

# **To Divert or Not to Divert – Our Future Hangs in the Balance**

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We can all agree that coastal restoration is about more than catching speckled trout. It's about saving our communities, our coastal infrastructure, our coastal heritage, and our coastal fisheries. There are a limited number of tools in the coastal restoration tool box. The costs vary and the usefulness varies, but all have both good and bad consequences. Placing rock along the shorelines slows erosion, but it disturbs the critical fringe marsh zone that is so important for interaction of open water with the marsh. Pumping sediment creates new marsh, but leaves a deep hole where the material is taken that may become low in oxygen and is very expensive. There are always trade-offs. Folks involved with planning and building restoration projects have concluded that the good benefits of that approach will outweigh the bad.

Most of the ongoing discussion in coastal restoration concerns building diversions versus pumping sediments. Pumping sediment provides more immediate but also more finite benefits, and it is expensive. Diversions can provide more sustainable benefits, but it takes longer to begin to see benefits. They can also change the fishing or have other negative effects. These are the normal give and take in the ongoing discussion, but other questions have been raised. For several years, LPBF has worked diligently to get a better understanding of diversions by studying those that already have a track record. Mostly, we have worked in the Bohemia Spillway and the Caernarvon Diversion, but we are aware of the record of others such as Wax Lake Delta, Atchafalaya Delta, Violet Siphon, etc.

The question is often asked: "Is the dramatic land loss which occurred near the Caernarvon Diversion during Hurricane Katrina somehow an effect of the Caernarvon Diversion?" The type of loss during Hurricane Katrina was very similar to the loss that occurred from Hurricane Betsy, but the loss from Betsy was much less than that from Katrina.

The map below of the Caernarvon area illustrates some key features. The prominent hurricane scars are not present in a zone around Bayou Mandeville (brown line) which is well known to carry most of the Caernarvon Diversion flow. Also, there is clearly a sediment pile in Lake Lery forming a basis for new wetlands. Of course, within Big Mar, LPBF has well documented the rapidly growing delta there and are even planting a cypress forest on that delta (see [Saveourlake.org](http://Saveourlake.org) > Coastal > Technical Documents). Nevertheless, the hurricane scars are

present around this zone of sustained marsh and it is still unclear whether some amount of that scarring may be related to the Caernarvon flow beyond where it is sediment enriched. The Caernarvon “freshwater” Diversion is clearly providing some strong positive benefits to the wetlands in the outfall area where sediment and nutrient concentration is high. Where sediment concentration is lower, it is simply unclear if the nutrients are having a net positive or negative effect. Vegetation tends to re-grow quickly here, but not within the deep hurricane scars.

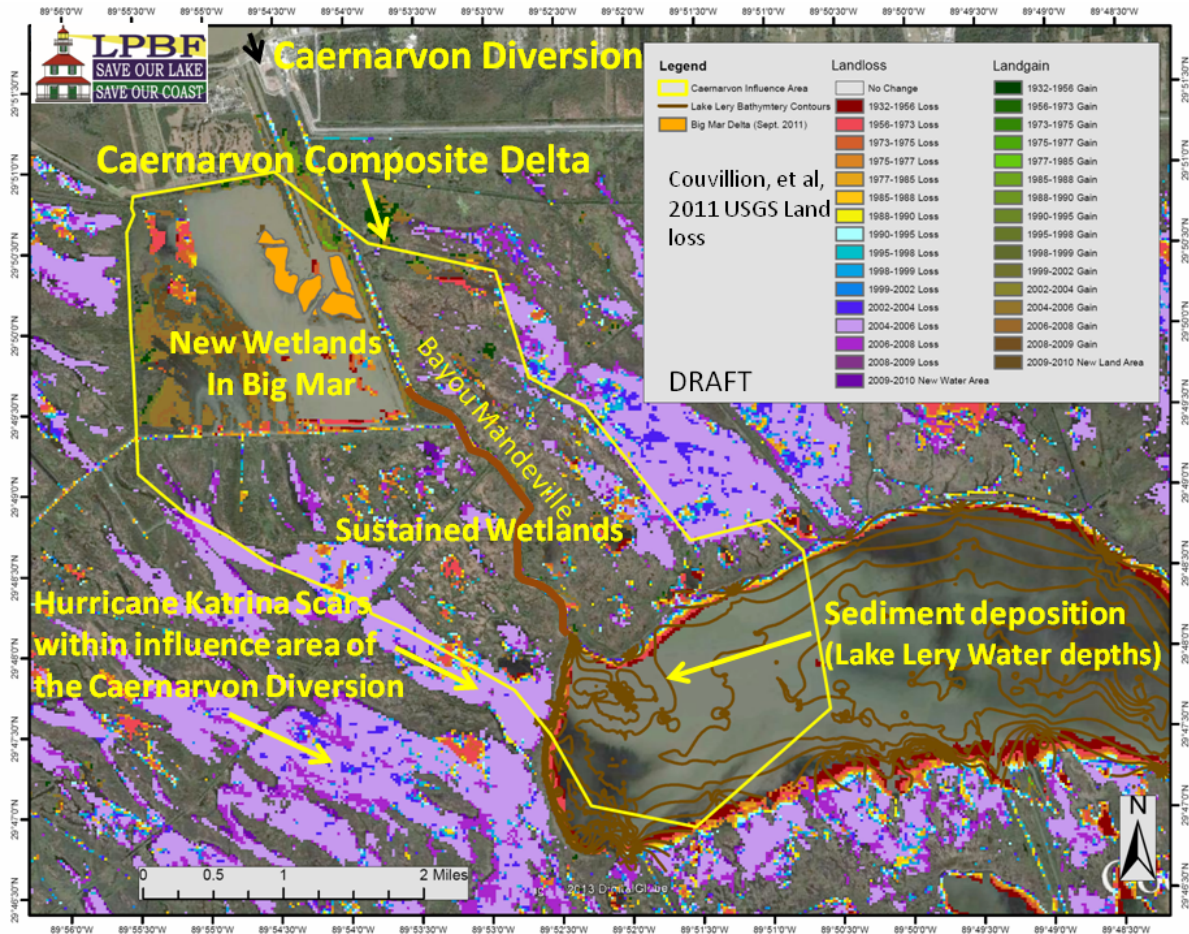
At Caernarvon, it took 13 years before land building began to be visible in 2004, but at Wax Lake Outlet, it took 30 years for to start building a delta (1973). Wax Lake Delta now has 40 years of growth. Considering Caernarvon as a “Freshwater” Diversion that has been operated for just 21 years, and has never been operated to optimize sediment introduction, it is remarkable to see what benefits it is providing.

The map below is the wetland loss map of the Bohemia Spillway. The Spillway was created in 1926 when river levees were removed and, since then, has allowed the river to naturally overflow its banks. The land loss here is dominantly due to oil canals and shoreline erosion along the sound. The rates of loss have been reduced to the point that these wetlands will persist for hundreds of years under current conditions. The details are unclear, but somehow the river water is sustaining these wetlands.

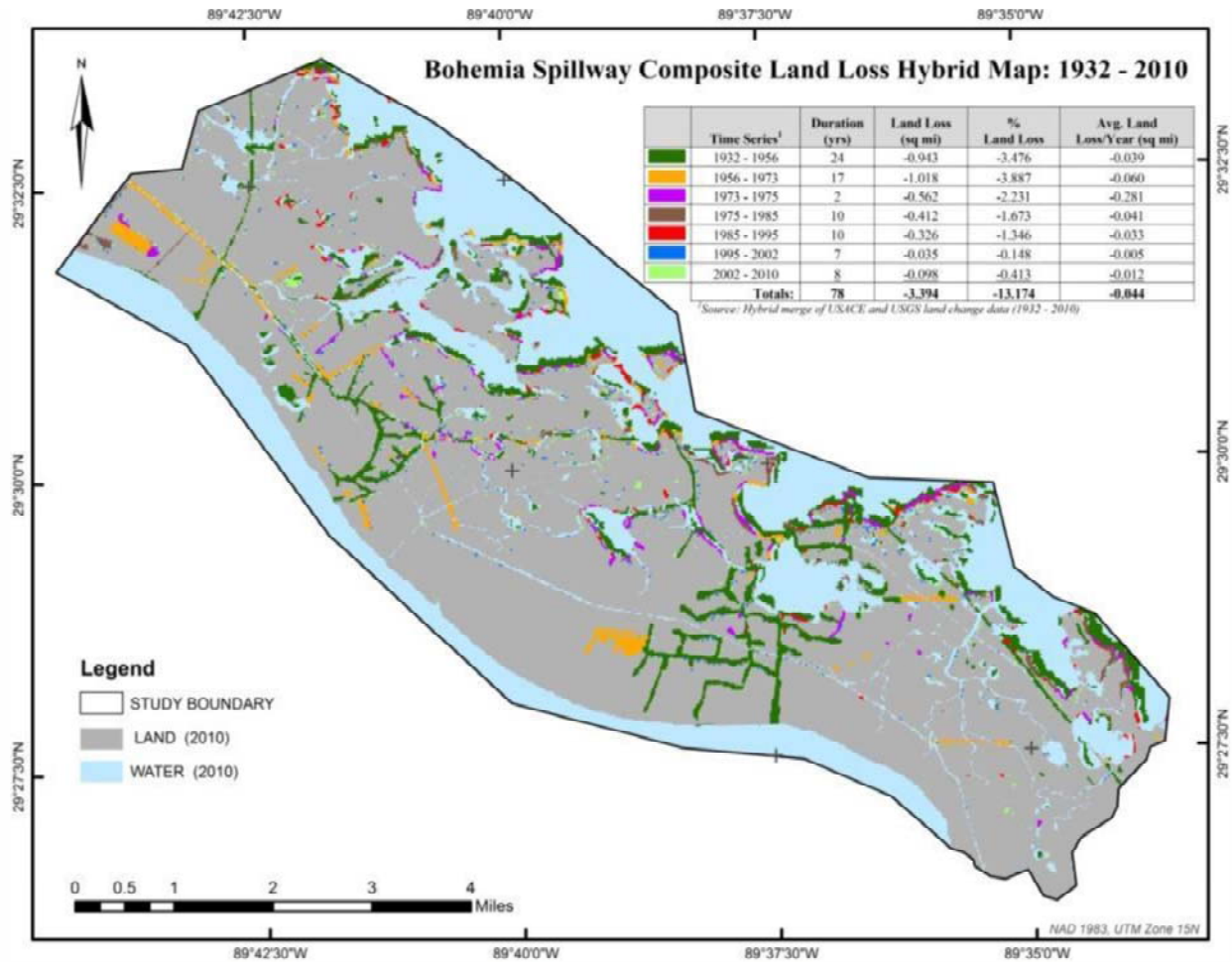
Let’s consider the alternative: pumping sediment to build wetlands. The map of Barataria Basin below shows the cumulative land loss in red. This landscape’s extent of collapse is startling and well known (Note the stark contrast to the Bohemia Spillway map.) On the Barataria Basin map, the yellow box is 3 miles by 3 miles. How much would it cost to rebuild the 9 square miles with pumped sediment? Based on the cost of 45 marsh creation projects in the CWPPRA program, the average cost is \$70,000 per acre. Nine square miles is 5,800 acres, which means the cost of that yellow square in a sea of red land loss is \$400,000,000. Ten of these squares would cost \$4 billion.

The State Master Plan illustrated the economic effectiveness of diversions. The \$4.5 billion to build diversions will build more land than \$15 billion in projects pumping sediment. Yes, building land with diversions will take longer, and there will be some negative effects. But the positive benefits will far outweigh the negative, and we can’t afford the pumping alternative alone. The State identified the areas where it is most important to rebuild wetlands quickly for storm surge buffering, and this is where sediment pumping projects are planned. Where the river is available and there is a need to rebuild wetlands, river diversions must be used because we need to take advantage of the lower cost to re-build wetlands. The new “Sediment Diversions” will be built and operated to optimize sediment transport and will dramatically improve the positive land-building effects, which will, as a result, outperform Wax Lake Outlet and the Caernarvon Freshwater Diversion.

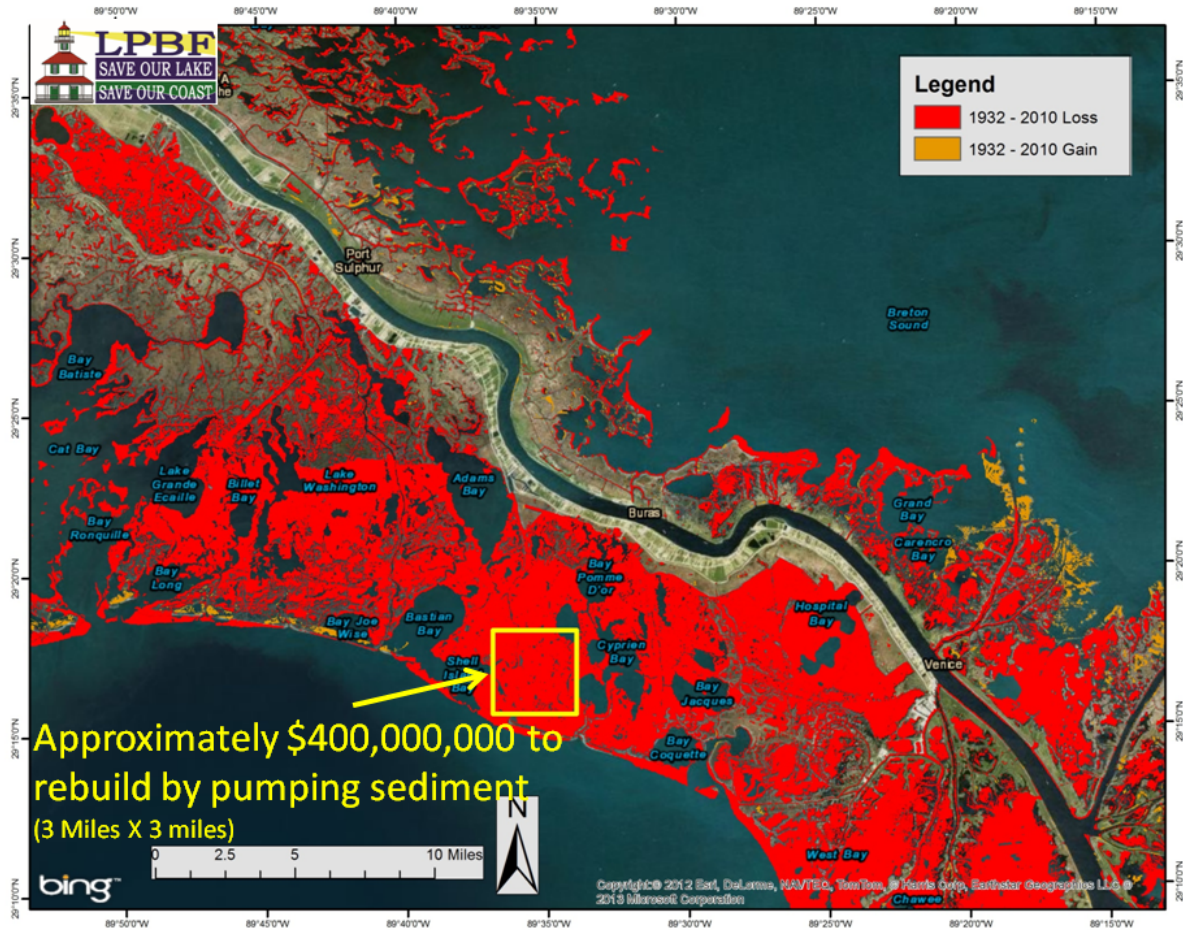
We must build sediment diversions, but it must be done with eyes wide open to the full effects of land loss or gain, fisheries changes, etc. It is likely that a diversion of approximately 75,000 cfs will be built on the east or west bank of the river, and be completed in about 5 years. In the meantime, expect continued collapse of our wetlands except in a few areas such as Wax Lake, Caernarvon and Bohemia where river water is already sustaining the wetlands. Diversions are our best chance to sustain our coast against the onslaught of sea level rise, subsidence and so forth. In the end, this will save our communities, coastal infrastructure, our coastal heritage, and our coastal fisheries.



Map of the Caernarvon Area which suggests a much larger area of positive influence than previously understood. Sediment is accumulating in Lake Lery and helping to sustain the marsh near Bayou Mandeville. An active delta is growing in Big Mar.



Land loss in the Bohemia Spillway where river water flows every year has been low and is now near zero loss. LPBF recently released a comprehensive report on the Spillway available at [SaveOurLake.org](http://SaveOurLake.org).



Barataria Basin land loss in red. The yellow box would cost approximately \$400,000,00 to rebuild by pumping sediment, and illustrates the unfeasibility of using marsh creation alone to rebuild our coast.