

RESTORE VS. RETREAT: SECURING ECOSYSTEM SERVICES PROVIDED BY COASTAL LOUISIANA

Based on Conceptual Ecological Model Focus Group—September 2006

Printed—February 2007

The hurricanes of 2005, following years of wetland loss, reinforced the urgent need for more aggressive coastal restoration. One reason is the enormous array of ecosystem goods & services provided by Louisiana's coastal landscape. Ecosystem goods & services are benefits that ecosystems provide to people. Ecosystem goods & services provided to Louisiana & the nation by coastal landscapes include wildlife & fisheries habitat, support for petrochemical production, improved water quality & flood protection, ecotourism & aesthetic appeal. One example illustrating the connection between coastal Louisiana & the nation was the widespread spike in gasoline prices following Hurricanes Katrina & Rita. The economic benefits of sustainable coastal restoration are substantial. Although most human-built infrastructure degrades over time (e.g., levees need to be maintained), healthy ecosystems sustain themselves & retain their value. The flood protection afforded by intact coastal landscapes (e.g. the 'horizontal levees' concept) is a key aspect of coastal Louisiana restoration; however, the multitude of ecological services provided by intact coastal landscapes produces the most compelling argument for an integrated & comprehensive restoration plan.

Sustaining coastal Louisiana provides vast economic benefits

Annual economic benefits

\$50 billion—crude oil refined in LA^{1*}

\$75 billion—cargo handled in LA ports²

\$3 billion—total fisheries harvested in LA²

Annual restoration costs

<\$60 million—average expenditure from 1990–2006 on LA coastal restoration²

>\$500 million—amount required for sustainable coastal restoration in LA³

1. LA Department of Natural Resources; *at \$55/barrel

2. Louisiana Coastal Wetlands Conservation & Restoration Task Force. 2006. *The 2006 Evaluation Report to the U.S. Congress on the Effectiveness of Coastal Wetlands Planning, Protection & Restoration Act Projects*. Submitted by Chairman of the Louisiana CWPPRA Task Force, U.S. Army Corps of Engineers, New Orleans District.

3. U.S. Army Corps of Engineers. 2004. *Louisiana Coastal Area (LCA), Louisiana Ecosystem Restoration Study*. U.S. Army Corps of Engineers, New Orleans District.



Loading seafood at a LA dock for nation-wide distribution

Coastal Louisiana is a national asset

Coastal Louisiana is an important nexus  for the delivery of natural

, cultural , & economic

resources to the world. It includes rich natural habitat , migratory songbird  & waterfowl  flyways, & corridors for waterborne commerce . An historic blending of cultures provides a gumbo of ethnic backgrounds that contribute to a unique heritage  that is intricately linked to our coastal ecosystems. Combined with commerce  through our ports  & one of the largest concentrations of oil & gas , a wide range of local commodities are consumed nationally & internationally.



Port Fourchon



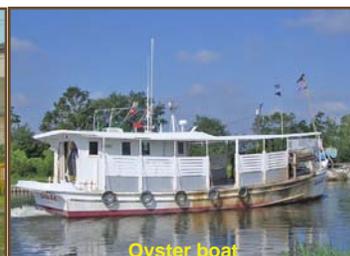
Yellow water lily



Beach fishing

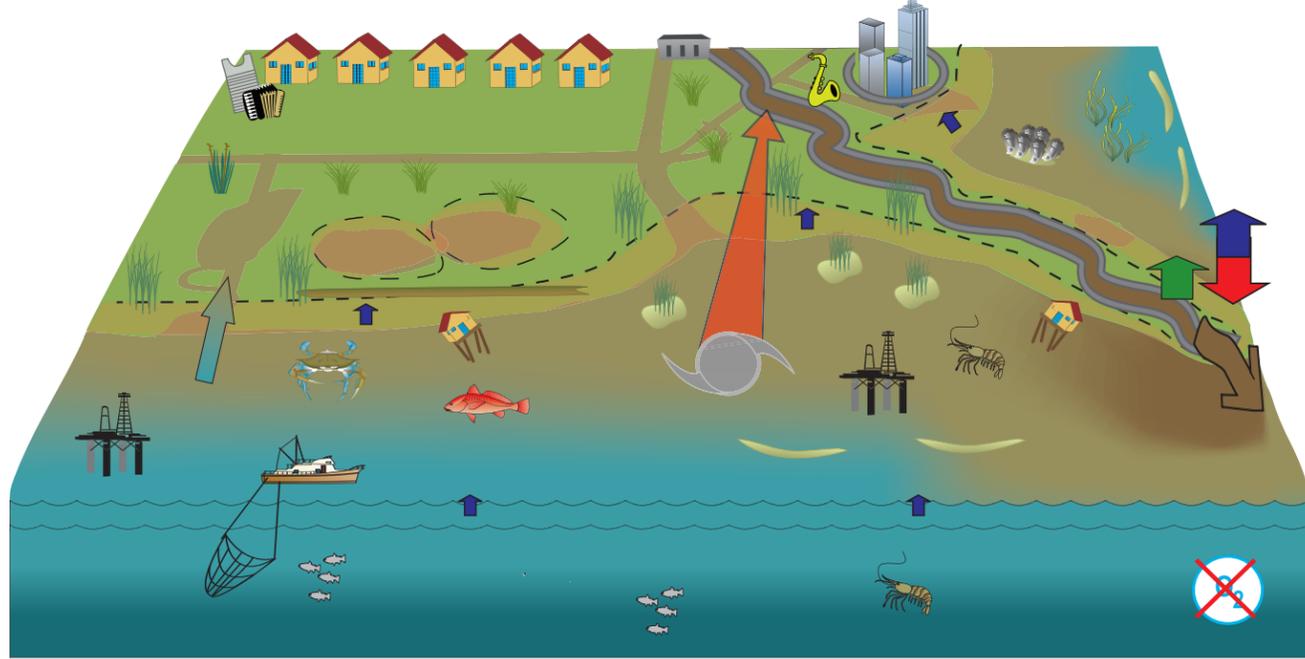


Coastal bait & seafood shop



Oyster boat

Future with current restoration: a retreating coast



By restricting ourselves to current levels of restoration effort, Louisiana's coast will continue to deteriorate. Urban & rural communities will be forced to retreat as they become increasingly vulnerable to coastal flooding & salt water intrusion. U.S. oil & gas supplies & transportation will be increasingly exposed to storms. Cajun & Creole cultures will also be threatened. Very little water from the Mississippi River will flow over the coastal marshes, & therefore excess nutrients will flow into open coastal waters causing low oxygen conditions to remain. Fish & wildlife habitat will be severely degraded, resulting in reduced fisheries production & there will be an overall net loss of land as accretion will not be able to keep up with subsidence & sea level rise. With current levels of restoration, the effects of climate change will amplify wetland deterioration & coastal flooding.

Future with aggressive restoration: a sustainable coast



Ensuring a sustainable coast requires immediate & aggressive wetland creation & barrier island restoration. This can only be achieved using river resources & effective use of dredged material. A sustainable coast provides storm protection for urban & rural communities & infrastructure, maintains normal oxygen conditions in offshore waters, reduces inshore salt water intrusion, & supports habitat for abundant fish & wildlife as well as the thriving Cajun & Creole cultures. With aggressive restoration, accretion can keep up with subsidence & sea level rise, so that there is a net land gain. Only with aggressive restoration does coastal Louisiana stand a fighting chance to survive the effects of future climate change.

ECOSYSTEM GOODS & SERVICES

Water quality

<p>Wastewater discharge: traditional</p>	<p>Wastewater discharge: traditional + wetlands</p>
<p>Traditional treatment of wastewater does not remove nutrients, such as nitrate or other nuisance compounds. In excess, these materials can result in lowered oxygen levels in the water causing large-scale fish kills. Swimming & fishing can be hazardous in an area where water quality is degraded.</p>	<p>Adding wetlands as a final step in treating wastewater can remove nutrients & nuisance compounds. The wetlands benefit from the added nutrients, & water quality is improved when the water is released. Water oxygen levels remain favorable for fish, & people can enjoy swimming & fishing.</p>
<p>Fish kill resulting from poor water quality</p>	<p>Fishing in an area of healthy water quality</p>

Habitat

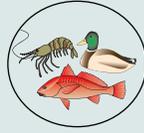
<p>Degraded cypress forest</p>	<p>Sustainable cypress forest</p>
<p>Many of Louisiana's cypress forests are currently unsustainable. They are too degraded to support cypress harvest. Swamp floors are flooded too long for cypress saplings to grow & mature, nutria destroy the few that do survive, & salt water intrusion is also a threat. These conditions impact the ability of cypress trees to regenerate & provide future ecosystem goods & services.</p>	<p>A vast array of ecosystem goods & services are supported by sustainable cypress forests. Not only do healthy, regenerating cypress forests support fish & wildlife habitat, they also provide aesthetics, recreational opportunities, flood protection, & water quality improvement. Restoring seasonal fresh water & nutrient inflows is vital to sustain Louisiana's cypress forests.</p>
<p>Degraded, unsustainable cypress forest</p>	<p>Healthy, sustainable cypress forest</p>

Storm surge protection

<p>Degraded buffer</p>	<p>Intact buffer</p>
<p>As barrier islands erode, their buffering capacity is lost. Storm surges & wave impacts penetrate farther inland with increased magnitude and frequency. This results in the need to build and maintain larger levees & more complex pumping systems to protect communities & commercial infrastructure.</p>	<p>Barrier islands & continuous marsh act as buffers to reduce storm surge penetration & wave impacts along the coast. With the presence of healthy, intact barrier islands & extensive wetlands, only small flood protection levees are required.</p>
<p>Severely degraded barrier island</p>	<p>Intact barrier island with terracing</p>

CONCLUSIONS AND RECOMMENDATIONS

Coastal Louisiana is a nexus of commercial & recreational activities providing ecosystem goods & services to the nation.



Restore and **sustain** Louisiana's coastal wetlands to benefit the nation.

Incorporate the valuation of coastal Louisiana's ecological goods & services in developing restoration strategies.

Investing in coastal LA ecosystems results in a long term accrual of economic gains.



Invest now in sustainable restoration to maximize long term benefits & minimize loss.

Employ valuation of ecosystem services in restoration planning.

Sustainable restoration can be achieved only by reconnecting the Mississippi River with the coastal Louisiana landscape.



Develop an aggressive regional approach to restoration that transcends local issues.

Incorporate climate change scenarios (e.g., sea level rise) to achieve sustainable restoration strategies.

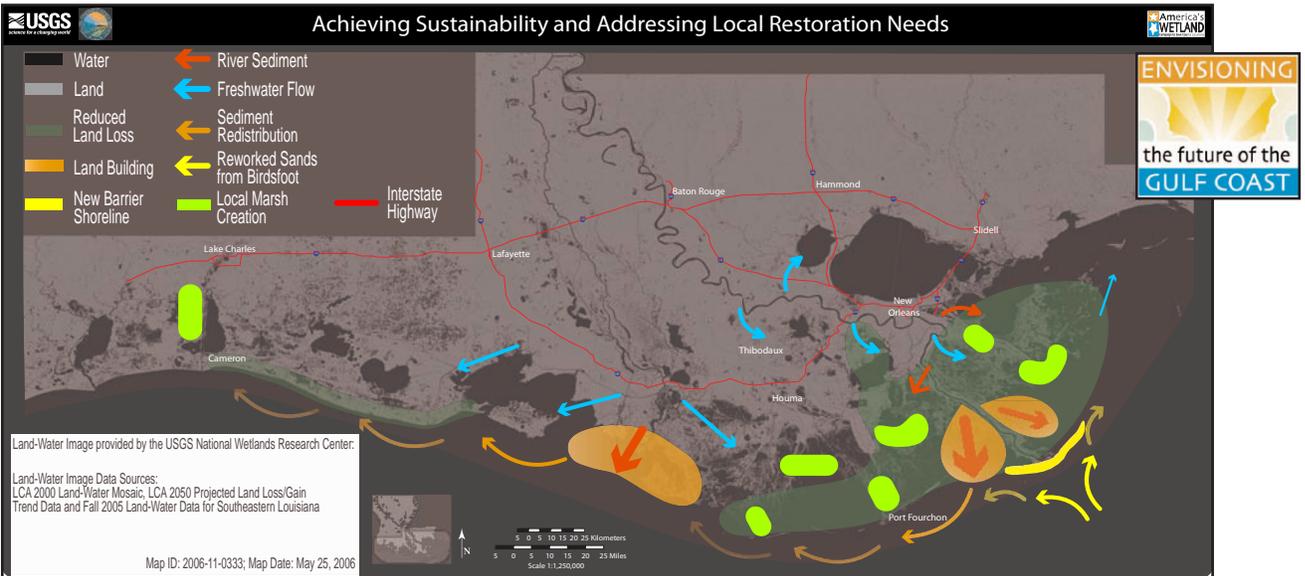
Louisiana residents are committed to restoring rather than retreating from coastal ecosystems.



Support Louisiana residents in coastal restoration using various local, regional & national initiatives.

Prioritize restoration activities that create sustainable ecosystems rather than human built infrastructure.

Results from *Envisioning the Future of the Gulf Coast* (New Orleans, LA; April 2006)



Workshop participants (alphabetical): David Batker: Earth Economics; Jan Boydston: Louisiana Dept. of Environmental Quality; Tim Carruthers: Univ. of Maryland Integration & Application Network; Piers Chapman: Coastal Restoration & Enhancement through Science & Technology; Ellis 'Buddy' Clairain: Engineer Research & Development Center; Chad Courville: Ducks Unlimited; Bill Dennison: Univ. of Maryland Integration & Application Network; Jane Hawkey: Univ. of Maryland Integration & Application Network; Doug Meffert: Tulane Univ.; Alaina Owens: Coastal LA Ecosystem Assessment & Restoration; Rick Raynie: LA Dept. of Natural Resources; Charles Sasser: Louisiana State Univ.; Greg Steyer: U.S. Geological Survey; Simone Theriot: Restore or Retreat; Robert Twilley: Louisiana State Univ.; Jenneke Visser: Louisiana State Univ.; Not pictured: Cindy Brown: The Nature Conservancy; Denise Reed: Univ. of New Orleans.



FURTHER INFORMATION Coastal Louisiana Ecosystem Assessment & Restoration (CLEAR)

www.clear.lsu.edu

SCIENCE COMMUNICATION

Graphics, design, & layout by Alaina Owens & Integration and Application Network, University of Maryland Center for Environmental Science

FUNDING LCA Science & Technology Office

