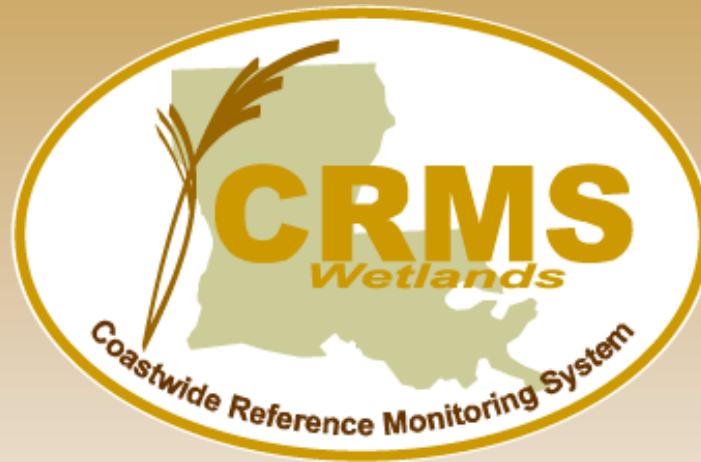


2014 CRMS Roadshow



March 27, 2014 - NOAA

April 1, 2014 - USFWS, EPA, NRCS

April 3, 2014 - USACE


<http://www.lacoast.gov/crms>





Web

- Released to Production
 - New Page: CRMS Publication Page



Coastwide Reference Monitoring System

[Home](#)[Data](#)[Mapping](#)[Library](#)[Visualization](#)[Program](#)

CRMS Publications

Couvillion, B.R. and H. Beck. 2013. [Marsh Collapse Thresholds for Coastal Louisiana: Elevation and Vegetation Index Data](#). Journal of Coastal Research 63:58-67

Dietrich, J.C., J.J. Westerink, A.B. Kennedy, J.M. Smith, R.E. Jensen, M. Zulema, L.H. Holthuijsen, C. Dawson, R.A. Luettich, Jr., M.D. Powell, V.J. Cardone, A.T. Cox, G.W. Stone, H. Pourtaheri, M.E. Hope, S. Tanaka, L.G. Westerink, H.J. Westerink, and Z. Cobell. 2011. [Hurricane Gustav \(2008\) Waves and Storm Surge: Hindcast, Synoptic Analysis, and Validation in Southern Louisiana](#). Monthly Weather Review 139:2488-2522.

Green, C.C., W.E. Kelso, M.D. Kaller, K.M. Gautreaux, and D.G. Kelly. 2012. [Potential for naturalization of nonindigenous Tilapia Oreochromis sp. in coastal Louisiana marshes based on integrating thermal tolerance and field data](#). Wetlands 32:717-723.

Honig, Aaron. 2013. [Population Ecology of the Ribbed Mussel in Southeastern Louisiana](#). Louisiana State University Thesis 54p.

Hope, M.E., J.J. Westerink, A.B. Kennedy, P.C. Kerr, J.C. Dietrich, C. Dawson, C.J. Bender, J.M. Smith, R.E. Jensen, M. Zulema, L.H. Holthuijsen, R.A. Luettich Jr., M.D. Powell, V.J. Cardone, A.T. Cox, H. Pourtaheri, H.J. Roberts, J.H. Atkinson, S. Tanaka, H.J. Westerink, L.G. Westerink. 2013. [Hindcast and validation of Hurricane Ike \(2008\) waves, forerunner, and storm surge](#). Journal of Geophysical Research: Oceans 118:4424-4460.

Kang, S.R. and S.L. King. 2013. [Effects of hydrologic connectivity and environmental variables on nekton assemblages in a coastal marsh system](#). Wetlands 33:321-334.

Kang, S.R. and S.L. King. 2013. [Effects of hydrologic connectivity on pond environmental characteristics](#)

Administration

Contacts

Data Descriptions

Support Docs

Publication

Privacy

Accessibility

FOIA

Disclaimer

Data Citation

localhost:1947/crms2/Publications.aspx



Mapping

- **Released to Production**

- Map Layer: 2012 Master Plan Layer
- Map Layer: 2012 DOQQ
- Map Tool: Save Map State
- Map Tool: CEC and SVI CRMS Site Classification
- Map: CRMS Floating Marsh Site Designation
- Map Tool: Acreage Assessment using Custom Polygon
- Map: CRMS Sites available as KML download

- **Staged for Release**

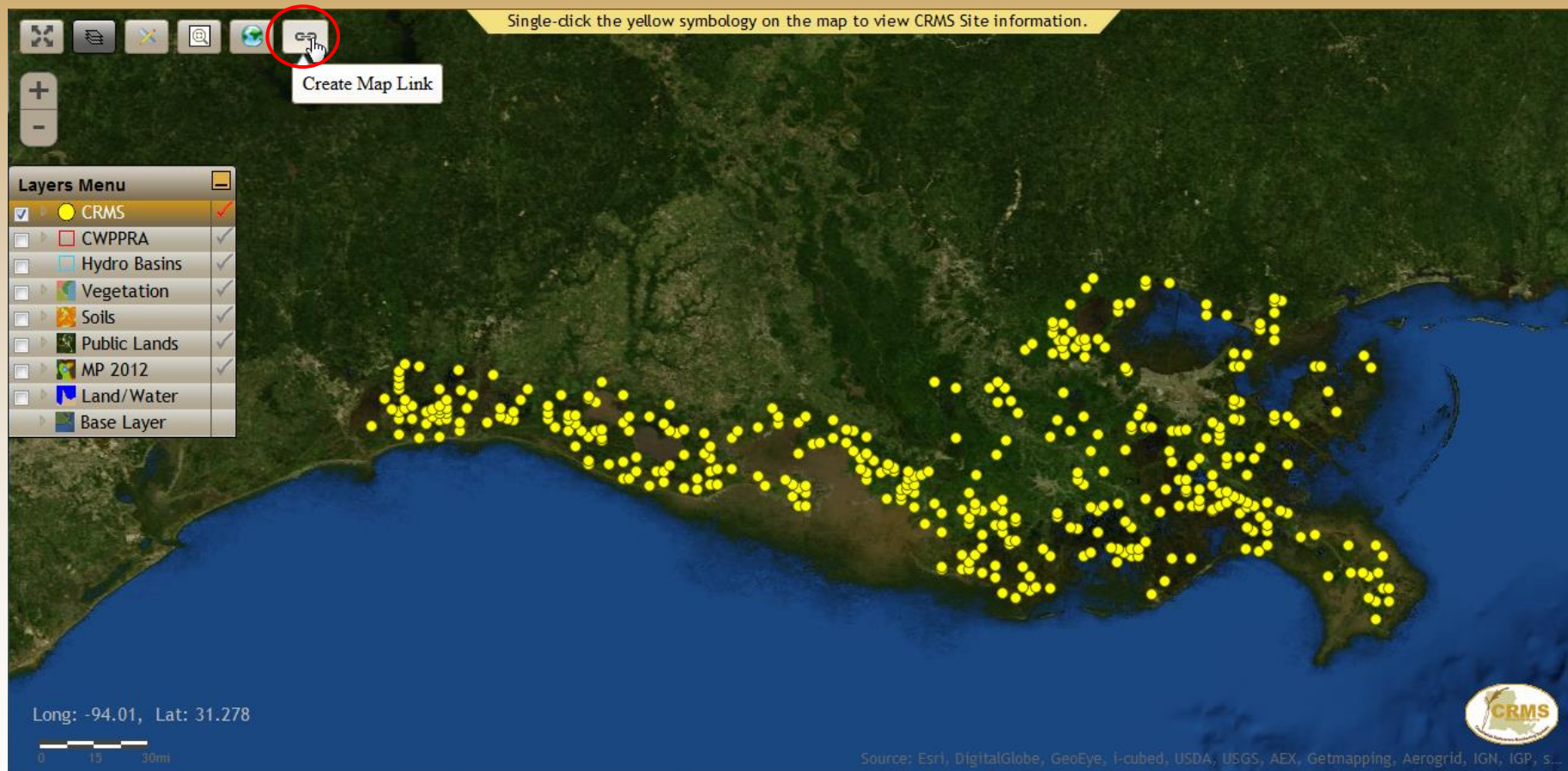
- Map: 2013 Coastwide Vegetation



Master Plan 2012 Layer









Single-click the yellow symbology on the map to view CRMS Site information.

Layers Menu

- ☒ CRMS
- ☐ CWPPRA
- ☐ Hydro Basins
- ☐ Vegetation
- ☐ Soils
- ☐ Public Lands
- ☐ MP 2012
- ☐ Land/Water
- ☐ Base Layer

Press Control-C to Copy the Map State for Email...

http://www.lacoast.gov/crms_viewer2/Default.aspx?active=crms&layersList=crms&zoom=8&vegMain=0&vegMain=0

Close

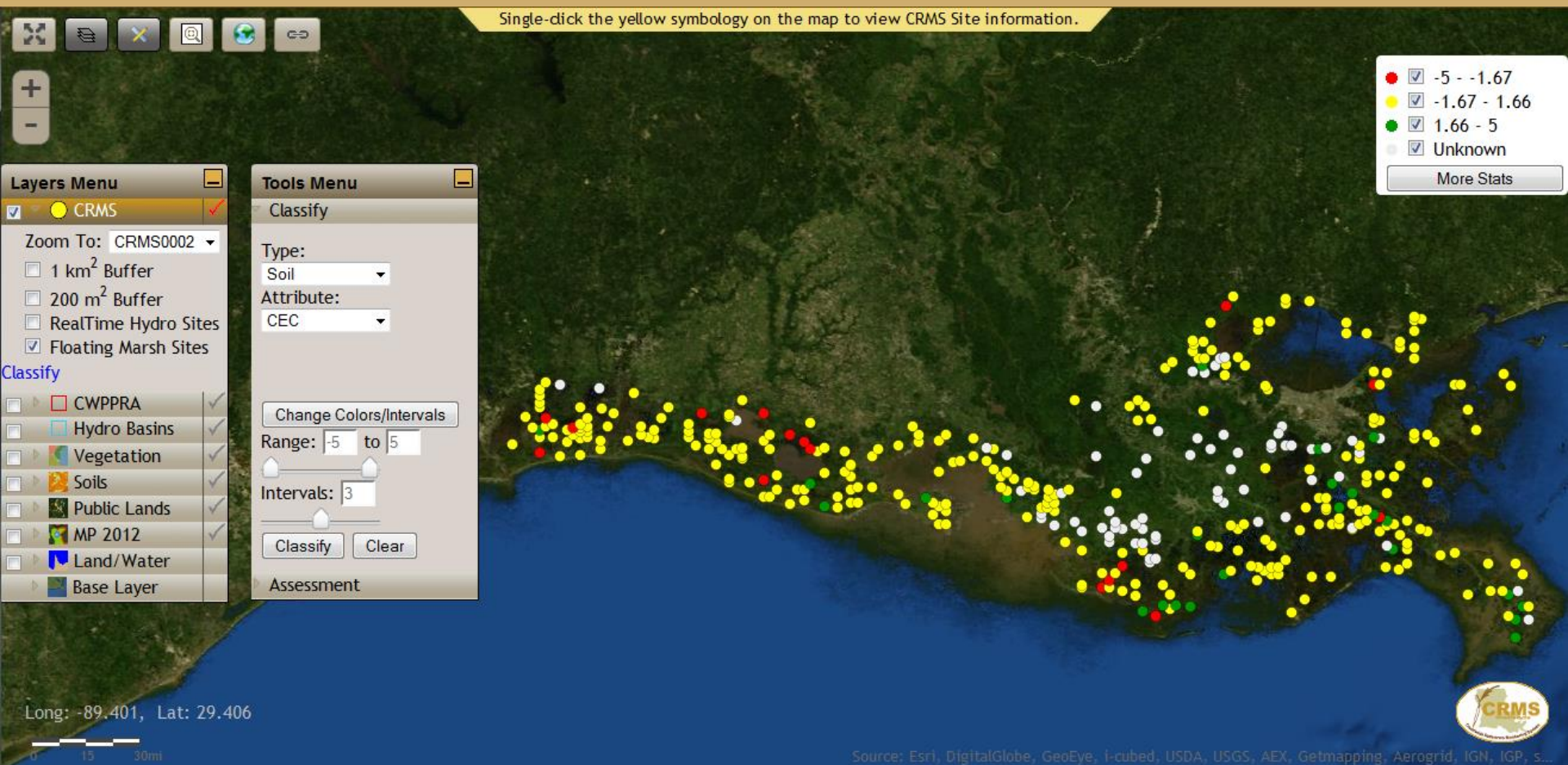
Long: -93.213, Lat: 30.519

0 10 30mi

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...

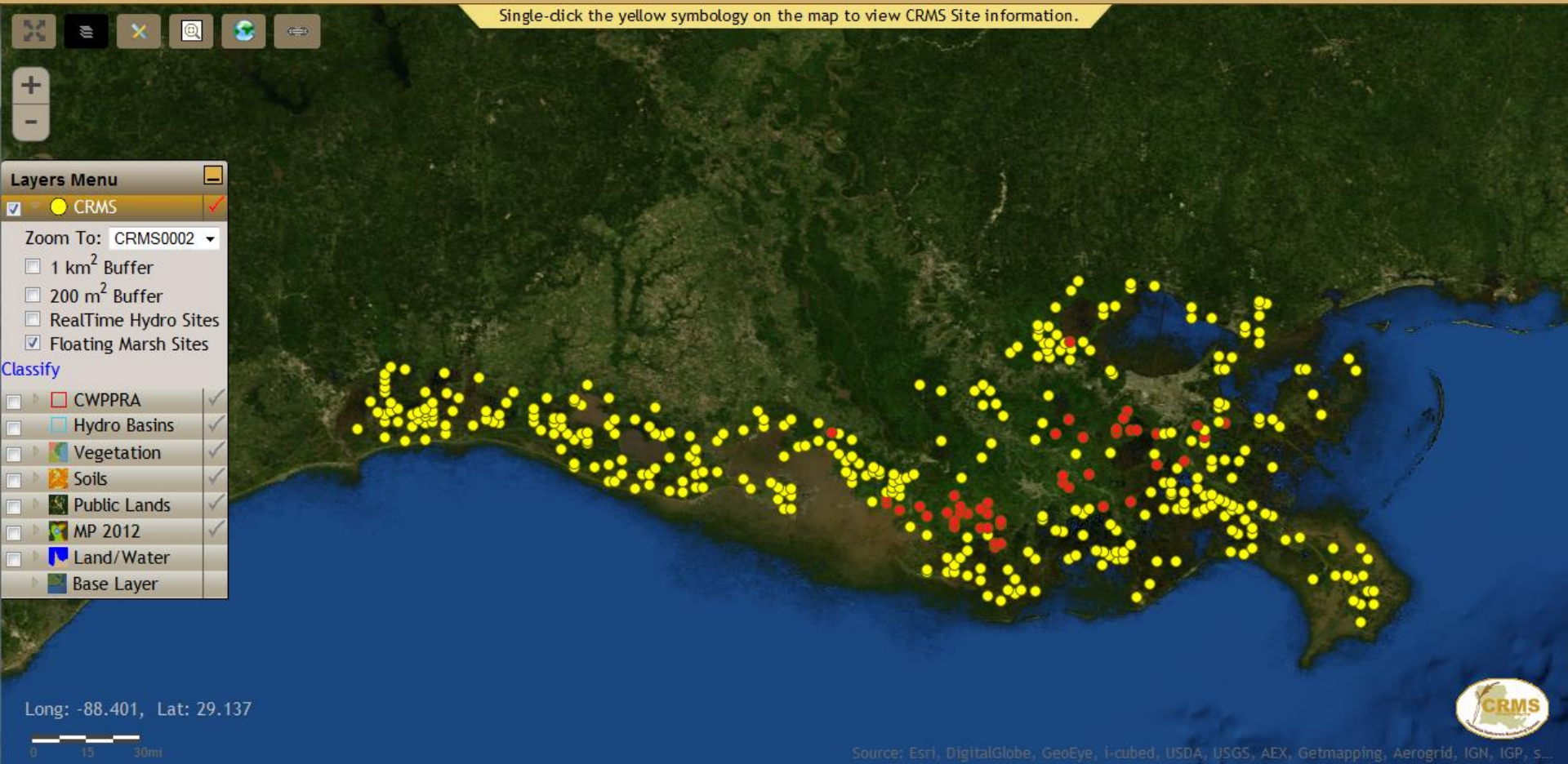


CEC added to CRMS Site Classification Tool





Users have the ability to highlight the floating marsh sites





Custom Acreage Assessment

Single-click the yellow symbology on the map to view CRMS Site information.

Layers Menu

- ☒ CRMS
- ☐ CWPPRA
- ☐ Hydro Basins
- ☐ Vegetation
- ☐ Soils
- ☐ Public Lands
- ☐ MP 2012
- ☐ Land/Water
- ☐ Base Layer

Tools Menu

- Classify
- Assessment
- Custom Polygon
- Layer to assess:
Choose one...
- Bounding polygon layer:
CRMS Sites (1Km Buffer)
- Bounding polygon:
Choose one...
- Year to assess:
Choose one...
- Acre Assess

Long: -92.554, Lat: 30.623

javascript:__doPostBack('AssessCPolygon','')

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...



Request Password: E-mail: comeauxm@usgs.gov

Single-click the yellow symbology on the map to view CRMS Site information.

Layers Menu

- ☒ CRMS
- ☒ CWPPRA
- ☒ Hydro Basins
- ☒ Vegetation
- ☒ Soils
- ☒ Public Lands
- ☒ MP 2012
- ☒ Land/Water
- ☒ Base Layer

Tools Menu

- Classify
- Assessment
- [Custom Polygon](#)

Layer to assess:
Choose one...

Bounding polygon layer:
CRMS Sites (1Km Buffer)

Bounding polygon:
Choose one...

Year to assess:
Choose one...

Acre Assess

Log In

User Name: comeauxm

Password:

Log In

Long: -93.642, Lat: 30.807

javascript:__doPostBack('AssessCPolygon','')

Source: Esri, DigitalGlobe, GeoEye, I-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...



Custom Acreage Assessment

Single-click the yellow symbology on the map to view CRMS Site information.

Layers Menu

- ☒ CRMS
- ☐ CWPPRA
- ☐ Hydro Basins
- ☐ Vegetation
- ☐ Soils
- ☐ Public Lands
- ☐ MP 2012
- ☒ Land/Water
- ☐ Base Layer

Tools Menu

Classify

Assessment

Layer to assess:
Land/Water

Year to assess:
2008

Begin

Long: -93.137, Lat: 29.926

javascript:__doPostBack('AssessCPolygon','')

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...



Custom Acreage Assessment

40 nodes/dicks. Single-click to start drawing polygon. Map is limited to 40 nodes/dicks.

CRMS Wetlands
Coastal Reference Monitoring System

Layers Menu

- ☒ CRMS
- ☐ CWPPRA
- ☐ Hydro Basins
- ☐ Vegetation
- ☐ Soils
- ☐ Public Lands
- ☐ MP 2012
- ☒ Land/Water
- ☐ Base Layer

Tools Menu

Classify

Assessment

Layer to assess:
Land/Water

Year to assess:
2008

Acre Assess Clear

Double-click to complete

Long: -90.945, Lat: 29.606

javascript:__doPostBack('AssessCPolygon','')

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...



Custom Acreage Assessment

40 nodes/dicks. Single-click to start drawing polygon. Map is limited to 40 nodes/dicks.

+

-

Layers Menu

☒ CRMS

☐ CWPPRA

☐ Hydro Basins

☐ Vegetation

☐ Soils

☐ Public Lands

☐ MP 2012

☒ Land/Water

☐ Base Layer

Tools Menu

Classify

Assessment

Layer to assess:
Land/Water

Year to assess:
2008

Acre Assess

Clear

Long: -92.939, Lat: 29.921

javascript:__doPostBack('AssessCPolygon','')

CRMS

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...



Custom Acreage Assessment

Single-click to start drawing polygon. Map is limited to 40 nodes/dicks.

Loading... May take 3-5 minutes...

Layers Menu

☒ CRMS

☐ CWPPRA

☐ Hydro Basins

☐ Vegetation

☐ Soils

☐ Public Lands

☐ MP 2012

☒ Land/Water

☐ Base Layer

Tools Menu

Classify

Assessment

Layer to assess:
Land/Water

Year to assess:
2008

Acre Assess

Clear

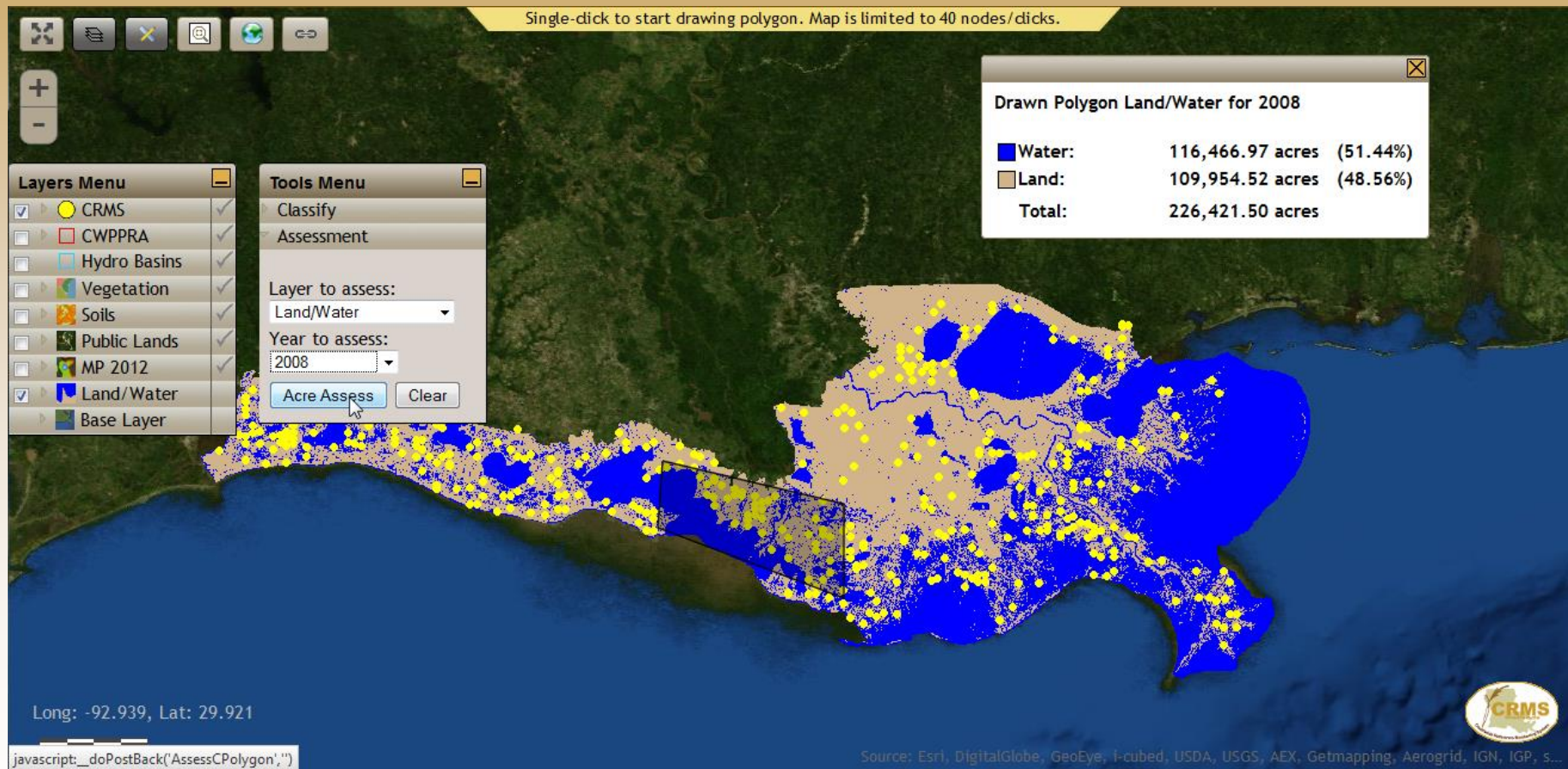
Long: -92.939, Lat: 29.921

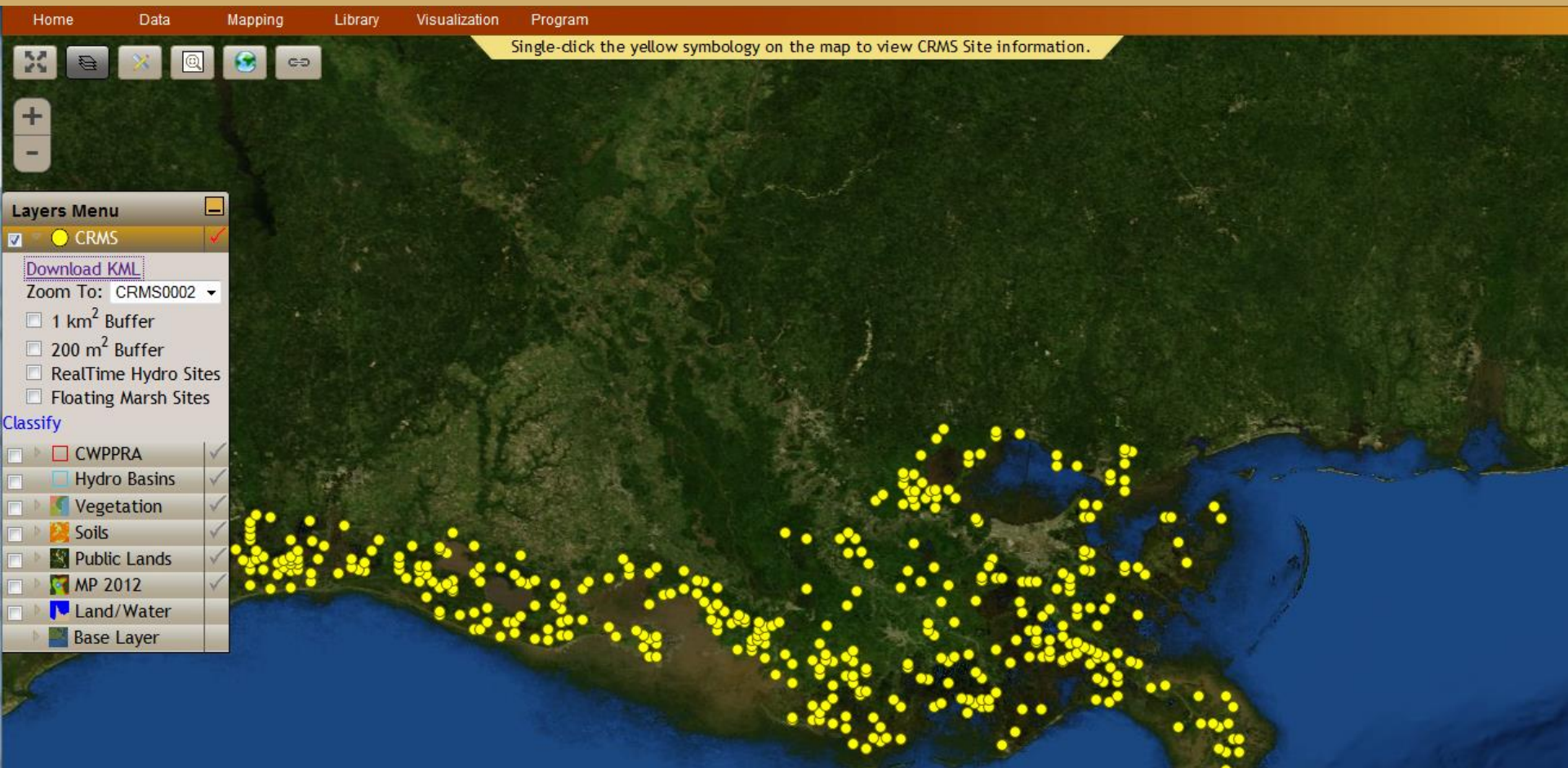
javascript:__doPostBack('AssessCPolygon','')

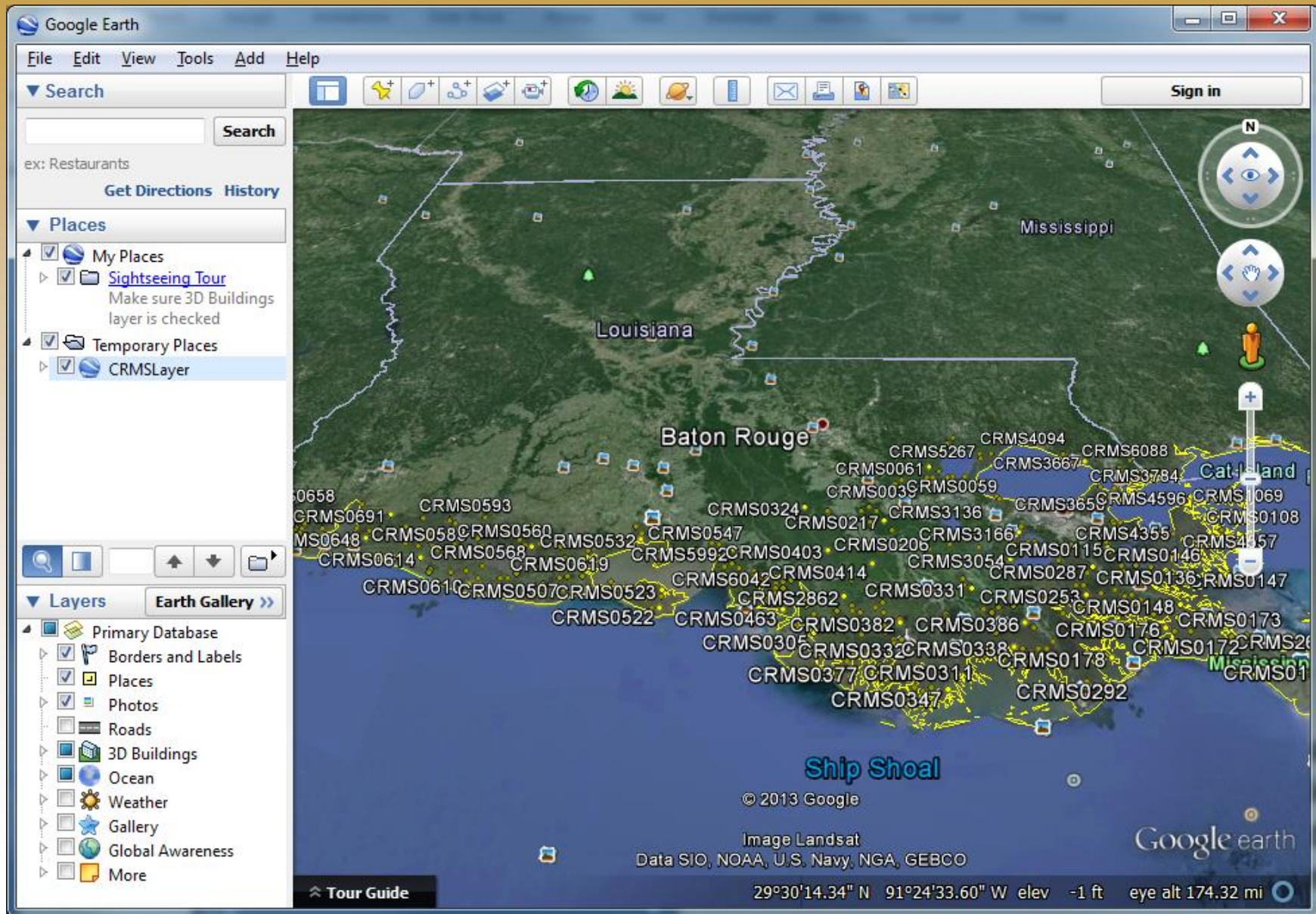
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, s...



Custom Acreage Assessment







Google Earth interface showing a map of Louisiana and the Gulf of Mexico. The map displays numerous CRMS points (labeled CRMS0001 through CRMS0658) clustered along the coast and around Baton Rouge. The interface includes a search bar, a left sidebar with 'Places' and 'Layers' panels, and a right sidebar with navigation controls. The 'Layers' panel shows the 'Primary Database' layer selected, with sub-layers for 'Borders and Labels', 'Places', 'Photos', 'Roads', '3D Buildings', 'Ocean', 'Weather', 'Gallery', 'Global Awareness', and 'More'. The 'Places' panel shows 'My Places' with a 'Sightseeing Tour' and 'Temporary Places' with a 'CRMSLayer'. The map shows the state of Louisiana, the Gulf of Mexico, and the city of Baton Rouge. The bottom status bar displays coordinates: 29°30'14.34" N 91°24'33.60" W, elevation -1 ft, and eye altitude 174.32 mi.

Google Earth interface showing a map of Louisiana and the Gulf of Mexico. The map displays numerous CRMS points (labeled CRMS0001 through CRMS0658) clustered along the coast and around Baton Rouge. The interface includes a search bar, a left sidebar with 'Places' and 'Layers' panels, and a right sidebar with navigation controls. The 'Layers' panel shows the 'Primary Database' layer selected, with sub-layers for 'Borders and Labels', 'Places', 'Photos', 'Roads', '3D Buildings', 'Ocean', 'Weather', 'Gallery', 'Global Awareness', and 'More'. The 'Places' panel shows 'My Places' with a 'Sightseeing Tour' and 'Temporary Places' with a 'CRMSLayer'. The map shows the state of Louisiana, the Gulf of Mexico, and the city of Baton Rouge. The bottom status bar displays coordinates: 29°30'14.34" N 91°24'33.60" W, elevation -1 ft, and eye altitude 174.32 mi.



Staged for Release
Coming SOON!!!

2013 Coastwide Vegetation Data for Heli Survey

Coastwide Reference Monitoring System

a CWPRA funded project

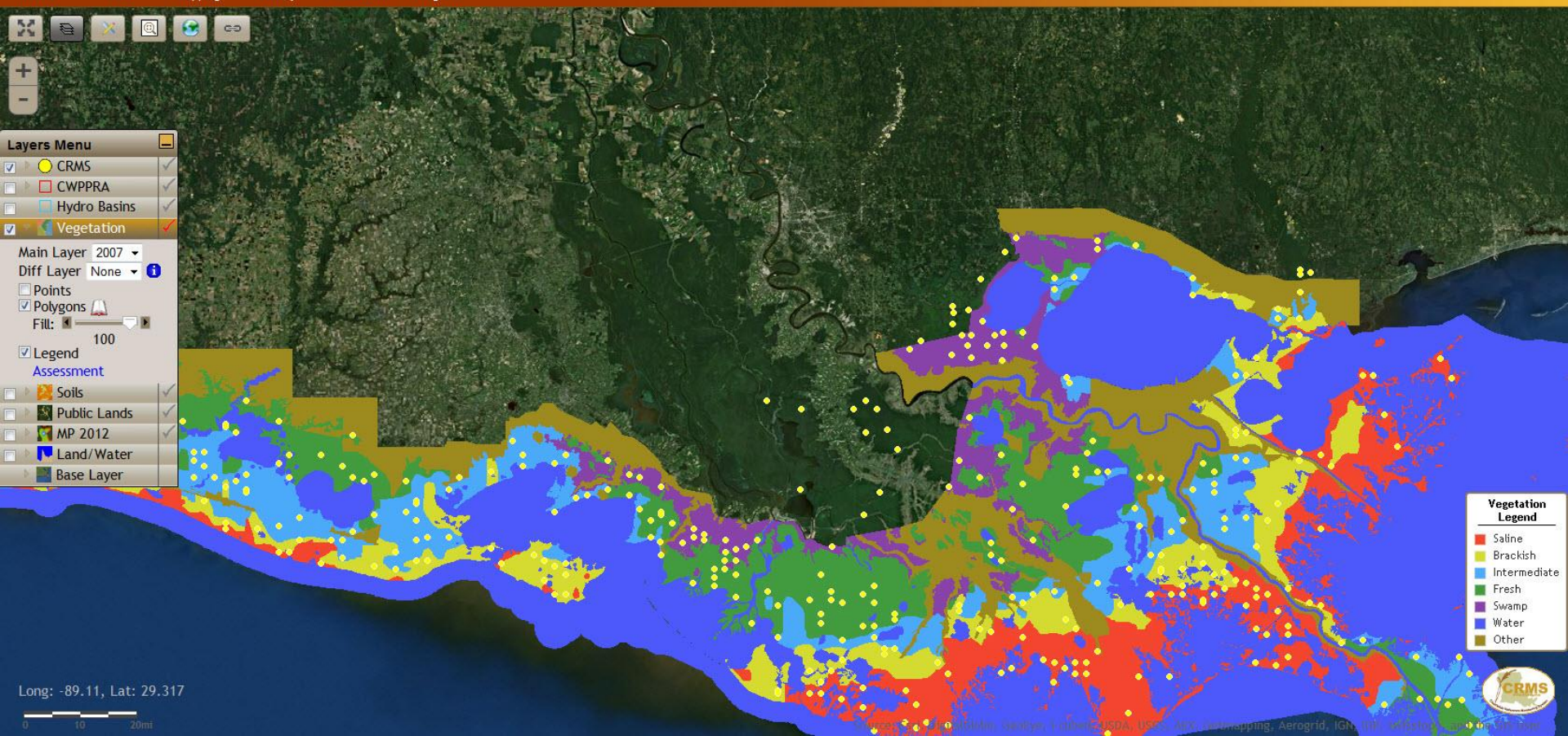


Home Data Mapping Library Visualization Program



Layers Menu

- ☒ CRMS
 - ☐ CWPRA
 - ☐ Hydro Basins
 - ☒ Vegetation
- Main Layer: 2007
Diff Layer: None
- ☐ Points
☒ Polygons
- Fill: 100
- ☒ Legend
- Assessment
- ☐ Soils
 - ☐ Public Lands
 - ☐ MP 2012
 - ☐ Land/Water
 - ☐ Base Layer



- ### Vegetation Legend
- Saline
 - Brackish
 - Intermediate
 - Fresh
 - Swamp
 - Water
 - Other

Long: -89.11, Lat: 29.317

0 10 20mi





Charting

- **Released to Production**

- Chart improvements made to:
 - Hydro index chart
 - Hydro station charts
 - Project FQI chart
 - Data availability chart
- Chart Tool: Interactive Hydro chart can plot inundation
- Charting Tool: Charting Interface Spatial Station/Site Selection
- Data Download: SVI and CEC added to Data download tool

- **In Progress**

- Forested FQI
- Vegetation Community Salinity
- Vegetative Volume
- Landscape Index
- Hypertemporal for Percent Land Chart



Hydro Index charts can plot multiple sites within same marsh

▼ Hydro

Water Level Range
Hydro Completeness
Salinity
Water Level
Temperature
Continuous
Site Hydro Index
Soil Porewater
Precipitation

Interactive Hydro

▶ Vegetation

▶ Soil

▶ Spatial

▶ Report Card Charts

Clear Charts

Water Year is October 1 - September 30

[More Info on Chart](#)

Scale: **Multi Station** ▼

Year: **2012** ▼

Marsh: **Saline** ▼

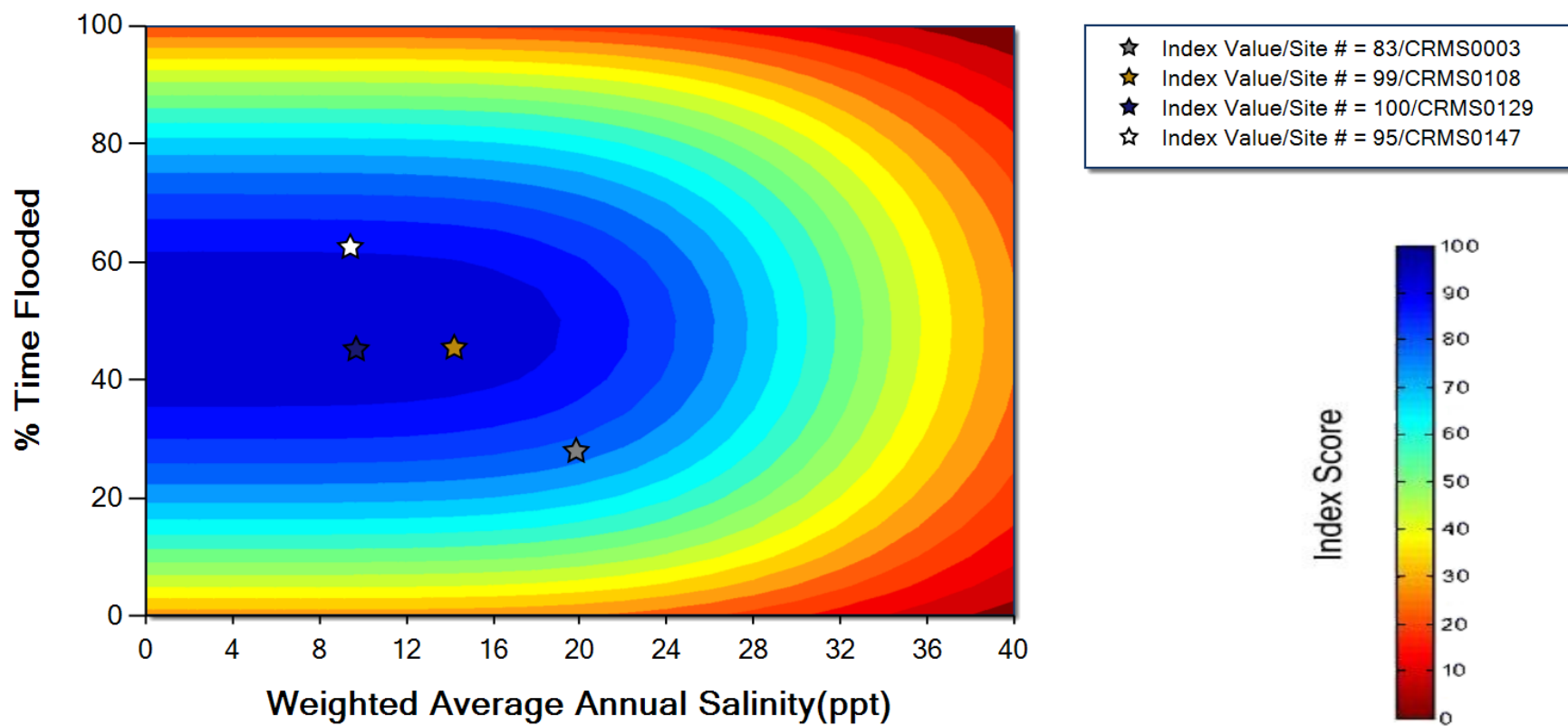
Selection limited to 5 items

CRMS0164	CRMS0003
CRMS0171	CRMS0108
CRMS0172	CRMS0129
CRMS0173	CRMS0147
CRMS0174	
CRMS0175	
CRMS0178	
CRMS0179	
CRMS0181	

[Show Map Selector](#)

Submit Request

Hydrologic Index for 2012 Saline Marsh





Request Access: E-mail: comeauxm@usgs.gov

The screenshot shows the web interface of the Coastwide Reference Monitoring System. At the top, there is a header with the title "Coastwide Reference Monitoring System" and a navigation bar with links: Home, Data, Mapping, Library, Visualization, and Program. Below the navigation bar, the main content area contains a form for site selection. The form includes three input fields: "CRMS Site:" with the value "CRMS0003", "Marsh Type:" with a dropdown menu showing "Saline", and "Year:" with the value "2012". A "Submit" button is located below these fields. At the bottom of the page, there is a footer with logos for CPRA (Coastal Protection and Restoration Authority) and USGS (United States Geological Survey), along with the tagline "science for a changing world".

Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

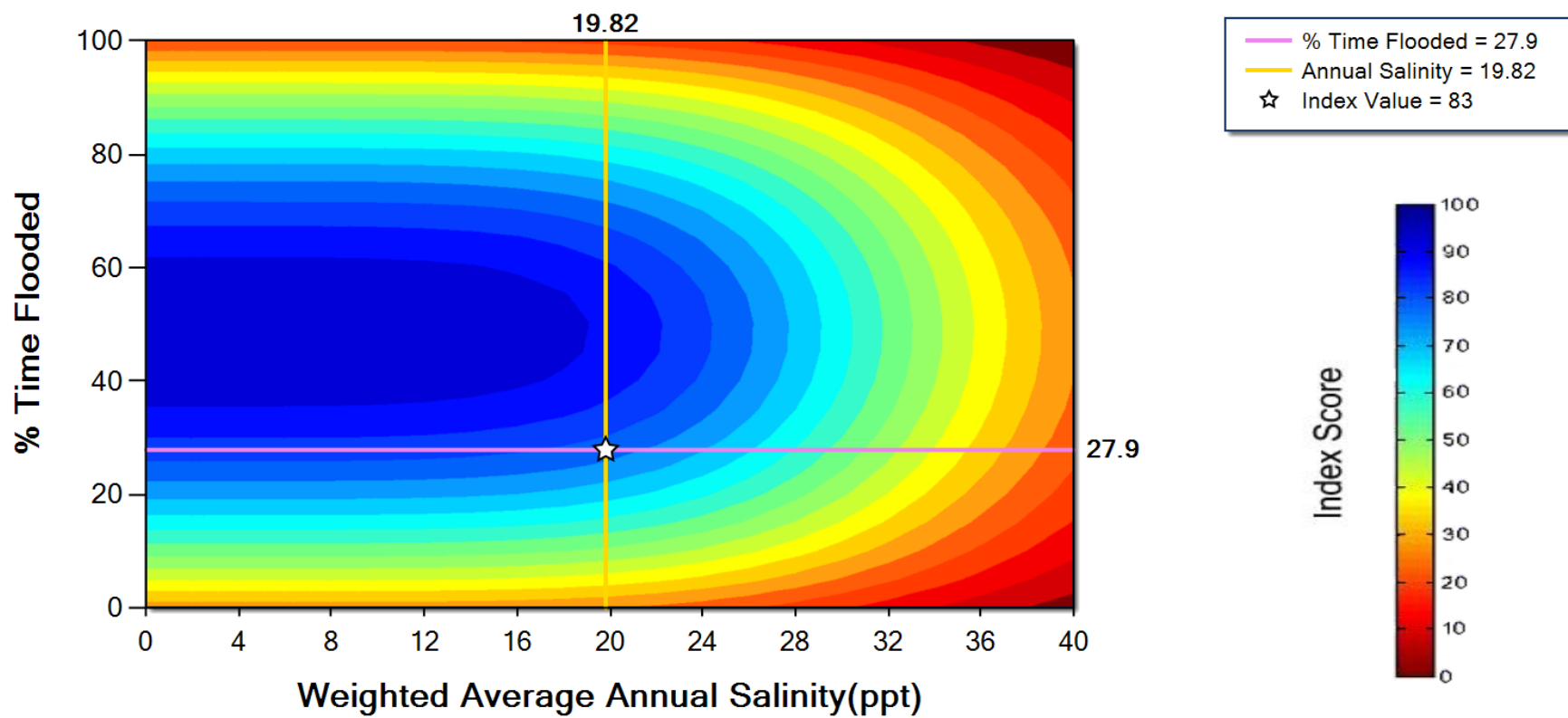
CRMS Site:

Marsh Type:

Year:

CPRA USGS science for a changing world

Custom Hydrologic Index for 2012 Saline Marsh, CRMS0003





Coastwide Reference Monitoring System

[Home](#)[Data](#)[Mapping](#)[Library](#)[Visualization](#)[Program](#)

CRMS Site:

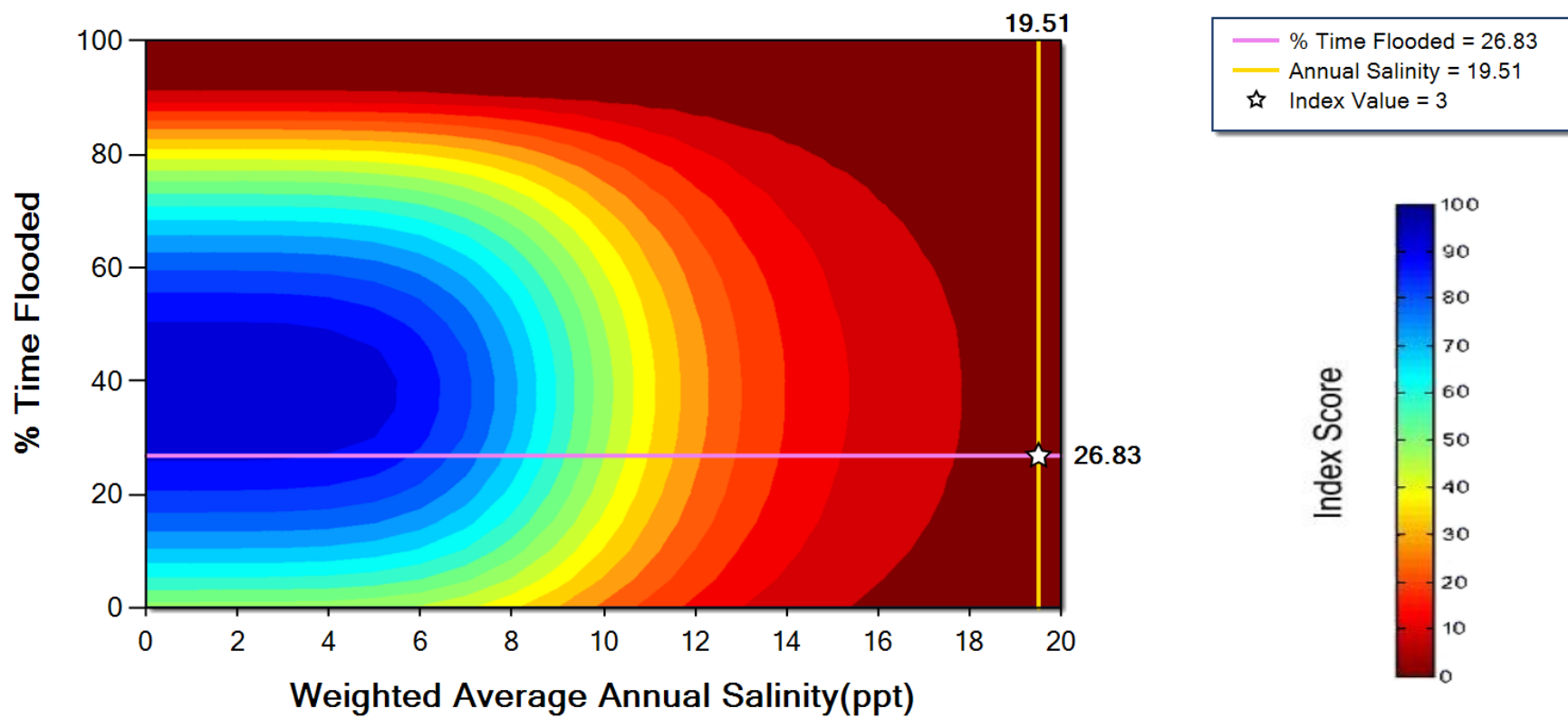
Marsh Type:

Year:

[Download Chart](#)

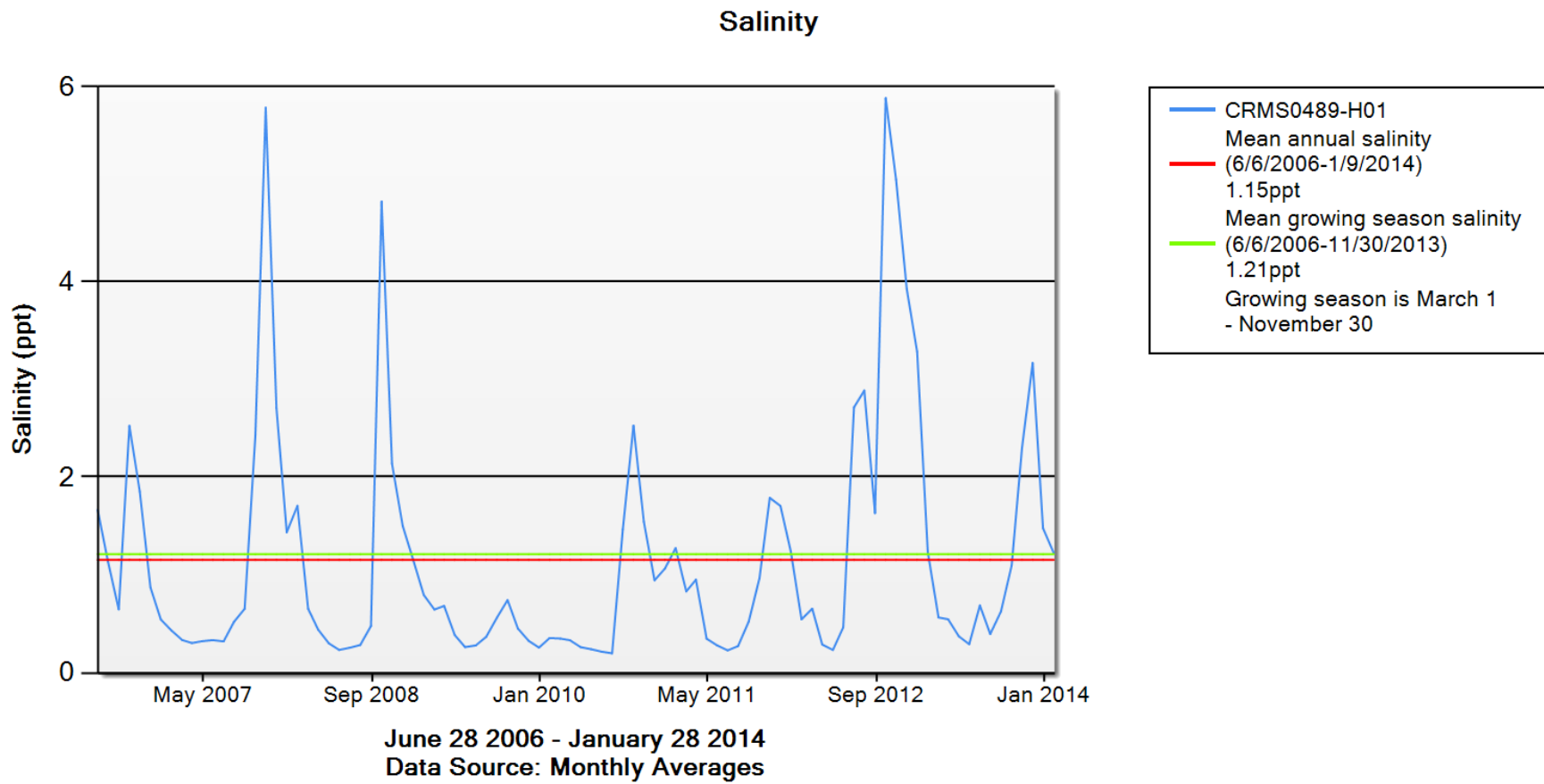


Custom Hydrologic Index for 2012 Brackish Marsh, CRMS0003





Hydro charts can show Mean Annual and Growing Salinity





Ability to plot Major events on Hydro Charts

[Previous Charting Version](#)

Charting

Bulk Charting

Data Download

Reporting

▼ Hydro

Water Level Range
Hydro Completeness
Salinity
Water Level
Temperature
Continuous
Site Hydro Index
Soil Porewater
Precipitation

Interactive Hydro

► Vegetation

► Soil

► Spatial

► Report Card Charts

Clear Charts

Water Year is October 1 - September 30

Scale: Station

Date Range:

2/25/1987 - 1/31/2014

Min Date: 2/25/1987

Max Date: 1/31/2014

Apply Date Filter



BS08-20
BS08-30
BS08-31
CRMS0002-H01
CRMS0003-H01
CRMS0006-H01
CRMS0008-H01
CRMS0008-H02
CRMS0008-W01
CRMS0030-H01
CRMS0033-H01
CRMS0034-H01

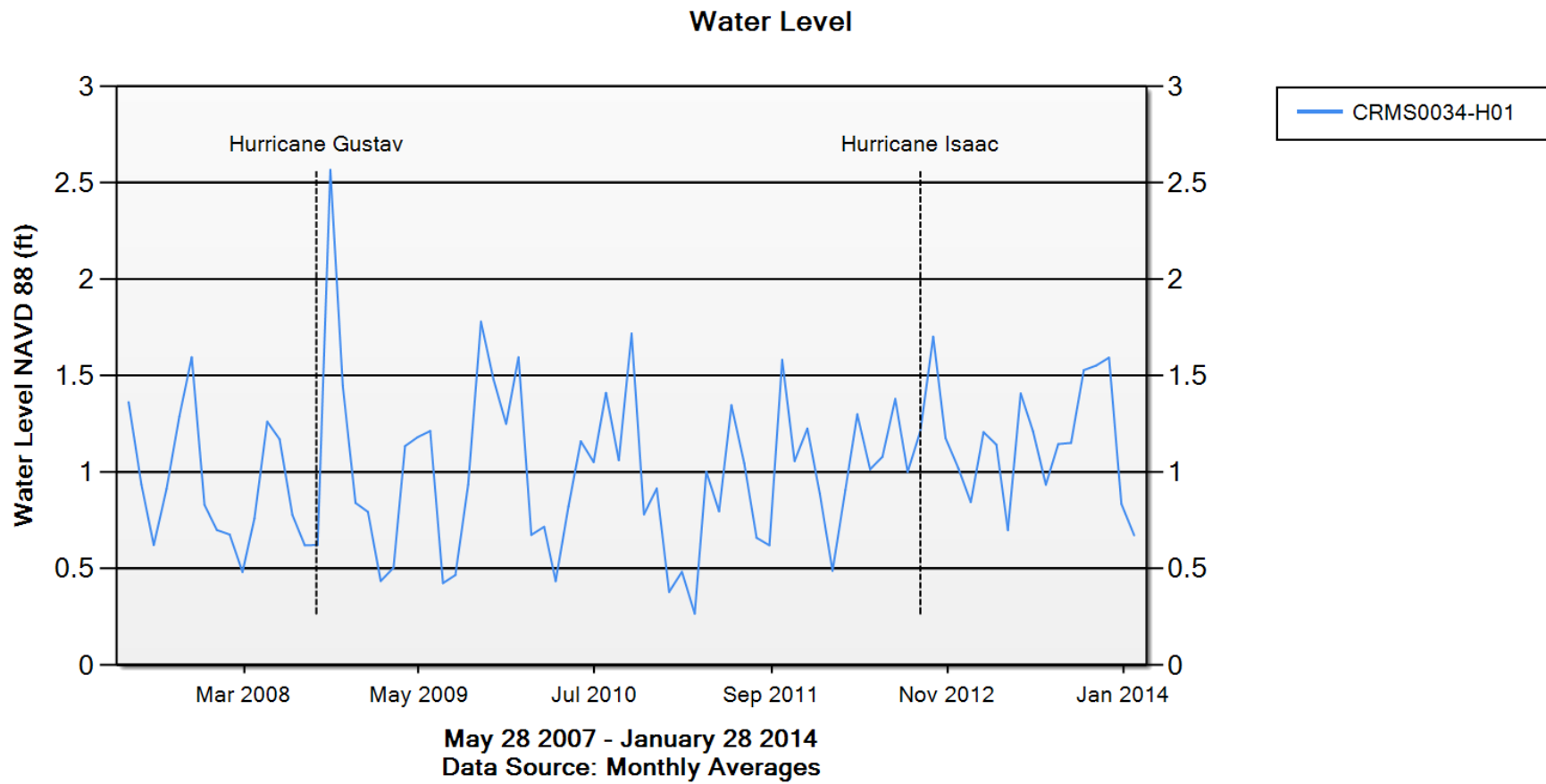
☒ Include major weather\storm events

[Show Map Selector](#)

[Submit Request](#)



Ability to plot Major events on Hydro Charts





Users can choose to plot Reference on Project FQI

▶ Hydro

▼ Vegetation

Forested
Herbaceous
Site Floristic Quality Index
Project/Reference FQI
Marsh Class

▶ Soil

▶ Spatial

▶ Report Card Charts

Clear Charts

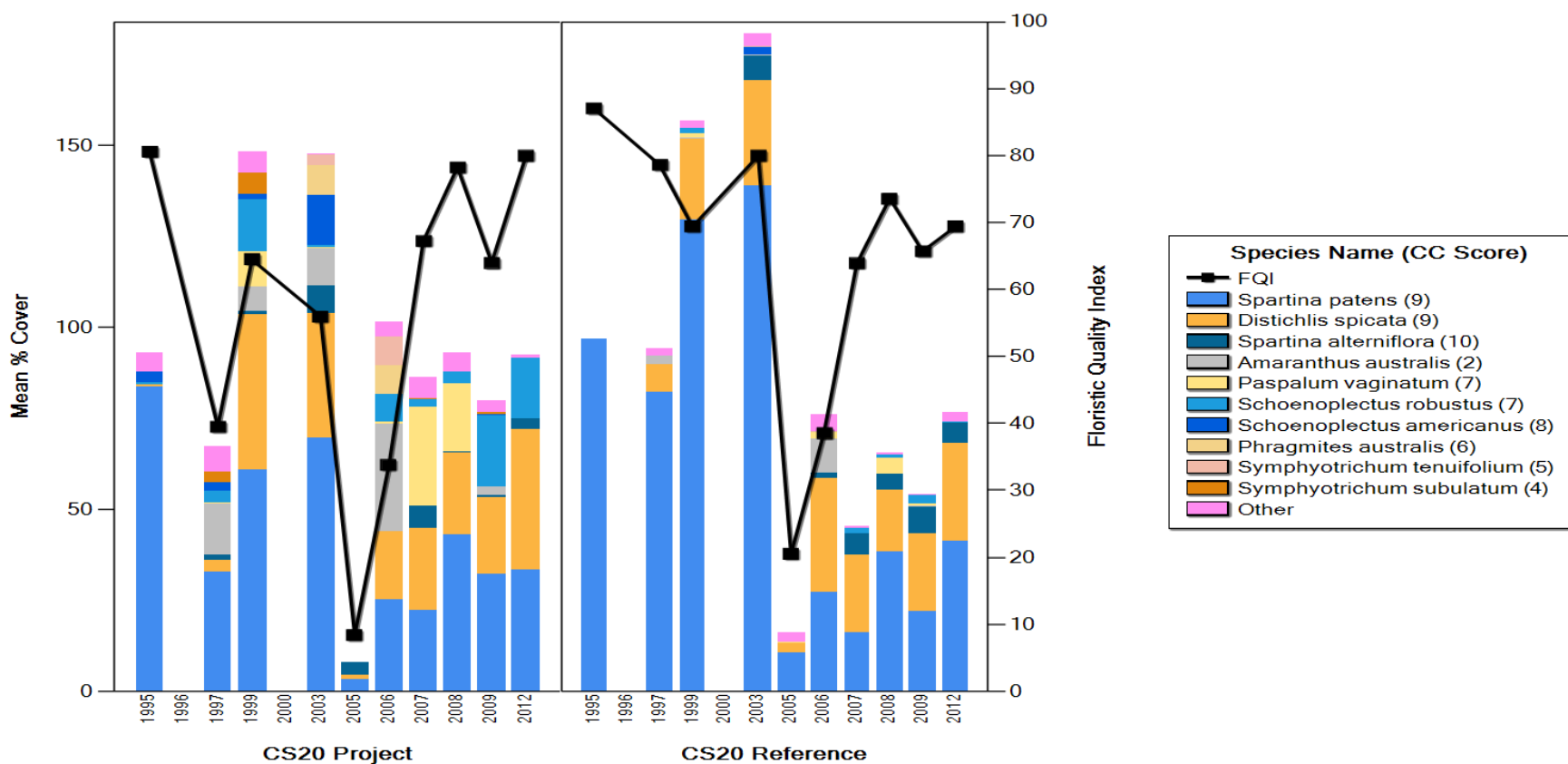
Submit Request

Scale: Project

Reference ☒

BA04
BA19
BA20
BA23
BA28
BA35
BA38
BA39
BS03
CS09
CS17
CS20

Floristic Quality Index for CS20





Users can choose to plot Reference on Project FQI

▶ Hydro

▼ Vegetation

Forested
Herbaceous
Site Floristic Quality Index
Project/Reference FQI
Marsh Class

▶ Soil

▶ Spatial

▶ Report Card Charts

Scale: Project

Reference ☐

BA28
BA35
BA38
BA39
BS03
CS09
CS17
CS20
CS21
CS23
CS25
CS28

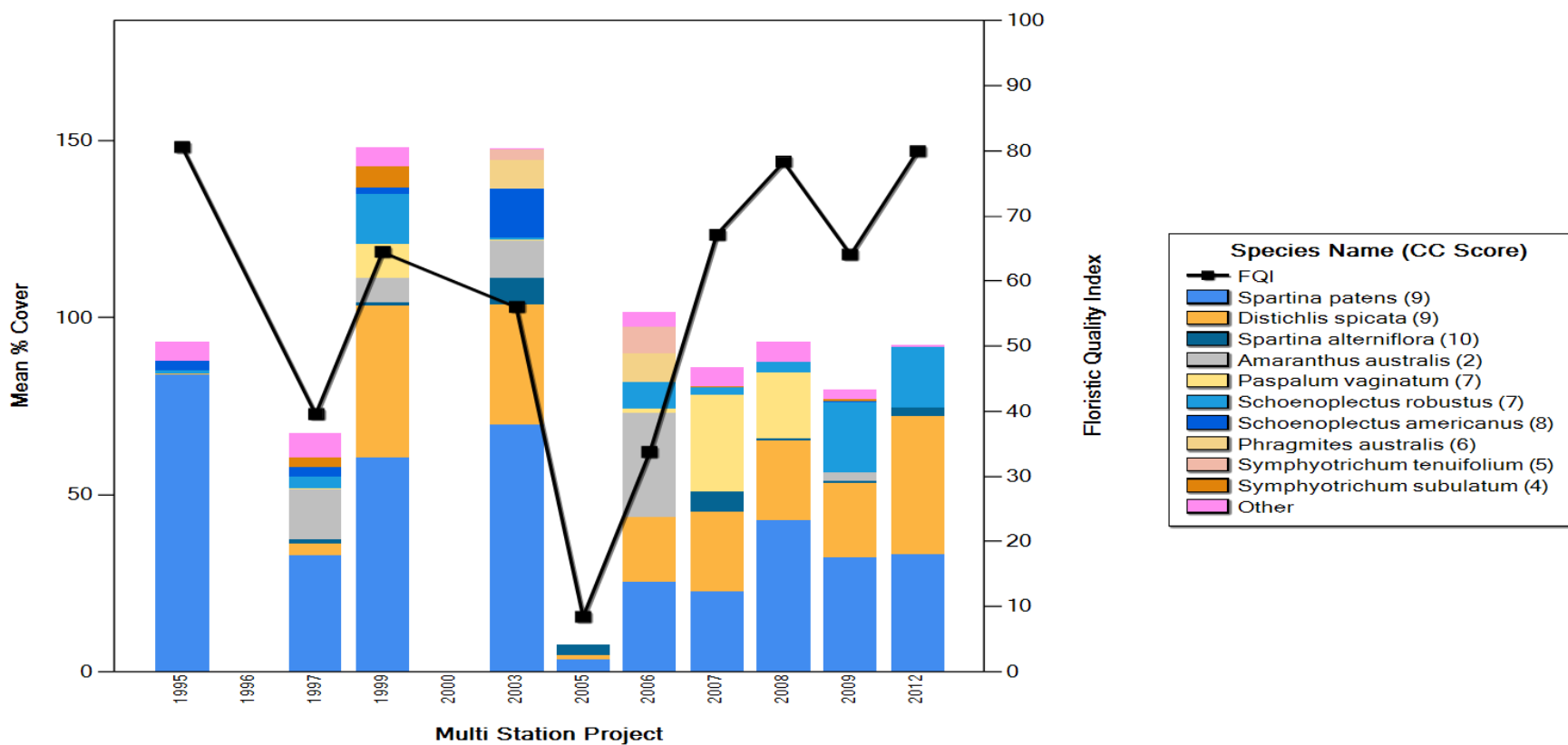
Clear Charts

Submit Request



Users can choose to plot Reference on Project FQI

Floristic Quality Index for CS20





Users now have control over what stations go into Reference

▶ Hydro

▼ Vegetation

Forested
Herbaceous
Site Floristic Quality Index
Project/Reference FQI
Marsh Class

▶ Soil

▶ Spatial

▶ Report Card Charts

Clear Charts

Scale: **Multi Station** ▼

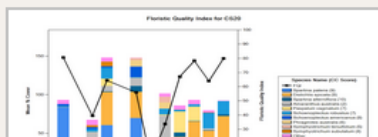
Reference ☐

Select an element below to populate the station selector.

CRMS6304
CS09
CS11B
CS17
CS19
CS20

Select All		Deselect All	
CS20-19		CS20-20	
CS20-26		CS20-21	
CS20-27		CS20-22	
CS20-28		CS20-23	
CS20-29		CS20-24	
CS20-30		CS20-25	
CS20-31			
CS20-32			

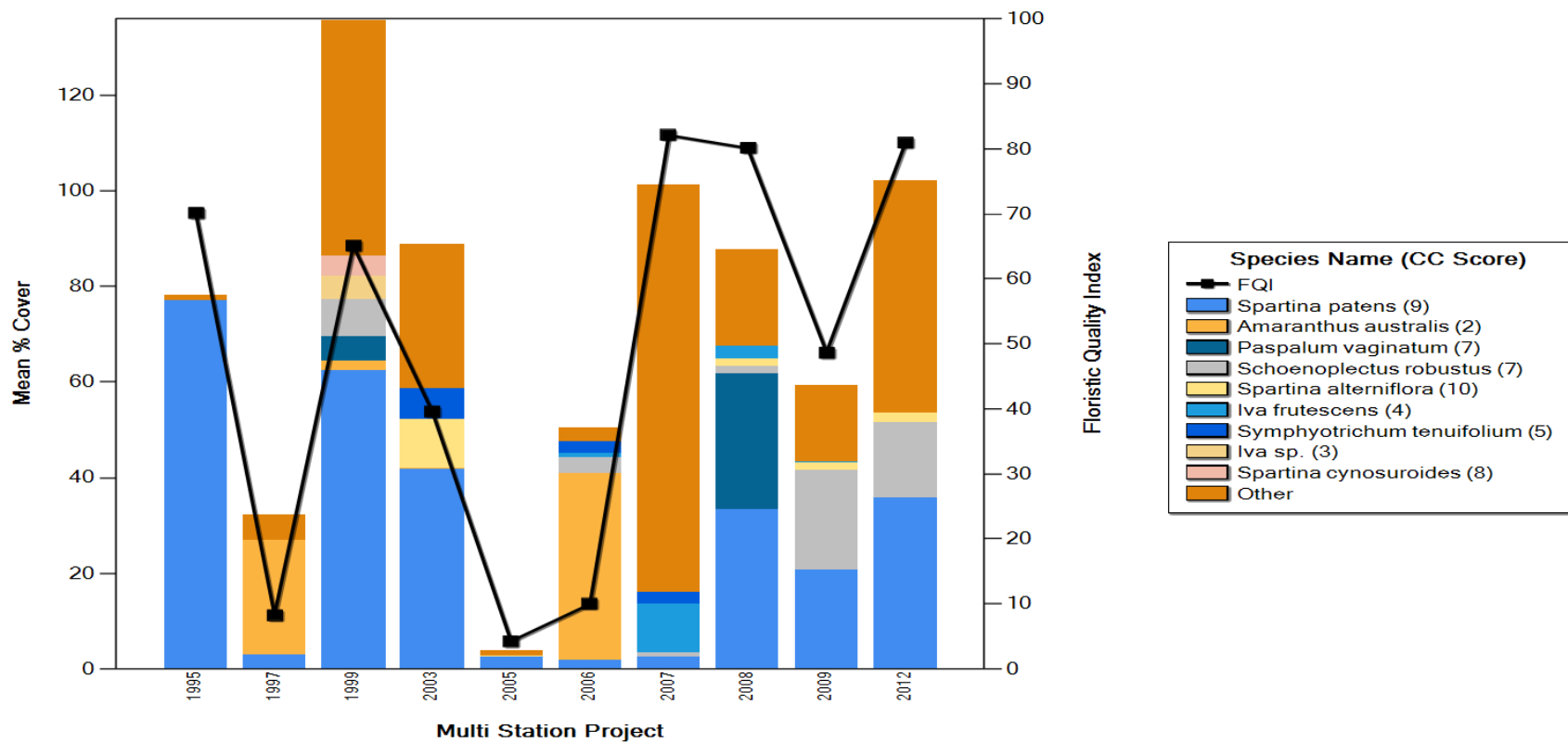
Submit Request





Users now have control over what stations go into Reference

Floristic Quality Index for Multiple Stations





Users now have control over what stations go into Reference

Forested
Herbaceous
Site Floristic Quality Index
Project/Reference FQI
Marsh Class

► Soil

► Spatial

► Report Card Charts

Clear Charts

Project

Select an element below to populate the station selector.

CRMS6304
CS09
CS11B
CS17
CS19
CS20

Reference

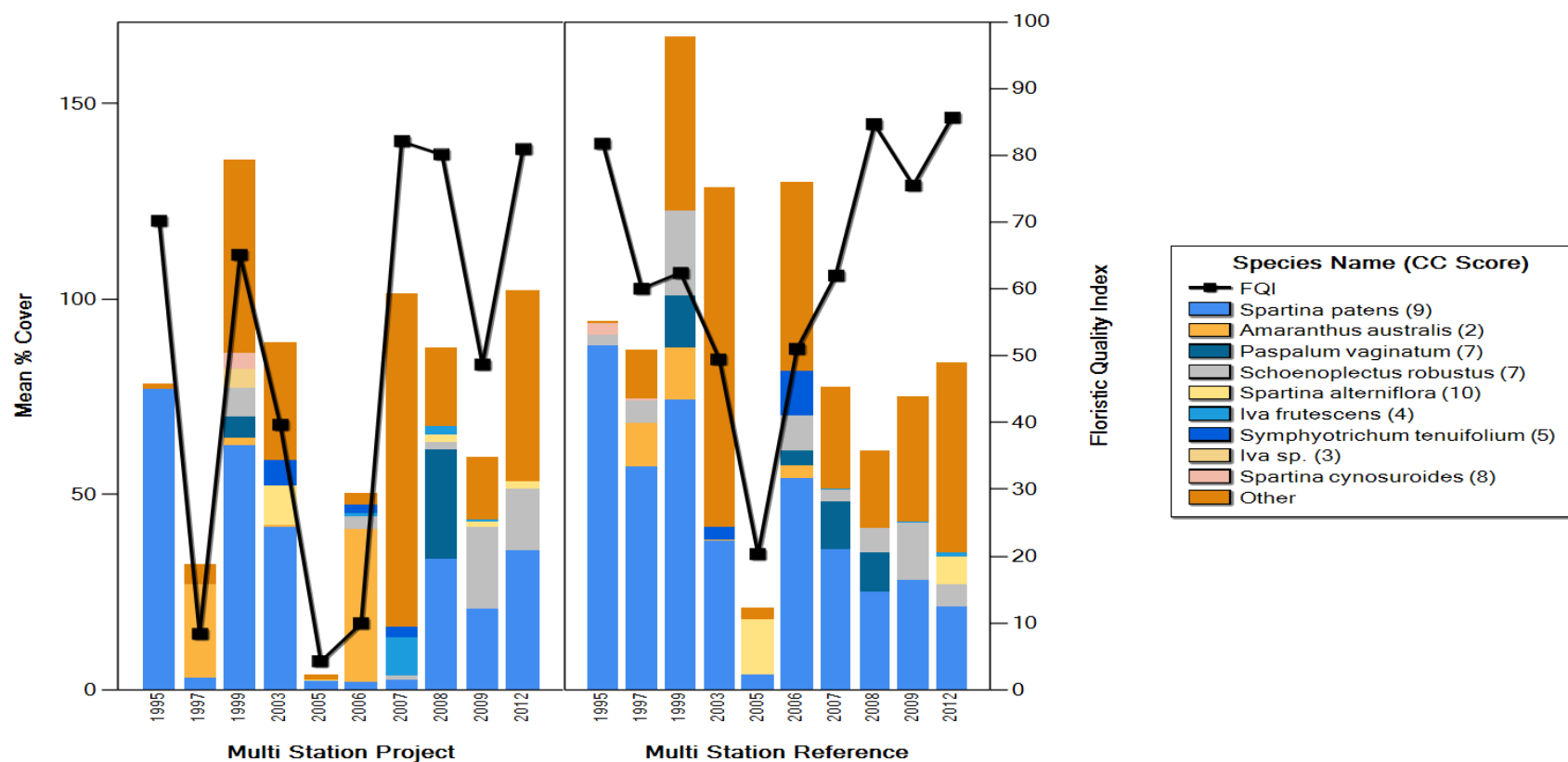
Select All		Deselect All	
CS20-19		CS20-20	
CS20-26		CS20-21	
CS20-27		CS20-22	
CS20-28		CS20-23	
CS20-29		CS20-24	
CS20-30		CS20-25	
CS20-31			
CS20-32			
CS20-33			

Select All		Deselect All	
CS20-20		CS20-19	
CS20-21		CS20-26	
CS20-22		CS20-27	
CS20-23		CS20-28	
CS20-24		CS20-29	
CS20-25		CS20-30	
CS20-31			
CS20-32			



Users now have control over what stations go into Reference

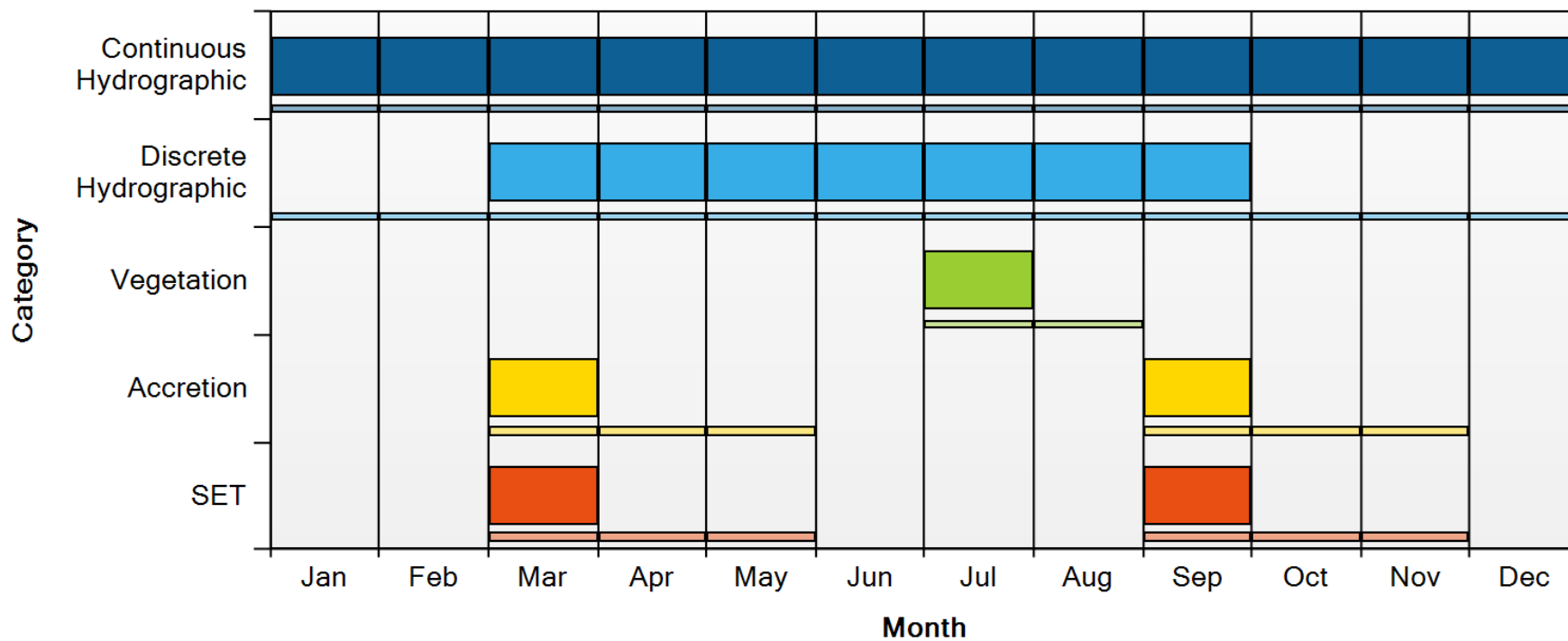
Floristic Quality Index for Multiple Stations





Data Availability chart now shows when data are expected

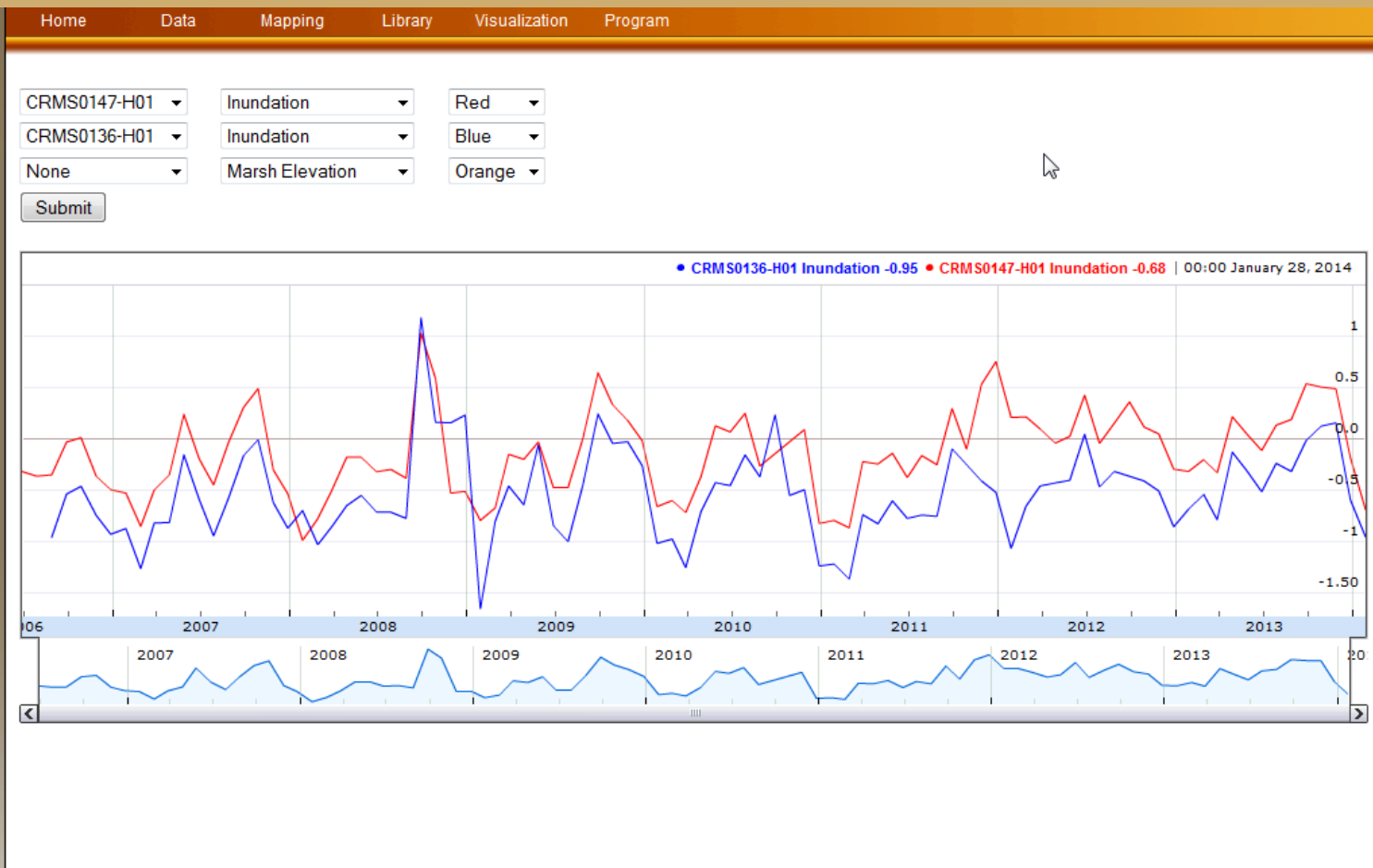
Data Availability for CRMS0034
2013



* Thin bar indicates typical data collection time range.

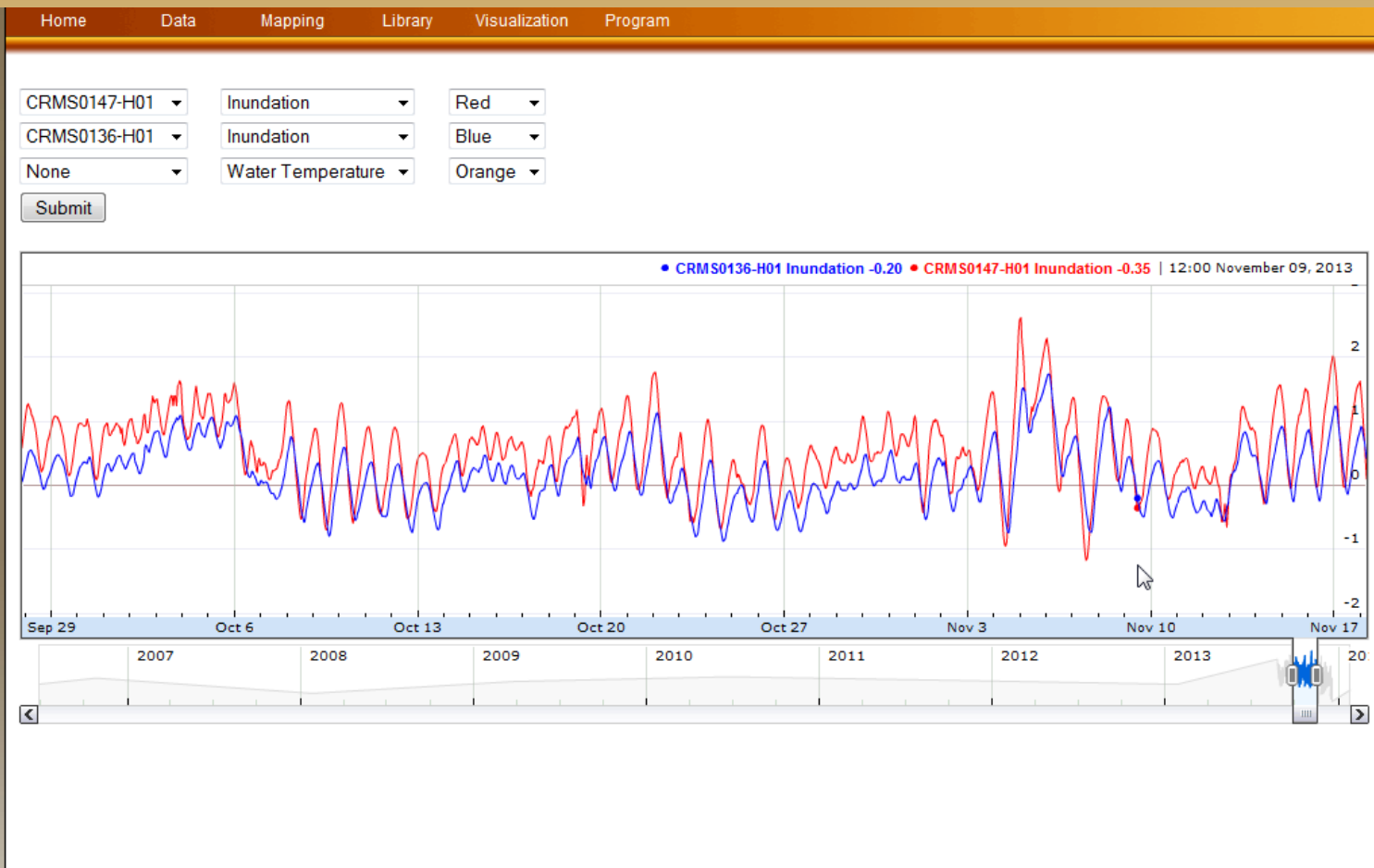


Inundation has been added to the Interactive Hydro Interface





Inundation has been added to the Interactive Hydro Interface





Spatial selection has been added to Charting

▼ Hydro

Water Level Range

Hydro Completeness

Salinity

Water Level

Temperature

Continuous

Site Hydro Index

Soil Porewater

Precipitation

Interactive Hydro

▶ Vegetation

▶ Soil

▶ Spatial

▶ Report Card Charts

Clear Charts

Water Year is October 1 - September 30

Scale: Multi Station ▼

Date Range:
2/25/1987 - 1/31/2014

Min Date: 2/25/1987

Max Date: 1/31/2014

Apply Date Filter ⓘ

Basin: All Basins ▼ Project: All Projects ▼

Selection limited to 10 items

AT04-01	
AT04-02	
AT04-03	
AT04-04	
AT04-06	
BA01-01	
BA01-02	
BA01-03	
BA01-04	

Show Map Selector Submit Request



Spatial selection has been added to Charting

Select Mode - Drag the Mouse inside the map to select stations.



■ CRMS Stations ■ CWPPRA Stations

Clear Selected

Submit

BA01-02

BA01-03

Show Map Selector

Submit Request

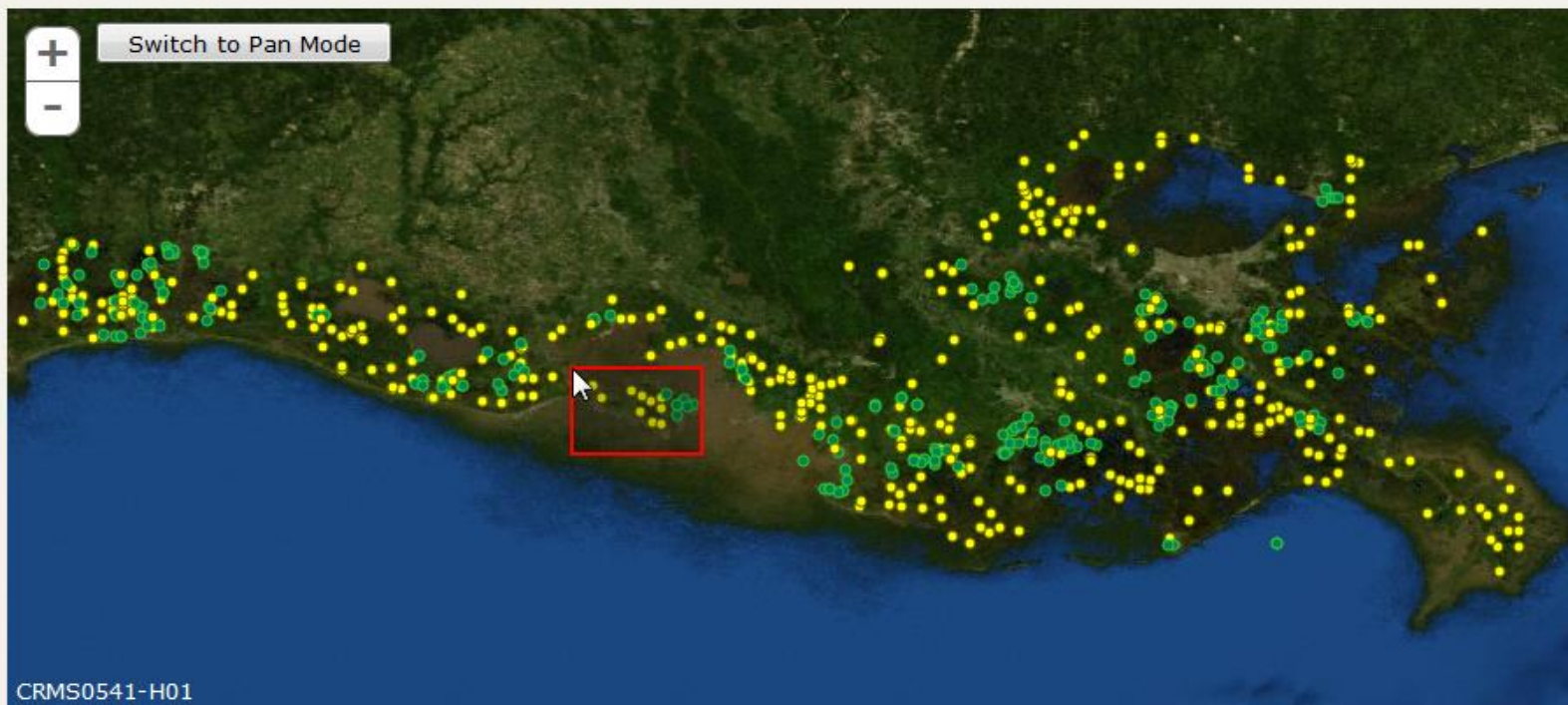




Spatial selection has been added to Charting

[Previous Charting Version](#)

Select Mode - Drag the Mouse inside the map to select stations.



● CRMS Stations

● CWPPRA Stations

Clear Selected

Submit

BA01-02

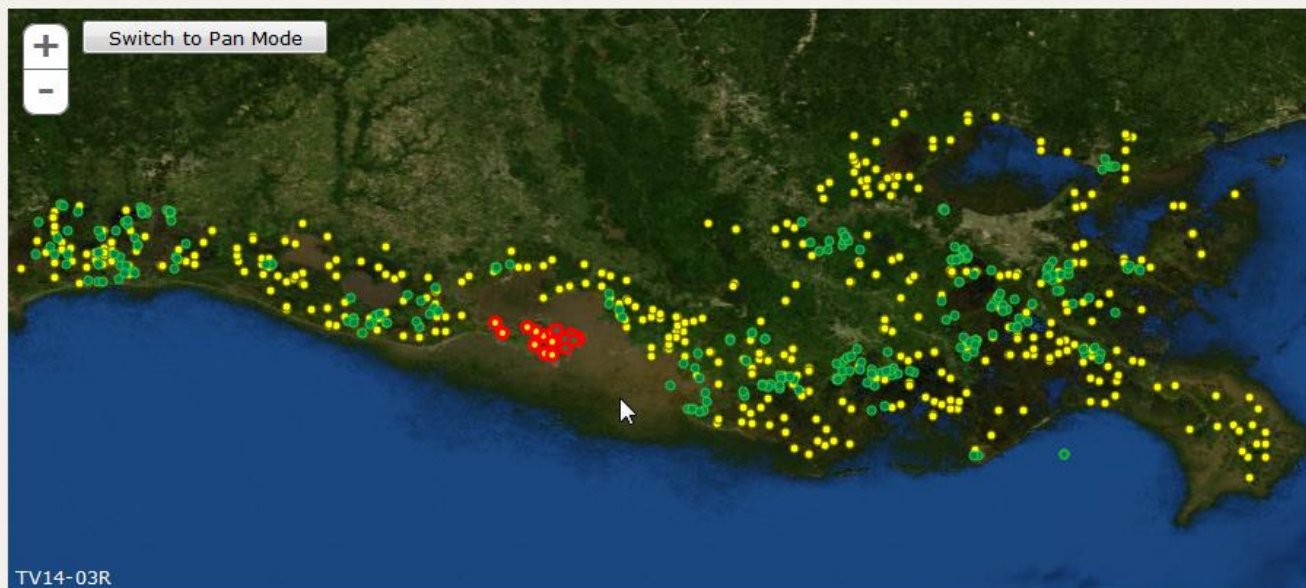
BA01-03

☐ Include major weather\storm events



Spatial selection has been added to Charting

Select Mode - Drag the Mouse inside the map to select stations.



■ CRMS Stations ■ CWPPRA Stations

Clear Selected

Submit

BA01-02

CRMS0524-W01

BA01-03

CRMS0529-H01

Show Map Selector

Submit Request





Spatial selection has been added to Charting

Water Level Range
Hydro Completeness
Salinity
Water Level
Temperature
Continuous
Site Hydro Index
Soil Porewater
Precipitation

Interactive Hydro

▶ Vegetation

▶ Soil

▶ Spatial

▶ Report Card Charts

Clear Charts

Scale: **Multi Station**

Date Range:

2/25/1987 - 1/31/2014

Min Date: 2/25/1987

Max Date: 1/31/2014

Apply Date Filter



Basin: All Basins

Project: All Projects

Selection limited to 10 items

AT04-01	CRMS0498-H01
AT04-02	CRMS0499-H01
AT04-03	CRMS0504-H01
AT04-04	CRMS0520-H01
AT04-06	CRMS0522-W01
BA01-01	CRMS0523-H01
BA01-02	CRMS0524-W01
BA01-03	CRMS0529-H01
BA01-04	CRMS0530-W01

Show Map Selector

Submit Request





Spatial selection has been added to Charting

[Previous Charting Version](#)

Charting

Bulk Charting

Data Download

Reporting

Hydro

Water Level Range
Hydro Completeness
Salinity
Water Level
Temperature
Continuous
Site Hydro Index
Soil Porewater
Precipitation

Interactive Hydro

Vegetation

Soil

Spatial

Report Card Charts

Clear Charts

Water Year is October 1 - September 30

Scale: Multi Station

Date Range:

2/25/1987 - 1/31/2014

Min Date: 2/25/1987

Max Date: 1/31/2014

Apply Date Filter



Basin: Mississippi River

Project: All Projects

Selection

- All Basins
- Atchafalaya
- Barataria
- Breton Sound
- Calcasieu/Sabine
- Mermentau
- Mississippi River Delta**
- Pontchartrain
- Terrebonne
- Teche/Vermilion
- CRMS0159-H01
- CRMS0161-H01
- CRMS0162-H01
- CRMS0163-H01
- CRMS0164-H01

☐ Include major weather/storm events


[Previous Charting Version](#)

Select Mode - Drag the Mouse inside the map to select stations. ✕

+

-

Switch to Pan Mode



● CRMS Stations ● CWPPRA Stations

CRMS0162-H01

CRMS0163-H01

CRMS0164-H01

Clear Selected

Submit

☐ Include major weather\storm events



Data Download

Data available through this website are calculated or derived values based on the original data which are available from the SONRIS database ([SONRIS](#))

▶ Hydro

▶ Vegetation

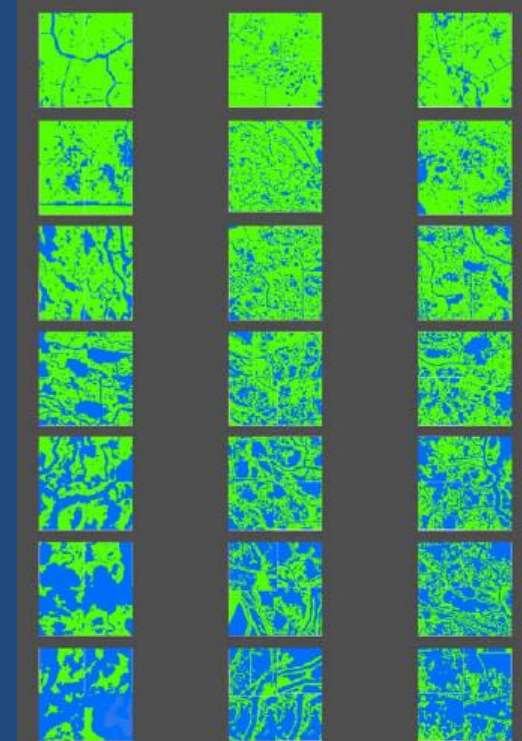
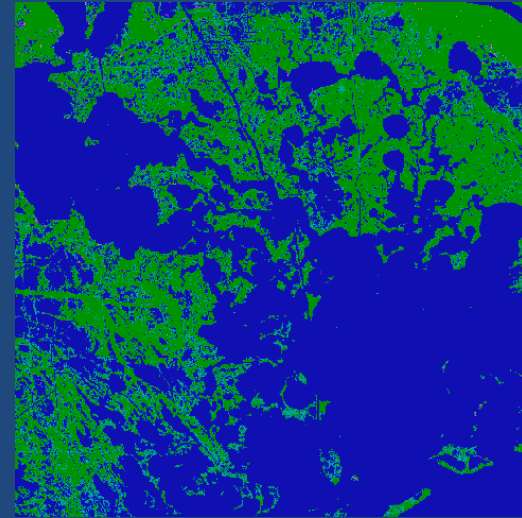
▼ Soil

Calculated Elevation Change
Submergence Vulnerability Index

▶ Spatial

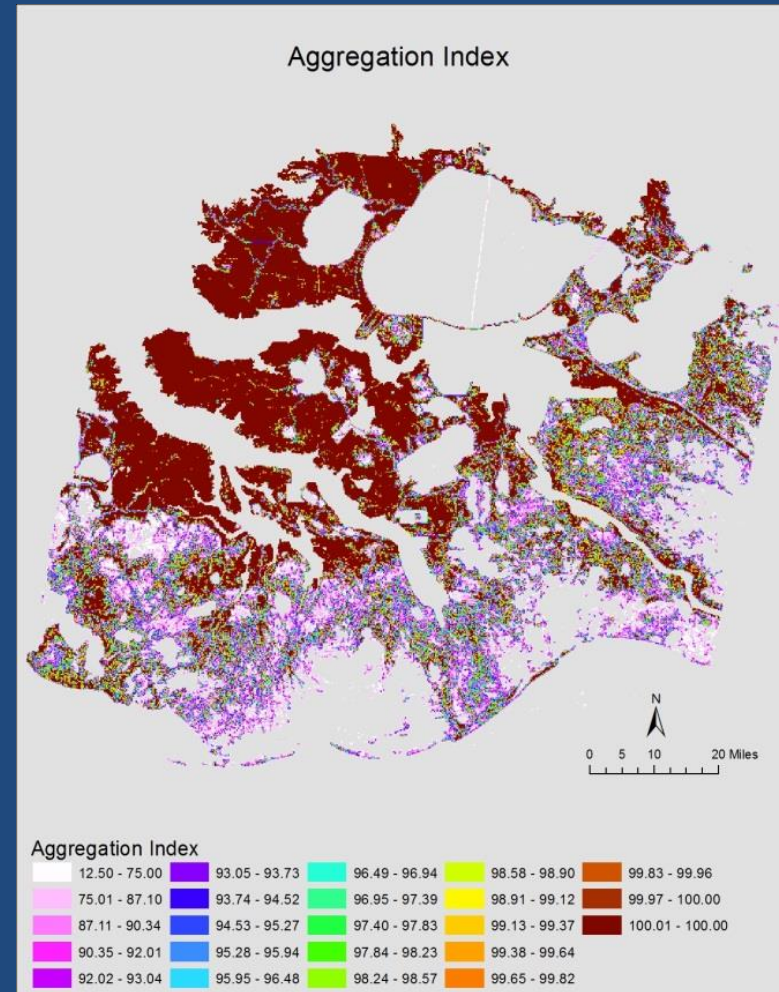
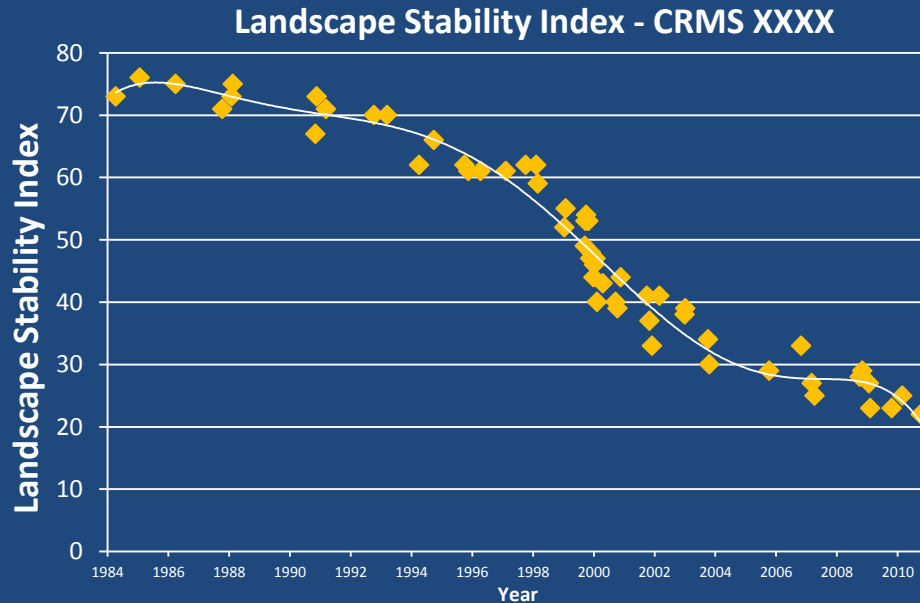
Landscape Configuration Index

- CRMS monitors landscape composition (land/water change), but landscape configuration hasn't been investigated.
 - Extent to which a landscape is aggregated or fragmented.
- The disaggregation of a landscape plays a crucial role in the process of wetland loss and fragmentation.
 - Wetland loss generally involves the disaggregation of contiguous wetlands into more dispersed wetland and isolated patches.
 - As wetland loss and fragmentation proceed, wetlands become disaggregated and eventually ecological function is impaired (Saunders et al. 1991).
- Building on previous USACE funded work



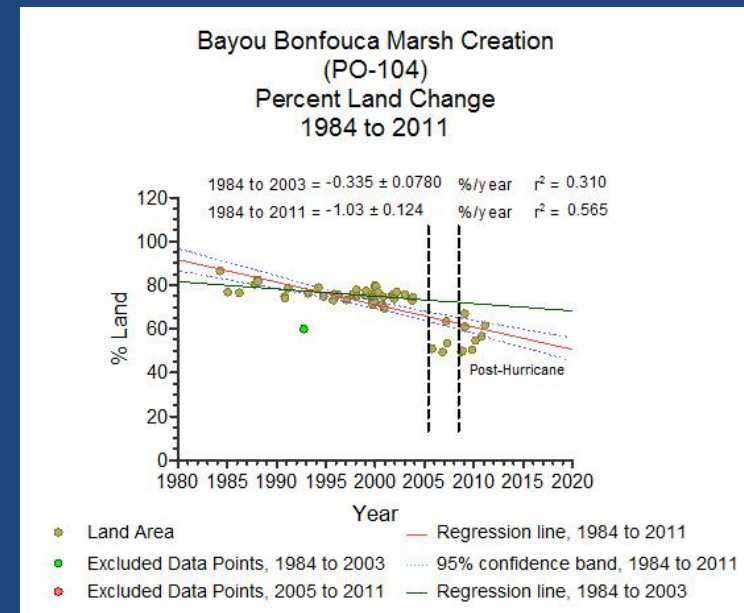
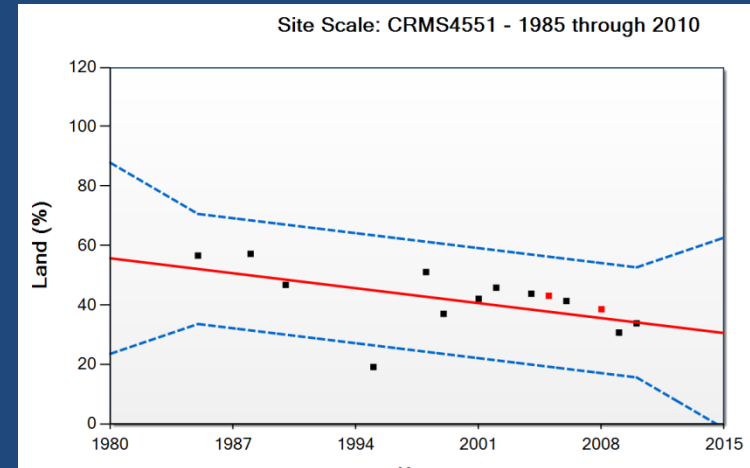
Landscape Configuration Index

- Uses Hypertemporal data, already acquiring
- Currently investigating an aggregation index as a metric to measure landscape stability at CRMS sites and the coastwide landscape.
- This will serve as an improvement over the WVA qualitative assessment of interspersions and will move toward a quantitative assessment.

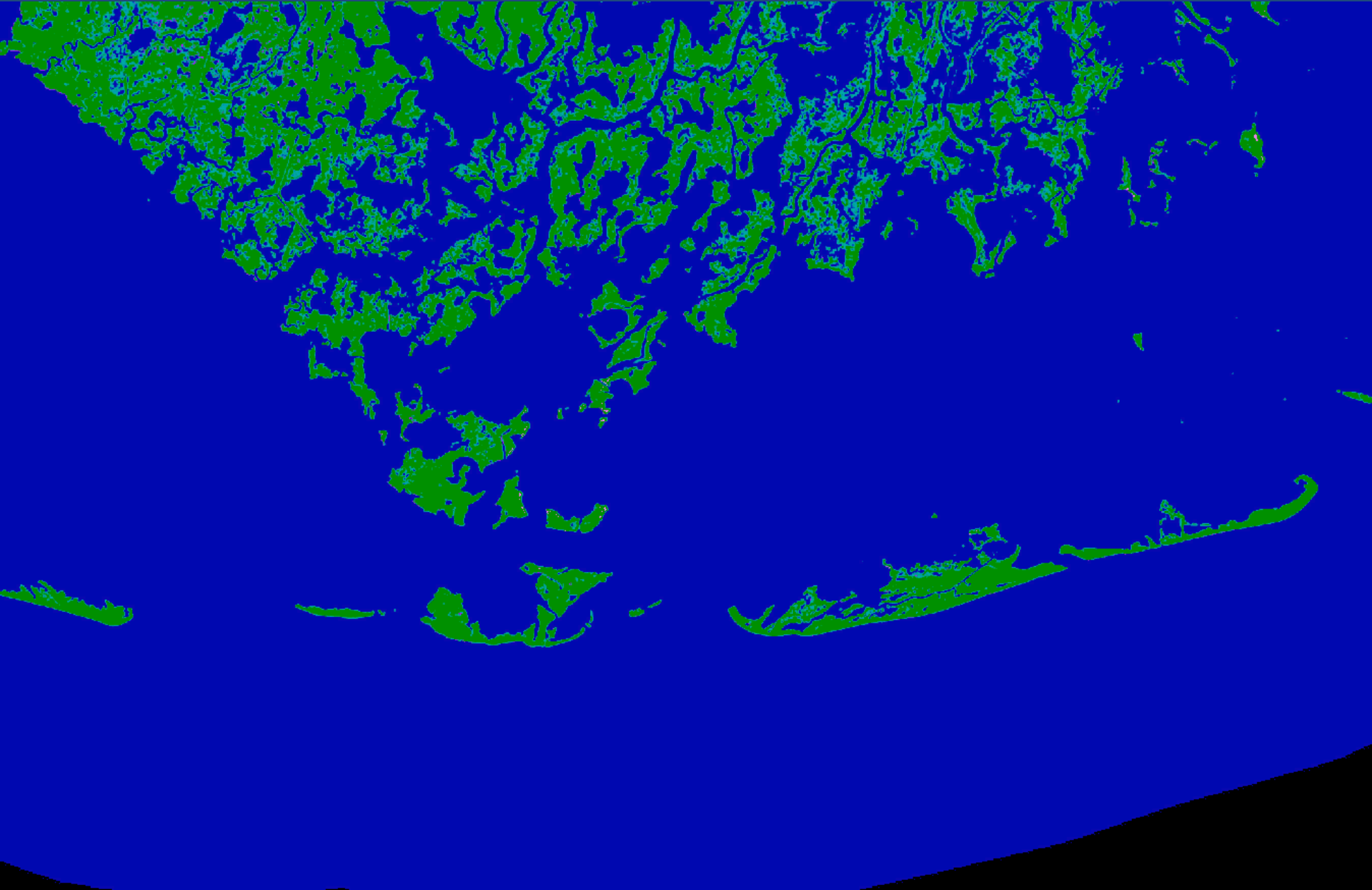


Hyper vs. Multi-temporal Wetland Change Analyses

- Previous wetland change rates were calculated on 8 to 14 dates
- Variability in remotely-sensed land area estimates can often be attributed to normal environmental variability present during imagery acquisition.
- A hyper-temporal analysis will enable the removal of transient phenomena and enable isolation of “true” change
 - Ex: Temporary flooding or isolation of a disturbance
 - Could focus on project construction features
- Number of dates varies depending upon location of the coast (due to cloud conditions)
 - ranges from 56 to 124 dates
- 30m resolution
- 1984 thru 2011 – Landsat 5 and Landsat 7
- 2013 and beyond – Landsat 8



Hyper-temporal Wetland Change Analyses





Coastwide Reference Monitoring System - *Wetlands*

Works in Progress

- **Forested Floristic Quality Index**
- **Vegetation Volume Index**
- **Vegetation Community Salinity Tool**
- **Porewater vs. Surface Salinity Analysis**

- **IDEAS:**

- **Station level visualization**
- **Rework interface for 1km spatial data**
- **Classify Tool –**
 - **Develop an outlier visualization**

Examples:

- 1) **2 STD of the mean for salinity based on previous annual site means**
- 2) **Shallow subsidence exceptionally high**

- **Suggestions???**



**Questions, comments, complaints,
or large data requests.....**

**piazzas@usgs.gov
225.578.7044**