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

Dr. Jenneke M. Visser
School of Geoscience
Institute for Coastal Ecology and Engineering

Prepared for Diversion Panel February 8, 2015
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_vie
wer2/Default.aspx#
Data from Couvillion et al. (2011)
Land Change
Atchafalaya Basin

Images obtained from Couvillion et al. (2011)
Vegetation Change 1968 to 2013

Data sources Chabreck (1972) and Sasser et al. (2014)
Hydrologic Record Atchafalaya Area

[Graph showing water level and salinity trends over years from 2007 to 2014]
Images obtained from CRMS website: http://lacoast.gov/crms_viewer2/Default.aspx#
Floristic Quality Index for Fresh Marsh, Site CRMS0273

Year

Cover (%)

Floristic Quality

Plant Name (CC Score)
- FQI
- Other
- Lythrum lineare(5)
- Polygonum punctatum(5)
- Hydrocotyle umbellata(3)
- Eleocharis cellulosa(7)
- Eleocharis macrostachya(7)
- Leersia hexandra(7)
- Sagittaria lancifolia(6)
- Panicum hemitomon(10)

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.
Land
Change
Bohemia
Spillway
1932-2010

Artificial levee removed in 1926

Image obtained from CRMS website:
http://lacoast.gov/crms_viewer2/Default.aspx#
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.
Floristic Quality Index for Brackish Marsh, Site CRMS0119

Cover (%)

Year

Floristic Quality

Plant Name (CC Score)
- FQI
- Other
- Schoenoplectus americanus(8)
- Symphyotrichum tenuifolium(5)
- Lythrum lineare(5)
- Juncus roemerianus(9)
- Distichlis spicata(9)
- Schoenoplectus robustus(7)
- Spartina patens(9)
- Spartina alterniflora(10)

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

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