Predicting Effects of Sediment Diversions using Existing Landscape Analogs in Coastal Louisiana

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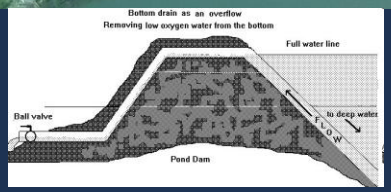
Freshwater vs Sediment Diversions

- Siphons
  - West Pointe ala Hache
  - Naomi
- Max 1,200 cfs

- Gated Structures
  - Caernarvon
  - Davis Pond
- Max 8,000 cfs

- Sediment Diversions
  - Wax Lake
  - Bohemia Spillway
- >20,000 cfs



Contemporary Landscape Analogs

Heavy sediment transported by the Atchafalaya and Mississippi rivers. April 28, 2011

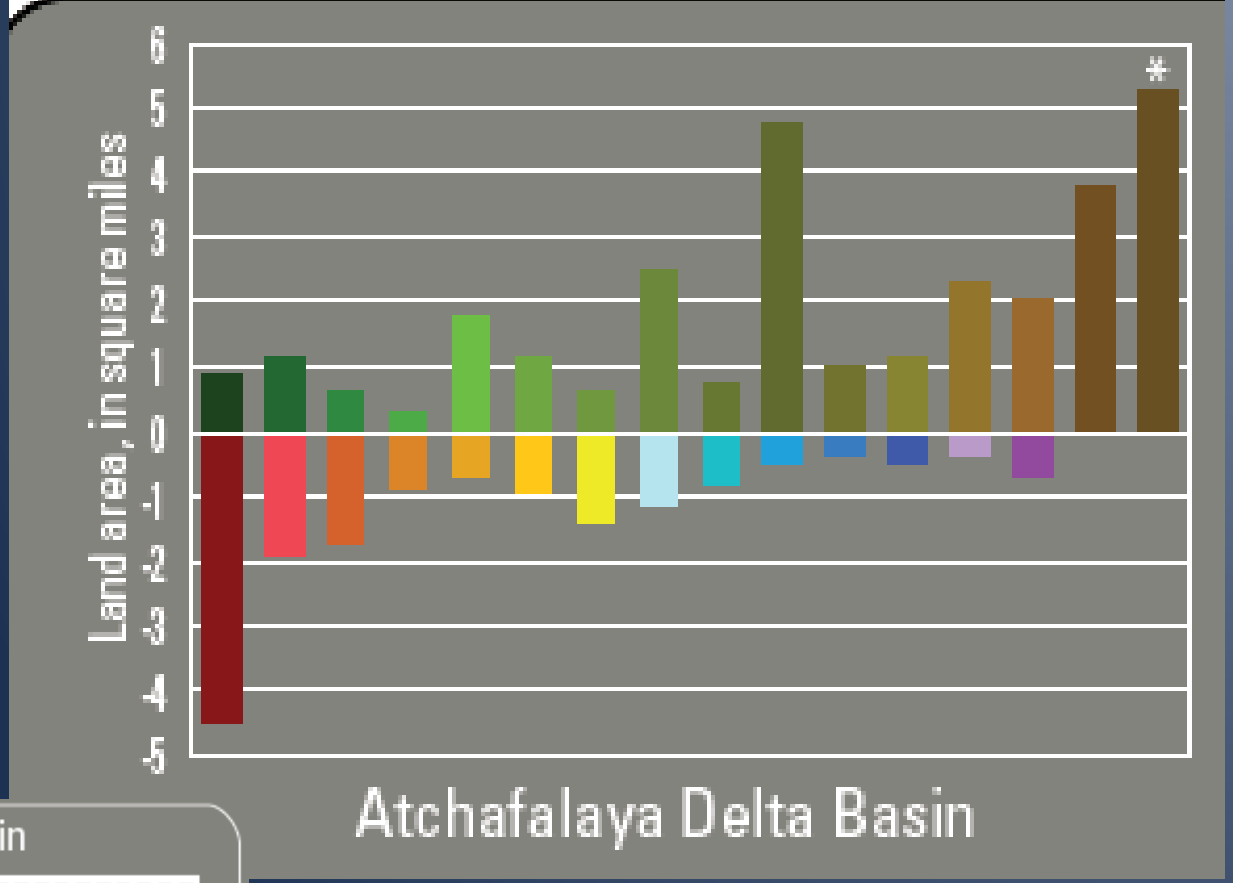
Image obtained from: http://www.esl.lsu.edu/imagery/gallery/mississippi-river-flooding-2011/

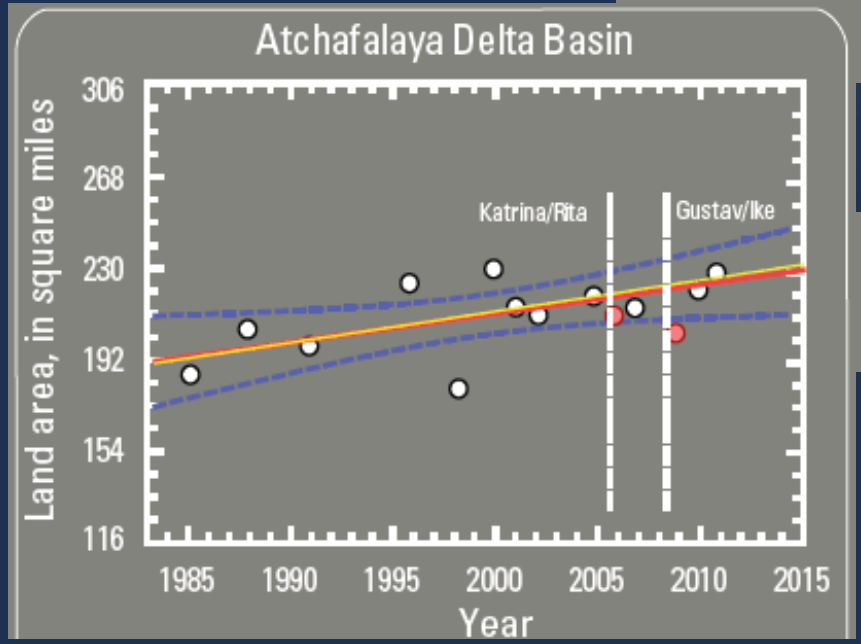
Land Change Atchafalaya Area 1932-2010

Wax Lake Channel constructed 1942

Image obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#
Data from Couvillion et al. (2011)

Land Change Atchafalaya Basin



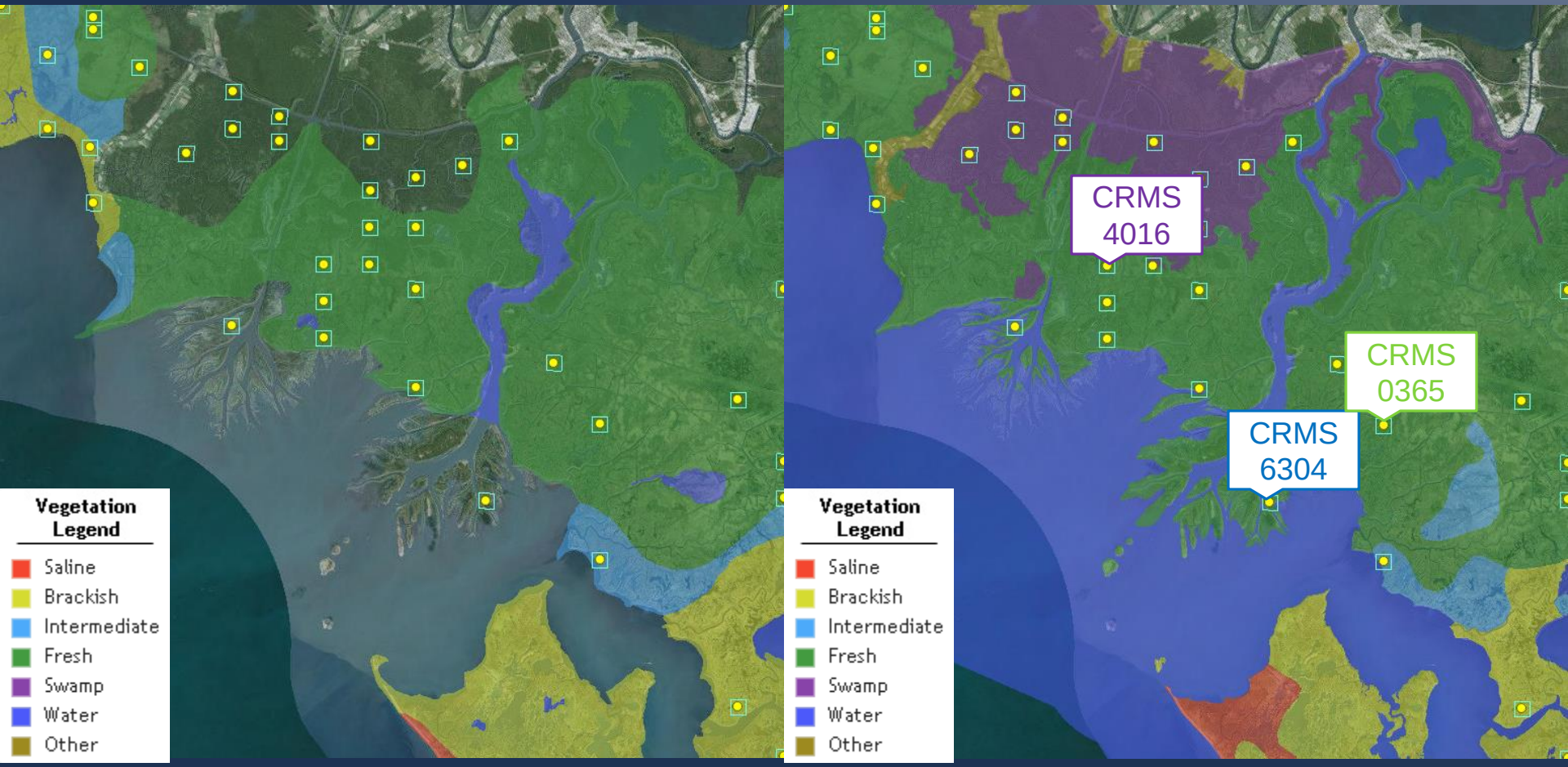


1985–2004 = 1.32 ± 0.81 mi^2/year (r^2 = 0.2758)

1985–2010 = 1.22 ± 0.48 mi^2/year (r^2 = 0.3909)

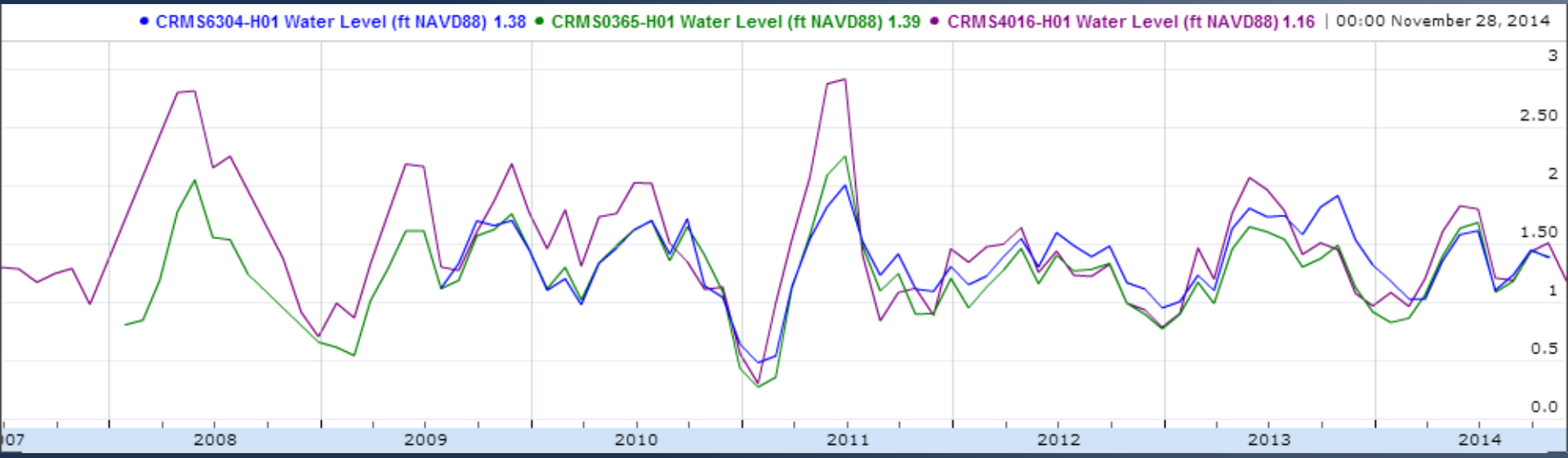
Images obtained from Couvillion et al. (2011)

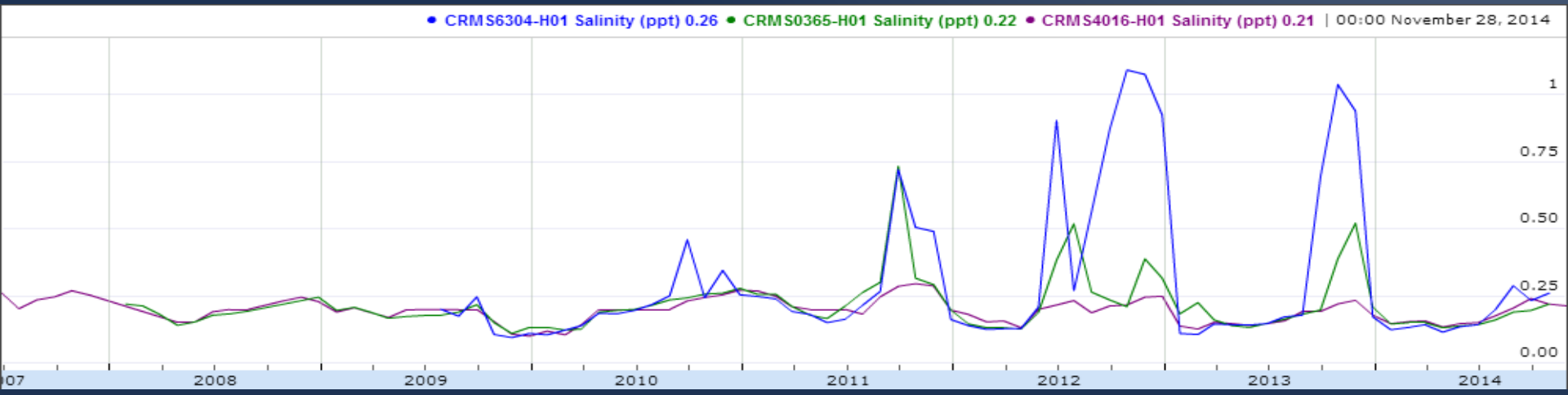
Vegetation Change 1968 to 2013



Images obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#
Data sources Chabreck (1972) and Sasser et al. (2014)

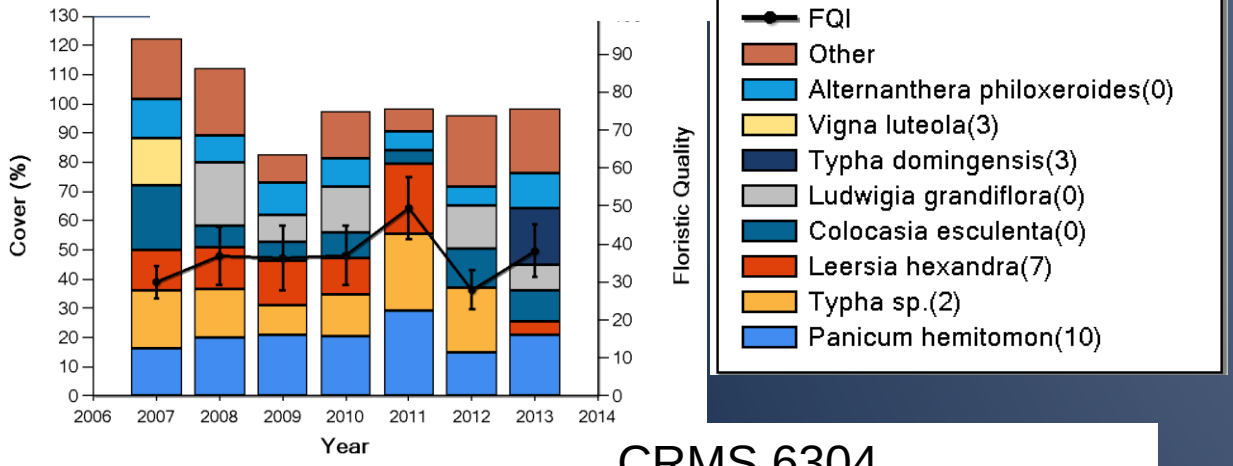
Hydrologic Record Atchafalaya Area

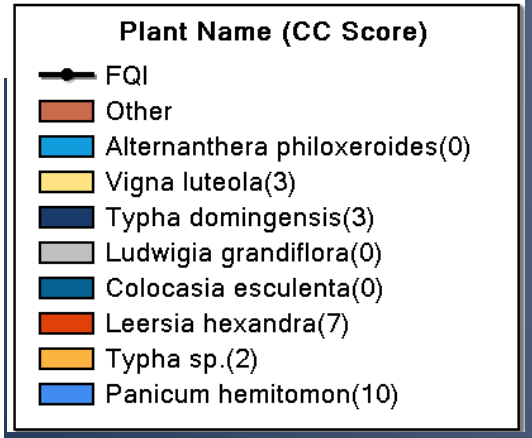




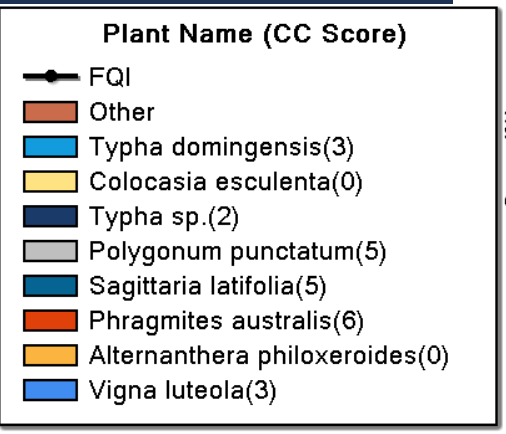
Atchafalaya Basin Vegetation

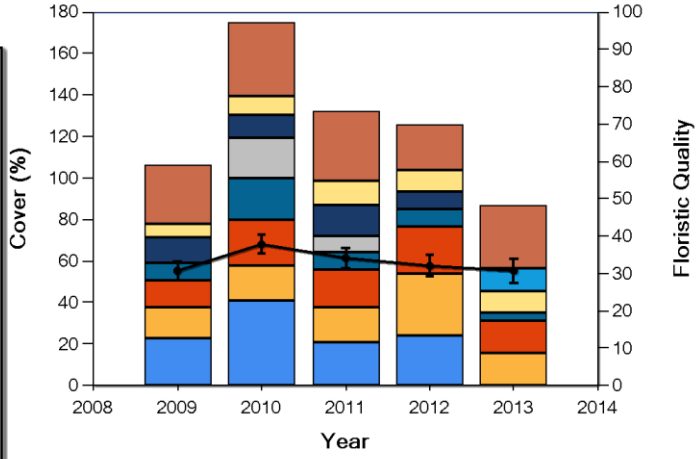
CRMS 4016

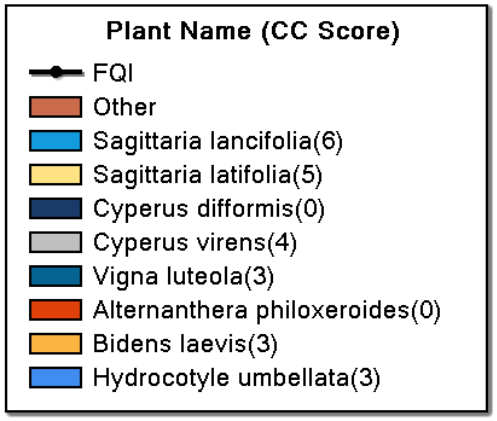




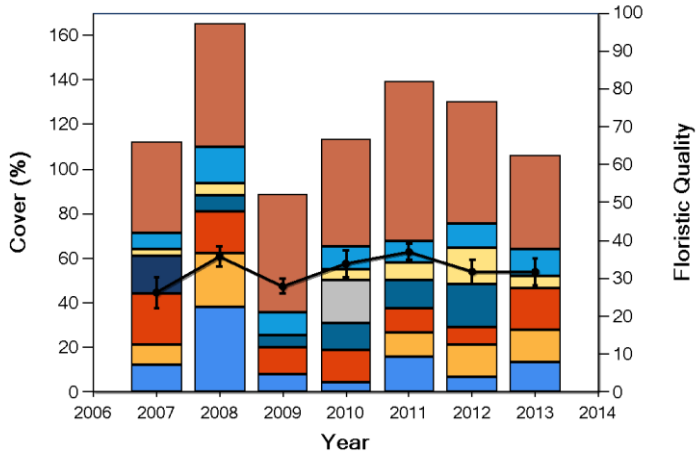
CRMS 6304







CRMS 0365



Images obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#

No River Influence Fresh Marsh

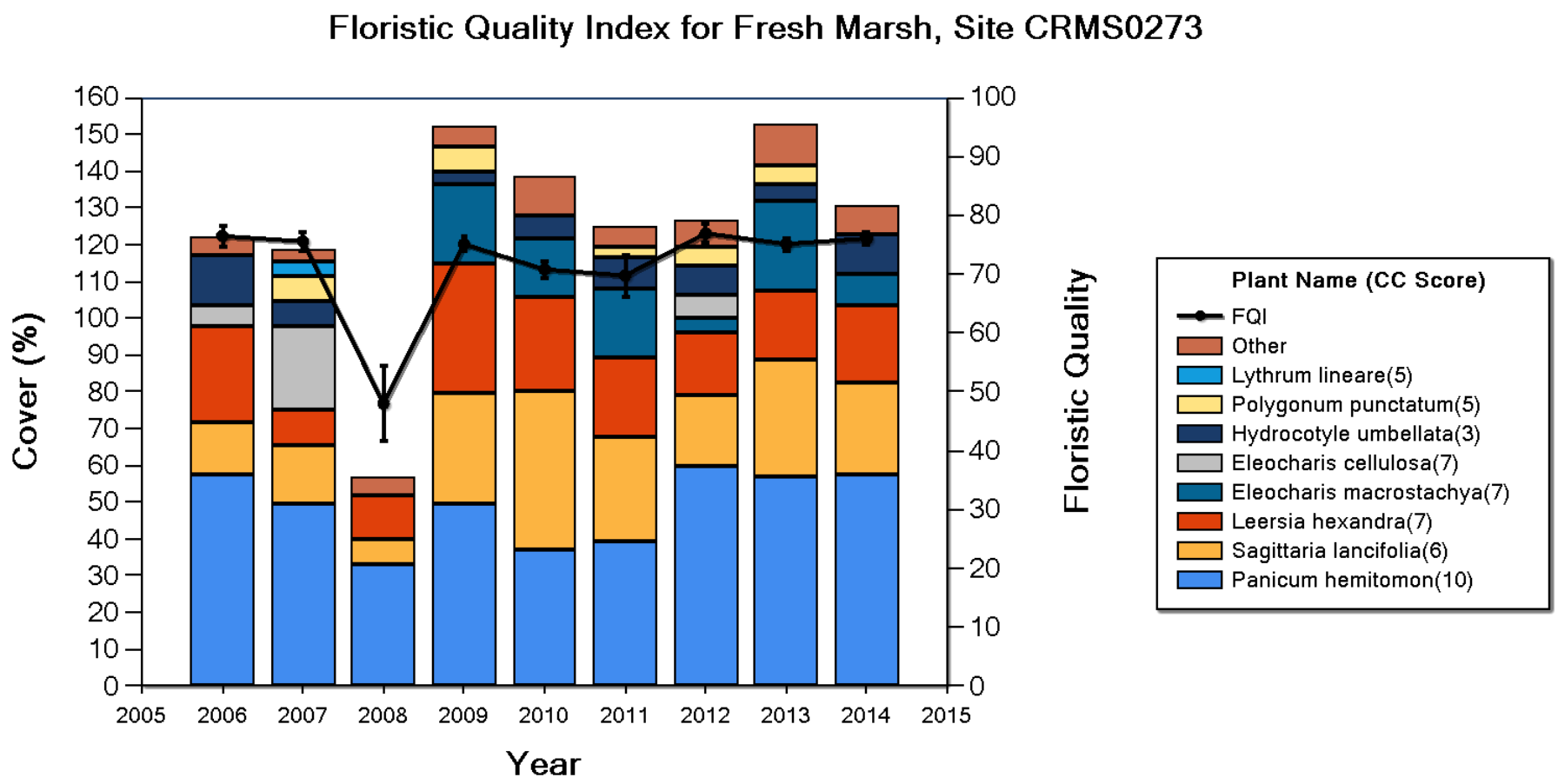


Image obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#

Soil Types Atchafalaya Basin

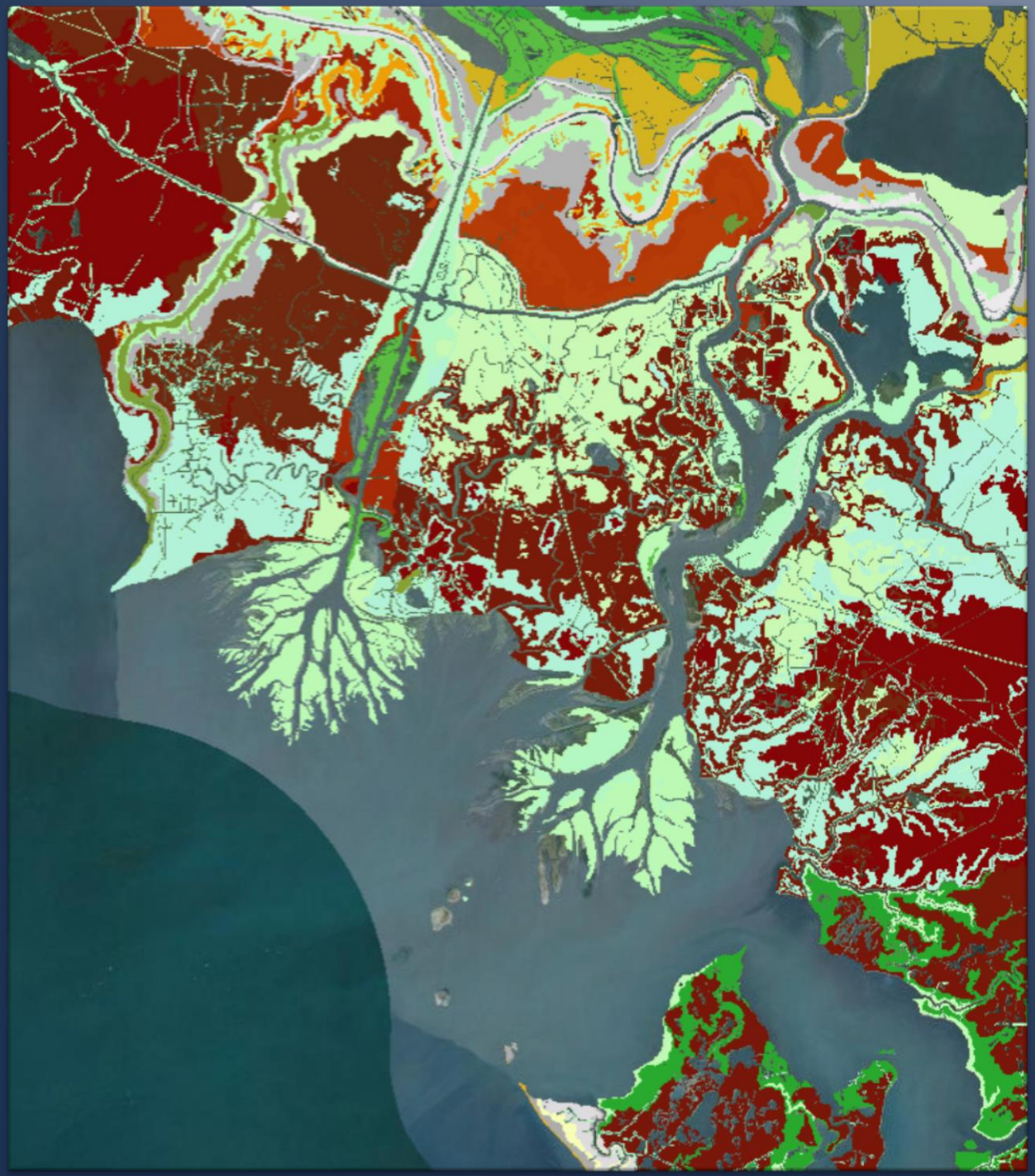


Image obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#

Bohemia hydrology
(Artificial levee removed in 1926)

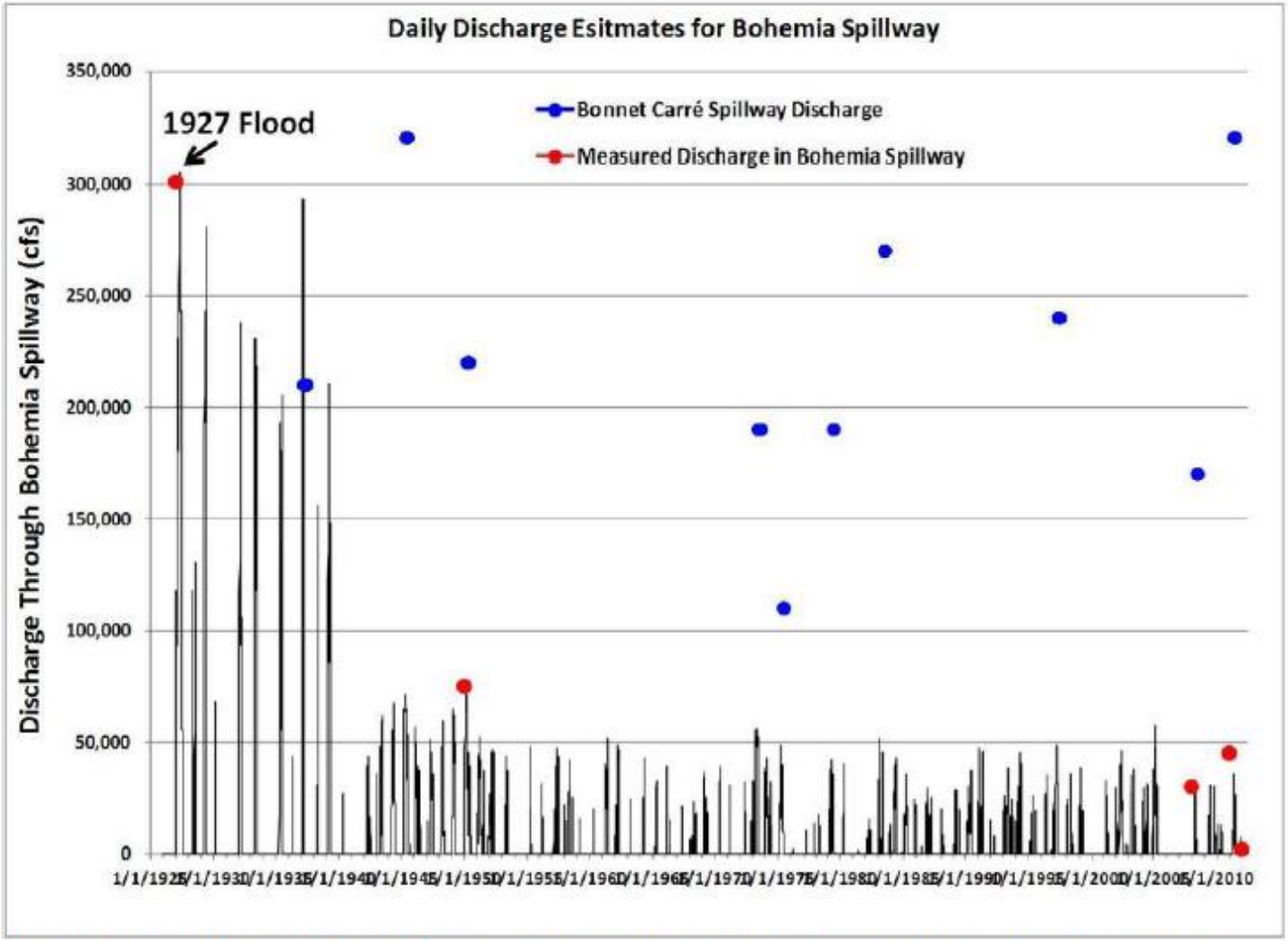


Figure 44: Daily discharge through the Bohemia Spillway from 1926 to 2012 calculated using the equations in Figure 41. Different equations were used from the periods of 1926 to 1940 and 1940 to the present because the maximum river stage is maintained lower than historic levels and the Bohemia Spillway experienced siltation which made it carry a lower discharge over time.

Image obtained Lopez et al. (2013)

Land Change Bohemia Spillway 1932-2010

Artificial levee removed in 1926

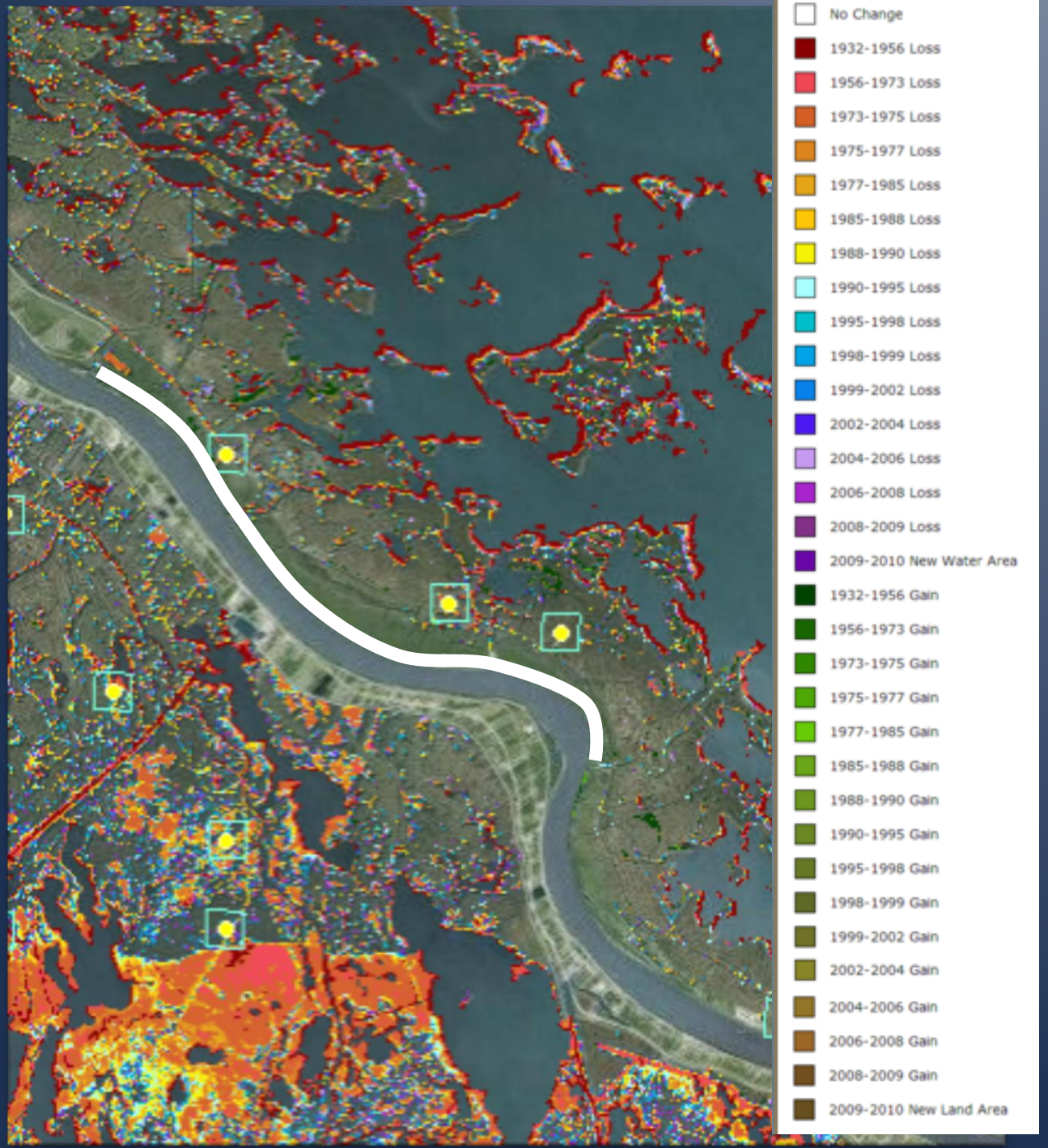


Image obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#

Landloss Bohemia Spill way

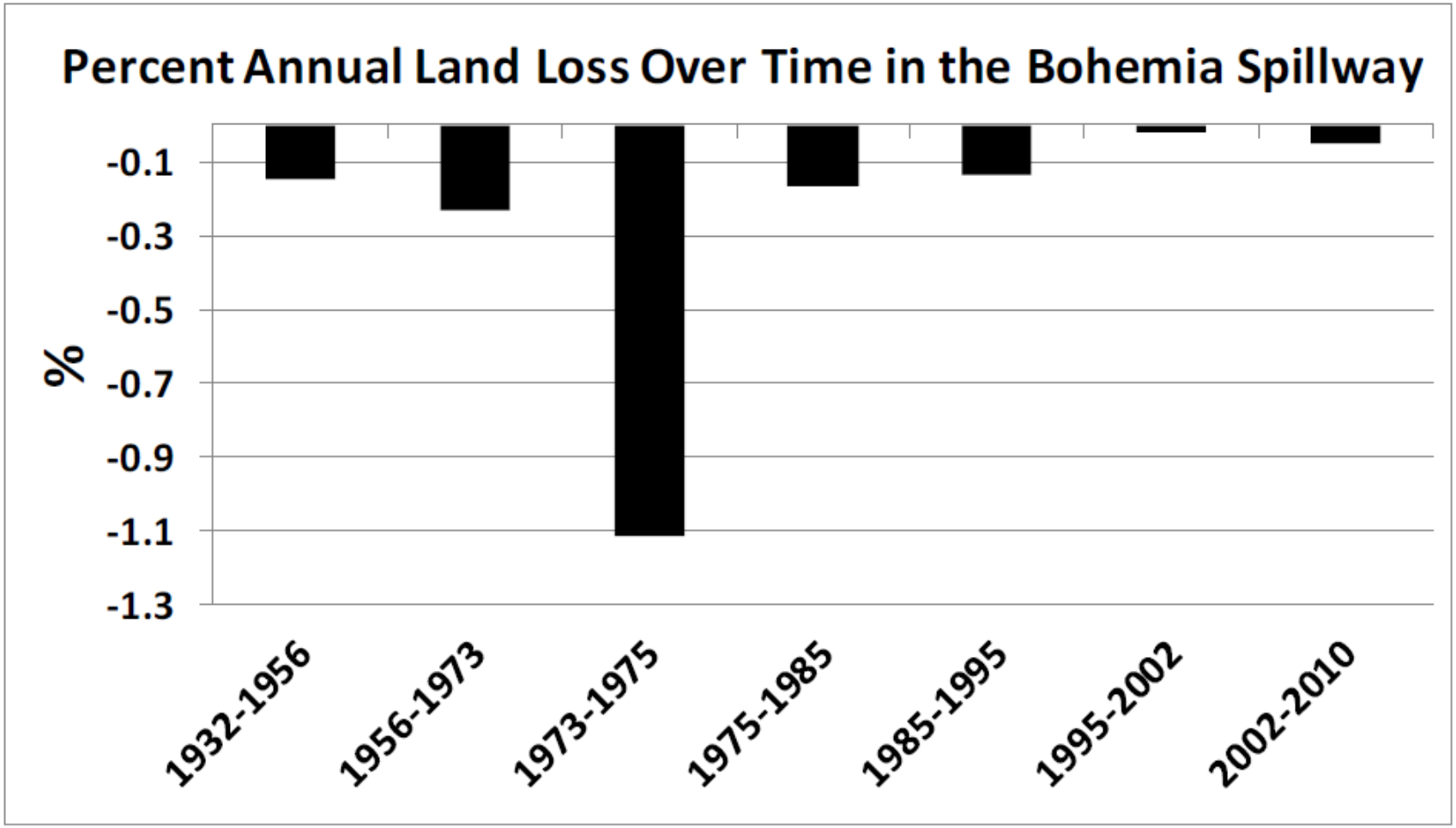
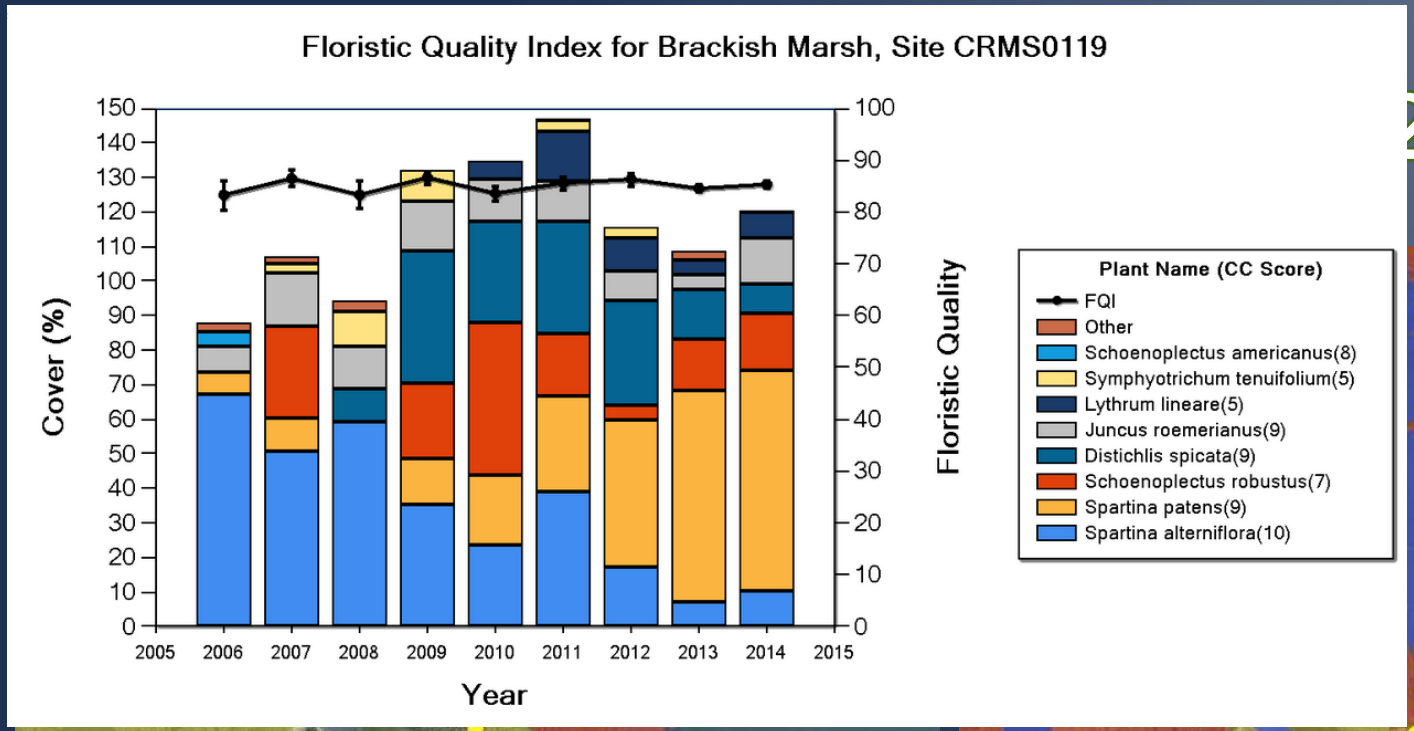
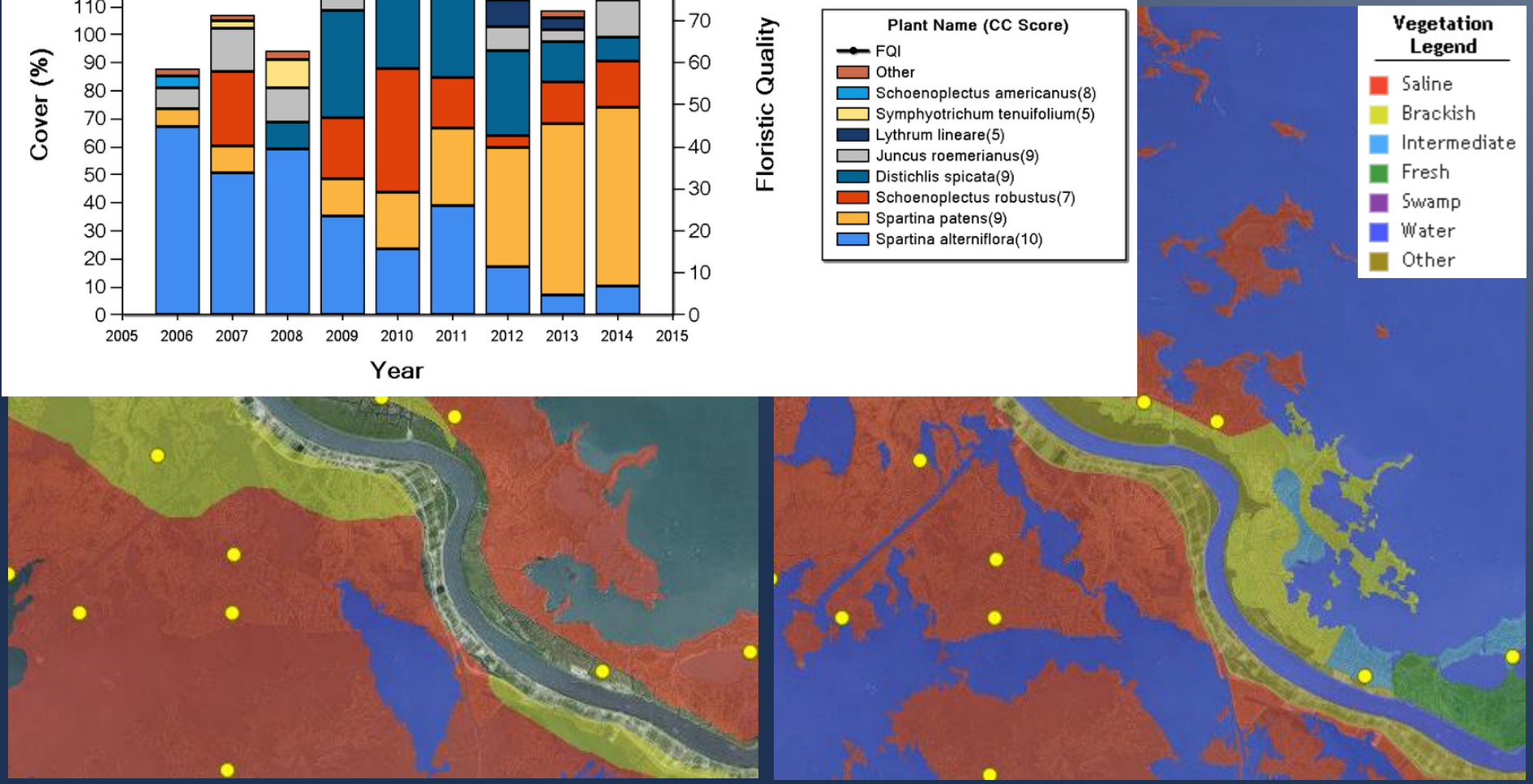


Figure 63: Percent annual land loss in the Bohemia Spillway over time using the hybrid data set (USACE and USGS estimates of land loss). Most land loss occurred from 1932 to 1973, due mostly to the construction of canals for the oil and gas industry.

Image obtained Lopez et al. (2013)

2013





Images obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#

Bohemia Spillway Vegetation 2010

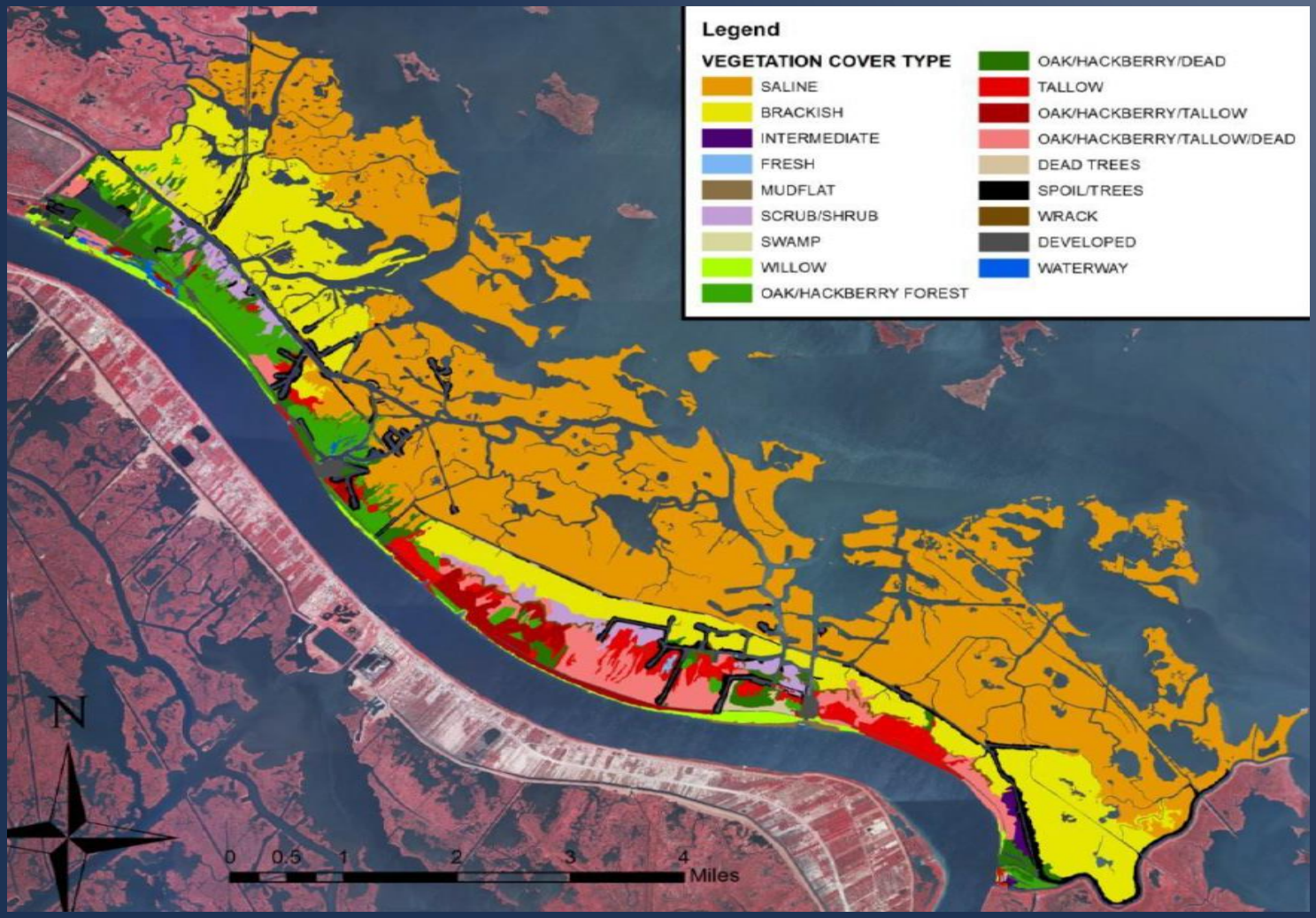


Image obtained Lopez et al. (2013)

References

- Couvillion BR, Barras JA, Steyer GD, Sleavin , Fischer M, Beck H, Trahan N, Griffin B, and Heckman D, 2011, Land area change in coastal Louisiana from 1932 to 2010: U.S. Geological Survey Scientific Investigations Map 3164, scale 1:265,000, 12 p. pamphlet.
- Lopez J, Henkel T, Boyd E, Conner P, Milliken M, Baker A, Gustavson C, and Martinez L, 2013, Bohemia Spillway in Southeastern Louisiana: History, General Description, and 2011 Hydrologic Surveys. Report Lake Pontchartrain Basin Foundation 178 pp. Obtained from: http://saveourlake.org/PDF-documents/our-coast/Bohemia/Bohemia%20Report_March2013.pdf