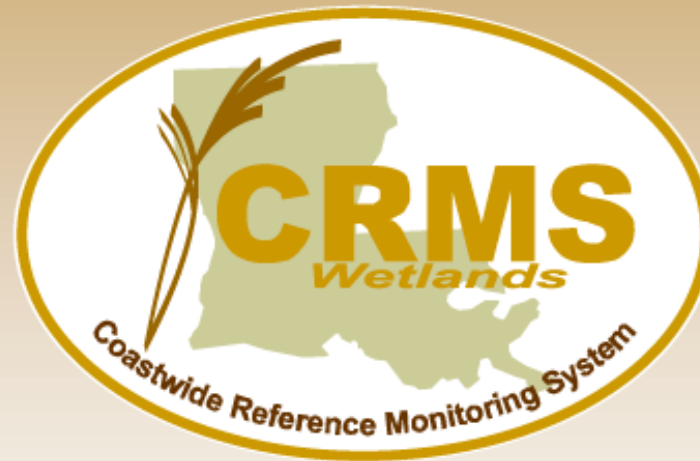
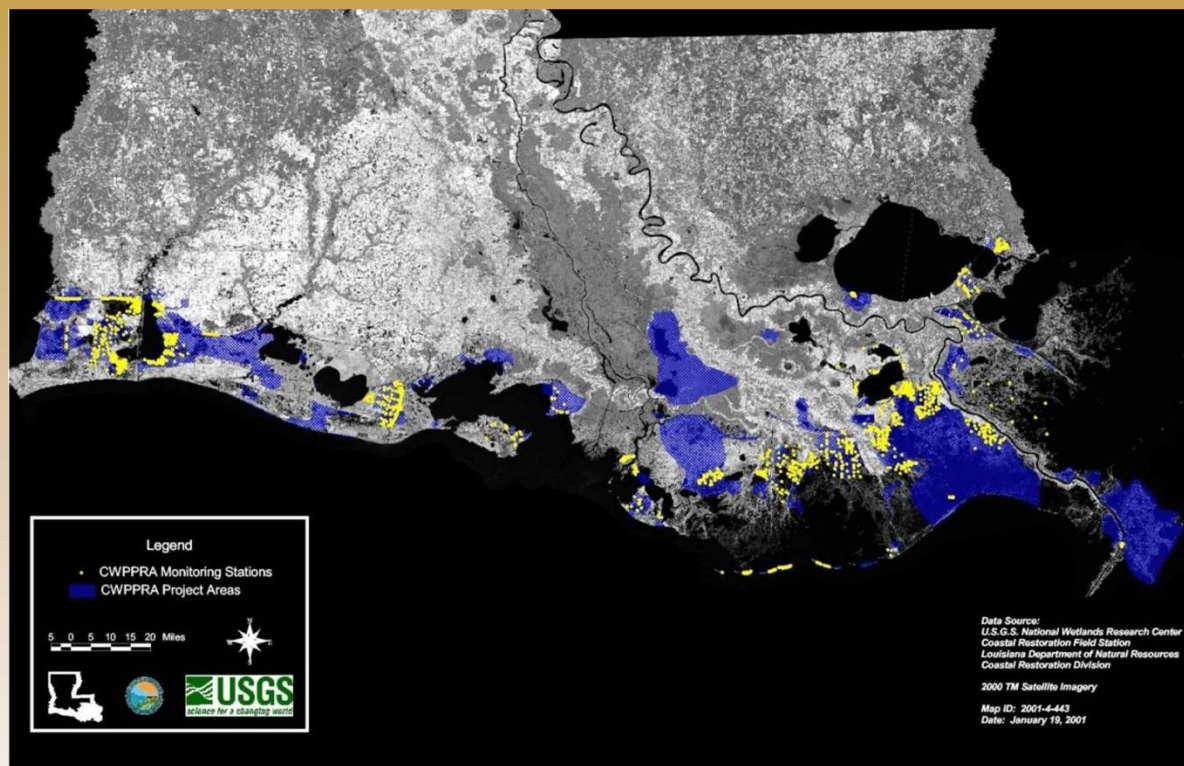


CRMS Website Training



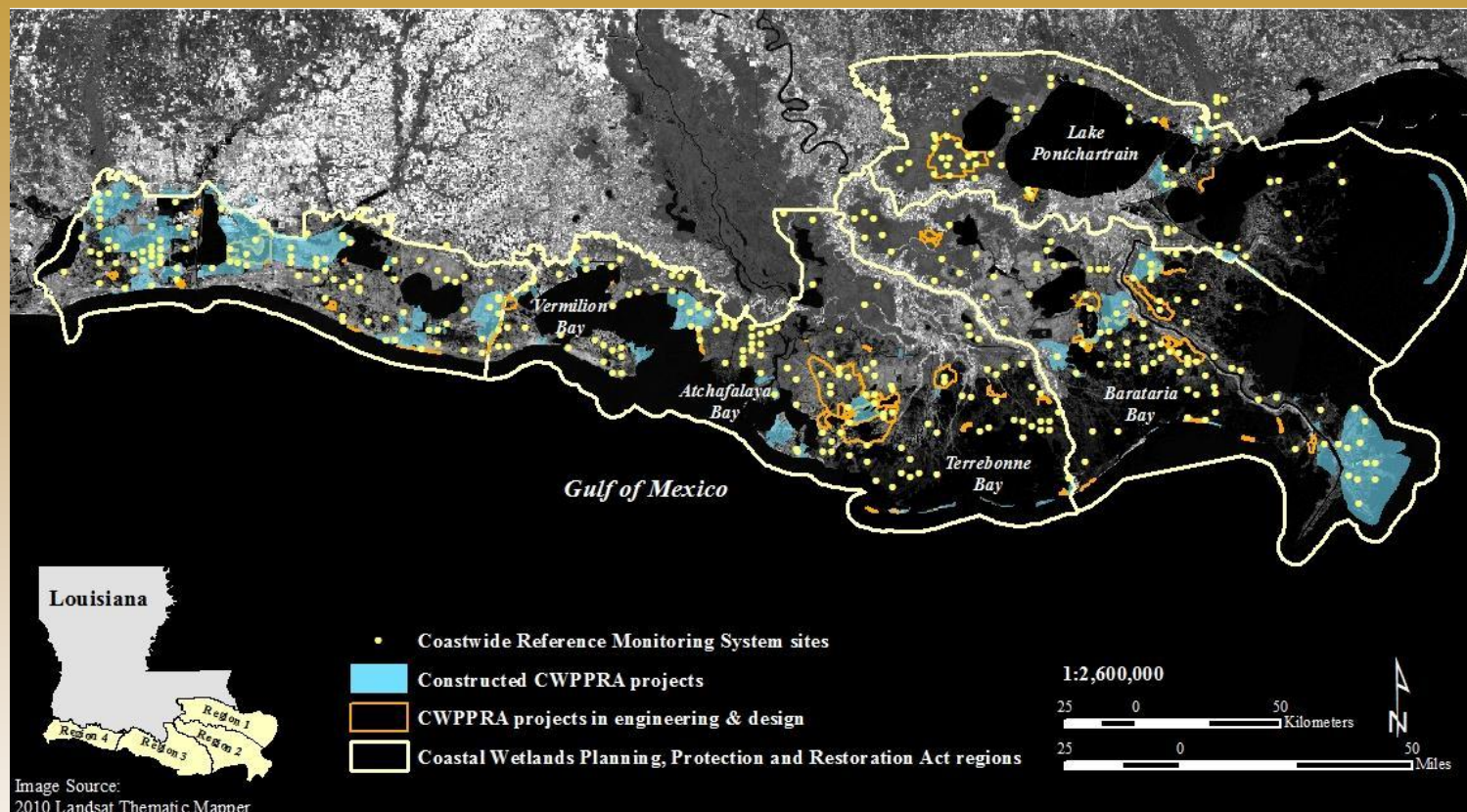
March 2015

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



Restoration project types: diversions of freshwater and sediments, marsh creation, shoreline protection, sediment and nutrient trapping, hydrologic restoration, and vegetation planting

- CWPPRA was congressionally funded in 1990 and mandated 20 years of restoration project monitoring
- CWPPRA program uses multiple restoration techniques
 - size and types of projects vary
- Initially the program used paired project and reference sites
 - with time, difficult to find “uninfluenced” reference
- Inconsistent monitoring variables and collection frequencies across projects with short data records



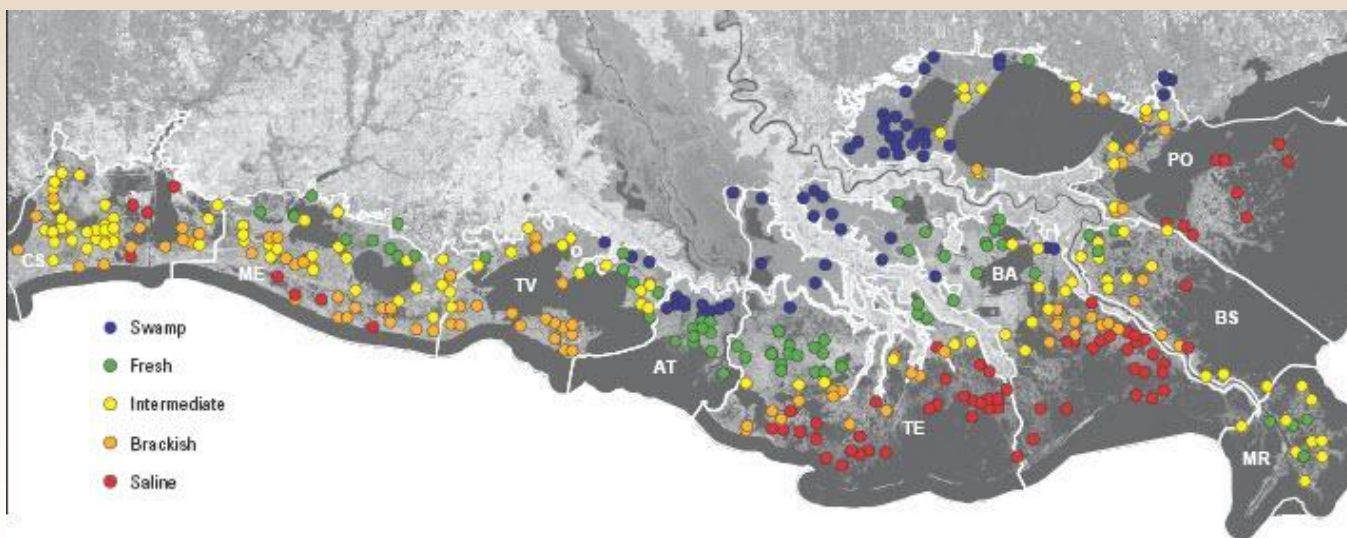
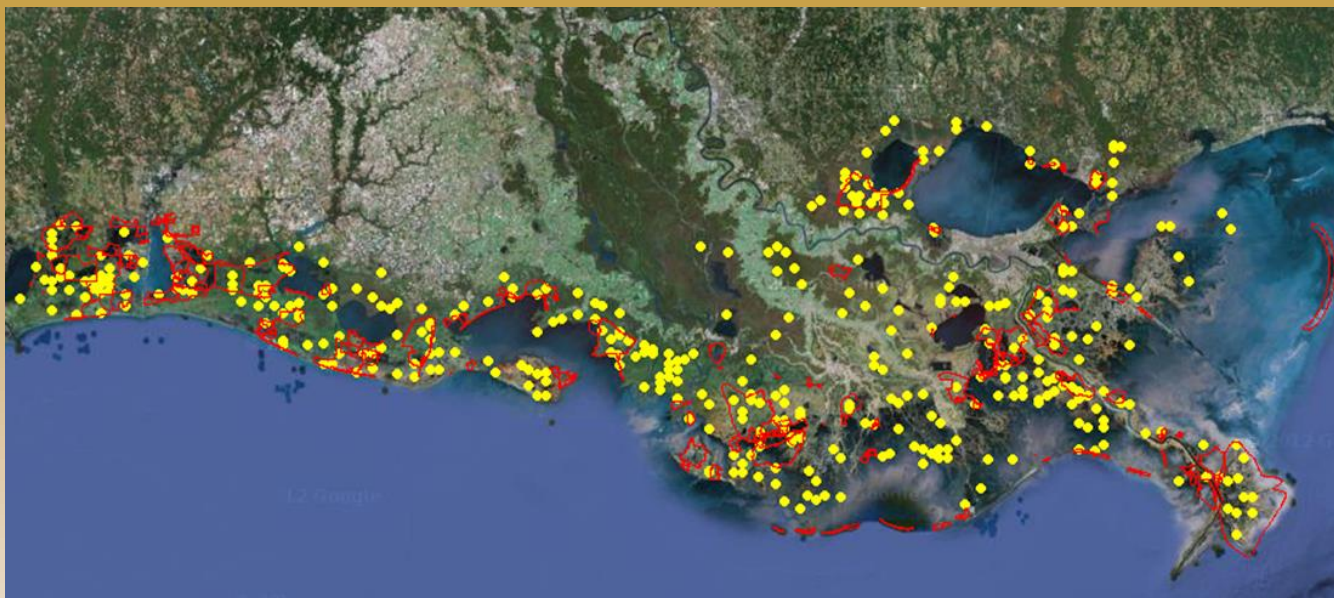
- To improve our ability to determine the effectiveness of individual coastal restoration projects.
- Provide information to evaluate coastal wetlands at the project, basin, and coastwide scales.
- To determine the ecological condition of coastal wetlands to ensure that the strategic coastal planning for Louisiana (Coast 2050, LCA, Louisiana Master Plan) is effective in recreating a sustainable coastal ecosystem.

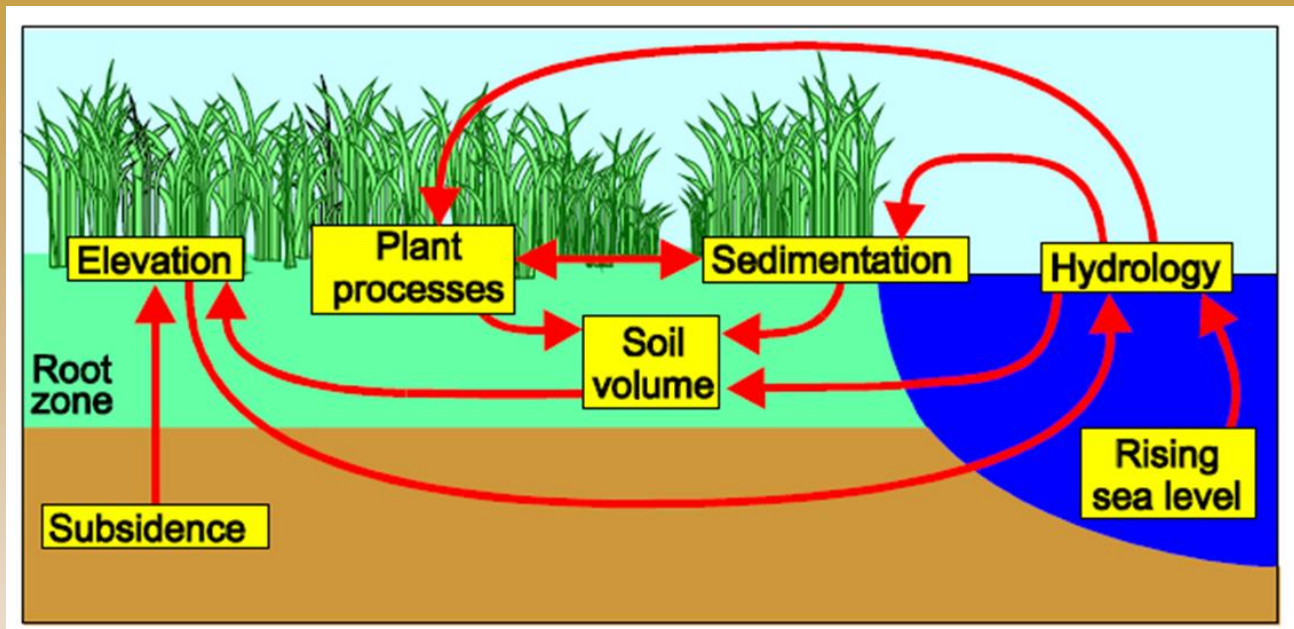


Coastwide Reference Monitoring System – *Wetlands*

CRMS Design and Assessment

- Funded by CWPPRA in 2003 & State of LA
- CPRA/USGS Sponsors
- ~ 390 CRMS sites
- Long-term dataset (2006-2019)
- Sites inside & outside of CWPPRA projects
- Sites in swamp, fresh, intermediate, brackish, and salt marsh
- Allows for multi-scale assessments through CRMS report cards
- Data used for future scenario modeling



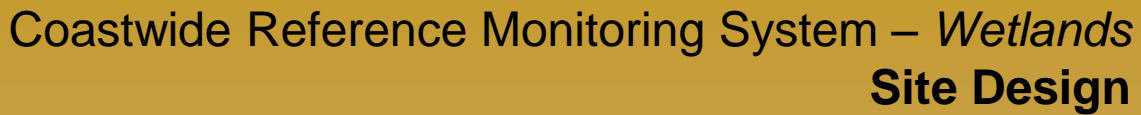


Questions to address through CRMS:

Did the restoration program:

- reduce coastal wetland loss?
- sustain a diversity of vegetation types within basins?

Is the restoration program effective in reducing major stressors on wetlands (i.e., flooding regime, salinity, elevation change)?



Typical Marsh Site



Typical Swamp Site

CRMS Site vs. CRMS Station

Aerial photo

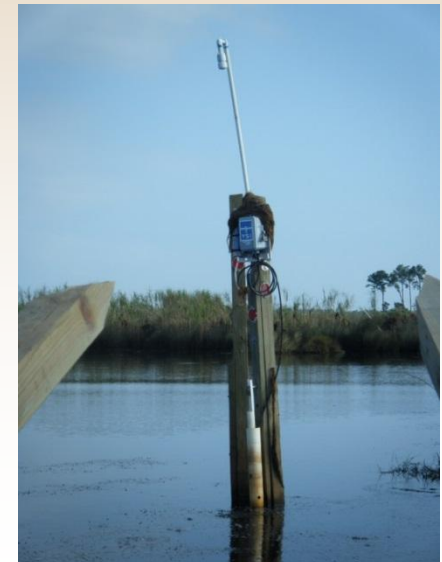
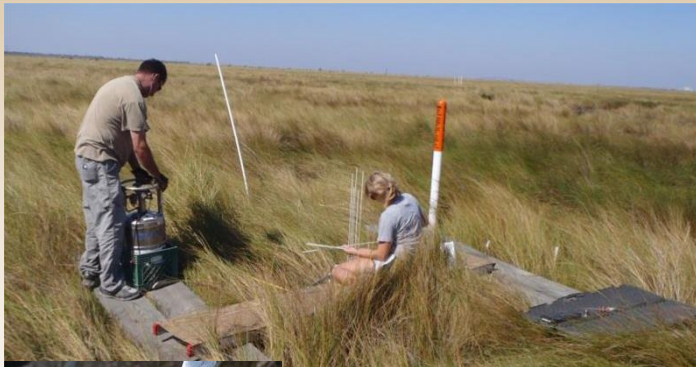
2005

2008

1km² scale:

High resolution aerial photography based land:water analyses to investigate land change through time.

200m² scale: Field data collection using standardized data collection protocols and consistent sampling intervals





Coastwide Reference Monitoring System – *Wetlands* Site Layout





Coastwide Reference Monitoring System – *Wetlands* Site Data Collection

Data Type	Parameter	Method	Scale	Frequency
Land change	Land:Water Ratio	Satellite Imagery	Hydrologic Basin	3 years
	Land:Water Ratio	Digital Aerial Photography	CRMS Site (1 km ²)	3 years
Vegetation	Emergent Vegetation	Braun Blanquet: % Cover, Species Richness, Height of Dominant Species	(10) 2m x 2m plots per marsh site or (9) plots per swamp sites	Annually during peak biomass
	Forested Vegetation	DBH, Canopy Cover, Understory veg	(3) 20m x 20m Forested plots & (9) 6m X6m Understory plots per site	3 yrs during peak biomass
Soils	Soil Characteristics	Core samples profiled into 4 cm increments to 24 cm. Bulk Density, OM%, Soil Salinity, pH, and Moisture.	3 cores, 18 archived samples per site	6 to 10 years
	Vertical Accretion	Feldspar Plots/Cryogenic Cores	3 plots per site	Twice per year
	Marsh Elevation Change	Rod Surface Elevation Table (RSET)	4 directions per site	Twice per year
Hydrology	Soil Porewater	10 and 30 cm syringe sippers	3 samples per depth per site and at vegetation plots	Variable and annually
	Surface Water Salinity, Temp and Water Level	Submersible Data Logger	in available water within 200m of CRMS site or in a well	Hourly



A STANDARD OPERATING PROCEDURES MANUAL FOR THE COAST-WIDE REFERENCE MONITORING SYSTEM-*WETLANDS*:

Methods for Site Establishment, Data Collection, and Quality
Assurance/Quality Control

Todd M. Folse, Jonathan L. West, Melissa K. Hymel, John P. Troutman,
Leigh A. Sharp, Dona Weifenbach, Tommy E. McGinnis, Laurie B.
Rodrigue, William M. Boshart, Danielle, C. Richardi, C. Mike Miller, and
W. Bernard Wood

The Louisiana Coastal Protection and Restoration Authority

- **QA/QC procedure for each data type**
- **Field procedures**
- **Data entry**
- **Initial data review**
- **Automated review during submission into database buffer**
- **CPRA regional office review**
- **Final approval and acceptance into CIMS database**



Coastwide Reference Monitoring System – *Wetlands* Database

lacoast.gov/crms

a CWPBRA funded project



Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

 Map  Data  FAQ  Factsheet

Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting the coastal landscape. The effectiveness of the traditional paired-reference monitoring approach in Louisiana has been limited because of difficulty in finding comparable test sites. CRMS is a multiple reference approach that uses aspects of hydrogeomorphic functional assessments and probabilistic sampling.

This approach includes a suite of sites that encompass the range of ecological conditions for each stratum, with projects placed on a continuum of conditions found for that stratum. Trajectories in reference sites are then compared with project trajectories through time. The approach could serve as a model for evaluating wetland ecosystems.



cims.coastal.louisiana.gov

cims.coastal.louisiana.gov

Apps Getting Started Latest Headlines Customize Links Free Hotmail RealPlayer Windows Marketplace Windows Media Windows Imported From Fire




Coastal Protection and Restoration Authority


Home Data Download Library Viewer Outreach Help



Welcome to the Louisiana Coastal Protection and Restoration Authority's Coastal Information Management System (CIMS).

CIMS provides geospatial, tabular database and document access to CPRA's suite of protection and restoration projects, Coastwide Reference Monitoring System (CRMS) stations, the 2012 Master Plan, project scheduling, geophysical data, and coastal community resiliency information.

 Map Viewer  Data Download  Document Library



Coastal Protection and Restoration Authority

[Log In]

Home Data Download Library Viewer Outreach Help

DOWNLOAD DATA - HYDROGRAPHIC MONTHLY

Hydrographic data are now available in two general formats: data collected monthly and data collected hourly. Parameters sampled generally include: water level, water temperature, specific conductance, and salinity. In some rare instances water velocity and wind speed/wind direction are sampled at stations where hourly data are collected.

Monthly hydrographic data can be downloaded either by project, CRMS (Coastwide Reference Monitoring System) site, or station number. These files are relatively small, as there are only approximately 12 records per station per year. In general, there is a much larger spatial distribution of stations where monthly data are collected than where hourly data are collected. Note: for CRMS stations, these monthly data comprise Soil Porewater data.

This screen defines a request for Monthly data. The data that matches this request will be returned real-time in a grid view and will provide an option to download a comma delimited file with user provide file name, please see disclaimer below.

Enter Selection Criteria:

☒ Filter by Projects ☐ Filter by CRMS Sites

For a detailed explanation of all data types and collection frequencies, please review the [Data Descriptions](#) document.


(Select either a Project Name or a CRMS Site to get a list of filtered Stations.)

Project:

Stations:

From Date (mm/dd/yyyy):

To Date (mm/dd/yyyy):



Coastal Protection and Restoration Authority

[Log In]

Home Data Download Library Viewer Outreach Help

Monitoring Data

Hydrographic Data

Hydrographic data are now available in two general formats: data collected monthly and data collected hourly. Parameters sampled generally include: water level, water temperature, specific conductance, and salinity. In some rare instances water velocity and wind speed/wind direction are sampled at stations where hourly data are collected.

Hydrographic Monthly Data

[Retrieve Monthly Data](#)

Monthly hydrographic data can be downloaded either by project, CRMS (Coastwide Reference Monitoring System) site, or station number. These files are relatively small, as there are only approximately 12 records per station per year. In general, there is a much larger spatial distribution of stations where monthly data are collected than where hourly data are collected. Note: for CRMS stations, these monthly data comprise Soil Porewater data.

Hydrographic Hourly Data

[Retrieve Hourly Data](#)

Hourly hydrographic data may also be downloaded either by project, CRMS (Coastwide Reference Monitoring System) site, or station number; however these files are much larger than the monthly files. For example, since one year of hourly sampling will yield approximately 8,760 records, a file for a project collecting data at 3 stations for a period of 5 years will contain approximately 131,400 records. Many typical spreadsheet programs will not be able to completely open a file of this size. For this reason, we recommend that hourly data be downloaded by station and not by project. Data are not necessarily available for download from all stations. However, if you would like to request data that are not currently available from the database, an alternate request option is available (see Other Data, below).

Accretion Data

[Retrieve Accretion Data](#)

Accretion data can be downloaded either by project, CRMS (Coastwide Reference Monitoring System) site, or station number. These data are collected from specific locations within herbaceous marsh vegetation areas and forested swamp/bottomland hardwood vegetation areas, and are collected at 6 months and 12 months after monitoring station establishment. Accretion measurements show rates of soil accretion or soil erosion at a location.

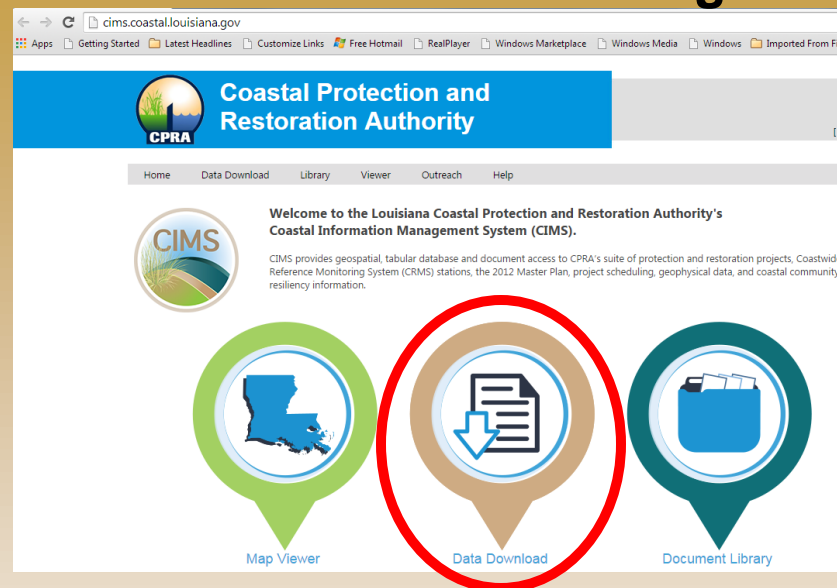


Coastwide Reference Monitoring System – *Wetlands* Database

lacoast.gov/crms



cims.coastal.louisiana.gov



CRMS Data Records:

Continuous Hydro - 28.5 million

Marsh Veg - 225K

Surface Elevation - 165K

Discrete Hydro - 100K

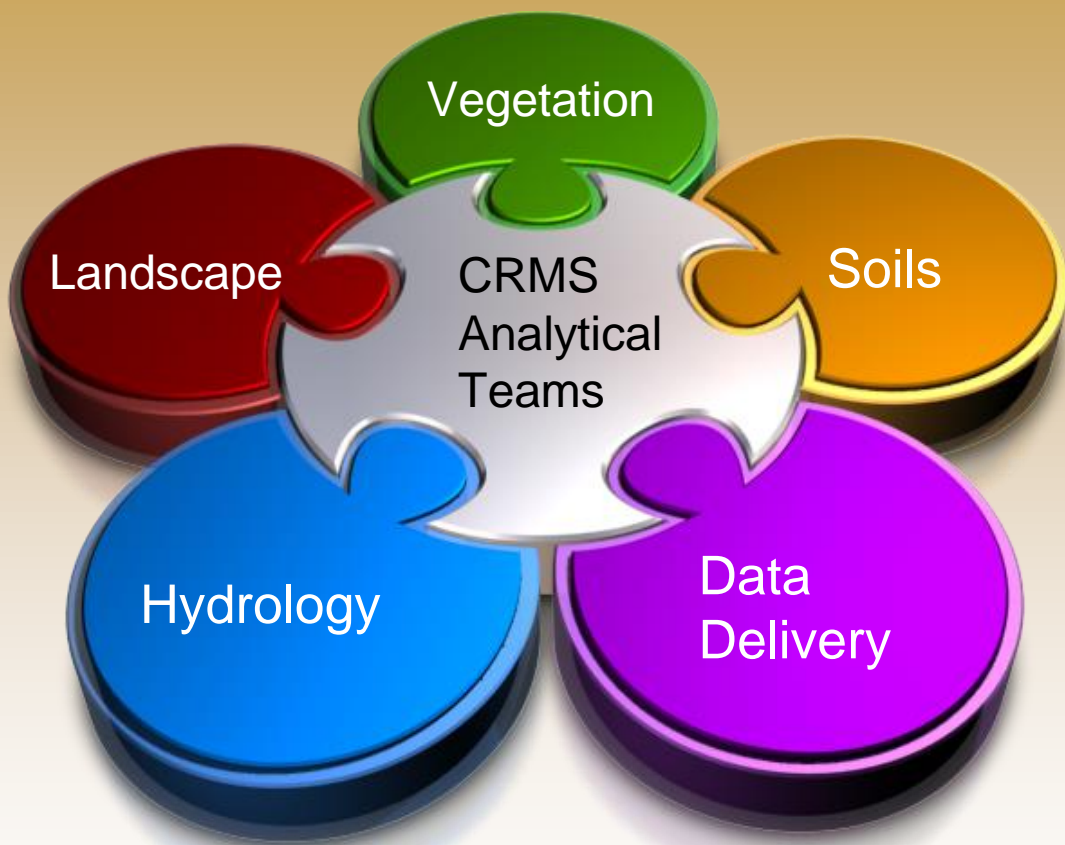
Forested Veg - 40K

Accretion - 26K

Soils - 7K



Coastwide Reference Monitoring System – *Wetlands* Analytical Teams



- Federal and State Scientists
- Academics
- NWRC's Advanced Applications Team
- Oversight by CWPPRA Monitoring Work Group

www.lacoast.gov/crms



Coastwide Reference Monitoring System – Wetlands Analytical Teams

a CWPRA funded project



Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program



Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting the coastal landscape. The effectiveness of the traditional paired-reference monitoring approach in Louisiana has been limited because of difficulty in finding comparable test sites. CRMS is a multiple reference approach that uses aspects of hydrogeomorphic functional assessments and probabilistic sampling.

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www.lacoast.gov/crms

- Web mapping viewer
- Summarize and visualize data at multiple scales
- On-the-fly user defined graphics and tools
- Simple queries and data downloads
- Develop multi-metric ecological indices
- Develop report card
- Continually evolving
- Google Chrome

Vegetation:

- **Floristic Quality Index (FQI)** used to determine wetland quality based on plant species composition.

Hydrology:

- **Hydrologic Index (HI)** assesses the suitability of average salinity and percent time flooded in maximizing vegetation primary productivity.

Soils:

- **Submergence Vulnerability Index (SVI)** assesses the vulnerability of a site to submergence based on its elevation relative to ESLR.



Coastwide Reference Monitoring System (CRMS)

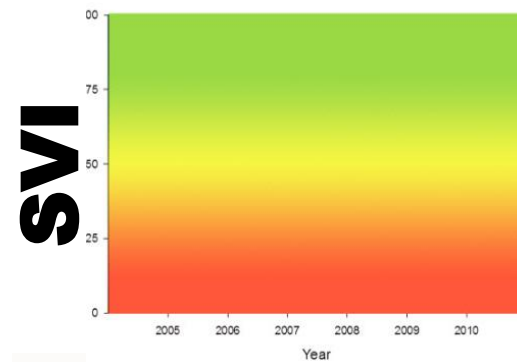
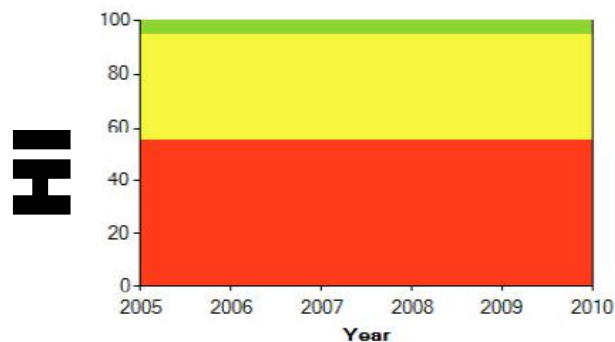
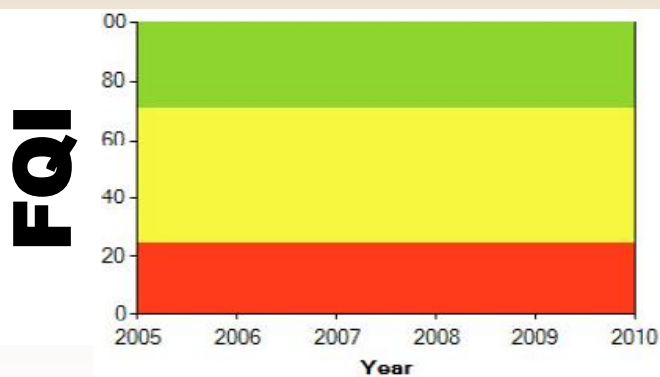
Site Level Report Card

Site: CRMS0672

Year: 2014



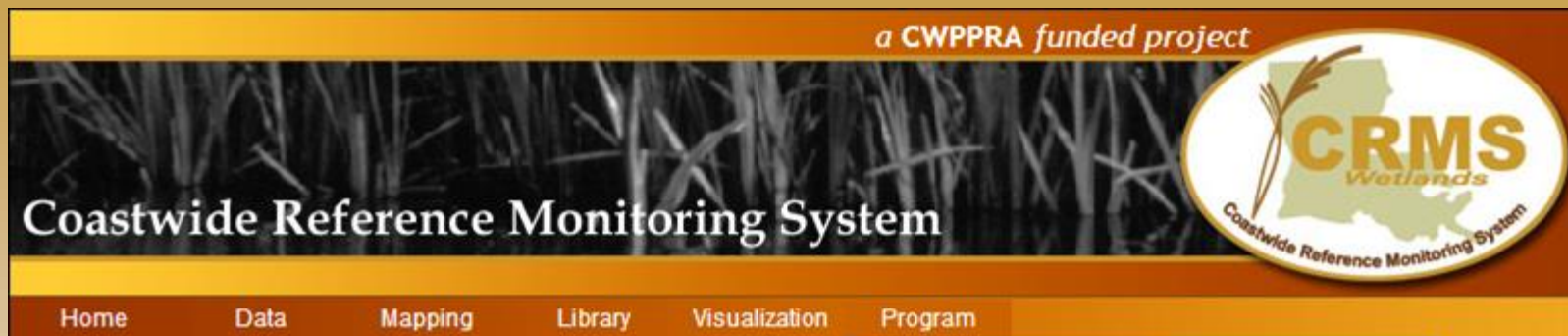
- **Developed using CRMS dataset**
 - **2006-2009**
- **Good (>75%), fair (25-50%), poor (<25%)**
- **Category thresholds vary by index**
- **SVI is a continuous scale without defined thresholds**





Coastwide Reference Monitoring System – *Wetlands*

Website Navigation



- Main menu with a series of submenus
- Most self explanatory
- Will focus on most used features



Coastwide Reference Monitoring System – Wetlands Site Navigation

a CWPRA funded project



Coastwide Reference Monitoring System

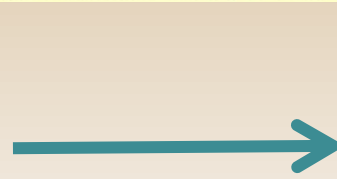
Home Data Mapping Library Visualization Program

**Map****Data****FAQ****Factsheet**

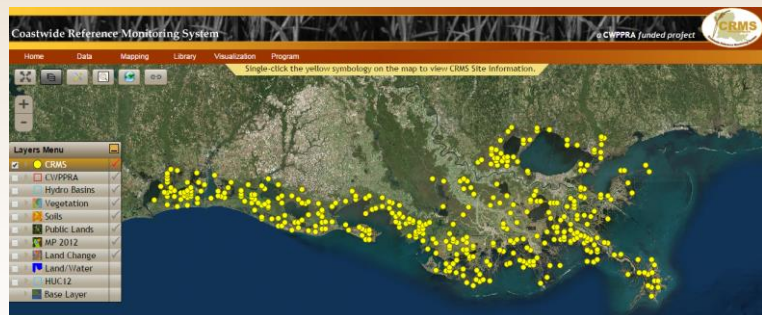
Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting



Data



Charting



Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting **Data Download** Reporting

Data Download

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

- Hydro
- Vegetation
- Soil
- Spatial

Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting Data Download Reporting

- Hydro
- Vegetation
- Soil
- Spatial
- Report Card Charts

Clear Charts



Coastwide Reference Monitoring System – Wetlands Site Navigation

a CWPRA funded project

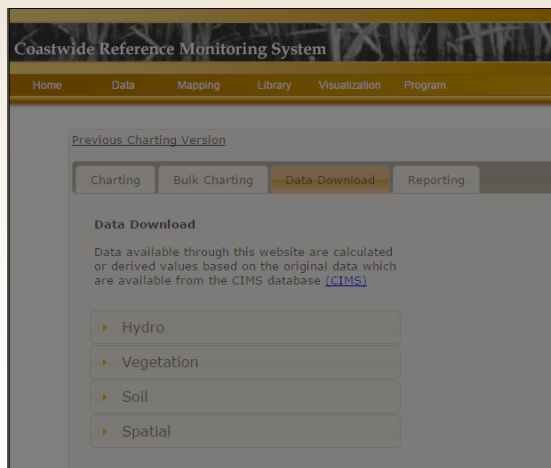
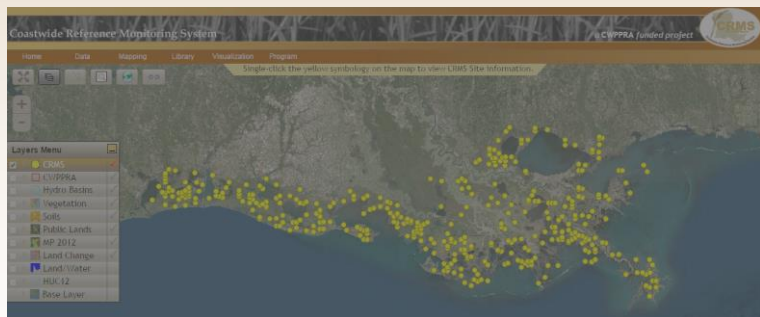
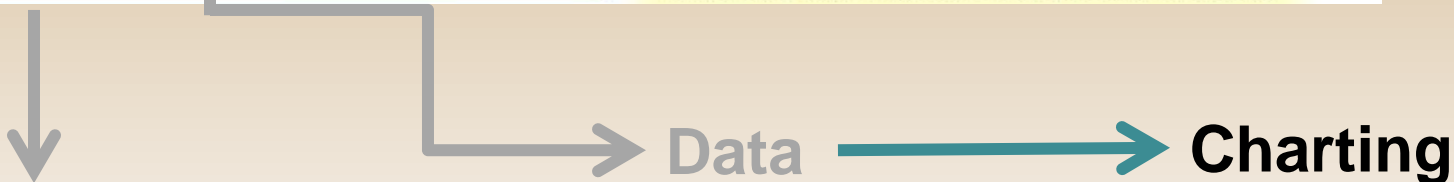


Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

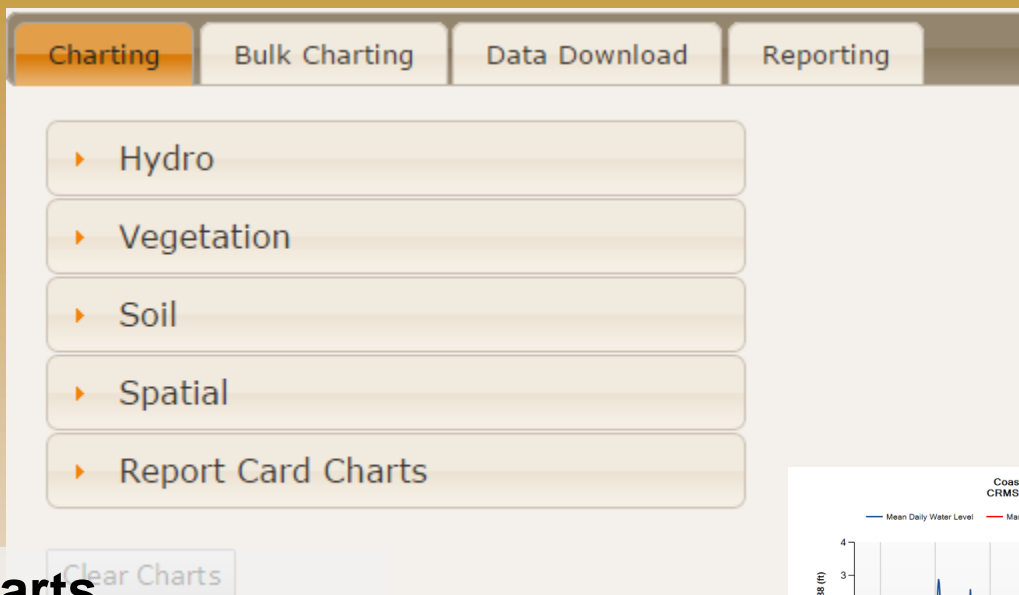
**Map****Data****FAQ****Factsheet**

Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting



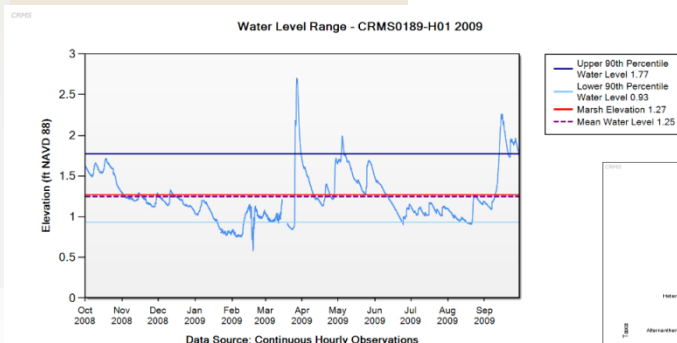
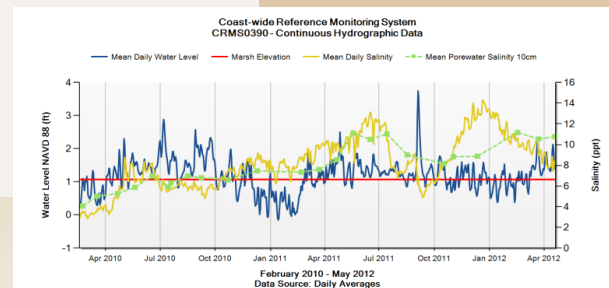


Coastwide Reference Monitoring System – Wetlands Using the Charting Interface

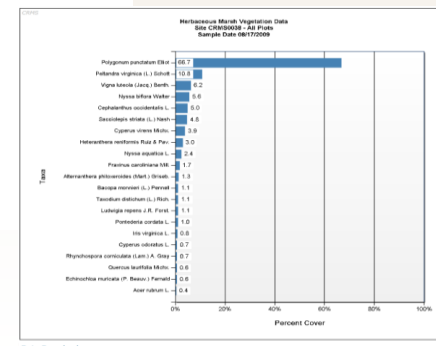


Charts...Lots of Charts

- Surface Elevation/Accretion
- % Organic / Bulk Density
- Vegetation
- Forested
- Porewater
- Hydrographic (Salinity, Temp, Water Level)
- Precipitation
- Report Card



[Data Download](#)



[Data Download](#)



Coastwide Reference Monitoring System – *Wetlands* Using the Charting Interface

1. Pick a Data Category
Hydro
2. Pick a Parameter
Salinity

[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

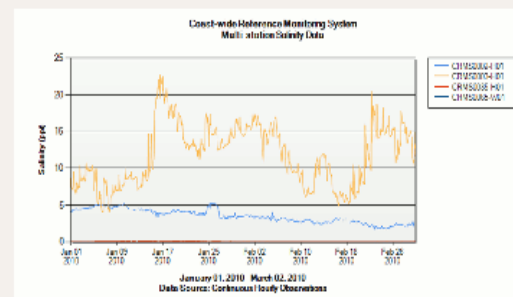
▶ Vegetation

▶ Soil

▶ Spatial

▶ Report Card Charts

Clear Charts





Coastwide Reference Monitoring System – *Wetlands* Using the Charting Interface

1. Pick a Data Category
Hydro
2. Pick a Parameter
Salinity
3. Pick a Scale
Station
4. Enter Start / End Dates
1/1/2001
12/31/2011
Apply Date Filter

[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 - 3/11/2014

Min Date: 01/01/2001

Max Date: 12/31/2011

Apply Date Filter

Dec 2011

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



Coastwide Reference Monitoring System – *Wetlands* Using the Charting Interface

1. Pick a Data Category
Hydro
2. Pick a Parameter
Salinity
3. Pick a Scale
Station
4. Enter Start / End Dates
1/1/2001
12/31/2011
Apply Date Filter
5. Pick Station
Submit Request

[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 - 3/11/2014

Min Date: 01/01/2001

Max Date: 12/31/2011

Apply Date Filter

☐ Mean annual salinity

☐ Mean growing season salinity

CRMS0153-H01

CRMS0154-H01

CRMS0156-H01

CRMS0157-H01

CRMS0159-H01

CRMS0161-H01

CRMS0162-H01

CRMS0163-H01

CRMS0164-H01

CRMS0171-H01

☐ Include major weather\storm events

[Show Map Selector](#)

Submit Request



Coastwide Reference Monitoring System – *Wetlands* Using the Charting Interface

1. Pick a Data Category
Hydro
2. Pick a Parameter
Salinity
3. Pick a Scale
Station
4. Enter Start / End Dates
1/1/2001
12/31/2011
Apply Date Filter
5. Pick Station
Submit Request

[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 - 3/11/2014

Min Date: 01/01/2001

Max Date: 12/31/2011

Apply Date Filter ⓘ

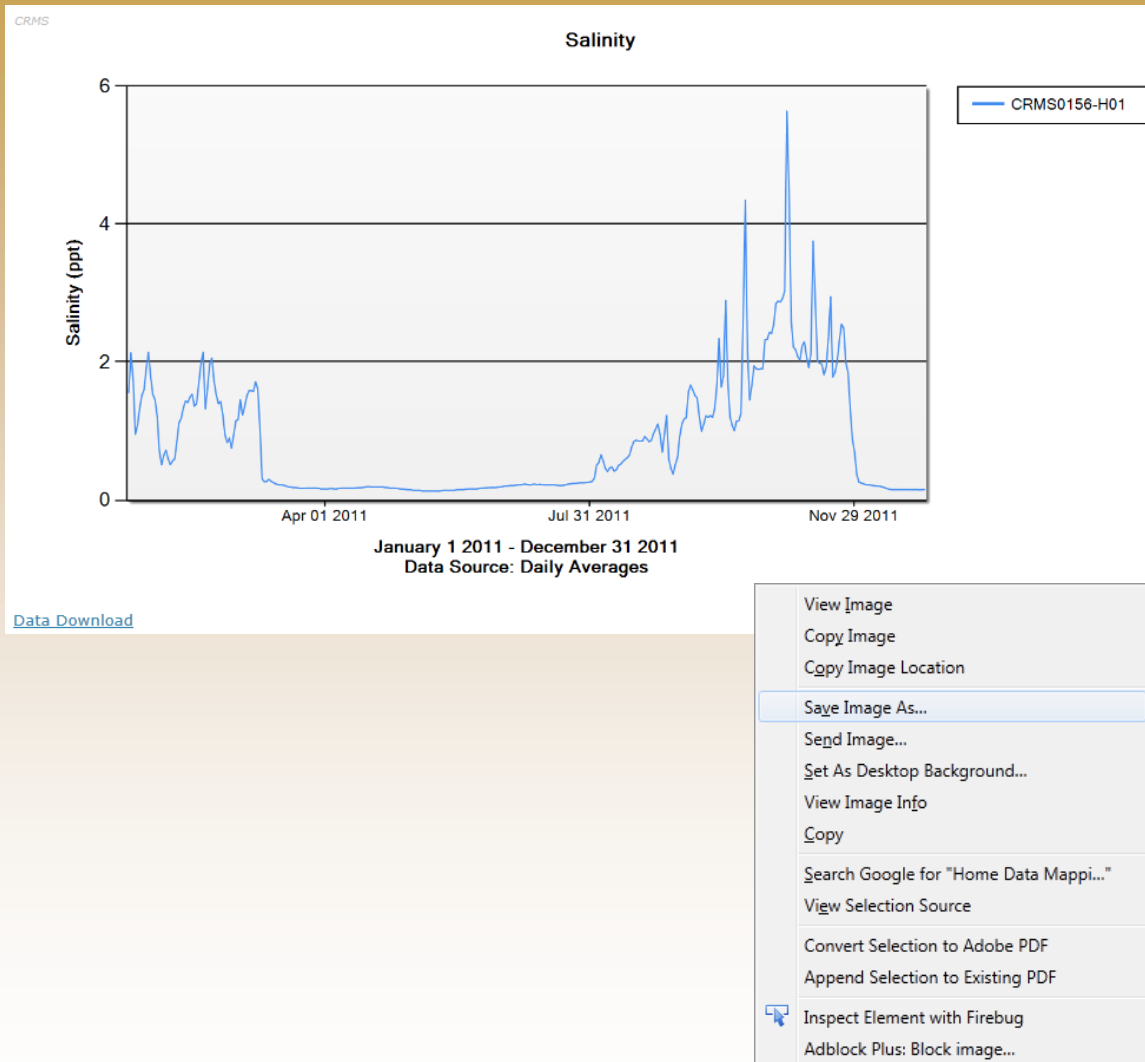
☐ Mean annual salinity
☐ Mean growing season salinity

CRMS0154-H01
CRMS0156-H01
CRMS0157-H01
CRMS0159-H01
CRMS0161-H01
CRMS0162-H01
CRMS0163-H01
CRMS0164-H01
CRMS0171-H01
CRMS0172-H01

☐ Include major weather\storm events
[Show Map Selector](#)
Submit Request

A line chart titled "Salinity" showing data for station CRMS0156-H01. The y-axis is labeled "Salinity (ppt)" and ranges from 0 to 5. The x-axis shows dates from June 28, 2007, to December 28, 2011, with labels for June 28, 2007, June 28, 2008, June 28, 2009, June 28, 2010, June 28, 2011, and December 28, 2011. The chart displays a fluctuating line representing salinity levels over time. A red oval is drawn around the chart area.

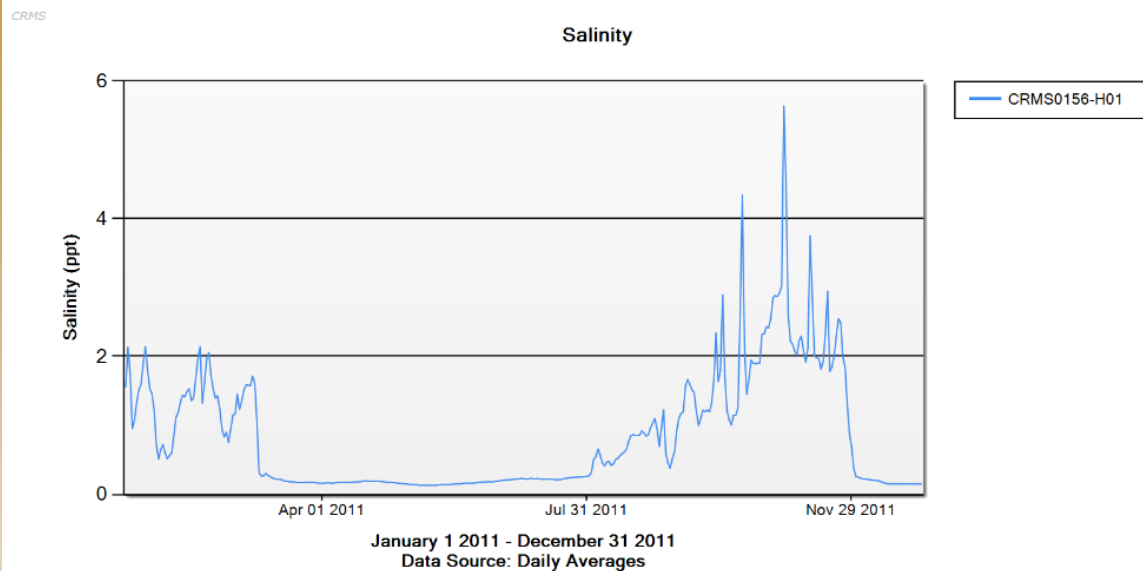
1. Pick a Data Category
 1. Hydro
2. Pick a Parameter
 1. Salinity
3. Pick a Scale
 1. Site
4. Enter Start / End Dates
 1. 1/1/2001
 2. 12/31/2011
 3. Apply Date Filter
5. Pick Site
6. View Chart
7. Save Chart Image





Coastwide Reference Monitoring System – *Wetlands* Using the Charting Interface

1. Pick a Data Category
Hydro
2. Pick a Parameter
Salinity
3. Pick a Scale
Station
4. Enter Start / End Dates
1/1/2001
12/31/2011
Apply Date Filter
5. Pick Station
6. Save Chart Image
7. View Chart
8. Download Data (optional)



[Data Download](#)

MultiStationChart_Salinity_201271013184495.csv-0.csv - Microsoft Excel

	A1		Station_ID		
	A	B	C	D	E
	Station_ID	MonDate	Salinity	Water_Level	Water_Temperature
1	CRMS0156-H01	1/1/2011 0:00	1.560417	1.8325	9.65125
2	CRMS0156-H01	1/2/2011 0:00	2.130833	1.62625	12.42083
3	CRMS0156-H01	1/3/2011 0:00	1.746667	1.434167	8.210417
4	CRMS0156-H01	1/4/2011 0:00	0.95375	1.350417	7.404583
5	CRMS0156-H01	1/5/2011 0:00	1.085833	1.344167	7.54125
6	CRMS0156-H01	1/6/2011 0:00	1.333333	1.408333	7.622083
7	CRMS0156-H01	1/7/2011 0:00	1.514583	1.237083	7.506667
8	CRMS0156-H01	1/8/2011 0:00	1.60125	1.127917	7.66375
9	CRMS0156-H01	1/9/2011 0:00	1.908333	1.9775	8.087916
10	CRMS0156-H01	1/10/2011 0:00	2.137083	1.900417	11.25458
11	CRMS0156-H01	1/11/2011 0:00	1.789583	1.528333	8.947917
12	CRMS0156-H01	1/12/2011 0:00	1.529583	1.18125	6.955
13	CRMS0156-H01	1/13/2011 0:00	1.455417	1.05125	6.779583
14	CRMS0156-H01	1/14/2011 0:00	1.21125	0.9725	6.984583
15	CRMS0156-H01	1/15/2011 0:00	0.7083333	1.16	6.829583



Multi-Station Charting- Plots data from multiple stations on the same chart

Pick a Data Category
Hydro

Pick a Parameter
Water Level

Pick a Scale
Multi Station

Enter Start / End Dates
1/1/2001
12/31/2011

Apply Date Filter

Pick Stations

[Previous Charting Version](#)

Charting Bulk Charting Data Download Reporting

Water Year is October 1 - September 30

Scale: Multi Station

Date Range:
2/25/1987 - 3/11/2014

Min Date: 01/01/2001

Max Date: 12/31/2005

Apply Date Filter

Basin: Calcasieu/Sabir Project: All Projects

Selection limited to 10 items

CS20	
CS20-106	CS20-03
CS20-14R	CS20-07
CS20-15R	CS20-09
	CS20-17

Options Selections

☐ Include major weather\storm events

[Show Map Selector](#)

Submit Request

Clear Charts

Hydro

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

Vegetation

Soil

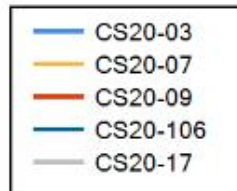
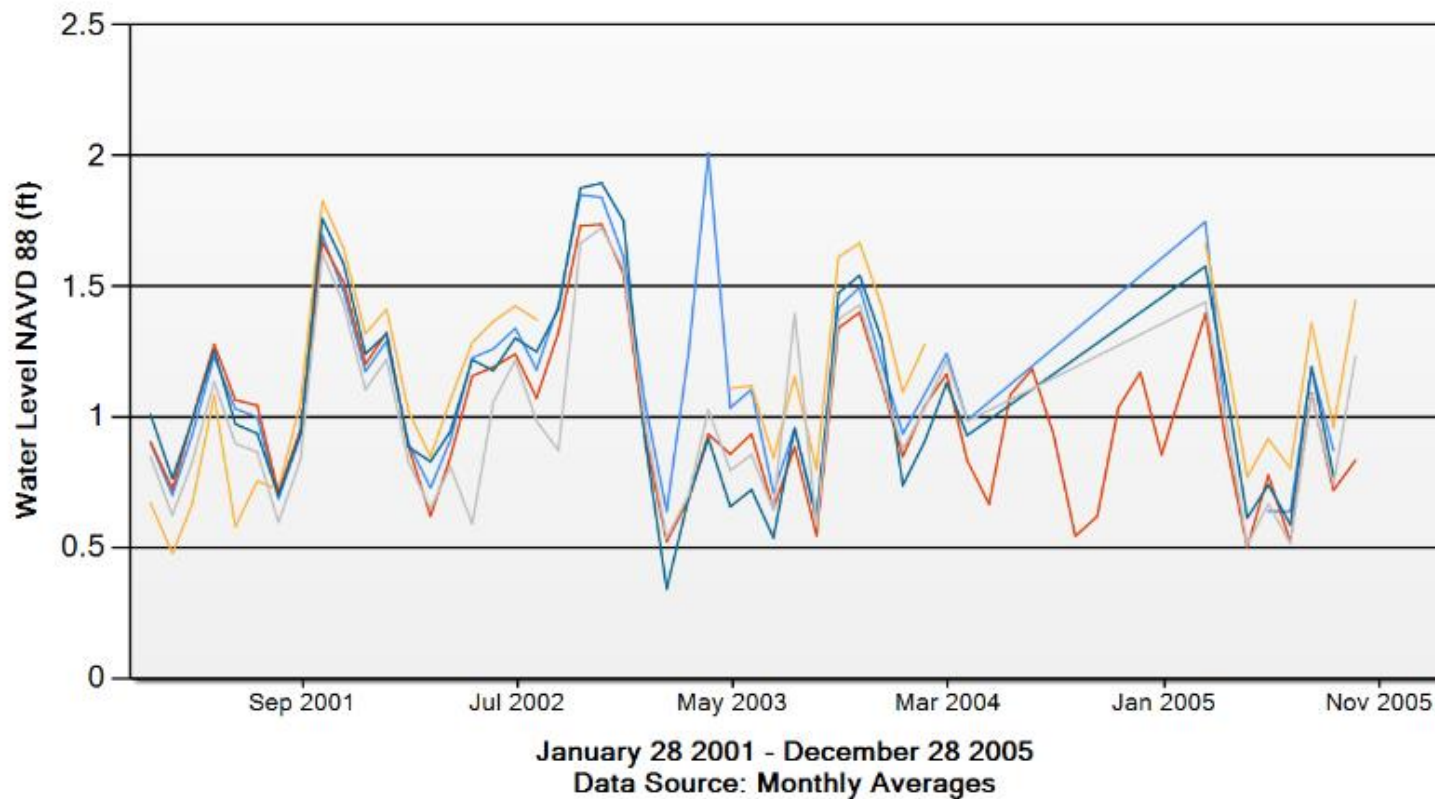
Spatial

Report Card Charts

Multi-Station Water Level Chart

CRMS

Water Level



- View Image
- Copy Image
- Copy Image Location
- Save Image As...
- Send Image...
- Set As Desktop Background...
- View Image Info
- Copy
- Search Google for "Home Data Ma
- View Selection Source
- Convert Selection to Adobe PDF
- Append Selection to Existing PDF
- Inspect Element with Firebug
- AdBlock Plus: Block image...

[Data Download](#)



Coastwide Reference Monitoring System – *Wetlands* Pairing the Charting Interface with the Map Selector

“Map Selector” allows chart stations to be picked in a mapping interface.

Great if you have an area of interest, but don’t know the station IDs.

The screenshot shows the "Charting" tab of the CRMS interface. On the left, a sidebar lists categories: Hydro (selected), Vegetation, Soil, Spatial, and Report Card Charts. Under "Hydro", "Salinity" is highlighted. Below the sidebar is a "Clear Charts" button. The main content area has a header "Water Year is October 1 - September 30". Below this is a "Scale" dropdown set to "Multi Station". The "Date Range" is "2/25/1987 - 3/11/2014", with "Min Date" and "Max Date" fields. An "Apply Date Filter" button is present. Below the date fields are "Basin" and "Project" dropdowns, both set to "All". A message "Selection limited to 10 items" is above a list of station IDs: AT04-01, AT04-02, AT04-03, AT04-04, AT04-06, BA01-01, BA01-02, BA01-03, and BA01-04. At the bottom right, there is a checkbox for "Include major weather\storm events" and a link "Show Map Selector" which is circled in red. A "Submit Request" button is at the very bottom.

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 - 3/11/2014

Min Date: 2/25/1987

Max Date: 3/11/2014

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

☐ Include major weather\storm events

[Show Map Selector](#)

Submit Request



Coastwide Reference Monitoring System – *Wetlands* Pairing the Charting Interface with the Map Selector

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



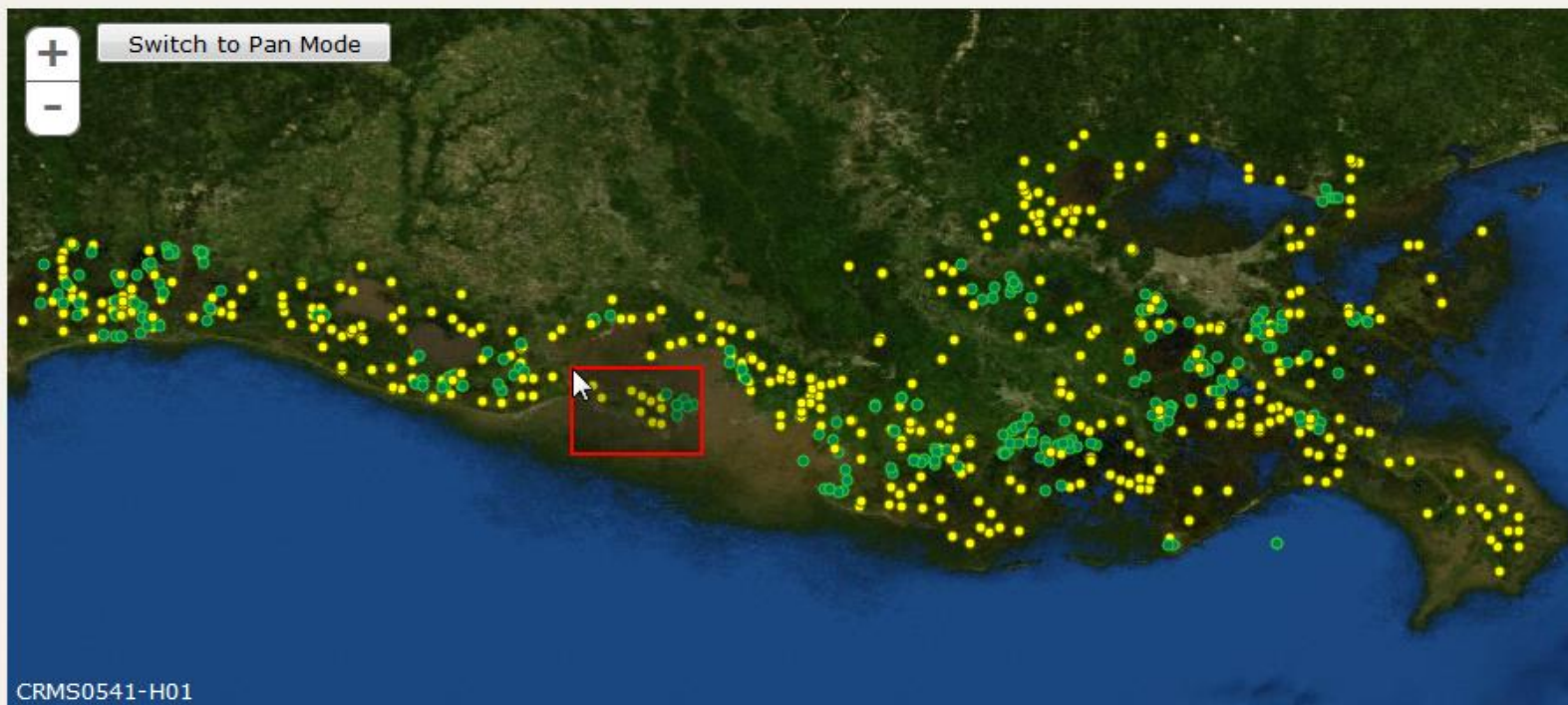


Coastwide Reference Monitoring System – *Wetlands*

Pairing the Charting Interface with the Map Selector

[Previous Charting Version](#)

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



● CRMS Stations

● CWPPRA Stations

Clear Selected

Submit

BA01-02

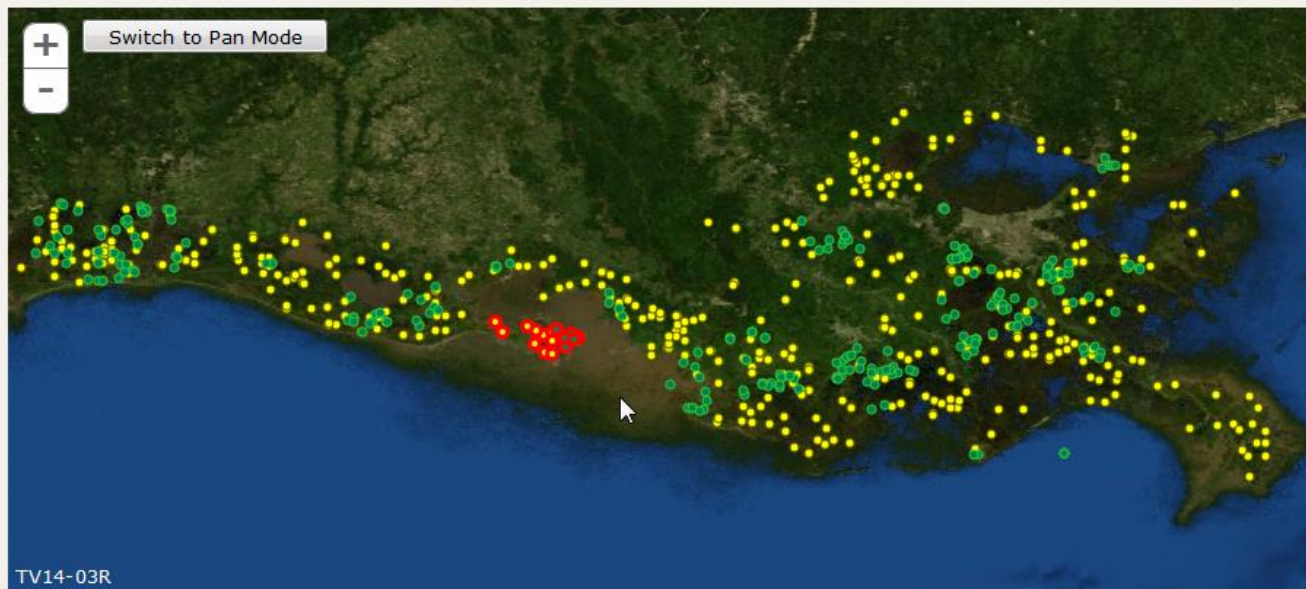
BA01-03

☐ Include major weather\storm events



Coastwide Reference Monitoring System – *Wetlands* Pairing the Charting Interface with the Map Selector

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





Coastwide Reference Monitoring System – *Wetlands*

Pairing the Charting Interface with the Map Selector

The sites/stations that were selected on the map appear in the right side of the selection box.

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

Hydrologic Index for 2012 Salt Marsh

A color-coded chart showing the hydrologic index for 2012 salt marsh. The chart displays a gradient from blue (low index) to red (high index). A legend on the right indicates the index values for different stations: AT04-01 (100), AT04-02 (100), AT04-03 (100), AT04-04 (100), AT04-06 (100), BA01-01 (100), BA01-02 (100), BA01-03 (100), BA01-04 (100).

Coastwide Reference Monitoring System – *Wetlands* Pairing the Charting Interface with the Map Selector

Filter the list by a Basin!!

[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



Coastwide Reference Monitoring System – *Wetlands*

Pairing the Charting Interface with the Map Selector


[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



Coastwide Reference Monitoring System – *Wetlands* Using the Interactive Hydro Charting Interface

Interactive Hydro Chart

Great for hydro **data exploration** without having to download data.

[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 - 3/11/2014

Min Date: 01/01/2001

Max Date: 12/31/2005

Apply Date Filter ⓘ

Basin: Calcasieu/Sabir ▼ Project: All Projects ▼

Selection limited to 10 items

CS20	
CS20-106	CS20-03
CS20-14R	CS20-07
CS20-15R	CS20-09
	CS20-17

☐ Include major weather\storm events

[Show Map Selector](#)

Submit Request



Coastwide Reference Monitoring System – *Wetlands* Using the Interactive Hydro Charting Interface

Stations

Parameters

Colors

Frequency Type

A screenshot of the CRMS Interactive Hydro Charting Interface. The interface has a header with the CRMS logo and the text "a CWPPRA funded project". Below the header is a navigation bar with links: Home, Data, Mapping, Library, Visualization, and Program. The main content area contains several dropdown menus for selecting data: "Stations" (CRMS0489-H01, CRMS0489-H01, None), "Parameters" (Water Level, Marsh Elevation, Water Temperature), and "Colors" (Blue, Red, Orange). There is a "Submit" button. To the right, there is a "Download type:" dropdown set to "Hourly" and a "Download csv" button.

Coastwide Reference Monitoring System a CWPPRA funded project

Home Data Mapping Library Visualization Program

CRMS0489-H01 CRMS0489-H01 None

Water Level Marsh Elevation Water Temperature

Blue Red Orange

Submit

Download type: Hourly

Download csv



**Charted time
extent.**

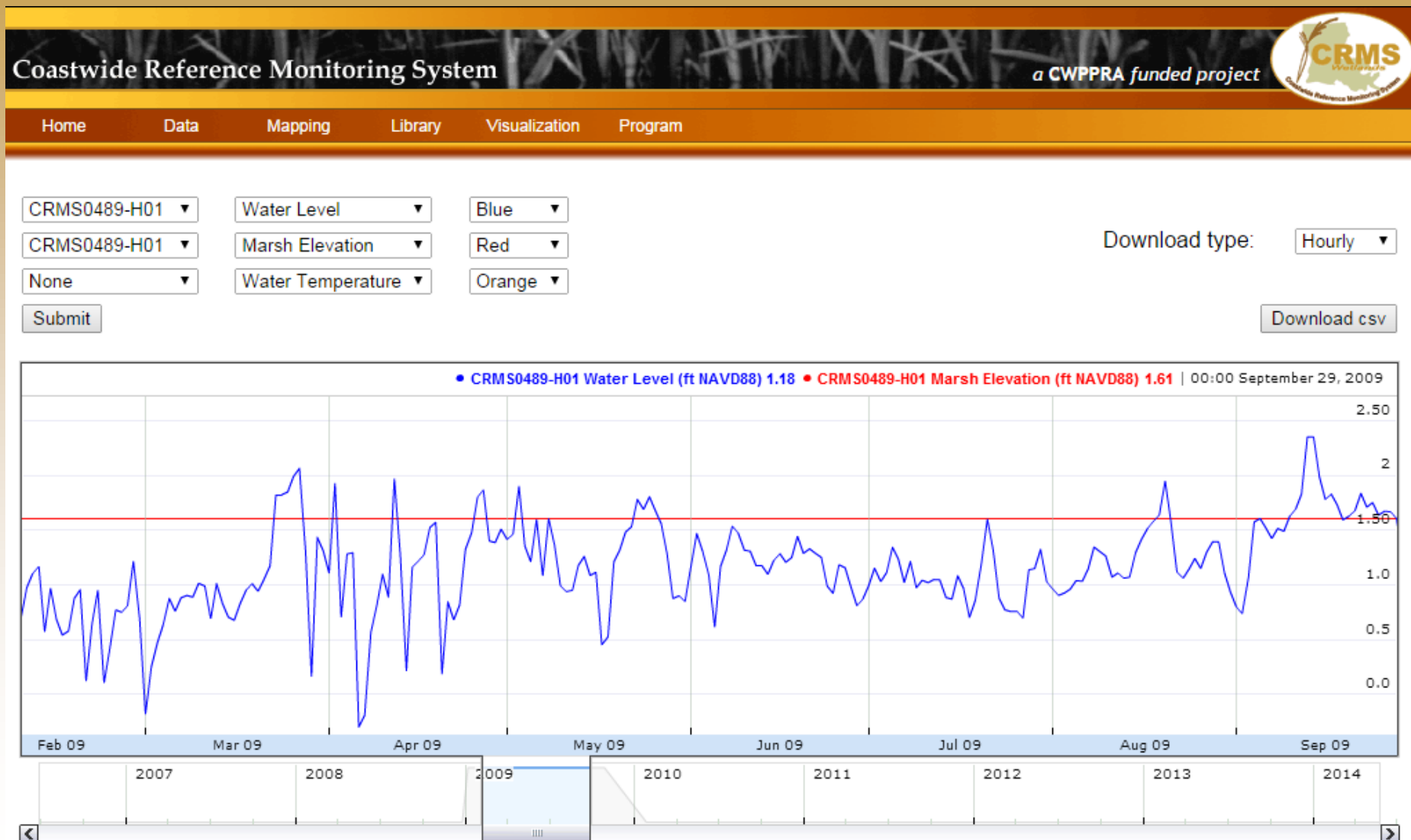
Data availability time extent:

- Window can slide along time line
- Changing window size controls temporal accuracy of chart



Coastwide Reference Monitoring System – Wetlands Using the Interactive Hydro Charting Interface

Same site with multiple parameters





Coastwide Reference Monitoring System – Wetlands Using the Interactive Hydro Charting Interface

Multiple sites with the same parameter

Coastwide Reference Monitoring System

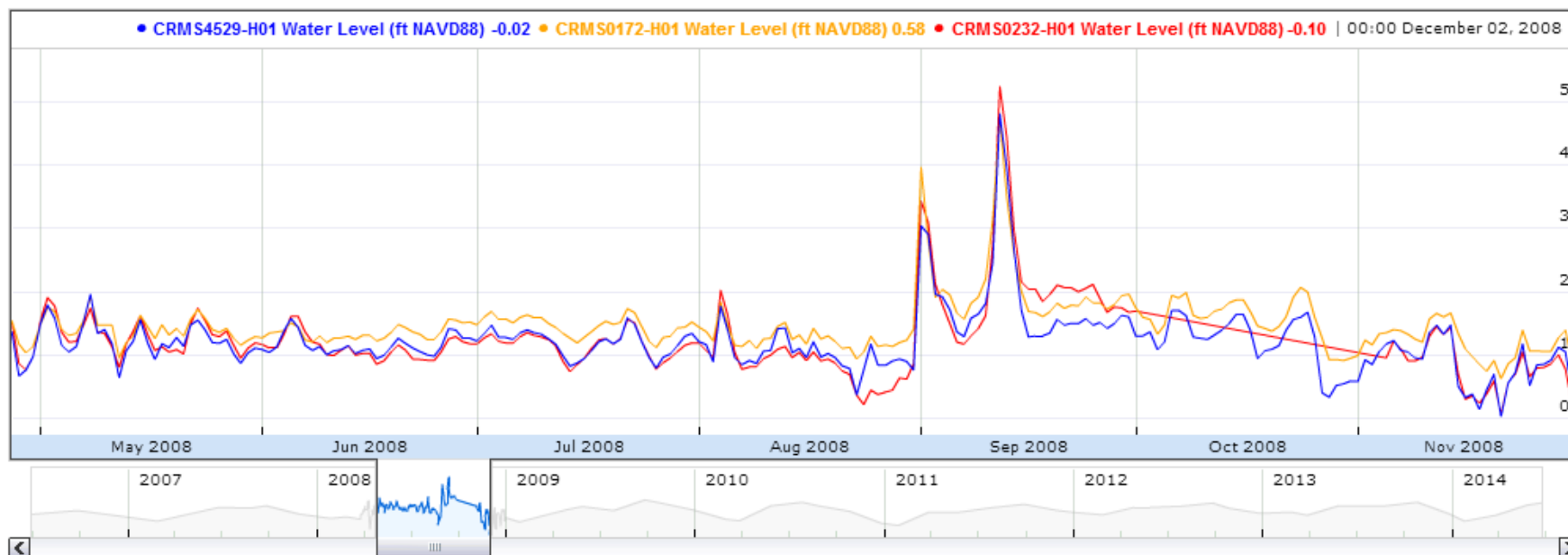
a CWPPRA funded project



Home Data Mapping Library Visualization Program

CRMS0232-H01 ▼	Water Level ▼	Red ▼
CRMS4529-H01 ▼	Water Level ▼	Blue ▼
CRMS0172-H01 ▼	Water Level ▼	Orange ▼
<input type="button" value="Submit"/>		

Download type:

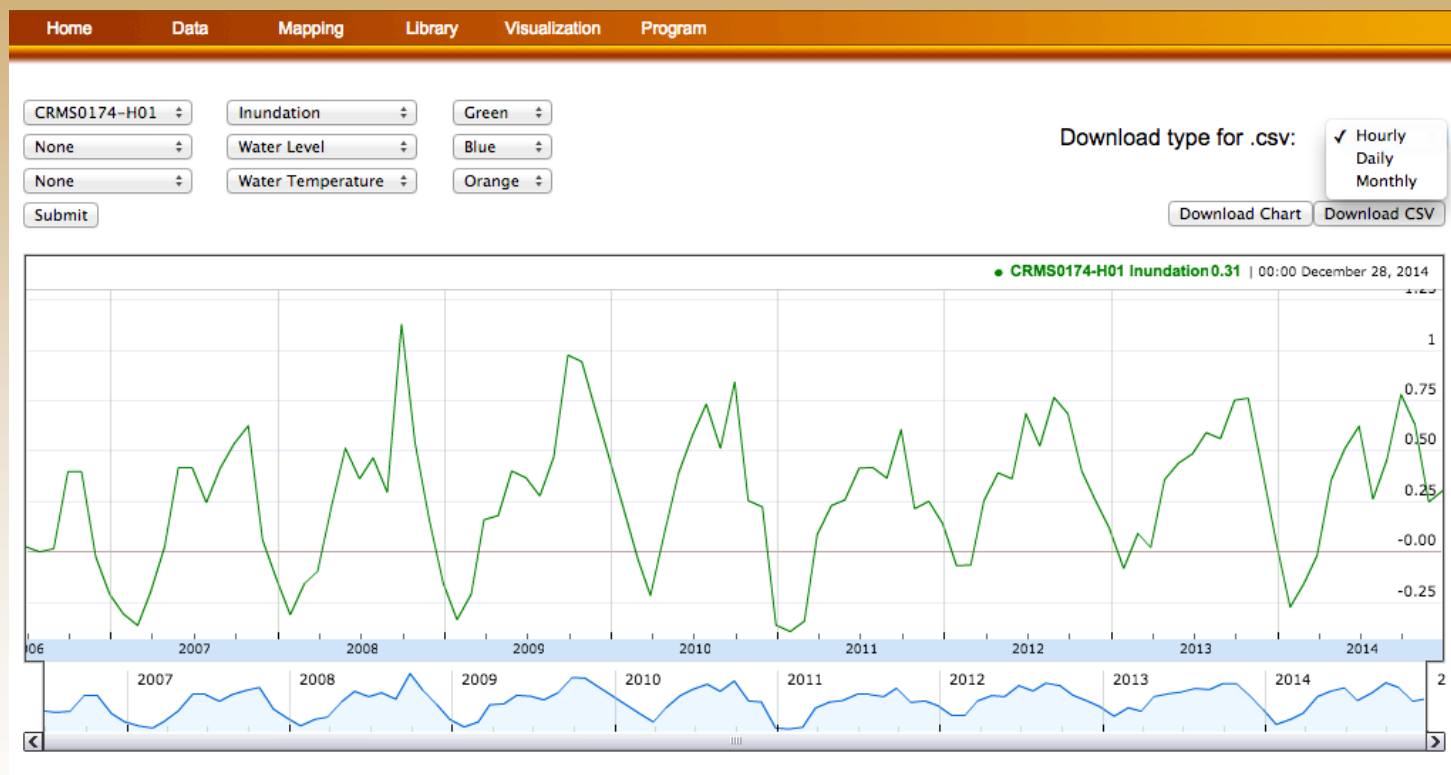




Coastwide Reference Monitoring System – *Wetlands* Using the Interactive Hydro Charting Interface

Downloading

- Set time frequency of data (i.e., hourly, daily, monthly)
- Data in CSV format

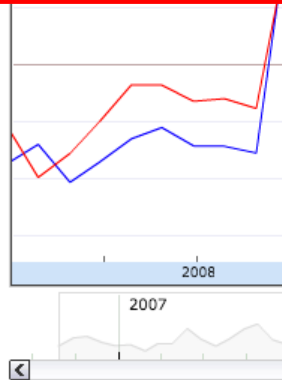




Coastwide Reference Monitoring System – Wetlands Using the Interactive Hydro Charting Interface

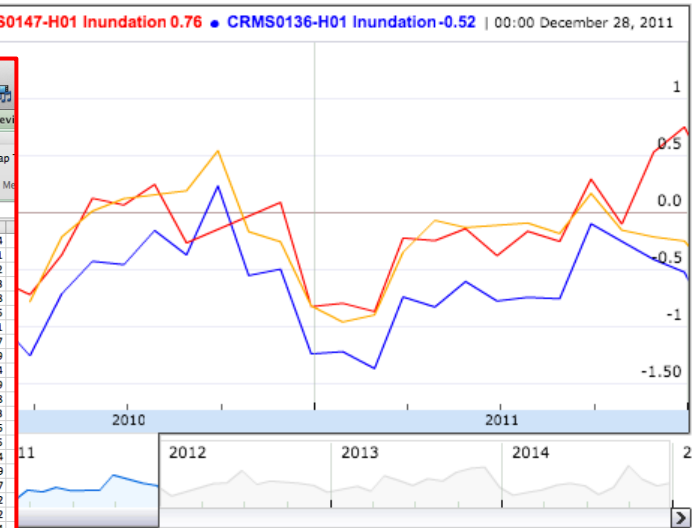
Downloaded CSV

Date	Station One	Station One Type	Station One Value
6/8/06 11:00	CRMS0174-H01	Inundation	0.27
6/8/06 12:00	CRMS0174-H01	Inundation	0.12
6/8/06 13:00	CRMS0174-H01	Inundation	-0.05
6/8/06 14:00	CRMS0174-H01	Inundation	-0.22
6/8/06 15:00	CRMS0174-H01	Inundation	-0.39
6/8/06 16:00	CRMS0174-H01	Inundation	-0.5
6/8/06 17:00	CRMS0174-H01	Inundation	-0.63
6/8/06 18:00	CRMS0174-H01	Inundation	-0.66
6/8/06 19:00	CRMS0174-H01	Inundation	-0.69
6/8/06 20:00	CRMS0174-H01	Inundation	-0.68
6/8/06 21:00	CRMS0174-H01	Inundation	-0.58
6/8/06 22:00	CRMS0174-H01	Inundation	-0.45
6/8/06 23:00	CRMS0174-H01	Inundation	-0.27
6/9/06 0:00	CRMS0174-H01	Inundation	-0.13
6/9/06 1:00	CRMS0174-H01	Inundation	0.05
6/9/06 2:00	CRMS0174-H01	Inundation	0.19
6/9/06 3:00	CRMS0174-H01	Inundation	0.33
6/9/06 4:00	CRMS0174-H01	Inundation	0.46
6/9/06 5:00	CRMS0174-H01	Inundation	0.55



2007

Date	Station One	Station One Type	Station One Value
12/17/14 13:00	CRMS0174-H01	Inundation	0.24
12/17/14 14:00	CRMS0174-H01	Inundation	0.41
12/17/14 15:00	CRMS0174-H01	Inundation	0.52
12/17/14 16:00	CRMS0174-H01	Inundation	0.63
12/17/14 17:00	CRMS0174-H01	Inundation	0.68
12/17/14 18:00	CRMS0174-H01	Inundation	0.75
12/17/14 19:00	CRMS0174-H01	Inundation	0.81
12/17/14 20:00	CRMS0174-H01	Inundation	0.87
12/17/14 21:00	CRMS0174-H01	Inundation	0.89
12/17/14 22:00	CRMS0174-H01	Inundation	0.84
12/17/14 23:00	CRMS0174-H01	Inundation	0.69
12/18/14 0:00	CRMS0174-H01	Inundation	0.48
12/18/14 1:00	CRMS0174-H01	Inundation	0.33
12/18/14 2:00	CRMS0174-H01	Inundation	0.16
12/18/14 3:00	CRMS0174-H01	Inundation	0.05
12/18/14 4:00	CRMS0174-H01	Inundation	-0.04
12/18/14 5:00	CRMS0174-H01	Inundation	-0.09
12/18/14 6:00	CRMS0174-H01	Inundation	-0.17
12/18/14 7:00	CRMS0174-H01	Inundation	-0.22
12/18/14 8:00	CRMS0174-H01	Inundation	-0.2
12/18/14 9:00	CRMS0174-H01	Inundation	-0.14
12/18/14 10:00	CRMS0174-H01	Inundation	-0.08
12/18/14 11:00	CRMS0174-H01	Inundation	0.05
12/18/14 12:00	CRMS0174-H01	Inundation	0.18





Creates multiple charts with the same parameter input

Great for creating figures for reports that all need to be uniformly designed.

Charting

Bulk Charting

Data Download

Reporting

Bulk Charting

▼ Hydro

Water Level Range

Hydro Completeness

Salinity

Water Level

Temperature

Continuous

Site Hydro Index

Soil Porewater

Precipitation

► Vegetation

► Soil

► Spatial

► Report Card Charts

Water Year is October 1 - September 30

Scale: Station ▼

Date Range:
2/25/1987 - 3/11/2014

Min Date: 01/01/2001

Max Date: 12/31/2005

Apply Date Filter

Basin: All Basins ▼ Project: CS-20 ▼

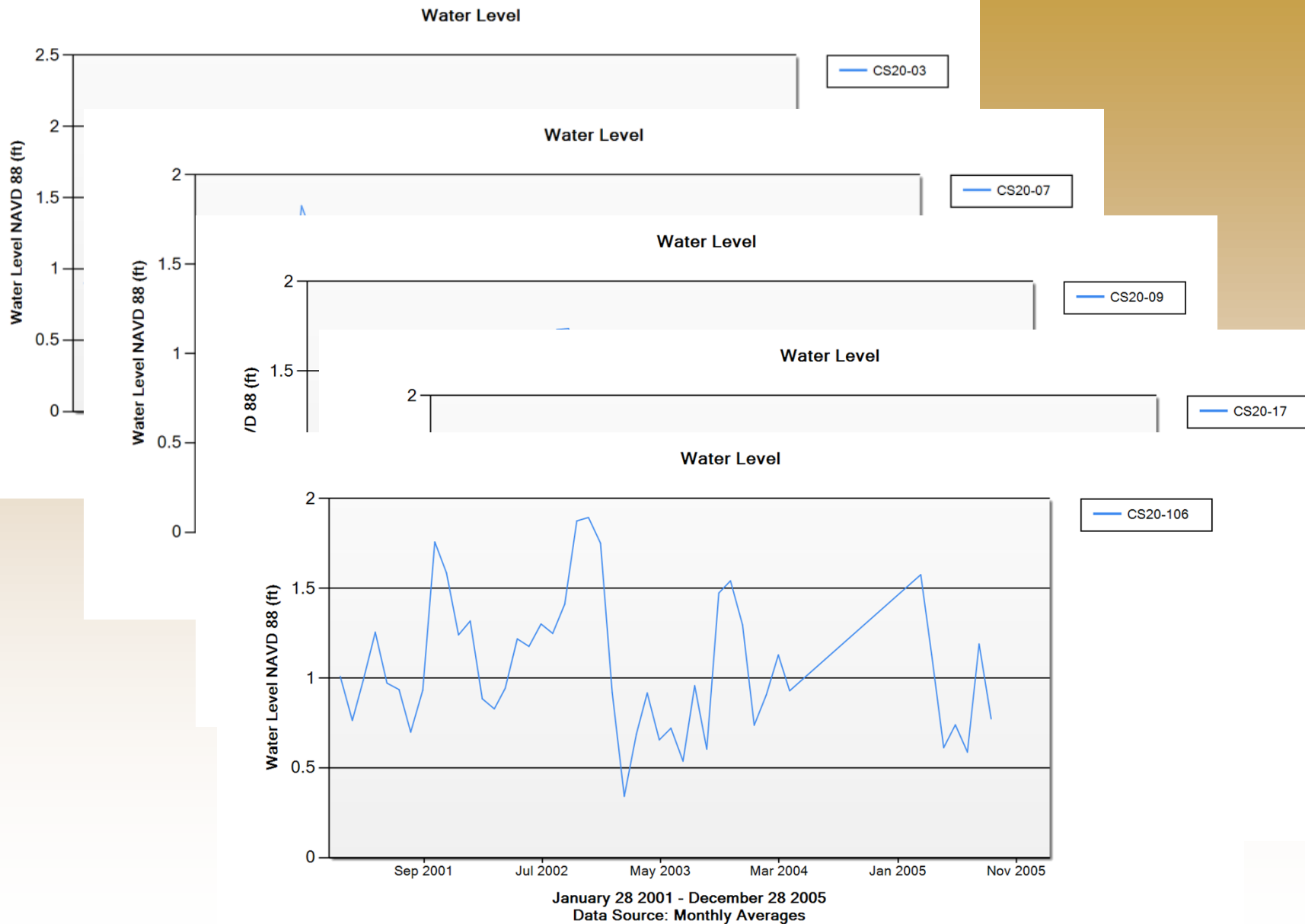
Select All	Deselect All
CS20-14R	CS20-03
CS20-15R	CS20-07
	CS20-09
	CS20-106
	CS20-17

Show Map Selector

Submit Request



Coastwide Reference Monitoring System – *Wetlands* Bulk Charting





Coastwide Reference Monitoring System – Wetlands Bulk Charting

Charting

Bulk Charting

Data Download

Reporting

Bulk Charting

▶ Hydro

▼ Vegetation

Forested

Herbaceous

Site Floristic Quality Index

Project/Reference FQI

Marsh Class

▶ Soil

▶ Spatial

▶ Report Card Charts

Basin: All Basins ▼ Project: All Projects ▼

Select All	Deselect All
CRMS0002	CRMS0647
CRMS0003	CRMS0655
CRMS0006	CRMS0672
CRMS0008	
CRMS0030	
CRMS0033	
CRMS0034	
CRMS0035	
CRMS0038	

Choose Colors

Cancel

■

 Spartina patens

■

 Typha latifolia

■

 Phragmites australis

■

 Distichlis spicata

■

 Schoenoplectus robustus

■

 Paspalum vaginatum

■

 Amaranthus bigelovii

■

 Paspalum distichum

■

 Symphyotrichum subulatum

■

 Other

Show Map Selector

jquibodeaux@usgs.gov

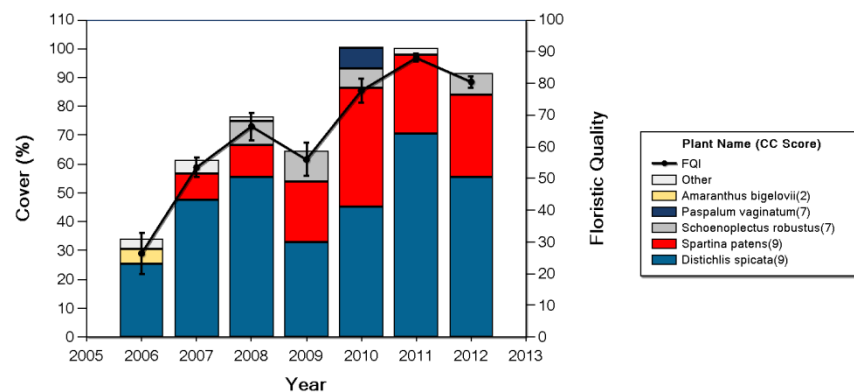
Submit Request

Site Floristic Quality Index:

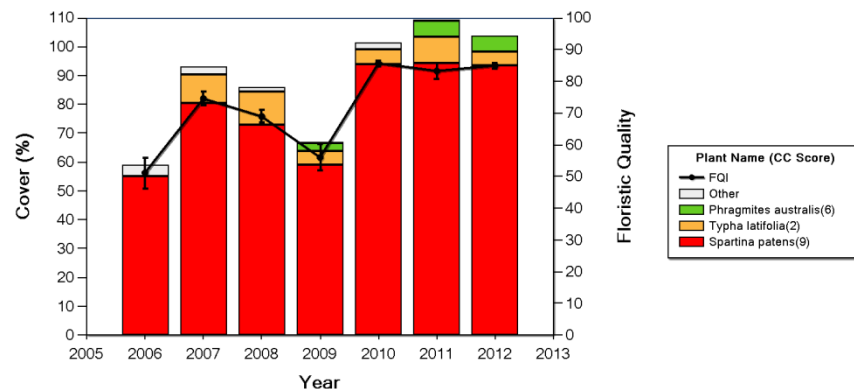
User can define color ramp for species of interest in all charts generated by one request.

Great for looking at species presence/absence or tracking invasive species

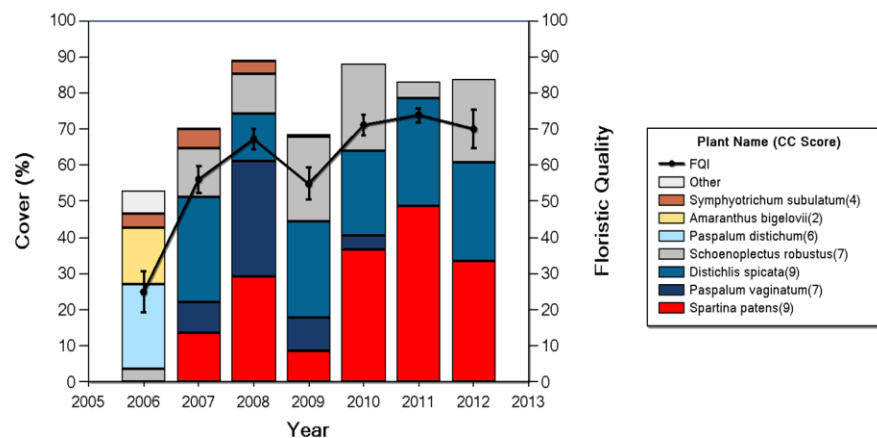
Floristic Quality Index for Saline Marsh, Site CRMS0655



Floristic Quality Index for Intermediate Marsh, Site CRMS0647



Floristic Quality Index for Brackish Marsh, Site CRMS0672



Ex: All *Spartina patens* are red as defined by user.



Coastwide Reference Monitoring System – Wetlands Site Navigation

a CWPRA funded project



Coastwide Reference Monitoring System

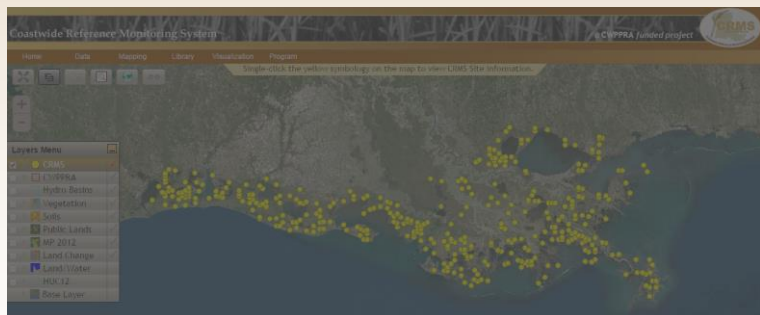
Home Data Mapping Library Visualization Program

**Map****Data****FAQ****Factsheet**

Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting

➔ **Data**

Charting



Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting **Data Download** Reporting

Data Download

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

- Hydro
- Vegetation
- Soil
- Spatial

Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting Data Download Reporting

- Hydro
- Vegetation
- Soil
- Spatial
- Report Card Charts

Clear Charts



Coastwide Reference Monitoring System – *Wetlands*

Bulk Data Download

- **CRMS bulk data download**
All values for selected years, for
selected stations
(queue processes first come first serve)

▼ Hydro

Hydro Averages
Hydro Index
Percent Flooded
Water Level Range

▼ Vegetation

Basal Area
Floristic Quality Index
Marsh Class
Veg Percent Cover

▼ Soil

Calculated Elevation Change
Submergence Vulnerability Index
Surface Elevation/Accretion

▼ Spatial

Percent Land
1km Land/Water Difference

Same interface for data selection as charting

Charting

Bulk Charting

Data Download

Reporting

Data Download

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

▼ Hydro

Hydro Averages

Hydro Index

Percent Flooded

Water Level Range

▶ Vegetation

▶ Soil

▶ Spatial

Water Year is October 1 - September 30

Yearly

Calendar Year

Year:

Select All	Deselect All
1992	1994
1993	1995
1997	1996
1998	
1999	
2000	
2001	
2002	
2003	

Submit

Basin: All Basins

Project: All Projects

Select All	Deselect All
BA04-07	BA04-10
BA04-20	BA04-17
BA04-55	
BA04-56	
BA20-08	
BA20-11	
BA20-20	
BA20-90R	
BA20-91R	

Show Map Selector

Email Address:

Submit Request



Coastwide Reference Monitoring System – Wetlands Site Navigation/Reporting

a CWPRA funded project



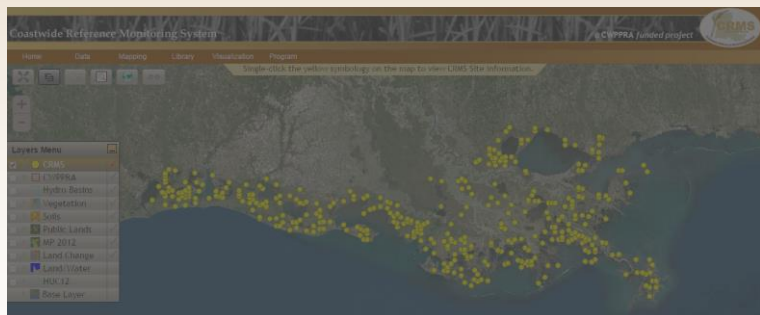
Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

**Map****Data****FAQ****Factsheet**

Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting

➔ **Data/Reporting** Charting



Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting Data Download **Reporting**

Data Download

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

- Hydro
- Vegetation
- Soil
- Spatial

Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting Data Download Reporting

- Hydro
- Vegetation
- Soil
- Spatial
- Report Card Charts

Clear Charts



Coastwide Reference Monitoring System – *Wetlands* Reporting

[Previous Charting Version](#)

Charting

Bulk Charting

Data Download

Reporting

Generate Report Card

Year: 2011 ▼

▼ Generate Report Card

Site Level Report

Project Level Report

Basin Level Report

Coastwide Level Report

▶ OM&M

CRMS0002

CRMS0003

CRMS0006

CRMS0008

CRMS0030

CRMS0033

CRMS0034

CRMS0035

CRMS0038

CRMS0039

CRMS0046

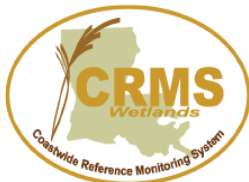
CRMS0047

Submit Request

[Report Card CRMS0003 2011](#)



Coastwide Reference Monitoring System – Wetlands Report Cards



Coastwide Reference Monitoring System (CRMS)

Site Level Report Card

Site: CRMS0003
Year: 2011



7/16/2012

About the program

In 1990, the U.S. Congress enacted the Coastal Wetlands Planning, Protection and Restoration Act (CWPRA) in response to the growing awareness of Louisiana's land loss crisis. The CWPRA was the first federal, statutorily mandated program with a stable source of federal funds dedicated exclusively to the short- and long-term restoration of the coastal wetlands of Louisiana. To date, the CWPRA program has constructed more than 78 restoration projects. These projects use a variety of methods to restore, protect, and create coastal wetland habitat including: diversions of freshwater and sediments to improve marsh vegetation; dredged material placement for marsh creation; shoreline protection; sediments and nutrient trapping; hydrologic restoration through outfall, marsh, and delta management; barrier island restoration; and vegetation planting projects.

Need for a Monitoring System

Louisiana's coastal protection and restoration efforts, implemented through numerous CWPRA projects, require monitoring and evaluation of project effectiveness and cumulative effects of all projects to achieve a sustainable coastal environment. In 2003, the CWPRA Task Force approved the implementation of a Coastwide Reference Monitoring System (CRMS) as a means to monitor and evaluate the effectiveness of CWPRA projects at three levels: project, region, and coastwide (Coffey et al., 2003). The CRMS network is currently funded through CWPRA and the state of Louisiana and provides data for a variety of user groups including resource managers, academics, landowners, and researchers.



CRMS Approach and Design

The CRMS approach includes a suite of sites (391) that encompasses a range of ecological conditions across the coast. The CRMS site locations were selected randomly throughout the coastal zone. Sites represent the entire range of ecological variability within a degraded coastal landscape. Sites are located within (project sites) and outside (reference sites) of coastal restoration projects. Trajectories of changing conditions in reference sites are compared with trajectories of change within project sites through time. The CRMS design not only allows for monitoring and evaluating the effectiveness of each project but will also support ongoing evaluation of the cumulative effects of all CWPRA projects throughout the coastal ecosystem of Louisiana. More information about the CRMS project is provided within a USGS factsheet (<http://pubs.usgs.gov/facts/2010/3018/>).

About the Interactive Report Card

Through the Coastal Wetlands Planning, Protection, and Restoration Act (CWPRA) a comprehensive, standardized monitoring and assessment program has been developed to evaluate coastal restoration projects throughout the Louisiana coastal zone. The Coastwide Reference Monitoring System (CRMS) collects monitoring data for numerous ecological variables. Using CRMS data, indices have been developed to assess wetland hydrology, vegetation, and soils. This interactive report card provides summary information and displays index scores for individual CRMS sites, restoration projects, hydrologic basins, and the entire Louisiana coast.

Index Development

What is an Index?

An index combines and synthesizes scientific data to help inform or assess a topic of interest. Each index helps explain the condition of a particular aspect of the coastal wetland ecosystem. By comparing indices at various time and spatial scales we can understand the overall condition of coastal wetlands in Louisiana.

How were the indices developed?

CRMS Analytical Teams, made up of agency and academic personnel, developed indices based on the suite of parameters available from the 2006 to 2009 CRMS dataset. Three indices have been developed: a floristic quality (FQI), hydrologic (HI), and submergence vulnerability (SVI), and a landscape index is currently being refined. Wetland vegetation, hydrology, and soils are undeniably interconnected and form the basis for ecological processes that ultimately influence future land change and the sustainability of coastal habitats. Although these indices have been developed using 4 years of baseline CRMS data, the indices will be refined to better define ecological relationships as the data set becomes more robust overtime.

Because no regulatory thresholds exist for the ecological parameters of interest, it was not possible to assess index scores based on previously defined values that would indicate an acceptable or unacceptable score. Therefore, for the FQI and the HI, assessments were made relative to a baseline distribution of the index scores derived from 2006 to 2009 data at CRMS sites across the Louisiana coast. Because ideal thresholds were not available for the FQI and HI, scores were classified as 'good' (green) if they exceeded the 75th percentile of index scores calculated for all CRMS sites during the baseline period, 'poor' (red) if they did not exceed the 25th percentile, or 'fair' (yellow) if they were intermediate to the 25th and 75th percentiles (Figure 1).

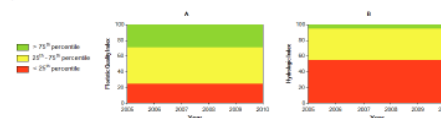
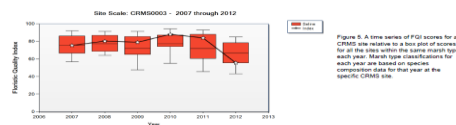
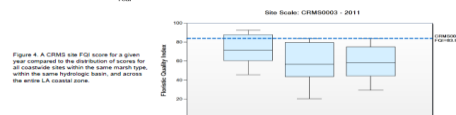
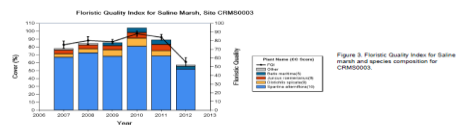


Figure 1. Example of how classifications change based on the assessment index and index score distribution. A) Floristic Quality Index distribution and B) Hydrologic index distribution based on coastwide data from 2006 to 2009.

Site Scale Assessment: CRMS0003 Floristic Quality Index (FQI)

The following graphics provide information about the CRMS site of interest with regard to the floristic quality index. These graphics provide an assessment of the vegetation quality of this site relative to other sites within a similar marsh type, basin, and coastwide.



Coastwide Scale Assessment: Floristic Quality Index (FQI)

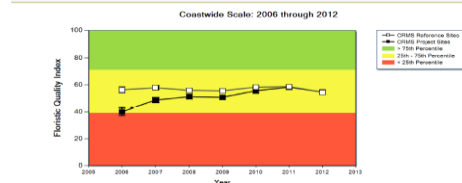


Figure 17. FQI scores across the coast are shown over time. The mean (± SE) FQI scores are calculated for all project and reference sites by year. CRMS Project Sites: 2006 N = 74, 2007 N = 133, 2008 N = 142, 2009 N = 144, 2010 N = 196, 2011 N = 143, 2012 N = 143. CRMS Reference Sites: 2006 N = 122, 2007 N = 120, 2008 N = 240, 2009 N = 243, 2010 N = 238, 2011 N = 244, 2012 N = 243.

Coastwide Scale Assessment: Hydrologic Index (HI)

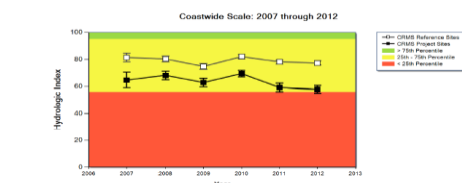


Figure 18. HI scores across the coast are shown over time. The mean (± SE) HI scores are calculated for all project and reference sites by year. CRMS Project Sites: 2007 N = 26, 2008 N = 72, 2009 N = 92, 2010 N = 111, 2011 N = 121, 2012 N = 127. CRMS Reference Sites: 2007 N = 60, 2008 N = 131, 2009 N = 171, 2010 N = 200, 2011 N = 209, 2012 N = 212.

- Dynamic documents
- Program and Index explanations
- Multi-scale assessments site, project, basin, coastwide



Coastwide Reference Monitoring System – Wetlands Site Navigation/Mapping Viewer

a CWPRA funded project



Coastwide Reference Monitoring System

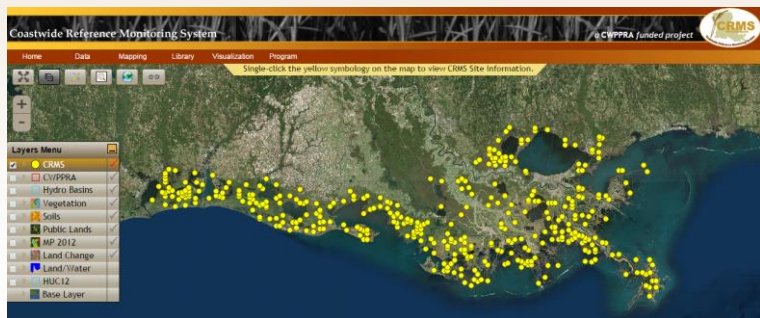
Home Data Mapping Library Visualization Program

**Map****Data****FAQ****Factsheet**

Wetland restoration efforts conducted in Louisiana require monitoring the effectiveness of individual projects as well as monitoring the cumulative effects of all projects in restoring, creating, enhancing, and protecting



Map



Data

Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting **Data Download** Reporting

Data Download

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

- Hydro
- Vegetation
- Soil
- Spatial

Charting

Coastwide Reference Monitoring System

Home Data Mapping Library Visualization Program

Previous Charting Version

Charting Bulk Charting Data Download Reporting

- Hydro
- Vegetation
- Soil
- Spatial
- Report Card Charts

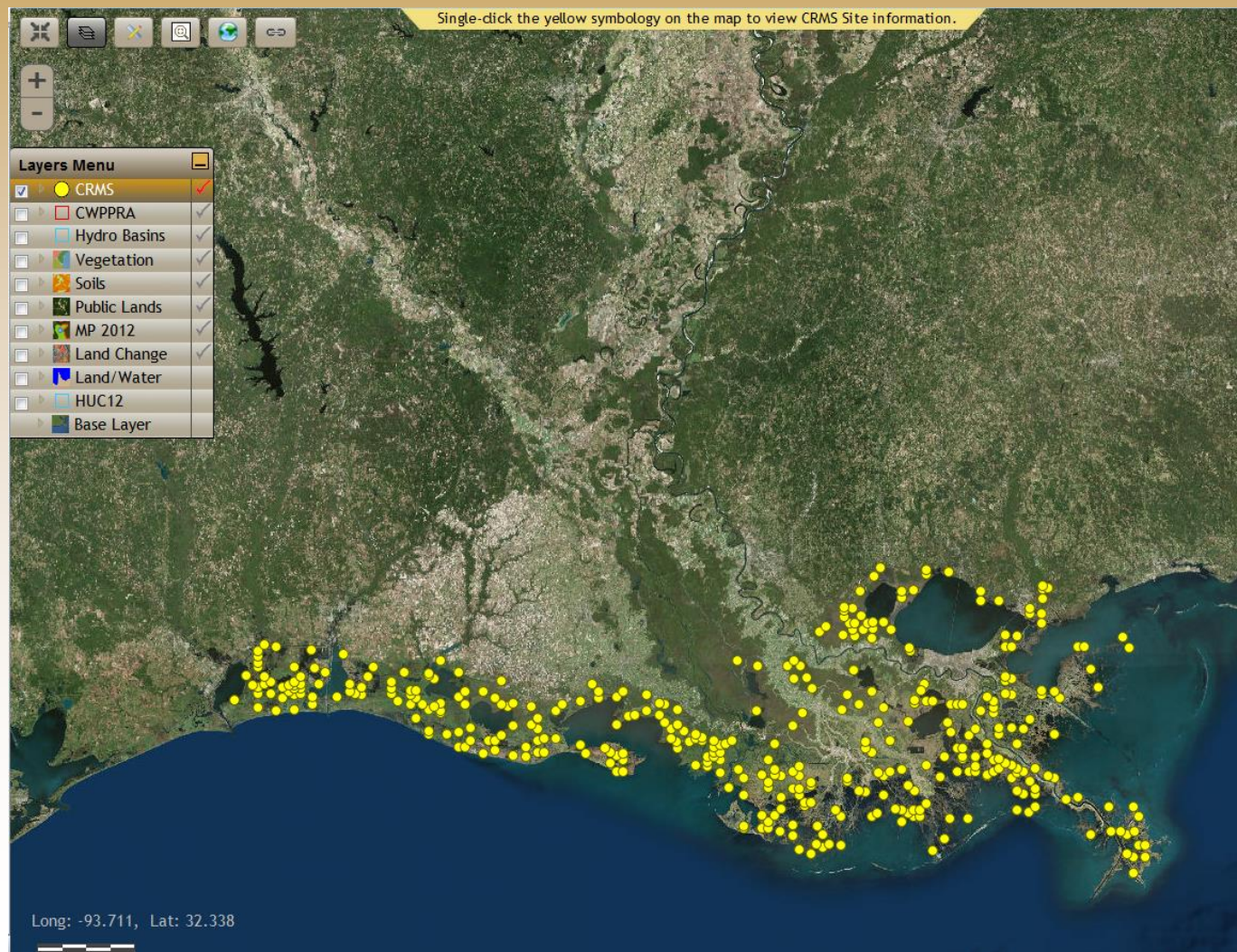
Clear Charts



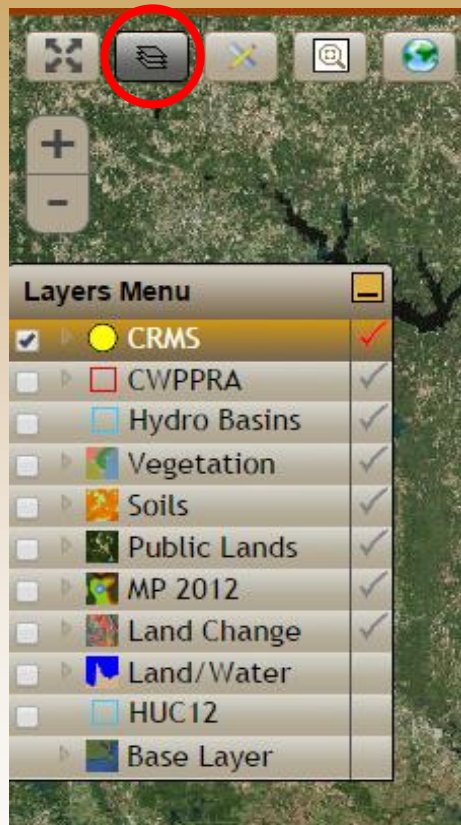
Coastwide Reference Monitoring System – *Wetlands*

Full Screen Button

Hides the CRMS Website banner and menu.
Allows for more map viewing space.



Shows and hides the Layers Menu

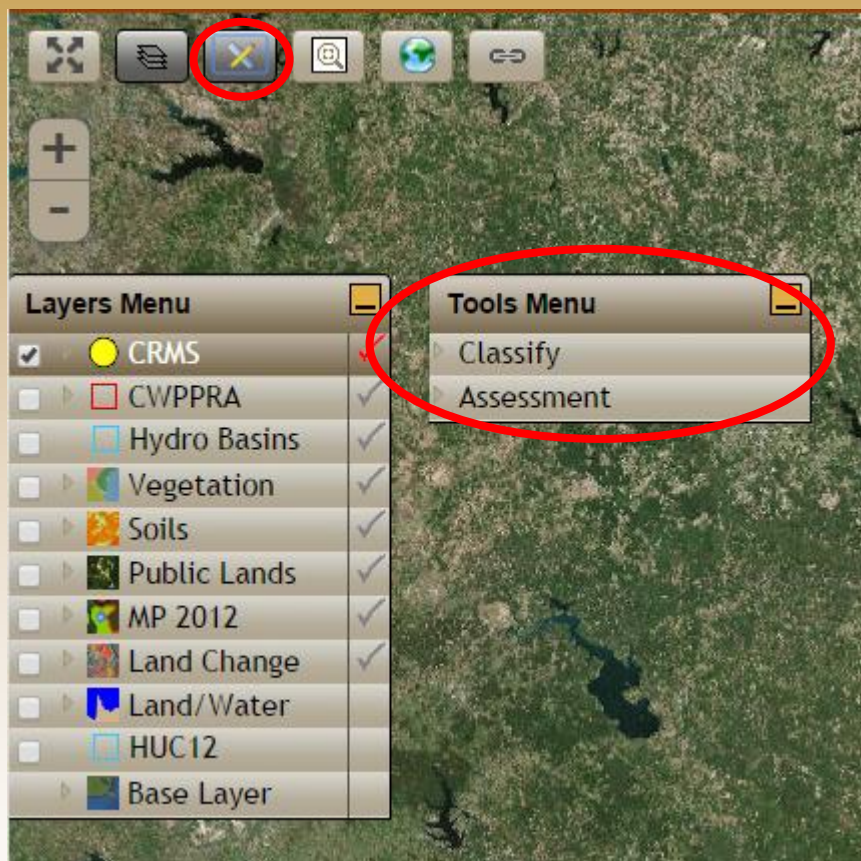




Coastwide Reference Monitoring System – *Wetlands*

Tools Menu Button

Activate Tools Menu



Zoom:

By rectangle



To Full Extent



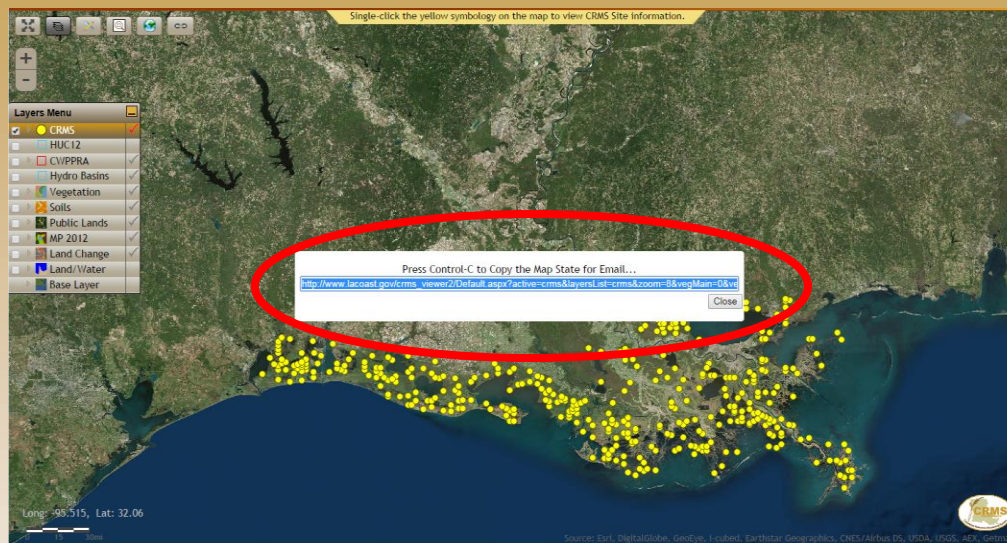
In & out



Used to create a save state on the map.



Link created to save the current state of the map.



Great to email to someone so that you know you are looking at the same information at different computers.



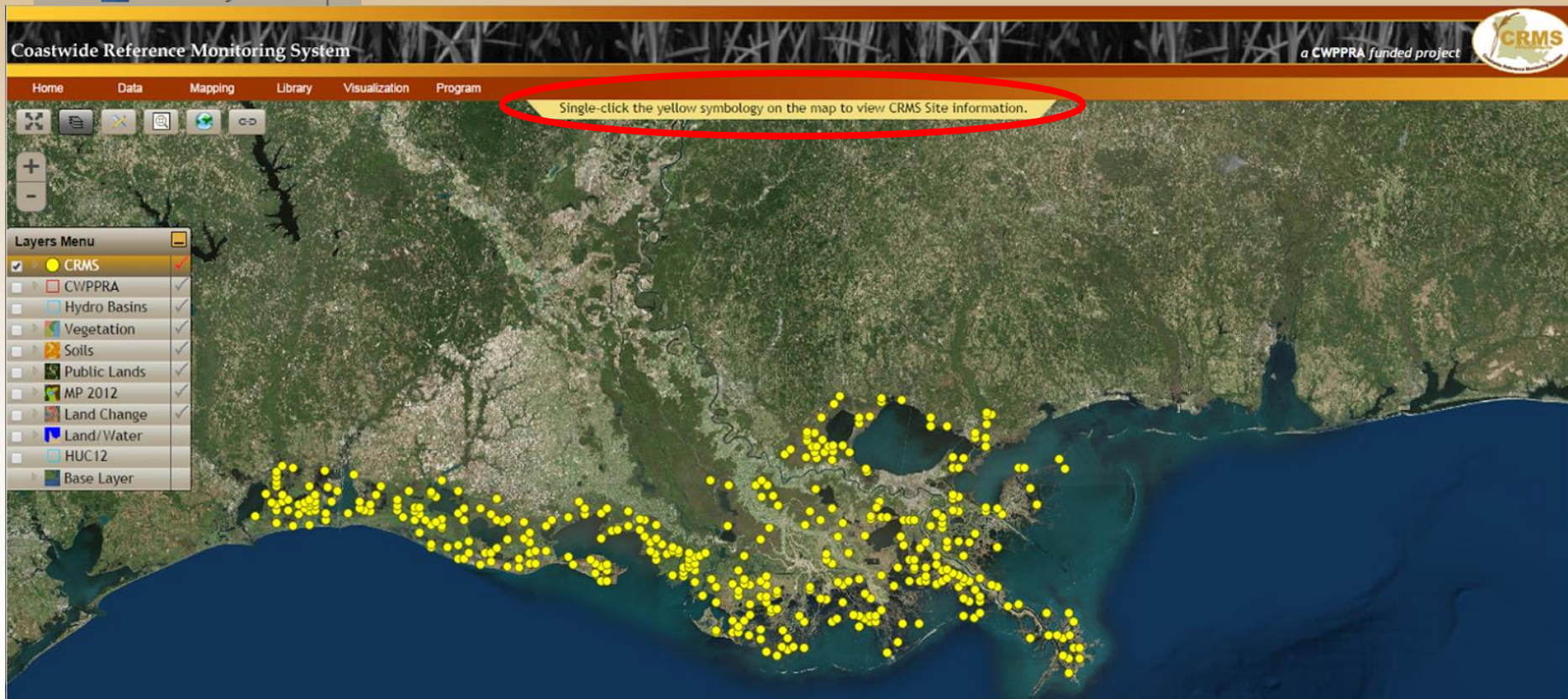
Coastwide Reference Monitoring System – Wetlands Activating Layers



You must activate the layer to interact with it on the map.

Manila dropdown shows how to interact with the current active layer.

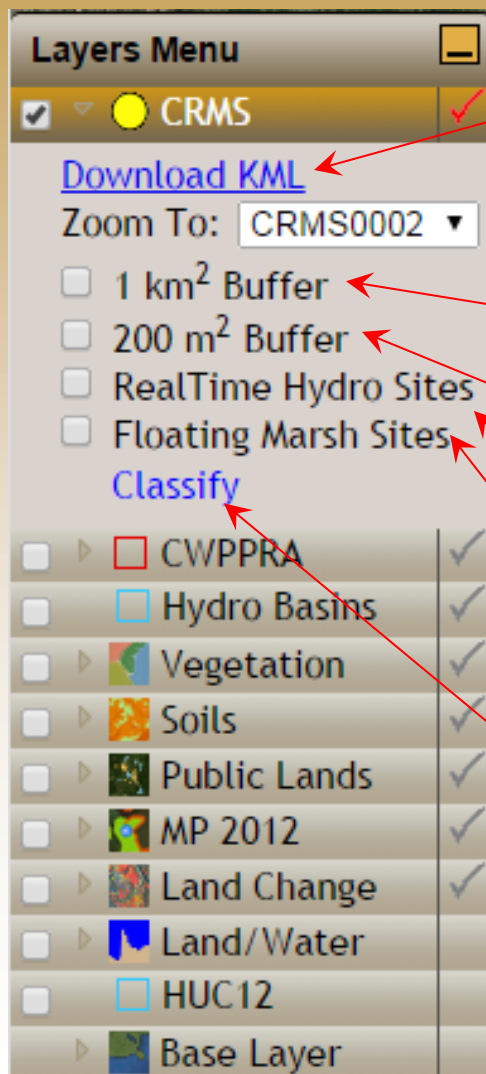
Single-click the yellow symbology on the map to view CRMS Site information.





Coastwide Reference Monitoring System – *Wetlands*

CRMS Active Layer Features



Download a KML file to used in Google Earth.

Zooms to the site and shows the site information bubble.

Adds/removes the 1 km² buffer layer
Aerial Photography Boundary

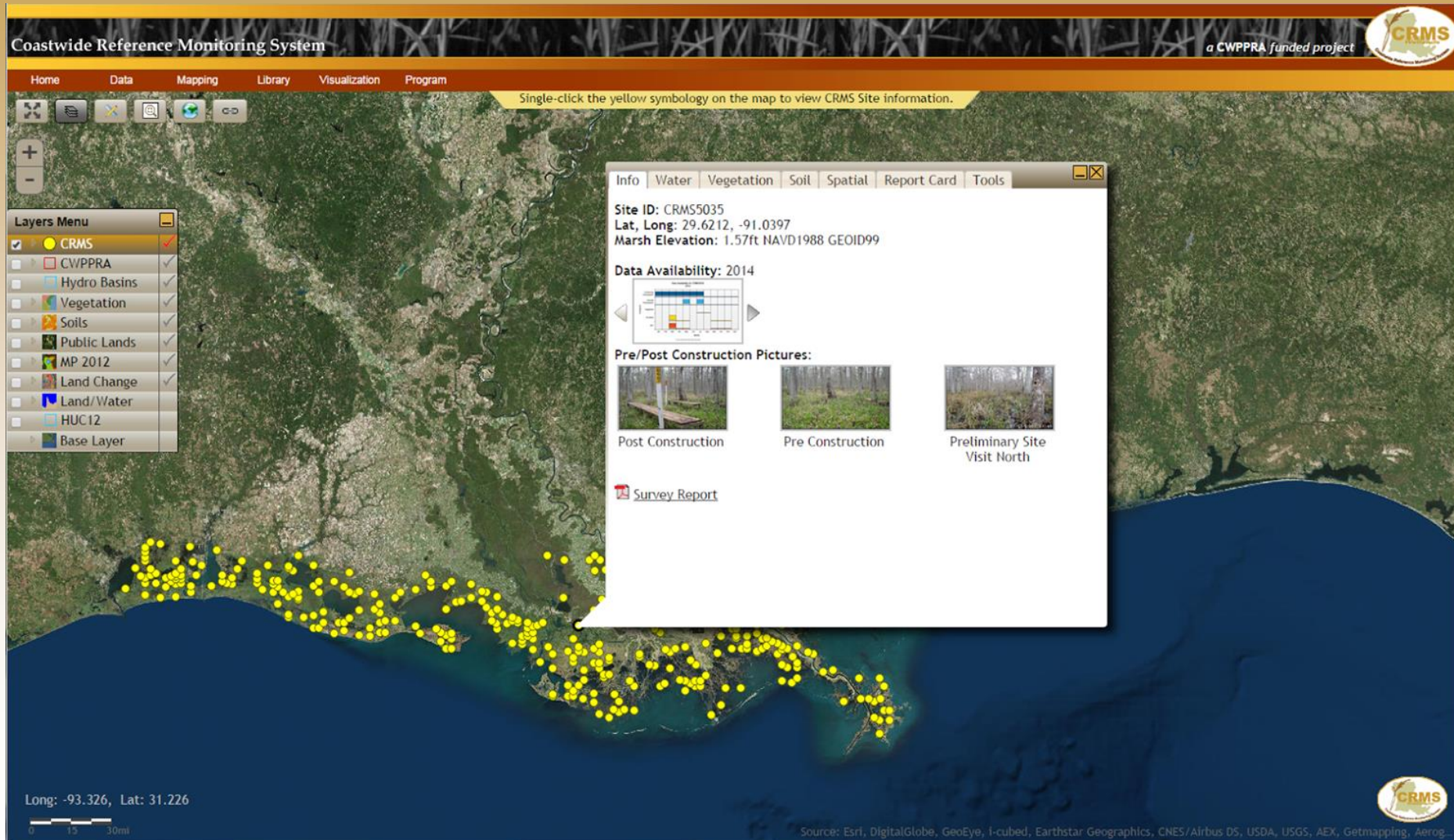
Adds/removes the 200 m² buffer layer
Ecological Data Collection Area

Highlights realtime hydro sites in blue

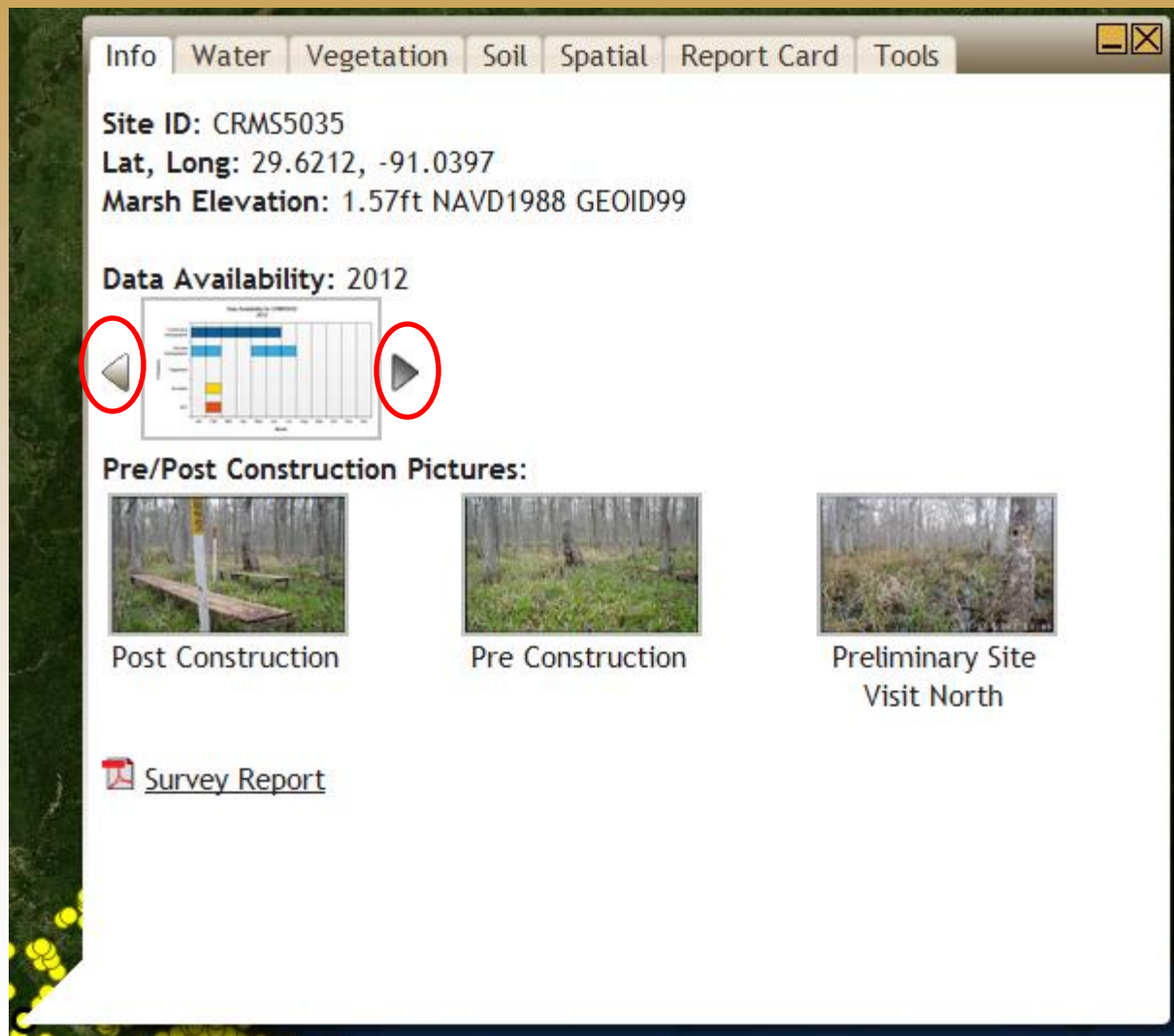
Highlights floating marsh sites in red

Classify invokes the tools menu with the classification option selected.

Click a point for site level information bubble



Site Information Bubble

A screenshot of the CRMS Site Information Bubble for site CRM55035. The bubble has a title bar with tabs: Info, Water, Vegetation, Soil, Spatial, Report Card, and Tools. The 'Info' tab is selected. The content includes site ID, coordinates, elevation, and a data availability chart for 2012. Below the chart are three photos labeled 'Post Construction', 'Pre Construction', and 'Preliminary Site Visit North'. At the bottom is a link to the 'Survey Report'. Two red circles highlight left and right navigation arrows on the data availability chart.


Info Water Vegetation Soil Spatial Report Card Tools

Site ID: CRM55035
Lat, Long: 29.6212, -91.0397
Marsh Elevation: 1.57ft NAVD1988 GEOID99

Data Availability: 2012

Pre/Post Construction Pictures:

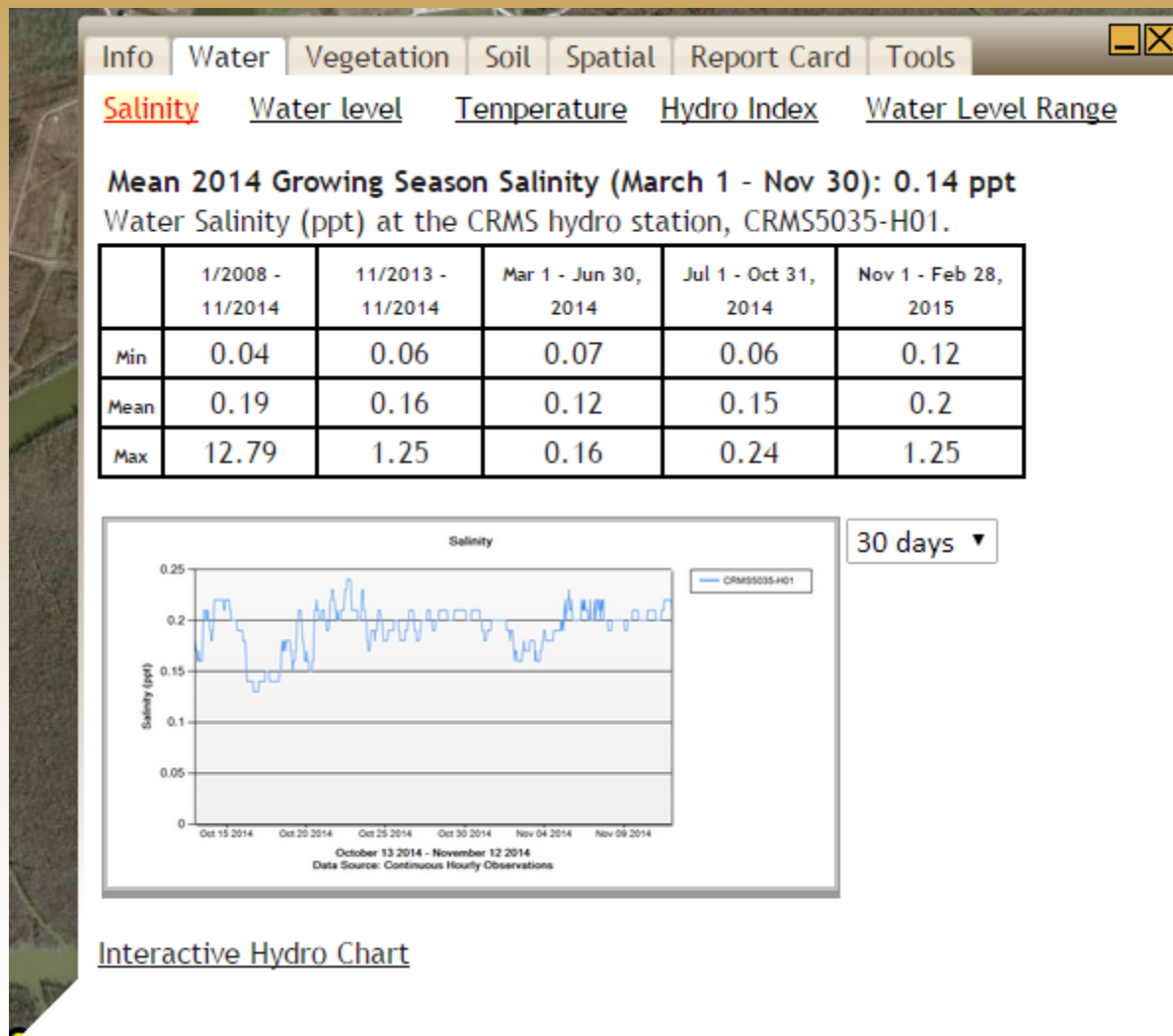
Post Construction Pre Construction Preliminary Site Visit North

 [Survey Report](#)

General information about the CRMS site including data availability, site photos, and survey reports.

Arrows allow user to scroll through data availability by year.

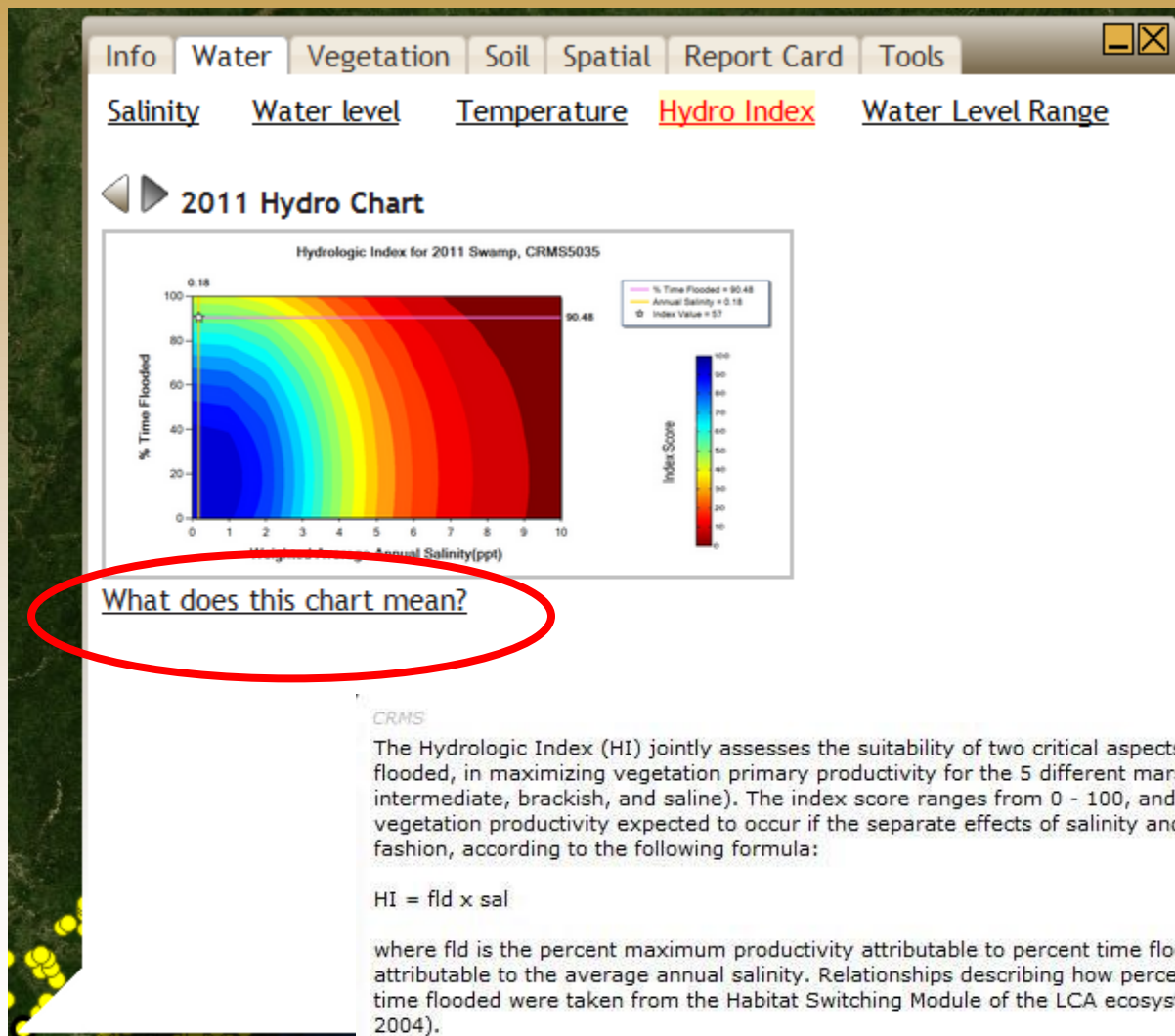
Site Information Bubble



The Water tab contains all hydrologic information for the selected site.

Salinity – Brief overview of salinity data for the site. Also charts most recent salinity data for the site.

Site Information Bubble

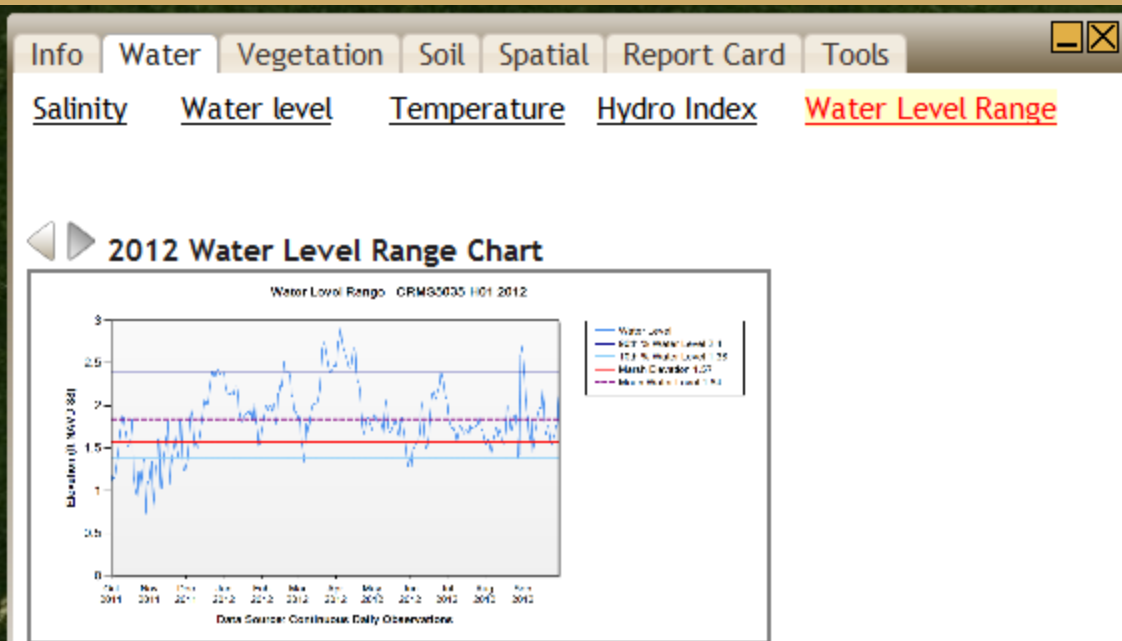


The Water tab contains all hydrologic information for the selected site.

Hydro Index – All Hydro Index charts available for the site.

The HI is calculated for a given water year, which begins October 1 and ends the following September 30.

Site Information Bubble



The Water tab contains all hydrologic information for the selected site.

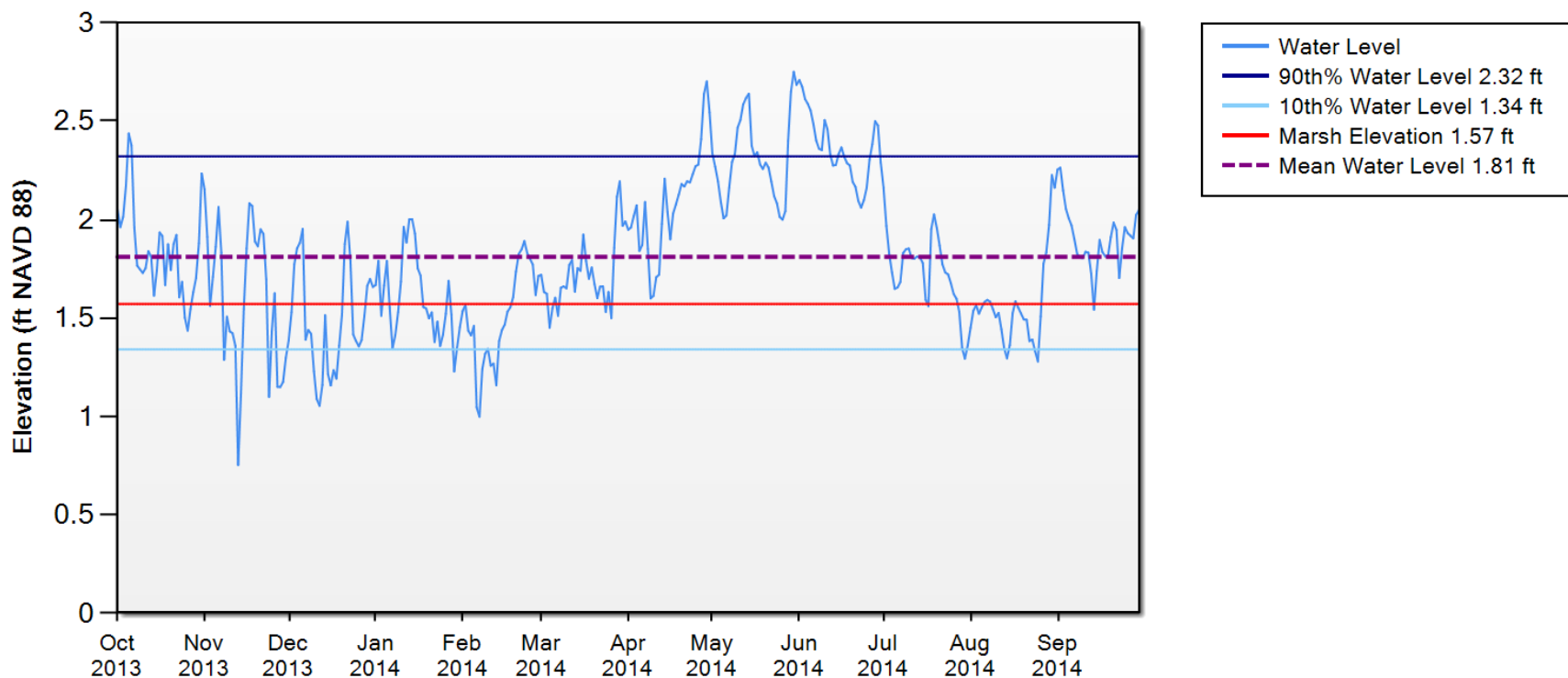
Water Level Range – All water level range charts available for the current site.

What does this chart mean?



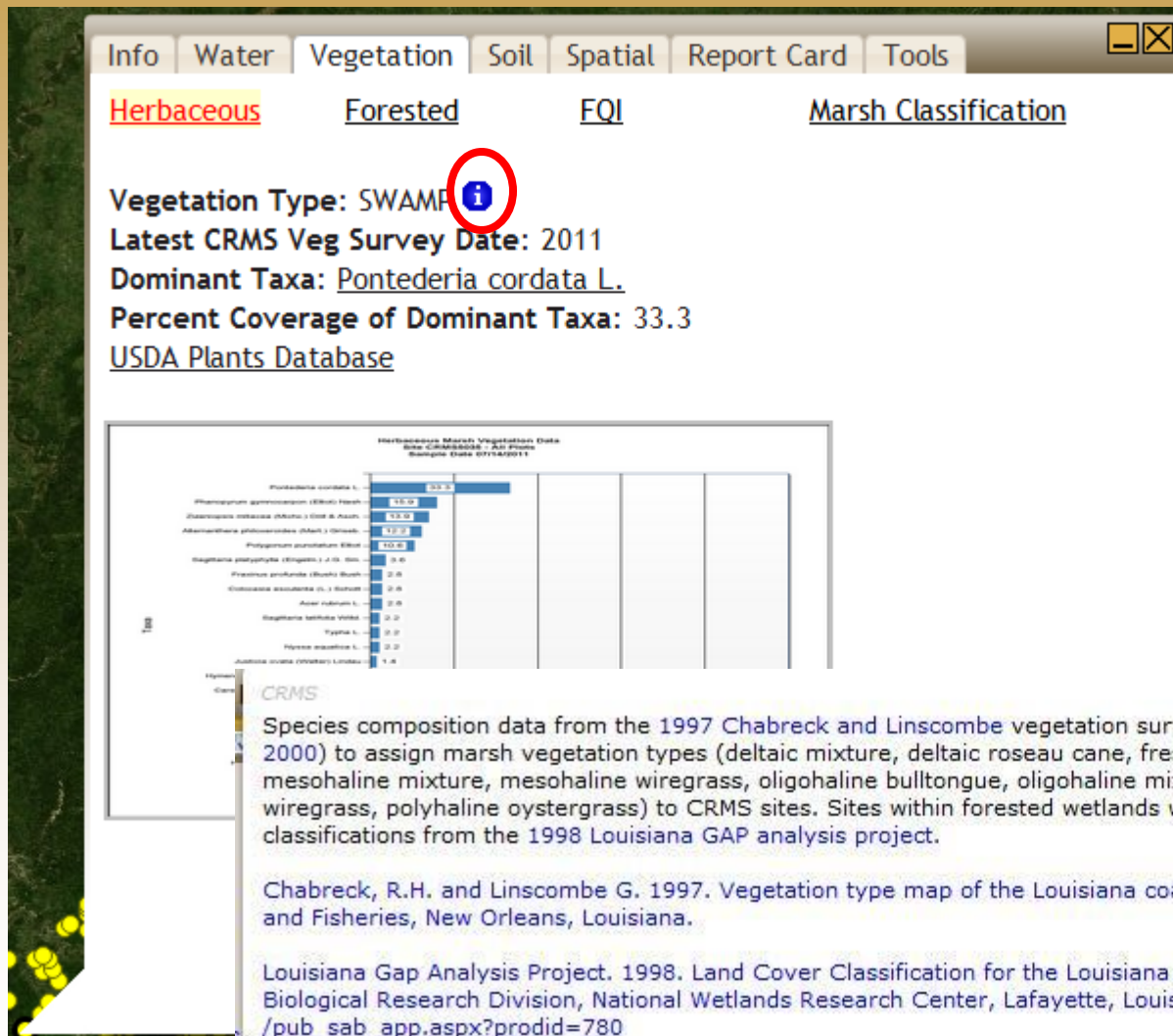
Site Information Bubble

Water Level Range - CRMS5035-H01 2014



Data Source: Continuous Daily Observations

Site Information Bubble



The screenshot shows the 'Vegetation' tab selected in the CRMS interface. The 'Herbaceous' sub-tab is active, displaying the following information:

- Vegetation Type:** SWAMP (with an information icon circled in red)
- Latest CRMS Veg Survey Date:** 2011
- Dominant Taxa:** Pontederia cordata L.
- Percent Coverage of Dominant Taxa:** 33.3
- [USDA Plants Database](#)

Below this information is a horizontal bar chart titled 'Herbaceous Marsh Vegetation Data' showing the percent coverage of various plant species. The chart lists species on the y-axis and their corresponding percent coverage on the x-axis. The data is as follows:

Species	Percent Coverage
Pontederia cordata L.	33.3
Phragmites communis (Rostk) Nash	15.0
Spartina patens (Michx.) C.D.C. & Nash	15.0
Alternanthera philoxeroides (Rostk) Olinch	12.5
Polygala purpurea Willd.	10.0
Sagittaria arifolia (Rostk) J.D. & Nash	5.0
Fraxinus profunda (Michx.) Benth.	5.0
Cladonia aculeata (L.) Rostk	5.0
Aster rubrum L.	5.0
Sagittaria latifolia Willd.	5.0
Lythra L.	5.0
Hieracium angustifolium L.	5.0
Aster sp.	5.0

Below the chart, there is a text box containing information about the species composition data and references.

Species composition data from the 1997 Chabreck and Linscombe vegetation survey were used by Visser et al. (1998, 1999, 2000) to assign marsh vegetation types (deltaic mixture, deltaic roseau cane, fresh bulltongue, fresh maidencane, fresh spikerush, mesohaline mixture, mesohaline wiregrass, oligohaline bulltongue, oligohaline mixture, oligohaline spikerush, oligohaline wiregrass, polyhaline oystergrass) to CRMS sites. Sites within forested wetlands were assigned as swamp based on swamp classifications from the 1998 Louisiana GAP analysis project.

Chabreck, R.H. and Linscombe G. 1997. Vegetation type map of the Louisiana coastal marshes. Louisiana Department of Wildlife and Fisheries, New Orleans, Louisiana.

Louisiana Gap Analysis Project. 1998. Land Cover Classification for the Louisiana GAP Analysis Project. U.S. Geological Survey, Biological Research Division, National Wetlands Research Center, Lafayette, Louisiana. http://sabdata.cr.usgs.gov/sabnet_pub/pub_sab_app.aspx?prodid=780

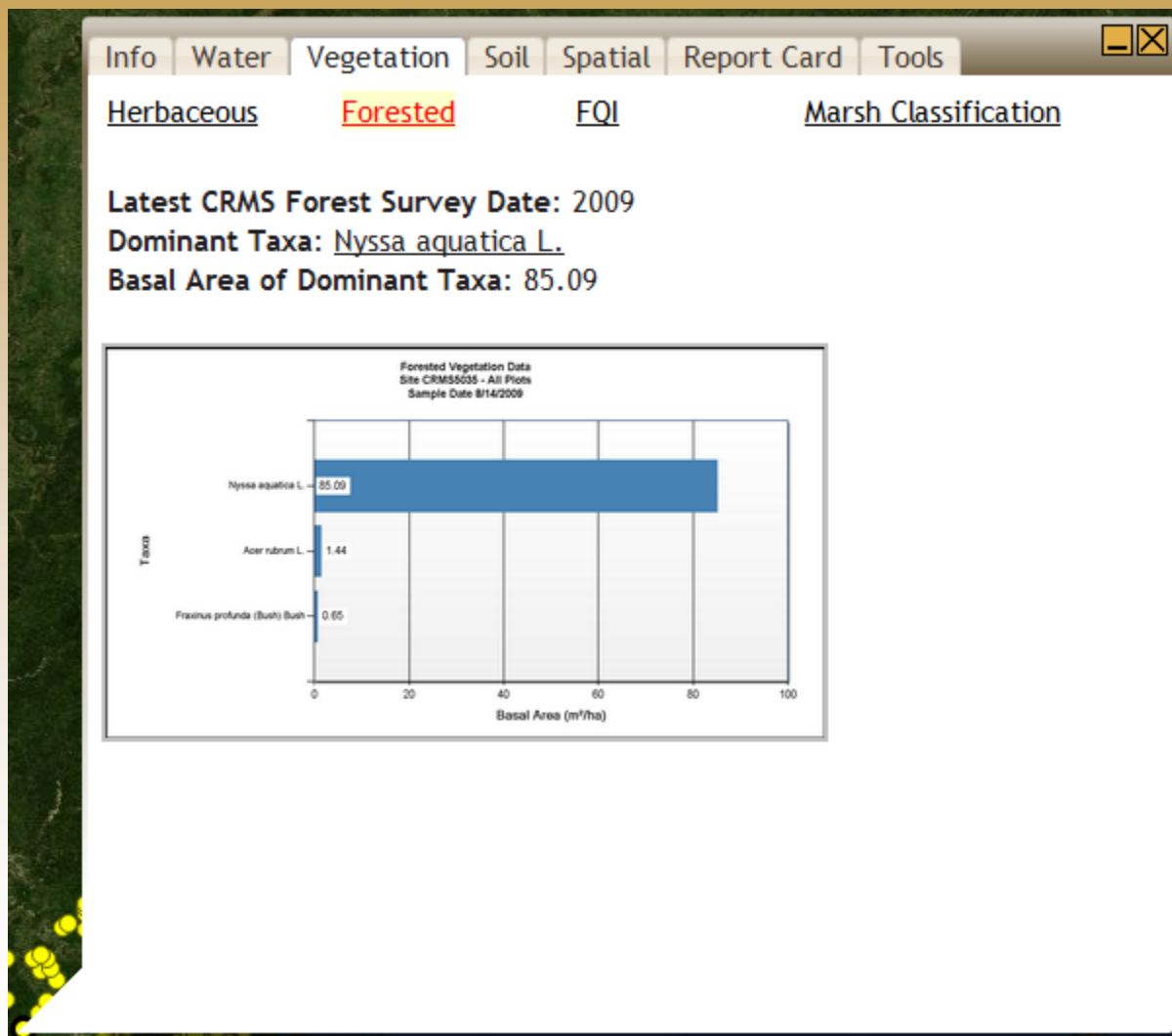
Visser, J.M., Sasser, C.E., Chabreck, R.H., Linscombe, R.G. 1998. Marsh vegetation types of the Mississippi River deltaic plain. Estuaries 21: 818-828.

The Vegetation tab contains all vegetation information for the selected site.

Herbaceous – Species driven percent cover chart.

MOVE CLOSE

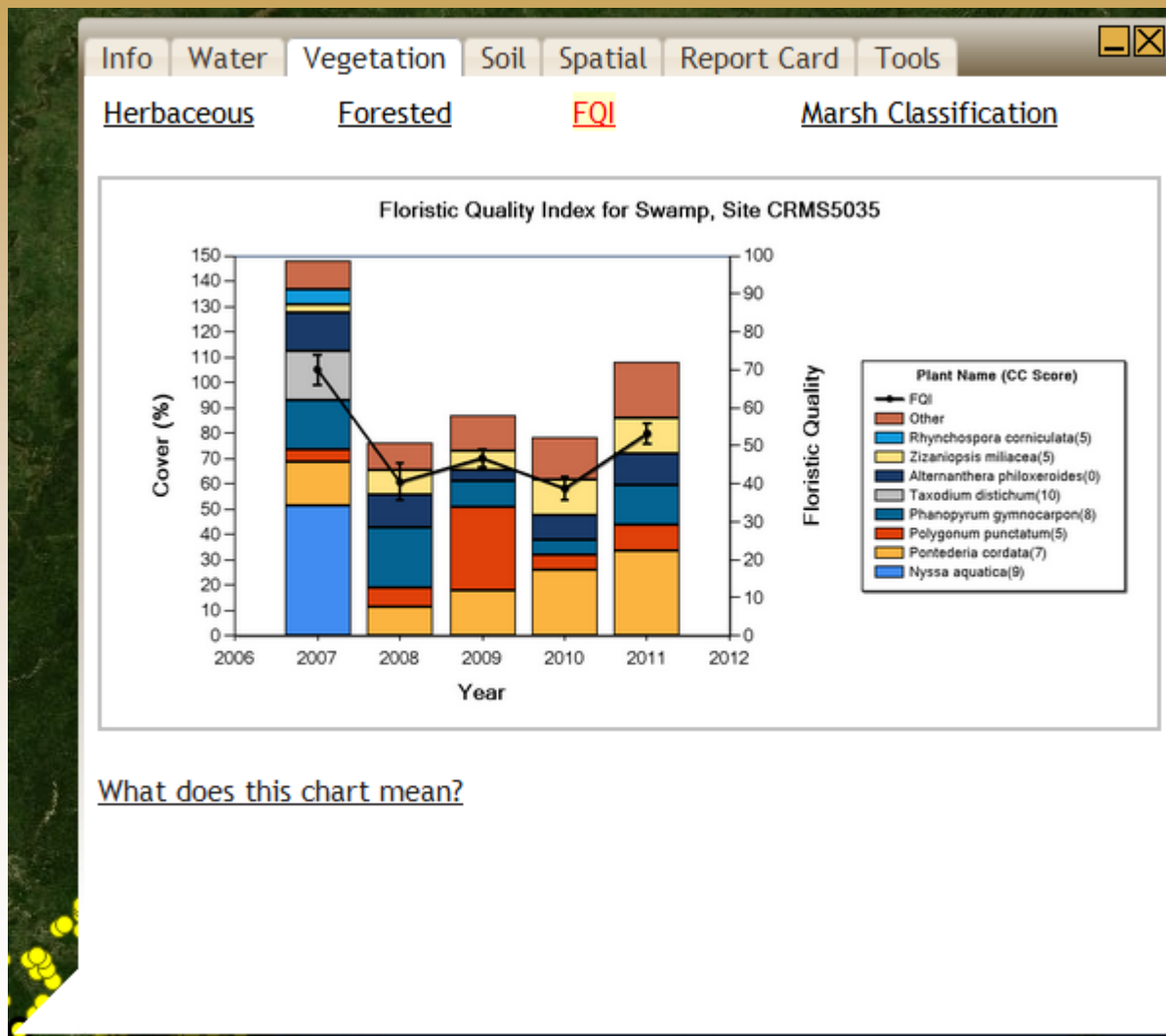
Site Information Bubble



The Vegetation tab contains all vegetation information for the selected site.

Forested – Species driven basal area chart.

Site Information Bubble

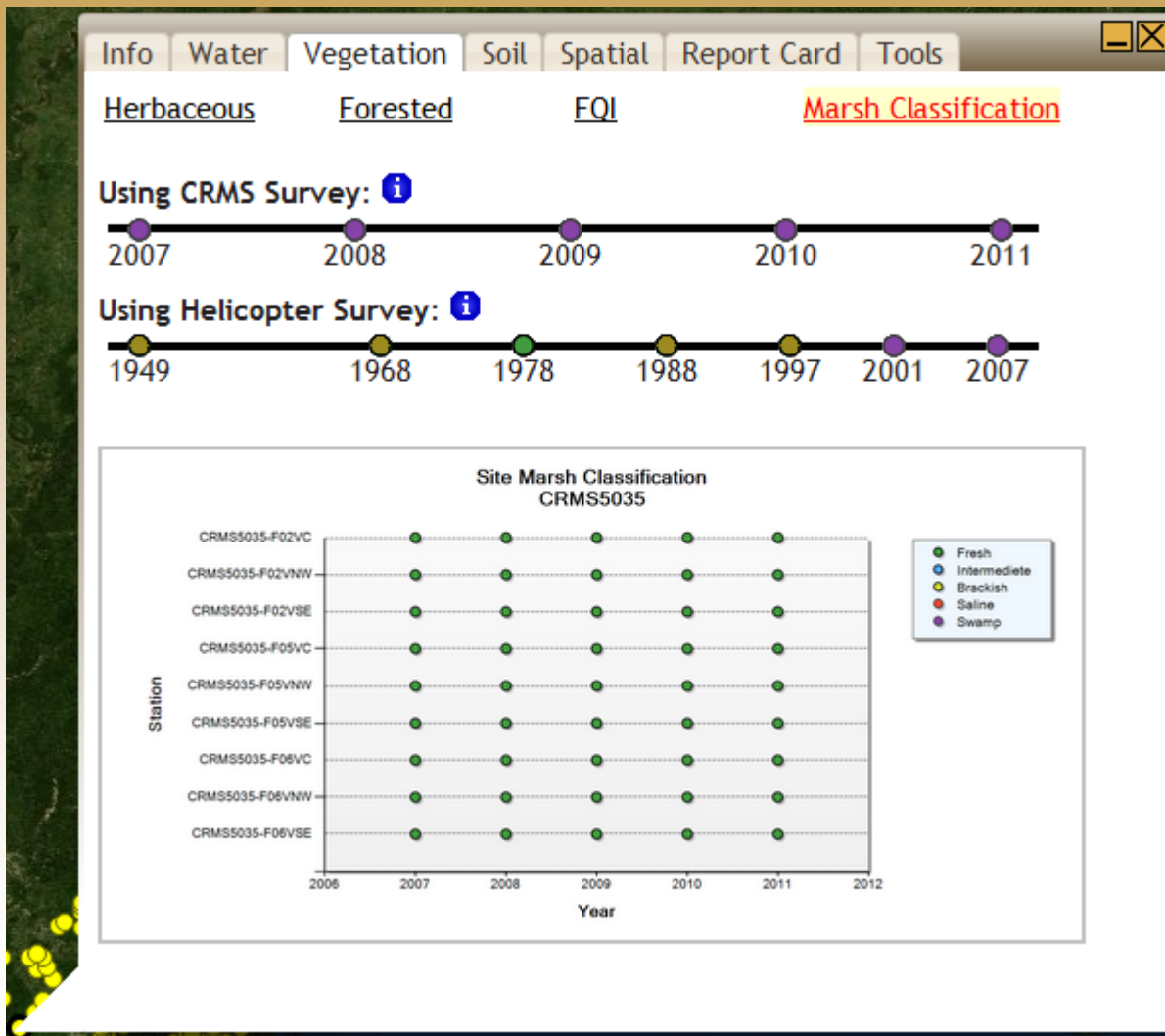


The Vegetation tab contains all vegetation information for the selected site.

Floristic Quality Index (FQI) chart showing vegetative species composition and FQI score annually.

What does this chart mean?

Site Information Bubble



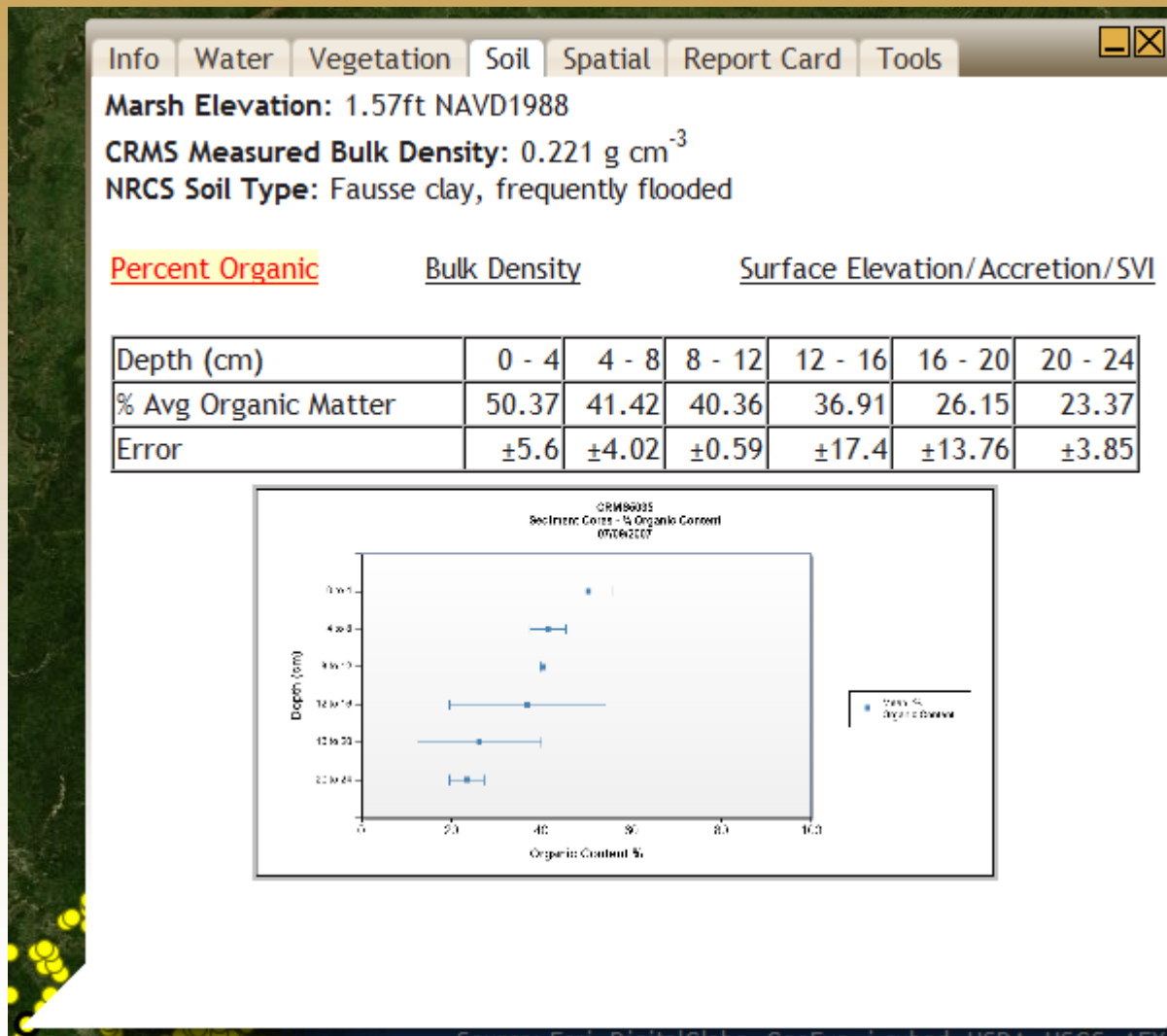
The Vegetation tab contains all vegetation information for the selected site.

Marsh Classification –
The chart displays marsh class by site over time.

Top bar is marsh class at the site level using annual on the ground vegetation survey data.

Bottom bar is marsh class at the site level using the helicopter survey data.

Site Information Bubble

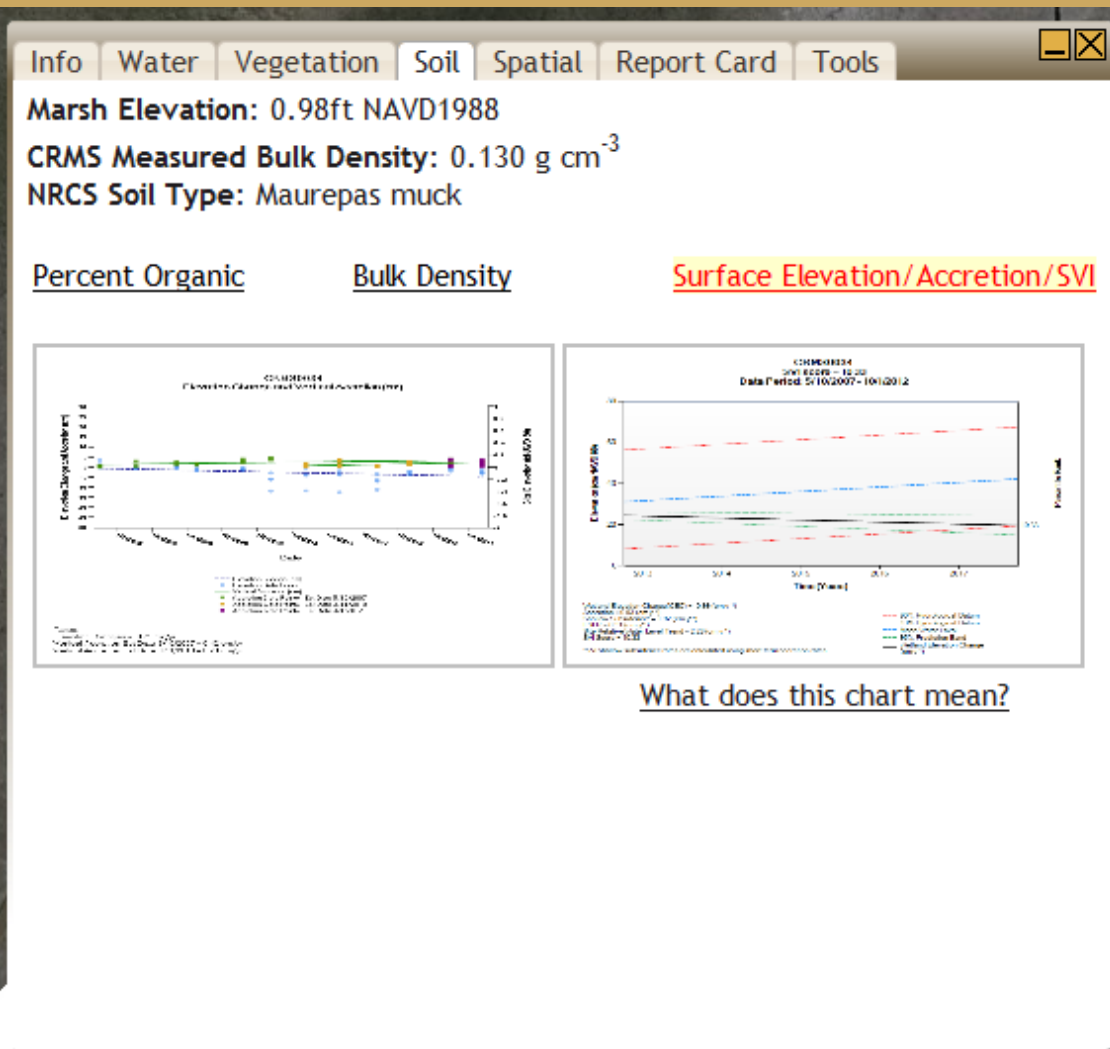


The Soil tab contains all soil information for the selected site.

Percent Organic – Soil profiles taken at site establishment.



Site Information Bubble

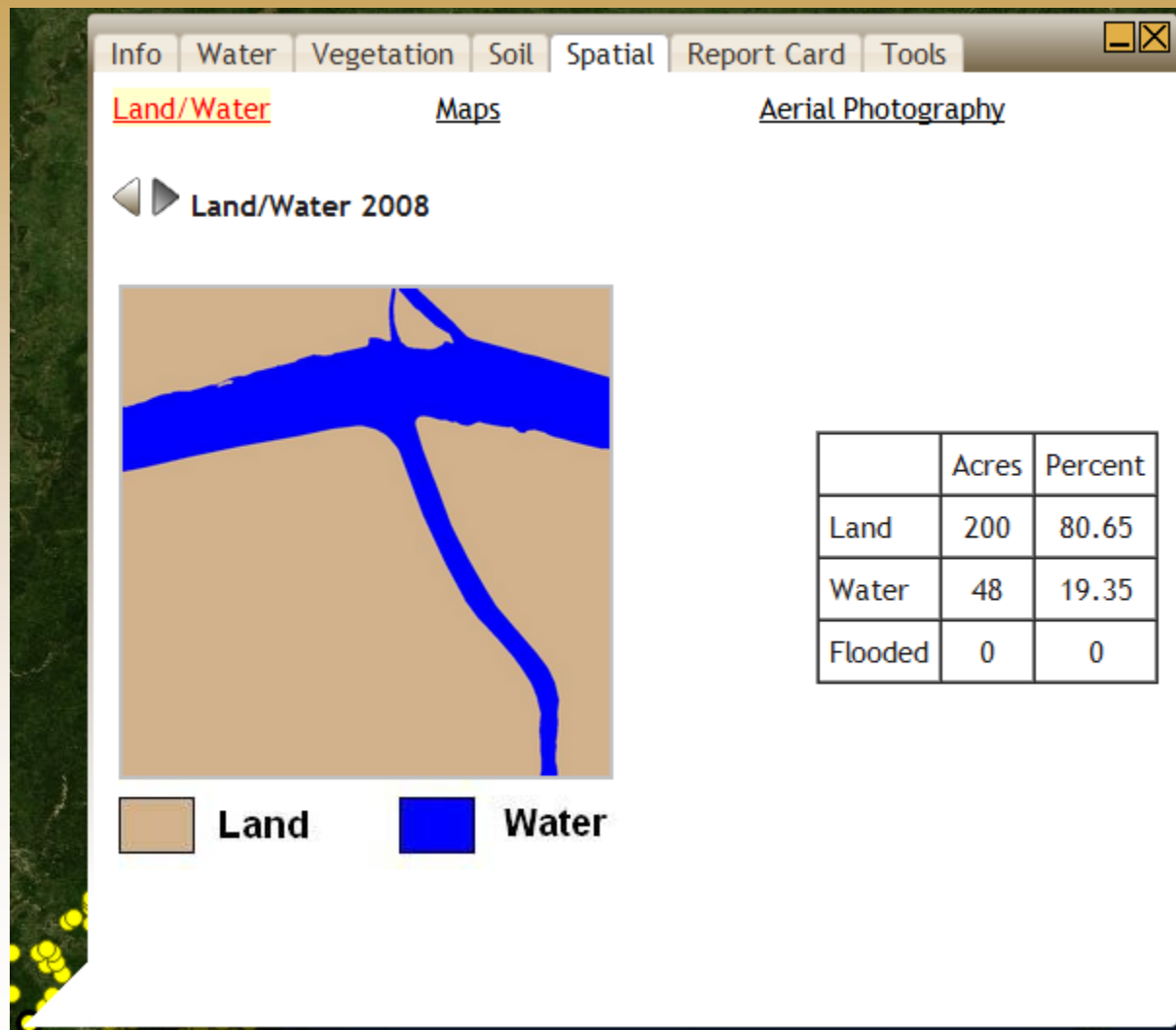


The Soil tab contains all soil information for the selected site.

Surface Elevation/Accretion – currently displays site level elevation change and accretion and gives rates for shallow subsidence.



Site Information Bubble



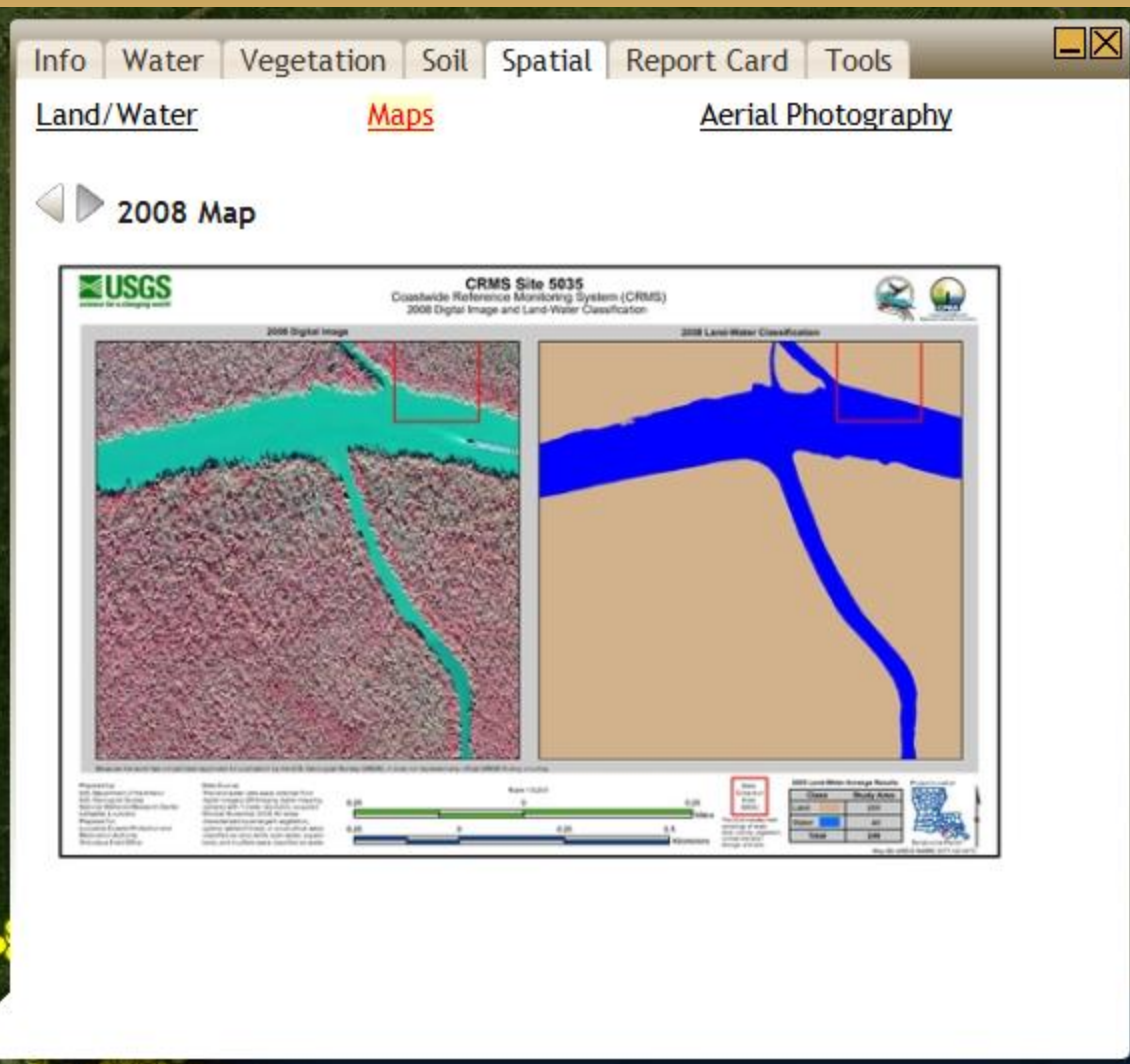
The Spatial tab contains all spatial information for the selected site.

Land/Water with acreage breakdowns

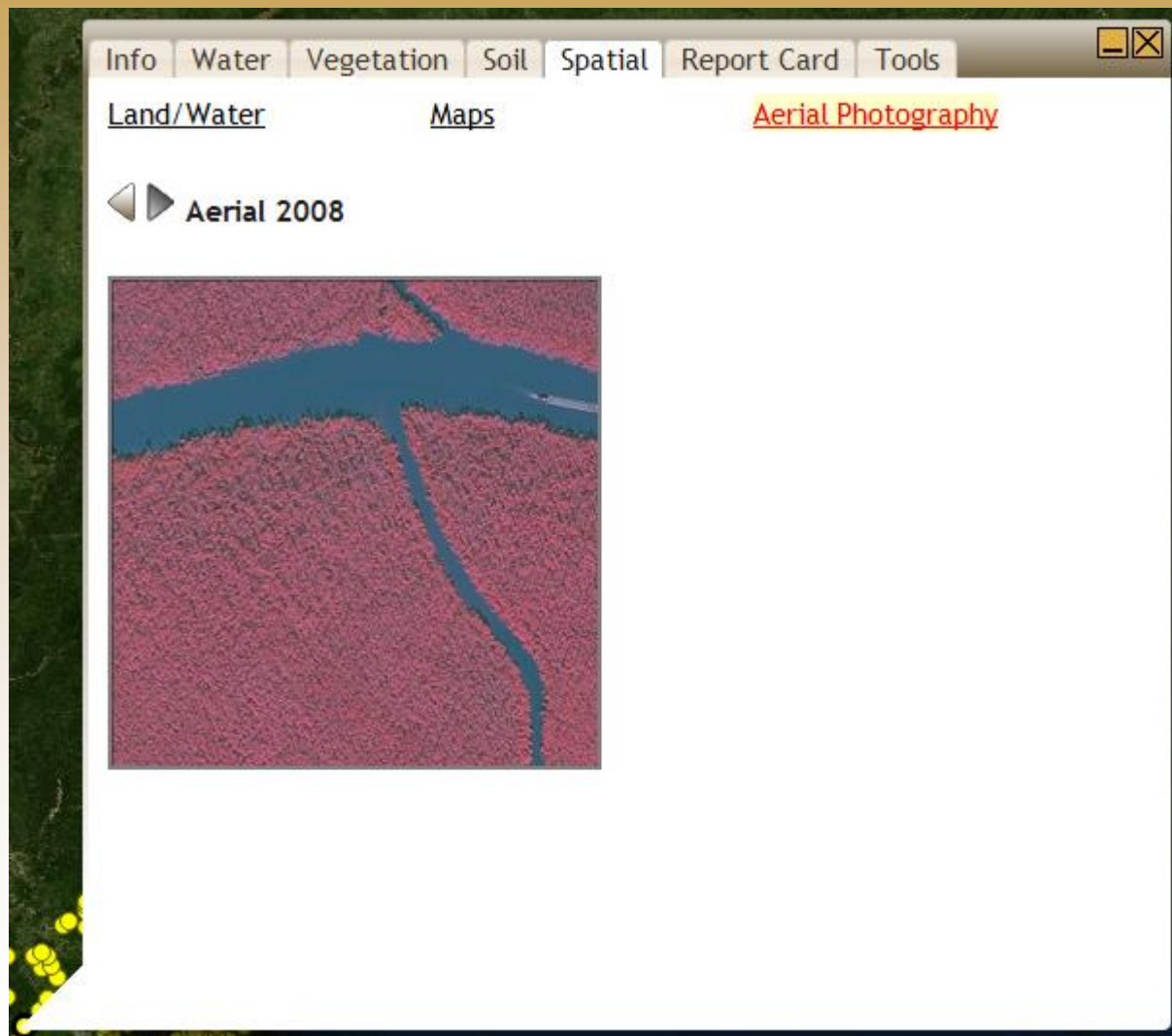
Site Information Bubble

The Spatial tab contains all spatial information for the selected site.

CRMS site land/water maps at the 1km² scale.



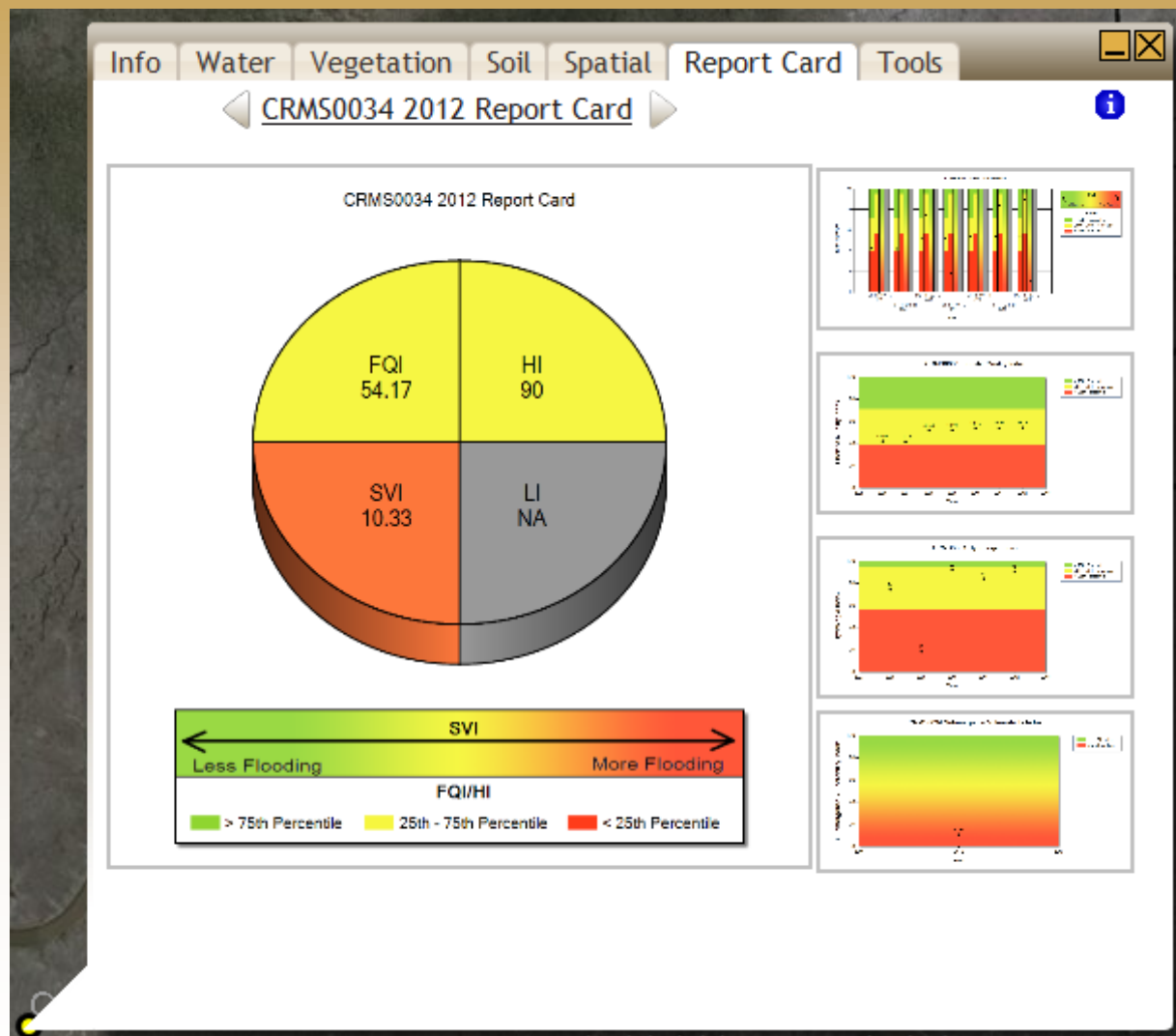
Site Information Bubble



The Spatial tab contains all spatial information for the selected site.

Aerial Photography

Site Information Bubble

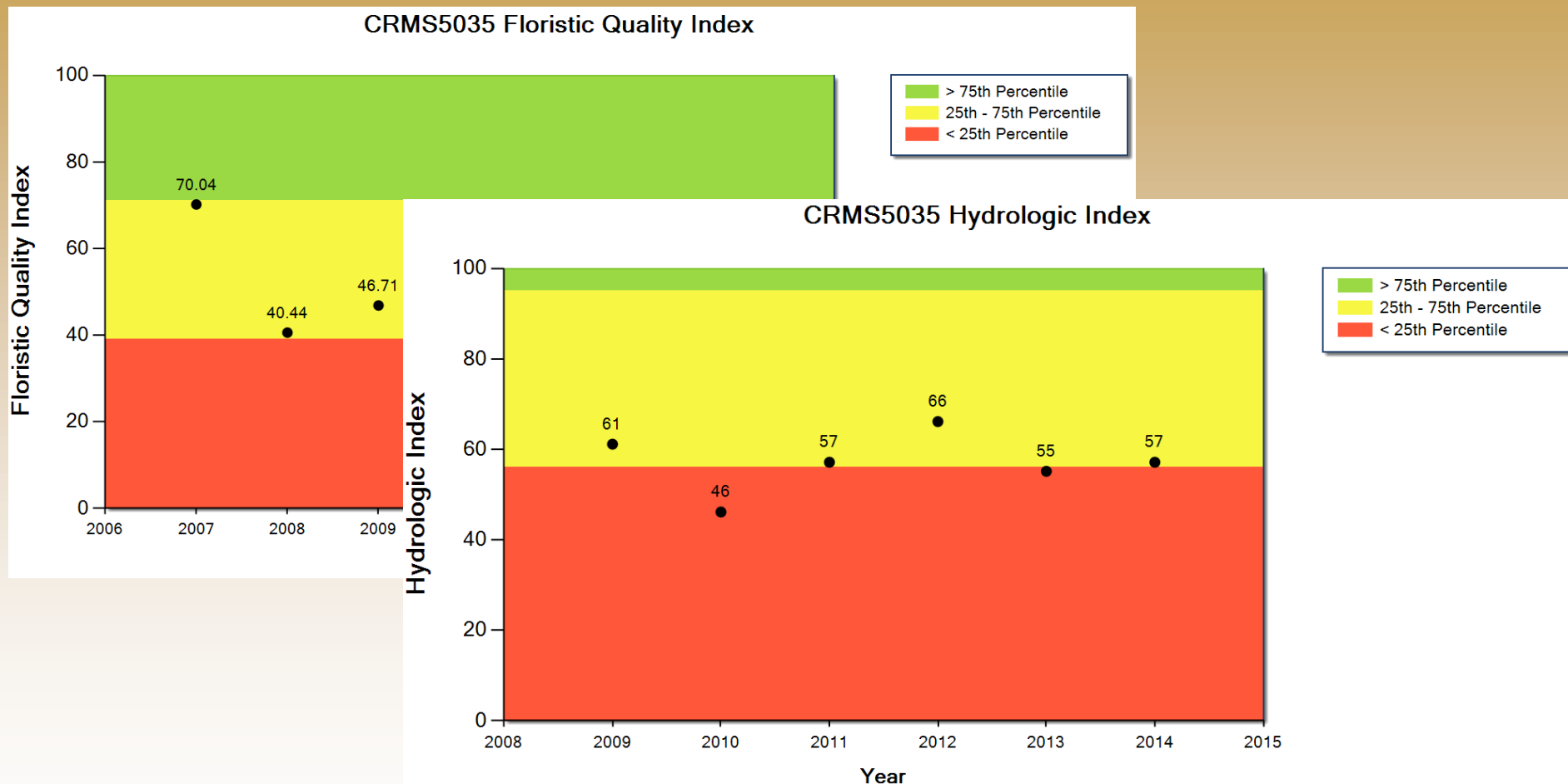


The Report Card tab contains all report card information for the selected site.

Report Card- Generate site report cards for previous years in the bubble or look at summary graphics.

Click on thumbnails to expand graphics.

Site Information Bubble



Report Card Summary Graphics- Allow you to visualize individual index scores through time for a particular site.

Site Information Bubble



The Tools tab lets you do an Acreage Assessment on the selected site.

Acreage Assessment – Use the acreage assessment tool to determine acreage breakdowns of the available coastwide vegetation surveys or land/water data.



Coastwide Reference Monitoring System – Wetlands

Project Level Information

Coastwide Reference Monitoring System

a CWPRA funded project



Home Data Mapping Library Visualization Program

Single-click in a red polygon on the map to view CWPRA Project information.



Layers Menu

- ☐ CRMS
- ☒ CWPRA
- Zoom To: AT-02
- ☒ Constructed
- ☒ Not Constructed
- ☐ Infrastructure
- ☐ Legend
- ☐ Hydro Basins
- ☐ Vegetation
- ☐ Soils
- ☐ Public Lands
- ☐ MP 2012
- ☐ Land Change
- ☐ Land/Water
- ☐ HUC12
- ☐ Base Layer

Long: -96.54, Lat: 31.91

0 15 30mi

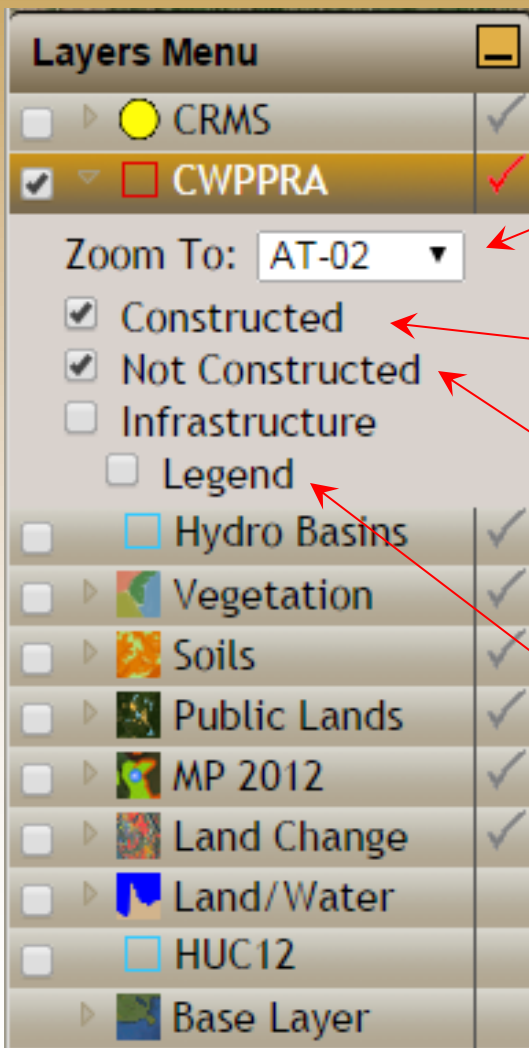
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerog





Coastwide Reference Monitoring System – *Wetlands*

Project Level Information



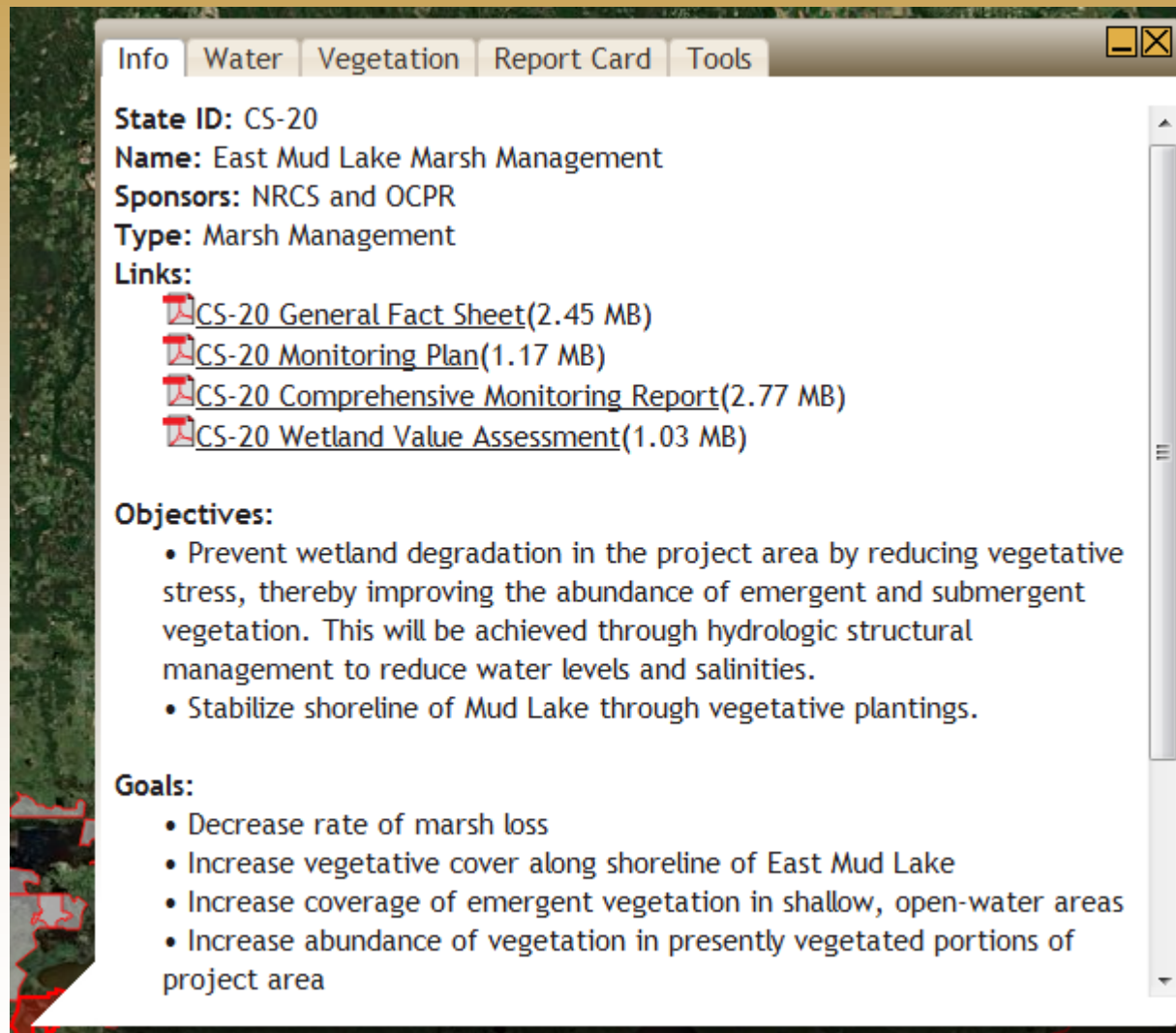
Zoom to function zooms to the project and shows the information bubble for it.

Adds/removes the Constructed projects layer to the map.

Adds/removes the “planning” projects layer to the map.

Adds/removes the Project Infrastructure layer to the map and shows the legend

Project Information Bubble

A screenshot of a web application window titled "Project Information Bubble". The window has a tabbed interface with tabs for "Info", "Water", "Vegetation", "Report Card", and "Tools". The "Info" tab is selected. The content area displays the following information:

State ID: CS-20
Name: East Mud Lake Marsh Management
Sponsors: NRCS and OCPR
Type: Marsh Management
Links:

- [CS-20 General Fact Sheet\(2.45 MB\)](#)
- [CS-20 Monitoring Plan\(1.17 MB\)](#)
- [CS-20 Comprehensive Monitoring Report\(2.77 MB\)](#)
- [CS-20 Wetland Value Assessment\(1.03 MB\)](#)

Objectives:

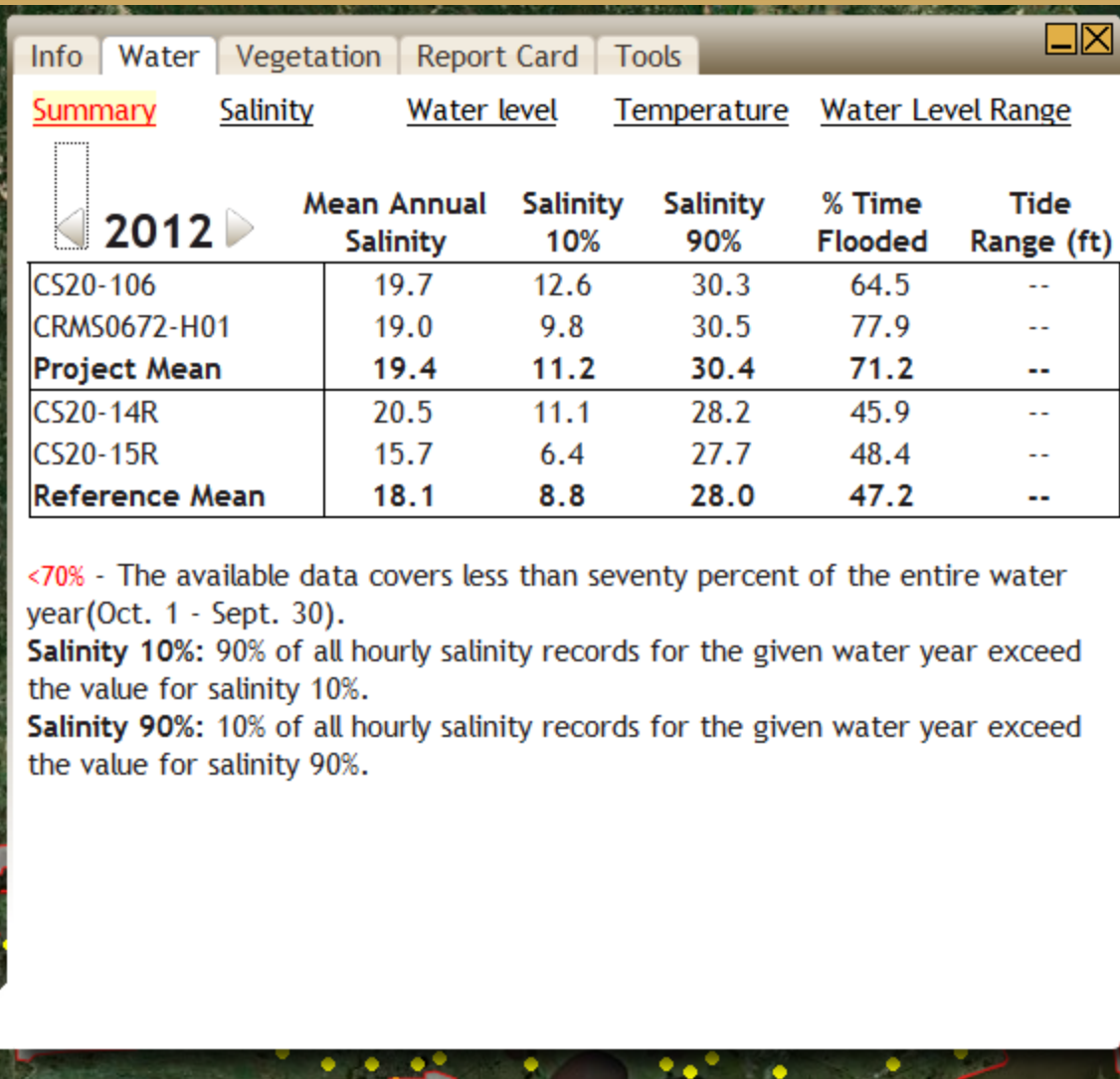
- Prevent wetland degradation in the project area by reducing vegetative stress, thereby improving the abundance of emergent and submergent vegetation. This will be achieved through hydrologic structural management to reduce water levels and salinities.
- Stabilize shoreline of Mud Lake through vegetative plantings.

Goals:

- Decrease rate of marsh loss
- Increase vegetative cover along shoreline of East Mud Lake
- Increase coverage of emergent vegetation in shallow, open-water areas
- Increase abundance of vegetation in presently vegetated portions of project area

The information bubble appears when a CWPPRA project is clicked. The Project Info tab is automatically chosen when the bubble pops up on the screen.

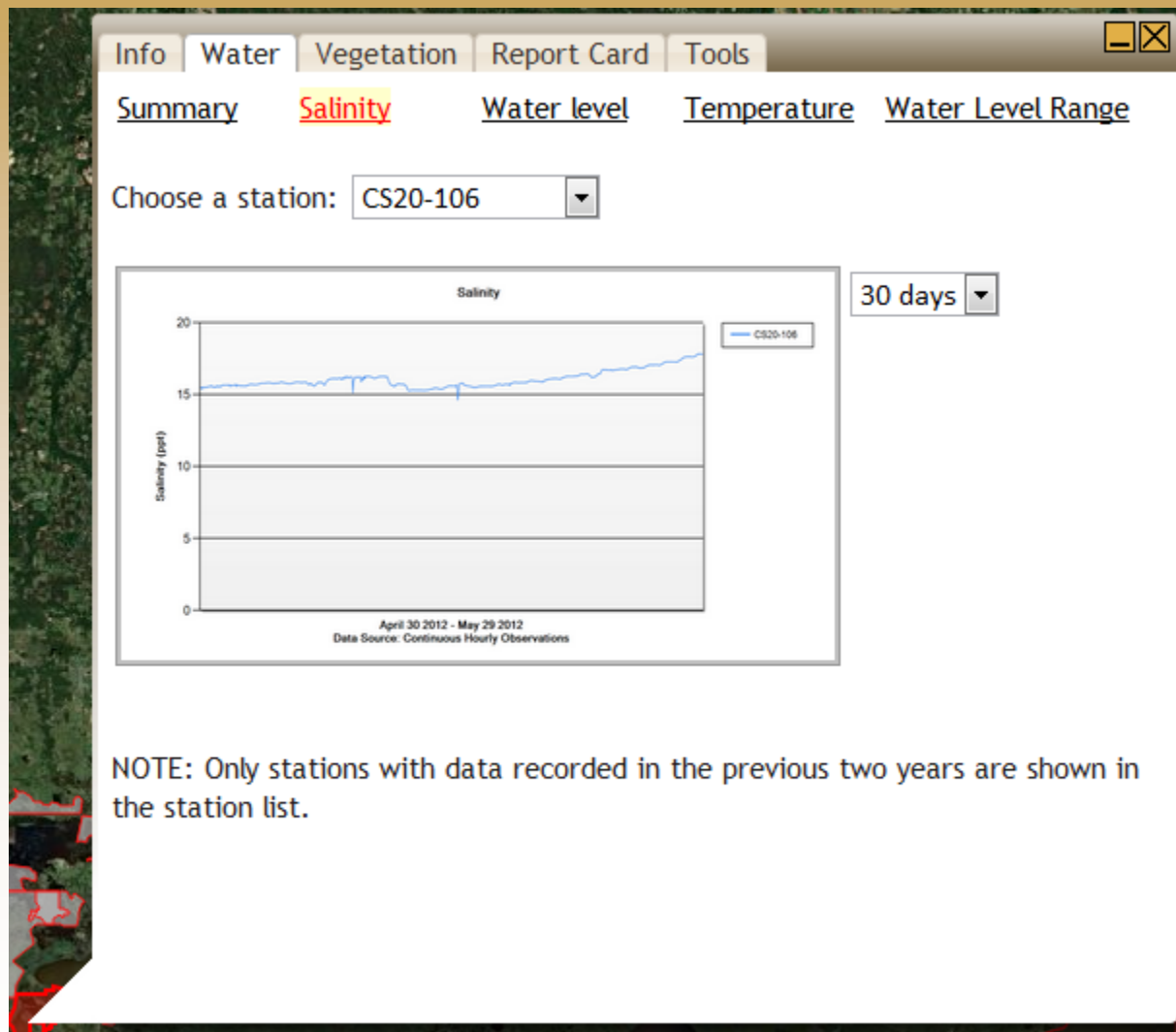
Project Information Bubble



The Water tab contains all hydrologic information for the selected project.

Summary – Gives a brief overview of the hydro data available for the project.

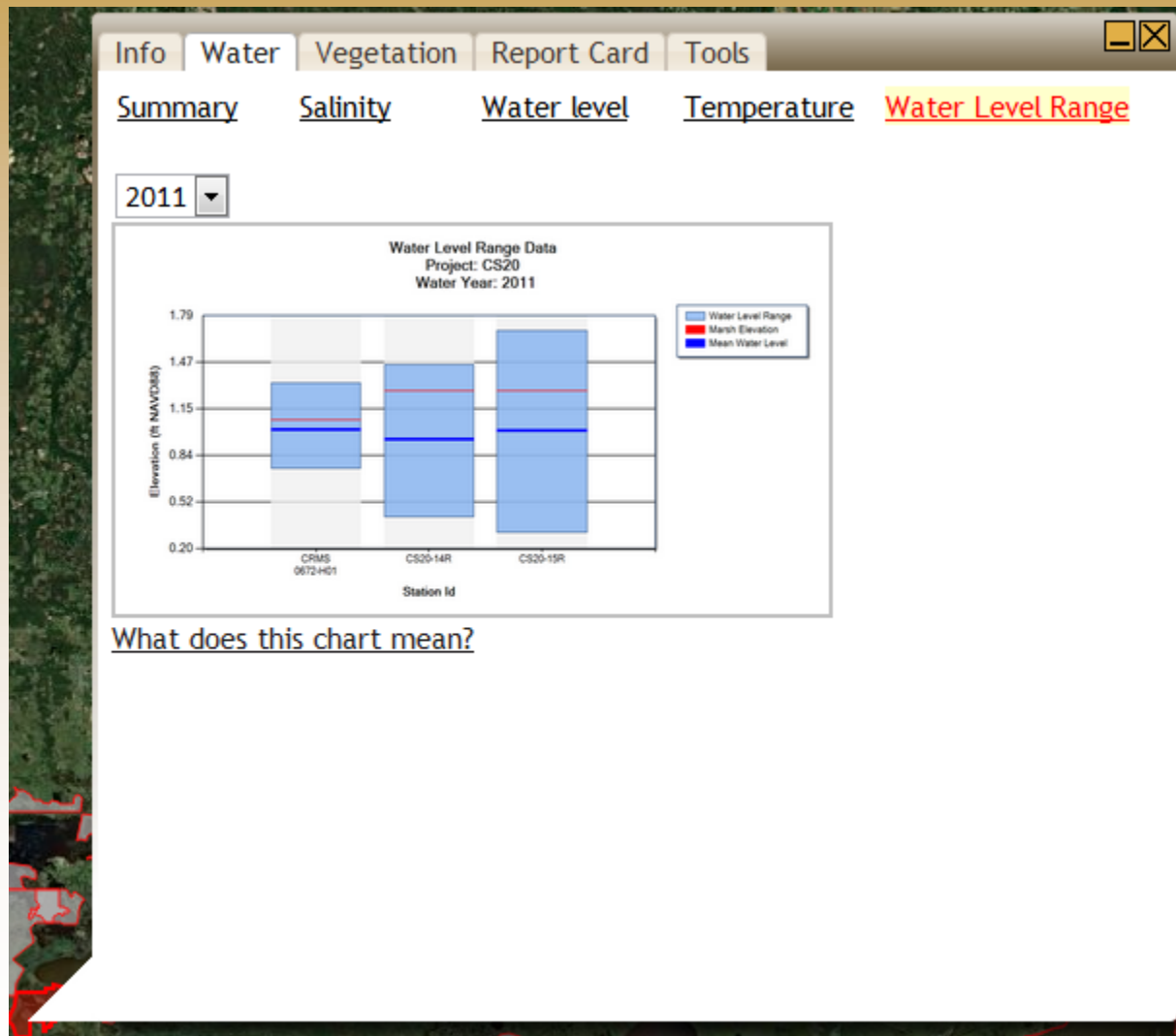
Project Information Bubble



The Water tab contains all hydrologic information for the selected project.

Salinity – Charts most recent data for hydro stations located within the project.

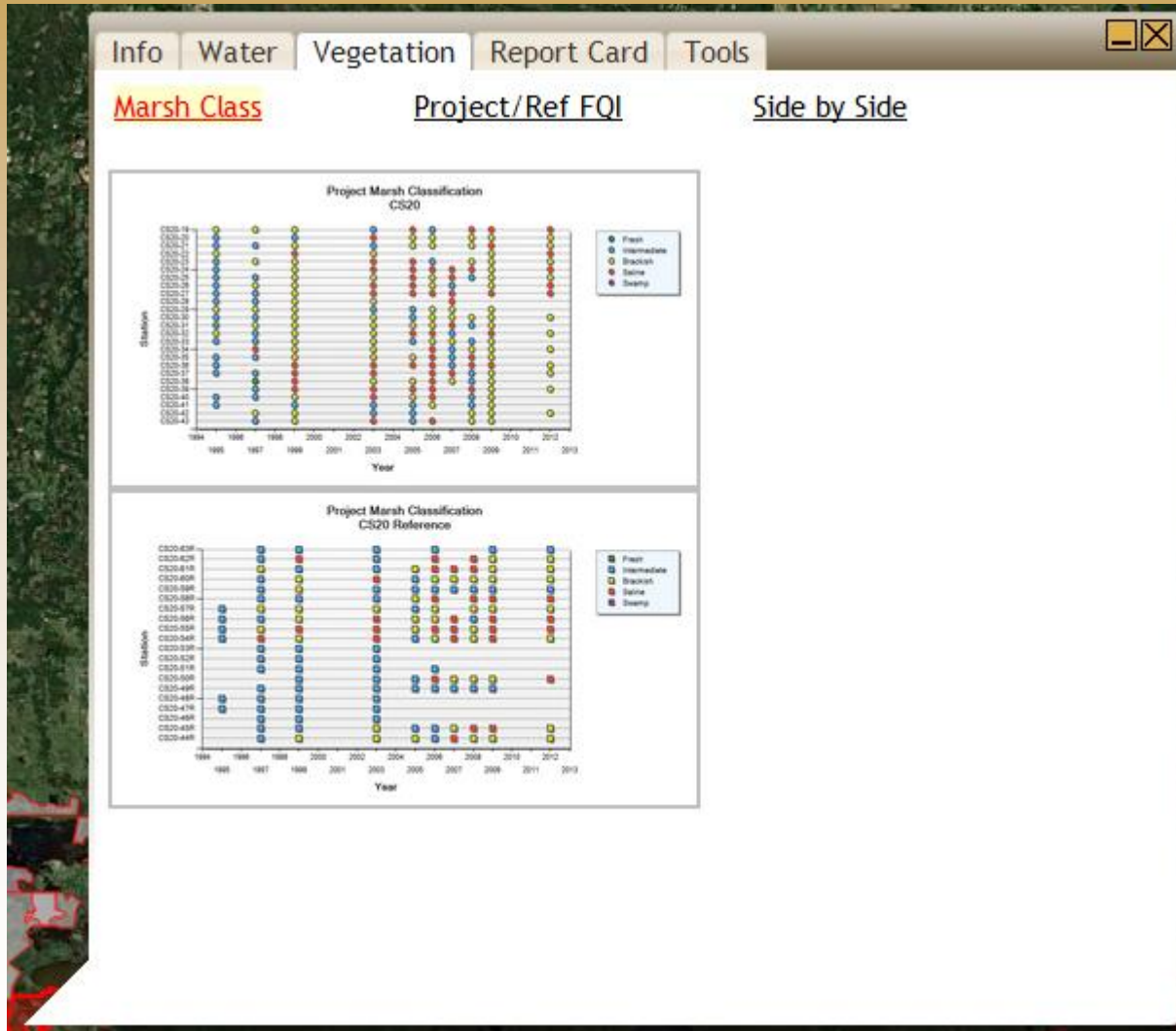
Project Information Bubble



The Water tab contains all hydrologic information for the selected project.

Water Level Range – Charts water level range data for **hydro stations located within the project.**

Project Information Bubble



The Vegetation tab contains all vegetation information for the selected project.

Marsh classification at project and reference stations over multiple years.

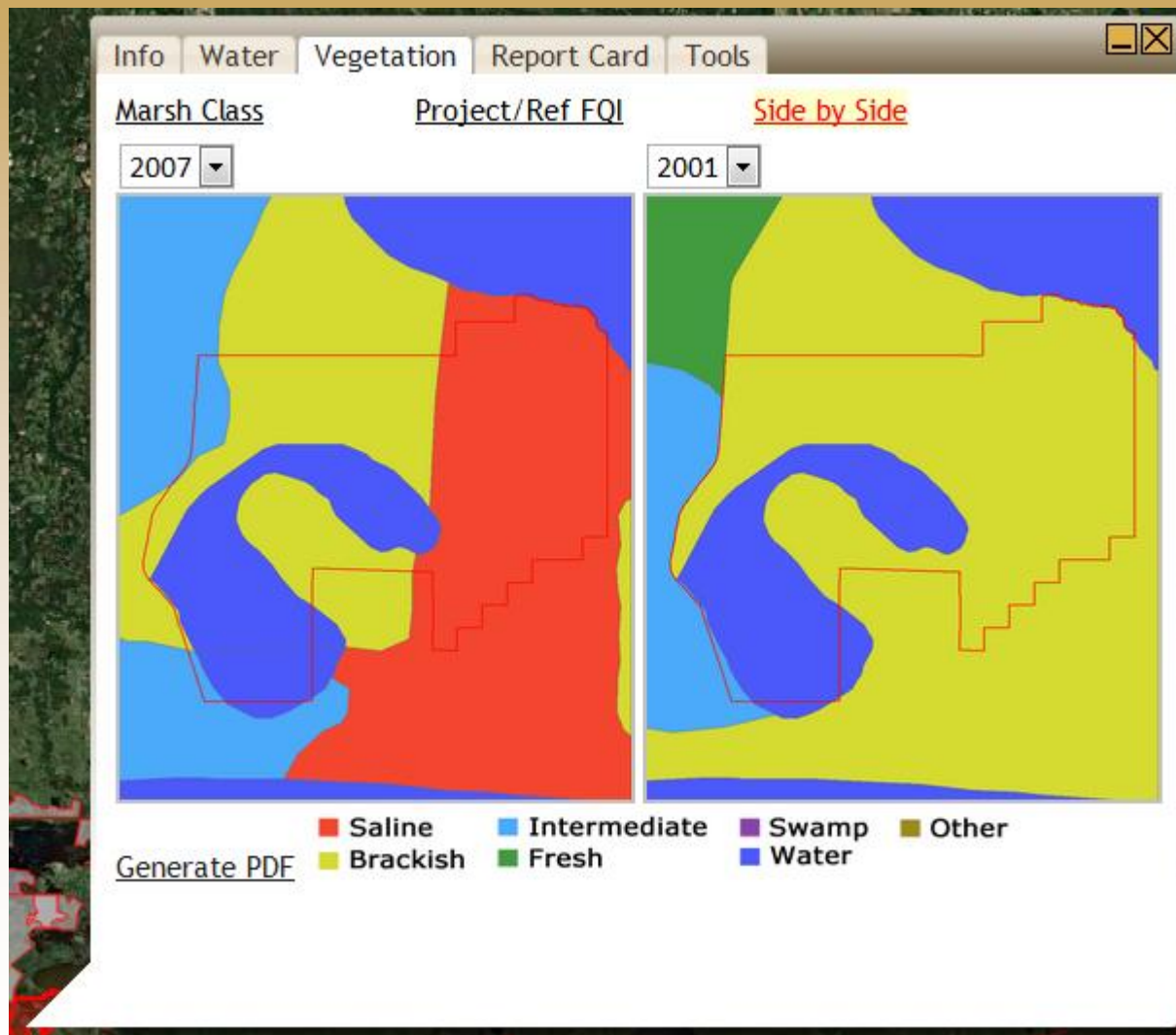
Project Information Bubble



The Vegetation tab contains all vegetation information for the selected project.

Project/Ref FQI – Project Scale Floristic Quality Index Chart.

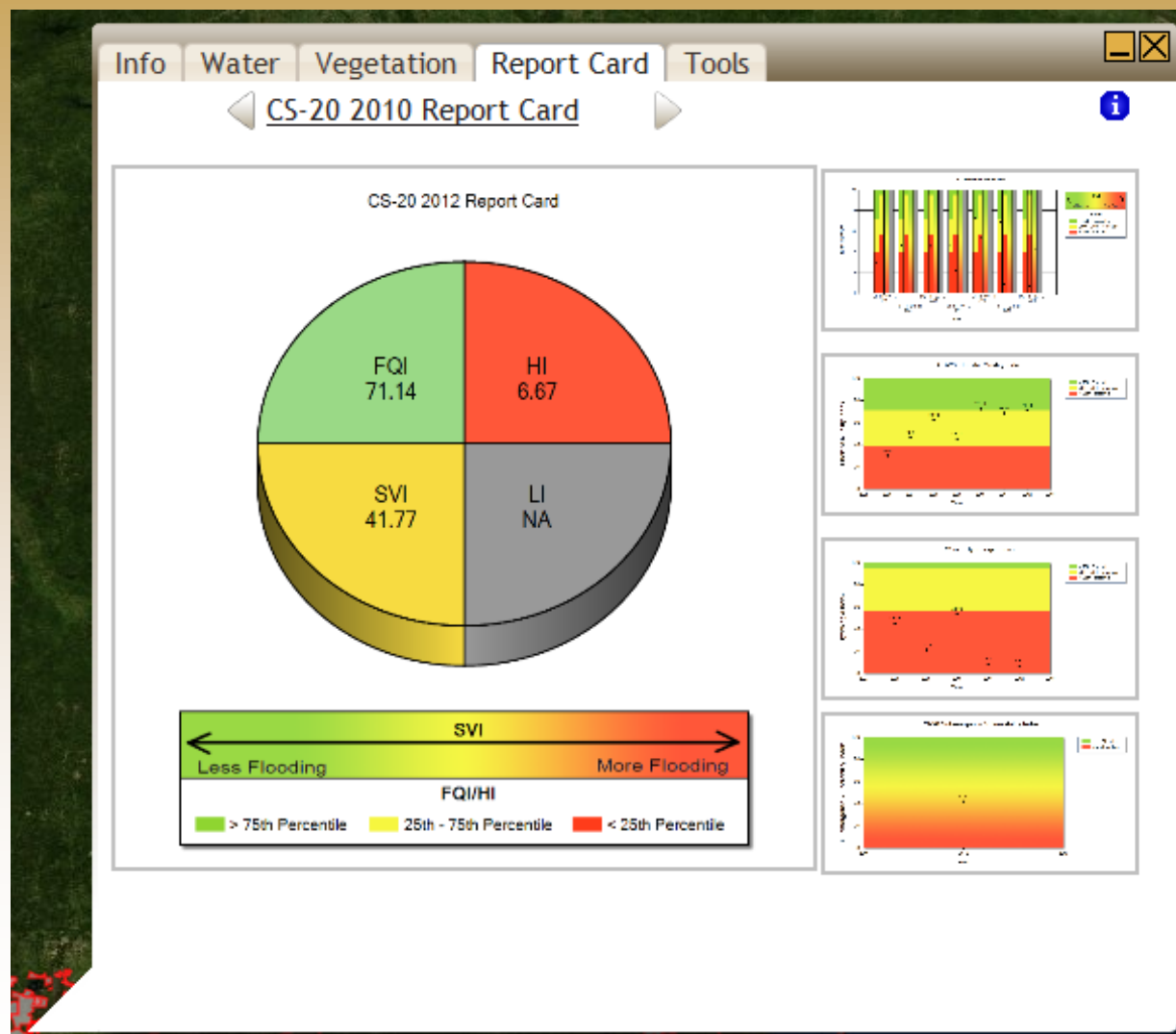
Project Information Bubble



The Vegetation tab contains all vegetation information for the selected project.

Side by Side – Side by side comparison of Marsh Class using the raster image created from helicopter surveys.

Project Information Bubble



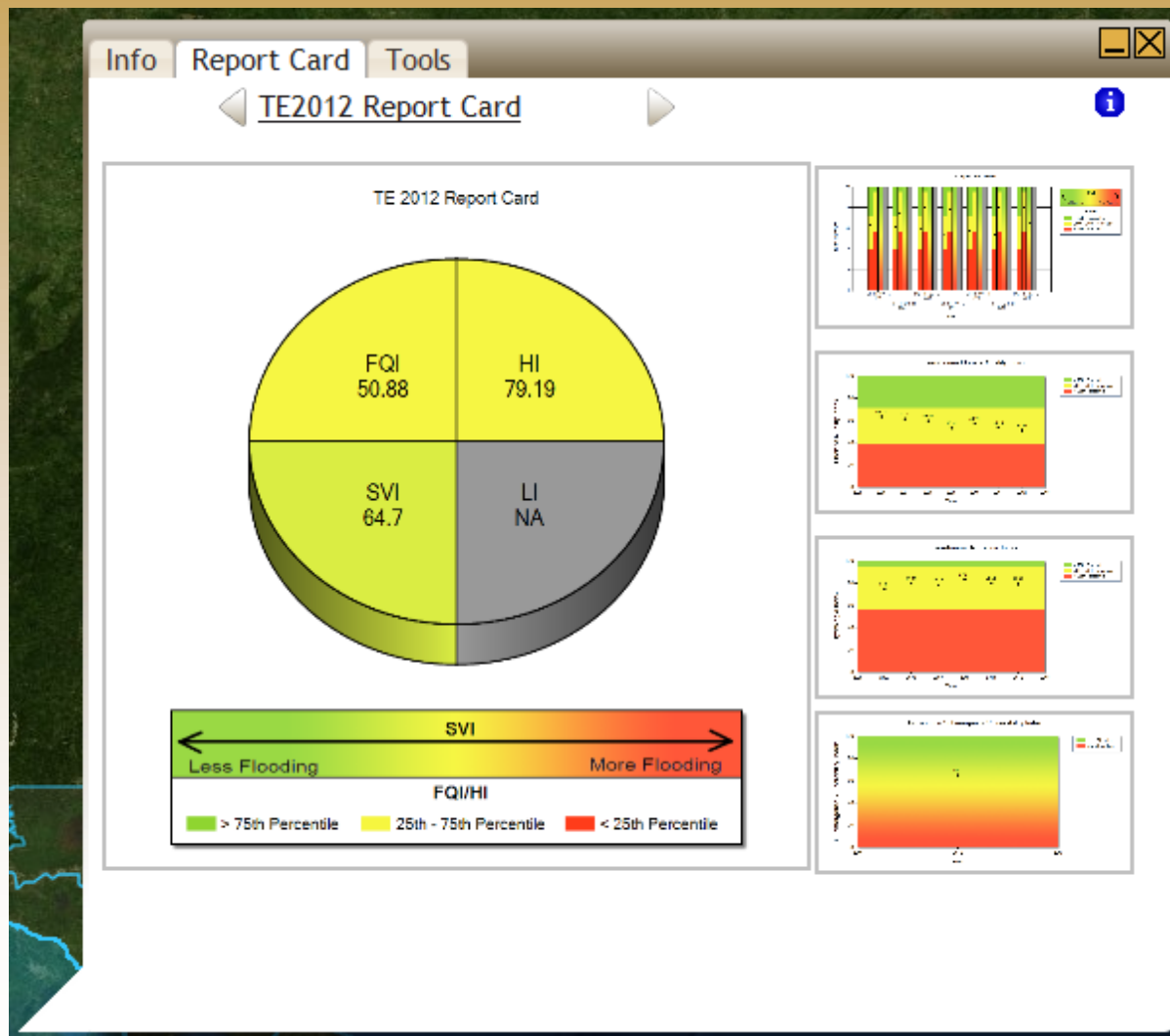
The Report Card tab contains all report card information for the selected project.

Report Card-Summary of project scale information compiled into a report card.

Hydrologic basins as defined by CWPPRA



Basin Information Bubble



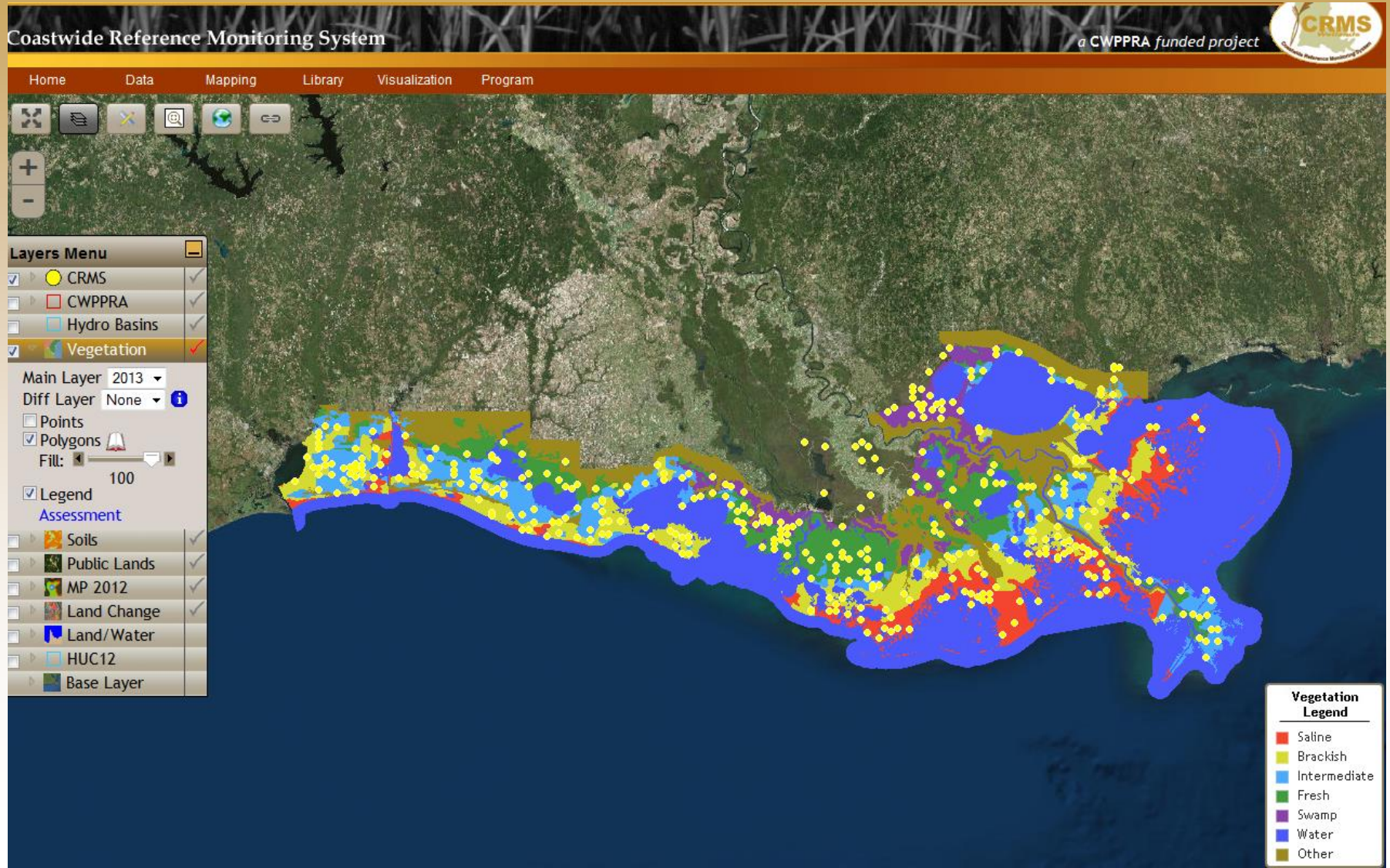
The Report Card tab contains all report card information for the selected basin.

Report Card – Summary of basin scale information compiled into a report card.



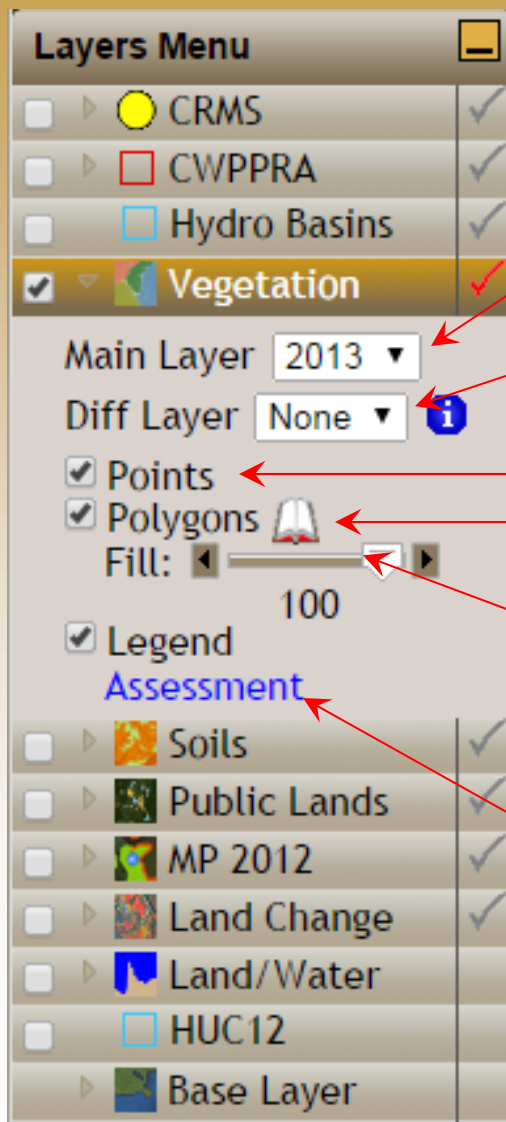
Coastwide Reference Monitoring System – Wetlands Vegetation Layer

**Vegetation classification based on helicopter surveys,
O'Neil 1949 through Sasser et al. 2013, 8 surveys**





Coastwide Reference Monitoring System – *Wetlands* Vegetation Layer



Main Year selects the primary polygon layer on the map.

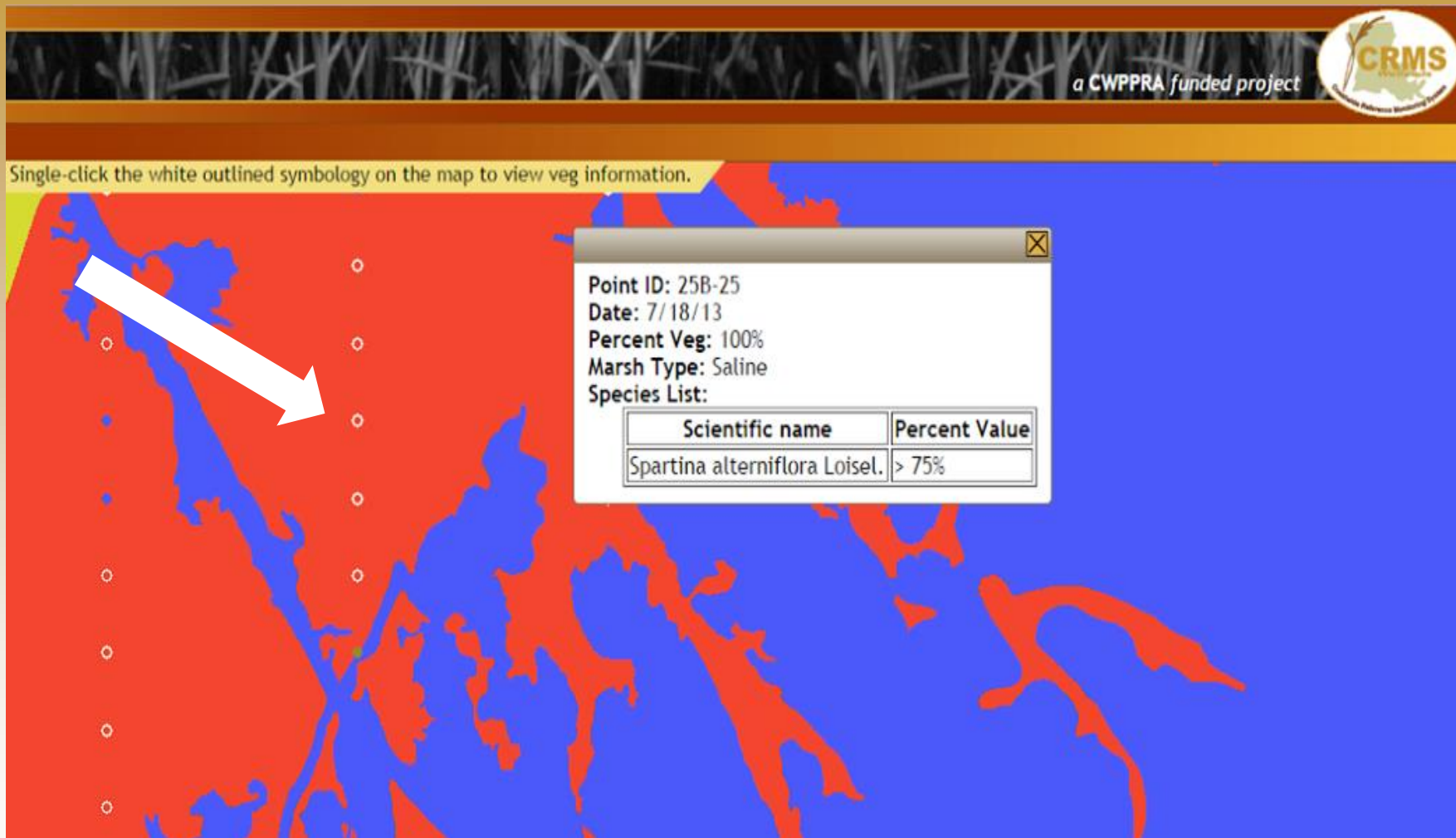
Diff Year selects the secondary polygon layer on the map.

Adds/removes the vegetation data points.

Adds/removes the vegetation polygons layer.

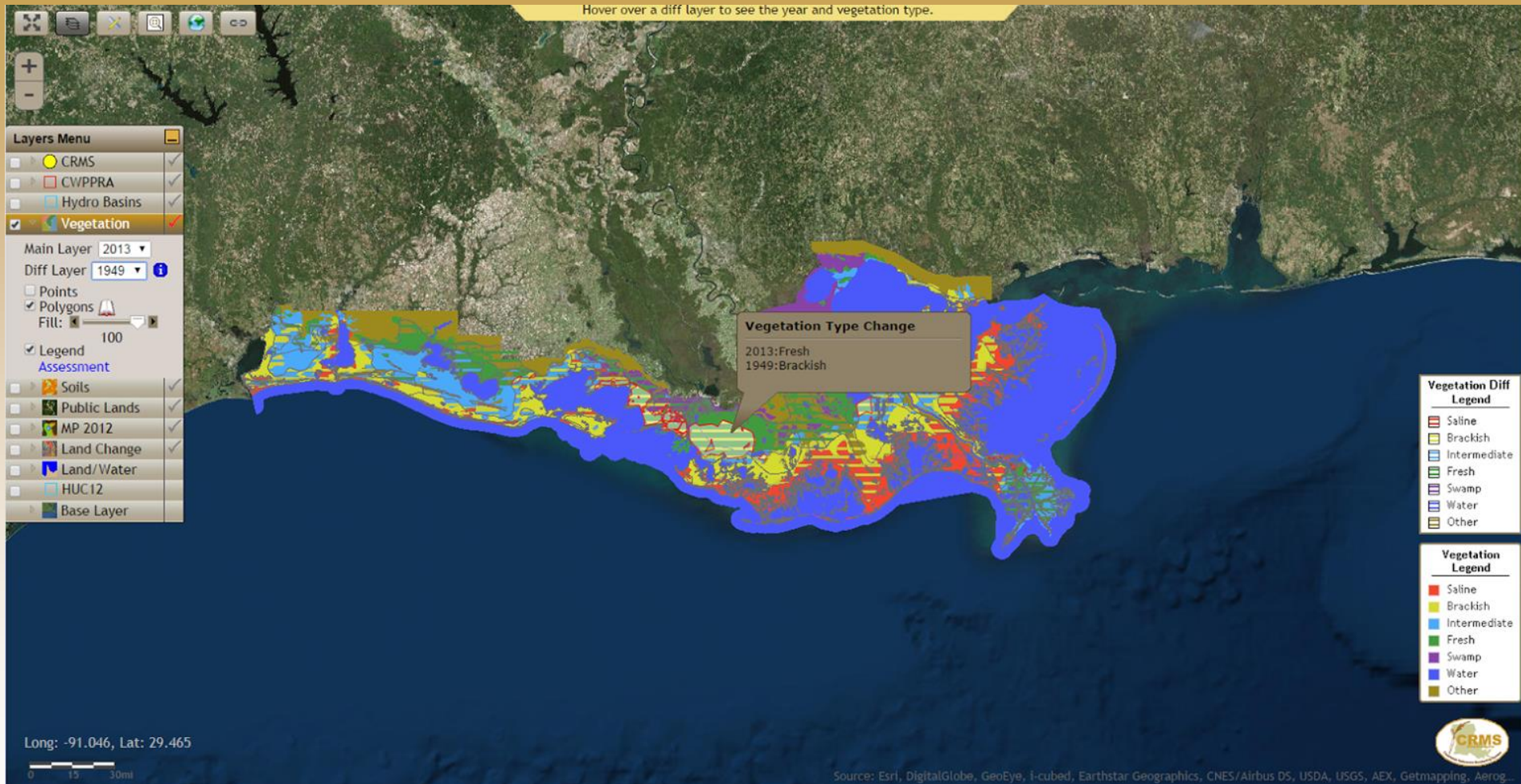
The slider changes the transparency of the layer.

Assessment link invokes the acreage assessment tool menu for the currently selected year.



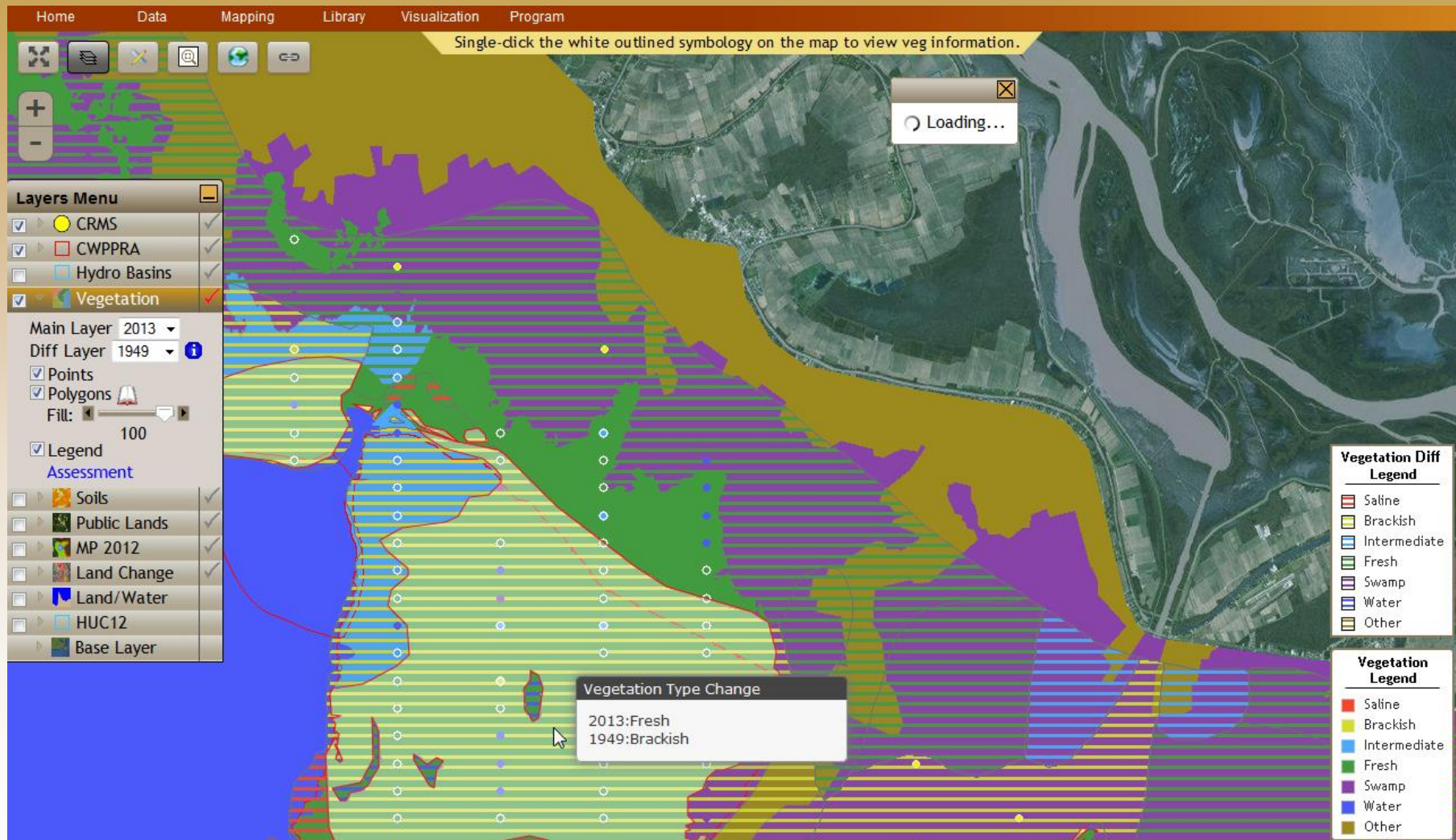
Points display the site specific vegetation data when clicked.

Vegetation Difference Layer Functionality

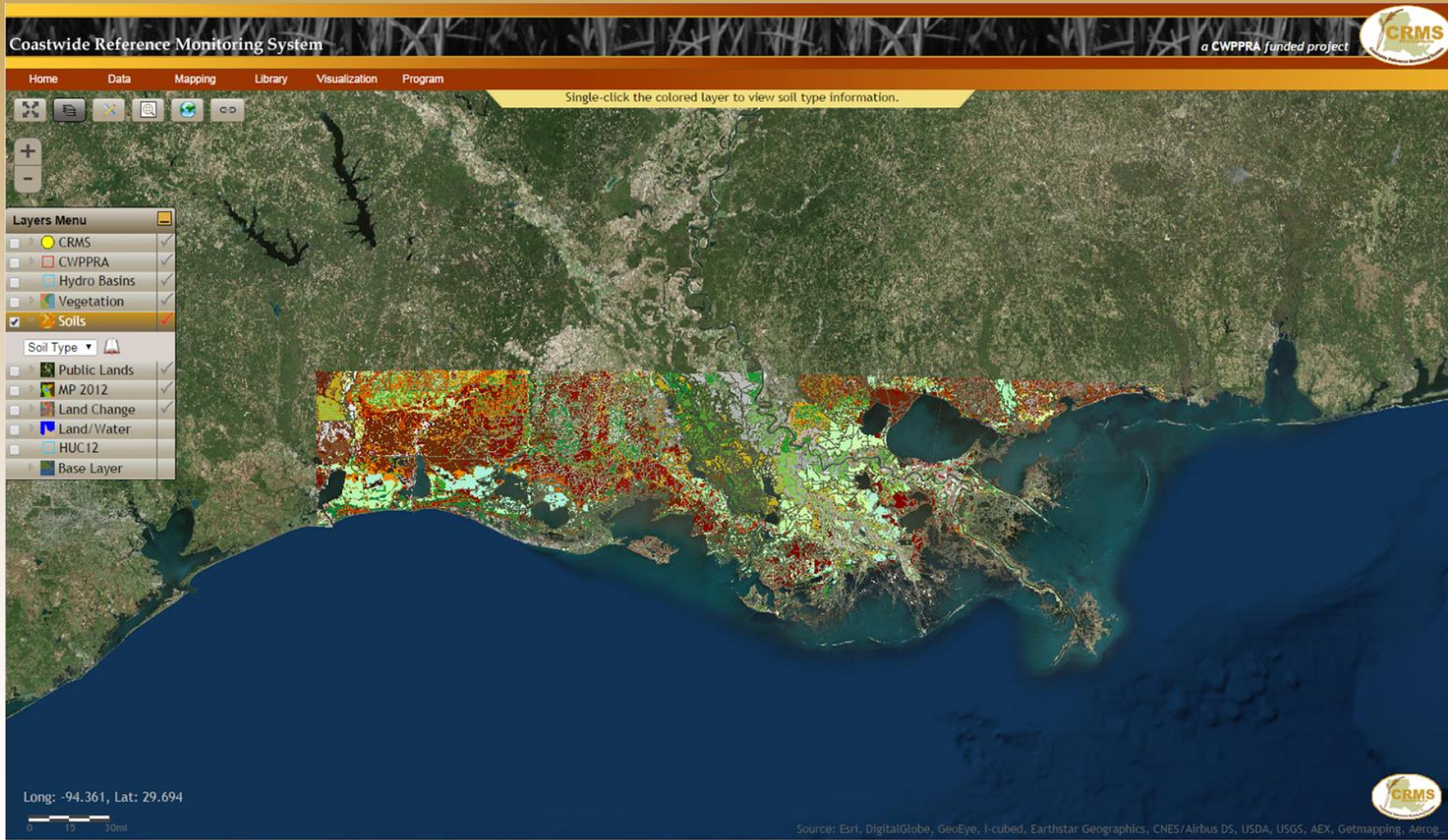


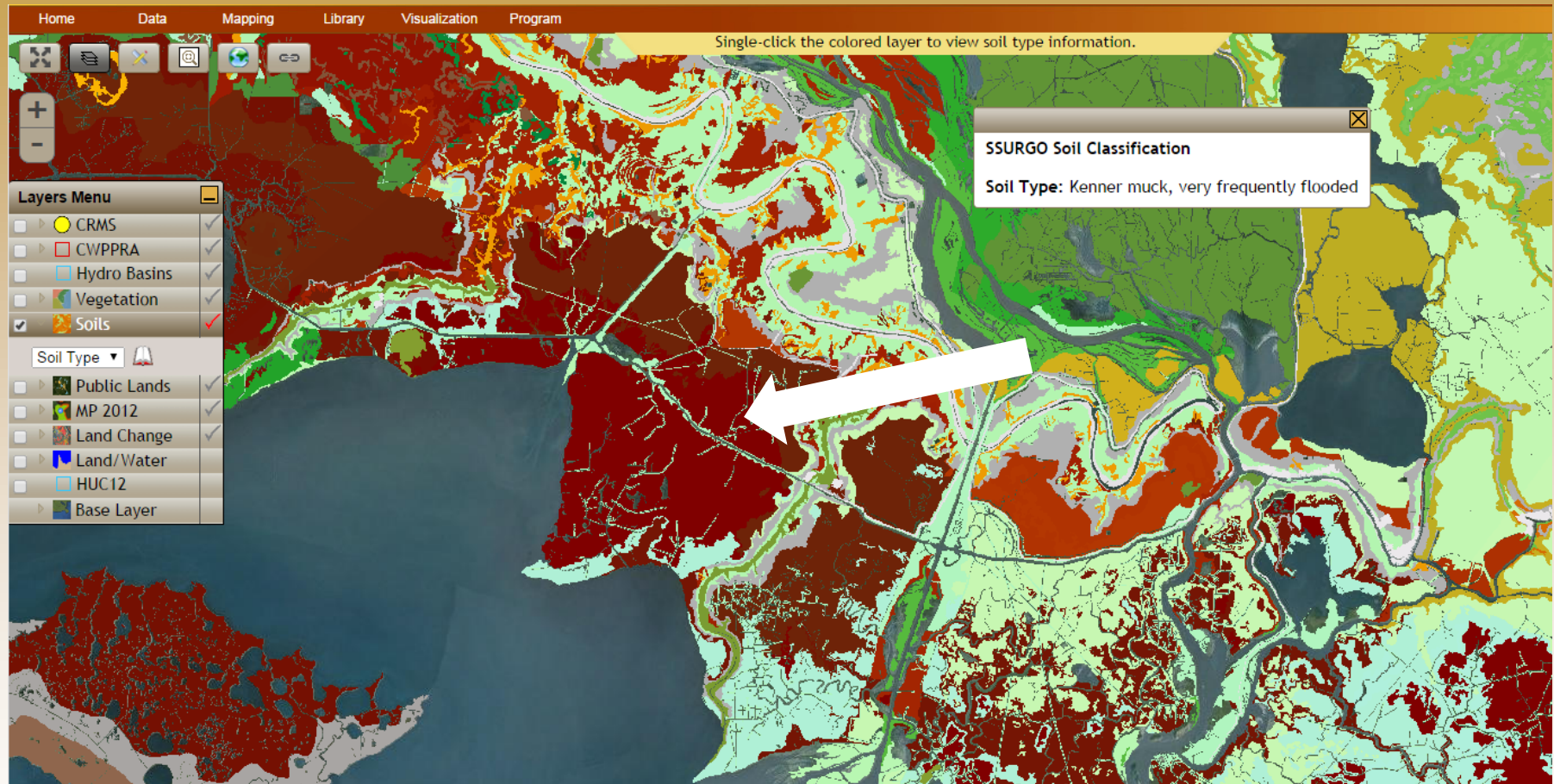
The “Vegetation Change” is shown when two different years are chosen for the Main Layer and Diff Layer.

Vegetation Difference Layer Functionality



NRCS SSURGO data displayed



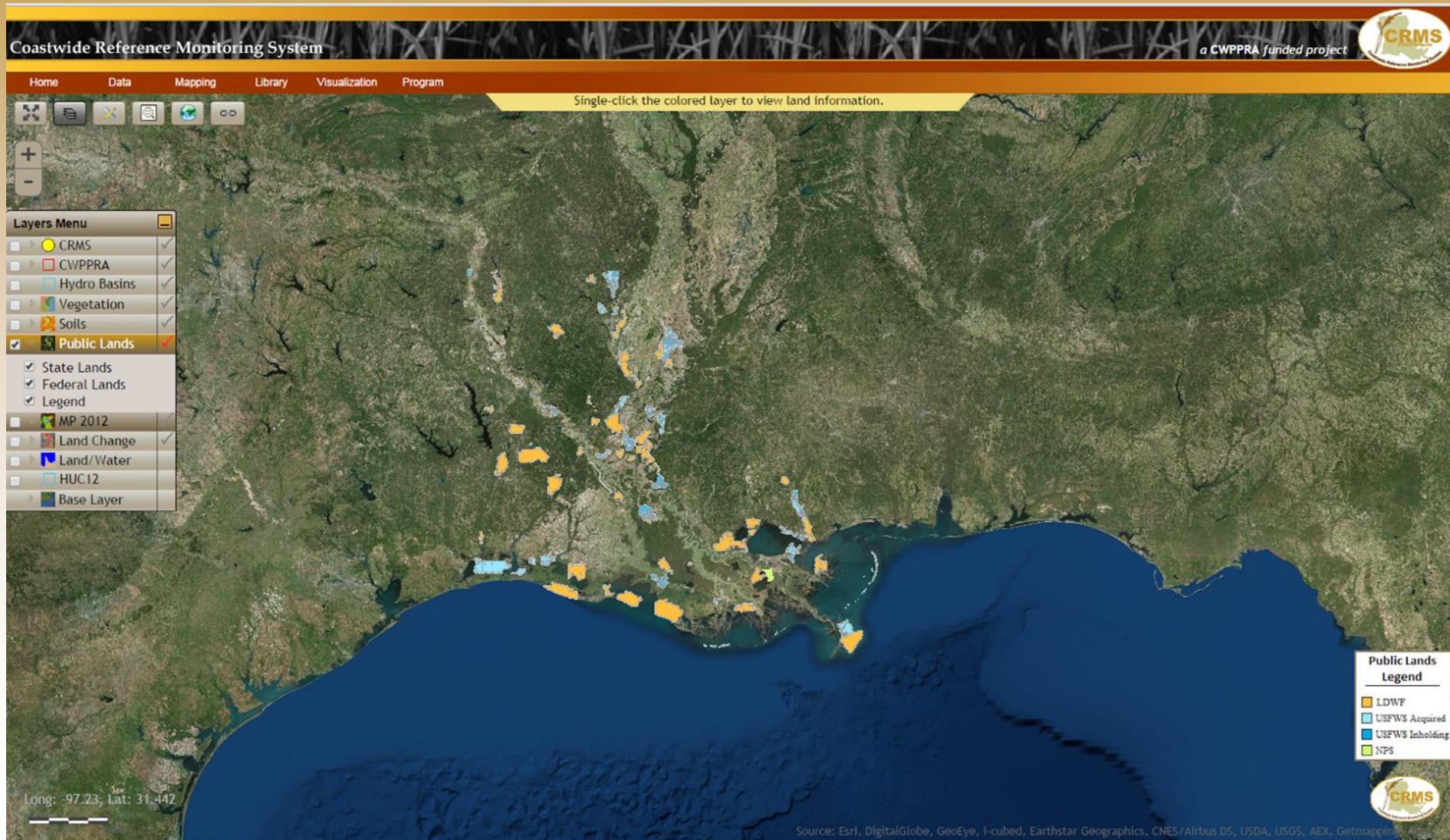


The Soil Type information window pops up when a soil area is clicked.



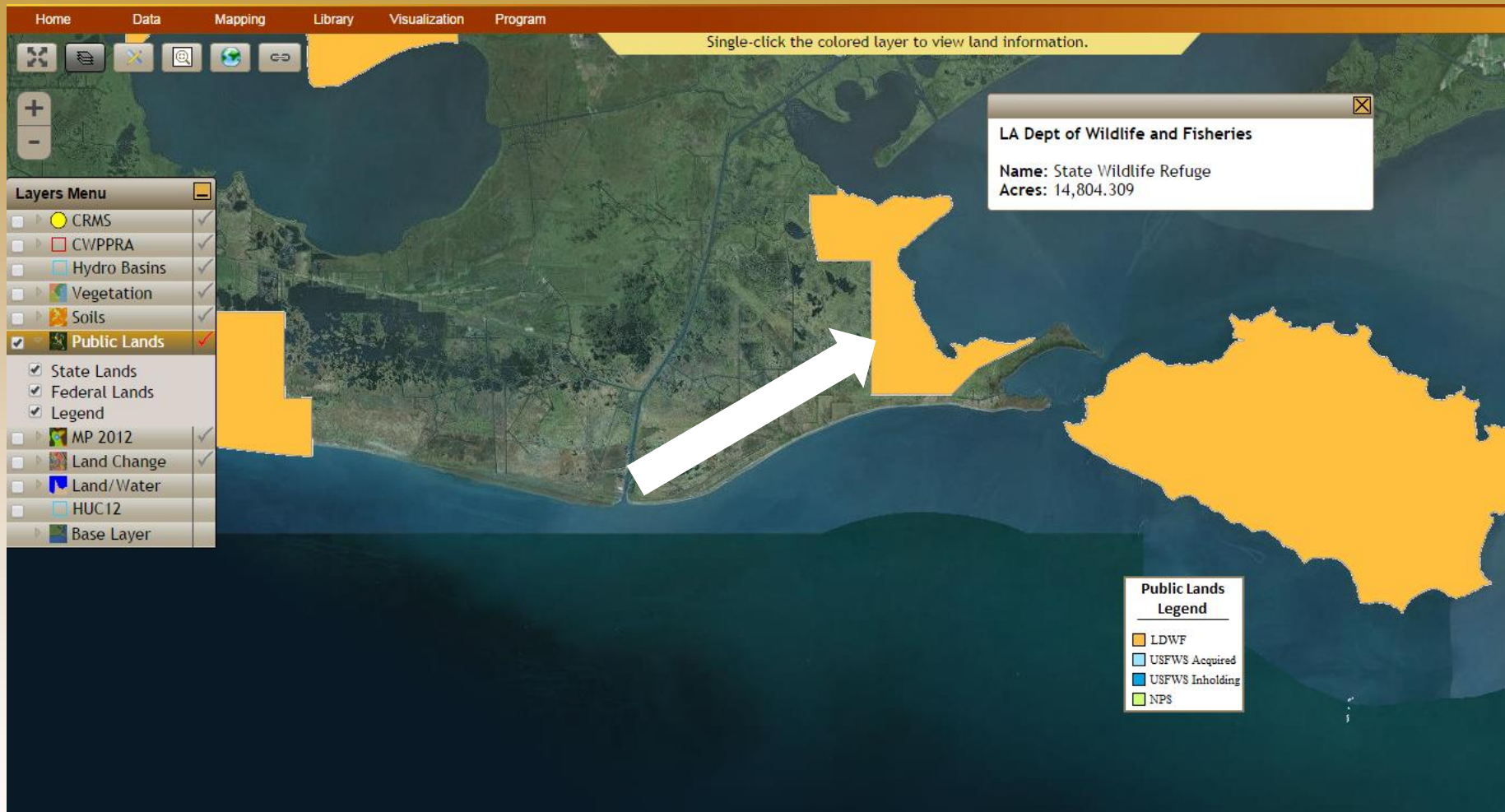
Coastwide Reference Monitoring System – Wetlands Public Lands Layer

Displays Federal (USFWS and NPS) and State (LDWF) land holdings.





Coastwide Reference Monitoring System – Wetlands Public Lands Layer



The Public Lands information window pops up when a Public Lands polygon is clicked.

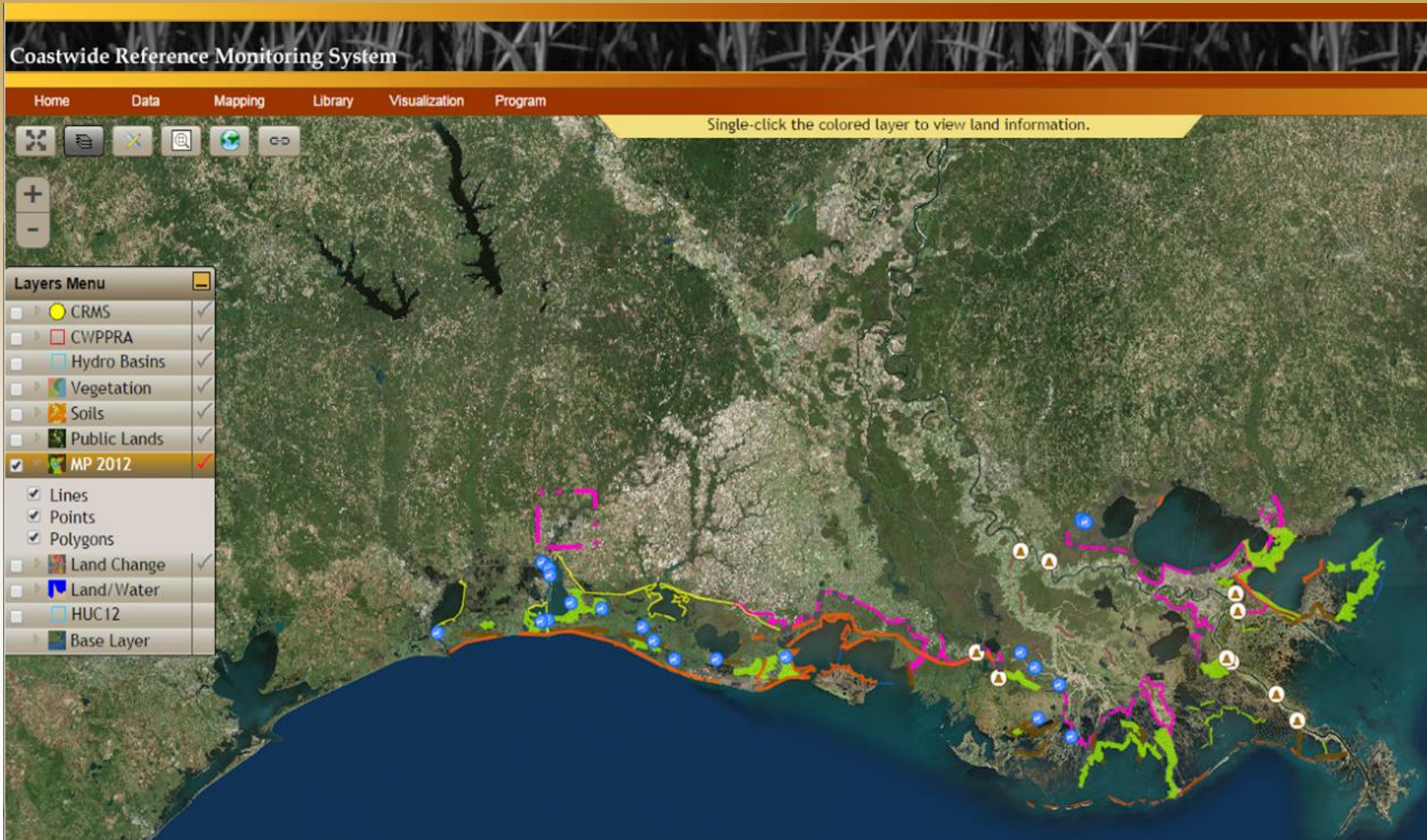


Coastwide Reference Monitoring System – Wetlands

Louisiana's Comprehensive Master Plan 2012 Layer

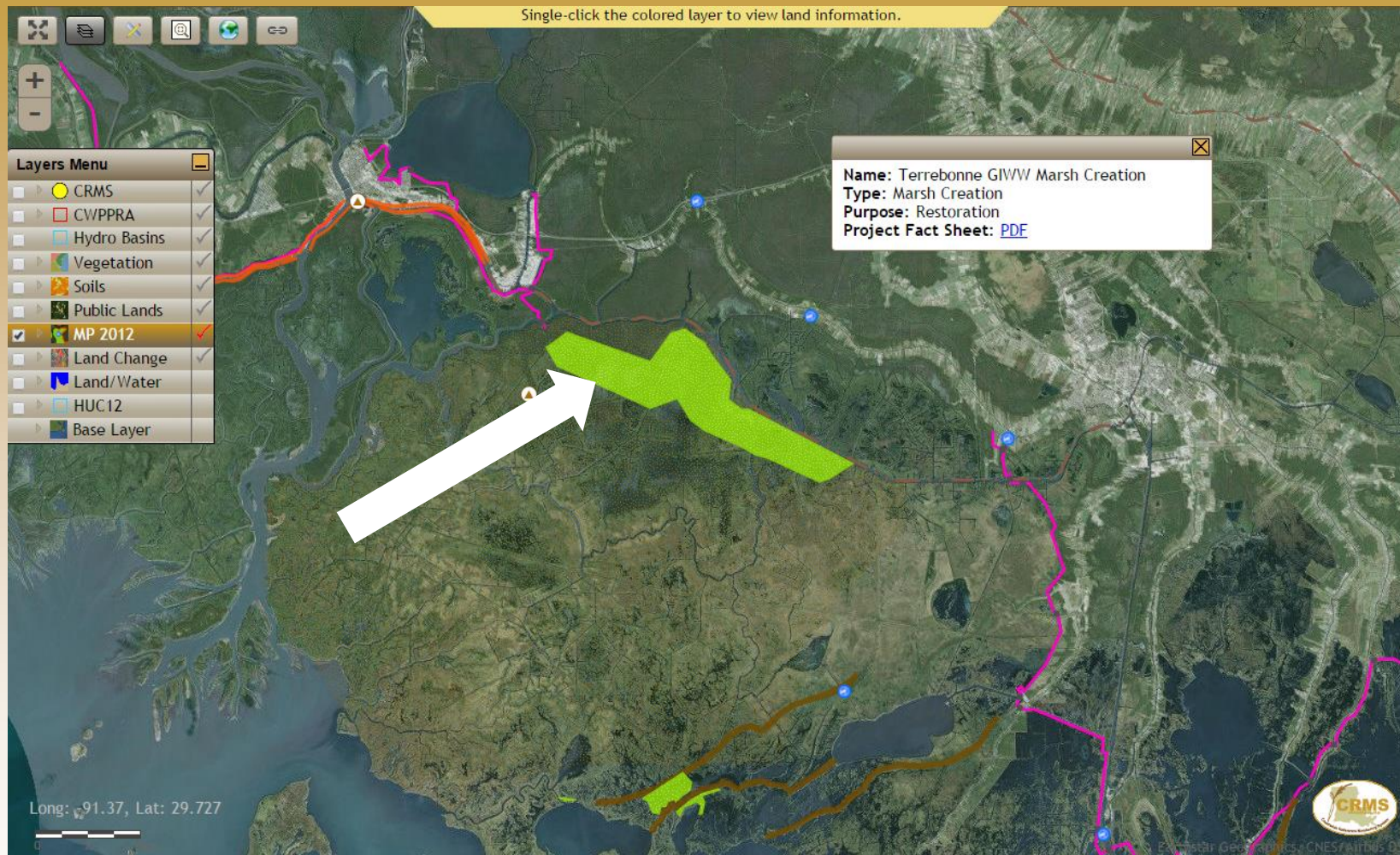
Master Plan project types and general project areas.

Additional visualizations of this information available through CIMS.





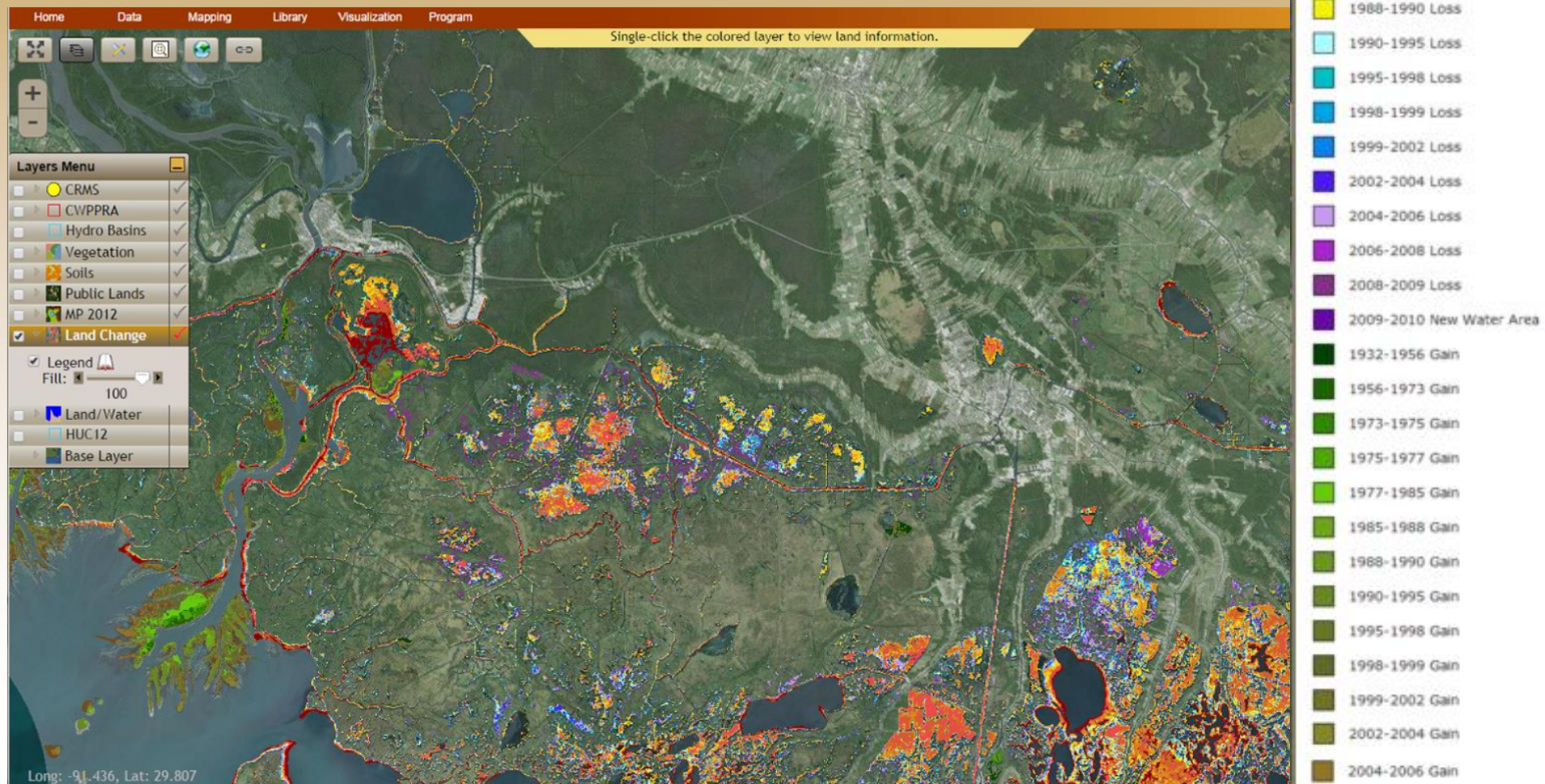
Coastwide Reference Monitoring System – Wetlands Louisiana's Comprehensive Master Plan 2012 Layer



The Master Plan information window providing project information pops up when a symbology is clicked.

Couvillion et al., 2011. Land Area Change in Coastal Louisiana from 1932 to 2010.

Displays land change (both loss and gain) broken down by time intervals.





Land/Water classifications from 1932 to 2010

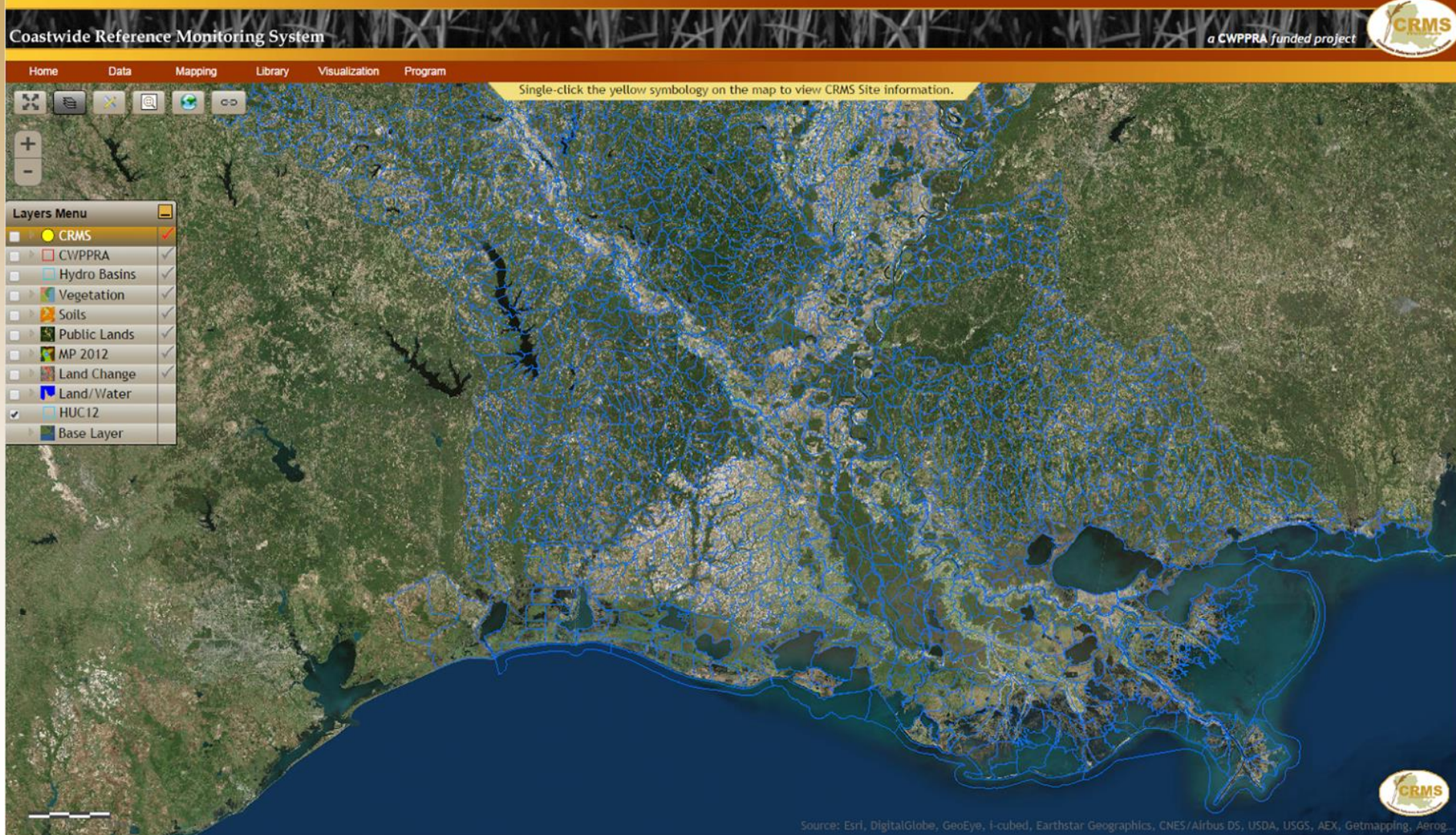
18 classification dates based on satellite imagery, 30m resolution.



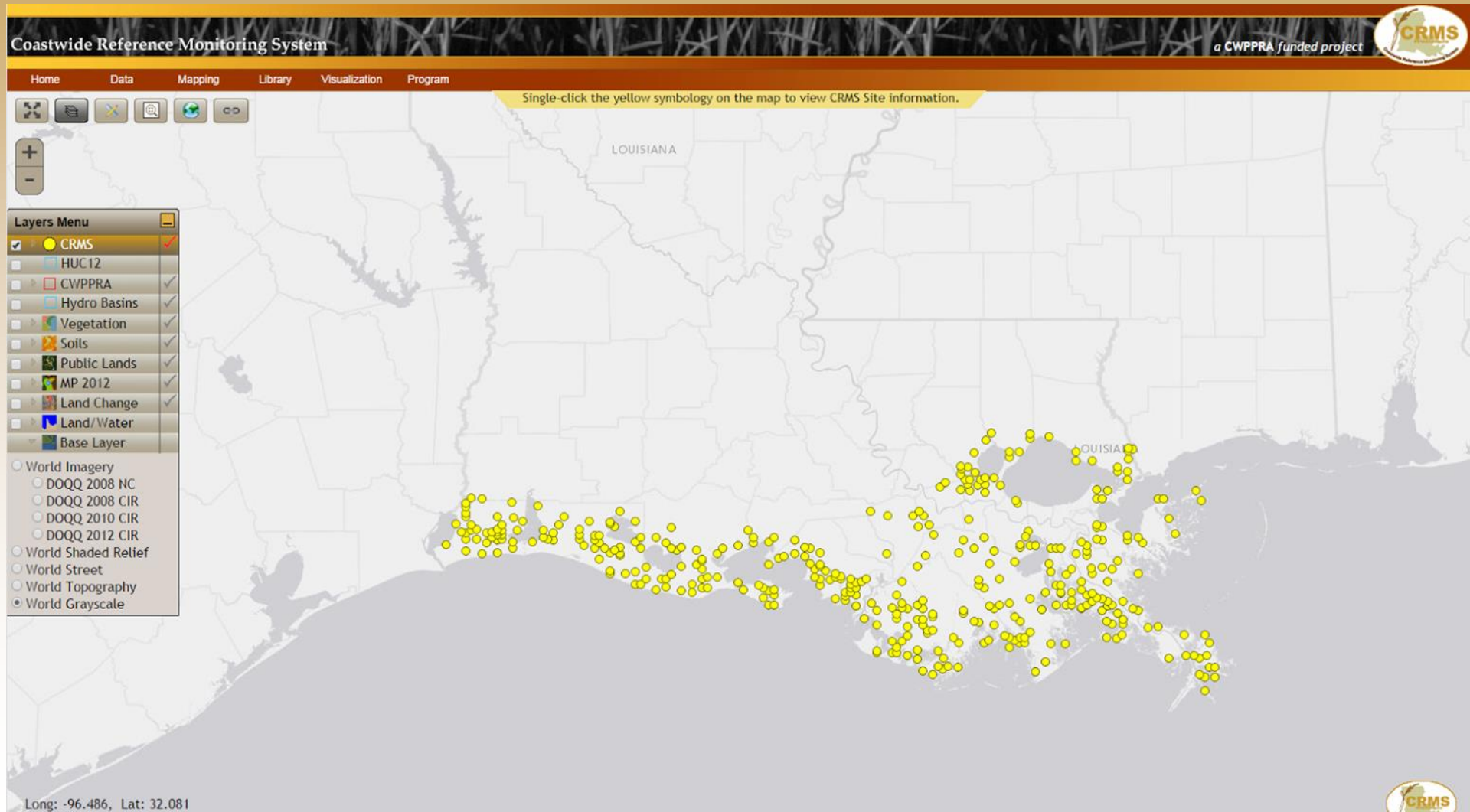


Coastwide Reference Monitoring System – Wetlands Watershed Boundary Layer

NRCS's Hydrologic Unit Code (HUC) Boundaries—12 digit subwatershed classification



Ability to visualize the base map layer as different years of aerial photography or world imagery.

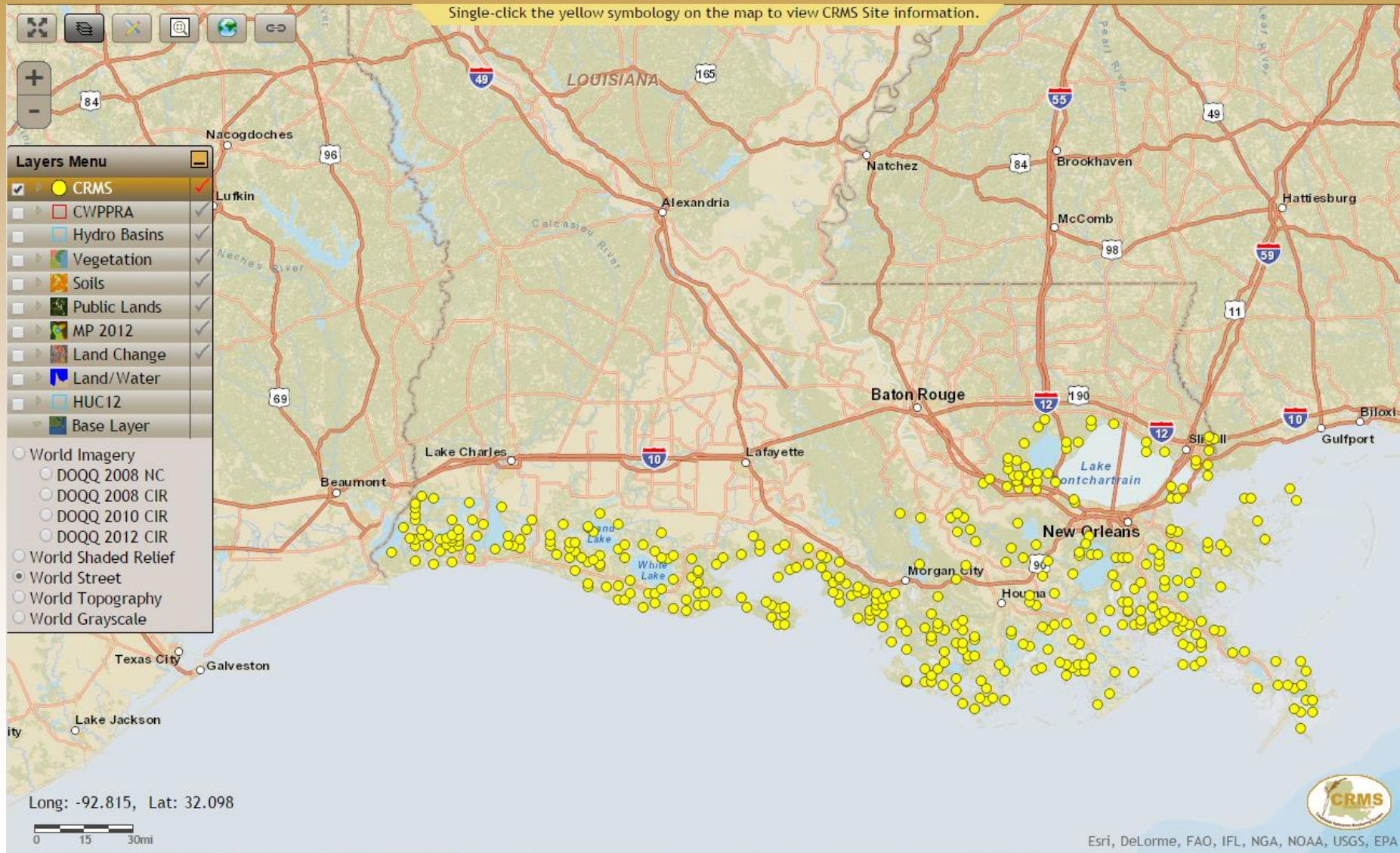




Coastwide Reference Monitoring System – Wetlands

Optional Base Layers

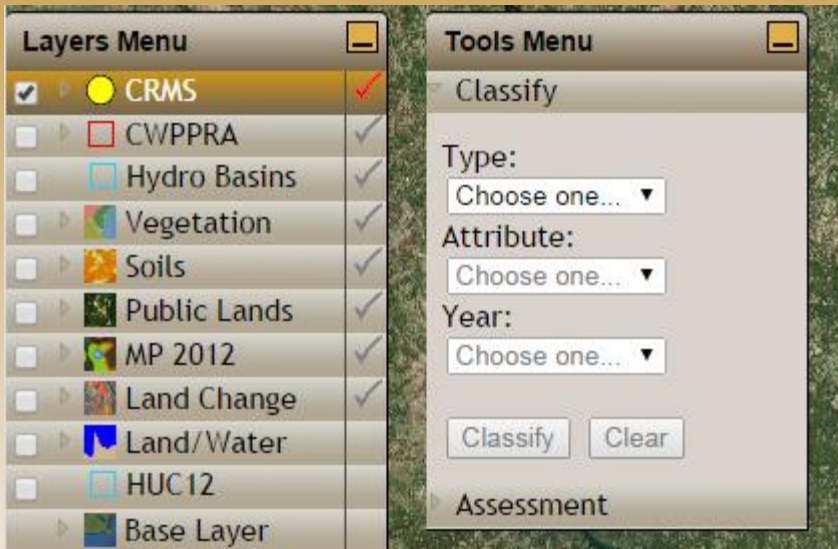
Streets Base Layer





Classify Tool- allows all CRMS sites to be visualized based on user-selected parameters.

A Type, Attribute, and Year must be chosen to Classify the CRMS sites.



- **Vegetation**

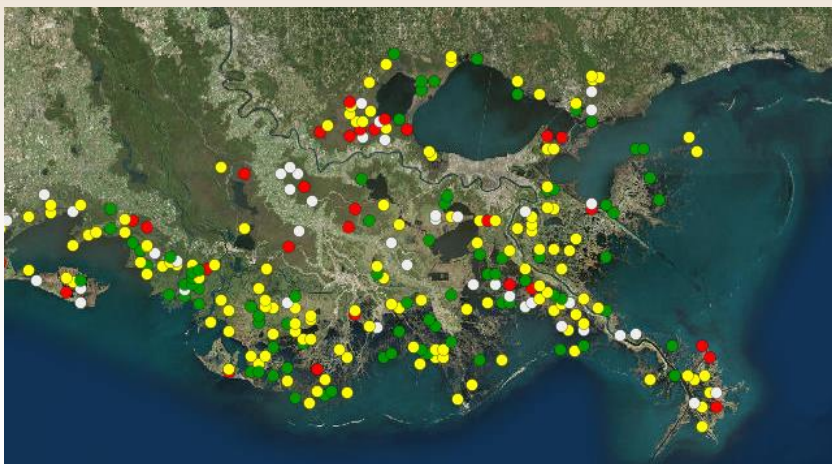
- FQI
- Marsh Classification

- **Hydro**

- Hydro Index
- Salinity
- Water Level

- **Soil**

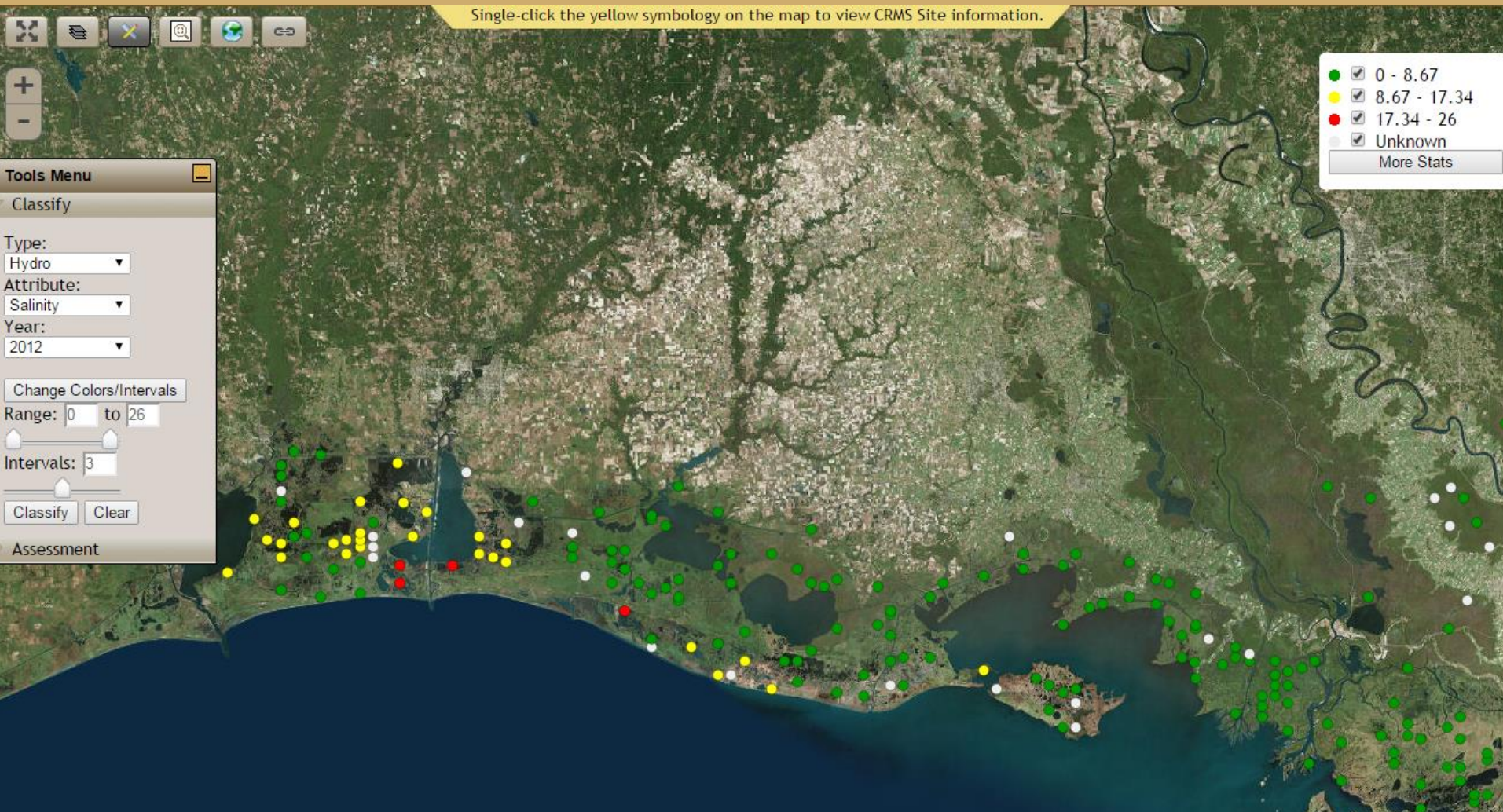
- Calculated Elevation Change (CEC)
- Submergence Vulnerability Index (SVI)





Coastwide Reference Monitoring System – Wetlands

CRMS Classify Tool



User defines classification intervals and color ramp. For each CRMS index the defaults are red, yellow, green (as in the report card).

Tools Menu

Classify

Type: Hydro

Attribute: Salinity

Year: 2012

Change Colors/Intervals

Range: 0 to 26

Intervals: 3

Classify Clear

Assessment

Tools Menu

Classify

Type: Hydro

Attribute: Salinity

Year: 2012

Change Colors/Intervals

Range: 13 to 26

Intervals: 5

Classify Clear

Assessment

Tools Menu






Classify

Type: Hydro

Attribute: Salinity

Year: 2012

Change Ranges

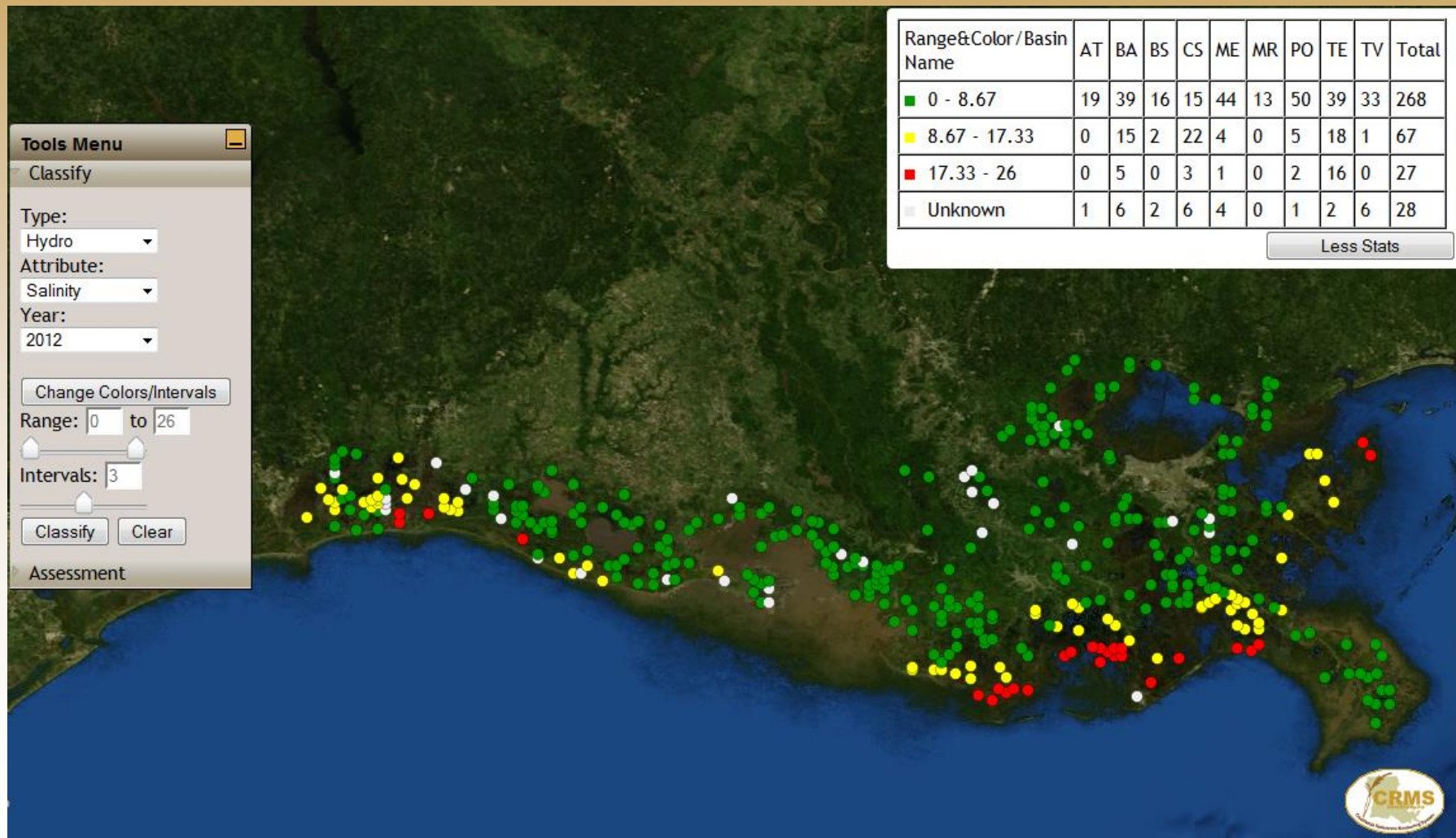
13	15.6	
15.6	18.2	
18.2	20.8	
20.8	23.40	
23.40	26	
Unknown		

Classify

Assessment



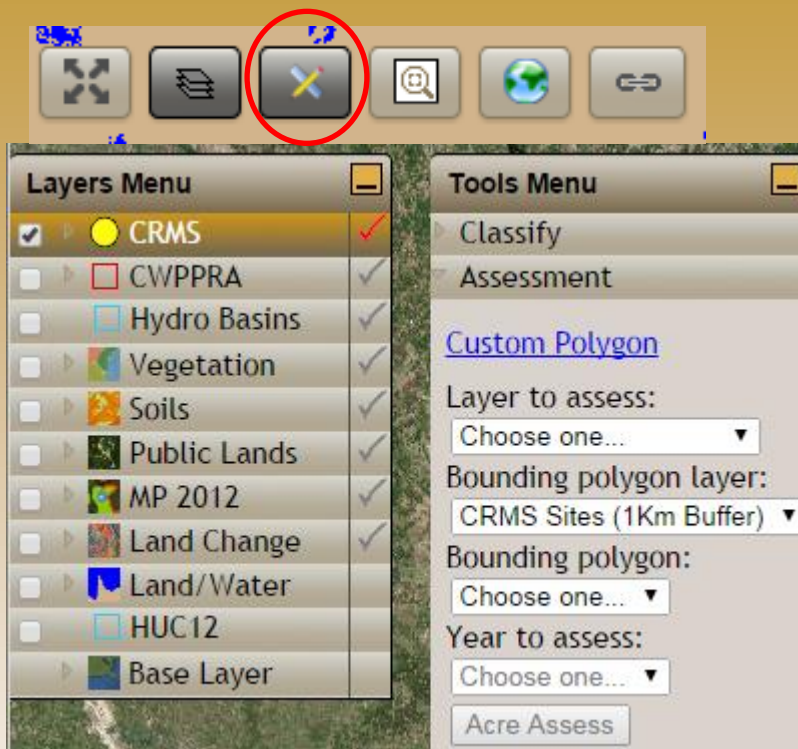
The tool will tally the classification categories by hydrologic basin.





Coastwide Reference Monitoring System – *Wetlands*

CRMS Acreage Assessment Tool



Acreage Assessment Tool provides area estimates of a chosen layer given a defined polygon.

Layers:

Land/Water

Coastwide Vegetation

Area:

Defined polygons or custom

Years:

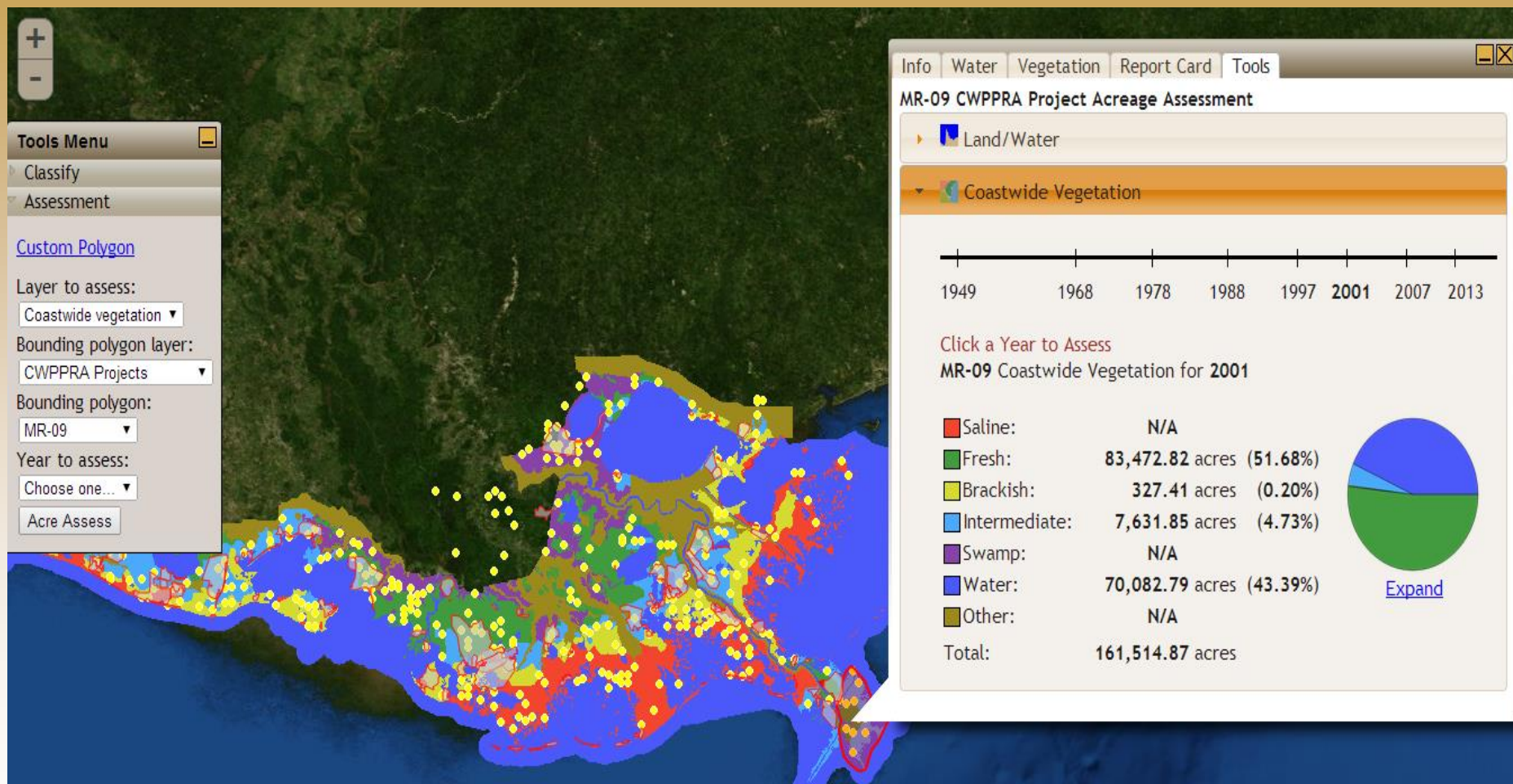
Varies based on layer dataset



Coastwide Reference Monitoring System – *Wetlands*

CRMS Acreage Assessment Tool

Acreage Assessment Tool



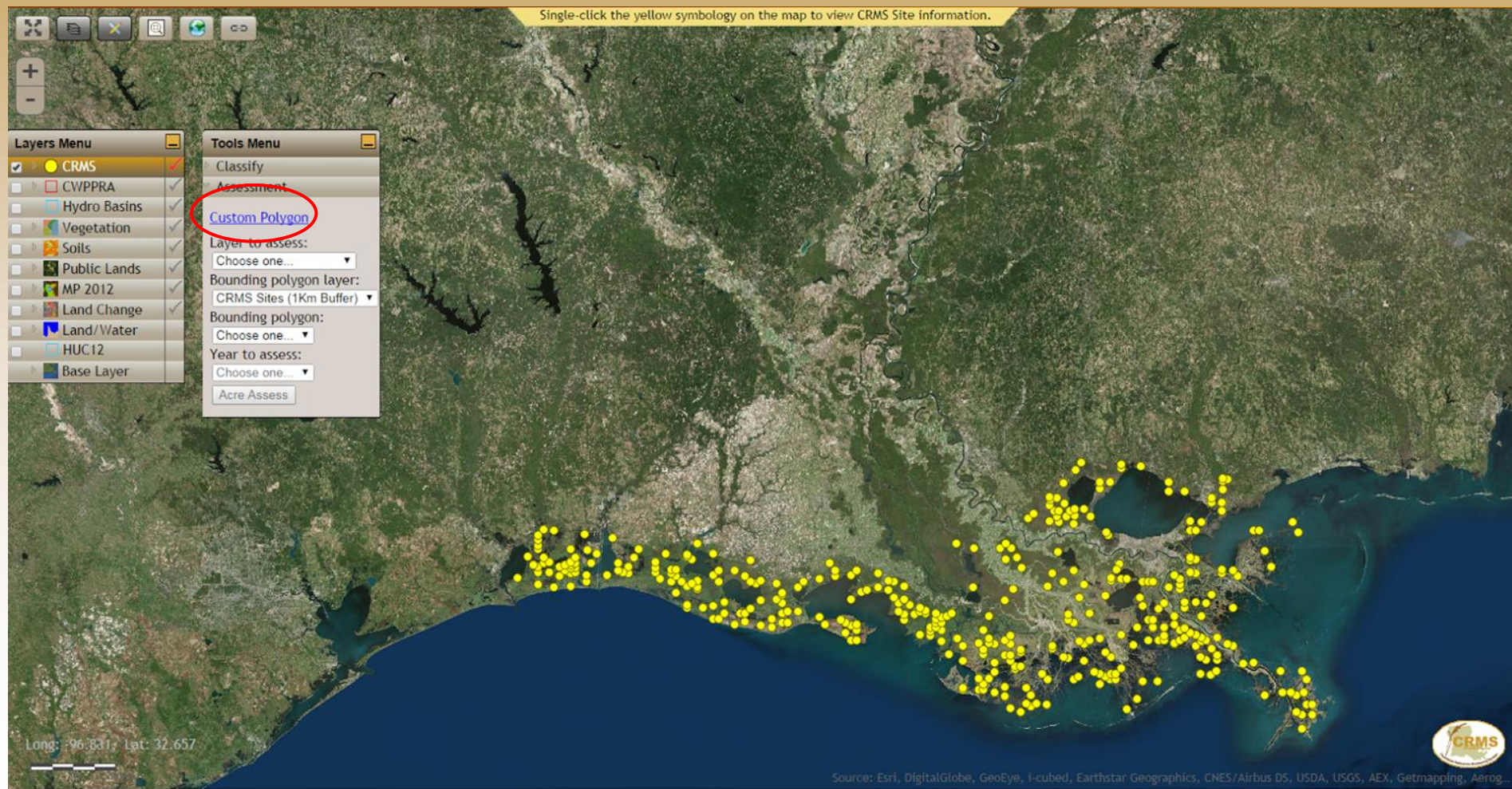


Coastwide Reference Monitoring System – Wetlands

CRMS Acreage Assessment Tool

Custom polygon assessment available.

Request password: jquibodeaux@usgs.gov

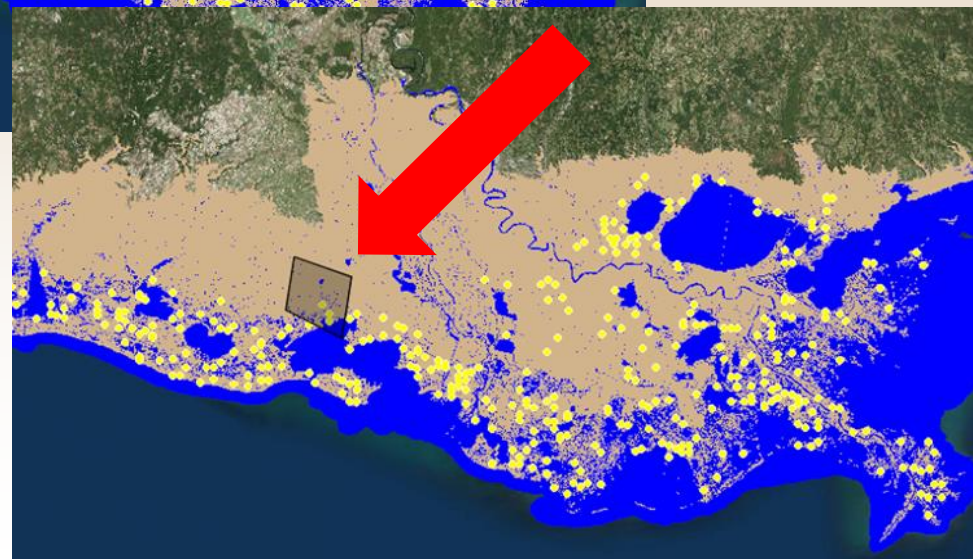
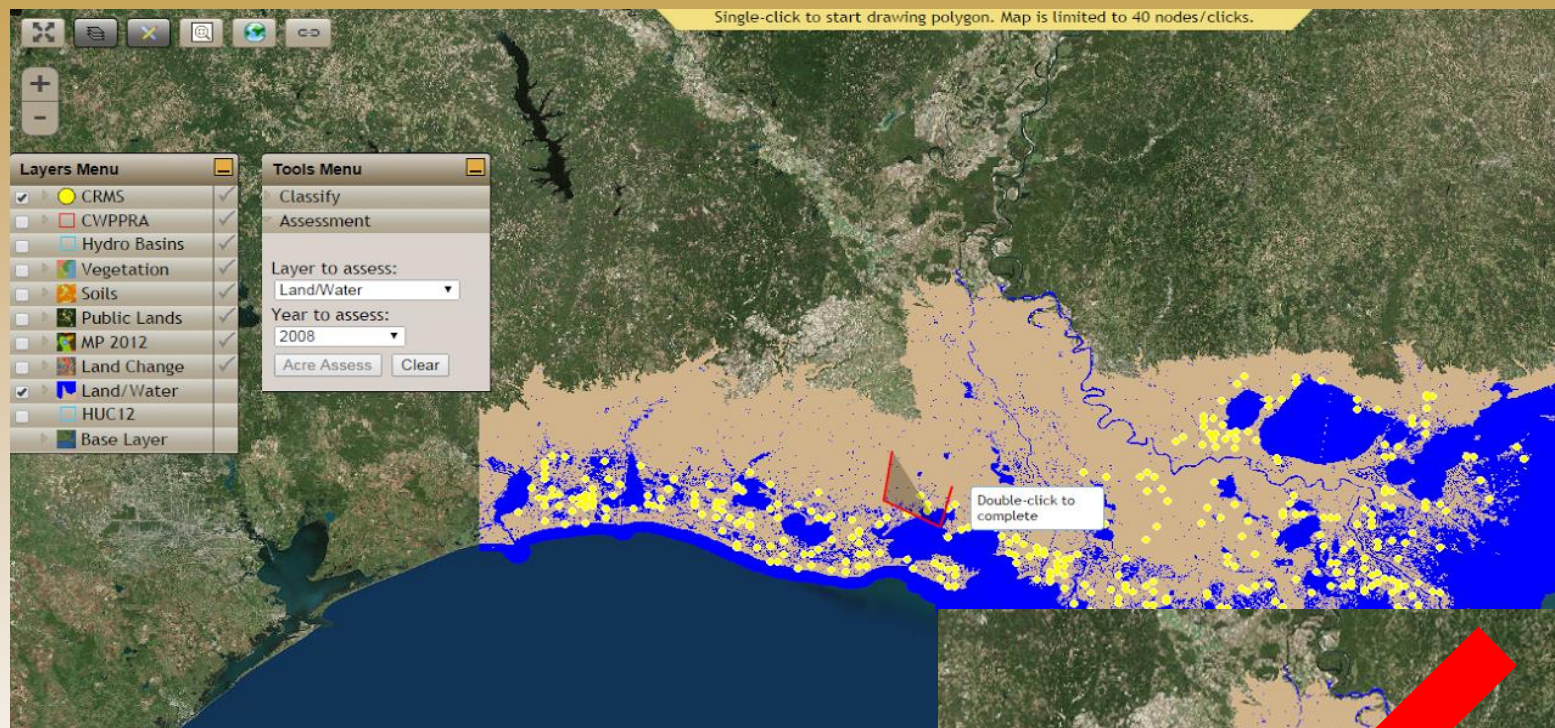




Coastwide Reference Monitoring System – *Wetlands*

CRMS Acreage Assessment Tool

Draw area of interest and double click to close polygon.





Coastwide Reference Monitoring System – *Wetlands*

CRMS Acreage Assessment Tool

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

Drawn Polygon Land/Water for 2008

Water:	54,037.09 acres	(37.84%)
Land:	88,754.39 acres	(62.16%)
Total:	142,791.48 acres	

Tools Menu

Classify
Assessment

Layer to assess:

Land/Water

Year to assess:

2008

Acre Assess Clear

Layers Menu

☒ CRMS
☐ CWPPRA
☐ Hydro Basins
☐ Vegetation
☐ Soils
☐ Public Lands
☐ MP 2012
☐ Land Change
☒ Land/Water
☐ HUC12
☐ Base Layer



Questions?

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

piazzas@usgs.gov

Request password:
jquibodeaux@usgs.gov