

## *Executive Summary*

---

This document presents the findings of a comprehensive science-based evaluation of the adequacy of the current inland boundary to meet the state's present and future needs to manage, protect, and restore its coastal resources. A guiding principle for this study was the need for balance between creating an overly expansive coastal zone and identifying a coastal zone that was sufficient to manage emerging coastal issues over the next several decades, especially those pertaining to climate change, sea level rise, nonpoint source pollution, and coastal and marine spatial planning. In addition, a critical factor to consider was delineating a management area based on science and geography that would allow for coastal management in the area covered by the Louisiana Comprehensive Master Plan for a Sustainable Coast.

The Louisiana Legislature, by Senate Concurrent Resolution 60 of 2009, directed the Coastal Protection and Restoration Authority (CPRA) to undertake a comprehensive science-based evaluation of Louisiana's currently defined Coastal Zone Boundary (CZB). The purpose of the study was to determine if changes (e.g., sea-level rise, regional subsidence, and wetland loss) that have occurred since the original boundary was established over 30 years ago have altered the coastline, such that the current CZB is no longer adequate for the current and future coastal zone management needs of the state. The CPRA selected the Louisiana Department of Natural Resources (LDNR), Office of Coastal Management (OCM) to lead the study.

The Coastal Zone Management Act of 1972 (CZMA) defines the coastal zone as the coastal waters and adjacent shorelands that extend inland only to the extent necessary to include areas that have a direct and significant impact on coastal waters and/or are likely to be affected by, or vulnerable to, sea-level rise. Louisiana's current CZB was first recommended in 1975 based on an analysis of biophysical parameters, but was revised to incorporate legal and governmental considerations. The resulting CZB included all or parts of 19 parishes and approximately 5.3 million acres. It was widely believed that the inland boundary of the coastal zone was, from its inception, insufficient to adequately manage Louisiana's coastal resources. Three primary deficiencies of the inland boundary were listed by Emmer (1989): 1) Water quality in the coastal zone can be significantly affected by activities occurring outside the coastal zone; 2) Some parishes, or parts of parishes, outside the coastal zone have the same physical and biological characteristics as lands inside the coastal zone; and 3) Riparian wetlands along rivers which influence the coastal zone were not included in the coastal zone. In addition, there are a number of State and Federal coastal programs established in south Louisiana (e.g., Coastal Wetlands Planning, Protection, and Restoration Act and Barataria-Terrebonne National Estuary Program) with boundaries that encompass part or all of the CZB, and in some instances, extend past the current CZB. Integrating the state's federally approved coastal zone with these existing coastal programs and the enforceable

policies and management mechanisms pertaining to coastal areas of Louisiana has been an important consideration in evaluating the CZB.

Involving the stakeholders of coastal Louisiana has also been critical in identifying concerns and potential changes to the current coastal zone boundary. The stakeholders who have participated in the public involvement aspect represent a diverse group, including governments, civic groups, industry representatives, and individual citizens. Contribution and participation was sought from these groups by holding a series of workshops, meetings, and presentations in strategic locations throughout southern Louisiana.

When the first CZB was proposed, 22 biophysical parameters were evaluated to determine if there was any one parameter that controlled the distribution of any, or all, of the other parameters. Best-fit correlations showed that the line of Pleistocene/Recent contact, which is approximated by the 5-foot contour line, provided the best measure approximation of the boundary line. To evaluate the current CZB, several tasks were necessary, including: 1) Analysis of parameters used in delineating the original CZB; 2) Collection and analysis of data that were unavailable at the time of the original study; and 3) Compilation of data sets into comparable Geographic Information System (GIS) layers for analysis and delineation of the CZB. In addition, during the evaluation of the current CZB, it was necessary to be aware of constraints and directions included in both the CZMA (16 USC 33:1451 et seq.) and the SLCRMA (R.S. 49:214.21 et seq.). Based on these two statutes, a number of objective criteria became clear, including that the redefined CZB needed to include:

- The inland extent of area needed to fully implement the state Master Plan;
- The inland extent of coastal waters as defined by law;
- The inland extent of tidal influence;
- The inland extent of wetland vegetation closely associated with coastal ecosystems;
- The inland extent of fish and wildlife closely associated with coastal ecosystems;
- The inland extent of coastal watersheds;
- The inland extent of projected effects of climate change, including sea level rise, storm surge, back water flooding and other coastal hazards;
- The inland extent of basic geological features frequently associated with shorelines, such as the Pleistocene terrace;
- The inland extent of the location of coastal dependent or coastal enhanced industry or other commercial activities closely related to the coast;
- The inland extent of coastal recreational activities; and
- The inland extent of population centers economically tied to coastal dependent or enhanced economic activities.

Technology has improved since 1975, and more data were available for the CZB re-evaluation than were available 30 years ago. Data acquired that were not available in 1975 included National Oceanic and

Atmospheric Administration (NOAA) Sea, Lake, and Overland Surge from Hurricanes (SLOSH) model outputs, Light Detecting and Ranging (LIDAR) Elevation data, National Resource Conservation Service (NRCS) State Soil Geographic (STATSGO) soils data, Multi-resolution Land Characteristics Consortium (MLCD) National Land Cover (NLC) vegetation data, and sea-level rise predictions for the next century. The SLOSH model is the primary computer model used by NOAA to forecast the inland extent of storm surge; the forecast is based the Maximum Envelope of Water (MEOW) and Maximum of the MEOWs (MOMs) plots that result from the model runs. LIDAR data were used to determine elevation contours. The NRCS STATSGO soil data were utilized to identify riparian areas within watersheds that touch the coast. MLCD NLC vegetation data were found to be more extensive within the area of interest than United States Geological Survey (USGS) marsh data. In addition, as sea levels rise and the Louisiana coast subsides, changes in the coastline are expected to occur, which should have an impact on coastal zone management. Thus, sea level predictions were given consideration when re-evaluating the CZB. Animal habitat data were not included in the present study. Instead, extensive regional vegetation data were relied upon to determine the inland extent of saltwater intrusion. The boundary of LDNR's Coastal Nonpoint Pollution Control Program (CNPCP) was included to evaluate the impact of drainage basins in watersheds that drain to the Gulf of Mexico. These data are discussed in more detail in the body of this report.

GIS layers of data sets included in the current study were compiled, then a series of questions were applied to the layers in order to numerically define areas of the coastal zone. The area to which questions were applied was limited to major watersheds that touch the coast (e.g., the study area). The study area was separated into a series of 1-km<sup>2</sup> areas that were approximately 247 acres each, for a total of 39,764 1-km<sup>2</sup> areas. Each question was asked in each of the 1-km<sup>2</sup> areas and the resulting answer could be either "Yes" or "No". The questions included:

- 1) Is any part of the 1-km<sup>2</sup> area at or below the line of contact between Pleistocene and Holocene sediments?
- 2) Is any part of the 1-km<sup>2</sup> area within the current coastal zone?
- 3) Is any part of the 1-km<sup>2</sup> area within the boundary of the existing CNPCP area?
- 4) Does the 1-km<sup>2</sup> area contain emergent herbaceous wetlands (fresh, intermediate, brackish or salt marsh)?
- 5) Is any part of the 1-km<sup>2</sup> area contained within the inland extent of storm surge, per the Maximum of MEOWs (MOMs) map?
- 6) Is any part of the 1-km<sup>2</sup> area at an elevation of 5 feet or lower?
- 7) Is any part of the 1-km<sup>2</sup> area at an elevation of 8 feet or lower?
- 8) Is any part of the 1-km<sup>2</sup> area at an elevation of 10 feet or lower?
- 9) Does the 1-km<sup>2</sup> area contain soils classified as floodplains, marsh, backswamp, or water?

If the answer was "Yes", then the 1-km<sup>2</sup> area received a score of 1 and if the answer was "No" the area received a score of 0. If any part of the 1-km<sup>2</sup> area contained the vegetation, elevation, etc for the query,

the answer for the entire 1-km<sup>2</sup> area was “Yes”. Values of 1 or 0 for each 1-km<sup>2</sup> grid were recorded in an attribute table and summed for the nine data layers queried, resulting in scores ranging from 0 to 9 for each grid. A score of 7 to 9 represented areas with a high level of coastal influence. A score of 3 to 6 represented areas with a moderate level of coastal influence. A score of 1 or 2 indicated a low level of coastal influence; and a score of 0 represented areas with no coastal influence. Scores for grids within the current CZB were examined and it was found that approximately 95% of the grids scored 7 or greater, with 99.9% scoring 3 or greater. Only four grids within the current CZB received a score of 2, and no grids received scores of 1 or 0.

The 1-km<sup>2</sup> areas were grouped according to the four levels of coastal influence and color coded for visual display. There were fairly distinct strata associated with areas highly influenced by coastal processes and those moderately impacted by coastal process. But, the areas barely influenced by coastal processes and those areas not influenced by coastal processes under normal circumstances tended to be more sporadic, with coastal processes extending to the limits of the study area in many of the 1-km<sup>2</sup> areas. Therefore, all 1-km<sup>2</sup> areas scoring between 0 – 2 were grouped together.

Based on scientific analyses performed for this report, a broader coastal management area designated the 2020 Science-Based Boundary (2010 SBB), with an adjacent planning area, is recommended to allow the state to effectively manage, protect, and restore its coastal resources. The 2010 SBB encompasses all areas subject to high and moderate coastal processes and divides coastal Louisiana into two management areas based on the degree of coastal influence and the nature and degree of management required. The SBB employs a hierarchical management structure, consisting of two distinct management areas: the coastal zone, or Coastal Use Permit (CUP) management area; and the contiguous area of moderate coastal influence adjacent to the coastal zone, or the Intergovernmental Coordination (IGC) management area. Activities in the coastal zone would be subject to the enforceable policies of the SLCRMA, and subject to regulation by the coastal use permit process. Whereas, activities in the IGC management area would not be “regulated” in the strict sense of the word. Rather, these activities would be subject to state and federal consistency, based on the same enforceable policies that are used to evaluate permits. In the IGC area, the OCM would evaluate proposed actions by governmental bodies that involve major hydrological modifications, because these activities have the potential to affect the coastal zone or Master Plan implementation. The individual actions of residents, private businesses, private industry, and landowners on a project-by-project basis would not be scrutinized within the IGC area. Thus, the 2010 SBB includes the updated coastal zone, which is called the Coastal Use Permit (CUP) management area to distinguish it from the current coastal zone, and the Intergovernmental Coordination (IGC) management area, which will be subject to oversight by the OCM, but will not be part of the regulated coastal zone. Areas not within the 2010 SBB, but contained within, or adjacent to, watersheds with potential coastal influence, are included in the Watershed Planning (WSP) management area located north of the IGC area; activities in the WSP area would not be subject to the enforceable policies of the SLCRMA, unless an activity specific effect on coastal waters was demonstrated.

The recommended management areas would include:

- Coastal Use Permit (CUP) Management Area
  - Zone of direct interaction
  - High level of coastal influence, based on the data set evaluation (Score 7-9)
  - Located within, and synonymous with, the regulated coastal zone
  - Permits would be required for certain activities pursuant to existing regulations as set forth in R.S. 49§214.30 or revisions thereto
  
- Intergovernmental Coordination (IGC) Area
  - Zone of direct influence
  - Moderate level of coastal influence, based on the data set evaluation (Score 3-6)
  - Located within the coastal management area, but outside of the regulated coastal zone
  - Consistency determinations, pursuant to existing authorities and state law, would be required for major hydrological modifications which are direct actions of governmental bodies
  
- Watershed Planning (WSP) Area
  - Zone of indirect influence
  - Low or no coastal influence, based on the data set evaluation (Score 0-2)
  - Located outside of the coastal management area, but within the identified planning area
  - Coastal zone management program might choose to participate in coastal planning efforts, with or without contributing funding, if the particular planning effort will have coastal ramifications.

The newly delineated coastal management area, with the proposed boundaries of the IGC and CUP areas, is shown on Figure ES 1 (Text Figure 30). The parishes included in each area, in whole or in part, are listed in Table ES 1 (Text Table 10). The generally proposed boundary for each area is described in Section 3.5.1: Management Areas. Adoption of the CUP area proposed inland boundary would add only a single new parish, a portion of Ascension, to the area now subject to coastal use permitting. Act 956 of the 2010 Regular Session of the Louisiana Legislature provides authorization to add all or any portion of Ascension within six months of approval of the boundary change for that parish by the CPRA. While it is true that other areas of the proposed CUP area are expanded by this proposal, certain areas in Livingston and Tangipahoa parishes are proposed to be deleted from the area subject to coastal use permitting, although they would remain in the IGC area of the broader coastal zone.

While this report provides a framework for establishing an expanded coastal management area and hierarchical management, the only required change to state law is to amend the boundary section of the SLCRMA to enlarge the coastal zone, so that it encompasses all of the CUP area. Implementation of the IGC area can be accomplished administratively, through existing state and federal law and regulations

under the CZMA and the SLCRMA. Thus, the only statutory change would be to amend the current coastal zone boundary statute, La. R.S. 49:214.24. Legal considerations, if the recommendations included in this report are accepted, are discussed in 4.0 Next Steps: Implementing an Updated Coastal Zone.

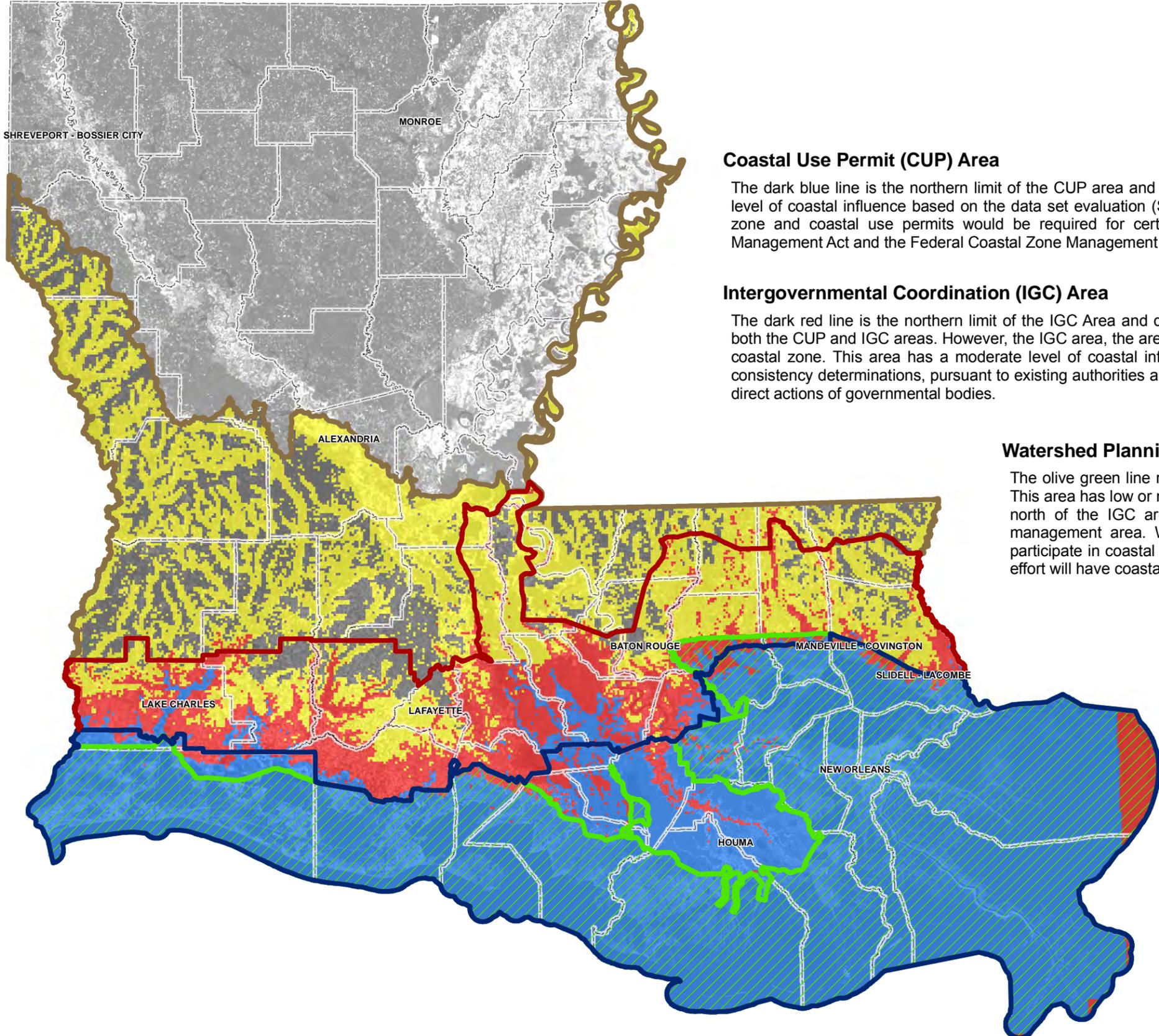
The coastal management area, consisting of the two management areas recommended in this report, could be implemented at the state level through regulation or statute. The Legislature enacts statutes. Administrative agencies adopt, amend and repeal regulations under the authority granted to them by statutes, and in accordance with the Administrative Procedure Act. Other coastal states have used both methods in establishing their coastal zones. This report recommends that the boundary section of the SLCRMA be amended to authorize the OCM, through rulemaking via the Administrative Procedures Act process, to make changes to the inland boundary following a periodic review, and that the CUP area boundary be implemented as the state's inland coastal zone boundary.

If the Legislature chooses to update Louisiana's coastal zone, regardless of the implementation approach chosen, it is recommended that the CUP and IGC boundaries be re-analyzed every ten years to evaluate the effects on the landscape, coastal populations, and infrastructure. The re-evaluations should use a GIS approach, and methods similar to those used in this study. New technology and approaches should be incorporated, as appropriate. Additionally, the coastal zone boundary and the IGC management area boundary should be maintained in an electronic GIS format on a website that is publically available. In this way, it can be consulted by any person or group considering any activity in coastal Louisiana.

**Table ES 1. Alternative Coastal Zone Boundary Matrix**

Current Coastal Zone Boundary		2010 Science-Based Recommendation Boundary (CUP & IGC Areas)							
		Entire Parish located inside CZB	Portion of Parish located in CZB	Local coastal program approved	Local coastal program being developed	Entire Parish located inside CUP area	Portion of Parish located inside CUP area	Entire Parish located inside IGC area	Portion of Parish located inside IGC area
<b>CRITERIA</b>									
<b>PARISH</b>	Acadia							•	
	Assumption		•			•			
	Ascension						•		•
	Avoyelles								•
	Calcasieu		•	•			•		•
	Cameron		•	•		•			
	Concordia								•
	East Feliciana								•
	East Baton Rouge								•
	Iberia		•		•		•		•
	Iberville							•	
	Jefferson	•		•		•			
	Jefferson Davis							•	
	Lafayette							•	
	Lafourche		•	•		•			
	Livingston		•				•		•
	Orleans	•		•		•			
	Plaquemines	•		•		•			
	Pointe Coupee								•
	St. Bernard	•		•		•			
	St. Charles	•			•	•			
	St. Helena								•
	St. James	•		•		•			
	St. John the Baptist	•				•			
	St. Martin		•				•		•
	St. Mary		•			•			
	St. Landry								•
	St. Tammany		•	•			•		•
	Tangipahoa		•				•		•
	Terrebonne		•	•		•			
	Vermilion		•		•		•		•
	Washington								•
West Baton Rouge								•	

**Figure ES-1**  
**2010 Science-Based Boundary**  
*CUP, IGC, and WSP Management Areas*



**Coastal Use Permit (CUP) Area**

The dark blue line is the northern limit of the CUP area and delineates the proposed inland coastal zone boundary. This area has a high level of coastal influence based on the data set evaluation (Score 7-9). The area south of the dark blue line will be the regulated coastal zone and coastal use permits would be required for certain activities in accordance with the State and Local Coastal Resources Management Act and the Federal Coastal Zone Management Act.

**Intergovernmental Coordination (IGC) Area**

The dark red line is the northern limit of the IGC Area and delineates the limits of the broader coastal management area which includes both the CUP and IGC areas. However, the IGC area, the area between the dark red line and the dark blue line, is not part of the regulated coastal zone. This area has a moderate level of coastal influence based on the data set evaluation (Score 3-6). Within the IGC area, consistency determinations, pursuant to existing authorities and state law, would be required for major hydrological modifications which are direct actions of governmental bodies.

**Watershed Planning (WSP) Area**

The olive green line represents the study area's northern boundary and delineates the WSP area. This area has low or no coastal influence based on the data set evaluation (Score 0-2). The WSP is north of the IGC area and is not part of the regulated coastal zone or the broader coastal management area. Within the WSP area, the coastal management program might choose to participate in coastal planning efforts, with or without contributing funding, if the particular planning effort will have coastal ramifications.

**Legend**

2010 Proposed Boundary	Analysis Grid Score 7 - 9
Coastal Use Permit (CUP) Area	Analysis Grid Score 3 - 6
Intergovernmental Coordination (IGC) Area	Analysis Grid Score 1 - 2
Watershed Planning (WSP) Area	Analysis Grid Score 0
	Current Coastal Zone Boundary
	Parish Boundary

REFERENCE:  
 Louisiana Oil Spill Coordinator's Office, 2007, Landsat Thematic Mapper Satellite Image 2005, UTM Zone 15 NAD83, LOSCO (2007) [landsat5tm\_la\_lsu\_2005.sid]; Louisiana Oil Spill Coordinator's Office, Baton Rouge, LA.