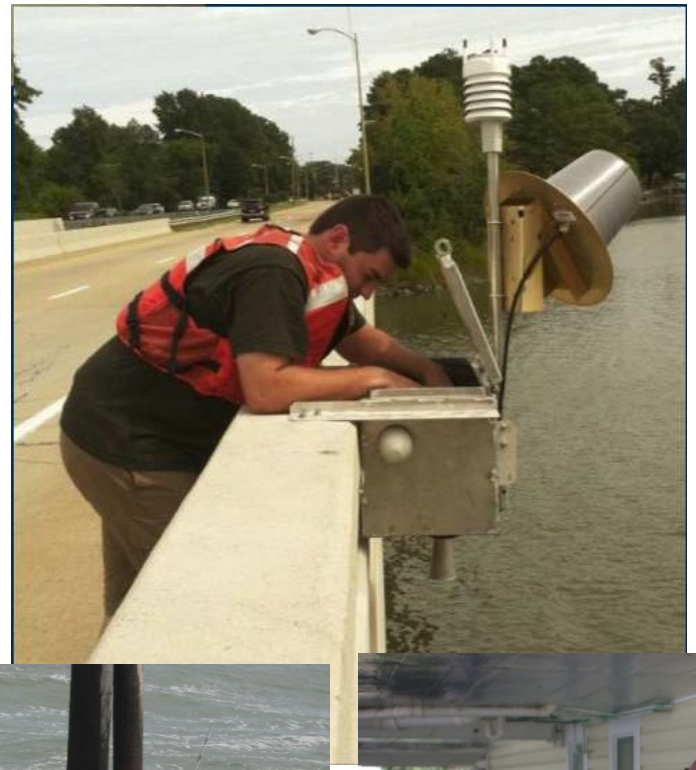
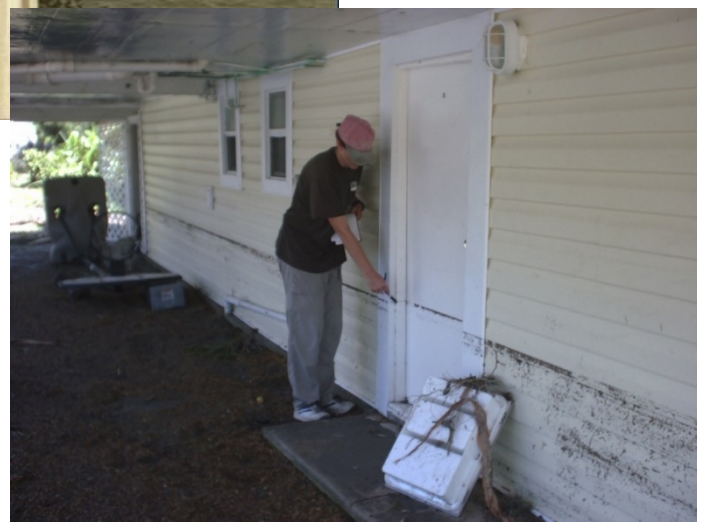
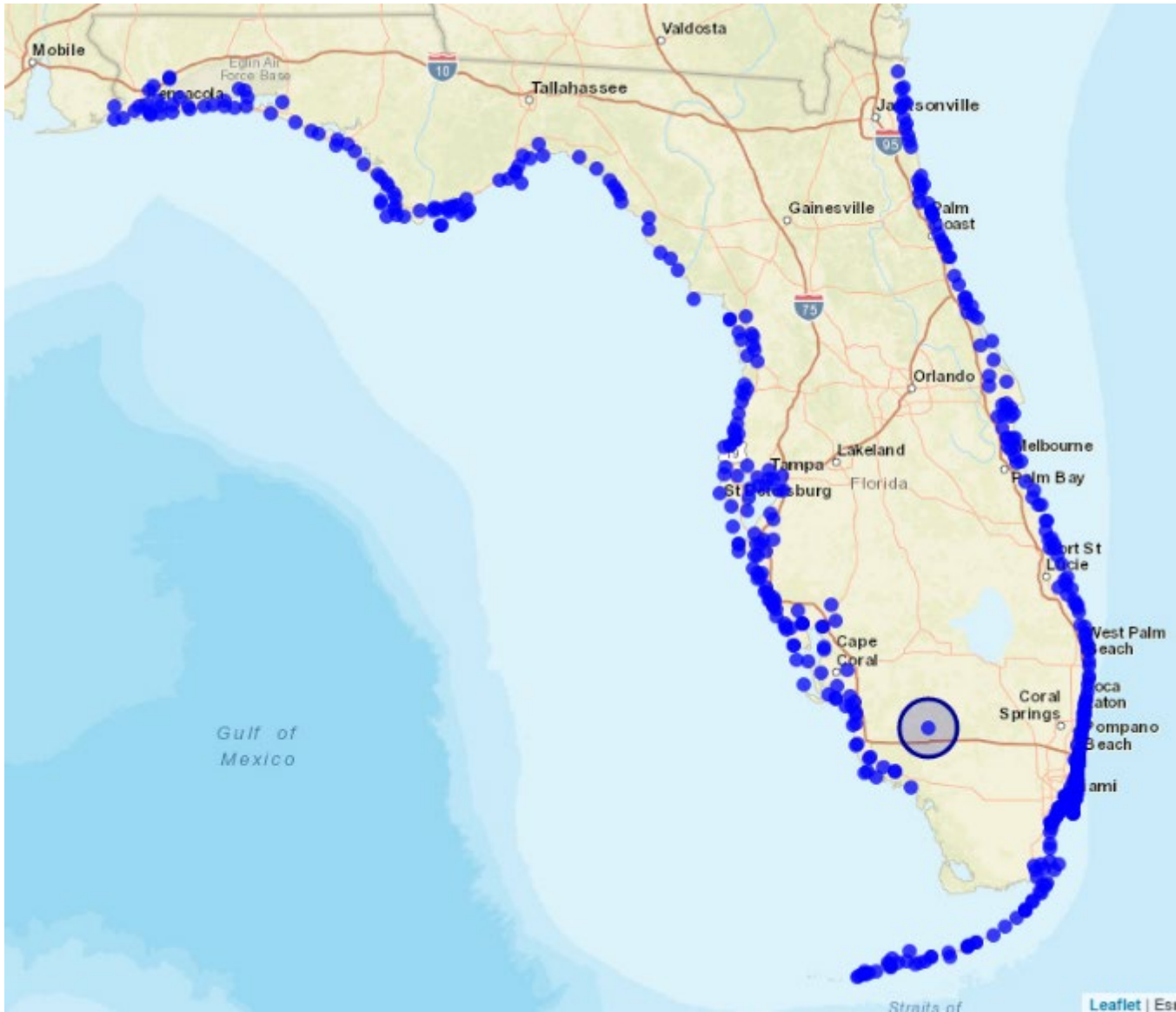
# Evapotranspiration monitoring



# Storm-tide monitoring







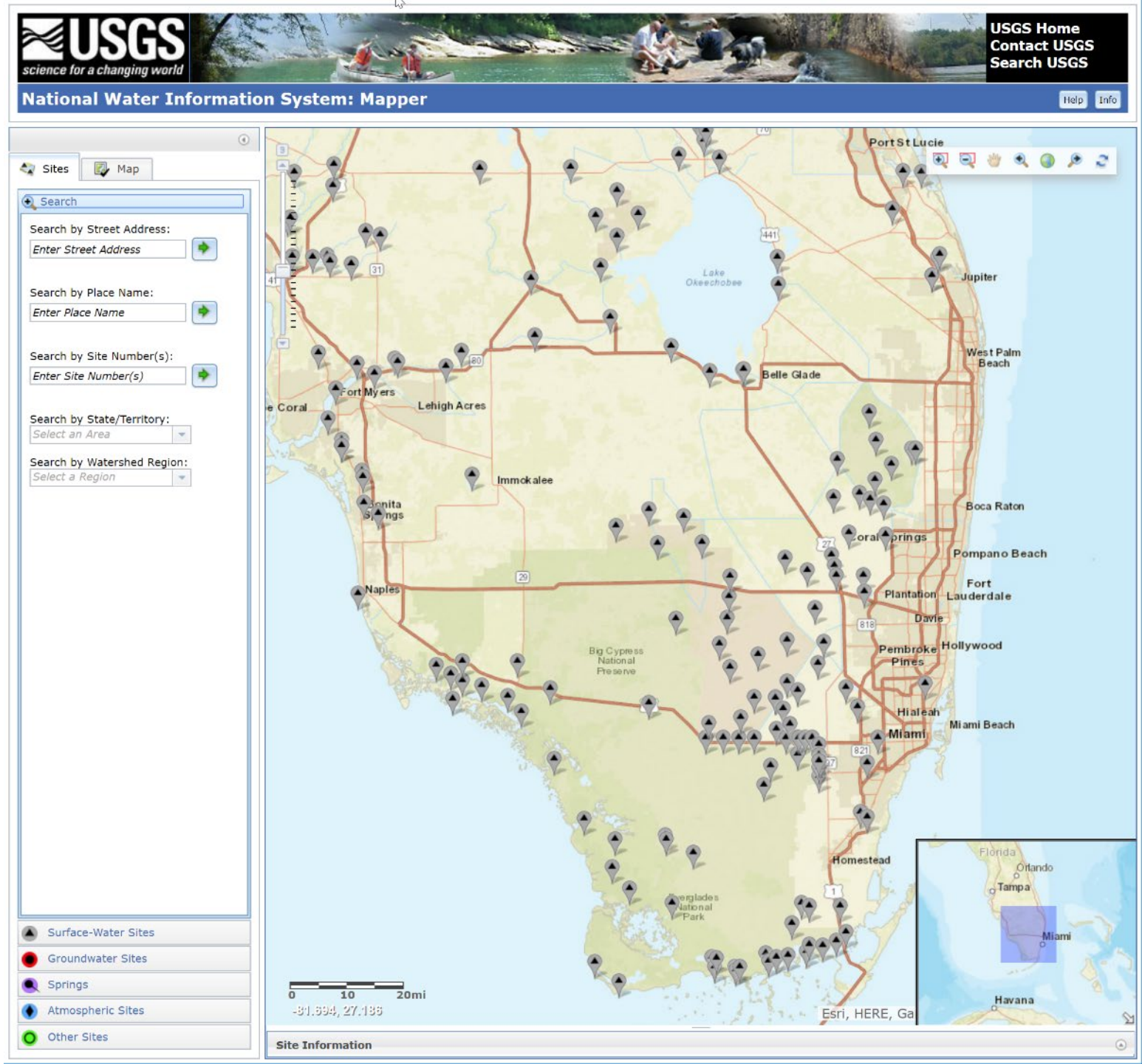
# Accessing Data – national websites

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

USGS

# 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

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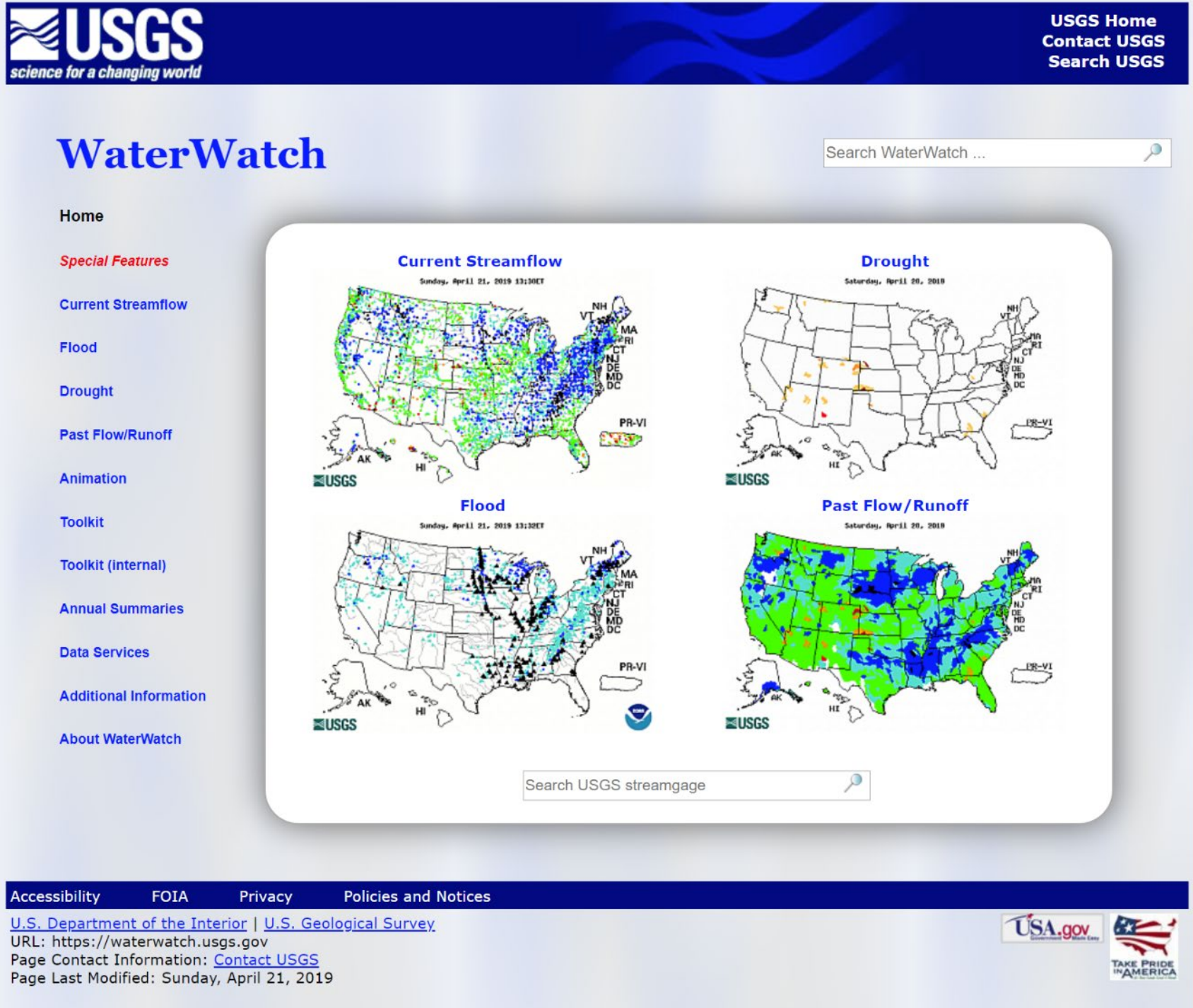
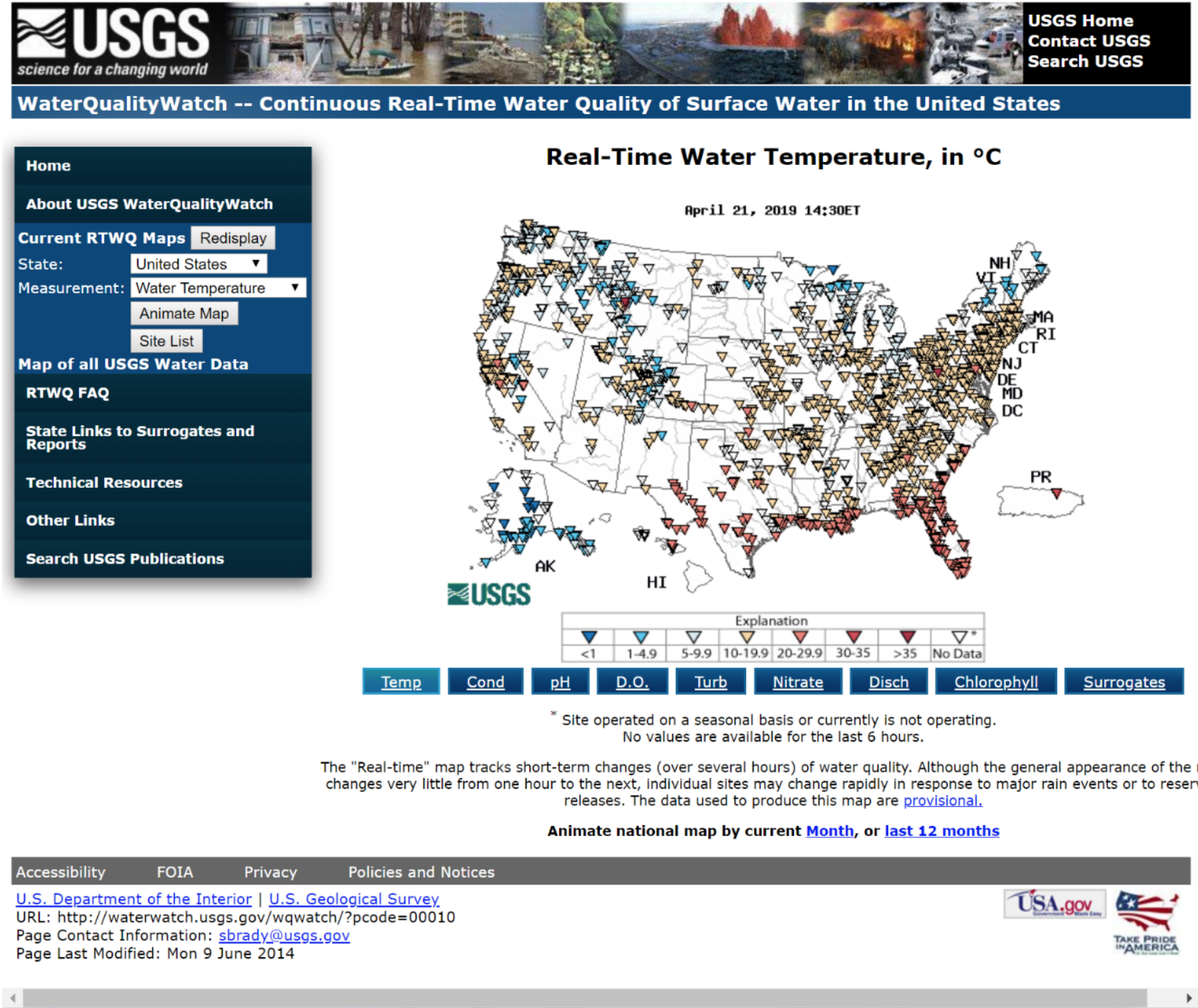
# Water Watch

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



# Water Quality Watch

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

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# Groundwater Watch

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

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Groundwater Watch | Latest News...

## USGS Groundwater Watch

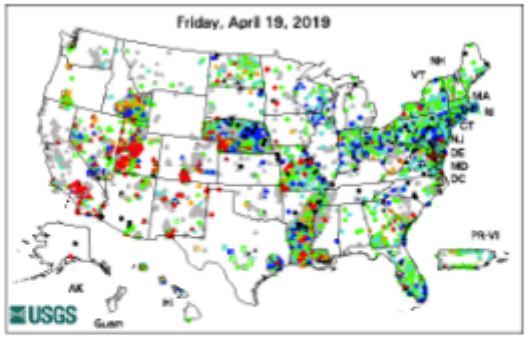
The USGS has a distributed water database that is locally managed. Surface water, groundwater, and water quality data are compiled from these local, distributed databases into a national information system. The groundwater database contains records from about 850,000 wells that have been compiled during 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.

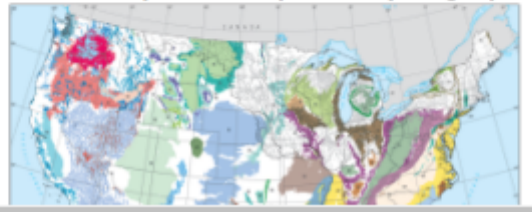
Groundwater Watch is maintained by the Office of Groundwater.

### National Networks

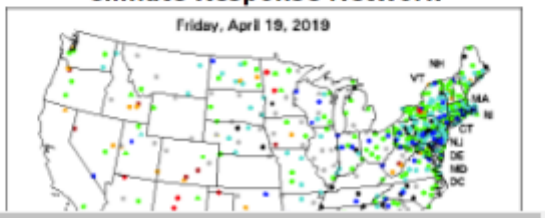
**Active Groundwater Level Network**




**National Aquifer Composite Hydrographs**



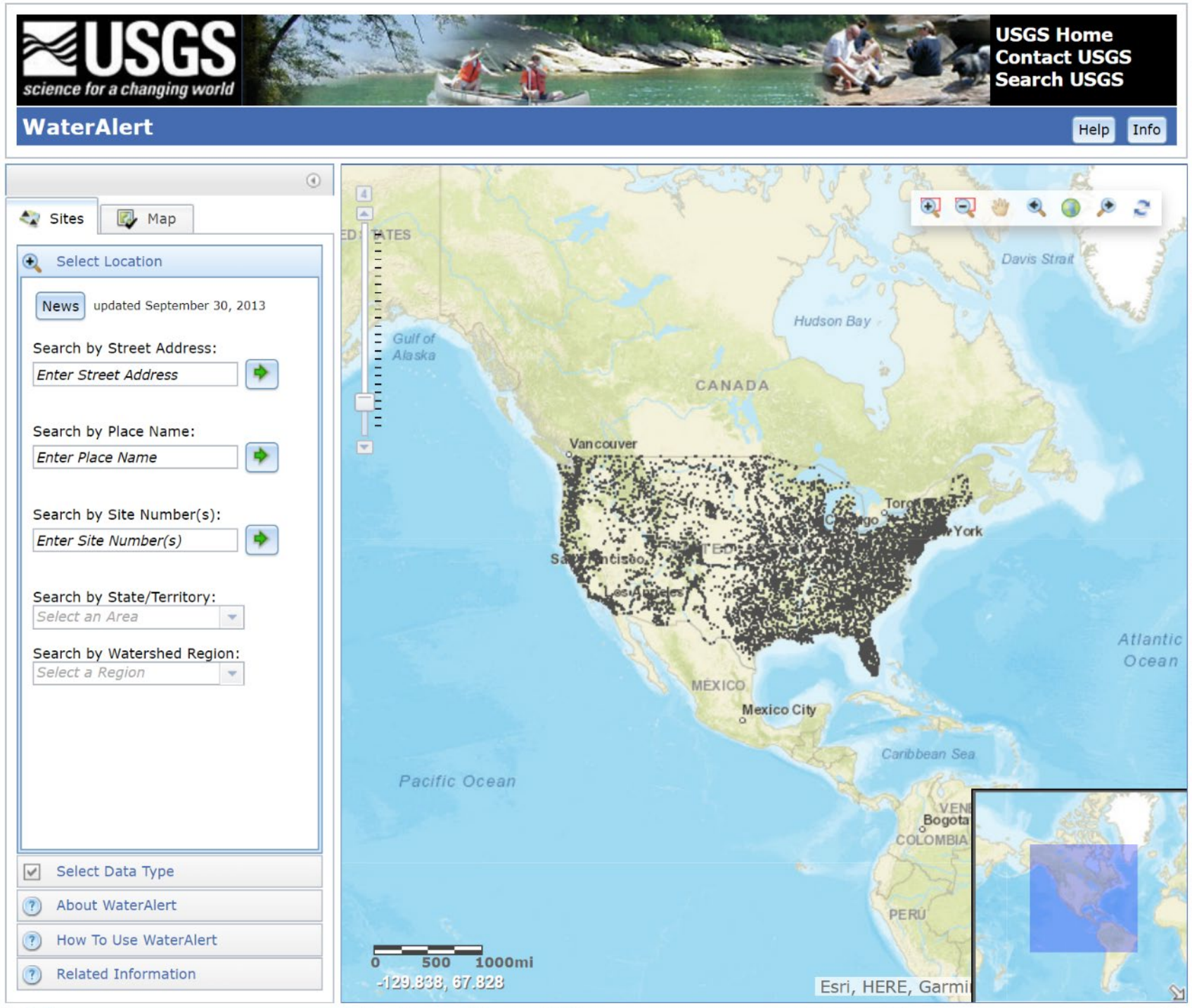
**Climate Response Network**




USGS

# 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

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# Water Now

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

# Water Services

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

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**USGS Water Services**

Home | REST Services | SOAP Services | Documentation | Examples | Links | FAQ | Contact us

## 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-Resistent 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.** 01646500
Find sites

**USGS Parameter** 00060

Get 7-Day Graph | Reset

## Tips

### Join the USGS Water Data Notification Service

While all USGS water web services strive to be highly

## USGS Water Services

This site serves USGS water data via

USGS hydrologist at work

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 Services News

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

## 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.

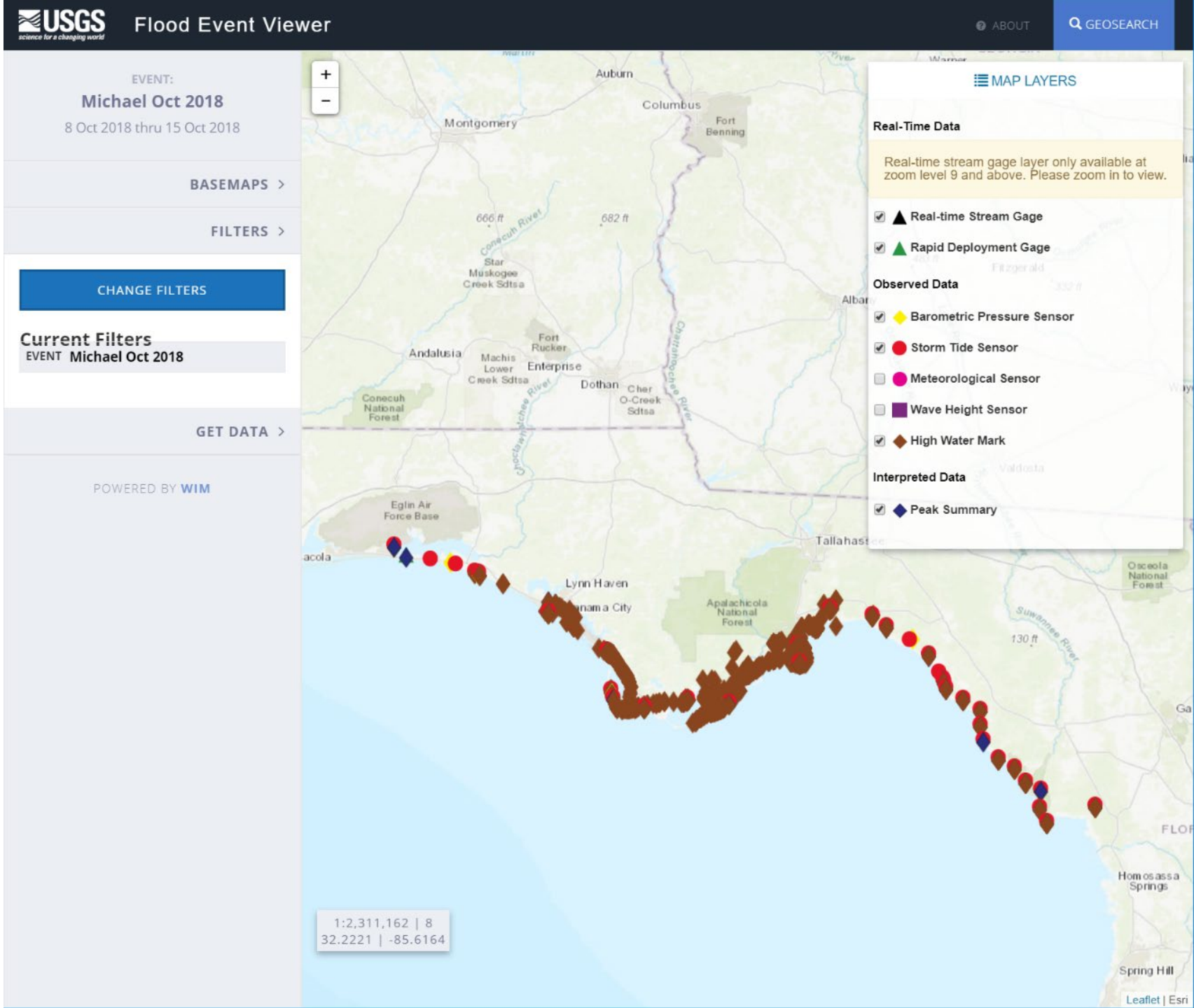
### USGS Site Service

Need USGS water site data? A rich new site service is now

USGS

# Flood Event Viewer

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

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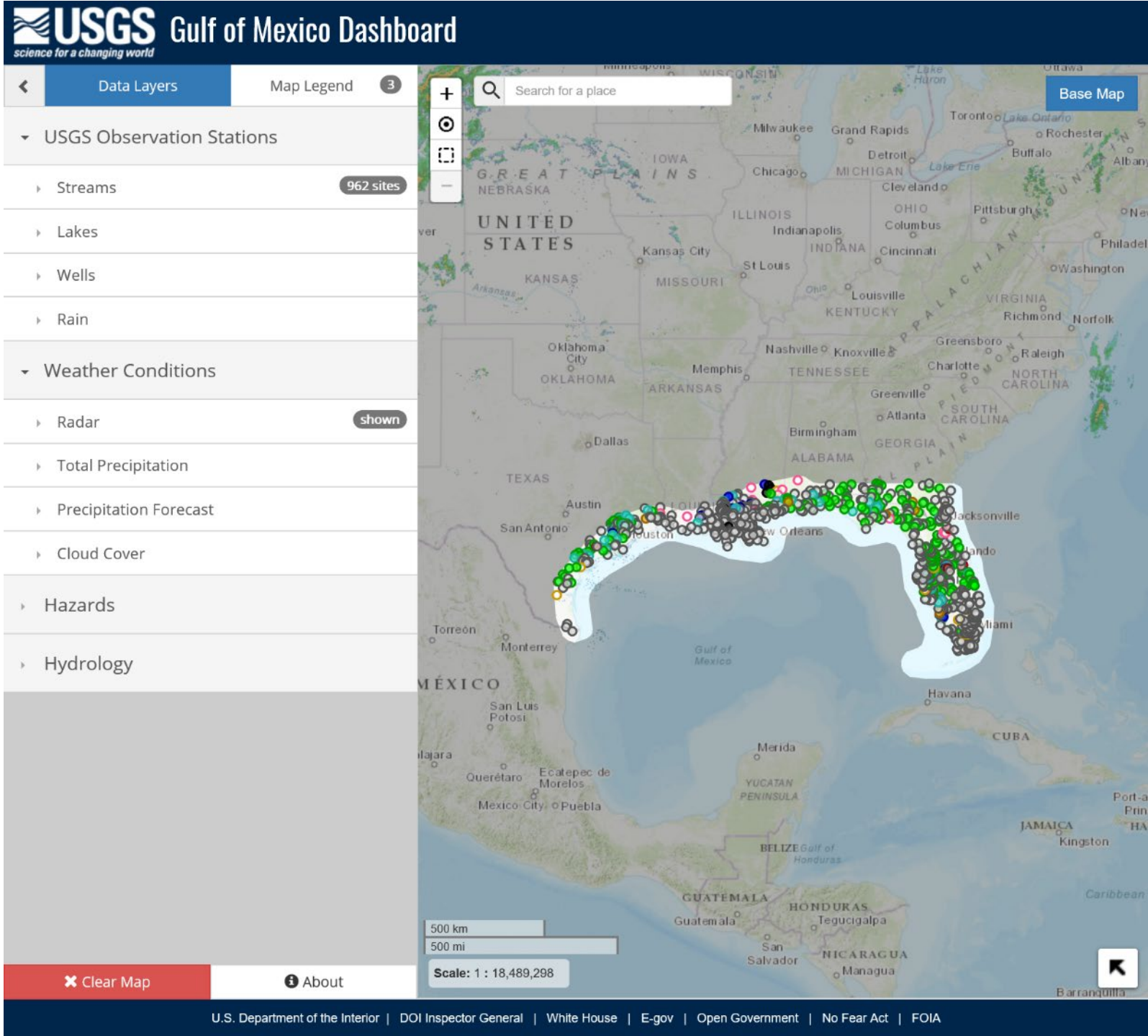
# Accessing Data – local websites

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

USGS

# GOM Dashboard

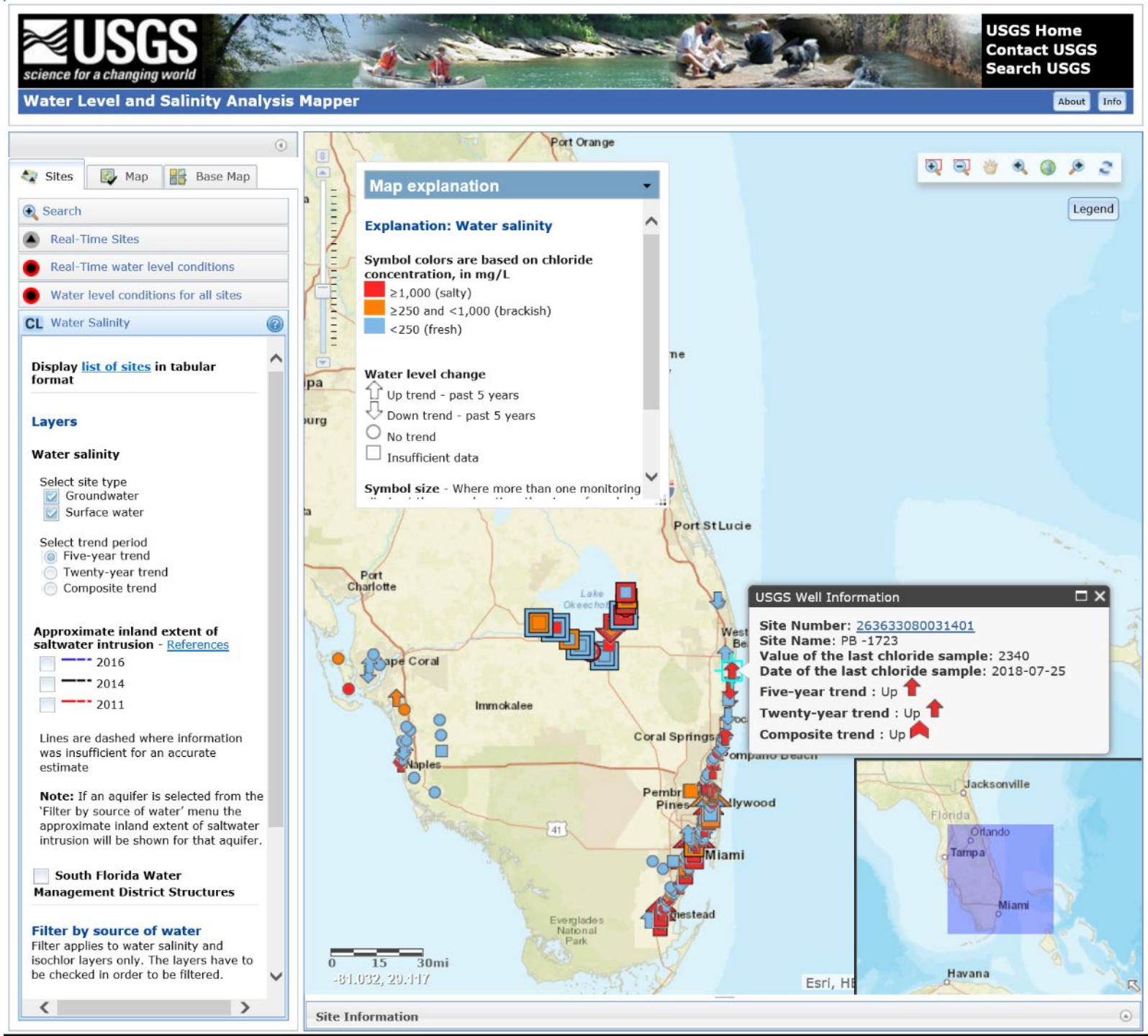
- Display real-time conditions
- Weather conditions overlaid




USGS

# Water Level & Salinity Analysis Mapper

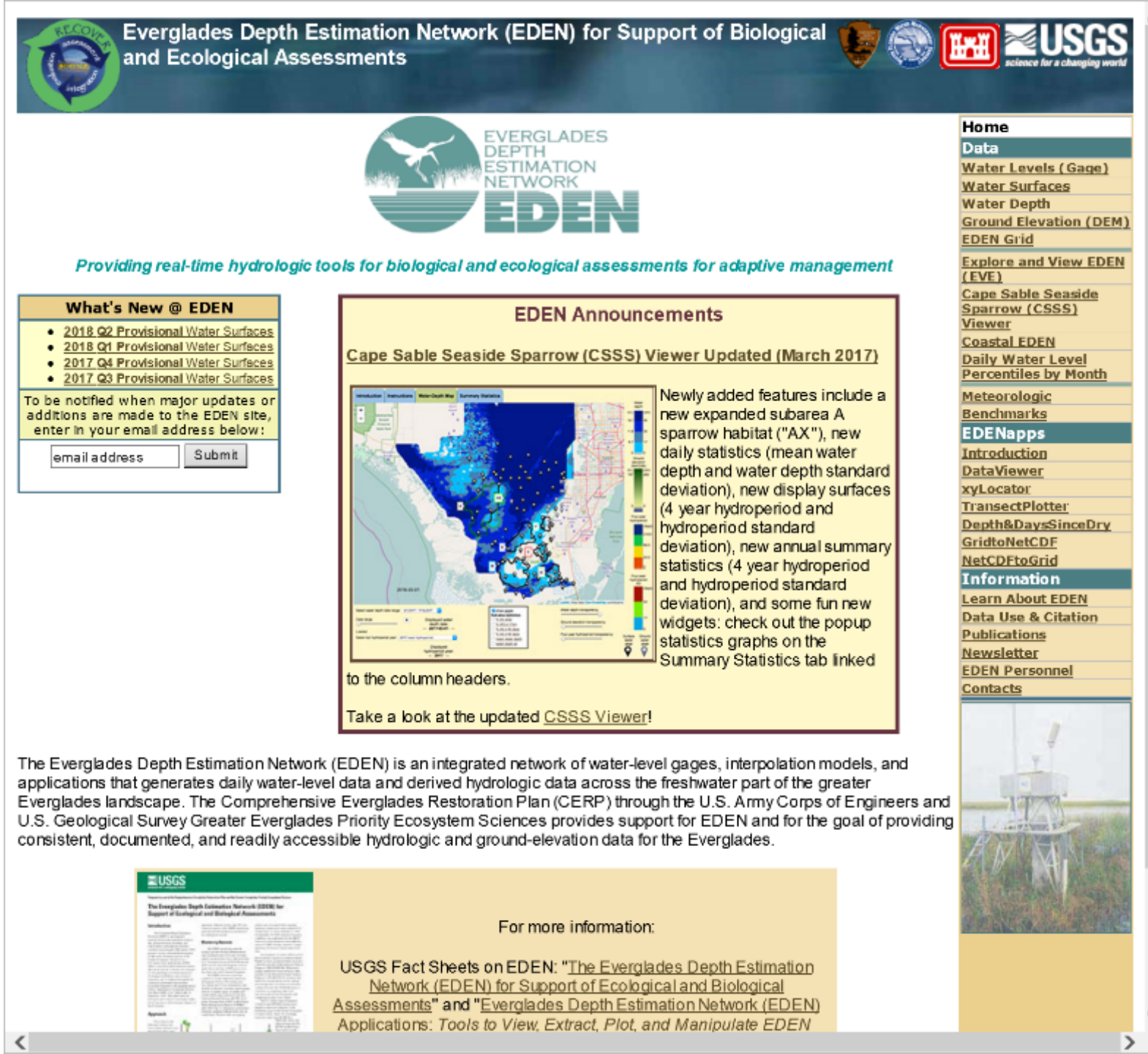
- Displays current groundwater levels and chloride data and trends
- Access period of record of active stations
- Select by aquifer




USGS

# EDEN

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




USGS

Thank you!
USGS