The Louisiana Coastline and Oil – Particularly the Case Study of the Horizon Oil Spill

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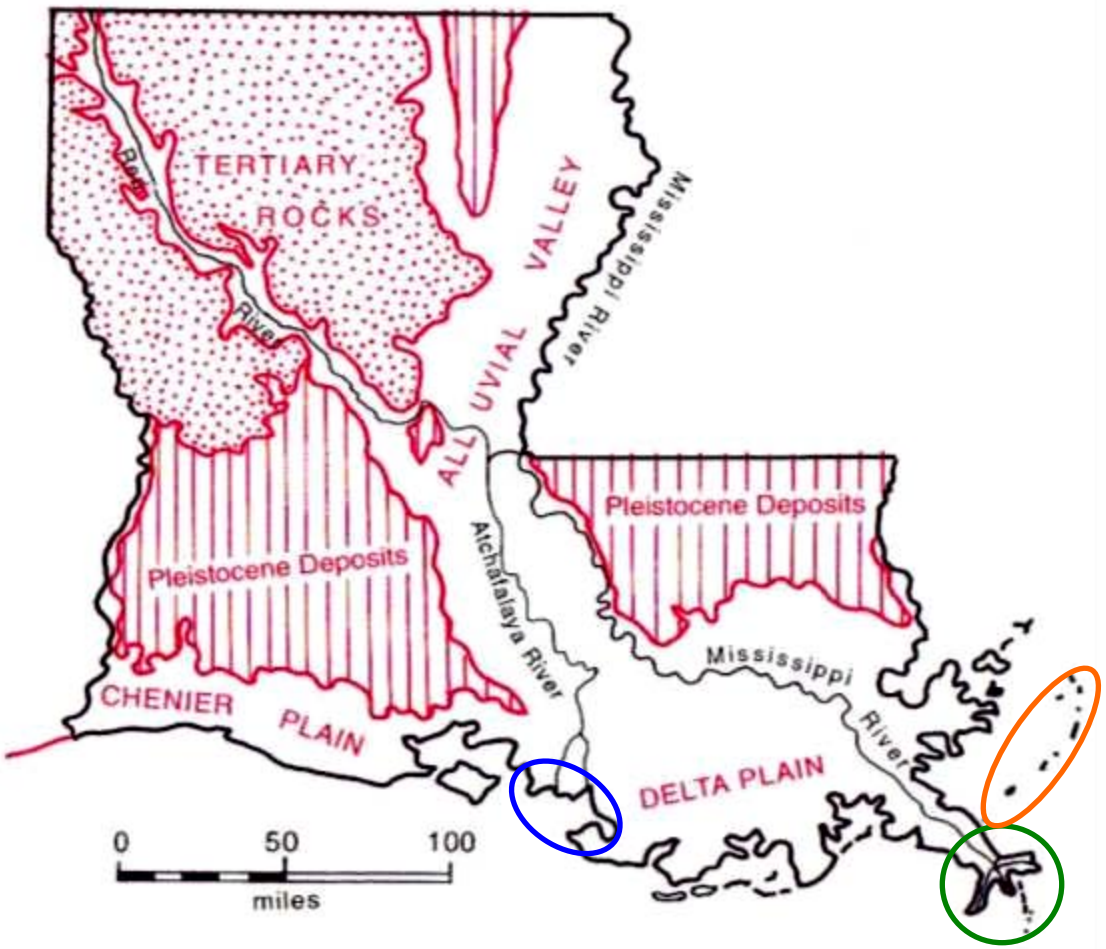
Coastline Shore Vegetation



GENERAL SHORELINE VEGETATION ACCORDING to GEOLOGY

Chenier Plain – *Spartina & beach front*

Atchafalaya (Wax Lake) deltas – oligohaline marsh

Delta Plain – *Spartina*

Mississippi (birdfoot) delta – *Phragmites*

Barrier Islands – beach front

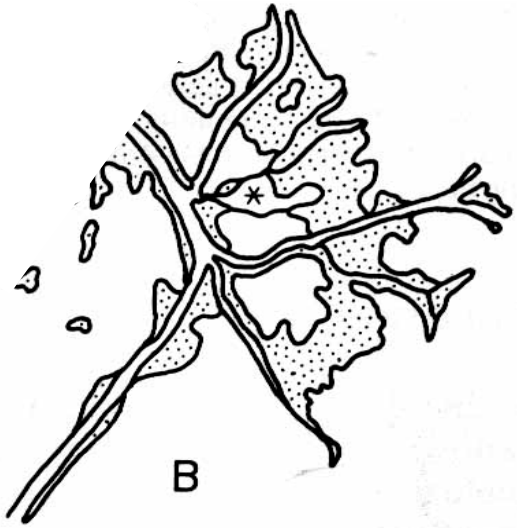
Map from: Spearing, D. 2007. Roadside geology of Louisiana. Missoula, Montana: Mt. Press Publishing Co..

Mississippi River Delta – Has Unique Threat Issues

- The peripheral *Phragmites* (rouseau cane) marshes of the MSRD are the vital physical barrier protecting all of the interior freshwater regions of the delta from the energy of the most violent tropical storms.
- Except during times of tropical storms, freshwater sheet flow keeps oil away from the interior freshwater wetlands – a critical bird habitat.
- These coupled factors (freshwater flow & *Phragmites* presence) make the MSRD a unique area of our coast (likely similar issues are associated with the oligohaline marshes of the Atchafalaya and Wax Lake deltas of the central coastline).

Mississippi (Birdfoot) River Delta – Vegetation

(A) from: Spearing, D. 2007. Roadside geology of Louisiana. Missoula, Montana: Mt. Press Publishing Co.



- (A) aerial photo during the growing season of the 'green' MSRD.
- (B) cartoon depicting winter conditions thus showing the outer eastern and southern permanent stands of *Phragmites* (rouseau cane) of a generally ubiquitous 'delta' form (haplotype).
- The inner ½ of the MSRD is an assortment of large ponds and inner deltaic 'splays' supporting freshwater species with only (but expanding) isolated stands of *Phragmites* – much of which are newly colonized introduced European haplotypes.

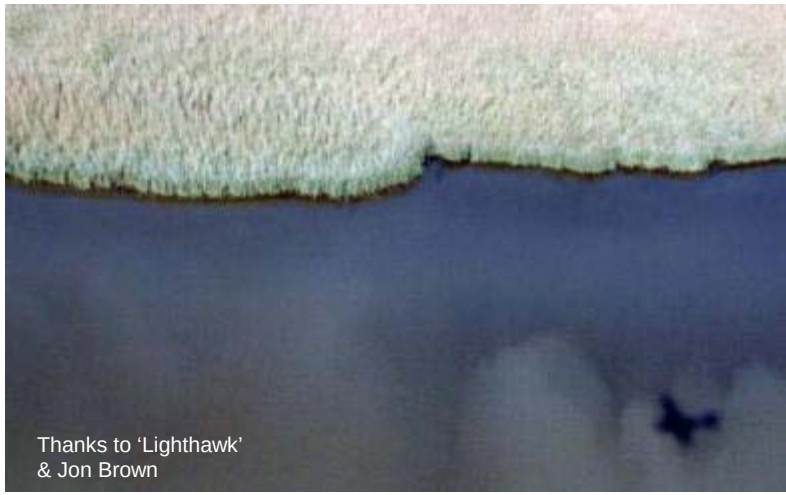
Phragmites in the MSRD – from the Ground

Two distinct genotypes

Oiled culms &
resprouting stubble

Phragmites in the MSRD – from the Air

- Photo locations of *Phragmites* taken since the Horizon Oil spill; except below taken 20yrs ago.
- Aerial photos taken two weeks ago using the services of 'Lighthawk' supported by the Coalition to Restore Coastal Louisiana.



What I Know about Changes to Our Coastline from the *Deepwater Horizon* Spill

Firsthand knowledge is only from the MSRD gained by several boat trips last summer to the *Phragmites* wetlands near & around South Pass and a February 2011 flyover along the entire southern coastline of MSRD.

Secondhand knowledge comes from conversations with professionals from LSU whose research west of the MSRD focuses on the central eastern coastline particularly within the southern end of the *Spartina*-dominated Barataria Basin.

- Generally, current knowledge on plant tolerance and recovery from past oil spills mostly is from field & lab research on *Spartina*.
- There has been very little such work on *Phragmites*, and no work on freshwater to oligohaline species. This should be a concern.
- It is known that the Horizon Oil Spill has caused some loss of our coast. The exact amount of loss from the spill is going to be difficult to quantify.
- Politics at the parish, state, and national levels has been playing a huge role in this 'case study.'

What I Know about Changes to Our Coastline from the *Deepwater Horizon* Spill

- With uncertainty, I would say the total wetland loss is remarkably low as a result of the spill. Any loss is bad. It seems that only about 200 – 300 miles of the coast has had any contact with oil; most of the affected coast experienced oil along only the immediate shoreline. This is in a state with a total coastline of 7,000 miles.
- Realize though that some of the fringe marsh loss has occurred from 'sloughing' from wave action that would have happened anyway absent the spill because of the 'background' wetland loss the state is experiencing. Marsh loss is the current norm for this region.
- As I have shown in a previous slide, some fringe *Phragmites* marshes in the MSRD have already resprouted stems (culms) and more regeneration from the damaging impacts of oil could continue. This might continue through the summer portion of the upcoming growing season.

What I Know about Changes to Our Coastline from the *Deepwater Horizon* Spill

- Some *Spartina* marshes in the Barataria Basin are now in the 'stubble' stage and researchers there are hoping these areas resprout from the 'hoped for' living underground rhizomes. 'Stubble' marshes of *Phragmites* of limited scope are also along the southern fringes of MSRD.
- Like for the *Phragmites* marshes in the MSRD, a much better idea of total loss in *Spartina* marshes should be able to be determined by the end of summer 2011 after another full growing season.
- Finally, there is a whole lot that I (we) do NOT know about the impact of oil on our coastline generally and particularly on specific marsh types, e.g., *Phragmites* & other oligohaline marshes. This impact is very dependent upon oil quality, quantity, and timing. We know each plant species has different physiology and so should react differently if all else is held constant.

What Can Be Done to Be Better Prepared for the Future – the Biological Response

- In the future, we need first hand quick response (within weeks to at most a couple of months) ground surveys after an oil spill to check for damage assessment.
- This effort must take into account the different general marsh types (*Spartina*, *Phragmites*, Freshwater – certainly *Sagittaria*) along the Louisiana coast.
- We need to know more about oil impacts and recovery especially to *Phragmites* and the freshwater marsh species. It is highly likely that each species reacts to oil differently. They certainly have different responses related to oil quality/quantity.
- The ground surveys immediately after a spill must be followed by long-term aerial surveys and GIS efforts to span the assessment to larger shoreline areas and to monitor the long term shoreline change.
- In the future, I personally suggest that BOEMRE direct resources immediately after a spill to the regional highly knowledgeable researchers (government, university, and private) able and generally willing to quickly mobilize to assess field impacts. Delay is never good.