LOUISIANA COASTAL PROTECTION AND RESTORATION
FINAL TECHNICAL REPORT

ECONOMICS APPENDIX

June 2009

U. S. Army Corps of Engineers
New Orleans District
Mississippi Valley Division

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PURPOSE

The Louisiana Coastal Protection and Restoration (LACPR) Technical Report has been developed by the United States Army Corps of Engineers (USACE) in response to Public Laws 109-103 and 109-148. Under these laws, Congress and the President directed the Secretary of the Army, acting through the Chief of Engineers, to:

- Conduct a comprehensive hurricane protection analysis and design in close coordination with the State of Louisiana and its appropriate agencies;
- Develop and present a full range of flood control, coastal restoration, and hurricane protection measures exclusive of normal policy considerations for South Louisiana;
- Consider providing protection for a storm surge equivalent to a Category 5 hurricane; and
- Submit preliminary and final technical reports.

The purpose of this appendix is to support the economic, regional, and social evaluation for LACPR, which is discussed in the main technical report.

INTRODUCTION AND BACKGROUND

Congress directed that the LACPR analysis to be conducted “exclusive of normal policy considerations.” Therefore, LACPR alternatives are being evaluated in a risk-informed decision framework across a wide range of metrics, rather than through the use of traditional methodology based on National Economic Development (NED) and/or environmental restoration benefits. This approach not only provides for the quantification of the damages reduced by the various alternatives plans, but it also allows for the quantification of other risk reduction parameters.

As a means to process data for approximately 72,000 census data blocks under multiple future scenarios, the LACPR team developed a customized geographic information system (GIS), which utilized remotely-sensed data to assess the damages to residential and nonresidential structures, their contents, and vehicles as well as agricultural resources, roads and railroads in the LACPR planning area. The application was also used to determine the number of structures, population, employment, income, and output affected by the stages associated with various frequency flood events. This inventory allows the LACPR team to evaluate alternatives and interact with stakeholders using a broader array of relevant outputs.

Planning Units and Subunits

Located in South Louisiana, the LACPR planning area contains all or portions of the 26 parishes that could be affected by the storm surge from hurricanes and tropical storms. It extends from the Pearl River on the Louisiana/Mississippi border west to the Sabine River on the Louisiana/Texas border. The area was divided into five planning units, which are based on hydrologic basins and watersheds rather than on existing political and economic boundaries.

Planning Unit 1 (PU1), the Lake Pontchartrain Basin, includes the city of New Orleans, the east bank of Jefferson Parish, and the north shore of Lake Pontchartrain and is the most densely populated planning unit in coastal Louisiana. It is bounded by the Mississippi River to the west, Interstate 12 to the north, the Pearl River to the east, and the Gulf of Mexico to the south.

Planning Unit 2 (PU2), the Barataria Basin, is a highly productive estuary that contains the heavily populated west bank of Orleans and Jefferson Parishes. It is a triangular shaped area bounded by Bayou Lafourche, the Mississippi River, and the Gulf of Mexico.

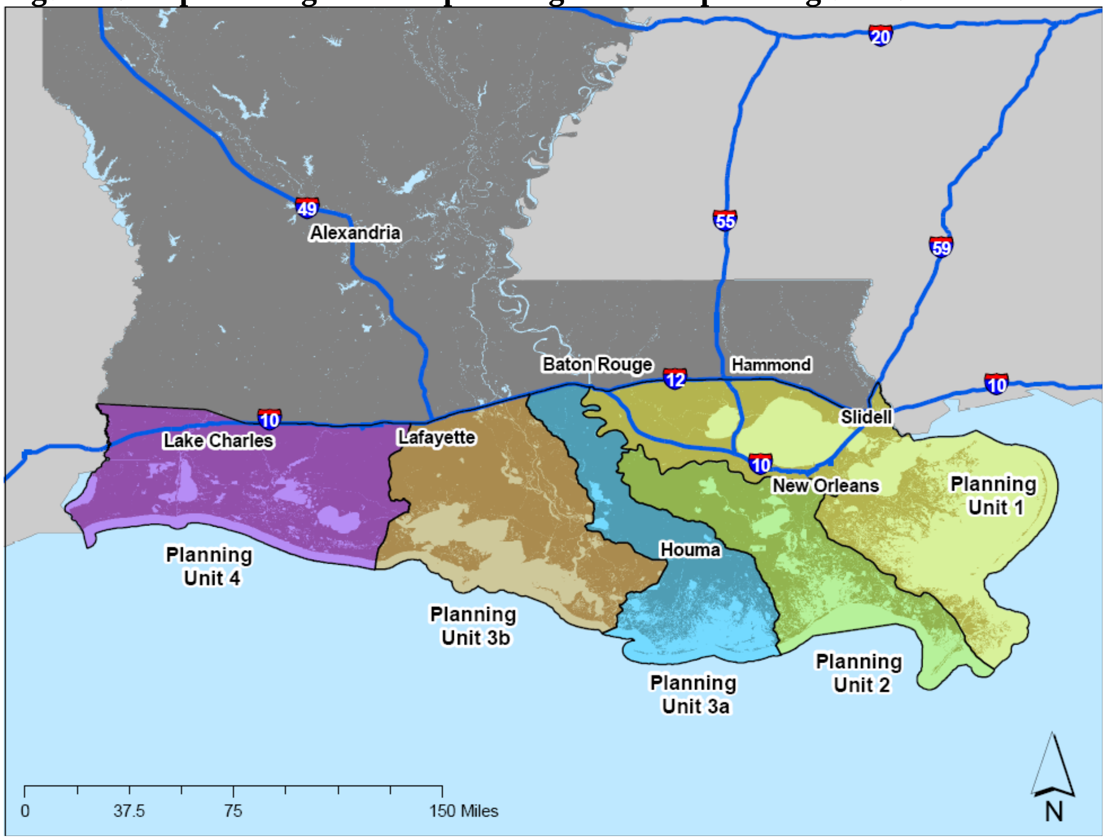
Planning Unit 3a (PU3a), the East Terrebonne Basin, contains the cities of Houma, Thibodaux, and Morgan City. It is bounded by Bayou Lafourche to the east, Interstate 10 to the north, and the Gulf of Mexico to the south. Its western border includes the East Atchafalaya Protection Levee to the GIWW in Morgan City, the GIWW to Miner's Canal, Miner's Canal to Lake de Cade, Lake de Cade to Lake Merchant, Lake Merchant to East Bay Junop, and East Bay Junop to the Gulf of Mexico.

Planning Unit 3b (PU3b), the Atchafalaya Influence Area, contains the city of Lafayette and the communities of New Iberia, Berwick, Abbeville, and Erath. It is bounded by Planning Unit 3a to the east, Interstate 10 to the north, and the Gulf of Mexico to the south. Its western border extends south from the city of Lafayette to Freshwater Bayou Canal and follows Freshwater Bayou Canal to the Gulf of Mexico.

Planning Unit 4 (PU4), the Chenier Plain, includes the city of Lake Charles and the communities of Sulphur, Crowley, Jennings, and Cameron. It is bounded by Planning Unit 3b to the east, Interstate 10 to the north, the Sabine River to the west, and the Gulf of Mexico.

The five planning units in the LACPR planning area were further delineated into planning subunits based on consistent topographical and hydrological characteristics. Planning subunits were developed for all or portions of 23 of the 26 parishes that are subject to the surges associated with storm events. The planning area contains a total of 963 planning subunits: 145 in PU1, 115 in PU2, 207 in PU3a, 231 in PU3b, and 265 in PU4. A total of 35,594 census blocks are included in the areas delineated as planning subunits. A map depicting the locations of the five planning units in the planning area is shown in Figure 1.

Figure 1. Map showing LACPR planning area and planning units.



Previous Flood Events

While the planning area has periodically experienced localized flooding from excessive rainfall events, the primary cause of the flood events that have taken place in South Louisiana has been the tidal surges from hurricanes and tropical storms. During the past 30 years, the planning area has been affected by numerous hurricanes and tropical storms of various intensities. The tidal surges associated with these storm events have inundated structures and resulted in billions of dollars in damages to coastal Louisiana. A summary of these storm events, the years of occurrence, and the planning units that were impacted is provided below.

Non-Tropical Events. Numerous rainfall events have affected the Metropolitan New Orleans area and other portions of urban areas in Louisiana; however, the most severe of these events in terms of damage occurred in May of 1995. Rainfall amounts of up to 17.5 inched were reported within a 24-hour period in some areas of Jefferson and Orleans Parishes (Planning Units 1 and 2). Approximately 43,000 residential structures incurred damage in the metropolitan area, with insurance flood claims totaling nearly $600 million dollars. Spring floods and rainfall caused backwater flooding in the city of Morgan City (Planning Unit 3b) in 1973, city of Baton Rouge (Planning Unit 1) in 1982, and the cities of Houma and Thibodaux (Planning Unit 3a) in 1991.

Hurricane Juan. Hurricane Juan caused extensive flooding throughout southern Louisiana due to its prolonged 5-day movement back and forth along the Louisiana coast in October 1985. The majority of the flood damage occurred in the Lincolnshire and Westminster subdivisions located on the west bank of Jefferson Parish (Planning Unit 2). Rainfall totals in the area ranged from five inches to almost 17 inches. The storm was responsible for storm surges of five to eight feet and tides of three to six above normal. According to FEMA officials, the estimated value of the residential and commercial damage and public assistance totaled $112.5 million.

Planning Unit 3a also incurred extensive damage as a result of Hurricane Juan. Over 800 homes were inundated in the coastal portion of Terrebonne Parish south of the city of Houma. Scattered pockets of flooding were also reported in the portions of Terrebonne and Lafourche Parishes north of Houma. Approximately 40 percent of the homes in the coastal areas of Lafourche Parish, including Pointe-aux-Chenes, were also inundated by the high tides.

Agricultural damages from the storm totaled $175 million, with 24 percent of these damages occurring in Lafourche and Terrebonne Parishes. The soybean crop suffered over half of the agricultural damage, while the sugar cane crop incurred 20 percent of the damage. Excessive rains oversaturated the fields and caused a reduction in crop yields. The saturated fields also made it easier for the winds to topple over the cane stalks.

Hurricane Andrew. Shortly after midnight on August 26, 1992, Hurricane Andrew made landfall in St. Mary Parish, 80 miles west of Morgan City. Following its landfall, the storm changed its course from northwest to north and battered the Acadiana Parishes of St. Mary, Iberia, and Lafayette (Planning Unit 3b) as well as Lafourche and Terrebonne Parishes (Planning Unit 3a). The rapid speed of the storm and the direction of its movement into Louisiana greatly reduced its storm surge and limited its flood damage potential. Because the storm skirted the coast before moving inland, its winds pushed the stages downward. These lowered stages were able to absorb much of the tidal surge when the eye moved ashore and the winds changed directions. As a result, tidal flooding in coastal parishes was minimized.

FEMA reported that over 2,000 flood claims were filed as a result of this storm in Louisiana. These claims had a total value of over $25 million. Over 90 percent of this flood damage occurred in the Terrebonne Parish communities south of Houma, where up to six feet of water was reported. Only minor flooding was reported in the lower elevation areas north of and within the city of Houma. The unleveed portion of Lafourche Parish along its border with Terrebonne Parish, which includes the community of Pointe-au-Chien, also incurred extensive flood damage. The majority of the agricultural damage in the area occurred as the result of wind damage to the sugar cane crop.

Tropical Storm Isidore and Hurricane Lili. Tropical Storm Isidore and Hurricane Lili caused widespread damage in the central and eastern coastal areas of the state during the fall of 2002. Tropical Storm Isidore made landfall west of the mouth of the Mississippi River near Grand Isle and Port Fourchon on the morning of September 26, 2002. After the storm moved inland, it took a northeasterly path across eastern New Orleans and Slidell. The approaching storm pushed high tides toward the southern shore of Lake Pontchartrain. This caused flooding in the portion of St. Charles Parish outside of the Federal levee protection (Planning Unit 1). However, as the center of the storm moved north of the lake, the winds shifted direction and pushed the high tides inland along the lakefront of St. Tammany Parish. This caused extensive flooding in the lakefront subdivisions of Mandeville and Slidell (Planning Unit 1).

One week later on October 3, 2002, Hurricane Lili made landfall on the western edge of Vermilion Bay south of the cities of Abbeville and New Iberia (Planning Unit 3b) as a weak Category 2 hurricane. Winds toppled trees and power lines leaving approximately half a million people without electricity immediately after the storm. The high winds caused tidal flooding in the communities east of the eye of the storm. The ridge communities in Terrebonne Parish south of the city of Houma, including Cocodrie, Dulac, Isle de Jean Charles, and Montegut, and the community of Pointe-aux-Chenes in Lafourche Parish were affected by tidal flooding (Planning Unit 3a). The only community south of Houma that did not flood was Chauvin. As the storm moved north, tidal flooding similar to that from Tropical Storm Isidore inundated the lakefront subdivisions of Mandeville and Slidell in St. Tammany Parish, the coastal communities of Lafitte and Grand Isle in Jefferson Parish, and the coastal portions of Plaquemines and St. Bernard Parishes (Planning Unit 1). Each of these areas is outside the existing Federal levee systems.

Insured losses from Tropical Storm Isidore and Hurricane Lili totaled nearly $600 million. New Orleans District has estimated that flooding caused approximately 80 percent of these damages, while the remainder was caused by wind and flying debris. Approximately $105 million of insured losses were related to Tropical Storm Isidore, while Hurricane Lili caused $471 million of insured losses. According to windshield surveys conducted by the American Red Cross, approximately 10,000 residential structures were damaged by the two storms. These surveys included both insured and uninsured structures. Tropical Storm Isidore caused damage to 2,905 structures, while Hurricane Lili caused damage to 7,356 structures.

In a revised report released in mid-November by the Louisiana State University Agricultural Center (LSU AgCenter), the estimated agricultural damages caused by Tropical Storm Isidore and Hurricane Lili totaled $454.3 million. This estimate also includes the agricultural damages caused by the continuation of rain during the month of October, which delayed the harvesting of crops. The excessive rains flooded the agricultural fields and increased the harvest costs.

The wind and waves of Tropical Storm Isidore and Hurricane Lili caused extensive beach erosion in the barrier islands of Louisiana. These islands protect the coastline of the state and provide a natural habitat for many species of wildlife. The barrier islands west of the mouth of the Mississippi River that were affected by the two storm events include the Isles Dernieres (Whiskey Bayou, Raccoon Island, Trinity Island, and East Island), Timbalier Island, East Timbalier Island, Elmer Island, and Grand Terre. Grand Isle incurred extensive damage along its eastern beach. Three small islands east of the mouth of the Mississippi River, Grand Gosier Island, Curlew Island, and Chandeleur Island, incurred extensive damage and beach erosion. A monetary value has not been determined for these environmental damages.

Hurricane Katrina. The most significant storm event to affect the Metropolitan New Orleans Area (Planning Unit 1) since Hurricane Betsy in 1965 was Hurricane Katrina. Hurricane Katrina made landfall on August 29, 2005, near the town of Buras in Plaquemines Parish as a Category 3 storm with winds in excess of 120 miles per hour. However, its storm surge of approximately 30 feet was more characteristic of a Category 5 hurricane. After tracking across the southeastern Louisiana coastline, it made a second landfall near the town of Waveland on the Mississippi Gulf Coast. The surge from Lake Pontchartrain pushed water into the three major outflow canals (London Avenue, Orleans, and 17th Street) of the city of New Orleans, which overwhelmed their adjacent floodwalls. The surge from Lake Borgne overwhelmed the levees protecting St. Bernard Parish, New Orleans East, and the Lower Ninth Ward. Many portions of the metropolitan area were submerged in more than 6 feet of water for more than 3 weeks. Area pump stations were left inoperable or inaccessible, which caused the dewatering process to take approximately 53 days.

According to the Department of Health and Hospitals (DHH), approximately 1,400 deaths were reported following Hurricane Katrina. Approximately 1.3 million residents were displaced immediately following the storm, and 900,000 residents remained displaced as of October 5, 2005. According to the Louisiana Recovery Authority (LRA), two years after the storm, approximately 210,000 FEMA applicants still have out-of state mailing addresses, while 230,000 FEMA applicants have an in-state mailing address in a different zip code.

The storm caused more than $40.6 billion of insured losses to the homes, businesses, and vehicles in six states. Approximately two thirds of these losses, or $25.3 billion, occurred in Louisiana based on data obtained from the Insurance Information Institute. According to the LRA, approximately 150,000 housing units were damaged, and according to the Department of Environmental Quality (DEQ), 350,000 vehicles, and 60,000 fishing and recreational vessels were damaged.

As of January 2007, approximately $30 billion in Federal funds have been obligated to Louisiana residents through Individual and Public Assistance Programs, National Flood Insurance claims, and Small Business Administration (SBA) disaster loan. Individual assistance grants, which totaled approximately $5.7 billion, included $3.8 billion for Housing Assistance (temporary housing, repair and replacement, and permanent housing construction), $1.6 billion for Other Needs Assistance (personal property, transportation, medical and dental expenses, and moving and storage cost), and $320 million for Disaster Unemployment Assistance. Public Assistance Grants, which totaled approximately $4.5 billion and are projected to reach $6.3 billion, included assistance to state and local governments to rebuild publicly owned infrastructure, such as schools, government offices, parks, and sewer lines. The National Flood Insurance Program has paid approximately $12.9 billion in Federal flood insurance claims to residents in the State of Louisiana. In addition, the SBA has approved approximately $6.8 billion in low-interest loans for homeowners, renters and businesses.

The storm surge from Hurricane Katrina inundated marshes and farmland throughout the coastal area. According to the LSU AgCenter, agricultural losses totaled approximately $825 million. The agricultural resources impacted by the storm include sugarcane, cotton, rice, soybeans, timber, pecans, citrus, and livestock. The losses to aquaculture (crawfish, alligators, and turtles), fisheries (shrimp, oysters, and menhaden), and wildlife and recreational resources totaled approximately $175 million.

Hurricane Rita. The most significant flood event to affect the southwest portion of the planning area (Planning Unit 4) since Hurricane Audrey in 1957 was Hurricane Rita. Hurricane Rita made landfall along the Texas-Louisiana border on September 24, 2005, as a Category 3 storm with winds in excess of 120 miles per hour. A storm surge of approximately 15 - 20 feet affected the coastal region from Port Arthur, Texas to Terrebonne Parish, Louisiana. The flooding extended north to Lake Charles, where the downtown and residential areas around the lake were covered with 3 to 6 feet of flooding. With estimated insured losses of approximately $5 billion, Hurricane Rita became one of the most costly natural disasters in U.S. history. Approximately 55,000 housing units in Calcasieu, Cameron, and Vermilion parishes incurred flood damages as a result of this hurricane.

Approximately 2,000 square miles of farmland and marshes throughout the coastal area were inundated. According to the LSU AgCenter, agricultural losses totaled approximately $490 million. The agricultural resources impacted by the storm include sugarcane, cotton, rice, soybeans, timber, pecans, citrus, and livestock. The losses to aquaculture (crawfish, alligators, and turtles), fisheries (shrimp, oysters, and menhaden), and wildlife and recreational resources totaled approximately $100 million.

The total FEMA flood claims by parish within the planning area that were paid between 1978 and 2007 are summarized in Table 1. The table includes only those damages that were covered by flood insurance. The amount paid reflects the price level of the year in which the claim was paid to the policyholder.

STRUCTURE INVENTORY METHODOLOGY

GIS Application

A customized GIS framework, or application, similar to the one previously developed for the Interagency Performance Evaluation Task Force (IPET) for the Hurricane Katrina IPET Report was used to assess the damages to residential and non-residential structures, their contents, and vehicles in the LACPR planning area. The application was used to develop a water elevation-damage, or stage-damage, relationship for each census block in the LACPR planning area. Inputs to the application included elevation data, depreciated exposure values of residential and nonresidential structures, and depth-damage relationships.

Ground Elevations

Topographical data obtained from the LIDAR (Light Detection and Ranging) digital elevation model (DEM) using the NAVD88 (2004.65 epoch), which were used for the IPET study area, were combined with census block boundaries obtained from the 2000 Census using GIS mapping to determine the mean ground elevation for each census block in the New Orleans metropolitan area. For the portion of the LACPR planning area outside of the New Orleans metropolitan area, unadjusted NAVD88 data were used to determine the mean ground elevation for each census block.

Two sources of uncertainty associated with the topographical data assigned to the structure inventory, transportation infrastructure (roads and railroads), and agricultural resources were quantified: the uncertainty implicit within the LIDAR data and the uncertainty from using a single value to represent the elevation of an entire census block. According to the IPET report, the LIDAR topographical data is accurate to approximately plus or minus 1 foot at the 90 percent level of confidence. The error in each spot elevation based on the LIDAR data was assumed to be normally distributed with a mean of zero, a standard deviation of 0.61 feet, and a variance of 0.37 feet.

Aerial photography was used to identity the locations of the residential and nonresidential structures in each census block. A structure point with x,y coordinates was placed on the GIS maps to show these locations and to assign a ground elevation to each structure using LIDAR data. The variation of the ground elevation associated with each structure point within a census block was used to determine the variation of the ground elevations within that census block. The average standard deviation of the ground elevations across all census block was calculated to be .57 feet with a variance of .325 feet. Thus, the sum of the variances in the LIDAR data and in the ground elevation across all census blocks can be represented by a normal distribution with a variance of .70 feet and a standard deviation of .83 feet.

In order to quantify the variability of the ground elevations within each census block for the transportation infrastructure and the agricultural resources, an average standard deviation was calculated across all census blocks in the LACPR planning area. The average standard deviation of the ground elevations within each census block was calculated to be 1.29 feet with a variance of 1.66 feet. Thus, the sum of the variances in the LIDAR data and in the ground elevation across all census blocks can be represented by a normal distribution with a variance of 2.03 feet and a standard deviation of 1.43 feet.

First Floor Elevations

An average height above ground was assigned to the residential structures in Jefferson and Orleans parishes based on data obtained from a first-floor elevation survey conducted by USACE personnel in 1991 by geographic areas known as traffic-zones. A sampling of residential structures in each traffic zone was used to estimate the percentage of residential structures with pier foundations and the percentage with slab foundations and to determine the average height of the pier and slab foundations above ground level. The surveys were also used to estimate the percentages of one-story and two-story residential structures in each traffic zone.

In St. Bernard, Plaquemines, and St. Charles parishes, the percentage of residential structures with pier and slab foundations, and the average pier and slab foundation heights were estimated for each community within these parishes based on the field surveys from previous feasibility studies in the area. Estimates were also made of the percentages of one-story and two-story residences in each community.

For each of the other parishes in the LACPR planning area, an average height above ground was assigned to the residential structures in each census block based on interviews with parish emergency management personnel. These officials were asked to estimate the percentage of residential structures with pier foundations and with slab foundations and to estimate the average height above ground level for each type of foundation. Mobile homes were assigned an average foundation height of 2.0 feet above ground level based on previous studies. For non-residential structures, an average height of 1.5 feet above ground was assigned to all non-residential properties in the planning area based on the information obtained during the interviews with parish emergency management personnel.

Assets at Risk

Asset and population data were processed within the GIS economic application for all or portions of 26 of the 64 civil parishes in the state, including approximately 72,000 census blocks and over one million residential and non-residential structures. The stages associated with storm events were modeled for planning subunits in 23 of these 26 parishes, including approximately 36,000 census blocks. The remaining three parishes, East Baton Rouge, West Baton Rouge, and Lafayette, do not contain planning subunits because the model showed that storm surges would not directly affect these areas. However, the assets and population of these parishes were included in the data processed within the GIS application because each of these parishes could be indirectly affected by population shifts resulting from the inundation of other areas. Tables 2 and 3 display the total number and value of residential and non-residential units, number of vehicles, and miles of roads and railroads by planning unit for the portions of the 23 parishes subject to the surges associated with storm events for the years 2010 and 2075.

Residential Structure Inventory and Valuation

The general building stock portion of the Hazard-U.S.-Multihazard (HAZUS-MH) application, MR2 Release 44 (copyright 2006, FEMA), a GIS-based multi-hazard loss estimation tool developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS) was used as a proxy for the structure inventory. Due to the large number of structures, as well as time constraints for completing the analysis, it was not feasible to inventory all of the structures in the planning area. The HAZUS-MH database was also used to estimate damages in the Interagency Performance Evaluation Team (IPET) Report.

The building stock data, which were based on data from the 2000 Census, were updated to represent 2nd quarter 2005 (Pre-Katrina) based on census block group data obtained from Calthorpe Associates, an urban planning agency contracted by the state of Louisiana as part of the Louisiana Speaks forum. The demographic trends identified in each parish were used to adjust the number of households, the number of residential structures, and the depreciated exposure values for each census block group in the HAZUS database. As an example, a shift in the pre-Katrina population of the New Orleans MSA was noted between the year 2000 and the 2nd quarter of 2005. During this period, the population of Orleans Parish decreased by approximately 30,000 people, while the population of St. Tammany Parish increased by an almost identical amount.

The updated HAZUS-MH database was used in the GIS application to provide the total square footage, building count, and the total depreciated exposure value for residential occupancies by census block. HAZUS-MH combined data from the 2000 Census with data from the Department of Energy Building Characteristic Reports to assign a total square footage to each of six residential occupancy categories: single-family dwellings, manufactured housing/mobile homes, multi-family dwellings, temporary lodgings, institutional dormitories, and nursing homes. It then combined the square footage for each residential occupancy category with the average age of the buildings in the area and a corresponding depreciation schedule to derive the depreciated exposure value for that category. These values, which were expressed in 2005 price levels and updated to 2007 price levels using the Marshall and Swift Valuation Service, were entered into the GIS framework by census block.

The depreciated exposure values were also adjusted to reflect the underestimation of the HAZUS-MH data as noted in the Interagency Performance Evaluation Team (IPET) Report in 2006. In this report, the total depreciated exposure value for each census block was compared to the depreciated replacement cost for residential structures that was calculated by USACE personnel using field surveys and the Marshall and Swift Valuation Service. A sampling of 40 city blocks from structure inventories compiled as part of feasibility studies conducted since the year 2000 in the New Orleans Metropolitan Area was used in the comparison. The sampled depreciated replacements costs were found to be approximately 16 percent higher than the depreciated exposure values calculated by HAZUS-MH. To account for this underestimation, the depreciated exposure values calculated within HAZUS-MH were increased by 16 percent.

The GIS application was used to allocate the depreciated exposure values that had been calculated for the residential occupancy category “single-family dwellings” within each census block into one-story and two-story structures and into pier and slab foundations. An estimate of the percentage of one and two-story residential structures in each parish within the planning area was provided by emergency management officials. This step was necessary in order to apply the depth-damage relationships to the different types of single-family dwellings.

Temporary lodgings, institutional dormitories, and nursing homes, which are normally valued as non-residential structures in USACE studies, were classified as residential structures in the GIS application for consistency with the HAZUS-MH database. However, the non-residential depth-damage relationships for public and semi-public buildings were used to calculate potential flood damages for these structures and their contents. The damages for these buildings are included in the GIS application as part of the residential multi-family damage category.

Non-Residential Structure Inventory and Valuation

The non-residential structure inventory was compiled using databases obtained from the Louisiana Department of Labor (LDOL) and the Louisiana State University GIS Department. The LDOL database provided a geo-referenced latitude/longitude coordinate for each business property in the planning area that had been registered for unemployment insurance. The latitude/longitude coordinates were used in the GIS application to relate the location of each business property to a census block in the planning area. The LDOL database provided a North American Industry Classification System (NAICS) code, which describes the type of business occupancy at each location, along with the number of employees, and total wages paid for second quarter 2005 (pre-Katrina conditions) for each business unit. Since many small businesses operate out of residential structures, and these structures were included in the residential inventory, only the businesses that employed more than one person were included in this analysis.

The NAICS codes were grouped into four general damage categories (commercial, industrial, agricultural, and public), and then assigned to one of eight non-residential occupancy classifications. The eight non-residential occupancy classifications include: eating and recreation, groceries and gas stations, professional buildings, public and semi-public facilities, repairs and home use, retail and personal services, warehouse and contractor services, and industrial facilities. An average depreciated replacement cost using 2007 price levels was calculated for each occupancy classification, except for industrial facilities, based on previous feasibility studies conducted by New Orleans District using the Marshall and Swift Valuation Service. Since the previous feasibility studies did not include a significant number of industrial properties, the Dun and

Bradstreet database within the HAZUS-MH application was used to determine the average depreciated replacement cost of industrial buildings.

The LDOL database provided only a single latitude/longitude coordinate for the central reporting office of the schools, post offices, and churches. In order to have a separate location and value for each individual school, church, and post office in the planning area, a separate database was obtained from Louisiana State University. The community layer within the LSU GEOLAGIS database provided a geo-referenced latitude/longitude coordinate for each school, church, and post office in the planning area and a description of the facility. Each of these buildings was assigned to the public damage category and the public occupancy classification to calculate the damages. The average depreciated replacement cost calculated for the public occupancy classification was used for these buildings.

Table 4 displays the average depreciated replacement costs that were assigned to each of the non-residential occupancy categories in the GIS application.

Residential and Non-Residential Contents Valuation

The contents for residential (one-story, two-story, mobile homes, and multi-family) and non-residential (eight categories) structures were determined based on limited field surveys and the experience of a building and insurance expert panel for the Jefferson and Orleans Parishes Feasibility Study in 1996; the Lower Atchafalaya Reevaluation and Morganza to the Gulf, Louisiana Feasibility Studies in 1997; and the Donaldsonville to the Gulf, Louisiana Feasibility Study in 2006. The value of the contents of each structure category were totaled and then compared to the total value of a structure in order to develop the contents-to-structure ratios (CSVRs). More specific detail regarding the development of the content values can be found in the following final reports: *Depth-Damage Relationships for Structures, Contents, and Vehicles and Contents-to Structure-Value Ratios (CSVRs) in support of the Jefferson and Orleans Flood Control Feasibility Studies* dated May 1997, *Depth-Damage Relationships for Structures, Contents, and Vehicles and Contents-to Structure-Value Ratios (CSVRs) in support of the Lower Atchafalaya Reevaluation and Morganza to the Gulf, Louisiana Feasibility Studies* dated May 1997, and *Donaldsonville to the Gulf, Louisiana Feasibility Study* dated March 2006.

The CSVRs and depth-damage relationships developed for the Jefferson and Orleans Studies were applied to residential and non-residential structures located in the eastern portion of the LACPR planning area that is west of the Louisiana/Mississippi state border and east of the Mississippi River. They were also applied to the west bank of the Mississippi River in Orleans and Jefferson parishes. The depth-damage relationships and CSVRs developed for the Donaldsonville area were applied to the areas east of Bayou Lafourche with the Mississippi River on the north, and the Jefferson Parish line on the east. The depth-damage relationships and CSVRs developed for the Lower Atchafalaya and Morganza to the Gulf study area were applied to the portion of the LACPR planning area that is west of the Mississippi River and west of Bayou Lafourche and extends to the

Louisiana and Texas border. In summary, Planning Unit 1 utilized the Jefferson and Orleans CSVRs and depth-damage relationships, Planning Unit 2 was analyzed with Jefferson and Orleans CSVRs and depth-damage relationships for part of the area and with the Donaldsonville relationships for the remainder of the area, and Planning Units 3a, 3b, and 4 were covered by the Morganza CSVRs and depth-damage relationships.

The CSVRs developed for each of the four residential structure categories and eight non-residential occupancy classifications for the three feasibility studies are shown in Table 5.

The GIS application used the CSVRs as a percentage of the total depreciated exposure value or total depreciated replacement cost to determine the total value of the contents for each residential and non-residential occupancy classification. The CSVR calculated for warehouses and contractor services was also assigned to the industrial non-residential occupancy classification.

Vehicles

Damages to private automobiles are based on the number of automobiles directly impacted per household. The elevation of each automobile is determined by the corresponding ground elevation near the structure. Automobile damages are then calculated by correlating the depth of flooding to the depth-damage relationships for vehicles.

Census data were used to determine the average number of privately owned vehicles per household (owner occupied housing or rental unit) within each census block group in the planning area. This relationship was used in the GIS application to determine the average number of vehicles per household within each census block. Approximately 1.4 million privately owned vehicles and 135,000 vehicles associated with businesses were estimated for the 23 parishes subject to surges from hurricanes in the LACPR planning area. Based on the Southeast Louisiana and Mississippi Clearance Time Updates for the 2006 Hurricane Season Final Report prepared by Federal Emergency Management Agency and U.S. Army Corps of Engineers, New Orleans District dated June 1, 2006, and the Southwest Louisiana Hurricane Evacuation Report prepared by Federal Emergency Management Agency and U.S. Army Corps of Engineers, New Orleans District dated 2003, between 65 and 80 percent of the privately owned vehicles in Southeast Louisiana were used for evacuation from Hurricane Katrina. For this analysis, it was assumed that the average household would use 70 percent of its vehicles to evacuate during a storm event, while the remaining 30 percent of its vehicles would remain parked at the residence.

Residential automobile damages were based on the number of privately owned vehicles that were not used by their owners during the evacuation process. The Manheim Used Vehicle Value Index, which is based on over 4 million automobile transactions conducted each year, was adjusted to reflect an average retail replacement value of $12,217 in 2007 prices for each of these vehicles. Depth-damage relationships for vehicles were developed based on interviews with the owners of automobile dealerships that had experienced previous flood damages. These interviews were used to calculate flood damages to vehicles at the various levels of flooding. The automobiles not used for evacuation were assigned the mean ground elevation of the census block in which the vehicle was parked by the residence or business.

Commercial vehicle damages were based on the number of commercial licenses as reported by the Louisiana Department of Motor Vehicles for parishes in the planning area for October 2006 and the total number of business units for each parish. Based on these data, it was determined that there was an average of 2.7 vehicles associated with each business unit in the planning area. It was assumed that since the business owners were using their privately owned vehicle for evacuation, all commercial vehicles would remain parked at the business. The ground elevation assigned to these vehicles was the same as the ground elevation assigned to the business property. The Manheim average value, $12,217, and the vehicle depth-damage relationships were used to derive the potential damages to commercial vehicles.

Depth-Damage Relationships

Damages from flooding were calculated for residential and non-residential buildings, their contents, and vehicles based on the depth-damage relationships developed by a panel of building and construction experts for the Jefferson and Orleans Parishes Feasibility Study in 1996; the Lower Atchafalaya Reevaluation and Morganza to the Gulf, Louisiana Feasibility Studies in 1997; and the Donaldsonville to the Gulf, Louisiana Feasibility Study in 2006. Saltwater, long-duration (one-week) depth damage curves were used to indicate the percentage of the structural value that was damaged at each depth of flooding. Damage percentages were determined for each one-half foot increment from one foot below first-floor elevation to two feet above first floor, and for each 1-foot increment from 2 feet to 15 feet above first-floor elevation.

Depth-damage relationships were developed for one-story and two-story residential structures, mobile homes, and non-residential structures, their contents and vehicles. The panel of experts developed depth-damage relationships for four residential structure categories (one-story, two-story, mobile homes, and multi-family dwellings) and for three commercial structure categories (masonry, wood or steel frame, and metal frame). Depth-damage relationships were also developed for the four residential content categories and for seven commercial content categories. The non-residential depth-damage relationships were assigned to the appropriate structure and content damage category based on the NCAIS code and occupancy classification.

Pre-Katrina (2nd Quarter 2005) Stage-Damage Relationships

Inputs to the GIS application have thus far included elevation data, structure inventory and valuation data, and depth-damage relationships. The application used these inputs to generate a water elevation or stage-damage relationship for each census block. Flood damages were calculated at one-foot increments from the beginning damage elevation to an elevation where damages for all the structural categories have reached a maximum. In order to insure that this maximum had been reached, the maximum height of a slab foundation or of a pier foundation in each census block was added to the maximum depth of flooding (15 feet) included in the depth-damage relationships. Damages were calculated for eight structural damage categories: single-family residential, multi-family residential, manufactured housing/mobile homes, commercial, industrial, public, agricultural, and vehicles.

The GIS application was used to develop a stage-damage relationship for each of the approximately 72,000 census blocks in the LACPR planning area. These stage-damage relationships reflect pre-Katrina conditions (2^{nd} Quarter 2005) and were developed using 2007 price levels. These relationships were used as the basis for the development of stage-damage relationships for any future year through the year 2075. Any residential and non-residential structures and their vehicles that incurred flood damages from Hurricanes Katrina and Rita were not included in this analysis until the properties were projected to be reoccupied.

FUTURE DEVELOPMENT AND LAND USE ALLOCATION SCENARIOS

Since uncertainty is implicit in all future projections, several future condition scenarios were considered in this analysis rather than only one “most-likely” scenario as in previous studies. These scenarios will provide the decision maker with a more comprehensive view of possible future conditions and their impact on potential flood damages. In this section of the analysis, three future development scenarios were used to project the growth in population, number of households, and non-agricultural employment that will take place in the LACPR planning area by the year 2050. Three future land use allocation scenarios, which show the placement of this growth within the planning area and the type of residential and non-residential construction, were considered for each of the three future development scenarios. Due to the uncertainty of the length of the project implementation period, the projections under each scenario were extended by New Orleans District to the year 2075.

Future Development Scenarios

Projections of population, number of households, and total non-agricultural employment for each of the five Metropolitan Statistical Areas (MSAs), New Orleans, Baton Rouge, Houma, Lafayette, and Lake Charles, and for each of the non-MSA parishes in southern Louisiana were provided by Calthorpe Associates under two future development scenarios: “high employment” and “business as usual”. These projections were based on the results of a custom application of the U.S. Macro Model, a macro-economic model prepared by Moody’s Economy.com, and acquired through the Brookings Institution. The Economy.com model used factors such as net migration of population, employment demand by sectors of the economy, distribution of personal income, and residential construction patterns to project population, number of households, and non-agricultural employment for the period 4th Quarter 2005 through 4th Quarter 2034. New Orleans District personnel developed a third set of projections, “modified high employment”,” which was a more conservative adaptation of the “high employment” projections.

Estimates of the population for each of the parishes in South Louisiana as of July 1, 2006 obtained from Louisiana Tech University were used by New Orleans District personnel as a reference point for all three sets of population projections.

The "high employment" future development scenario assumes that the state of Louisiana will implement policies that will be conducive to increased employment in non-traditional Louisiana growth industries such as technology and medical services. Calthorpe Associates developed this scenario using the projections of the population, number of households, and total non-agricultural employment prepared by Economy.com for the period 4th Quarter 2005 through 2030 for five MSAs and for the rural parishes in South Louisiana. Calthorpe Associates then used the projected growth rate during this 25-year period to extend the projections to the year 2050. In the areas affected by Hurricanes Katrina and Rita, the 4th Quarter 2005 population was drastically reduced from its pre-Katrina level because a large portion of the population had evacuated from the impacted areas. Thus, the growth rate projected to occur between 4th Quarter 2005 and the year 2010 as the population returns to the area is relatively higher than the growth rate projected to occur between the year 2010 and 2030 when most of the evacuated residents have returned. Since Calthorpe Associates used the growth rate for the 25-year period beginning 4th quarter 2005 and extending through the year 2030, which includes the relatively high rate of growth expected during the five years following the two storms, to extend the Economy.com population projections through the year 2050, the projected growth rate in population accelerates during the 20-year period 2030 to 2050 relative to the projected growth rate during the 20-year period 2010 to 2030.

The "business as usual" future development scenario assumes that the state of Louisiana will continue to implement the economic policies that were in place before Hurricane Katrina. As a result, the majority of the projected future development in South Louisiana will take place in the more traditional Louisiana growth industries such as oil and gas and tourism. Calthorpe Associates provided this scenario using the "business-as-usual" projections prepared by Economy.com for each MSA and for each parish located outside of an MSA for the period 2010 through 2030. New Orleans District personnel extended these projections to the year 2050 based on the average annual "business-as-usual" growth rate between 2010 and 2034 as developed by Economy.com.

A third future development scenario, which was developed by New Orleans District personnel, used the "high employment" projections prepared by Economy.com for each MSA and for each coastal parish located outside of an MSA for the period 2010 through 2034. These projections were then extended to the year 2050 based on the "high employment" growth rate projected by Economy.com to occur between the years 2010 and 2034. Since the population growth rate for the five-year period following Hurricanes Katrina and Rita was not considered in the extension of the Economy.com projections, the growth rate used during the period 2034 to 2050 is relatively lower than the growth rate used by Calthorpe Associates for the period 2030 to 2050 in their "high employment" projections.

Future Land Use Allocation Scenarios

Calthorpe Associates also developed three land use allocation scenarios (compact, dispersed, and hybrid) for the “high employment” future development projections for the year 2050 to show the location and type of development expected to take place throughout southern Louisiana. New Orleans District personnel then applied the three land use allocation scenarios to the “business as usual” and to the “modified high employment”” future development scenarios. The specific location of the future development was primarily based on the existing and projected transportation systems in each area. However, other factors, including current and projected commercial activity, land elevation, susceptibility to flooding and other hazards, and environmental constraints such as wetlands, were also considered. The projected location and types of residential dwelling units varied under each of the three land use allocation scenarios.

Under the compact land use allocation scenario, residential development was primarily projected to occur in the census blocks located near the five major cities in the planning area, New Orleans, Baton Rouge, Houma, Lafayette, and Lake Charles. A larger proportion of multi-family dwelling units relative to the single-family residential construction was projected under this scenario. Under the dispersed land use allocation scenario, residential development was projected to spread out from the major cities, and there was more single-family residential construction relative to multi-family dwellings. The hybrid land use allocation is a combination of the compact and the dispersed land use allocations.

The projections by Calthorpe Associates included the number and classification of the residential and the non-residential properties for each of the three land use allocations projected by census block throughout the LACPR planning area for the year 2050. For example, it was projected that 32 percent of the total residential dwelling units would be single-family units under the compact land use allocation scenario, while 70 percent and 55 percent would be single-family units under the dispersed and the hybrid land use allocation scenarios, respectively.

Allocation of Future Development at the Parish Level

Thus far, the projections under the three future development scenarios and under the three land use allocation scenarios were made for the MSAs as a whole rather than for the individual parishes (with the exception of the more rural coastal parishes located outside of the five MSAs). In order to more accurately reflect the shifts in population that occurred as a result of Hurricanes Katrina and Rita, a method of allocating the growth to the individual parishes rather than the MSAs was developed by New Orleans District personnel. It was assumed that each parish would receive a percentage share of the population growth based on its share of the population within the MSA as projected for each of the three land use allocation scenarios with the “high employment” future development scenario for the year 2050. As an example, the population for Orleans Parish was projected to be 30 percent of the New Orleans MSA for the compact land use category, 25 percent for the disperse land use category, and 27 percent for the hybrid land use category. Thus, Orleans Parish was assumed to receive these percentages of the population growth in each of the other time periods between 2006 and 2050 depending on which land use category was selected. This same method was also used to develop the projections of total households and total employment under each of the different scenarios.

Projected Structure Inventory

The projections of population, number of households, and non-agricultural employment between 2nd quarter 2005 and the year 2050 were used to develop the residential and non-residential stage-damage relationships for each census block in the planning area for the three future development and three land-use scenarios. Calthorpe Associates provided the incremental residential and non-residential development by census block expected to occur during the period under the "high employment" future development scenario and under each of the three land use scenarios for South Louisiana. This projected incremental level of residential and non-residential development was added to the pre-Katrina (2nd quarter 2005) residential and non-residential development.

For residential property, the projected number of single-family, townhouses, multi-family, and mobile home dwelling units and the average square footage for each type of dwelling for the year 2050 were provided by Calthorpe for each census block. The Marshall and Swift Residential Valuation Service was then used to develop an average replacement cost per square footage across the five three-digit zip code areas in the LACPR planning area. The average replacement cost per square footage was multiplied by the average square footage to derive the total construction cost for each type of residential dwelling unit.

For non-residential properties, Calthorpe provided the projected number of office, retail, and industrial buildings and the total square footage for each type of non-residential building for each census block for the year 2050. The Marshall and Swift Commercial Valuation Service was then used to develop an average cost per square footage for each type of non-residential building across five zip code areas in the LACPR planning area. The average cost per square footage was multiplied by the average square footage to derive the total construction cost for each type of non-residential dwelling unit. The total replacement cost or exposure value for each type of non-residential buildings was totaled by census block and used to calculate the potential flood damages for the year 2050 under each of the three land use allocation scenarios.

In order to calculate the potential flood damages for the non-residential properties, each non-residential building was assigned a damage category (commercial or industrial), a structure type (metal frame, steel frame, or masonry bearing walls), and a content type (professional, retail, and warehouse) depth damage category, similar to the existing condition inventory in the GIS application. LIDAR data were used to assign the mean ground elevation to each census block with projected non-residential development. The building characteristics, one or two stories, slab or pier foundation, and the corresponding average height above ground, were all assigned based on information collected from the emergency managers of each parish in the LACPR planning area.

Stage-Damage Relationships for the year 2050 Under the High Employment Future Development Scenario

The projected incremental structure inventory and valuation data for the "high employment" future development scenario under each of the three land use allocation scenarios was combined in the GIS application with the projected elevation data and the depth-damage relationships to generate a stage-damage relationship for each census block that contained incremental residential or non-residential development for the year 2050. Flood damages were calculated at one-foot increments from the beginning damage elevation to an elevation where damages for all the structural categories have reached a maximum. In order to insure that this maximum had been reached, the maximum height of a slab foundation or of a pier foundation in each census block was added to the maximum depth of flooding (15 feet) included in the depth-damage relationships. Eight structural damage categories were considered: single-family residential, multi-family residential, manufactured housing/mobile homes, commercial, industrial, public, agricultural, and vehicles using 2007 price levels.

The future development stage-damage relationships were adjusted to reflect FEMA elevation requirements for new construction. Any residential and non-residential development projected to take place after the 2nd quarter of 2005, including the rebuilding of structures damaged by Hurricanes Katrina and Rita, was assigned a first floor elevation greater than or equal to the stage associated with the 100-year frequency event for the year 2010. This storm event has a .01 exceedance probability and a .90 non-exceedance probability in any given year.

Stage-Damage Relationships for the Years between 2nd Quarter 2005 and 2050 and for the Year 2075 Under the High Employment Future Development Scenario

Stage-damage relationships for each census block in the LACPR planning area were developed for 2nd quarter 2005 and for the year 2050 for the "high employment" future development scenario under each of the three land use allocation scenarios. The projected number of households in the coastal parishes was used to adjust the residential stage-damage relationships at the census block level for each year between 2nd quarter 2005 and the year 2050, while the projected non-agricultural employment level in the coastal parishes was used to adjust the non-residential stage-damage relationships at the census block level for a each year during the period.

The number of households under the "high employment" future development scenario and under each of the three land use allocation scenarios for each parish in the planning area projected for each of the years between the 2nd quarter 2005 and the year 2050 was expressed as a percentage of the total number of households projected for the year 2050. These percentages at the parish level were then used as the basis for projecting the residential stage-damage relationships at the census block level for each of the years during the period. For example, using the "high employment" future development scenario and the hybrid land use allocation scenario, it was determined that the number of households projected for Ascension Parish for the year 2040 was approximately 85 percent of the total number of households projected for Ascension Parish for the year 2050. Thus, the projected residential stage-damage relationship for each of the census blocks in Ascension Parish for the year 2040 would be 85 percent of the stage-damage relationship projected for that census block for the year 2050.

The level of non-agricultural employment under the “high employment” future development scenario under each of the three land use allocation scenarios for each parish in the planning area projected for each of the years between the 2nd quarter 2005 and the year 2050 was expressed as a percentage of the non-agricultural employment level projected for the year 2050. These percentages at the parish level were then used as the basis for projecting the non-residential stage-damage relationships at the census block level for each of the years during the period.

Stage-Damage Relationships Under the Business-As-Usual and Modified Full Employment Future Development Scenarios

A similar process was used to develop residential stage-damage relationships under the “business as usual” and the “modified high employment” future development scenarios with each of the three land use allocation scenarios for the year 2050 and for each of the years between 2nd quarter 2005 and the year 2050. However, since the breakdown by census blocks was not available for either of these future development scenarios, an additional adjustment was made to the residential stage-damage relationships developed for the “high employment” scenario in the year 2050. The total number of households projected for each parish under the “business as usual” and “modified high employment” future development scenarios in the year 2050 were expressed as percentages of the total number of households projected for the parish in the year 2050 under the “high employment” scenario. These percentages were then used to develop residential stage-damage relationships for each of the census blocks in the planning area under the “business as usual” and “modified high employment” scenarios for the year 2050.

This process was also used to adjust the non-residential stage-damage relationships projected for the year 2050 under the “business as usual” and “modified high employment”” future development scenarios with each of the three land use allocation scenarios to reflect the stage-damage relationships for each of the years between 2nd quarter 2005 and the year 2050. Again, since the breakdown of non-residential development by census blocks was not available under either of these future development scenarios, an additional adjustment was made to the non-residential stage-damage relationships developed under the “high employment” scenario for the year 2050. The level of non-agricultural employment projected for each parish under the “business as usual” and “modified high employment” future development scenarios in the year 2050 were expressed as percentages of the total non-agricultural employment level projected for the parish in the year 2050 under the “high employment” scenario with each of the three land use allocation scenarios. These percentages were then used to develop non-residential stage-damage relationships for each of the census blocks in the planning area under the "business as usual" and "modified high employment" scenarios for the year 2050.

Extension of the Projections to the Year 2075

Since the length of the project implementation period is uncertain, the projections of population, number of households, and employment under each of the three future development scenarios and under each of the three land use scenarios scenario were extended by New Orleans District to the year 2075. The average annual growth rate projected to occur between 2010 and 2034 was used to extend each set of projections from the year 2050 to the year 2075. The projected number of households for the year 2075 was used to estimate the residential damages, while the projected employment for the year 2075 was used to estimate the non-residential damages. These projected damages were used to develop stage-damage relationships under each of the future development and land use allocation scenarios for the year 2075.

Two Economic Development Scenarios

The "high employment" future development scenario was combined with the dispersed land use allocation scenario as the first future economic development scenario, and the "business as usual" future development scenario was combined with the compact land use allocation scenario as the second future economic development scenario. The "modified high employment" future development scenario and the hybrid land use allocation were not used to develop the range of possible outcomes for the project alternatives. The "high employment" future development with dispersed land use allocation was considered the scenario with the highest damage or residual risk potential, while the "business as usual" future development with compact land use allocation was considered the lowest potential damage or residual risk scenario. These two economic development scenarios were combined with two sea-level rise scenarios to calculate the range of potential damage or residual risk throughout the period of analysis.

Tables 6 through 11 show the projected population, number of households and employment for the 26-parish LACPR planning area for the "high employment" future development with dispersed land use scenario and "business as usual" future development with compact land use scenario.

EMERGENCY AND OTHER POST-FLOOD COST CATEGORIES

A flooded community typically incurs a variety of flood-related costs not associated with structural damages. The emergency costs incurred by the Federal, state, and local governments during and after the storm event are designed to eliminate or reduce the immediate threat to life, public health, or safety. These costs include the following: search and rescue operations; the evacuation of emergency medical facilities and the setting up of temporary facilities; rescue, care, shelter, and essential needs for household pets and service animals; emergency repairs to protective facilities, including temporary levees and the bracing of damaged property; and security in the disaster area. The emergency costs associated with inundated residential properties include evacuation and subsistence, clean up and reoccupation costs, debris removal, and landscaping. The emergency costs associated with inundated non-residential properties include clean up and restoration costs, recovery of business records, and landscaping. These costs are incurred either by the Federal government, the occupants of inundated residential properties, or the owners of inundated non-residential properties. The depth-damage relationships developed for each of these emergency cost categories were used to develop emergency cost stage-damage relationships for the inundated residential and non-residential properties in the study area.

The costs required for repair of inundated highways, streets, and railroad tracks were also considered in the analysis. The depth-damage relationships developed for highway, street, and railroad track repairs were used to develop stage-damage relationships for each of these categories.

Federal, State, and Local Government Emergency Protective Measures

The actual costs of the Category B emergency protective measures were obtained from FEMA for Hurricanes Juan, Andrew, Katrina, and Rita. The total Category B spending for each of the hurricanes was adjusted to reflect the percentage of the total structures damaged by the storm that incurred flood damage. All of the structures damaged by Hurricane Juan incurred flood damages; however, only 10 percent of the structures damaged by Hurricane Andrew and only 40 percent of the structures damaged by Hurricanes Katrina and Rita incurred flood damages. These adjusted costs were then divided by the number of inundated structures in each flood event to estimate the average cost per inundated structure associated with the emergency protective measures taken by the federal, state, and local government during and following a storm event.

Hurricane Juan data were used for depths of flooding between one and two feet. This storm event caused localized flooding in two subdivisions on the west bank of Jefferson Parish. The average emergency protective measure cost per structure inundated with between one and two feet of flooding was determined by dividing the actual spending by federal, state, parish, and municipal entities during Hurricane Juan in 1985 (approximately $856,000) by the number of structures flooded (4, 445). Thus, the average cost of emergency protective measures totaled $193 per inundated structure, or $366 per inundated structure in 2007 price levels.

Hurricane Andrew data were used for depths of flooding between two and three feet. The tidal surge from this storm event caused extensive damage to the communities south of the city of Houma. The average emergency protective measure cost per structure inundated with between two and three feet of flooding was determined by dividing the actual government spending during Hurricane Andrew in 1992 (approximately $1.56 million) by the number of structures flooded (2,500). Thus, the average cost of emergency protective measures totaled $624 per inundated structure, or $998 per inundated structure in 2007 price levels.

Data from Hurricanes Katrina and Rita were used for depths of flooding greater than three feet. Hurricane Katrina caused extensive flood damages to southeastern Louisiana including the city of New Orleans, while Hurricane Rita caused extensive flood damages to southwestern Louisiana. The average emergency protective measure cost per structure inundated with more than three feet of flooding was determined by dividing the actual government spending during Hurricanes Katrina and Rita in 2005 (approximately $744.3 million) by the number of structures flooded (204,682). Thus, the average cost of emergency protective measures totaled $3,637 per inundated structure, or $3,894 per inundated structure in 2007 price levels.

Table 12 displays the average emergency protective measures expenditure per inundated structure in 2007 price levels based on previous storm events.

A depth-damage relationship for the costs of emergency protective measures was developed for each increment of flooding up to 15 feet above first floor elevation. These depth-damage relationships were then combined in the GIS application with the number of residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for the costs of emergency protective measures. It should be noted that emergency costs were not included for the 10-year frequency storm event when calculating an expected annual value.

Evacuation and Subsistence Costs

The experiences of residents affected by previous flood events, including Hurricanes Katrina and Rita, were used to estimate the evacuation and subsistence costs incurred by property owners and the Federal government immediately following a storm event. Residents of structures inundated between one and three feet above first floor elevation were evacuated from their homes for approximately three months following the flood event. During this period, most of the residents of evacuated households lived in hotels in cities north and west of the planning area. Based on the fiscal year 2007 government per diem for lodging in Dallas, Houston, Shreveport, Monroe, Little Rock, and Memphis, the average hotel rate is $75.33 per day, or $6,780 for the 3-month evacuation period. It should be noted that the lodging component of the government per diem is usually less than the non-contracted rates typical of hotels and motor lodges.

The average daily subsistence cost per evacuated household was also based on the average government per diem in the cities north and west of the planning area. The fiscal year 2007 average cost for meals prepared outside of the home was $47.67 per person, per day. Since the average household in the planning area as reported by the U.S. Census in the year 2000 contains 2.6 people, each evacuated household spent an average of $123.94 per day for meals. According to the U.S. Department of Agriculture, each household would have spent $8.32 per person, or $21.63 per household, on meals prepared in the home. Thus, the net additional food expenditure per household totaled approximately $102.31. The total evacuation and subsistence cost for the 90-day evacuation period was approximately $16,000 per inundated household.

For depths of flooding ranging between three and six feet above first floor elevation, the evacuation period increased to approximately one year. Most of these residents moved to an apartment closer to their inundated structure or to a FEMA trailer in front of their home after the initial three months of the evacuation period. Based on the national fair market rental assistance by FEMA following Hurricane Katrina, the average cost of renting an apartment was $800 per month, or $7,200 for the nine-months following the initial three-month evacuation period. According to an article in the Times Picayune, the average cost of a FEMA trailer, including the purchase price of $13,000, the cost of delivery, installation, maintenance, cleaning, and disposal, is approximately $60,000 per trailer for an 18-month "life cycle." Since the cost of a FEMA trailer is significantly greater than the cost of an apartment, the lower cost temporary housing alternative was used in this analysis. The average total evacuation and subsistence cost for the one-year period was approximately $23,200 per household. For depths of flooding greater than six feet, the period of evacuation was increased to eighteen months, and the total evacuation and subsistence cost increased to approximately $28,000 per household.

A depth-damage relationship for evacuation and subsistence costs was developed for each increment of flooding up to 15 feet above first floor elevation. These depth-damage relationships were then combined in the GIS application with the number of residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for evacuation and subsistence costs. It should be noted that emergency costs were not included for the 10-year frequency storm event when calculating an expected annual value.

Residential Clean Up and Reoccupation Costs

The experiences of residents affected by previous flood events, including Hurricanes Katrina and Rita, were used to estimate the residential clean up and reoccupation costs incurred by residential households immediately following a storm event. Included in this category are the costs of driving to and meeting with insurance adjustors and contractors, the costs of interior clean up and dehumidifying the property, and the opportunity cost for the time spent by the resident meeting with the adjustors and contractors and inspecting the repairs. While the rebuilding process will likely last longer than one year, the clean up and reoccupation costs are based only on the actual hours estimated to be spent by residents on these activities.

Since the residents of properties inundated at least one foot above first floor elevation are evacuated for at least three months, they will periodically visit their properties during the evacuation period to inspect the extent of their damages, meet with insurance adjustors, and meet with contractors to determine the necessary repairs. Based on the experiences of residents evacuated from Hurricane Katrina, travel costs were estimated for a minimum of three visits during the evacuation period.

The average distance that the residents of each inundated household traveled to an evacuation destination was 350 miles, or 700 miles round trip. According to the Internal Revenue Service (IRS), the operation and maintenance cost, including gasoline, for each vehicle used in the evacuation process was $0.485 per mile. With a round trip cost of $339.50 per visit, the total transportation cost for three round trips to the inundated property during the period of evacuation was $1,019. This amount was applied to all residential structures that were inundated one foot or more above first floor elevation.

The estimated costs incurred by residents to clean up and gut their inundated properties were based on interviews with contractors and repair personnel in the planning area. The tasks involved in this cost category include obtaining permits, employing dehumidifiers, gutting the interior of the structure, sanitizing the salvageable items, and removing mold. A total of $13,500 was applied to each residential structure inundated at least one foot above first floor elevation. For mobile homes inundated at least one foot above first floor elevation, the clean up and gutting costs totaled $5,000.

During their period of evacuation, homeowners will devote many hours applying for governmental assistance, filing insurance claims, scheduling appointments, meeting with insurance adjustors and contractors, and supervising repair work. The opportunity cost associated with the time spent completing these tasks can be measured by the average hourly wage for residents in the planning area. According to a pre-Katrina homeowner survey completed by the Amite River Citizens Community Group following a non-hurricane related flood event in East Baton Rouge Parish, residents of structures inundated less than three feet above first floor elevation spent an average of 100 hours completing these tasks. The average nonagricultural wage rate in the planning area for 3rd quarter 2006, as derived from data reported by the Louisiana Department of Labor, was $18.08 per hour. Thus, the total opportunity cost for each resident whose property was inundated between one and three feet above the first floor elevation was determined to be $1,808.

For residential structures inundated three feet or more above first floor elevation, the experiences of residents flooded by Hurricane Katrina were considered. Several of these homeowners had accurately recorded the amount of time that they had spent completing various reoccupation tasks in the months following the storm. Based on these records, an average of approximately 571 hours is required to complete the following tasks: the initial clean up of the lot and exterior of house, meetings with insurance adjustors, telephone conversations with non-profit groups and government agencies, meetings with contractors, the overseeing of repair work, and the purchasing of replacement items. With an average wage of $18.08 per hour, the total opportunity cost for each homeowner whose property was inundated more than three feet above first floor elevation was $10,308.

A depth-damage relationship for clean up and reoccupation costs was developed for each increment of flooding up to 15 feet above first floor elevation. These depth-damage relationships were then combined in the GIS application with the number of residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for evacuation and subsistence costs. It should be noted that emergency costs were not included for the 10-year frequency storm event when calculating an expected annual value.

Landscaping

After the completion of the residential clean up and reoccupation process, the costs associated with restoring the exterior of the property were considered. The average lot size of the residential properties in the planning area is 5,000 square feet, with approximately one half of this amount, or 2,500 square feet, devoted to landscaping. If the residential property is inundated with saltwater at a depth of 2 feet or more above first floor elevation, the grass, shrubs, and an average of one tree per property would need to be replaced. Data regarding the landscaping replacement were obtained from a local landscaping company, from Value Engineering, and from the landscape architects of the USACE. Damage to the fencing surrounding the property was not considered in this analysis because of the difficulty in separating the portion of the damage caused by water from the portion of the damage caused by wind.

Before new grass, plants, and trees can be planted on the property, the soil damaged by the saltwater must be removed, disposed of, and replaced. The cost to replace 6 inches of topsoil throughout the property, or approximately 46 cubic yards at $50 per cubic yard plus administrative costs, is $3,000. Approximately 7 grass palettes, each costing $300 plus labor and administrative costs, would be required to re-sod the property; the total cost of this task is $4,000. According to the landscape architects of the USACE, it would cost $3,500 to replace the shrubs (azaleas, rose bushes, camellias, gardenias, etc.) on the property, $4,000 to remove one damaged tree, and $100 to plant a new tree. The cost of labor is included in each of these costs. Thus, the total landscaping cost for each residential property is $14,600.

The total landscaping cost was applied to all residential structures that incurred flooding of 2 feet or greater above first floor elevation. This cost was used in the GIS application together with the number of residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for landscaping costs. It should be noted that emergency costs were not included for the 10-year frequency storm event when calculating an expected annual value.

Debris Removal

The costs associated with the removal of debris from the curbside in front of inundated structures and the transporting of this debris to waste disposal sites were primarily incurred by the Federal government. According to emergency management officials from New Orleans District, each inundated residential structure created approximately 30 cubic yards of debris. The cost to remove this debris ranged from $15 to $25 per cubic yard with an average of $20 per cubic yard. Thus, the average cost of debris removal was $600 per inundated residential structure. This amount was applied to all residential structures that incurred flooding at least one-foot above the first floor elevation, and was used in the GIS application together with the number of residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for debris removal. It should be noted that emergency costs were not included for the 10-year frequency storm event when calculating an expected annual value.

Total Residential Emergency Costs

A depth-damage relationship for the total of all residential emergency cost categories was developed for each increment of flooding up to 15 feet above first floor elevation. These depth-damage relationships were then combined in the GIS application with the number of residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for the total of all residential emergency cost categories.

Table 13 displays the depth-damage relationships for each of the emergency cost categories applied to the inundated residential structures. (Non-residential structures are also included.)

Non-Residential Clean Up and Restoration Costs

Post-flood surveys of business owners and managers were conducted as part of the IWR Flood Damage Collection Program. These surveys consisted of personal interviews with the owners and managers of businesses in the New Orleans Metropolitan Area that experienced flooding due to Hurricane Katrina. Based on the responses to the survey of 161 businesses, the average cost of commercial clean up and business restoration was $134,947. Most of the non-residential structures included in the survey incurred flooding between two and eight feet above first floor elevation. Clean up and restoration costs include the cost of labor and materials to clean the interior and exterior of the building and to remove and dispose of debris. The average cost of salvaging and replacing business records was $4,946. The costs associated with restoring the exterior of the property, including landscaping, averaged $7,039. Thus, the clean up and restoration cost for each non-residential property that incurred flooding one or more feet above first-floor elevation totaled $146,932.

A depth-damage relationship for the total of all non-residential emergency cost categories was developed for each increment of flooding up to 15 feet above first floor elevation. These depth-damage relationships were then combined in the GIS application with the number of non-residential structures inundated at each one-foot increment of flooding to develop a stage-damage relationship for the total of all non-residential emergency cost categories. It should be noted that emergency costs were not included for the 10-year frequency storm event when calculating an expected annual value.

Table 13 displays the depth-damage relationships for each of the emergency cost categories applied to the inundated non-residential structures. (Residential structures are also included.)

Repairing of Highways, Streets, and Railroad Tracks

According to a report by the Louisiana Department of Transportation and Development, the total cost of repairing the road systems in Louisiana following Hurricanes Katrina and Rita was estimated to be $1.46 billion. Approximately $1.1 billion was needed to repair Federal roadways, and $359 million was needed to repair non-Federal roadways. While some of the major highways, streets, and railroad tracks throughout the area, which were inundated with floodwater for an extended period of time, experienced only minimal damages, other roadways and railways experienced major damages to both their surfaces and their foundations.

Based on data obtained from Engineering Division, the cost to repair each lane of an asphalt-paved highway is $205,300 per mile. Since a highway was defined in the analysis as containing four lanes, the total repair cost applied to each highway mile was $821,200. The cost to repair each lane of a street was $103,000 per mile. Since local streets contain two lanes, the total repair cost applied to each mile was $206,000. Based on data obtained from Engineering Division, railroad track repairs cost $103 per linear foot, or $542,000 per mile. Revised depth-damage relationships for highways, streets, and railroad tracks were developed for each one-foot increment up to 15 feet of flooding by using these data to update the data developed as part of the Economic Data Survey for the Mississippi River and Tributaries Protected Area.

The GIS database, which contains the total number of miles of major and secondary highways, roads and streets, and railroad tracks in each census block, was combined with LIDAR DEM data, which provides the mean ground elevation for each census block, to assign a mean ground elevation to the roadways and railways in the planning area. Based on a sampling of LIDAR DEM data, the railroad tracks in the planning area were located an average of approximately 3 feet above the mean ground elevation of the census block.

The mean ground elevation in each census block was combined with the depth-damage relationship for highways and streets to develop stage-damage relationship for the highways and streets in that census block. The mean ground elevation plus the average height above ground for the railroad tracks in each census block was combined with the depth-damage relationship for railways to develop a stage-damage relationship for the railroad tracks in that census block. These relationships show the total number of highway, street, or railway miles inundated and the subsequent damage in each census block at each one-foot increment of flooding.

The GIS application was then used to determine the number of miles of highways, streets, and railroad tracks for the stages associated with each of the frequency storm events. Because fewer miles will flood with the project in place, the portion of the expected annual highway, street, and railroad track repair costs that will be reduced by the project alternatives is considered the highway, street, and railroad track repair costs saved.

Table 14 displays the depth-damage relationships for highways, roads and railroad tracks in the LACPR planning area.

AGRICULTURAL RESOURCES

National Economic Development (NED) agricultural benefits are defined as the value of increases in the agricultural output of the area and the cost savings in maintaining a given level of output. The benefits include reductions in production costs and in associated costs, the reduction in damage costs from floods, erosion, sedimentation, inadequate drainage, or inadequate water supply, the value of increased production of crops, and the economic efficiency of increasing the production of crops in the planning area.

The National Agricultural Statistics Service (NASS) GIS database for the year 2005 was used to provide the location of each of the various crops farmed in the LACPR planning area. Table 15 displays the total agricultural acres by planning unit. There are approximately 3.9 million agricultural acres in the LACPR planning area. These crops include corn, cotton, rice, sorghum, soybeans, winter wheat, small grains (alfalfa, oats, millet, and rye) and hay, sugar cane, fallow cropland, pecans, and pasture. The number of citrus acres in Plaquemines Parish was provided by the Louisiana State University Agricultural Center (LSU AgCenter) and their location was estimated based on the location of fallow cropland in the area. The LSU AgCenter provided the number of acres of crawfish farming for each parish, and it was assumed that these acres were located in the same area as the rice acres. The GIS layer containing the location of each crop in the planning area was combined with the LIDAR DEM in the GIS application to determine the number of cleared agricultural acres inundated for each one-foot increase in stage. The acres of agricultural land were assigned to census blocks in the GIS Application in order to combine the damages to crops for each one-foot increase in stage with the increase in damage to residential and non-residential property, if any, within that census block. The number of acres that could be inundated for each one-foot increase in stage is commonly referred to as a stage-area curve.

Crop Damage Rate

The crop damage rate per acre inundated is defined as the difference between the net return per cleared acre in a year in which a storm event occurs and the net return per cleared acre in a year in which a storm event does not occur. The damage rates per inundated acre of all crops except pecans and citrus were developed based on farm budget analysis. Production cost and return data published by the LSU AgCenter and discussions with professors associated with the LSU AgCenter were used as inputs for each crops farm budget analysis. The crop damage rate per inundated acre of sugar cane was based on the damage rate developed as part of the Morganza to the Gulf, Louisiana Feasibility Study. The actual crop losses that resulted from saltwater inundation caused by Hurricanes Katrina and Rita were used to develop the damage rate per acre of small grains and hay, pecan and citrus crops.

In order to determine the flood damages to the corn, cotton, rice, sorghum, soybean, sugarcane and winter wheat crops and to crawfish farming, the monthly probability of a hurricane affecting the Louisiana coast, the production cycle of each crop, and the production costs and revenues per crop acre were considered. Data obtained from the National Oceanic and Atmospheric Administration (NOAA) for the period 1851 through 2005 were used to determine the probability of a storm affecting the Louisiana coast during each of the six months (June through November) in the hurricane season. Table 16 displays the number of historical hurricanes by month of occurrence between the years 1851 and 2005. The average yield for the period 2001 through 2005 (pre-Katrina/Rita) and the 2007 current normalized price (CNP) per crop were used to determine the gross annual revenue per crop. The average price received by crawfish farmers for the period 2001 through 2005 was applied to crawfish, since a CNP was not available for crawfish.

The production budgets obtained for each crop from the LSU AgCenter were used to determine the cumulative production costs expended for each month in the production cycle of each crop, beginning with the planting of the crop and ending with harvesting. These cumulative monthly expenditures were multiplied by the probability of a hurricane occurring during that month in order to calculate the expected value of the expended production costs. According to discussions with the professors associated with the LSU AgCenter, all revenues generated by crawfish farming will be lost if the ponds are inundated with saltwater. This same assumption was applied to corn, cotton, sorghum, and soybeans. Since winter wheat is harvested in May before the beginning of the hurricane season, it was assumed that there would be no loss to the crop. Also, it was assumed that there would be no crop loss to fallow land.

The damage rate per inundated crop acre is equal to the loss of the net income normally generated by the crop. It can be equivalently measured as gross revenues minus the expected value of the unexpended production costs for that year. For purposes of this analysis, it was assumed that total revenues would never be less than the cost of production for that crop (i.e. net returns are always greater than or equal to zero). This assumption was made because if net income is negative in a non-flood year, then the flood event would negate this loss and actually have a positive effect on the NED account.

The damage rate per inundated acre of pastureland was based on data obtained from the LSU AgCenter as part of a previous USACE study in Southwest Louisiana. According to this data, there are approximately 40,000 head of cattle grazing on 120,000 acres of pastureland in Vermilion Parish, with an average of three acres of pasture for each animal. The annual revenues generated by the pastureland averages about $16 million, or $133.33 per acre. In the event of a storm, the inundated acres from saltwater flooding would be completely unusable for one year. For small grains and hay, pecans and citrus crops, the total damage to these crops caused by Hurricanes Katrina and Rita as reported by the LSU AgCenter was divided by the number of inundated acres to derive a damage rate per crop acre flooded.

Non-Crop Damage Rate

In addition to the crop and pasture losses, there are other non-crop damages and expenses that would be incurred as the result of a storm event. These include losses to agricultural infrastructure (farm roads, fences, farm equipment, supplies, and drainage improvements) and agricultural land restoration costs. A weighted average of the non-crop flood damage rate per inundated acre was developed in June 2006 for Vicksburg District by Mississippi State University based on data obtained from eleven counties in Mississippi. This non-crop damage rate, which was calculated to be $77.59 in 2006 per inundated acre, was applied to each acre of agricultural land inundated in the LACPR planning area. A non-crop damage rate of $491 for crawfish farms was developed using the damages to crawfish infrastructure from Hurricanes Katrina and Rita and the number of acres impacted. The non-crop damage rates were updated to 2007 price levels.

Total Damage Rate

The total damage rate developed for each crop, including both crop loss and non-crop loss, was multiplied by the number of cleared acres inundated in order to calculate the total loss from inundation for each crop. Table 17 displays the damage rates per acre by crop in 2007 price levels. The reduction in the acres inundated under the with-project alternatives was compared to the without-project condition and multiplied by the damage rates in order to determine the damages and benefits associated with each project alternative.

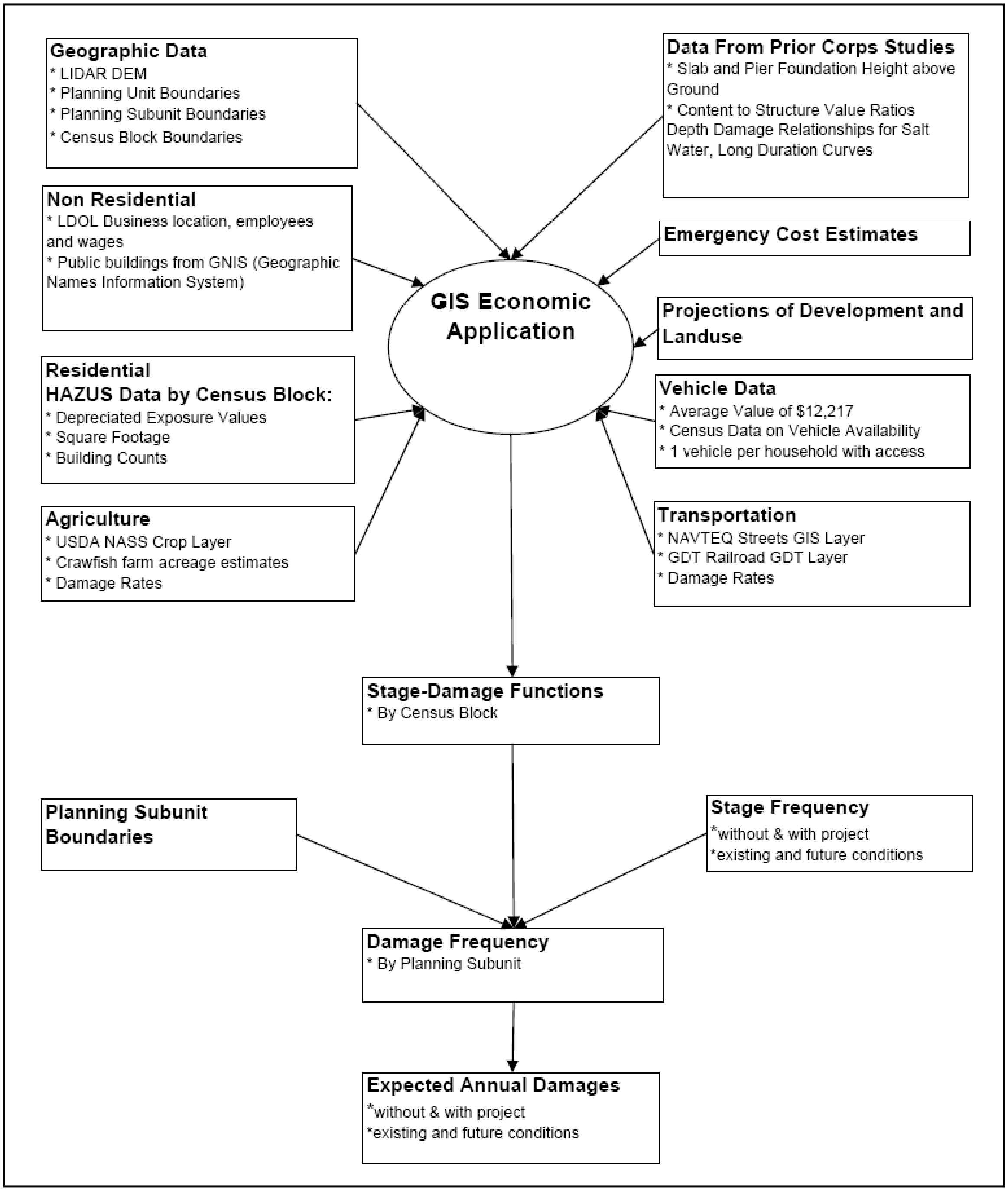
EQUIVALENT ANNUAL DAMAGES

Aggregated Stage-Damage Relationships

The stage-damage relationships for residential and non-residential structures, contents, and vehicles were combined with the stage-damage relationships for emergency costs, road, highway, and railroad track repairs, and agricultural resources to develop one aggregated stage-damage relationship for each census block. The stage-damage relationships at the census block level were then combined to develop an aggregated stage-damage relationship for each planning subunit. The aggregated stage-damage relationships were developed under two future development and land use allocation scenarios: "high employment" future development with dispersed land use allocation and "business as usual" future development with compact land use allocation. The aggregated stage-damage relationship under each scenario was developed for the years 2010 and 2075.

Figure 2 displays a flowchart that exhibits the databases used by the GIS economic application to produce damage estimates for the LACPR project alternatives.

Figure 2. LACPR GIS economic application flowchart.



Stage-Damage Uncertainty

Uncertainty is inherent in both the hydrologic and economic data used to calculate stage-damage relationships. While any of the economic variables could contain measurement errors, the most significant source of economic uncertainty arises from the methods used to assign ground elevations to the residential and non-residential structure inventory, transportation infrastructure and agricultural resources. Based on the error surrounding the LIDAR data and the error arising from the use of a single mean value to represent the elevation for an entire census block, this uncertainty was estimated to be plus or minus 1.38 feet for the structure inventory and plus or minus 2.34 feet for the transportation infrastructure and agricultural resources at the 90 percent level of confidence. (The uncertainty arising from the methods used to assign a mean elevation to each census block was discussed in the Ground Elevation section of the Economic Appendix.) As an example, when rounded to the nearest foot, the damages for residential and non-residential properties calculated at the three-foot stage could range from the damages calculated for the two-foot stage to the damages calculated for the four-foot stage. Alternatively, when rounded to the nearest foot, the damages for the transportation infrastructure and the agricultural resources calculated at the three-foot stage could range from the damages calculated for the one-foot stage to the damages calculated for the five-foot stage.

Stage-Frequency Data

The H&H Branch provided stage-frequency data for each planning subunit under existing and future without-project and with-project conditions. Stages were provided for five storm events with exceedance probabilities of .10, .01, .0025, .001, and .0005, respectively. Exceedance probabilities reflect the percentage chance that the actual stage associated with a storm event will be greater than the stage predicted by the H&H model in any given year. The five exceedance probabilities are more commonly referred to as the 10-year, 100-year, 400-year, 1000-year, and 2000-year frequency storm events.

Stages for each of the five frequency events were also provided for three non-exceedance probabilities: .10, .50, and .90. Non-exceedance probabilities quantify the uncertainty inherent in the hydrologic model and reflect the likelihood that the actual stage associated with a storm event will be less than or equal to the stage predicted by the H&H model in any given year. As an example, at the .90 non-exceedance probability, there is at least a 90 percent chance that the actual stage will be less than or equal to the stage predicted by the H&H model in any given year. Alternatively, there is a 10 percent chance that the actual stage will be greater than the stage predicted by the H&H model in any given year.

The stage-frequency data for the without and with-project conditions were provided for six future scenarios based on the condition of the Louisiana coastline and the rate of relative sea level rise expected to occur over time. The first three scenarios assume that the Louisiana coastline will continue to degrade with zero, low, and high rates of relative sea level rise, respectively. The second three scenarios assume that the Louisiana coastline will be sustained at its current (2010) condition with zero, low, and high rates of relative sea level rise, respectively. However, damages for each of the LACPR alternatives were calculated using only the low and high sea level rise scenarios.

Damage Calculations

The stage-frequency data were combined with the stage-damage relationships to develop frequency-damage relationships for each planning subunit. Frequency-damage relationships were estimated for the no-action alternative (degraded coastline) and the coastal restoration only alternative (coastline sustained at the 2010 condition). Both the nonstructural and the structural alternatives include coastal restoration measures. Each alternative was analyzed with a sustained (2010) Louisiana coastline and with low and high relative sea level rise, respectively. The alternatives were also analyzed under the "business as usual" future development and compact land use allocation scenario and under the "high employment" future development and dispersed land use scenario. The frequency-damage relationships for each alternative were calculated for three non-exceedance probabilities (.10, .50, and .90) in any given year to account for the hydrologic uncertainty inherent in the H&H model.

Frequency-damage relationships were developed for three nonstructural alternatives (including coastal restoration), which included the raising in place of all residential and non-residential structures in each planning unit to an elevation above the 100-year event, the 400-year event and the 1000-year event, respectively. If a structure was raised 14 feet or higher, then a buyout option was used, and the damages associated with that structure were removed from the analysis. The reduction in damages resulting from the buyout of all structures located in the V-zone areas where no structure-raising takes place that are highly susceptible to flooding were also removed from the analysis.

Frequency-damage relationships were developed for eleven structural alternatives (including coastal restoration) in PU1, thirteen structural alternatives (including coastal restoration) in PU2, four structural alternatives (including coastal restoration) in PU3a, six structural alternatives (including coastal restoration)in PU3b, and seven structural alternatives (including coastal restoration) in PU4. The structural alternatives were designed to contain the stages associated with the 100-year, 400-year, and 1000-year events. The comprehensive plans include these same relationships with the addition of the reduction in damages resulting from the complementary nonstructural measures for those areas not protected by the structural plans. The specific details regarding the LACPR alternatives can be found in the main report.

Tables 18 through 37 display the frequency damage relationships for the project alternatives by planning unit and by economic development scenario for the years 2010 and 2075.

The GIS application was used to weight the damages corresponding to each magnitude of flooding by the percentage chance of exceedance. From these weighted damages, the application was used to determine the expected annual damages for the year 2010 and the year 2075 for the no-action alternative, the coastal restoration only alternative, the combination coastal restoration and either structural or nonstructural alternatives, and the comprehensive alternatives.

Damages for the years 2010 and 2075 were calculated for each of the LACPR planning units using the projected population and number of households for the years 2010 and 2075. The expected annual damages for each year between 2010 and 2075 were computed using straight-line linear interpolation. The initial construction period for each of the structural alternatives was assumed to begin in the year 2010 and the implementation period of the structural alternatives ranged from six to sixteen years. Thus, each alternative was assumed to be operational through the year 2075.

For the structural alternatives, the no-action (degraded coastline) damages were used for the years between 2010 and the year in which the project becomes operational, and the residual damages relative to the no action alternative were used for the remaining years through the year 2075. For the nonstructural alternatives, a 15-year implementation period was used. The reduction in damages relative to the no-action alternative was assumed to occur at a uniform rate between the year 2010 and the year 2075.

Since the comprehensive plans included complementary nonstructural measures, the reduction in damages due to the nonstructural alternatives was estimated during the implementation period for each alternative. The reduction in damages resulting from the structural alternatives, which include a combination of coastal restoration and complementary nonstructural measures, was estimated through the year 2075.

The fiscal year 2008 Federal discount rate of 4-7/8 percent was used to compound the stream of expected annual flood damages before the base year (2025) and to discount the stream of expected annual damages occurring after the base year in order to calculate the total present value of the damages in the year 2025. The present value of the expected annual damages was then amortized using the Federal discount rate to calculate the equivalent annual damages. These equivalent annual damages were calculated for three non-exceedance probabilities (.10, .50, and .90) to account for the hydrologic uncertainty inherent in the H&H model.

Tables 38 through 57 display the expected annual metric values for the LACPR alternatives for the years 2010 and 2075. The expected annual metric values are displayed for residual damages, population, number of employees impacted, their wages and their output or sales. The equivalent annual metric values were calculated for a 2025 base year using a 4-7/8 percent interest rate. The metric values are displayed for the two economic development scenarios and for the two sea-level rise scenarios. The values are shown for the .10, .50 and .90 non-exceedance probabilities.

Table 58 displays the percentage of expected annual damages by damage category for each planning unit for the sustained cost alternative. The percentages are displayed for two economic development scenarios in combination with the low sea level rise scenario for the years 2010 and 2075. The damage categories include residential properties, non-residential properties, emergency activities, agricultural resources and transportation infrastructure including roads, streets and railroads.

PRESENT VALUE COSTS

Cost estimates were developed for each of the coastal restoration only alternatives and for each alternative combining coastal restoration with either nonstructural or structural alternatives. Comprehensive cost estimates were provided for a combination of a coastal restoration with both nonstructural and structural alternatives. These costs were based on the design criteria associated with the stages developed for the .90 non-exceedance probability.

The coastal restoration only alternatives for all five planning units were designed to sustain the Louisiana coastline at its condition in the year 2010 for both the low and high sea level rise scenarios. For PU1 and PU2, the coastal restoration measures include marsh creation, diversions, shore protection, reinforcement of natural ridges, and the building up of the barrier islands. Only the first three measures were considered for PU1, while all five measures were considered for PU2. Costs were initially developed for all five coastal restoration only alternatives (R1 through R5), but were then screened to only three alternatives (R1 through R3). When the coastal restoration alternatives were combined with a nonstructural alternative, a structural alternative, or both a nonstructural and a structural alternative for PU1 and PU2, only the costs for R2 were used.

Two coastal restoration alternatives, R1 and R2, were developed under both the low and high sea level scenarios for PU3a, PU3b, and PU4. Alternative R1 for PU3a includes marsh creation, diversions, the re-distribution of flows, the construction of a by-pass channel, and the building up of the barrier islands. Alternative R1 for PU3b includes marsh creation, relocation of a navigation channel, and shore protection. Alternative R1 for PU4 includes marsh creation and shore protection. Alternative R2 has the same coastal restoration measures as R1 but does not include the construction of a bypass channel for PU3a, or shore protection for PU3b and PU4. When the coastal restoration alternatives were combined with a nonstructural alternative, a structural alternative, or both a nonstructural and a structural alternative for PU3a, PU3b, and PU4, only the costs for R1 were used.

Table 59 displays the present value of the life-cycle costs for each alternative by planning unit using 2007 price levels. A 4-7/8 percent interest rate was used to calculate the equivalent annual coastal restoration costs for each alternative for a 2025 base year. The values are presented for two sea-level rise scenarios.

Costs were developed for three nonstructural alternatives (including coastal restoration), which included the raising all of residential and non-residential structures in each planning unit to an elevation above the 100-year event, the 400-year event and the 1000-year event, respectively. A buyout cost estimate was used for those structures that were required to be raised 14 feet or higher above the ground. Nonstructural cost estimates were also provided for the buyout of all structures located in the V-zone areas that are highly susceptible to flooding. The costs for each of the non-structural alternatives are provided in the Non-structural Appendix.

Cost estimates were provided for structural alternatives (including coastal restoration) in the five planning units. The structural alternatives were designed to contain the stages associated with the .01 (100-year), .0025 (400-year), and .001 (1000-year) exceedance probability storm events in any given year. The comprehensive plans include these same cost estimates with the addition of the costs of complementary nonstructural measures for those areas not protected by the structural plans.

Tables 60 and 61 displays the total present value of the life-cycle costs for each of the structural alternatives for PU1 and PU2, and PU3a, PU3b, and PU4, respectively. A 4-7/8 percent interest rate was used to display the equivalent annual cost values for each alternative in a 2025 base year using 2007 price levels. The costs for each of the alternatives were developed for a degraded and sustained coastline without sea level rise. The costs were also developed for each of the alternatives for a degraded and a sustained coastline in combination with a low and a high sea level rise scenario.

Costs for each of the coastal restoration only plans, the combination coastal restoration and either structural or nonstructural plans, and the comprehensive plans were estimated under four future condition scenarios based on the condition of the Louisiana coastline and the relative sea level rise. The first two scenarios assume that the Louisiana coastline will be sustained at its current condition with no further degradation and with low and high relative sea level rise, respectively. The third and fourth scenarios assume that the coastline will continue to degrade with low and high rates of relative sea level rise, respectively.

The cost estimates for each alternative were provided using October 2007 price levels over the period beginning in the year 2010 and ending in the year 2075. For the structural alternatives, the estimates included initial construction costs, mitigation costs, the costs of levee lifts, and the required operation and maintenance (O&M) expenditures. Since the initial construction period of the various structural alternatives ranges from six to sixteen years, the O&M expenditures for each cost estimate were extended through the year 2075 to insure that each alternative was operational through the year 2075. The implementation period for the coastal restoration only alternatives and for the coastal restoration alternative with nonstructural alternatives was assumed to be 15 years. The present value of the life cycle costs for each alternative was calculated using the fiscal year 2007 Federal discount rate of 4-7/8 percent. The cost for each alternative was either compounded or discounted to reflect a common base year, the year 2025, using the Federal discount rate.

REGIONAL ECONOMIC DEVELOPMENT AND OTHER SOCIAL EFFECTS

The customized GIS application used to assess flood damages to residential and non-residential properties in the LACPR planning area was also be used to determine the direct regional economic impacts of a storm event. These direct impacts were measured by changes in employment, wages, and output under without-project conditions and under the with-project conditions for each of the alternatives. Also discussed in this section is the development of a regional model that will build upon these current estimates of direct regional effects to measure also the indirect impacts, or multiplier effects, on regional economic activity. The multiplier effects are captured by the use of a regional input-output model that was developed by Regional Economic Models, Inc. (REMI). The REMI results are displayed in Attachment 3 to this appendix. Finally, the social impacts of flooding caused by the surges associated with a storm event for a community or region are discussed in the Other Social Effects (OSE) section.

Methodology

The employment, wages, and output associated with each commercial property in a census block were adversely affected whenever the stage associated with a frequency storm event at the planning subunit level reaches or exceeds the first floor elevation of the structure. The impacts on employment were based on data provided by the Louisiana Department of Labor (LDOL) for 2nd quarter 2005 plus the incremental non-residential development projected by Calthorpe Associates to occur by the year 2050. These data were adjusted annually through the year 2034 using the population and employment projections provided by Economy.com, and they were extended through the year 2075 using data provided by Calthorpe Associates.

The increment of non-residential development projected for the year 2050 was separated into three non-residential categories: retail, office and mixed use, and industrial. A corresponding NAICS code (44, 54, and 32, respectively) was assigned to each non-residential category. The quarterly wages associated with the employees in each NAICS code for the 2nd quarter 2005 were annualized and then used to represent the impacted annual wages. The projected growth in output, or sales, for the businesses in each NAICS code was applied to the 2005 annual wages in order to adjust the growth in wages for each year. The annual wages were represented in 2007 prices.

The impact on output, or sales, of the commercial establishments in each census block in the planning area was based on the annual employment-to-output ratio developed by NAICS code for the 70-sector Regional Economic Model Incorporated (REMI) as part of the IPET Report. Output, or sales, per employee was linked to each two or three digit NAICS code assigned to businesses by LDOL to estimate the impact of flooding on annual output for the study year (2010), the base year (2025), and the year 2075. The annual employment-to-output ratio for the year 2050 was assumed to be constant through the year 2075.

Data were developed for five exceedance probabilities: .10, .01, .025, .001, and .0005. These exceedance probabilities correspond to the 10-year, 100-year, 400-year, 1000-year, and 2000-year storm events, respectively. The employment, wages, and output values were converted to average annual values and then to equivalent annual values. Finally, the total employment, total wages, and total output affected by each frequency storm event were then aggregated for each planning unit. These data are used to demonstrate the direct regional economic impacts for the without-project conditions and for the selected project alternatives on an equivalent annual basis.

Development of a Regional Model

In general, regional economic policy analysis models use simulations to assess the economic effects of various policies relating to economic development, transportation, energy, the environment and taxation, on regional areas. Regional economies compete with one another within a national economy, and as such exhibit different behavior than national economies, such as the presence of second and third-round multiplier effects.

The development of a regional model to measure regional impacts will build upon these current estimates of direct regional effects. The advancement will be centered upon the calculation of changes in regional output, income, and employment that results from second-round and third-round spending effects, or lack thereof. The multiplier effects captured in this approach are embedded within a regional input-output model that was developed by Regional Economic Models, Inc. (REMI). It was this model that was used by the Interagency Performance Evaluation Team (IPET) to estimate the regional economic impacts associated with Hurricane Katrina in September 2005. The advantage of the REMI model over a number of alternative regional input-output models lies with its superior ability to trace reductions in output, income, and employment associated with disruptions to the established interrelationships among industrial sectors, whereas more conventional models are restricted to measuring increases in these variables as a result of a positive stimulus that is introduced into the system.

REMI Model

The REMI model uses a wide variety of economic indicators to describe the effects of policies on regional economies. It uses a large set of inputs from the following five (5) categories:

1) *Output and Demand*: Describes the output in each industry based on demand for that industry. Demand is generated by consumption, investment, government spending, and intermediate income. Subsequent determinants include real per capita disposable income, relative prices, the elasticity of demand with respect to income, and the size of the population. In addition to being influenced by demand in the home region, output is also influenced by demand in other regions, the region's market share, and the exports to other nations. The REMI model is the only input-output model to account for the displacement or augmentation effects that location choices have on other local firms.

2) *Labor and Capital Demand*: Describes the characteristics of labor including productivity, intensity, and optimal amounts of capital relative to the availability of labor.

3) *Demographic/Population and Labor Force*: Demographic information about the region, including birth and survival rates for each group. Based on the size and labor force participation rates for each group, the labor supply can be determined. This block also accounts for migration characteristics of the population.

4) *Wages, Prices, and Costs*: The interactions between the costs of labor, goods, and production will dictate how and how much they will be used – the cost of production for each industry is the cost of its inputs (labor, capital, and fuel). Access is another important characteristic because of the resulting transport and transaction costs.

5) *Market Shares*: The proportion of markets, both local and export, that each industry has captured.

REMI software allows for discrete, single-event modeling of a regional system that is defined according to the parameters of the study. Because model execution is relatively labor-intensive, it was found not to constitute a suitable tool for screening through a series of over one hundred alternatives. This level of effort is accentuated by the requirement that sufficient runs for a range of frequency events be conducted within each construction alternative such that an average annual equivalent value can be derived. Finally, unlike specific estimates of direct impacts such as the number of residences damages and affected population, multiplier-based regional impacts span across planning units since the industrial linkages are defined for integrated economic regions. Therefore, the possibility and desirability of defining economic regions within the REMI model to coincide with that of planning units requires further investigation once the number of final alternatives has been determined. This effort will be conducted as part of follow-up investigations to be conducted after the final array of project alternatives is established.

Other Social Effects (OSE)

In addition to regional economic development impacts, water resource project alternatives can be assessed on the basis of their contribution to the social dynamics and quality of life in the local and regional communities. Two criteria, residual population and the number of historic districts affected by potential flooding, are currently being used as metrics for the Other Social Effects (OSE) account in the LACPR evaluation. A variety of other social statistics can be used in conjunction with these metrics to describe other changes in the social dynamics and quality of life in the planning area attributable to the project alternative. Examples of these social statistics include a comparison of the per capita rates of alcoholism, per capita rates of suicide, and the per capita availability of hospital beds throughout the planning area before and after Hurricanes Katrina and Rita. The expanded OSE criteria can also be augmented by involving members of the local and regional communities in a collaborative process, which would begin in the earliest stages of the evaluation. These issues are addressed more fully in Attachment 2 to this appendix.

METRICS

In previous water resource studies, project alternatives were compared and selected based on the ratio of the National Economic Development (NED) equivalent annual benefits derived from the alternative to the average annual project costs. The alternative that generated the highest net benefits and maximized the ecosystem benefits was considered the NED/NER plan. However, for LACPR, a more comprehensive method was developed to compare the alternatives. This method encompasses a broader range of objectives and performance criteria to be used in the evaluation process. A system of quantifiable parameters, or metrics, was developed to evaluate and rank the alternatives based on the four planning objectives for LACPR: people, economy, environment, and culture. These metrics not only consider the criteria of the National Economic Development and National Ecosystem Restoration (NED/NER) account, as in previous studies, but also consider the criteria of the Regional Economic Development (RED), the Environmental Quality (EQ), and the Other Social Effects (OSE) accounts.

NED Metrics

Data from the economic analysis were used to evaluate each project alternative based on the criteria of the NED/NER, RED, and OSE accounts. The three metrics developed for the NED/NER account include equivalent annual damages, life cycle costs, and the length of time (in years) required to construct and implement each of the alternatives. Damages were calculated for the stages associated with five exceedance probabilities: .10, .01, .025, .001, and .0005, which correspond to the 10-year, 100-year, 400-year, 1,000-year, and 2,000-year storm events, to derive the expected annual damages. The expected annual damages were converted to an equivalent annual value using the Federal discount rate. The equivalent annual damage value includes damages to residential and non-residential properties, emergency losses, losses to agricultural resources, and damages to the transportation infrastructure. An equivalent annual damage value was provided for both the degraded and maintained coast, for the high-employment future development and dispersed land use allocation scenarios, and for the business-as-usual future development and compact land use allocation scenarios, and for the 10, 50, and 90 percent confidence intervals surrounding the hydrologic data.

Life-cycle costs, which were prepared for each alternative, include initial implementation costs, operations, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs, real estate costs, and mitigation costs. Since these costs occur at various times during the life cycle of the alternatives, the costs were discounted to the base year (2025) to reflect their present value and were then expressed in October 2007 price levels. This process allows for the comparison of alternatives with different investment patterns. The construction and implementation time metric considers the number of years required to complete the construction of each alternative and for the alternative to begin providing flood risk reduction. An alternative with a shorter construction and implementation period could provide less flood risk reduction to a community than other alternatives, but it would provide flood risk reduction to the community sooner. Thus, there could be a tradeoff between the time that flood risk reduction begins and the overall magnitude of the risk reduction provided.

RED Metrics

Three metrics were developed to assess the direct impacts of a storm event on the regional economy based on the criteria of the RED account. These metrics include gross regional output, number of people employed, and average earned income. Indirect impacts, such as the reduced customer base following a storm event and the closing of related businesses, are not currently considered by the metrics for the RED account. However, these indirect impacts will be considered when the REMI model becomes available. The output, or sales, employment, and earned income associated with each commercial property in a census block under the no action condition and for each alternative are assumed to be affected whenever the stage associated with a frequency storm event at the planning subunit level reaches or exceeds the first floor elevation of the structure. Data were developed for the stage associated with five exceedance probabilities: .10, .01, .025, .001, and .0005, which correspond to the 10-year, 100-year, 400-year, 1000-year, and 2000 storm events, in order to derive the expected annual values. These expected annual values were converted to an equivalent annual value using the Federal discount rate.

OSE Metrics

A metric for residual population impacted was developed to assess the ability of alternatives to protect the health and safety of the public from a storm event based on the criteria of the OSE account. The impacted population is defined as the total number of residents in each census block in which the stage associated with a frequency storm event is greater than the mean ground elevation of that census block. The population metric does not consider the portion of the population that would evacuate before a storm event. Data were developed for the stage associated with five exceedance probabilities: .10, .01, .025, .001, and .0005, which correspond to the 10-year, 100-year, 400-year, 1000-year, and 2000 storm events, in order to derive the expected annual values. These expected annual values were converted to an equivalent annual value using the Federal discount rate.

Attachment 1 –
Tables Referenced

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Table 1
FEMA Flood Claims and Dollar Damages By Parish
1978 to 2007
Louisiana Coastal Protection and Restoration

Parish	Number of Policies Dec. 2007	Number of Claims Filed	Total Amount Paid ($)	Average Amount Paid ($)
Acadia	2,942	471	$ 2,663,341	$ 5,655
Ascension	9,366	2,110	19,253,353	9,125
Assumption	1,617	830	3,330,322	4,012
Calcasieu	13,313	4,513	69,595,269	15,421
Cameron	1,876	1,952	108,383,612	55,524
East Baton Rouge	24,481	7,338	91,187,617	12,427
Iberia	5,624	1,708	46,110,435	26,997
Iberville	879	415	2,061,093	4,966
Jefferson	130,717	121,409	3,262,161,119	26,869
Jefferson Davis	991	202	2,721,731	13,474
Lafayette	15,372	2,561	22,869,286	8,930
Lafourche	13,956	3,956	47,655,683	12,046
Livingston	11,886	5,053	53,865,013	10,660
Orleans	112,064	119,399	7,107,694,720	59,529
Plaquemines	6,370	4,721	263,319,162	55,776
St. Bernard	12,415	23,008	2,225,735,411	96,737
St. Charles	11,849	5,502	95,168,286	17,297
St. James	1,002	88	717,194	8,150
St. John the Baptist	6,733	1,306	7,505,889	5,747
St. Martin	2,258	758	4,427,513	5,841
St. Mary	6,118	1,824	21,080,651	11,557
St. Tammany	52,502	29,517	1,519,000,430	51,462
Tangipahoa	5,629	882	7,762,764	8,801
Terrebonne	19,144	9,513	204,028,082	21,447
Vermilion	6,797	2,257	76,020,106	33,682
West Baton Rouge	569	93	648,924	6,978

Source: U.S. Federal Emergency Management Administration

Notes:
1. The amount paid reflects the price level of the year in which the claim was paid to the policyholder.
2. A single policy can have multiple claims.

Table 2
Total Number of Residential and Non-Residential Units and
Miles of Roads and Railroads by Planning Unit
2010 & 2075
Louisiana Coastal Protection and Restoration

Planning Unit	Residential Units	Non Residential Units	Number of Vehicles	Roads (miles)	Railroads (miles)
High Employment Future Development Scenario and Dispersed Land Use Allocation Scenario					
2010					
1	234,080	11,582	403,974	5,503	326
2	119,698	3,987	188,014	2,530	152
3a	57,830	2,888	94,018	1,973	46
3b	30,849	1,394	48,802	2,055	123
4	43,777	1,645	72,535	3,011	92
Total:	486,234	21,497	807,344	15,072	738
2075					
1	438,340	23,121	746,444	5,503	326
2	172,021	6,080	270,645	2,530	152
3a	78,140	3,835	127,149	1,973	46
3b	39,527	1,520	62,031	2,055	123
4	56,108	2,197	92,985	3,011	92
Total:	784,136	36,753	1,299,255	15,072	738
Business As Usual Future Development Scenario and Compact Land Use Allocation Scenario					
2010					
1	253,498	11,689	424,110	5,503	326
2	111,552	4,001	184,051	2,530	152
3a	56,477	2,788	87,991	1,973	46
3b	31,099	1,239	48,160	2,055	123
4	38,084	1,788	61,916	3,011	92
Total:	490,709	21,506	806,228	15,072	738
2075					
1	312,345	14,480	519,292	5,503	326
2	130,678	4,720	215,425	2,530	152
3a	64,358	3,150	100,291	1,973	46
3b	39,229	1,767	61,670	2,055	123
4	45,805	2,139	74,280	3,011	92
Total:	592,415	26,256	970,957	15,072	738

Source: GIS Economic Application Databases

Notes:
1. Residential and non-residential include structures and vehicles were included in portions of 23 parishes that are directly affected by storm surges.

Table 3
Total Value of Assets by Planning Unit
2010 & 2075 (2007 Price Level)
Louisiana Coastal Protection and Restoration

Planning Unit	Residential ($1,000)	Non Residential ($1,000)	Roads ($1,000)	Railroads ($1,000)
High Employment Future Development Scenario and Dispersed Land Use Allocation Scenario				
2010				
1	51,875,588	14,967,869	12,127,003	352,946
2	27,567,369	8,931,551	4,975,878	164,694
3a	12,076,274	7,788,917	4,237,566	49,615
3b	5,507,509	3,692,715	3,596,335	132,982
4	9,005,410	4,599,943	6,074,581	100,196
Total:	106,032,150	39,980,995	31,011,363	800,433
2075				
1	96,635,016	30,850,992	12,127,003	352,946
2	39,425,996	13,253,232	4,975,878	164,694
3a	16,446,755	10,620,182	4,237,566	49,615
3b	7,170,449	4,142,639	3,596,335	132,982
4	11,529,069	6,058,856	6,074,581	100,196
Total:	171,207,285	64,925,902	31,011,363	800,433
Business As Usual Future Development Scenario and Compact Land Use Allocation Scenario				
2010				
1	52,717,249	16,585,511	12,127,003	352,946
2	23,916,143	11,817,697	4,975,878	164,694
3a	10,398,174	7,322,588	4,237,566	49,615
3b	4,915,343	3,708,721	3,596,335	132,982
4	7,178,151	7,575,302	6,074,581	100,196
Total:	99,125,060	47,009,819	31,011,363	800,433
2075				
1	64,439,657	20,581,624	12,127,003	352,946
2	28,003,882	13,908,533	4,975,878	164,694
3a	11,898,569	8,322,878	4,237,566	49,615
3b	6,227,461	5,405,167	3,596,335	132,982
4	8,618,310	8,845,542	6,074,581	100,196
Total:	119,187,879	57,063,744	31,011,363	800,433

Source: GIS Economic Application Databases

Notes:

Table 4
Average Building Value by
Non-residential Occupancy Category
2007 Price Level
Louisiana Coastal Protection and Restoration

Non-Residential Occupancy Category	Average Building Value ($)
Eating and Recreation	$ 166,644
Groceries and Gas Stations	151,613
Professional Buildings	503,583
Public and Semi-Public Buildings	699,987
Repair and Home Use	111,812
Retail and Personal Services	263,369
Warehouses and Contractor Services	241,252
Industrial Buildings	2,728,950

Source: USACE and Marshall and Swift Valuation Service

Table 5
Contents-to-Structure Value Ratios
Louisiana Coastal Protection and Restoration

Structure Category		Feasibility Study		
		Jefferson and Orleans Area (%)	Donaldsonville to the Gulf Area (%)	Lower Atchafalaya and Morganza to the Gulf Area (%)
Residential	One-story	69	69	71
	Two-story	59	67	50
	Mobile home	79	112	148
	Multi-family residence	37	27	23
Non-residential	Eating and Recreation	114	83	306
	Groceries and Gas Stations	127	397	128
	Professional Buildings	43	44	78
	Public and Semi-Public Buildings	114	79	82
	Repair and Home Use	206	74	251
	Retail and Personal Services	142	367	148
	Warehouses and Contractor Services	168	256	372
	Industrial Buildings	168	256	372

Source: USACE Feasibility Studies Depth Damage Panel of Experts.

Notes:
1. Depth-damage relationships developed by a panel of building and construction experts for the Jefferson and Orleans Parishes Feasibility Study in 1996; the Lower Atchafalaya Reevaluation and Morganza to the Gulf, Louisiana Feasibility Studies in 1997; and the Donaldsonville to the Gulf, Louisiana Feasibility Study in 2006.

2. Saltwater, long-duration (one-week) depth damage curves were used to indicate the percentage of the structural value that was damaged at each depth of flooding.

Table 6
Historical and Projected Estimates of Population by Parish and MSA
26-Parish General Planning Area
High Employment Future Development/Dispersed Land Use Allocation Scenario
2005 to 2075
Louisiana Coastal Protection and Restoration

Parish	2nd Quarter 2005	4th Quarter 2005	July 2006	2010	2025	2030	2034	2050	2075
Baton Rouge MSA									
Ascension	86,259	98,039	97,478	110,542	132,814	139,071	144,080	212,002	262,591
East Baton Rouge	413,047	472,196	437,167	470,236	526,614	542,453	555,132	536,654	664,714
Iberville	32,611	35,323	33,567	37,623	44,538	46,481	48,036	65,822	81,529
Livingston	106,762	114,516	115,268	130,585	156,699	164,036	169,909	248,575	307,892
West Baton Rouge	22,077	24,312	22,554	27,513	35,968	38,343	40,245	80,480	99,685
Total	**660,756**	**744,386**	**706,034**	**776,499**	**896,633**	**930,384**	**957,402**	**1,143,533**	**1,416,411**
Houma MSA									
Lafourche	92,330	92,329	93,438	92,476	96,791	97,888	99,028	101,643	109,667
Terrebonne	106,632	108,844	108,938	107,676	113,334	114,773	116,268	133,285	143,807
Total	**198,962**	**201,173**	**202,376**	**200,152**	**210,125**	**212,661**	**215,296**	**234,928**	**253,473**
Lafayette MSA									
Lafayette	196,129	201,806	202,798	203,733	215,165	217,045	217,753	237,667	254,913
Saint Martin	50,961	52,223	51,114	51,362	54,400	54,899	55,087	63,145	67,727
Total	**247,090**	**254,029**	**253,912**	**255,095**	**269,565**	**271,944**	**272,840**	**300,812**	**322,640**
New Orleans MSA									
Jefferson	453,266	370,864	441,741	480,924	503,142	507,946	512,052	517,994	569,110
Orleans	463,283	140,534	201,474	235,315	254,505	258,654	262,200	447,382	491,530
Plaquemines	28,923	16,935	20,348	23,192	24,805	25,154	25,452	37,599	41,309
Saint Bernard	65,382	30,245	25,592	31,302	34,540	35,240	35,838	75,486	82,935
Saint Charles	50,313	46,984	50,969	55,556	58,157	58,719	59,200	60,637	66,621
Saint John the Baptist	45,380	45,380	48,742	52,967	55,362	55,881	56,323	55,852	61,363
Saint Tammany	210,352	186,304	223,432	269,800	296,092	301,778	306,636	612,982	673,471
Total	**1,316,899**	**837,246**	**1,012,298**	**1,149,056**	**1,226,603**	**1,243,372**	**1,257,701**	**1,807,932**	**1,986,339**
Lake Charles MSA									
Calcasieu	182,570	182,572	183,428	187,312	191,500	192,130	192,613	207,477	212,312
Cameron	9,960	7,752	8,086	8,218	8,360	8,381	8,397	7,036	7,200
Total	**192,530**	**190,324**	**191,514**	**195,530**	**199,860**	**200,511**	**201,011**	**214,513**	**219,512**
Non MSA									
Acadia	58,829	60,230	59,867	61,120	64,112	65,103	65,910	81,471	88,132
Assumption	23,377	24,081	23,671	23,683	24,247	24,427	24,577	30,821	32,035
Iberia	74,590	75,971	74,988	77,604	84,304	86,530	88,329	84,976	97,244
Jefferson Davis	31,583	31,583	31,057	31,558	31,859	31,309	31,282	43,396	43,001
Saint James	21,205	21,954	21,904	21,843	22,095	22,171	22,232	33,414	34,034
Saint Mary	52,437	54,097	52,065	51,861	49,665	49,397	49,266	50,671	48,033
Tangipahoa	104,956	109,527	112,464	116,045	142,527	151,354	158,461	195,676	270,689
Vermilion	54,925	54,925	55,074	55,816	61,237	63,028	64,476	64,027	74,407
Total	**421,902**	**432,368**	**431,090**	**439,530**	**480,046**	**493,319**	**504,533**	**584,452**	**687,574**
26-parish Total	**3,038,139**	**2,659,526**	**2,797,224**	**3,015,862**	**3,282,832**	**3,352,191**	**3,408,782**	**4,286,170**	**4,885,949**

Source: Calthorpe Associates, Moody's Economy.com, and Louisiana Tech University for July 2006.

Table 7
Historical and Projected Estimates of Population by Parish and MSA
26-Parish General Planning Area
Business as Usual Future Development/Compact Land Use Allocation Scenario
2005 to 2075
Louisiana Coastal Protection and Restoration

Parish	2nd Quarter 2005	4th Quarter 2005	July 2006	2010	2025	2030	2034	2050	2075
Baton Rouge MSA									
Ascension	86,259	98,039	97,478	106,669	118,266	121,304	123,646	136,476	159,300
East Baton Rouge	413,047	472,196	437,167	480,657	535,536	549,913	560,994	621,708	729,709
Iberville	32,611	35,323	33,567	35,393	37,697	38,301	38,766	41,315	45,850
Livingston	106,762	114,516	115,268	126,245	140,096	143,725	146,522	161,846	189,105
West Baton Rouge	22,077	24,312	22,554	28,232	35,397	37,275	38,721	46,648	60,750
Total	**660,756**	**744,386**	**706,034**	**777,196**	**866,992**	**890,517**	**908,649**	**1,007,993**	**1,184,713**
Houma MSA									
Lafourche	92,330	92,329	93,438	92,049	94,003	94,267	94,677	96,469	99,332
Terrebonne	106,632	108,844	108,938	107,503	109,522	109,795	110,219	112,070	115,028
Total	**198,962**	**201,173**	**202,376**	**199,551**	**203,525**	**204,062**	**204,896**	**208,538**	**214,360**
Lafayette MSA									
Lafayette	196,129	201,806	202,798	203,209	214,557	216,561	217,316	227,233	243,596
Saint Martin	50,961	52,223	51,114	51,191	53,309	53,684	53,824	55,676	58,731
Total	**247,090**	**254,029**	**253,912**	**254,399**	**267,867**	**270,245**	**271,140**	**282,908**	**302,327**
New Orleans MSA									
Jefferson	453,266	370,864	441,741	479,803	485,279	486,062	487,068	491,998	499,846
Orleans	463,283	140,534	201,474	240,485	246,098	246,900	247,931	252,985	261,028
Plaquemines	28,923	16,935	20,348	22,585	22,907	22,953	23,012	23,302	23,763
Saint Bernard	65,382	30,245	25,592	30,608	31,329	31,433	31,565	32,215	33,249
Saint Charles	50,313	46,984	50,969	54,808	55,360	55,439	55,541	56,038	56,829
Saint John the Baptist	45,380	45,380	48,742	52,322	52,837	52,911	53,005	53,469	54,207
Saint Tammany	210,352	186,304	223,432	262,145	267,715	268,511	269,534	274,550	282,532
Total	**1,316,899**	**837,246**	**1,012,298**	**1,142,757**	**1,161,526**	**1,164,209**	**1,167,656**	**1,184,557**	**1,211,455**
Lake Charles MSA									
Calcasieu	182,570	182,572	183,428	187,319	191,514	192,145	192,629	196,252	202,048
Cameron	9,960	7,752	8,086	8,211	8,346	8,366	8,381	8,498	8,684
Total	**192,530**	**190,324**	**191,514**	**195,530**	**199,859**	**200,511**	**201,011**	**204,750**	**210,732**
Non MSA									
Acadia	58,829	60,230	60,233	61,080	63,557	64,377	65,045	67,831	72,425
Assumption	23,377	24,081	23,488	23,661	24,074	24,205	24,315	24,761	25,475
Iberia	74,590	75,971	75,900	77,521	83,088	84,937	86,432	92,935	104,089
Jefferson Davis	31,583	31,583	31,501	31,557	31,316	31,256	31,223	31,003	30,662
Saint James	21,205	21,954	21,755	21,841	22,023	22,078	22,122	22,311	22,610
Saint Mary	52,437	54,097	53,213	51,801	49,038	48,701	48,536	46,475	43,428
Tangipahoa	104,956	109,527	109,956	115,567	135,215	141,764	147,037	172,645	221,873
Vermilion	54,925	54,925	54,451	55,748	60,272	61,766	62,975	68,306	77,553
Total	**421,902**	**432,368**	**430,497**	**438,775**	**468,583**	**479,085**	**487,686**	**526,268**	**598,115**
26-parish Total	**3,038,139**	**2,659,526**	**2,796,631**	**3,008,208**	**3,168,352**	**3,208,628**	**3,241,038**	**3,415,014**	**3,721,702**

Source: Calthorpe Associates, Moody's Economy.com, and Louisiana Tech University for July 2006.

Table 8
Historical and Projected Estimates of Number of Households by Parish and MSA
26-Parish General Planning Area
High Employment Future Development/Dispersed Land Use Allocation Scenario
2005 to 2075
Louisiana Coastal Protection and Restoration

Parish	2nd Quarter 2005	4th Quarter 2005	July 2006	2010	2025	2030	2034	2050	2075
Baton Rouge MSA									
Ascension	30,319	36,445	35,566	41,004	52,041	54,658	56,927	81,265	106,423
East Baton Rouge	156,290	179,942	159,504	172,805	199,796	206,197	211,746	198,742	260,270
Iberville	10,377	11,291	12,247	13,999	17,555	18,398	19,129	26,180	34,285
Livingston	37,758	40,065	42,056	48,766	62,382	65,611	68,411	100,259	131,298
West Baton Rouge	7,798	8,535	8,229	10,398	14,801	15,845	16,750	32,416	42,452
Total	**242,542**	**276,278**	**257,602**	**286,973**	**346,574**	**360,709**	**372,963**	**438,862**	**574,727**
Houma MSA									
Lafourche	33,001	33,371	32,846	32,919	35,593	36,012	36,473	38,662	42,293
Terrebonne	36,718	38,180	38,295	38,388	41,816	42,353	42,944	49,558	54,213
Total	**69,719**	**71,551**	**71,142**	**71,307**	**77,409**	**78,365**	**79,418**	**88,220**	**96,506**
Lafayette MSA									
Lafayette	74,465	78,024	76,281	77,646	84,735	85,150	85,129	93,212	100,754
Saint Martin	17,911	18,292	19,226	19,597	21,523	21,636	21,630	25,326	27,375
Total	**92,376**	**96,316**	**95,507**	**97,243**	**106,258**	**106,786**	**106,760**	**118,538**	**128,129**
New Orleans MSA									
Jefferson	175,509	139,874	167,758	184,300	197,441	198,809	199,931	217,587	239,763
Orleans	180,019	57,709	76,513	90,901	102,330	103,520	104,495	189,247	208,535
Plaquemines	9,740	5,822	7,727	8,924	9,874	9,973	10,054	15,737	17,341
Saint Bernard	24,369	11,498	9,719	12,142	14,067	14,267	14,432	31,872	35,120
Saint Charles	17,109	15,613	19,356	21,248	22,752	22,908	23,036	24,889	27,426
Saint John the Baptist	15,015	15,172	18,511	20,231	21,598	21,740	21,857	22,630	24,936
Saint Tammany	75,895	64,947	84,852	104,501	120,110	121,735	123,067	258,453	284,794
Total	**497,656**	**310,635**	**384,435**	**442,247**	**488,171**	**492,952**	**496,872**	**760,415**	**837,915**
Lake Charles MSA									
Calcasieu	68,432	68,432	68,737	71,126	75,181	75,138	75,059	83,995	87,843
Cameron	3,469	2,734	3,030	3,132	3,306	3,304	3,301	3,596	3,761
Total	**71,901**	**71,166**	**71,767**	**74,258**	**78,487**	**78,442**	**78,360**	**87,591**	**91,604**
Non MSA									
Acadia	21,163	21,665	21,558	22,501	24,444	24,730	24,960	32,602	36,323
Assumption	8,210	8,564	8,216	8,501	9,022	9,054	9,082	11,379	12,190
Iberia	25,708	26,621	26,023	27,303	30,768	31,458	32,010	32,960	38,899
Jefferson Davis	11,555	11,555	11,477	11,774	12,112	12,049	12,002	16,933	17,274
Saint James	6,998	7,370	7,005	7,362	7,737	7,733	7,728	12,325	12,964
Saint Mary	18,815	19,222	18,493	18,991	18,839	18,668	18,561	19,745	19,280
Tangipahoa	38,606	36,506	39,356	43,094	54,801	57,981	60,520	81,955	116,735
Vermilion	20,128	19,763	20,543	21,062	23,912	24,523	25,011	25,904	30,982
Total	**151,183**	**151,266**	**152,671**	**160,588**	**181,637**	**186,196**	**189,875**	**233,803**	**284,647**
26-parish Total	**1,125,377**	**977,212**	**1,033,124**	**1,132,617**	**1,278,537**	**1,303,450**	**1,324,247**	**1,727,429**	**2,013,529**

Source: Calthorpe Associates, Moody's Economy.com, and Louisiana Tech University for July 2006.

Table 9
Historical and Projected Estimates of Number of Households by Parish and MSA
26-Parish General Planning Area
Business as Usual Future Development/Compact Land Use Allocation Scenario
2005 to 2075
Louisiana Coastal Protection and Restoration

Parish	2nd Quarter 2005	4th Quarter 2005	July 2006	2010	2025	2030	2034	2050	2075
Baton Rouge MSA									
Ascension	30,319	36,445	35,601	39,289	45,349	46,641	47,767	54,473	66,982
East Baton Rouge	156,290	179,942	159,662	177,484	206,762	213,004	218,447	250,844	311,286
Iberville	10,377	11,291	12,259	13,014	14,253	14,517	14,747	16,119	18,677
Livingston	37,758	40,065	42,098	46,844	54,641	56,303	57,753	66,380	82,476
West Baton Rouge	7,798	8,535	8,237	10,720	14,798	15,668	16,426	20,939	29,359
Total	**242,542**	**276,278**	**257,857**	**287,351**	**335,804**	**346,134**	**355,141**	**408,756**	**508,781**
Houma MSA									
Lafourche	33,001	33,371	32,846	32,822	34,753	34,867	35,067	36,641	38,976
Terrebonne	36,718	38,180	38,295	38,271	40,225	40,341	40,543	42,137	44,501
Total	**69,719**	**71,551**	**71,142**	**71,093**	**74,978**	**75,208**	**75,609**	**78,779**	**83,478**
Lafayette MSA									
Lafayette	74,465	78,024	76,281	77,517	84,755	85,201	85,180	90,685	99,993
Saint Martin	17,911	18,292	19,226	19,461	20,834	20,918	20,914	21,959	23,724
Total	**92,376**	**96,316**	**95,507**	**96,978**	**105,589**	**106,119**	**106,095**	**112,644**	**123,717**
New Orleans MSA									
Jefferson	175,509	139,874	167,758	183,880	190,414	190,209	190,131	194,467	212,393
Orleans	180,019	57,709	76,513	93,141	99,880	99,668	99,588	104,060	122,548
Plaquemines	9,740	5,822	7,727	8,671	9,053	9,041	9,036	9,290	10,339
Saint Bernard	24,369	11,498	9,719	11,856	12,722	12,695	12,684	13,259	15,635
Saint Charles	17,109	15,613	19,356	20,966	21,619	21,598	21,590	22,023	23,813
Saint John the Baptist	15,015	15,172	18,511	19,989	20,588	20,569	20,562	20,960	22,604
Saint Tammany	75,895	64,947	84,852	101,321	107,996	107,787	107,707	112,137	130,449
Total	**497,656**	**310,635**	**384,435**	**439,823**	**462,272**	**461,567**	**461,299**	**476,195**	**537,780**
Lake Charles MSA									
Calcasieu	68,432	68,432	68,737	71,131	75,195	75,151	75,072	77,820	83,503
Cameron	3,469	2,734	3,030	3,127	3,293	3,291	3,288	3,399	3,630
Total	**71,901**	**71,166**	**71,767**	**74,258**	**78,487**	**78,442**	**78,360**	**81,219**	**87,134**
Non MSA									
Acadia	21,163	21,665	21,762	22,391	24,115	24,331	24,503	26,020	28,801
Assumption	8,210	8,564	8,323	8,510	8,968	8,980	8,991	9,327	9,950
Iberia	25,708	26,621	26,451	27,427	30,463	31,014	31,454	34,461	40,051
Jefferson Davis	11,555	11,555	11,571	11,759	12,071	12,001	11,950	12,080	12,378
Saint James	6,998	7,370	7,214	7,358	7,702	7,688	7,676	7,896	8,312
Saint Mary	18,815	19,222	19,325	19,087	18,699	18,498	18,375	17,915	17,160
Tangipahoa	38,606	36,506	40,196	42,860	51,883	54,184	56,018	66,965	89,493
Vermilion	20,128	19,763	20,185	20,962	23,437	23,926	24,316	26,845	31,566
Total	**151,183**	**151,266**	**155,027**	**160,354**	**177,338**	**180,622**	**183,283**	**201,509**	**237,713**
26-parish Total	**1,125,377**	**977,212**	**1,035,735**	**1,129,857**	**1,234,467**	**1,248,092**	**1,259,786**	**1,359,101**	**1,578,602**

Source: Calthorpe Associates, Moody's Economy.com, and Louisiana Tech University for July 2006.

Table 10
Historical and Projected Estimates of Employment by Parish and MSA
26-Parish General Planning Area
High Employment Future Development/Dispersed Land Use Allocation Scenario
2005 to 2075
Louisiana Coastal Protection and Restoration

Parish	2nd Quarter 2005	4th Quarter 2005	July 2006	2010	2025	2030	2034	2050	2075
Baton Rouge MSA									
Ascension	26,232	28,535	44,916	50,483	69,402	74,266	76,870	123,173	176,354
East Baton Rouge	216,505	238,352	201,436	216,283	266,729	279,698	286,640	328,432	470,236
Iberville	10,216	11,360	15,467	17,390	23,925	25,606	26,505	42,548	60,918
Livingston	16,414	17,295	53,113	61,100	88,239	95,216	98,951	176,690	252,978
West Baton Rouge	8,288	9,191	10,392	12,618	20,183	22,127	23,168	49,247	70,510
Total	**277,655**	**304,733**	**325,324**	**357,874**	**468,479**	**496,913**	**512,133**	**720,090**	**1,030,996**
Houma MSA									
Lafourche	29,259	31,355	39,269	38,538	43,146	43,492	42,870	35,055	40,339
Terrebonne	39,024	42,000	45,783	44,492	52,628	53,239	52,141	61,890	71,219
Total	**68,283**	**73,355**	**85,053**	**83,030**	**95,775**	**96,730**	**95,011**	**96,945**	**111,558**
Lafayette MSA									
Lafayette	95,010	103,364	112,794	113,381	136,306	138,723	137,290	155,052	187,089
St. Martin	8,811	9,565	28,429	28,531	32,492	32,910	32,663	26,797	32,334
Total	**103,821**	**112,929**	**141,223**	**141,912**	**168,798**	**171,633**	**169,952**	**181,849**	**219,423**
New Orleans MSA									
Jefferson	192,735	161,903	221,748	225,391	253,755	258,712	259,473	286,211	335,080
Orleans	230,284	102,821	101,137	104,342	129,290	133,650	134,320	251,748	294,733
Plaquemines	11,756	7,408	10,214	10,450	12,281	12,601	12,650	18,479	21,634
St. Bernard	15,454	9,908	12,847	13,152	15,524	15,938	16,002	23,936	28,023
St. Charles	18,841	17,648	25,586	25,945	28,744	29,233	29,308	28,242	33,064
St. John the Baptist	11,177	11,173	24,468	24,782	27,225	27,652	27,718	24,658	28,868
St. Tammany	59,933	55,542	112,160	115,668	142,983	147,757	148,490	275,625	322,687
Total	**540,180**	**366,403**	**508,160**	**519,730**	**609,802**	**625,544**	**627,962**	**908,899**	**1,064,090**
Lake Charles MSA									
Calcasieu	74,425	78,804	91,038	90,122	101,820	101,223	97,323	122,829	130,770
Cameron	2,340	2,476	4,013	3,994	4,234	4,222	4,142	2,515	2,678
Total	**76,765**	**81,280**	**95,052**	**94,116**	**106,054**	**105,445**	**101,465**	**125,344**	**133,448**
Non MSA									
Acadia	12,552	13,609	13,273	14,338	15,199	15,673	16,295	28,413	32,466
Assumption	3,104	3,453	4,154	4,353	4,490	4,564	4,686	4,593	4,960
Iberia	23,511	25,320	29,842	32,250	35,114	36,491	38,168	36,405	43,389
Jefferson Davis	6,616	7,298	7,377	7,932	7,967	8,095	8,328	12,763	13,427
St. James	6,604	6,864	6,983	7,291	7,466	7,559	7,725	12,639	13,423
St. Mary	19,344	20,987	24,056	24,802	23,767	23,898	24,377	20,612	20,244
Tangipahoa	26,222	28,834	35,438	39,789	48,492	52,051	55,777	64,334	91,463
Vermilion	9,193	10,170	12,850	13,724	15,147	15,785	16,538	14,242	17,296
Total	**107,146**	**116,535**	**133,971**	**144,478**	**157,643**	**164,116**	**171,894**	**194,001**	**236,668**
26-parish Total	**1,173,850**	**1,055,235**	**1,288,782**	**1,341,141**	**1,606,550**	**1,660,381**	**1,678,416**	**2,227,128**	**2,796,182**

Source: Calthorpe Associates, Moody's Economy.com, and Louisiana Tech University for July 2006.

Table 11
Historical and Projected Estimates of Employment by Parish and MSA
26-Parish General Planning Area
Business as Usual Future Development/Compact Land Use Allocation Scenario
2005 to 2075
Louisiana Coastal Protection and Restoration

Parish	2nd Quarter 2005	4th Quarter 2005	July 2006	2010	2025	2030	2034	2050	2075
Baton Rouge MSA									
Ascension	26,232	28,535	45,205	48,118	55,527	56,957	57,435	65,049	79,747
East Baton Rouge	216,505	238,352	202,735	225,488	283,370	294,537	298,277	357,752	472,577
Iberville	10,216	11,360	15,567	16,346	18,327	18,710	18,838	20,874	24,805
Livingston	16,414	17,295	53,455	56,493	64,222	65,713	66,212	74,153	89,484
West Baton Rouge	8,288	9,191	10,459	13,996	22,993	24,728	25,310	34,554	52,402
Total	**277,655**	**304,733**	**327,422**	**360,440**	**444,440**	**460,644**	**466,072**	**552,381**	**719,015**
Houma MSA									
Lafourche	29,259	31,355	39,269	38,069	41,416	41,280	40,160	41,617	44,002
Terrebonne	39,024	42,000	45,783	44,377	48,300	48,140	46,827	48,535	51,330
Total	**68,283**	**73,355**	**85,053**	**82,445**	**89,716**	**89,420**	**86,987**	**90,153**	**95,331**
Lafayette MSA									
Lafayette	95,010	103,364	112,794	112,266	132,589	134,585	132,507	147,732	174,682
Saint Martin	8,811	9,565	28,429	28,383	30,163	30,338	30,156	31,490	33,850
Total	**103,821**	**112,929**	**141,223**	**140,648**	**162,752**	**164,923**	**162,663**	**179,221**	**208,533**
New Orleans MSA									
Jefferson	192,735	161,903	221,748	224,556	239,555	240,549	237,412	246,582	261,944
Orleans	230,284	102,821	101,137	104,391	121,769	122,921	119,286	129,911	147,711
Plaquemines	11,756	7,408	10,214	10,390	11,328	11,390	11,194	11,767	12,727
Saint Bernard	15,454	9,908	12,847	13,099	14,446	14,535	14,253	15,077	16,457
Saint Charles	18,841	17,648	25,586	25,851	27,268	27,362	27,066	27,932	29,384
Saint John the Baptist	11,177	11,173	24,468	24,695	25,911	25,992	25,738	26,481	27,727
Saint Tammany	59,933	55,542	112,160	114,762	128,663	129,584	126,677	135,176	149,413
Total	**540,180**	**366,403**	**508,160**	**517,745**	**568,941**	**572,334**	**561,625**	**592,926**	**645,362**
Lake Charles MSA									
Calcasieu	74,425	78,804	91,038	90,055	101,074	100,266	96,200	100,523	106,195
Cameron	2,340	2,476	4,013	3,992	4,230	4,212	4,125	4,218	4,340
Total	**76,765**	**81,280**	**95,052**	**94,047**	**105,303**	**104,479**	**100,325**	**104,741**	**110,535**
Non MSA									
Acadia	12,552	13,609	12,082	13,773	14,497	15,087	15,861	17,426	20,789
Assumption	3,104	3,453	3,631	4,111	4,233	4,373	4,571	4,906	5,602
Iberia	23,511	25,320	26,861	30,838	33,425	35,102	37,162	42,083	53,135
Jefferson Davis	6,616	7,298	6,858	7,722	7,753	7,948	8,260	8,639	9,397
Saint James	6,604	6,864	6,080	6,864	7,008	7,221	7,531	8,011	8,995
Saint Mary	19,344	20,987	21,539	23,575	22,557	23,002	23,840	24,018	24,357
Tangipahoa	26,222	28,834	32,330	38,197	45,186	48,659	52,497	64,894	96,567
Vermilion	9,193	10,170	11,403	13,118	14,328	15,079	15,991	18,249	23,375
Total	**107,146**	**116,535**	**120,783**	**138,198**	**148,987**	**156,472**	**165,713**	**188,226**	**242,217**
26-parish Total	**1,173,850**	**1,055,235**	**1,277,691**	**1,333,523**	**1,520,138**	**1,548,271**	**1,543,384**	**1,707,648**	**2,020,994**

Source: Calthorpe Associates, Moody's Economy.com, and Louisiana Tech University for July 2006.

Table 12
Average Expenditure per Inundated Structure
Government Emergency Protective Measures
FEMA Category B Expenditures
Louisiana Coastal Protection and Restoration

Storm Event	Year of Event	FEMA Category B Protective Measures Expenditures (As Reported in Year of Event) ($)	Structures Inundated	Average Expenditure Per Inundated Structure (2007 Price Level) ($)
Hurricane Juan	1985	$ 856,000	4,445	$ 366
Hurricane Andrew	1992	1,560,000	2,500	998
May 1995 Flood	1995	1,359,026	43,400	46
Hurricanes Katrina & Rita	2005	744,358,412	204,682	3,894

Source: FEMA data and USACE Post Flood Reports

Note: The total Category B expenditures (wind and flood) were adjusted to reflect only inundation damage.

Table 13
Average Emergency Cost per Inundated Structure
Emergency Expenditures Depth-Damage Relationships
2007 Price Levels
Louisiana Coastal Protection and Restoration

Flood Depth (feet)	Government Emergency Response ($)	Residential (one and two story structures) ($)	Residential Mobile Home ($)	Non-Residential ($)
0	-	-	-	-
1	$ 366	$ 34,236	$ 25,511	$ 138,523
2	998	49,223	40,498	150,826
3	3,894	65,002	56,276	150,826
4	3,894	65,002	56,276	150,826
5	3,894	65,002	56,276	150,826
6	3,894	69,802	61,076	150,826
7	3,894	69,802	61,076	150,826
8	3,894	69,802	61,076	150,826
9	3,894	69,802	61,076	150,826
10	3,894	69,802	61,076	150,826
11	3,894	69,802	61,076	150,826
12	3,894	69,802	61,076	150,826
13	3,894	69,802	61,076	150,826
14	3,894	69,802	61,076	150,826
15	3,894	69,802	61,076	150,826

Source: GIS Economic Application Databases

Notes:
1. The average government emergency response expenditure per inundated structure includes search and rescue operations, emergency repairs to public properties and security by flood depth.
2. The average emergency expenditures per inundated residential structure includes the costs associated with evacuation and subsistence, clean-up and reoccupation, landscaping and debris removal by flood depth.
3. The average emergency expenditures per inundated non-residential structure includes the costs associated with clean-up and restoration by flood depth.

Table 14
Highways, Streets, and Railroad Depth-Damage Relationships
2007 Price Levels
Louisiana Coastal Protection and Restoration

Flood Depth (feet)	Damage per mile Highways ($)	Damage per mile Roads ($)	Damage per mile Single RR Track ($)
0	-	-	-
1	$ 689,808	$ 172,452	$ 452,962
2	698,020	174,505	462,333
3	714,444	178,611	471,705
4	739,080	184,770	481,076
5	755,504	188,876	490,448
6	771,928	192,982	499,820
7	788,352	197,088	510,753
8	804,776	201,194	520,125
9	821,200	205,300	531,058
10	821,200	205,300	541,992
11	821,200	205,300	541,992
12	821,200	205,300	541,992
13	821,200	205,300	541,992
14	821,200	205,300	541,992
15	821,200	205,300	541,992

Source: GIS Economic Application Databases

Notes: Based on repair costs per mile received from Engineering Division and damage percentage for each one-foot increment of flooding developed as part of the Economic Data Survey for the Mississippi River and Tributaries Protected Area.

Table 15
Agricultural Acres by Planning Unit
2005
Louisiana Coastal Protection and Restoration

Planning Unit	Acres
1	621,940
2	621,684
3a	573,928
3b	850,283
4	1,237,895
Total	3,905,730

Source: GIS Economic Application Databases

Table 16
Hurricanes Affecting the Louisiana Coast by Month
1851 - 2005
Louisiana Coastal Protection and Restoration

Month	Number of Occurrences	Percentage chance of occuring in that month (%)
June	3	6
July	3	6
August	14	27
September	22	43
October	9	18
November	0	0

Source: National Oceanic and Atmospheric Administration

Table 17
Agricultural Damage Rates
2007 Price Levels
Louisiana Coastal Protection and Restoration

Crop	Damage Rate Per Acre ($)
Corn	$ 215.81
Cotton	74.29
Sorghum	237.28
Soybeans	248.38
Winter Wheat	81.27
Small Grains & Hay	111.09
Sugar Cane	278.34
Fallow Cropland	80.21
Pecans	307.44
Fallow Idle Cropland	80.21
Pasture	218.05
Citrus	7,585.23
Rice (except for rice-crawfish parishes below)	317.84
Crawfish in St. Martin and Acadia Parishes	779.35
Rice-Crawfish double crop in Calcasieu Parish	415.74
Rice-Crawfish double crop in Jefferson Davis Parish	433.50
Rice-Crawfish double crop in Lafayette Parish	835.88
Rice-Crawfish double crop in Vermillion Parish	437.39

Source: USACE and LSU Agricultural Center

Table 18
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, No Sea Level Rise Scenario
2010
Planning Unit 1
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	909,900	4,271,509	30,365,288	43,457,602	63,360,070	121,461	185,545	423,299	507,580	669,405
Comprehensive Plans	C-HL-a-100-2	NONE	618,610	1,055,382	30,336,365	41,654,089	62,321,814	112,657	131,951	422,820	501,613	664,784
	C-HL-a-100-3	NONE	615,875	1,061,991	30,064,308	41,486,899	62,241,315	113,491	133,816	421,609	500,290	663,917
	C-HL-b-400-2	NONE	610,640	852,072	1,098,445	3,721,212	13,429,739	111,297	116,808	144,543	253,657	380,822
	C-HL-b-400-3	NONE	608,989	870,819	1,127,444	3,796,369	13,511,740	112,131	119,558	149,618	260,160	386,629
	C-LP-a-100-1	NONE	605,007	1,003,552	7,566,851	27,070,074	56,271,487	111,894	137,819	261,826	408,105	640,254
	C-LP-a-100-2	NONE	614,327	924,366	8,400,173	27,601,131	57,270,897	112,064	116,936	266,311	408,875	639,474
	C-LP-a-100-3	NONE	609,588	930,109	8,341,970	27,604,247	57,288,707	112,497	118,440	267,956	411,147	641,738
	C-LP-b-400-1	NONE	596,930	903,087	1,183,650	6,090,525	17,381,356	109,822	134,008	179,090	280,688	386,312
	C-LP-b-400-3	NONE	604,673	845,013	993,291	4,905,498	16,473,082	111,539	115,050	133,522	249,630	374,242
	C-LP-b-1000-1	NONE	593,936	880,971	1,037,389	1,353,502	4,302,196	108,204	131,575	166,193	206,452	275,690
	C-LP-b-1000-2	NONE	607,037	822,850	860,125	1,077,991	2,247,846	109,857	111,462	117,618	142,591	213,699
Structural Plans	HL-a-100-2	NONE	799,160	1,748,331	31,391,617	42,796,990	63,478,360	116,344	137,578	428,560	507,353	671,082
	HL-a-100-3	NONE	821,711	1,898,148	31,258,054	42,741,759	63,493,997	117,416	139,726	427,631	506,312	670,497
	HL-b-400-2	NONE	798,052	1,564,486	2,698,021	5,574,812	15,143,109	116,344	124,175	152,023	261,137	388,860
	HL-b-400-3	NONE	821,687	1,727,242	2,997,192	6,003,942	15,542,637	117,416	127,208	157,380	267,922	394,949
	LP-a-100-1	NONE	827,711	2,462,676	9,544,326	29,124,694	58,249,599	114,549	145,536	270,281	417,239	649,389
	LP-a-100-2	NONE	787,963	1,701,240	9,361,733	28,766,810	58,474,985	114,312	122,810	272,347	415,590	646,190
	LP-a-100-3	NONE	788,382	1,796,483	9,433,565	28,896,780	58,615,883	114,904	124,597	274,275	418,145	648,736
	LP-b-400-1	NONE	826,603	2,415,459	5,523,724	10,193,632	20,592,339	114,549	144,177	189,997	292,274	397,899
	LP-b-400-3	NONE	787,274	1,733,397	2,382,164	6,561,204	18,082,338	114,904	122,545	141,179	257,966	382,578
	LP-b-1000-1	NONE	826,603	2,414,383	5,443,014	8,581,117	10,984,901	114,549	144,152	179,798	220,735	289,974
	LP-b-1000-2	NONE	786,855	1,627,694	2,095,876	2,804,581	4,075,169	114,312	119,999	126,317	151,969	223,078
Non-Structural Plans	NS-100	NONE	350,612	959,927	27,797,591	41,296,327	61,469,690	116,354	177,199	414,450	498,732	660,000
	NS-400	NONE	135,068	497,031	2,295,142	31,495,890	55,542,012	109,505	169,668	406,920	491,202	652,469
	NS-1000	NONE	63,337	365,161	1,369,386	2,223,385	45,845,753	80,158	139,428	362,889	447,169	608,437

Source: GIS Economic Application Databases
Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 19
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, No Sea Level Rise Scenario
2010
Planning Unit 2
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	833,906	3,114,492	31,106,264	34,223,677	35,193,190	62,047	82,310	345,635	352,944	354,414
Comprehensive Plans	C-G-100-1	NONE	192,115	482,380	3,134,938	6,849,284	8,454,969	54,475	69,384	99,678	105,599	112,153
	C-G-100-4	NONE	161,554	361,856	3,364,549	6,764,212	8,099,390	38,904	50,892	99,827	105,185	111,605
	C-G-400-4	NONE	153,600	300,468	481,643	1,731,122	2,908,424	38,313	45,776	50,143	59,829	77,850
	C-G-1000-4	NONE	147,015	242,401	270,437	661,128	1,283,035	37,095	41,706	44,343	46,483	53,991
	C-S-100-2	NONE	188,237	731,798	26,320,052	29,686,277	30,695,523	50,240	61,815	307,917	315,779	317,218
	C-S-100-3	NONE	167,855	672,109	26,233,402	29,670,919	30,630,566	42,862	54,441	307,917	315,779	317,218
	C-S-100-4	NONE	164,754	652,238	26,218,478	29,538,121	30,390,746	41,486	49,458	307,633	315,495	316,934
	C-S-400-2	NONE	178,420	352,422	828,891	5,074,346	19,909,541	49,334	57,853	69,827	138,723	283,688
	C-S-400-3	NONE	162,607	317,525	783,812	4,925,605	19,667,752	42,234	50,753	62,729	132,311	280,479
	C-S-400-4	NONE	159,505	302,300	758,853	4,774,849	19,425,357	40,858	45,571	57,236	127,444	278,005
	C-S-1000-4	NONE	153,339	269,097	296,974	448,299	2,157,465	39,492	44,150	49,090	56,144	85,735
	C-WBI-100-1	NONE	192,839	781,689	26,044,634	29,731,103	30,894,742	59,090	72,783	308,166	316,264	317,733
	C-WBI-400-1	NONE	182,448	381,403	885,703	5,500,908	20,424,790	58,184	69,237	82,605	146,837	285,715
Structural Plans	G-100-1	NONE	643,113	2,446,375	4,844,227	8,541,937	10,024,504	57,432	76,567	106,861	112,782	119,336
	G-100-4	NONE	545,127	2,088,626	4,756,969	8,140,158	9,373,087	41,861	58,075	107,010	112,368	118,788
	G-400-4	NONE	545,127	2,069,327	2,653,969	3,823,025	4,915,533	41,861	55,827	60,194	69,880	87,901
	G-1000-4	NONE	545,127	2,069,310	2,638,608	3,608,756	4,470,708	41,861	55,480	58,117	60,257	67,765
	S-100-2	NONE	711,768	2,595,980	28,072,845	31,286,407	32,140,283	53,197	68,998	315,100	322,962	324,401
	S-100-3	NONE	631,693	2,394,289	27,815,626	31,120,885	31,933,313	45,819	61,624	315,100	322,962	324,401
	S-100-4	NONE	621,819	2,270,898	27,698,092	30,894,667	31,623,722	44,443	56,641	314,816	322,678	324,117
	S-400-2	NONE	711,768	2,587,989	4,557,341	8,879,521	23,003,100	53,197	68,271	80,245	149,141	294,106
	S-400-3	NONE	631,693	2,385,969	4,053,119	8,255,017	22,342,397	45,819	60,893	72,869	142,451	290,619
	S-400-4	NONE	621,819	2,261,102	3,706,605	7,798,270	21,827,487	44,443	55,711	67,376	137,584	288,145
	S-1000-4	NONE	621,819	2,261,088	3,635,830	4,651,963	5,852,986	44,443	55,711	60,651	67,705	97,296
	WBI-100-1	NONE	833,906	3,101,090	28,199,246	31,588,468	32,530,934	62,047	79,966	315,349	323,447	324,916
	WBI-400-1	NONE	833,906	3,095,958	5,619,672	10,180,348	24,099,104	62,047	79,655	93,023	157,255	296,133
Non-Structural Plans	NS-100	NONE	172,264	770,079	28,951,349	32,366,117	33,556,926	59,090	75,127	338,452	345,761	347,231
	NS-400	NONE	94,565	276,356	2,105,909	7,181,160	15,865,144	45,467	56,779	303,839	311,147	312,618
	NS-1000	NONE	85,258	234,140	1,078,226	1,458,962	5,006,690	42,997	54,097	283,986	291,294	292,765

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 20
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, No Sea Level Rise Scenario
2010
Planning Unit 3a
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	678,443	5,588,896	13,381,441	18,168,040	20,217,479	30,027	110,166	142,477	151,022	152,627
Comprehensive Plans	C-M-100-1	NONE	104,486	281,037	1,551,085	12,676,100	16,258,438	9,816	11,245	50,119	149,305	152,966
	C-R-100-1	NONE	70,166	669,689	4,132,244	16,309,382	16,649,135	7,120	19,652	77,885	152,875	152,966
	C-R-400-2	NONE	56,846	499,787	1,265,052	7,163,722	8,006,823	5,886	17,833	36,116	137,061	139,989
	C-R-1000-2	NONE	52,421	451,721	1,049,864	1,383,750	2,178,289	5,400	17,150	34,872	37,055	53,033
Structural Plans	M-100-1	NONE	276,821	739,781	1,835,669	12,804,790	16,343,122	9,890	11,319	50,193	149,379	153,040
	M-400-1	NONE	276,821	734,366	975,276	1,068,476	1,163,782	9,890	11,131	11,319	12,157	14,937
	M-1000-1	NONE	276,821	734,366	971,126	1,038,555	1,062,933	9,890	11,131	11,131	11,319	11,567
	R-100-1	NONE	243,128	1,197,334	4,447,620	16,455,539	16,742,385	7,194	19,726	77,959	152,949	153,040
	R-400-1	NONE	243,128	1,188,959	2,149,687	2,638,946	3,308,863	7,194	18,944	22,095	27,304	34,153
	R-400-2	NONE	246,342	1,194,715	2,522,654	9,063,999	9,684,162	7,269	19,216	38,273	139,218	142,146
	R-1000-1	NONE	243,128	1,188,904	2,143,089	2,546,861	2,857,703	7,194	18,944	21,435	23,569	25,736
	R-1000-2	NONE	246,342	1,194,660	2,515,906	4,186,930	4,728,950	7,269	19,216	37,714	39,897	55,875
Non-Structural Plans	NS-100	NONE	97,809	710,624	10,054,952	16,603,838	19,341,122	29,179	109,318	141,629	150,174	151,779
	NS-400	NONE	60,070	473,112	1,675,105	8,473,190	13,951,482	18,631	97,906	130,217	138,762	140,367
	NS-1000	NONE	46,056	407,481	1,347,369	2,552,518	6,094,879	12,148	88,127	120,436	128,981	130,586

Source: GIS Economic Application Databases
Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 21
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, No Sea Level Rise Scenario
2010
Planning Unit 3b
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	523,000	2,569,273	5,781,130	8,062,926	9,443,491	15,543	42,347	64,641	77,884	81,782
Comprehensive Plans	C-F-100-1	NONE	53,688	157,856	3,990,231	8,461,465	9,088,816	1,853	3,894	55,448	82,024	82,299
	C-F-400-1	NONE	41,526	113,178	297,473	715,525	1,390,063	1,849	3,799	6,856	10,079	21,933
	C-F-1000-1	NONE	38,004	103,959	230,952	507,171	937,460	1,827	3,777	6,762	7,790	8,300
	C-G-100-1	NONE	42,798	93,039	329,852	2,718,966	5,796,235	333	830	7,319	42,129	69,396
	C-R-100-1	NONE	72,614	291,931	4,243,219	7,144,594	8,183,576	4,651	17,009	57,894	73,729	76,522
	C-R-400-1	NONE	60,451	212,713	445,039	3,518,267	5,960,783	4,647	14,751	28,715	46,966	57,289
Structural Plans	F-100-1	NONE	136,425	479,642	4,233,493	8,661,525	9,273,249	2,110	4,508	56,062	82,638	82,913
	F-400-1	NONE	136,425	477,324	754,731	1,110,670	1,665,440	2,110	4,417	7,474	10,697	22,551
	F-1000-1	NONE	136,425	477,324	752,841	1,083,756	1,342,953	2,110	4,417	7,402	8,430	8,940
	G-100-1	NONE	98,277	276,180	483,414	2,855,878	5,925,248	562	1,082	7,571	42,381	69,648
	G-400-1	NONE	98,277	275,755	352,150	439,615	505,877	562	1,082	2,038	2,369	3,120
	G-1000-1	NONE	98,277	275,755	351,880	436,425	480,277	562	1,082	2,038	2,197	2,668
	R-100-1	NONE	168,309	949,870	4,648,093	7,430,056	8,436,064	4,908	17,996	58,881	74,716	77,509
	R-400-1	NONE	168,309	918,563	2,383,952	4,685,388	6,506,607	4,908	15,742	29,706	47,957	58,280
	R-1000-1	NONE	168,309	918,562	2,350,129	3,257,000	4,418,337	4,908	15,742	27,514	33,156	46,797
Non-Structural Plans	NS-100	NONE	75,893	414,517	4,647,573	7,513,639	9,078,207	15,286	41,360	63,654	76,897	80,795
	NS-400	NONE	63,605	318,505	798,245	5,090,770	8,155,109	15,282	41,356	63,650	76,893	80,791
	NS-1000	NONE	54,485	293,219	560,298	890,274	4,341,890	14,622	40,650	62,942	76,186	80,084

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 22
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, No Sea Level Rise Scenario
2010
Planning Unit 4
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	300,064	2,355,067	4,721,996	7,470,019	9,418,434	7,480	28,802	46,683	67,098	78,611
Comprehensive Plans	C-G-100-1	NONE	144,213	336,310	2,421,494	5,343,473	6,279,327	5,096	10,524	47,630	72,360	74,394
	C-G-100-2	NONE	169,015	470,779	2,644,429	5,465,741	6,308,001	5,678	11,667	49,152	72,701	74,455
	C-G-400-3	NONE	144,908	396,143	941,070	6,016,759	8,276,695	6,229	12,492	26,587	86,229	90,942
	C-G-1000-3	NONE	110,469	262,674	749,846	1,965,186	4,186,604	5,657	11,497	24,394	44,614	67,459
	C-R-100-1	NONE	156,817	508,949	3,145,974	5,305,016	6,451,160	7,595	22,375	55,565	69,558	73,585
	C-R-400-1	NONE	149,464	429,773	709,030	5,659,873	8,557,855	7,121	21,522	31,870	86,781	93,856
	C-R-1000-1	NONE	129,519	396,644	593,800	1,058,346	3,794,308	6,353	20,688	29,838	45,327	70,534
Structural Plans	G-100-1	NONE	279,546	1,776,551	3,660,405	6,430,009	7,294,928	7,911	14,038	51,144	75,874	77,908
	G-100-2	NONE	312,436	1,953,242	3,929,319	6,598,342	7,367,123	8,495	15,183	52,668	76,217	77,971
	G-400-1	NONE	279,546	1,773,040	2,469,825	5,722,034	7,665,911	7,911	13,807	17,431	61,623	67,613
	G-400-2	NONE	312,436	1,949,738	2,723,543	6,002,882	7,955,338	8,495	14,952	18,630	62,883	68,927
	G-400-3	NONE	317,630	1,977,072	3,158,608	8,048,156	9,960,157	9,968	16,975	31,070	90,712	95,425
	G-1000-1	NONE	279,546	1,773,040	2,462,550	3,798,049	4,923,748	7,911	13,807	17,104	28,812	43,692
	G-1000-2	NONE	312,436	1,949,738	2,716,267	4,078,768	5,212,600	8,495	14,952	18,303	30,072	44,952
	G-1000-3	NONE	317,630	1,977,072	3,144,258	5,453,994	7,254,135	9,968	16,975	29,872	50,092	72,937
	R-100-1	NONE	327,289	2,226,035	4,614,667	6,537,288	7,595,808	10,450	25,955	59,155	73,148	77,175
	R-400-1	NONE	327,573	2,221,353	3,829,141	8,337,202	10,545,373	10,531	25,703	36,061	90,972	98,047
	R-1000-1	NONE	327,573	2,221,353	3,814,791	5,743,040	7,839,351	10,531	25,703	34,863	50,352	75,559
Non-Structural Plans	NS-100	NONE	129,590	525,687	3,210,002	6,227,885	8,269,555	4,625	25,222	43,093	63,508	75,021
	NS-400	NONE	121,953	417,469	823,052	4,238,632	7,226,103	4,070	24,621	42,492	62,907	74,420
	NS-1000	NONE	102,009	384,340	636,804	1,218,628	4,121,054	3,302	23,787	41,658	62,073	73,586

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 23
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, No Sea Level Rise Scenario
2010
Planning Unit 1
Louisiana Coastal Protection and Restoration

	Sea Level	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	878,019	4,540,557	31,728,840	45,148,336	66,252,178	119,827	199,650	445,625	530,762	709,318
Comprehensive Plans	C-HL-a-100-2	NONE	569,696	994,770	32,067,911	43,195,247	65,369,671	108,863	126,321	448,534	525,647	705,794
	C-HL-a-100-3	NONE	566,017	999,983	31,712,567	42,986,070	65,272,029	109,497	128,629	446,318	523,713	704,827
	C-HL-b-400-2	NONE	563,301	796,293	1,026,774	3,542,834	13,819,556	108,126	111,577	137,311	250,736	389,608
	C-HL-b-400-3	NONE	560,690	814,566	1,059,473	3,662,300	13,954,322	108,760	114,575	144,757	260,165	396,573
	C-LP-a-100-1	NONE	557,405	964,859	7,640,987	28,157,089	58,487,457	107,975	143,322	278,723	428,289	681,214
	C-LP-a-100-2	NONE	566,287	872,499	8,439,909	28,420,599	59,565,199	108,425	113,123	284,856	431,166	679,566
	C-LP-a-100-3	NONE	560,829	876,825	8,365,425	28,398,782	59,552,759	108,613	114,817	286,376	433,441	682,243
	C-LP-b-400-1	NONE	548,969	862,152	1,181,615	6,838,320	18,732,065	105,779	139,353	196,191	300,895	410,717
	C-LP-b-400-3	NONE	557,137	792,540	940,546	4,981,120	17,271,670	108,120	111,738	129,421	253,618	389,972
	C-LP-b-1000-1	NONE	546,443	840,118	1,026,012	1,366,936	4,805,383	105,239	137,945	183,820	228,464	302,381
	C-LP-b-1000-2	NONE	560,773	771,621	806,649	1,018,942	2,178,373	107,780	109,259	113,786	138,171	212,888
Structural Plans	HL-a-100-2	NONE	749,776	1,713,300	32,885,686	44,032,341	66,208,721	112,037	131,444	453,782	530,894	711,154
	HL-a-100-3	NONE	774,229	1,877,831	32,684,310	43,947,591	66,217,915	112,937	134,067	451,881	529,275	710,502
	HL-b-400-2	NONE	748,683	1,533,243	2,106,832	4,721,015	14,946,717	112,037	117,888	143,747	257,171	396,156
	HL-b-400-3	NONE	774,204	1,711,727	2,442,880	5,230,594	15,417,658	112,937	121,201	151,508	266,915	403,436
	LP-a-100-1	NONE	788,770	2,306,718	9,532,614	30,000,823	60,214,959	110,692	150,464	286,754	436,566	689,490
	LP-a-100-2	NONE	740,303	1,505,931	9,176,914	29,238,322	60,392,895	110,615	118,264	290,224	436,780	685,180
	LP-a-100-3	NONE	740,589	1,609,814	9,246,282	29,356,405	60,516,579	110,980	120,272	292,059	439,370	688,172
	LP-b-400-1	NONE	787,677	2,260,911	5,636,201	11,090,948	21,943,822	110,692	149,142	206,869	311,819	421,640
	LP-b-400-3	NONE	739,497	1,547,355	1,969,913	6,168,161	18,454,962	110,980	118,137	136,048	260,491	396,845
	LP-b-1000-1	NONE	787,677	2,259,791	5,556,181	9,530,082	12,301,562	110,692	149,116	196,036	240,925	314,842
	LP-b-1000-2	NONE	739,211	1,432,022	1,674,320	2,108,083	3,318,648	110,615	115,579	120,333	144,964	219,681
Non-Structural Plans	NS-100	NONE	329,445	979,317	29,136,268	43,062,802	64,461,831	114,922	191,224	436,520	521,657	700,100
	NS-400	NONE	124,253	520,916	2,321,617	31,644,626	57,707,067	108,257	183,768	429,063	514,200	692,643
	NS-1000	NONE	60,675	397,453	1,431,659	2,341,872	47,134,267	80,316	155,033	388,798	473,935	652,378

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 24
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, No Sea Level Rise Scenario
2010
Planning Unit 2
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	825,558	3,234,816	30,815,997	33,053,798	33,907,323	42,312	68,077	324,633	331,348	331,884
Comprehensive Plans	C-G-100-1	NONE	178,904	464,653	2,989,701	5,739,298	6,814,214	35,700	49,984	75,228	80,228	85,421
	C-G-100-4	NONE	153,094	346,046	3,343,126	5,838,514	6,647,972	21,519	32,218	76,695	79,975	85,053
	C-G-400-4	NONE	145,233	289,842	360,268	1,112,915	1,769,251	20,865	27,591	31,131	39,127	54,843
	C-G-1000-4	NONE	138,917	232,064	256,976	311,488	553,797	19,802	23,076	25,314	27,019	32,606
	C-S-100-2	NONE	172,355	413,237	26,393,198	28,900,568	29,765,161	29,890	45,348	292,119	299,392	299,893
	C-S-100-3	NONE	157,182	373,379	26,454,258	28,999,462	29,833,602	24,642	40,104	292,119	299,392	299,893
	C-S-100-4	NONE	154,675	352,861	26,116,367	28,458,455	29,170,344	23,770	31,998	291,759	299,032	299,645
	C-S-400-2	NONE	162,706	338,953	472,920	4,571,726	20,003,299	29,157	41,731	50,433	127,550	272,278
	C-S-400-3	NONE	151,884	308,645	437,345	4,469,066	19,823,712	23,913	36,487	45,191	122,473	268,280
	C-S-400-4	NONE	149,377	291,812	407,335	4,237,033	19,269,449	23,041	28,327	36,891	114,457	264,186
	C-S-1000-4	NONE	143,424	258,739	281,917	384,838	1,675,587	22,795	28,016	31,460	36,921	66,710
	C-WBI-100-1	NONE	177,397	467,369	26,087,990	28,958,220	30,017,721	39,476	56,940	292,401	300,003	300,538
	C-WBI-400-1	NONE	167,108	369,780	535,351	5,025,601	20,547,919	38,743	53,794	64,620	136,727	275,698
Structural Plans	G-100-1	NONE	622,134	2,555,145	4,862,845	7,473,154	8,415,450	38,537	57,733	82,977	87,977	93,170
	G-100-4	NONE	523,364	2,177,751	4,879,248	7,237,834	7,938,890	24,356	39,967	84,444	87,724	92,802
	G-400-4	NONE	523,364	2,158,847	2,728,049	3,194,629	3,737,203	24,356	38,198	41,738	49,734	65,450
	G-1000-4	NONE	523,364	2,158,830	2,712,950	2,979,780	3,259,310	24,356	37,856	40,094	41,799	47,386
	S-100-2	NONE	689,421	2,660,015	28,177,518	30,517,350	31,226,768	32,726	53,097	299,868	307,141	307,642
	S-100-3	NONE	607,321	2,443,827	28,047,973	30,448,536	31,136,668	27,478	47,853	299,868	307,141	307,642
	S-100-4	NONE	599,606	2,344,626	27,631,190	29,835,176	30,419,426	26,606	39,747	299,508	306,781	307,394
	S-400-2	NONE	689,421	2,651,883	4,091,506	7,863,983	22,692,482	32,726	52,377	61,079	138,196	282,924
	S-400-3	NONE	607,321	2,435,387	3,677,512	7,374,525	22,187,418	27,478	47,129	55,833	133,115	278,922
	S-400-4	NONE	599,606	2,334,805	3,071,404	6,561,917	21,283,427	26,606	38,969	47,533	125,099	274,828
	S-1000-4	NONE	599,606	2,334,793	3,004,380	3,290,566	4,419,917	26,606	38,969	42,413	47,874	77,663
	WBI-100-1	NONE	825,558	3,222,285	28,320,809	30,861,965	31,692,831	42,312	64,689	300,150	307,752	308,287
	WBI-400-1	NONE	825,558	3,217,235	5,251,789	9,283,842	23,915,358	42,312	64,440	75,266	147,373	286,344
Non-Structural Plans	NS-100	NONE	157,914	456,065	28,582,877	31,149,852	32,232,137	39,476	60,328	316,884	323,599	324,135
	NS-400	NONE	84,674	270,496	1,708,897	6,254,896	14,629,005	27,781	43,052	283,743	290,459	290,996
	NS-1000	NONE	76,732	229,558	1,068,746	1,330,711	4,149,359	26,951	42,058	267,569	274,285	274,821

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 25
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, No Sea Level Rise Scenario
2010
Planning Unit 3a
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's) 10yr	100yr	400yr	1000yr	2000yr	Population Impacted at each Frequency Storm Event 10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	664,421	5,502,549	12,670,135	16,674,927	18,470,531	26,740	107,008	142,304	147,953	149,324
Comprehensive Plans	C-M-100-1	NONE	100,366	268,853	1,513,010	11,929,999	15,184,147	8,763	9,765	44,822	147,741	148,919
	C-R-100-1	NONE	66,392	686,208	4,078,525	15,139,896	15,426,115	6,095	19,046	68,100	148,812	148,919
	C-R-400-2	NONE	52,003	517,870	1,313,036	6,428,539	7,199,732	4,820	17,189	33,461	132,365	135,322
	C-R-1000-2	NONE	47,426	461,444	1,066,193	1,275,623	2,006,882	4,330	16,514	32,230	33,108	44,336
Structural Plans	M-100-1	NONE	266,265	710,588	1,782,807	12,046,363	15,259,940	8,835	9,837	44,894	147,813	148,991
	M-400-1	NONE	266,265	705,437	942,752	1,028,404	1,124,827	8,835	9,679	9,837	10,653	13,221
	M-1000-1	NONE	266,265	705,437	938,834	1,000,258	1,029,169	8,835	9,679	9,679	9,837	10,092
	R-100-1	NONE	232,997	1,200,529	4,382,938	15,276,937	15,512,730	6,167	19,118	68,172	148,884	148,991
	R-400-1	NONE	232,997	1,192,472	2,187,968	2,550,331	3,160,690	6,167	18,351	20,344	24,205	29,622
	R-400-2	NONE	235,308	1,197,063	2,568,670	8,329,612	8,894,904	6,219	18,588	35,860	134,764	137,721
	R-1000-1	NONE	232,997	1,192,417	2,181,639	2,460,828	2,719,841	6,167	18,351	19,701	20,521	22,712
	R-1000-2	NONE	235,308	1,197,008	2,562,278	4,114,889	4,578,904	6,219	18,588	35,306	36,183	47,411
Non-Structural Plans	NS-100	NONE	94,592	687,938	9,429,654	15,179,692	17,624,832	25,668	105,936	141,232	146,881	148,252
	NS-400	NONE	56,623	452,777	1,535,325	7,414,043	12,647,560	15,234	94,925	130,221	135,870	137,241
	NS-1000	NONE	43,228	390,487	1,242,101	2,164,300	5,272,021	10,237	86,718	122,013	127,662	129,033

Source: GIS Economic Application Databases
Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 26
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, No Sea Level Rise Scenario
2010
Planning Unit 3b
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	519,814	2,582,978	5,309,378	7,392,940	8,901,691	14,483	41,249	61,026	77,071	83,211
Comprehensive Plans	C-F-100-1	NONE	53,588	158,503	3,642,070	7,884,189	8,584,457	1,604	3,477	52,298	83,406	83,641
	C-F-400-1	NONE	41,425	114,057	231,676	526,449	1,212,716	1,601	3,378	5,679	11,147	22,694
	C-F-1000-1	NONE	37,898	104,711	196,965	388,074	769,693	1,578	3,355	5,582	9,446	9,902
	C-G-100-1	NONE	42,734	95,331	328,820	2,834,930	5,782,248	336	802	7,427	41,334	67,424
	C-R-100-1	NONE	72,363	290,689	3,881,153	6,539,132	7,577,990	3,538	15,597	54,910	72,552	76,171
	C-R-400-1	NONE	60,200	210,061	409,972	2,940,321	5,218,181	3,535	13,326	24,878	46,233	58,838
Structural Plans	F-100-1	NONE	136,539	478,156	3,877,214	8,077,223	8,762,422	1,864	4,068	52,889	83,997	84,232
	F-400-1	NONE	136,539	475,804	652,626	895,140	1,475,776	1,864	3,972	6,273	11,741	23,288
	F-1000-1	NONE	136,539	475,804	650,705	867,104	1,141,271	1,864	3,972	6,199	10,063	10,519
	G-100-1	NONE	97,958	276,965	480,980	2,970,827	5,910,376	566	1,055	7,680	41,587	67,677
	G-400-1	NONE	97,958	276,544	351,221	451,492	527,000	566	1,055	2,141	2,483	3,107
	G-1000-1	NONE	97,958	276,544	350,955	448,324	501,751	566	1,055	2,141	2,317	2,651
	R-100-1	NONE	168,040	960,231	4,283,071	6,819,581	7,826,704	3,798	16,602	55,914	73,557	77,176
	R-400-1	NONE	168,040	928,319	1,929,065	3,864,409	5,694,273	3,798	14,334	25,885	47,241	59,846
	R-1000-1	NONE	168,040	928,319	1,894,466	2,506,821	3,581,993	3,798	14,334	23,709	30,994	45,651
Non-Structural Plans	NS-100	NONE	75,408	412,885	4,185,652	6,856,380	8,543,956	14,223	40,244	60,022	76,066	82,206
	NS-400	NONE	63,120	314,752	752,804	4,641,486	7,674,369	14,220	40,241	60,019	76,063	82,203
	NS-1000	NONE	54,162	289,808	546,943	882,915	4,320,952	13,664	39,635	59,411	75,456	81,596

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 27
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, No Sea Level Rise Scenario
2010
Planning Unit 4
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level	Damages at each Frequency Storm Event ($1000's) 10yr	100yr	400yr	1000yr	2000yr	Population Impacted at each Frequency Storm Event 10yr	100yr	400yr	1000yr	2000yr
Base Condition	Base	NONE	298,076	2,356,108	5,833,693	8,562,112	10,644,632	7,327	26,501	40,391	56,703	68,530
Comprehensive Plans	C-G-100-1	NONE	165,275	359,494	3,005,113	5,689,674	6,658,172	4,570	9,980	43,791	63,461	64,846
	C-G-100-2	NONE	186,801	478,664	3,178,458	5,766,489	6,671,271	4,943	10,903	45,075	63,754	64,908
	C-G-400-3	NONE	165,351	411,926	978,115	5,644,785	8,258,750	5,443	11,653	24,776	74,845	78,749
	C-G-1000-3	NONE	131,274	284,748	751,788	1,766,918	3,914,604	4,861	10,638	22,333	38,889	57,820
	C-R-100-1	NONE	177,648	528,435	3,581,695	5,543,690	6,676,376	6,692	20,140	50,408	60,888	64,166
	C-R-400-1	NONE	170,447	450,300	757,338	5,493,022	8,499,415	6,273	19,345	29,225	74,952	81,055
	C-R-1000-1	NONE	150,438	416,891	599,513	938,633	3,552,329	5,493	18,497	26,949	39,163	60,293
Structural Plans	G-100-1	NONE	303,768	1,855,616	5,294,474	7,940,281	8,901,056	7,395	13,506	47,317	66,987	68,372
	G-100-2	NONE	331,544	2,006,180	5,501,944	8,051,393	8,946,732	7,770	14,431	48,603	67,282	68,436
	G-400-1	NONE	303,768	1,851,369	4,040,478	7,212,733	9,305,069	7,395	13,283	17,143	53,771	58,665
	G-400-2	NONE	331,544	2,001,937	4,232,780	7,422,407	9,520,999	7,770	14,208	18,091	54,781	59,730
	G-400-3	NONE	336,668	2,029,167	4,646,403	9,353,689	11,411,995	9,209	16,167	29,290	79,359	83,263
	G-1000-1	NONE	303,768	1,851,369	4,031,482	5,392,148	6,632,048	7,395	13,283	16,828	25,687	37,602
	G-1000-2	NONE	331,544	2,001,937	4,223,782	5,601,690	6,847,353	7,770	14,208	17,776	26,697	38,612
	G-1000-3	NONE	336,668	2,029,167	4,630,219	6,833,627	8,778,492	9,209	16,167	27,862	44,418	63,349
	R-100-1	NONE	346,296	2,253,133	5,849,942	7,825,729	8,928,971	9,557	23,734	54,012	64,491	67,769
	R-400-1	NONE	346,585	2,247,700	4,970,284	9,456,723	11,725,330	9,640	23,489	33,379	79,105	85,208
	R-1000-1	NONE	346,585	2,247,700	4,954,100	6,936,661	9,091,827	9,640	23,489	31,951	44,164	65,294
Non-Structural Plans	NS-100	NONE	129,427	521,606	3,522,521	6,269,988	8,387,522	4,462	22,907	36,787	53,100	64,927
	NS-400	NONE	121,937	415,767	838,943	4,103,573	7,222,619	3,960	22,357	36,237	52,550	64,377
	NS-1000	NONE	101,927	382,358	614,080	1,039,335	3,981,402	3,180	21,509	35,389	51,702	63,529

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 28a
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, Low Sea Level Rise Scenario
2075
Planning Unit 1
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,214,705	11,934,612	89,936,575	118,259,861	122,343,381	223,926	507,355	1,066,555	1,160,194	1,179,493
Coastal Restoration Plan	Sustained Coast	LOW	1,214,358	5,956,800	54,549,774	78,763,432	119,248,154	222,954	346,838	702,408	853,823	1,162,875
Comprehensive Plans	C-HL-a-100-2	LOW	716,770	1,367,891	49,812,878	69,880,282	114,191,801	191,314	222,390	682,760	825,676	1,139,461
	C-HL-a-100-3	LOW	720,636	1,440,408	49,753,691	70,153,753	114,932,839	194,245	231,636	685,275	826,620	1,145,415
	C-HL-b-400-2	LOW	702,830	979,849	1,531,483	5,671,954	22,470,497	187,917	198,345	238,656	398,268	611,582
	C-HL-b-400-3	LOW	707,872	1,023,459	1,793,220	6,558,019	23,779,246	190,848	209,798	256,861	418,748	634,197
	C-LP-a-100-1	LOW	722,673	1,702,525	16,335,100	50,410,262	104,180,487	197,083	273,243	478,784	695,339	1,106,913
	C-LP-a-100-2	LOW	713,305	1,108,635	14,015,724	47,839,255	102,967,163	187,949	200,000	464,377	679,742	1,095,905
	C-LP-a-100-3	LOW	713,540	1,165,782	14,212,249	48,364,214	103,665,057	189,903	207,496	472,989	689,546	1,106,192
	C-LP-b-400-1	LOW	703,513	1,174,997	2,761,127	14,209,192	33,493,920	192,736	264,820	335,337	485,475	635,310
	C-LP-b-400-3	LOW	701,761	994,803	1,337,373	6,866,024	25,731,077	187,540	200,011	231,555	396,474	591,046
	C-LP-b-1000-1	LOW	694,888	1,125,437	1,407,777	3,323,533	12,019,752	189,588	260,306	316,464	386,110	472,292
	C-LP-b-1000-2	LOW	696,330	930,992	995,773	1,361,549	3,099,340	183,717	188,747	200,986	244,854	339,148
Structural Plans	HL-a-100-2	LOW	959,558	2,156,297	52,132,712	72,432,963	116,818,647	202,292	235,659	696,310	840,617	1,154,403
	HL-a-100-3	LOW	1,010,674	2,398,443	52,212,826	72,825,463	117,663,718	205,893	245,611	699,531	842,267	1,161,061
	HL-b-400-2	LOW	958,357	1,952,289	5,473,693	9,481,809	26,063,523	202,292	215,689	256,281	417,284	630,599
	HL-b-400-3	LOW	1,010,649	2,208,836	6,515,891	11,051,361	28,008,867	205,893	227,848	275,192	438,470	653,918
	LP-a-100-1	LOW	1,034,463	4,200,197	19,737,437	54,344,508	108,113,562	211,021	293,457	499,019	717,245	1,128,820
	LP-a-100-2	LOW	940,687	2,536,483	16,182,803	50,576,082	105,784,082	199,227	214,311	478,709	695,746	1,111,910
	LP-a-100-3	LOW	960,318	2,741,660	16,544,507	51,238,017	106,606,096	201,772	222,512	488,026	706,255	1,122,902
	LP-b-400-1	LOW	1,033,262	4,143,569	11,215,608	20,433,671	39,642,179	211,021	290,059	360,597	512,406	662,242
	LP-b-400-3	LOW	959,117	2,668,346	4,448,440	10,316,221	29,258,308	201,772	218,068	249,633	416,224	610,797
	LP-b-1000-1	LOW	1,033,262	4,142,183	11,125,839	18,304,407	23,524,231	211,021	289,993	346,895	418,213	504,396
	LP-b-1000-2	LOW	939,486	2,451,310	3,853,001	5,329,878	7,207,611	199,227	207,968	220,229	265,769	360,064
Non-Structural Plans	NS-100	LOW	490,072	2,191,280	50,600,834	74,873,567	115,363,856	208,172	327,133	681,960	831,984	1,141,038
	NS-400	LOW	246,158	803,861	5,449,730	61,994,567	106,842,286	197,443	315,364	670,190	820,214	1,129,268
	NS-1000	LOW	139,471	618,258	2,089,732	5,056,654	89,282,714	135,599	251,801	577,823	727,846	1,036,899

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 28b
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, High Sea Level Rise Scenario
2075
Planning Unit 1
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	1,471,952	34,000,280	116,204,431	122,422,904	125,885,785	248,566	637,105	1,158,319	1,179,082	1,184,847
Coastal Restoration Plan	Sustained Coast	HIGH	1,466,381	12,290,846	58,922,851	82,448,239	123,202,325	246,621	372,237	730,145	863,950	1,172,003
Comprehensive Plans	C-HL-a-100-2	HIGH	728,879	2,322,847	50,451,736	71,216,495	115,531,572	195,099	226,246	695,426	831,801	1,145,191
	C-HL-a-100-3	HIGH	736,424	2,773,974	50,952,916	72,279,283	117,538,188	199,945	239,027	702,251	834,924	1,154,313
	C-HL-b-400-2	HIGH	712,449	1,106,071	2,491,344	7,378,506	23,947,508	191,702	202,201	251,322	404,393	617,312
	C-HL-b-400-3	HIGH	721,159	1,248,135	3,387,124	9,085,800	26,611,378	196,548	217,189	273,837	427,052	643,095
	C-LP-a-100-1	HIGH	783,873	3,524,014	20,708,959	54,445,436	107,582,912	213,191	294,129	509,888	708,424	1,120,008
	C-LP-a-100-2	HIGH	733,892	1,310,384	14,461,891	48,457,545	103,783,873	192,505	205,058	475,707	680,909	1,101,139
	C-LP-a-100-3	HIGH	737,741	1,599,274	15,042,929	49,463,630	104,997,466	195,302	216,611	488,210	696,501	1,115,974
	C-LP-b-400-1	HIGH	749,085	1,543,968	8,697,308	18,516,232	37,673,412	208,382	285,706	366,441	498,560	648,405
	C-LP-b-400-3	HIGH	720,438	1,218,289	2,323,069	8,000,389	27,152,767	192,477	209,126	246,776	403,429	600,828
	C-LP-b-1000-1	HIGH	732,241	1,295,762	2,250,468	10,985,162	17,239,904	204,584	280,471	347,569	399,195	485,387
	C-LP-b-1000-2	HIGH	706,719	967,598	1,172,066	1,932,993	4,018,207	187,811	193,805	212,316	246,021	344,382
Structural Plans	HL-a-100-2	HIGH	1,039,451	3,965,312	52,964,890	73,855,572	118,268,211	206,864	239,795	710,367	846,742	1,160,133
	HL-a-100-3	HIGH	1,119,808	4,571,438	53,587,008	75,020,151	120,371,803	212,416	253,281	717,898	850,571	1,169,961
	HL-b-400-2	HIGH	1,038,250	3,761,304	6,305,871	10,904,418	27,513,087	206,864	219,825	270,338	423,409	636,329
	HL-b-400-3	HIGH	1,119,784	4,381,831	7,890,073	13,246,049	30,716,952	212,416	235,518	293,559	446,774	662,818
	LP-a-100-1	HIGH	1,211,350	6,144,894	24,112,335	58,423,963	111,525,230	229,531	314,343	531,795	730,332	1,141,915
	LP-a-100-2	HIGH	1,007,111	2,851,464	16,791,401	51,286,560	106,664,080	206,029	219,368	491,711	696,914	1,117,143
	LP-a-100-3	HIGH	1,051,726	3,298,932	17,507,414	52,430,042	108,011,126	209,496	231,627	504,919	713,212	1,132,684
	LP-b-400-1	HIGH	1,210,149	6,088,266	15,590,506	24,513,126	43,053,848	229,531	310,945	393,373	525,493	675,337
	LP-b-400-3	HIGH	1,050,525	3,225,618	5,411,347	11,508,246	30,663,338	209,496	227,183	266,526	423,181	620,579
	LP-b-1000-1	HIGH	1,210,149	6,086,880	15,500,737	22,383,863	26,935,900	229,531	310,879	379,671	431,300	517,491
	LP-b-1000-2	HIGH	1,005,910	2,766,291	4,461,599	6,040,355	8,087,608	206,029	213,025	233,231	266,937	365,297
Non-Structural Plans	NS-100	HIGH	529,161	8,385,710	55,036,143	78,489,284	119,181,410	231,004	352,253	708,306	842,112	1,150,164
	NS-400	HIGH	282,745	1,219,074	13,075,393	67,873,010	112,306,824	220,275	340,483	696,536	830,342	1,138,394
	NS-1000	HIGH	175,276	720,824	3,188,060	14,722,520	97,921,498	158,432	276,920	604,169	737,973	1,046,026

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 29a

Residual Risk/Frequency Damage and Population

High Employment Growth, Dispersed Land Use, Low Sea Level Rise Scenario

2075

Planning Unit 2

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,582,611	46,651,759	51,670,721	53,208,190	53,965,103	91,162	461,190	466,522	467,050	467,277
Coastal Restoration Plan	Sustained Coast	LOW	1,805,013	6,117,185	46,911,575	50,259,279	51,581,387	92,134	119,658	458,157	466,030	466,299
Comprehensive Plans	C-G-100-1	LOW	701,936	2,148,137	6,470,528	11,684,034	13,601,331	90,123	102,192	134,289	143,619	152,376
	C-G-100-4	LOW	335,834	1,396,144	5,784,894	10,537,118	12,166,819	63,180	73,306	132,502	141,661	150,122
	C-G-400-4	LOW	260,246	521,610	2,200,825	3,927,283	5,010,653	59,766	65,558	70,026	81,744	103,829
	C-G-1000-4	LOW	185,157	323,451	651,403	1,926,031	3,062,659	55,035	59,208	61,626	64,191	73,095
	C-S-100-2	LOW	361,124	2,783,140	37,566,336	41,457,297	42,667,995	72,713	89,126	382,431	392,007	392,247
	C-S-100-3	LOW	309,025	2,475,347	37,177,957	41,243,423	42,415,279	63,864	80,282	382,431	392,007	392,247
	C-S-100-4	LOW	288,122	2,293,399	36,989,854	40,878,570	41,942,185	59,850	73,768	382,094	391,670	391,910
	C-S-400-2	LOW	249,002	485,620	2,859,016	9,146,619	28,398,009	71,310	82,686	93,549	176,062	347,745
	C-S-400-3	LOW	225,645	443,896	2,584,168	8,675,200	27,832,498	62,794	74,170	85,038	168,373	343,898
	C-S-400-4	LOW	217,894	415,986	2,390,222	8,293,726	27,376,633	58,780	67,419	78,524	162,604	340,964
	C-S-1000-4	LOW	190,419	335,975	666,237	2,263,571	4,415,185	57,116	65,657	68,762	76,946	111,273
	C-WBI-100-1	LOW	649,608	3,493,172	38,148,839	42,170,358	43,450,897	87,905	104,614	383,395	392,672	392,938
	C-WBI-400-1	LOW	351,250	628,925	3,900,445	10,662,458	29,791,298	86,502	98,673	109,537	185,875	350,248
Structural Plans	G-100-1	LOW	1,477,409	4,302,526	8,510,333	13,630,193	15,564,193	98,249	113,935	146,032	155,362	164,119
	G-100-4	LOW	958,571	3,227,175	7,521,065	12,199,089	13,854,615	71,306	85,049	144,245	153,404	161,865
	G-400-4	LOW	958,571	3,207,522	5,118,385	6,641,336	7,692,226	71,306	82,361	86,829	98,547	120,632
	G-1000-4	LOW	958,571	3,207,504	5,102,738	6,424,096	7,228,397	71,306	81,950	84,368	86,933	95,837
	S-100-2	LOW	1,155,191	4,924,258	39,518,224	43,309,767	44,519,915	76,942	100,869	394,174	403,750	403,990
	S-100-3	LOW	1,012,198	4,439,890	38,984,877	42,957,361	44,130,697	68,093	92,025	394,174	403,750	403,990
	S-100-4	LOW	956,332	4,136,424	38,703,708	42,529,035	43,620,124	64,079	85,511	393,837	403,413	403,653
	S-400-2	LOW	1,155,191	4,916,002	7,968,725	13,048,810	32,053,526	76,942	99,980	110,843	193,356	365,039
	S-400-3	LOW	1,012,198	4,431,292	7,164,796	12,155,505	31,126,339	68,093	91,131	101,999	185,334	360,859
	S-400-4	LOW	956,332	4,126,334	6,628,128	11,468,316	30,381,652	64,079	84,380	95,485	179,565	357,925
	S-1000-4	LOW	956,332	4,126,321	6,540,762	7,327,890	8,995,443	64,079	84,380	87,485	95,669	129,996
	WBI-100-1	LOW	1,805,013	6,101,914	40,302,233	44,147,143	45,405,046	92,134	116,357	395,138	404,415	404,681
	WBI-400-1	LOW	1,805,013	6,096,528	9,802,124	15,046,561	33,812,113	92,134	115,967	126,831	203,169	367,542
Non-Structural Plans	NS-100	LOW	629,033	3,483,431	44,757,878	48,282,299	49,627,165	87,905	107,915	446,414	454,287	454,556
	NS-400	LOW	255,961	516,502	5,548,214	13,451,233	24,867,170	67,014	79,576	395,597	403,470	403,739
	NS-1000	LOW	155,073	349,049	1,949,841	4,675,246	9,861,727	63,880	76,135	364,621	372,494	372,762

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 29b

Residual Risk/Frequency Damage and Population

High Employment Growth, Dispersed Land Use, High Sea Level Rise Scenario

2075

Planning Unit 2

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	2,833,612	49,466,651	53,124,117	54,188,144	54,716,464	96,481	465,955	467,011	467,389	467,392
Coastal Restoration Plan	Sustained Coast	HIGH	3,061,870	8,115,021	47,986,634	51,146,416	52,299,796	97,404	123,048	458,736	466,698	466,864
Comprehensive Plans	C-G-100-1	HIGH	1,208,538	4,027,152	8,139,541	13,014,254	14,558,741	97,540	104,812	135,666	144,720	153,193
	C-G-100-4	HIGH	611,475	2,674,413	6,754,188	11,351,880	12,656,471	68,068	75,167	132,708	142,006	150,443
	C-G-400-4	HIGH	491,823	1,342,565	3,288,186	4,868,557	5,634,766	63,409	67,419	70,232	82,089	104,150
	C-G-1000-4	HIGH	325,682	652,258	1,780,735	2,855,550	3,995,897	57,492	61,069	61,832	64,536	73,416
	C-S-100-2	HIGH	1,205,442	4,429,987	38,571,169	42,230,132	43,327,400	77,043	92,371	383,010	392,649	392,809
	C-S-100-3	HIGH	1,073,259	3,893,248	38,085,783	41,945,646	43,007,616	68,194	83,527	383,010	392,649	392,809
	C-S-100-4	HIGH	1,033,587	3,554,334	37,779,385	41,462,433	42,447,430	62,773	77,013	382,673	392,312	392,472
	C-S-400-2	HIGH	395,981	1,449,744	4,392,485	10,221,231	29,261,613	75,640	85,931	94,128	176,704	348,307
	C-S-400-3	HIGH	365,619	1,353,553	3,923,309	9,603,695	28,595,414	67,124	77,415	85,617	169,015	344,460
	C-S-400-4	HIGH	347,276	1,296,172	3,576,319	9,129,517	27,999,340	61,703	70,664	79,103	163,246	341,526
	C-S-1000-4	HIGH	291,312	606,669	1,941,619	3,423,026	5,715,922	60,039	68,902	69,341	77,588	111,835
	C-WBI-100-1	HIGH	1,774,840	5,734,224	39,402,357	43,092,674	44,241,765	93,175	108,004	383,974	393,340	393,503
	C-WBI-400-1	HIGH	671,885	1,933,081	5,888,953	12,004,695	30,866,892	91,772	102,063	110,116	186,543	350,813
Structural Plans	G-100-1	HIGH	2,146,712	5,779,124	10,064,641	14,956,890	16,481,866	107,891	116,555	147,409	156,463	164,936
	G-100-4	HIGH	1,352,467	4,104,585	8,394,913	13,026,331	14,328,874	78,419	86,910	144,451	153,749	162,186
	G-400-4	HIGH	1,352,467	4,084,931	5,992,233	7,468,577	8,166,485	78,419	84,222	87,035	98,892	120,953
	G-1000-4	HIGH	1,352,467	4,084,913	5,976,586	7,251,338	7,702,656	78,419	83,811	84,574	87,278	96,158
	S-100-2	HIGH	2,153,786	6,496,404	40,414,325	44,076,329	45,135,963	81,272	104,114	394,753	404,392	404,552
	S-100-3	HIGH	1,931,301	5,798,931	39,790,203	43,656,175	44,688,437	72,423	95,270	394,753	404,392	404,552
	S-100-4	HIGH	1,833,342	5,360,843	39,406,562	43,131,316	44,106,567	67,002	88,756	394,416	404,055	404,215
	S-400-2	HIGH	2,153,786	6,488,148	8,864,826	13,815,371	32,669,573	81,272	103,225	111,422	193,998	365,601
	S-400-3	HIGH	1,931,301	5,790,333	7,970,122	12,854,319	31,684,079	72,423	94,376	102,578	185,976	361,421
	S-400-4	HIGH	1,833,342	5,350,754	7,330,981	12,070,597	30,868,095	67,002	87,625	96,064	180,207	358,487
	S-1000-4	HIGH	1,833,342	5,350,740	7,243,615	7,930,171	9,481,886	67,002	87,625	88,064	96,311	130,558
	WBI-100-1	HIGH	3,061,870	8,099,750	41,377,292	45,034,280	46,123,455	97,404	119,747	395,717	405,083	405,246
	WBI-400-1	HIGH	3,061,870	8,094,364	10,877,184	15,933,699	34,530,522	97,404	119,357	127,410	203,837	368,107
Non-Structural Plans	NS-100	HIGH	1,754,265	5,724,482	46,011,396	49,204,615	50,418,032	93,175	111,305	446,993	454,955	455,121
	NS-400	HIGH	576,597	1,820,658	7,536,722	14,793,469	25,942,764	72,284	82,966	396,176	404,138	404,304
	NS-1000	HIGH	288,209	669,966	3,902,024	6,758,504	11,766,222	69,150	79,525	365,200	373,162	373,327

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 30a
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, Low Sea Level Rise Scenario
2075
Planning Unit 3a
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,460,217	10,628,865	22,650,012	26,921,611	28,658,919	67,853	168,812	187,940	191,287	193,184
Coastal Restoration Plan	Sustained Coast	LOW	1,465,549	10,573,680	22,760,105	27,034,265	28,781,026	67,535	170,481	189,541	192,916	194,813
Comprehensive Plans	C-M-100-1	LOW	106,502	421,947	1,852,120	15,181,675	20,184,098	12,373	12,616	61,631	189,325	194,166
	C-R-100-1	LOW	152,116	1,548,367	5,132,878	20,469,397	20,694,485	20,168	26,998	95,851	194,166	194,166
	C-R-400-2	LOW	124,922	1,188,291	2,109,618	9,203,965	9,920,953	18,505	24,815	46,295	176,594	179,222
	C-R-1000-2	LOW	102,382	977,039	1,651,413	2,271,591	3,155,935	17,858	23,915	44,865	47,403	66,875
Structural Plans	M-100-1	LOW	346,794	873,003	2,015,086	15,269,581	20,249,817	12,471	12,714	61,729	189,423	194,264
	M-400-1	LOW	346,794	867,667	1,158,124	1,228,314	1,311,807	12,471	12,489	12,714	13,689	17,186
	M-1000-1	LOW	346,794	867,667	1,154,017	1,198,796	1,212,238	12,471	12,489	12,489	12,714	13,004
	R-100-1	LOW	399,139	2,082,038	5,311,787	20,566,942	20,763,455	20,266	27,096	95,949	194,264	194,264
	R-400-1	LOW	399,139	2,073,683	3,099,601	3,555,578	4,116,345	20,266	26,323	27,718	33,197	40,951
	R-400-2	LOW	402,514	2,079,600	3,482,652	10,992,792	11,503,155	20,348	26,658	49,171	179,470	182,098
	R-1000-1	LOW	399,139	2,073,628	3,093,016	3,466,374	3,686,535	20,266	26,323	27,064	29,527	31,499
	R-1000-2	LOW	402,514	2,079,545	3,475,906	5,200,405	5,655,299	20,348	26,658	48,641	51,179	70,651
Non-Structural Plans	NS-100	LOW	178,648	5,110,660	20,975,747	26,214,739	28,307,861	66,404	169,350	188,410	191,785	193,682
	NS-400	LOW	122,857	1,270,811	8,151,101	19,435,643	23,655,015	51,180	154,128	173,189	176,564	178,461
	NS-1000	LOW	79,249	717,230	3,067,910	8,155,585	16,544,707	38,862	141,322	160,383	163,758	165,655

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 30b
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, High Sea Level Rise Scenario
2075
Planning Unit 3a
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	2,471,942	15,966,006	25,236,252	28,128,021	29,317,051	106,702	180,746	189,371	191,583	193,184
Coastal Restoration Plan	Sustained Coast	HIGH	2,479,036	15,992,689	25,350,585	28,243,652	29,437,304	106,564	182,313	191,000	193,212	194,813
Comprehensive Plans	C-M-100-1	HIGH	162,251	613,525	1,933,655	15,207,241	20,196,059	12,379	12,616	61,631	189,325	194,166
	C-R-100-1	HIGH	423,229	2,236,427	5,406,158	20,630,851	20,723,165	25,417	27,422	97,660	194,166	194,166
	C-R-400-2	HIGH	330,507	1,628,406	2,557,323	9,504,687	10,024,720	23,754	25,239	48,104	176,594	179,222
	C-R-1000-2	HIGH	275,798	1,357,958	1,950,690	2,717,756	3,313,285	23,107	24,339	46,674	47,403	66,875
Structural Plans	M-100-1	HIGH	444,521	996,257	2,046,058	15,273,310	20,251,060	12,477	12,714	61,729	189,423	194,264
	M-400-1	HIGH	444,521	990,920	1,189,096	1,232,043	1,313,050	12,477	12,489	12,714	13,689	17,186
	M-1000-1	HIGH	444,521	990,920	1,184,989	1,202,526	1,213,481	12,477	12,489	12,489	12,714	13,004
	R-100-1	HIGH	725,166	2,670,068	5,528,326	20,701,579	20,780,359	25,515	27,520	97,758	194,264	194,264
	R-400-1	HIGH	725,166	2,661,713	3,316,140	3,690,215	4,133,249	25,515	26,747	29,527	33,197	40,951
	R-400-2	HIGH	728,541	2,667,630	3,699,191	11,127,429	11,520,060	25,597	27,082	50,980	179,470	182,098
	R-1000-1	HIGH	725,166	2,661,658	3,309,555	3,601,011	3,703,440	25,515	26,747	28,873	29,527	31,499
	R-1000-2	HIGH	728,541	2,667,575	3,692,445	5,335,042	5,672,204	25,597	27,082	50,450	51,179	70,651
Non-Structural Plans	NS-100	HIGH	400,703	12,047,160	24,215,081	27,710,610	29,085,679	105,433	181,182	189,869	192,081	193,682
	NS-400	HIGH	221,434	3,001,624	15,181,511	22,703,493	25,585,853	90,213	165,961	174,648	176,860	178,461
	NS-1000	HIGH	158,584	1,232,093	4,819,333	15,159,921	20,336,318	77,403	153,155	161,842	164,054	165,655

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 31a
Residual Risk/Frequency Damage and Population
High Employment Growth, Dispersed Land Use, Low Sea Level Rise Scenario
2075
Planning Unit 3b
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,023,608	4,254,108	8,571,095	11,203,265	12,280,780	28,512	59,280	80,944	93,025	96,453
Coastal Restoration Plan	Sustained Coast	LOW	1,021,995	4,253,090	8,576,084	11,196,808	12,280,382	28,489	59,280	81,054	93,110	96,453
Comprehensive Plans	C-F-100-1	LOW	82,519	417,970	5,299,557	10,719,824	11,244,757	3,179	5,971	66,682	94,801	96,004
	C-F-400-1	LOW	69,819	243,856	763,294	1,369,233	1,921,437	3,175	5,847	9,433	13,003	28,379
	C-F-1000-1	LOW	65,051	153,482	555,652	1,125,412	1,506,813	3,148	5,820	9,310	10,149	11,611
	C-G-100-1	LOW	67,548	147,467	426,093	2,732,951	6,239,531	523	1,782	7,634	45,442	78,965
	C-R-100-1	LOW	107,020	1,038,276	6,485,701	9,359,617	10,261,466	9,318	26,656	71,361	86,205	88,936
	C-R-400-1	LOW	94,840	291,493	1,826,624	6,160,791	8,635,434	9,314	23,695	39,194	61,569	72,642
Structural Plans	F-100-1	LOW	222,001	713,115	5,507,880	10,913,172	11,431,384	3,559	6,579	67,290	95,409	96,612
	F-400-1	LOW	222,001	710,785	1,237,799	1,678,727	2,166,951	3,559	6,459	10,045	13,615	28,991
	F-1000-1	LOW	222,001	710,785	1,235,898	1,651,548	1,843,518	3,559	6,459	9,949	10,788	12,250
	G-100-1	LOW	158,165	318,052	567,287	2,866,635	6,368,286	738	2,018	7,870	45,678	79,201
	G-400-1	LOW	158,165	317,628	443,240	525,162	603,534	738	2,018	2,554	2,863	4,258
	G-1000-1	LOW	158,165	317,628	442,971	521,981	579,153	738	2,018	2,554	2,693	3,822
	R-100-1	LOW	315,969	1,664,428	6,800,097	9,637,207	10,524,587	9,884	27,729	72,435	87,279	90,010
	R-400-1	LOW	315,969	1,627,893	3,993,028	6,852,055	9,058,225	9,884	24,772	40,272	62,647	73,720
	R-1000-1	LOW	315,969	1,627,892	3,953,567	4,999,636	6,222,659	9,884	24,772	37,392	43,539	60,469
Non-Structural Plans	NS-100	LOW	140,695	2,343,595	7,953,725	10,804,915	11,993,302	27,923	58,207	79,980	92,036	95,379
	NS-400	LOW	115,546	537,164	3,643,033	9,690,893	11,524,275	27,919	58,203	79,976	92,032	95,375
	NS-1000	LOW	103,294	432,996	817,084	3,928,421	9,273,742	27,111	57,394	79,167	91,224	94,567

Source: GIS Economic Application Databases
Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 31b

Residual Risk/Frequency Damage and Population

High Employment Growth, Dispersed Land Use, High Sea Level Rise Scenario

2075

Planning Unit 3b

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	1,522,790	5,716,563	9,628,481	11,827,150	12,591,429	40,667	70,871	88,114	95,598	96,602
Coastal Restoration Plan	Sustained Coast	HIGH	1,521,534	5,720,763	9,629,148	11,823,410	12,589,697	40,657	70,859	88,029	95,554	96,602
Comprehensive Plans	C-F-100-1	HIGH	101,849	630,952	5,481,804	10,825,567	11,327,508	3,747	8,438	67,349	95,657	96,058
	C-F-400-1	HIGH	87,544	375,756	1,051,175	1,519,988	2,016,600	3,743	8,314	10,100	13,859	28,433
	C-F-1000-1	HIGH	81,246	226,397	811,305	1,365,102	1,636,329	3,716	8,287	9,977	11,005	11,665
	C-G-100-1	HIGH	82,918	203,651	478,427	2,754,362	6,285,931	743	2,034	7,634	46,082	79,019
	C-R-100-1	HIGH	128,237	1,859,428	7,015,689	9,686,389	10,468,411	13,911	32,524	74,589	88,095	89,085
	C-R-400-1	HIGH	112,630	376,431	3,226,825	6,695,518	8,885,138	13,907	29,563	42,422	63,459	72,791
Structural Plans	F-100-1	HIGH	282,130	878,766	5,679,529	11,012,562	11,510,321	4,148	9,046	67,957	96,265	96,666
	F-400-1	HIGH	282,130	876,436	1,409,448	1,778,116	2,245,888	4,148	8,926	10,712	14,471	29,045
	F-1000-1	HIGH	282,130	876,436	1,407,547	1,750,937	1,922,455	4,148	8,926	10,616	11,644	12,304
	G-100-1	HIGH	193,723	358,560	614,397	2,883,446	6,412,434	979	2,270	7,870	46,318	79,255
	G-400-1	HIGH	193,723	358,136	490,350	541,972	647,682	979	2,270	2,554	3,503	4,312
	G-1000-1	HIGH	193,723	358,136	490,081	538,792	623,301	979	2,270	2,554	3,333	3,876
	R-100-1	HIGH	453,497	2,320,868	7,302,385	9,951,337	10,722,751	14,497	33,598	75,663	89,169	90,159
	R-400-1	HIGH	453,497	2,284,333	4,495,316	7,166,185	9,256,389	14,497	30,641	43,500	64,537	73,869
	R-1000-1	HIGH	453,497	2,284,333	4,455,855	5,313,766	6,420,823	14,497	30,641	40,620	45,429	60,618
Non-Structural Plans	NS-100	HIGH	331,209	4,541,540	9,163,312	11,504,705	12,328,310	40,071	69,785	86,955	94,480	95,528
	NS-400	HIGH	166,930	852,995	6,792,763	10,926,560	12,009,099	40,067	69,781	86,951	94,476	95,524
	NS-1000	HIGH	138,579	564,842	1,370,382	7,609,001	10,829,653	39,259	68,972	86,143	93,668	94,716

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 32a

Residual Risk/Frequency Damage and Population

High Employment Growth, Dispersed Land Use, Low Sea Level Rise Scenario

2075

Planning Unit 4

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	471,501	3,033,543	6,592,287	10,315,843	12,755,215	11,207	36,802	61,739	82,956	95,140
Coastal Restoration Plan	Sustained Coast	LOW	472,215	3,022,998	6,577,491	10,304,157	12,731,366	11,194	36,845	61,794	82,843	95,124
Comprehensive Plans	C-G-100-1	LOW	156,639	520,248	3,172,465	7,197,593	8,212,659	6,952	12,397	56,703	84,812	87,450
	C-G-100-2	LOW	206,574	712,845	3,488,194	7,412,251	8,298,491	8,075	13,947	58,811	85,266	87,531
	C-G-400-3	LOW	173,405	469,169	1,384,116	8,519,463	11,032,194	8,916	15,132	33,145	100,680	106,280
	C-G-1000-3	LOW	122,301	304,055	864,213	3,219,875	6,444,720	7,941	14,120	30,603	53,600	79,780
	C-R-100-1	LOW	182,787	1,012,423	4,738,721	7,607,555	8,928,103	11,639	28,786	69,096	83,885	87,847
	C-R-400-1	LOW	174,810	501,571	1,585,342	8,800,546	12,030,504	11,192	27,938	42,070	103,529	110,947
	C-R-1000-1	LOW	153,536	456,100	836,084	2,456,260	6,837,091	10,421	27,151	39,753	56,674	84,672
Structural Plans	G-100-1	LOW	394,314	1,866,835	422,100	8,170,468	9,112,930	9,815	15,501	59,807	87,916	90,554
	G-100-2	LOW	463,698	2,113,482	4,588,161	8,435,206	9,247,423	10,941	17,054	61,918	88,373	90,638
	G-400-1	LOW	394,314	1,862,600	2,841,182	7,272,259	9,578,441	9,815	15,240	20,637	69,275	76,407
	G-400-2	LOW	463,698	2,109,254	3,193,009	7,650,679	9,965,502	10,941	16,793	22,312	70,955	78,158
	G-400-3	LOW	469,040	2,136,816	3,644,956	10,276,525	12,550,769	12,681	19,139	37,152	104,687	110,287
	G-1000-1	LOW	394,314	1,862,600	2,832,221	4,854,994	6,108,179	9,815	15,240	20,268	32,105	49,230
	G-1000-2	LOW	463,698	2,109,254	3,184,047	5,233,285	6,494,659	10,941	16,793	21,943	33,785	50,910
	G-1000-3	LOW	469,040	2,136,816	3,628,083	6,997,541	9,114,550	12,681	19,139	35,622	58,619	84,799
	R-100-1	LOW	503,940	2,666,140	5,957,516	8,700,700	9,937,082	14,546	31,950	72,267	87,056	91,018
	R-400-1	LOW	504,357	2,660,865	5,007,108	11,013,871	13,725,057	14,655	31,660	45,799	107,258	114,676
	R-1000-1	LOW	504,357	2,660,865	4,990,235	7,734,887	10,288,839	14,655	31,660	44,269	61,190	89,188
Non-Structural Plans	NS-100	LOW	150,868	1,248,511	5,339,652	9,205,985	11,720,233	8,287	33,681	58,623	79,672	91,953
	NS-400	LOW	142,474	503,549	2,213,514	7,706,516	10,905,489	7,731	33,123	58,065	79,114	91,395
	NS-1000	LOW	121,200	457,937	934,521	3,146,175	8,277,771	6,960	32,336	57,278	78,327	90,608

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 32b

Residual Risk/Frequency Damage and Population

High Employment Growth, Dispersed Land Use, High Sea Level Rise Scenario

2075

Planning Unit 4

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	724,883	4,142,404	7,874,130	11,580,791	13,904,059	18,774	46,397	73,798	94,654	101,883
Coastal Restoration Plan	Sustained Coast	HIGH	725,617	4,125,466	7,868,997	11,559,813	13,897,526	18,727	46,418	74,275	94,000	101,905
Comprehensive Plans	C-G-100-1	HIGH	169,815	995,999	3,665,966	7,793,997	8,726,497	8,933	13,447	64,254	87,182	89,394
	C-G-100-2	HIGH	242,870	1,247,100	4,002,840	8,018,749	8,819,093	10,068	15,040	66,362	87,636	89,475
	C-G-400-3	HIGH	193,842	554,226	2,159,303	9,251,830	11,588,099	10,908	16,225	40,696	103,050	108,224
	C-G-1000-3	HIGH	129,975	356,846	1,126,654	4,471,312	7,377,854	9,896	15,213	38,154	55,970	81,724
	C-R-100-1	HIGH	210,993	2,062,051	5,704,046	8,554,358	9,835,884	17,552	32,560	77,902	87,697	90,628
	C-R-400-1	HIGH	195,756	653,904	3,182,264	10,117,055	13,033,817	17,104	31,681	50,876	107,341	113,728
	C-R-1000-1	HIGH	173,887	538,083	1,267,707	4,572,048	8,526,017	16,315	30,894	48,559	60,486	87,453
Structural Plans	G-100-1	HIGH	562,110	2,232,145	4,667,814	8,688,565	9,540,904	11,996	16,551	67,358	90,286	92,498
	G-100-2	HIGH	661,353	2,533,617	5,055,104	8,961,150	9,681,052	13,134	18,147	69,469	90,743	92,582
	G-400-1	HIGH	562,110	2,227,910	3,288,896	7,790,357	10,006,415	11,996	16,290	28,188	71,645	78,351
	G-400-2	HIGH	661,353	2,529,388	3,659,952	8,176,623	10,399,131	13,134	17,886	29,863	73,325	80,102
	G-400-3	HIGH	666,696	2,556,951	4,111,900	10,802,469	12,984,398	14,874	20,232	44,703	107,057	112,231
	G-1000-1	HIGH	562,110	2,227,910	3,279,935	5,373,092	6,536,154	11,996	16,290	27,819	34,475	51,174
	G-1000-2	HIGH	661,353	2,529,388	3,650,990	5,759,229	6,928,288	13,134	17,886	29,494	36,155	52,854
	G-1000-3	HIGH	666,696	2,556,951	4,095,026	7,523,484	9,548,180	14,874	20,232	43,173	60,989	86,743
	R-100-1	HIGH	751,749	3,524,355	6,826,493	9,566,383	10,733,182	20,674	35,723	81,073	90,868	93,799
	R-400-1	HIGH	752,166	3,519,080	5,860,116	11,875,803	14,520,668	20,783	35,402	54,605	111,070	117,457
	R-1000-1	HIGH	752,166	3,519,080	5,843,243	8,596,819	11,084,450	20,783	35,402	53,075	65,002	91,969
Non-Structural Plans	NS-100	HIGH	181,261	2,570,313	6,737,406	10,544,657	12,999,101	15,605	43,255	71,104	90,829	98,734
	NS-400	HIGH	164,833	682,472	4,520,144	9,628,655	12,344,156	15,048	42,697	70,546	90,271	98,176
	NS-1000	HIGH	142,964	557,183	1,465,627	6,249,547	10,868,036	14,259	41,910	69,759	89,484	97,389

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 33a

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, Low Sea Level Rise Scenario

2075

Planning Unit 1

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,081,120	9,878,938	62,688,250	81,963,449	84,350,812	134,638	349,414	699,378	767,109	774,563
Coastal Restoration Plan	Sustained Coast	LOW	1,080,804	5,945,972	40,241,605	56,290,157	82,753,537	133,957	230,372	483,309	574,689	768,518
Comprehensive Plans	C-HL-a-100-2	LOW	591,663	1,106,312	38,074,846	51,501,476	80,010,549	117,432	136,348	475,710	561,059	753,273
	C-HL-a-100-3	LOW	590,116	1,156,606	37,969,132	51,580,973	80,285,126	118,523	141,839	476,416	561,252	760,911
	C-HL-b-400-2	LOW	584,656	837,174	1,178,097	4,048,892	16,517,150	116,628	120,828	147,372	269,668	415,132
	C-HL-b-400-3	LOW	584,194	869,197	1,389,032	4,589,897	17,140,992	117,719	127,063	158,488	282,104	431,321
	C-LP-a-100-1	LOW	594,248	1,516,162	11,351,775	35,864,805	73,592,663	121,109	176,905	313,407	474,125	735,442
	C-LP-a-100-2	LOW	593,335	951,917	9,601,510	33,835,579	72,510,860	116,242	122,008	303,714	460,711	726,080
	C-LP-a-100-3	LOW	589,907	990,783	9,672,371	34,032,548	72,776,674	116,864	125,677	308,200	466,309	731,841
	C-LP-b-400-1	LOW	579,420	995,225	2,366,844	11,120,595	25,056,764	118,784	172,670	225,926	339,528	445,314
	C-LP-b-400-3	LOW	582,501	854,636	1,127,446	5,668,295	20,496,549	116,331	122,383	141,756	275,324	417,897
	C-LP-b-1000-1	LOW	572,589	953,188	1,194,501	2,636,225	10,021,506	117,882	171,155	212,935	263,653	331,346
	C-LP-b-1000-2	LOW	581,602	806,522	854,100	1,137,398	2,488,021	115,453	117,866	122,415	151,297	228,540
Structural Plans	HL-a-100-2	LOW	822,768	1,879,195	39,022,628	52,485,681	81,009,976	121,441	141,835	481,332	566,802	759,017
	HL-a-100-3	LOW	872,610	2,115,666	39,049,132	52,668,093	81,361,919	122,854	147,665	482,377	567,335	766,995
	HL-b-400-2	LOW	821,659	1,694,864	2,590,565	5,396,948	17,818,274	121,441	127,594	154,273	276,690	422,155
	HL-b-400-3	LOW	872,585	1,945,552	3,270,330	6,319,771	18,776,118	122,854	134,168	165,728	289,466	438,684
	LP-a-100-1	LOW	906,233	3,193,750	13,417,773	37,801,326	75,416,586	126,673	185,523	322,034	483,008	744,327
	LP-a-100-2	LOW	810,807	1,677,563	10,505,213	34,816,240	73,501,187	120,640	127,765	309,481	466,734	732,103
	LP-a-100-3	LOW	828,169	1,853,080	10,728,561	35,143,964	73,882,882	121,546	131,773	314,306	472,671	738,204
	LP-b-400-1	LOW	905,124	3,146,264	8,665,770	14,819,409	28,406,654	126,673	184,088	237,353	351,211	456,999
	LP-b-400-3	LOW	827,060	1,788,708	2,452,150	7,047,827	21,860,918	121,546	129,487	148,870	282,694	425,268
	LP-b-1000-1	LOW	905,124	3,145,093	8,583,801	13,108,808	16,729,731	126,673	184,060	226,017	276,992	344,686
	LP-b-1000-2	LOW	809,699	1,601,486	1,998,824	2,505,357	3,852,996	120,640	124,887	129,446	158,584	235,827
Non-Structural Plans	NS-100	LOW	372,406	1,945,350	37,765,997	54,169,491	80,707,735	127,815	221,351	473,575	564,833	758,662
	NS-400	LOW	161,859	656,623	4,086,986	44,769,794	74,337,286	120,839	213,546	465,770	557,028	750,857
	NS-1000	LOW	90,320	514,275	1,761,037	3,981,271	63,810,670	90,425	182,371	422,082	513,340	707,169

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 33b

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, High Sea Level Rise Scenario

2075

Planning Unit 1

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	1,345,047	26,075,648	80,694,136	84,514,752	86,336,357	150,961	444,758	766,017	774,436	776,799
Coastal Restoration Plan	Sustained Coast	HIGH	1,339,029	9,991,565	42,875,460	58,415,356	84,993,695	149,599	247,326	497,450	579,675	771,651
Comprehensive Plans	C-HL-a-100-2	HIGH	599,027	1,405,869	38,237,260	51,963,531	80,442,719	119,144	137,049	480,026	563,162	754,660
	C-HL-a-100-3	HIGH	599,477	1,711,927	38,451,928	52,419,649	81,501,896	121,170	145,222	483,024	564,584	763,863
	C-HL-b-400-2	HIGH	589,306	911,894	1,432,362	4,586,087	16,965,556	118,340	121,529	151,688	271,771	416,519
	C-HL-b-400-3	HIGH	590,828	1,028,527	2,018,610	5,527,158	18,415,446	120,366	130,446	165,096	285,436	434,273
	C-LP-a-100-1	HIGH	646,122	2,954,940	14,331,488	38,371,184	75,636,519	131,548	192,070	332,132	482,544	742,209
	C-LP-a-100-2	HIGH	612,105	1,062,077	9,802,745	34,042,677	72,749,361	118,111	123,017	307,484	461,023	727,569
	C-LP-a-100-3	HIGH	610,786	1,257,052	10,068,523	34,503,555	73,317,762	119,138	129,057	314,633	469,789	736,139
	C-LP-b-400-1	HIGH	614,229	1,277,479	6,867,739	13,954,948	27,508,434	128,900	187,835	244,651	347,947	452,081
	C-LP-b-400-3	HIGH	597,482	1,024,301	1,513,865	6,172,371	21,082,072	118,282	125,763	148,189	278,804	422,195
	C-LP-b-1000-1	HIGH	598,624	1,086,118	1,750,134	8,711,103	13,277,586	127,723	186,152	231,660	272,072	338,113
	C-LP-b-1000-2	HIGH	588,910	832,467	968,661	1,375,556	2,790,221	116,999	118,875	126,185	151,609	230,029
Structural Plans	HL-a-100-2	HIGH	900,604	2,253,874	39,216,172	52,963,260	81,443,501	123,582	142,671	485,769	568,904	760,403
	HL-a-100-3	HIGH	980,787	2,717,097	39,535,647	53,490,951	82,565,491	125,947	151,183	489,107	570,666	769,946
	HL-b-400-2	HIGH	899,495	2,069,543	2,784,109	5,874,527	18,251,799	123,582	128,430	158,710	278,792	423,541
	HL-b-400-3	HIGH	980,762	2,546,984	3,756,845	7,142,629	19,979,689	125,947	137,686	172,458	292,797	441,635
	LP-a-100-1	HIGH	1,074,231	4,731,305	16,201,870	40,212,565	77,362,160	138,117	200,688	341,015	491,428	751,093
	LP-a-100-2	HIGH	870,281	1,816,223	10,729,563	35,037,024	73,744,668	123,439	128,774	313,507	467,046	733,592
	LP-a-100-3	HIGH	913,172	2,159,000	11,127,713	35,611,775	74,416,801	124,789	135,153	320,995	476,152	742,502
	LP-b-400-1	HIGH	1,073,122	4,683,819	11,449,867	17,230,647	30,352,227	138,117	199,253	256,334	359,631	463,765
	LP-b-400-3	HIGH	912,063	2,094,629	2,851,301	7,515,638	22,394,837	124,789	132,867	155,559	286,175	429,566
	LP-b-1000-1	HIGH	1,073,122	4,682,648	11,367,897	15,520,047	18,675,305	138,117	199,225	244,998	285,412	351,452
	LP-b-1000-2	HIGH	869,173	1,740,146	2,223,175	2,726,142	4,096,477	123,439	125,896	133,472	158,896	237,316
Non-Structural Plans	NS-100	HIGH	399,275	6,799,139	40,721,717	56,319,938	82,931,700	143,005	238,170	487,594	569,820	761,796
	NS-400	HIGH	186,002	987,061	9,939,908	48,443,616	77,619,418	136,029	230,365	479,789	562,015	753,991
	NS-1000	HIGH	114,033	599,938	2,579,493	10,921,318	69,580,522	105,613	199,191	436,101	518,326	710,303

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 34a

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, Low Sea Level Rise Scenario

2075

Planning Unit 2

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,512,293	37,218,424	40,614,206	41,776,538	42,385,699	55,526	346,129	349,174	349,551	349,704
Coastal Restoration Plan	Sustained Coast	LOW	1,691,659	4,915,496	37,200,624	39,600,465	40,485,339	56,541	78,663	342,851	348,815	349,027
Comprehensive Plans	C-G-100-1	LOW	586,127	1,747,652	4,780,776	8,052,285	9,114,993	51,790	61,236	83,390	87,550	93,854
	C-G-100-4	LOW	220,190	1,092,283	4,344,510	7,286,339	8,131,863	29,254	36,162	82,315	85,798	91,065
	C-G-400-4	LOW	176,916	412,452	1,157,526	1,994,220	2,623,419	27,206	31,310	34,101	42,431	58,893
	C-G-1000-4	LOW	156,715	279,511	395,366	782,106	1,168,534	23,800	26,575	28,007	29,804	35,582
	C-S-100-2	LOW	261,826	1,636,522	31,510,452	34,342,468	35,178,450	38,288	52,039	307,157	314,346	314,454
	C-S-100-3	LOW	216,403	1,488,353	31,415,289	34,354,982	35,176,900	32,844	46,599	307,157	314,346	314,454
	C-S-100-4	LOW	210,324	1,177,243	30,738,127	33,481,368	34,174,208	28,140	37,641	306,768	313,957	314,186
	C-S-400-2	LOW	196,939	419,751	1,705,306	6,868,129	24,117,457	37,519	48,242	54,729	134,664	285,367
	C-S-400-3	LOW	181,398	385,858	1,530,278	6,564,819	23,766,933	32,080	42,803	49,294	129,400	281,222
	C-S-400-4	LOW	175,441	354,019	1,236,989	5,791,155	22,872,775	27,376	33,787	40,336	120,748	276,804
	C-S-1000-4	LOW	163,995	300,467	488,372	1,253,674	2,977,916	27,118	33,461	34,673	39,967	70,593
	C-WBI-100-1	LOW	510,273	2,289,186	32,015,095	35,033,643	35,961,366	53,564	66,975	308,164	315,061	315,272
	C-WBI-400-1	LOW	295,880	546,730	2,673,339	8,317,179	25,438,267	52,795	63,666	70,153	144,260	289,062
Structural Plans	G-100-1	LOW	1,326,131	3,829,292	6,603,450	9,687,129	10,712,359	57,417	69,377	91,531	95,691	101,995
	G-100-4	LOW	800,000	2,832,459	5,851,913	8,629,720	9,448,672	34,881	44,303	90,456	93,939	99,206
	G-400-4	LOW	800,000	2,813,404	3,505,728	4,014,579	4,570,196	34,881	42,457	45,248	53,578	70,040
	G-1000-4	LOW	800,000	2,813,387	3,490,507	3,798,583	4,080,817	34,881	42,101	43,533	45,330	51,108
	S-100-2	LOW	1,039,037	3,727,787	33,220,892	35,875,585	36,663,131	41,265	60,180	315,298	322,487	322,595
	S-100-3	LOW	891,743	3,382,222	32,963,865	35,733,480	36,509,254	35,821	54,740	315,298	322,487	322,595
	S-100-4	LOW	859,357	2,978,219	32,214,664	34,810,790	35,477,614	31,117	45,782	314,909	322,098	322,327
	S-400-2	LOW	1,039,037	3,719,553	5,405,111	9,666,897	26,734,756	41,265	59,430	65,917	145,852	296,555
	S-400-3	LOW	891,743	3,373,679	4,849,612	9,073,057	26,133,701	35,821	53,986	60,477	140,583	292,405
	S-400-4	LOW	859,357	2,968,294	3,894,508	7,931,685	24,894,251	31,117	44,970	51,519	131,931	287,987
	S-1000-4	LOW	859,357	2,968,282	3,819,611	4,158,704	5,448,322	31,117	44,970	46,182	51,476	82,102
	WBI-100-1	LOW	1,691,659	4,902,537	33,950,309	36,705,439	37,560,156	56,541	75,116	316,305	323,202	323,413
	WBI-400-1	LOW	1,691,659	4,897,391	7,207,429	11,651,837	28,473,074	56,541	74,854	81,341	155,448	300,250
Non-Structural Plans	NS-100	LOW	490,791	2,278,311	35,265,110	37,928,468	38,886,473	53,564	70,522	334,710	340,674	340,886
	NS-400	LOW	211,336	445,347	4,015,784	9,816,043	18,767,332	41,208	52,312	299,837	305,801	306,014
	NS-1000	LOW	130,819	309,513	1,573,035	3,345,649	7,640,590	40,337	51,268	282,738	288,702	288,914

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 34b

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, High Sea Level Rise Scenario

2075

Planning Unit 2

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	2,129,325	39,132,999	41,659,241	42,555,588	42,963,361	57,805	348,775	349,498	349,765	349,767
Coastal Restoration Plan	Sustained Coast	HIGH	2,315,755	6,428,536	37,872,144	40,134,201	40,926,249	58,772	79,977	343,058	349,284	349,337
Comprehensive Plans	C-G-100-1	HIGH	888,082	2,871,109	5,812,267	8,754,091	9,812,410	58,094	62,962	85,594	90,973	96,250
	C-G-100-4	HIGH	302,790	1,671,852	4,799,934	7,550,667	8,352,911	32,636	37,119	82,456	86,232	91,474
	C-G-400-4	HIGH	224,518	636,556	1,764,346	2,365,661	2,966,446	29,776	32,267	34,242	42,865	59,302
	C-G-1000-4	HIGH	183,223	393,046	803,952	1,296,668	1,592,366	25,412	27,532	28,148	30,238	35,991
	C-S-100-2	HIGH	468,963	2,976,703	32,135,737	34,784,608	35,544,327	40,230	53,212	307,364	314,712	314,761
	C-S-100-3	HIGH	325,971	2,664,424	31,992,985	34,764,852	35,510,558	34,786	47,772	307,364	314,712	314,761
	C-S-100-4	HIGH	308,095	1,962,990	31,163,427	33,744,489	34,394,823	29,398	38,814	306,975	314,323	314,493
	C-S-400-2	HIGH	244,241	714,896	2,982,445	7,455,729	24,663,624	39,461	49,415	54,936	135,030	285,674
	C-S-400-3	HIGH	221,442	661,006	2,679,792	7,071,555	24,256,495	34,022	43,976	49,501	129,766	281,529
	C-S-400-4	HIGH	211,699	598,709	1,978,158	6,162,107	23,210,197	28,634	34,960	40,543	121,114	277,111
	C-S-1000-4	HIGH	188,106	443,560	978,871	1,944,983	3,362,724	28,376	34,634	34,880	40,333	70,900
	C-WBI-100-1	HIGH	1,002,262	4,210,920	32,911,520	35,646,327	36,478,794	55,795	68,289	308,371	315,530	315,582
	C-WBI-400-1	HIGH	489,660	1,145,337	4,409,219	9,194,024	26,218,742	55,026	64,980	70,360	144,729	289,372
Structural Plans	G-100-1	HIGH	1,850,986	4,824,952	7,466,644	10,342,083	11,369,654	65,262	71,103	93,735	99,114	104,391
	G-100-4	HIGH	1,060,717	3,290,549	6,163,759	8,866,267	9,655,427	39,804	45,260	90,597	94,373	99,615
	G-400-4	HIGH	1,060,717	3,271,494	3,817,574	4,251,127	4,776,952	39,804	43,414	45,389	54,012	70,449
	G-1000-4	HIGH	1,060,717	3,271,477	3,802,353	4,035,131	4,287,573	39,804	43,058	43,674	45,764	51,517
	S-100-2	HIGH	1,404,364	4,847,601	33,699,054	36,270,940	36,984,916	43,207	61,353	315,505	322,853	322,902
	S-100-3	HIGH	1,145,531	4,355,760	33,401,456	36,099,801	36,808,636	37,763	55,913	315,505	322,853	322,902
	S-100-4	HIGH	1,083,847	3,577,955	32,511,999	35,047,324	35,675,983	32,375	46,955	315,116	322,464	322,634
	S-400-2	HIGH	1,404,364	4,839,368	5,883,273	10,062,252	27,056,541	43,207	60,603	66,124	146,218	296,862
	S-400-3	HIGH	1,145,531	4,347,217	5,287,203	9,439,378	26,433,083	37,763	55,159	60,684	140,949	292,712
	S-400-4	HIGH	1,083,847	3,568,030	4,191,844	8,168,220	25,092,620	32,375	46,143	51,726	132,297	288,294
	S-1000-4	HIGH	1,083,847	3,568,018	4,116,946	4,395,239	5,646,691	32,375	46,143	46,389	51,842	82,409
	WBI-100-1	HIGH	2,315,755	6,415,576	34,621,829	37,239,175	38,001,066	58,772	76,430	316,512	323,671	323,723
	WBI-400-1	HIGH	2,315,755	6,410,431	7,878,949	12,185,573	28,913,984	58,772	76,168	81,548	155,917	300,560
Non-Structural Plans	NS-100	HIGH	982,779	4,200,045	36,161,535	38,541,152	39,403,901	55,795	71,836	334,917	341,143	341,196
	NS-400	HIGH	405,116	1,043,954	5,751,664	10,692,888	19,547,808	43,439	53,626	300,044	306,270	306,324
	NS-1000	HIGH	186,941	491,230	2,652,321	5,179,951	8,658,647	42,568	52,582	282,945	289,171	289,224

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 35a
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, Low Sea Level Rise Scenario
2075
Planning Unit 3a
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,422,417	9,695,051	17,847,802	20,766,247	21,942,249	51,139	141,866	153,993	154,768	155,226
Coastal Restoration Plan	Sustained Coast	LOW	1,427,745	9,682,853	17,925,052	20,854,771	22,034,719	51,019	143,153	155,222	156,023	156,481
Comprehensive Plans	C-M-100-1	LOW	99,195	434,345	1,751,569	12,875,494	16,612,989	9,160	9,344	46,009	154,766	156,029
	C-R-100-1	LOW	152,964	1,549,520	4,777,103	16,774,499	16,943,837	16,149	21,011	69,728	156,029	156,029
	C-R-400-2	LOW	124,625	1,168,331	1,916,830	7,399,619	8,048,131	14,784	19,173	35,253	140,368	142,756
	C-R-1000-2	LOW	98,359	931,267	1,437,904	1,853,229	2,626,628	14,260	18,450	34,057	34,738	46,231
Structural Plans	M-100-1	LOW	328,948	859,298	1,891,029	12,947,567	16,667,494	9,238	9,422	46,087	154,844	156,107
	M-400-1	LOW	328,948	854,314	1,066,416	1,135,245	1,213,002	9,238	9,253	9,422	10,226	12,918
	M-1000-1	LOW	328,948	854,314	1,062,606	1,108,028	1,120,181	9,238	9,253	9,253	9,422	9,671
	R-100-1	LOW	390,016	2,055,998	4,933,294	16,856,674	17,002,187	16,227	21,089	69,806	156,107	156,107
	R-400-1	LOW	390,016	2,048,378	2,813,035	3,060,759	3,558,821	16,227	20,417	21,211	24,486	29,513
	R-400-2	LOW	392,385	2,053,027	3,197,605	9,147,545	9,600,275	16,282	20,671	37,821	142,936	145,324
	R-1000-1	LOW	390,016	2,048,324	2,807,053	2,976,903	3,144,172	16,227	20,417	20,645	21,264	23,041
	R-1000-2	LOW	392,385	2,052,973	3,191,557	4,661,417	5,034,831	16,282	20,671	37,350	38,031	49,524
Non-Structural Plans	NS-100	LOW	161,235	4,257,124	16,213,074	20,074,957	21,586,758	49,871	142,005	154,074	154,875	155,333
	NS-400	LOW	111,590	1,147,880	6,365,625	14,870,147	18,101,938	38,088	130,222	142,291	143,092	143,550
	NS-1000	LOW	72,525	651,966	2,199,208	5,917,331	12,660,448	29,392	121,424	133,493	134,294	134,752

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 35b
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, High Sea Level Rise Scenario
2075
Planning Unit 3a
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	2,424,857	13,659,231	19,692,554	21,591,362	22,347,693	78,554	148,409	154,661	154,987	155,226
Coastal Restoration Plan	Sustained Coast	HIGH	2,431,178	13,697,197	19,778,666	21,682,984	22,440,067	78,419	149,606	155,916	156,242	156,481
Comprehensive Plans	C-M-100-1	HIGH	161,825	592,675	1,830,091	12,895,893	16,622,544	9,165	9,344	46,009	154,766	156,029
	C-R-100-1	HIGH	471,742	2,128,816	4,984,716	16,877,321	16,979,607	19,631	21,095	69,781	156,029	156,029
	C-R-400-2	HIGH	369,794	1,539,928	2,273,481	7,638,410	8,159,851	18,266	19,257	35,306	140,368	142,756
	C-R-1000-2	HIGH	289,252	1,249,777	1,681,367	2,230,202	2,795,506	17,742	18,534	34,110	34,738	46,231
Structural Plans	M-100-1	HIGH	431,136	946,371	1,923,883	12,950,761	16,668,553	9,243	9,422	46,087	154,844	156,107
	M-400-1	HIGH	431,136	941,387	1,099,270	1,138,439	1,214,061	9,243	9,253	9,422	10,226	12,918
	M-1000-1	HIGH	431,136	941,387	1,095,460	1,111,222	1,121,241	9,243	9,253	9,253	9,422	9,671
	R-100-1	HIGH	761,919	2,532,075	5,088,213	16,936,563	17,027,712	19,709	21,173	69,859	156,107	156,107
	R-400-1	HIGH	761,919	2,524,455	2,967,953	3,140,648	3,584,345	19,709	20,501	21,264	24,486	29,513
	R-400-2	HIGH	764,287	2,529,104	3,352,524	9,227,434	9,625,799	19,764	20,755	37,874	142,936	145,324
	R-1000-1	HIGH	761,919	2,524,401	2,961,971	3,056,792	3,169,696	19,709	20,501	20,698	21,264	23,041
	R-1000-2	HIGH	764,287	2,529,050	3,346,475	4,741,305	5,060,355	19,764	20,755	37,403	38,031	49,524
Non-Structural Plans	NS-100	HIGH	365,069	9,796,430	18,693,913	21,177,863	22,107,001	77,271	148,458	154,768	155,094	155,333
	NS-400	HIGH	225,554	2,601,322	11,875,310	17,414,864	19,452,594	65,488	136,675	142,985	143,311	143,550
	NS-1000	HIGH	144,780	1,107,655	3,554,893	11,434,964	15,570,362	56,690	127,877	134,187	134,513	134,752

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 36a

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, Low Sea Level Rise Scenario

2075

Planning Unit 3b

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	1,012,730	4,148,297	7,771,594	10,886,290	12,369,822	26,345	56,166	78,016	94,540	98,612
Coastal Restoration Plan	Sustained Coast	LOW	1,011,628	4,147,235	7,770,948	10,876,911	12,368,845	26,306	56,166	78,133	94,641	98,612
Comprehensive Plans	C-F-100-1	LOW	82,295	351,499	4,922,593	10,476,917	11,154,354	2,921	5,351	65,215	97,431	97,788
	C-F-400-1	LOW	69,518	185,289	539,692	1,154,722	1,790,138	2,916	5,215	9,250	14,823	29,477
	C-F-1000-1	LOW	64,786	144,402	402,472	956,259	1,368,256	2,888	5,187	9,119	12,589	13,201
	C-G-100-1	LOW	68,111	145,597	435,306	2,815,408	6,191,979	454	1,686	7,251	43,098	75,409
	C-R-100-1	LOW	104,571	925,582	5,972,765	8,744,709	9,833,219	8,275	24,889	70,235	86,182	88,213
	C-R-400-1	LOW	92,391	283,730	1,412,908	5,279,561	8,156,384	8,270	21,760	37,182	64,346	76,762
Structural Plans	F-100-1	LOW	223,322	635,513	5,128,055	10,667,921	11,338,532	3,306	5,913	65,777	97,993	98,350
	F-400-1	LOW	223,322	633,142	985,428	1,461,552	2,034,383	3,306	5,782	9,817	15,390	30,044
	F-1000-1	LOW	223,322	633,142	983,491	1,433,161	1,695,549	3,306	5,782	9,714	13,184	13,796
	G-100-1	LOW	158,902	317,965	578,669	2,950,432	6,321,396	651	1,902	7,467	43,314	75,625
	G-400-1	LOW	158,902	317,544	454,522	550,754	619,639	651	1,902	2,539	2,852	3,382
	G-1000-1	LOW	158,902	317,544	454,256	547,589	594,453	651	1,902	2,539	2,703	2,975
	R-100-1	LOW	314,976	1,564,025	6,294,353	9,031,825	10,107,095	8,879	26,005	71,350	87,296	89,327
	R-400-1	LOW	314,976	1,526,088	3,116,598	5,916,550	8,573,155	8,879	22,881	38,302	65,465	77,881
	R-1000-1	LOW	314,976	1,526,088	3,075,488	4,018,748	5,354,836	8,879	22,881	35,303	43,584	60,667
Non-Structural Plans	NS-100	LOW	136,708	2,237,432	7,132,716	10,465,112	12,068,314	25,702	55,050	77,018	93,527	97,498
	NS-400	LOW	112,146	523,604	3,185,111	9,314,344	11,536,094	25,697	55,045	77,013	93,522	97,493
	NS-1000	LOW	100,176	424,235	800,901	3,962,892	9,373,583	25,008	54,356	76,322	92,831	96,802

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 36b

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, High Sea Level Rise Scenario

2075

Planning Unit 3b

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	1,543,136	5,447,079	8,781,521	11,680,354	12,768,788	38,428	67,224	88,942	98,023	98,712
Coastal Restoration Plan	Sustained Coast	HIGH	1,545,157	5,451,942	8,778,612	11,673,345	12,766,160	38,412	67,205	88,852	97,568	98,712
Comprehensive Plans	C-F-100-1	HIGH	102,214	508,380	5,091,999	10,643,294	11,235,593	3,488	6,981	68,502	97,616	97,788
	C-F-400-1	HIGH	87,699	276,838	800,066	1,364,855	1,883,722	3,483	6,845	12,537	15,008	29,477
	C-F-1000-1	HIGH	81,564	195,573	616,166	1,227,573	1,491,164	3,455	6,817	12,406	12,774	13,201
	C-G-100-1	HIGH	84,202	200,244	495,556	2,839,298	6,211,202	656	1,986	7,251	43,108	75,409
	C-R-100-1	HIGH	125,168	1,584,659	6,398,804	9,112,817	10,074,640	13,012	29,746	75,521	87,643	88,313
	C-R-400-1	HIGH	109,572	363,910	2,466,412	5,812,408	8,441,303	13,007	26,617	42,468	65,807	76,862
Structural Plans	F-100-1	HIGH	285,170	749,622	5,287,236	10,827,789	11,415,691	3,892	7,543	69,064	98,178	98,350
	F-400-1	HIGH	285,170	747,251	1,144,609	1,621,420	2,111,542	3,892	7,412	13,104	15,575	30,044
	F-1000-1	HIGH	285,170	747,251	1,142,672	1,593,029	1,772,708	3,892	7,412	13,001	13,369	13,796
	G-100-1	HIGH	196,234	357,355	633,175	2,969,104	6,338,016	872	2,202	7,467	43,324	75,625
	G-400-1	HIGH	196,234	356,934	509,028	569,425	636,259	872	2,202	2,539	2,862	3,382
	G-1000-1	HIGH	196,234	356,934	508,762	566,260	611,074	872	2,202	2,539	2,713	2,975
	R-100-1	HIGH	455,965	2,055,069	6,693,614	9,388,221	10,340,475	13,635	30,861	76,635	88,757	89,427
	R-400-1	HIGH	455,965	2,017,132	3,515,859	6,272,946	8,806,535	13,635	27,737	43,587	66,926	77,981
	R-1000-1	HIGH	455,965	2,017,131	3,474,750	4,375,143	5,588,216	13,635	27,737	40,588	45,045	60,767
Non-Structural Plans	NS-100	HIGH	346,785	4,259,215	8,294,044	11,338,097	12,492,489	37,789	66,090	87,738	96,454	97,598
	NS-400	HIGH	162,190	825,012	6,048,404	10,694,621	12,143,614	37,784	66,085	87,733	96,449	97,593
	NS-1000	HIGH	135,285	554,601	1,309,291	7,535,509	10,929,434	37,095	65,395	87,042	95,758	96,902

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 37a

Residual Risk/Frequency Damage and Population

Business as Usual Growth, Compact Land Use, Low Sea Level Rise Scenario

2075

Planning Unit 4

Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	LOW	510,574	3,315,417	8,001,213	11,241,476	13,421,682	12,120	34,699	52,560	68,966	78,702
Coastal Restoration Plan	Sustained Coast	LOW	510,968	3,205,878	7,966,840	11,229,214	13,395,037	12,099	34,725	52,611	68,867	78,687
Comprehensive Plans	C-G-100-1	LOW	180,931	529,425	3,902,559	7,369,673	8,296,312	6,960	12,562	50,868	71,935	73,524
	C-G-100-2	LOW	224,358	697,287	4,167,913	7,547,657	8,381,570	7,849	13,874	52,717	72,343	73,610
	C-G-400-3	LOW	194,376	475,332	1,326,353	8,008,736	10,469,385	8,431	14,792	30,603	84,310	88,550
	C-G-1000-3	LOW	145,148	325,816	853,666	2,760,741	6,097,268	7,304	13,618	27,543	45,402	65,899
	C-R-100-1	LOW	206,496	992,576	5,195,654	7,517,467	8,540,864	11,038	26,660	60,292	70,074	72,874
	C-R-400-1	LOW	198,732	530,359	1,511,749	8,227,734	11,133,468	10,572	25,810	37,096	85,259	91,105
	C-R-1000-1	LOW	176,377	477,267	760,746	2,006,576	6,170,585	9,654	24,870	34,270	46,585	68,688
Structural Plans	G-100-1	LOW	468,003	2,574,811	6,333,851	9,786,643	10,777,977	10,392	16,291	54,597	75,664	77,253
	G-100-2	LOW	526,419	2,785,067	6,646,574	10,013,070	10,912,752	11,284	17,606	56,449	76,075	77,342
	G-400-1	LOW	468,003	2,569,970	4,937,093	8,806,386	11,099,389	10,392	16,052	20,535	59,116	64,553
	G-400-2	LOW	526,419	2,780,230	5,233,634	9,132,716	11,438,439	11,284	17,367	21,936	60,522	66,034
	G-400-3	LOW	531,703	2,807,691	5,660,053	11,568,986	13,834,303	12,948	19,605	35,416	89,123	93,363
	G-1000-1	LOW	468,003	2,569,970	4,926,718	6,678,162	7,973,023	10,392	16,052	20,196	28,814	41,700
	G-1000-2	LOW	526,419	2,780,230	5,223,256	7,004,359	8,311,446	11,284	17,367	21,597	30,220	43,106
	G-1000-3	LOW	531,703	2,807,691	5,641,572	8,534,137	10,747,208	12,948	19,605	33,530	51,389	71,886
	R-100-1	LOW	565,419	2,870,672	7,613,564	9,957,419	10,961,887	14,526	30,462	64,103	73,885	76,685
	R-400-1	LOW	565,853	2,864,789	6,591,584	11,953,539	14,329,106	14,641	30,192	41,487	89,650	95,496
	R-1000-1	LOW	565,853	2,864,789	6,573,103	8,918,689	11,242,011	14,641	30,192	39,601	51,916	74,019
Non-Structural Plans	NS-100	LOW	151,859	1,209,393	5,529,871	8,783,916	10,971,794	8,611	30,923	48,800	65,056	74,876
	NS-400	LOW	143,660	507,461	1,972,790	7,162,304	10,061,461	8,030	30,343	48,220	64,476	74,296
	NS-1000	LOW	121,306	454,241	820,490	2,560,958	7,422,625	7,112	29,403	47,280	63,536	73,356

Source: GIS Economic Application Databases

Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 37b
Residual Risk/Frequency Damage and Population
Business as Usual Growth, Compact Land Use, High Sea Level Rise Scenario
2075
Planning Unit 4
Louisiana Coastal Protection and Restoration

	Alternative	Sea Level Rise	Damages at each Frequency Storm Event ($1000's)					Population Impacted at each Frequency Storm Event				
			10yr	100yr	400yr	1000yr	2000yr	10yr	100yr	400yr	1000yr	2000yr
No Action Scenario	Degraded Coast	HIGH	794,229	5,182,611	9,282,981	12,313,476	14,372,660	18,938	42,043	61,154	79,743	84,244
Coastal Restoration Plan	Sustained Coast	HIGH	794,732	5,224,467	9,263,331	12,299,273	14,387,342	18,882	42,056	61,906	78,954	84,264
Comprehensive Plans	C-G-100-1	HIGH	195,022	1,384,000	4,418,079	7,935,584	8,745,342	9,028	14,266	55,759	73,788	74,927
	C-G-100-2	HIGH	258,597	1,596,174	4,705,068	8,125,159	8,839,801	9,929	15,580	57,608	74,196	75,013
	C-G-400-3	HIGH	214,761	559,640	2,358,964	8,791,730	10,981,277	10,513	16,498	35,494	86,163	89,953
	C-G-1000-3	HIGH	153,422	375,060	1,073,239	4,216,415	6,970,486	9,339	15,324	32,434	47,255	67,302
	C-R-100-1	HIGH	234,690	2,405,245	6,087,644	8,246,569	9,253,917	16,915	30,305	65,898	73,375	74,779
	C-R-400-1	HIGH	219,858	665,916	3,320,850	9,394,238	11,932,755	16,450	29,422	42,702	88,560	93,010
	C-R-1000-1	HIGH	196,782	557,435	1,090,048	4,148,239	7,581,106	15,510	28,482	39,876	49,886	70,593
Structural Plans	G-100-1	HIGH	674,073	3,735,265	6,816,964	10,411,185	11,093,856	12,710	17,995	59,488	77,517	78,656
	G-100-2	HIGH	757,811	3,990,594	7,152,286	10,649,409	11,238,530	13,614	19,312	61,340	77,928	78,745
	G-400-1	HIGH	674,073	3,730,424	5,420,207	9,430,928	11,415,268	12,710	17,756	25,426	60,969	65,956
	G-400-2	HIGH	757,811	3,985,757	5,739,345	9,769,055	11,764,216	13,614	19,073	26,827	62,375	67,437
	G-400-3	HIGH	763,095	4,013,218	6,165,764	12,205,326	14,160,081	15,278	21,311	40,307	90,976	94,766
	G-1000-1	HIGH	674,073	3,730,424	5,409,831	7,302,704	8,288,903	12,710	17,756	25,087	30,667	43,103
	G-1000-2	HIGH	757,811	3,985,757	5,728,968	7,640,698	8,637,223	13,614	19,073	26,488	32,073	44,509
	G-1000-3	HIGH	763,095	4,013,218	6,147,283	9,170,476	11,072,986	15,278	21,311	38,421	53,242	73,289
	R-100-1	HIGH	843,499	4,570,188	8,523,335	10,673,414	11,662,544	20,670	34,107	69,709	77,186	78,590
	R-400-1	HIGH	843,932	4,564,305	7,484,787	12,665,627	15,029,264	20,785	33,804	47,093	92,951	97,401
	R-1000-1	HIGH	843,932	4,564,305	7,466,306	9,630,777	11,942,169	20,785	33,804	45,207	55,217	75,924
Non-Structural Plans	NS-100	HIGH	182,198	2,968,776	6,818,273	9,869,128	11,977,617	15,127	38,254	58,095	75,143	80,453
	NS-400	HIGH	166,191	667,643	4,523,906	8,854,850	11,202,059	14,547	37,674	57,515	74,563	79,873
	NS-1000	HIGH	143,114	550,499	1,229,497	5,665,354	9,552,362	13,607	36,734	56,575	73,623	78,933

Source: GIS Economic Application Databases
Note: There is a 90 percent chance that values are less than the indicated value, or only a 10 percent chance that values exceed the indicated value. All damages are in 2007 prices.

Table 38
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU1-0	NA	10	172,658	293,245	442,270	13,923	26,486	37,371	580	961	1,471	17,682	81,216	76,072	62,571	317,040	287,017
Degraded Coast PU1-0	NA	50	247,932	555,458	715,884	15,139	30,240	41,502	858	2,851	3,036	28,965	264,860	203,877	112,826	1,019,409	786,767
Degraded Coast PU1-0	NA	90	445,123	1,190,034	1,401,187	17,091	41,065	51,017	1,590	6,470	6,339	58,049	597,237	448,539	216,861	2,341,417	1,741,951
Sustained Coast PU1-R	NA*	10	172,658	260,477	422,566	13,923	25,896	37,016	580	915	1,443	17,682	77,299	73,716	62,571	302,864	278,493
Sustained Coast PU1-R	NA*	50	247,932	389,549	616,120	15,139	28,146	40,243	858	1,490	2,219	28,965	130,010	122,790	112,826	519,649	486,254
Sustained Coast PU1-R	NA*	90	445,123	699,090	1,105,974	17,091	31,247	45,113	1,590	4,214	4,983	58,049	388,302	322,903	216,861	1,502,437	1,237,459
Comprehensive Plans																	
C-HL-a-100-2	12	10	74,557	86,523	264,239	11,378	19,299	31,018	257	279	882	6,347	20,615	35,523	22,278	72,398	128,643
C-HL-a-100-2	12	50	106,061	136,959	399,042	12,286	20,694	33,710	427	659	1,594	12,911	57,828	82,892	49,649	233,627	325,363
C-HL-a-100-2	12	90	273,035	421,526	872,515	14,073	23,634	39,008	1,171	2,046	3,709	42,627	186,504	213,832	156,233	718,950	816,653
C-HL-a-100-3	12	10	74,920	88,187	263,143	11,488	19,682	31,233	252	283	874	6,206	21,238	35,572	21,801	74,818	128,960
C-HL-a-100-3	12	50	106,394	140,939	397,973	12,418	21,302	34,023	423	701	1,601	12,843	61,166	84,005	49,431	245,137	329,260
C-HL-a-100-3	12	90	271,823	425,427	869,609	14,194	24,230	39,309	1,163	2,108	3,717	42,406	193,462	215,898	155,457	745,426	824,517
C-HL-b-400-2	16	10	72,952	83,157	279,388	11,210	18,911	31,154	253	253	924	6,150	18,018	37,253	21,531	61,726	135,803
C-HL-b-400-2	16	50	73,782	84,889	394,922	11,340	19,179	33,173	254	259	1,494	6,182	18,575	76,162	21,694	63,800	291,777
C-HL-b-400-2	16	90	81,039	97,576	708,260	11,702	19,751	37,294	289	326	2,864	7,537	24,722	159,305	27,188	86,227	609,504
C-HL-b-400-3	16	10	73,516	84,793	276,886	11,322	19,297	31,321	247	248	910	5,996	17,711	36,770	21,010	60,672	134,093
C-HL-b-400-3	16	50	74,584	87,315	391,404	11,485	19,821	33,435	248	263	1,481	6,045	19,233	75,916	21,223	65,560	290,717
C-HL-b-400-3	16	90	82,105	102,320	704,215	11,904	20,549	37,636	287	351	2,853	7,529	27,575	159,475	27,102	95,961	609,744
C-LP-a-100-1	14	10	74,918	93,811	270,868	11,540	20,715	31,885	224	255	825	5,657	20,263	35,308	20,124	79,198	131,824
C-LP-a-100-1	14	50	87,287	124,488	386,921	12,078	22,428	34,496	277	520	1,421	7,681	44,624	77,864	29,588	157,203	299,368
C-LP-a-100-1	14	90	151,337	265,482	744,483	13,500	25,316	39,725	591	1,423	3,102	19,471	127,186	183,109	73,712	509,233	709,793
C-LP-a-100-2	14	10	74,396	85,735	275,534	11,156	18,732	30,998	260	270	884	6,444	19,750	36,502	22,895	70,908	133,405
C-LP-a-100-2	14	50	91,170	111,661	398,509	11,572	19,496	33,212	326	389	1,479	8,895	30,705	75,855	33,076	111,756	292,473
C-LP-a-100-2	14	90	152,427	222,796	751,189	12,511	21,251	37,747	611	1,013	3,057	19,780	86,925	172,108	72,215	347,770	661,309
C-LP-a-100-3	14	10	74,513	87,017	274,673	11,229	19,103	31,162	254	269	876	6,290	20,064	36,441	22,369	73,235	133,544
C-LP-a-100-3	14	50	90,953	113,430	397,038	11,671	19,986	33,433	320	417	1,477	8,729	33,003	76,359	32,542	119,181	294,070
C-LP-a-100-3	14	90	152,240	227,177	749,919	12,614	21,756	37,976	607	1,077	3,068	19,725	93,110	173,942	72,189	365,261	666,557
C-LP-b-400-1	16	10	72,604	87,648	271,995	11,325	20,239	31,572	219	220	816	5,495	16,701	33,685	19,243	57,732	123,355
C-LP-b-400-1	16	50	75,067	93,991	378,498	11,727	21,705	34,075	224	263	1,346	5,691	20,639	72,120	19,968	72,457	277,363
C-LP-b-400-1	16	90	86,650	123,947	684,397	12,658	23,736	38,960	288	586	2,758	8,102	50,151	160,943	28,442	174,881	610,980

Table 38--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
C-LP-b-400-3	16	10	72,065	82,972	279,371	11,094	18,785	31,109	247	248	878	6,000	17,746	35,668	21,020	60,777	129,652
C-LP-b-400-3	16	50	72,925	84,777	392,769	11,229	19,141	33,133	248	257	1,449	6,024	18,561	74,757	21,078	63,084	286,339
C-LP-b-400-3	16	90	81,898	99,393	704,620	11,572	19,776	37,263	293	382	2,830	7,795	30,666	159,668	27,497	102,501	605,372
C-LP-b-1000-1	16	10	71,390	85,774	269,955	11,170	19,917	31,285	219	219	816	5,491	16,618	33,655	19,233	57,388	123,237
C-LP-b-1000-1	16	50	73,390	89,309	375,093	11,516	21,315	33,710	219	219	1,326	5,491	16,658	70,648	19,234	57,464	271,841
C-LP-b-1000-1	16	90	76,772	98,799	667,472	12,307	23,150	38,446	228	303	2,618	5,827	24,154	150,973	20,335	81,968	575,394
C-LP-b-1000-2	16	10	71,319	80,904	279,695	10,894	18,231	30,761	253	253	889	6,150	17,989	35,998	21,531	61,532	130,805
C-LP-b-1000-2	16	50	71,744	81,617	393,197	10,973	18,411	32,697	253	253	1,459	6,150	17,990	74,885	21,531	61,536	286,951
C-LP-b-1000-2	16	90	72,941	83,338	697,418	11,103	18,703	36,596	255	258	2,780	6,230	18,476	155,397	21,763	63,168	591,337
Structural Plans																	
HL-a-100-2	12	10	108,455	129,928	318,440	11,823	20,398	31,894	383	447	1,085	11,108	35,377	45,820	38,473	125,198	164,468
HL-a-100-2	12	50	149,022	194,043	468,376	12,752	21,913	34,647	561	879	1,823	17,904	75,303	94,307	66,938	303,228	367,706
HL-a-100-2	12	90	321,122	484,534	949,847	14,546	24,854	39,955	1,311	2,505	4,019	47,857	229,980	233,586	174,208	884,930	889,671
HL-a-100-3	12	10	114,174	140,034	326,397	11,957	20,846	32,157	392	473	1,101	11,387	38,012	46,998	39,506	135,722	169,110
HL-a-100-3	12	50	156,665	208,154	479,233	12,909	22,587	35,012	571	937	1,853	18,210	80,472	96,438	68,051	322,100	375,483
HL-a-100-3	12	90	328,788	499,604	961,074	14,694	25,519	40,309	1,325	2,581	4,058	48,445	237,603	236,830	176,608	913,985	902,153
HL-b-400-2	16	10	107,897	129,291	335,692	11,793	20,352	32,301	382	446	1,139	11,067	35,245	48,500	38,330	124,763	175,524
HL-b-400-2	16	50	119,344	151,927	470,465	11,961	20,773	34,414	407	641	1,797	12,070	53,284	93,991	42,840	212,060	363,120
HL-b-400-2	16	90	133,683	178,929	796,752	12,331	21,346	38,544	449	987	3,261	13,677	88,310	186,381	48,959	343,178	715,262
HL-b-400-3	16	10	113,826	139,620	342,333	11,928	20,803	32,516	391	472	1,152	11,347	37,882	49,451	39,367	135,297	179,277
HL-b-400-3	16	50	127,749	167,080	480,031	12,132	21,481	34,727	419	703	1,822	12,427	58,774	95,836	44,142	232,156	369,871
HL-b-400-3	16	90	144,556	200,535	809,722	12,560	22,213	38,940	473	1,090	3,306	14,635	98,414	189,959	52,609	380,755	728,618
LP-a-100-1	14	10	121,130	182,018	353,750	11,985	21,920	32,794	471	781	1,285	14,362	68,329	60,661	49,884	251,163	220,866
LP-a-100-1	14	50	157,004	254,389	510,977	12,596	24,047	35,620	609	1,070	1,991	18,710	96,203	107,099	66,941	371,535	410,660
LP-a-100-1	14	90	243,939	421,502	904,144	14,045	27,047	40,916	967	1,946	3,715	32,383	175,913	213,725	121,818	687,400	822,814
LP-a-100-2	14	10	104,523	140,617	328,754	11,519	19,697	31,733	442	625	1,213	12,951	56,045	55,567	45,894	204,893	202,554
LP-a-100-2	14	50	133,478	190,576	473,818	11,993	20,770	34,111	521	792	1,839	15,830	71,508	96,831	57,028	289,539	376,332
LP-a-100-2	14	90	203,907	315,829	841,899	12,934	22,541	38,655	829	1,388	3,435	27,606	124,655	193,204	105,147	491,068	745,286
LP-a-100-3	14	10	107,443	146,964	332,833	11,613	20,131	31,942	447	658	1,227	13,024	58,332	56,390	46,225	212,804	205,453
LP-a-100-3	14	50	137,186	199,243	479,204	12,113	21,324	34,379	528	828	1,856	15,990	74,204	97,850	57,625	298,595	379,795
LP-a-100-3	14	90	209,058	329,210	849,835	13,059	23,110	38,931	840	1,460	3,467	27,990	131,263	195,696	106,432	510,269	752,639
LP-b-400-1	16	10	120,732	181,470	358,920	11,979	21,902	32,873	470	778	1,291	14,320	68,028	60,193	49,753	250,194	219,647
LP-b-400-1	16	50	152,051	243,870	517,480	12,472	23,793	35,618	589	1,027	2,021	18,050	92,626	109,276	64,749	358,930	419,929

Table 38--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
LP-b-400-1	16	90	195,149	329,310	878,455	13,430	25,937	40,570	748	1,516	3,598	24,157	137,805	207,393	90,710	534,771	797,311
LP-b-400-3	16	10	105,712	145,034	339,048	11,575	20,074	32,087	441	650	1,235	12,792	57,487	56,142	45,258	209,541	204,869
LP-b-400-3	16	50	120,642	175,968	478,385	11,787	20,751	34,302	468	727	1,859	13,835	65,142	98,575	49,171	265,052	382,668
LP-b-400-3	16	90	141,732	210,891	811,093	12,134	21,403	38,442	545	854	3,279	16,904	77,018	184,975	65,703	304,918	714,000
LP-b-1000-1	16	10	120,732	181,470	358,920	11,979	21,902	32,873	470	778	1,291	14,320	68,028	60,193	49,753	250,194	219,647
LP-b-1000-1	16	50	151,951	243,751	517,384	12,458	23,775	35,605	589	1,027	2,021	18,048	92,610	109,269	64,741	358,877	419,909
LP-b-1000-1	16	90	190,719	322,680	873,815	13,284	25,738	40,423	716	1,455	3,561	22,910	132,303	205,008	86,246	514,409	788,575
LP-b-1000-2	16	10	102,743	138,632	335,357	11,479	19,635	31,899	437	617	1,223	12,717	55,197	55,417	44,918	201,612	202,310
LP-b-1000-2	16	50	116,132	166,420	472,831	11,637	20,142	34,031	460	689	1,843	13,640	62,344	97,627	48,460	255,668	379,454
LP-b-1000-2	16	90	128,013	186,249	795,506	11,770	20,450	37,940	491	708	3,203	14,875	63,750	179,813	58,245	260,529	696,326
Non-Structural Plans																	
NS-100	15	10	50,946	79,804	204,285	13,268	24,278	32,289	47	252	542	1,598	23,052	21,464	5,152	92,096	78,648
NS-100	15	50	81,608	168,277	319,466	14,462	26,408	35,151	270	756	1,146	9,958	71,641	53,898	38,714	285,732	211,928
NS-100	15	90	244,327	460,296	732,412	16,403	29,502	39,672	948	3,373	3,236	37,043	313,629	179,877	136,739	1,227,410	687,404
NS-400	15	10	27,007	44,929	166,594	12,584	23,207	31,188	1	2	413	25	119	12,594	101	583	44,631
NS-400	15	50	31,946	55,229	228,670	13,758	25,301	34,018	11	69	642	401	6,497	22,986	2,486	26,443	90,929
NS-400	15	90	86,018	163,494	462,664	15,684	28,377	38,517	326	863	1,760	13,465	82,958	81,951	67,017	368,066	342,937
NS-1000	15	10	17,157	31,384	151,334	9,662	17,049	25,999	0	0	411	0	0	12,529	0	0	44,337
NS-1000	15	50	21,334	37,833	211,362	10,797	19,069	28,761	3	5	613	139	695	20,895	1,474	5,929	83,438
NS-1000	15	90	40,499	73,197	383,568	12,637	21,965	33,107	132	305	1,370	6,212	32,518	58,182	43,586	192,917	262,371

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 39
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU1-0	NA	10	172,658	425,399	521,736	13,923	28,867	38,803	580	1,994	2,092	17,682	178,032	134,288	62,571	710,770	523,773
Degraded Coast PU1-0	NA	50	247,932	912,039	930,302	15,139	36,301	45,147	858	4,897	4,267	28,965	447,690	313,816	112,826	1,743,220	1,222,006
Degraded Coast PU1-0	NA	90	445,123	2,400,566	2,129,099	17,091	48,932	55,748	1,590	14,286	11,040	58,049	1,343,018	896,989	216,861	5,165,302	3,439,998
Sustained Coast PU1-R	NA*	10	172,658	361,699	483,432	13,923	27,831	38,180	580	1,587	1,847	17,682	139,826	111,315	62,571	551,275	427,866
Sustained Coast PU1-R	NA*	50	247,932	517,611	693,125	15,139	29,993	41,354	858	3,164	3,225	28,965	286,955	217,164	112,826	1,058,989	810,567
Sustained Coast PU1-R	NA*	90	445,123	1,043,568	1,313,115	17,091	33,687	46,581	1,590	4,872	5,378	58,049	446,046	357,625	216,861	1,679,444	1,343,896
Comprehensive Plans																	
C-HL-a-100-2	12	10	74,557	95,917	281,377	11,378	19,657	31,392	257	443	1,048	6,347	37,217	51,387	22,278	146,172	195,855
C-HL-a-100-2	12	50	106,061	163,570	444,623	12,286	20,973	34,415	427	730	1,837	12,911	63,428	104,623	49,649	257,757	411,766
C-HL-a-100-2	12	90	273,035	473,171	1,014,276	14,073	24,056	39,947	1,171	2,083	4,498	42,627	189,686	288,977	156,233	733,169	1,102,035
C-HL-a-100-3	12	10	74,920	101,009	281,693	11,488	20,323	31,712	252	520	1,066	6,206	45,261	54,094	21,801	176,366	206,088
C-HL-a-100-3	12	50	106,394	178,282	447,582	12,418	21,854	34,829	423	854	1,875	12,843	76,043	109,093	49,431	304,362	428,338
C-HL-a-100-3	12	90	271,823	499,322	1,019,587	14,194	24,934	40,352	1,163	2,239	4,540	42,406	205,451	294,301	155,457	786,292	1,119,758
C-HL-b-400-2	16	10	72,952	85,580	299,461	11,210	19,269	31,611	253	257	1,076	6,150	18,307	51,432	21,531	63,052	193,349
C-HL-b-400-2	16	50	73,782	90,261	448,951	11,340	19,457	34,153	254	286	1,801	6,182	21,102	103,608	21,694	74,907	400,825
C-HL-b-400-2	16	90	81,039	110,558	890,271	11,702	20,174	38,583	289	360	4,031	7,537	27,638	270,592	27,188	100,028	1,031,707
C-HL-b-400-3	16	10	73,516	88,130	297,165	11,322	19,938	31,863	247	259	1,063	5,996	18,810	51,122	21,010	64,312	192,067
C-HL-b-400-3	16	50	74,584	96,100	446,337	11,485	20,374	34,496	248	319	1,796	6,045	25,104	104,291	21,223	86,753	402,494
C-HL-b-400-3	16	90	82,105	124,279	888,717	11,904	21,253	39,009	287	442	4,037	7,529	36,437	272,487	27,102	124,662	1,036,210
C-LP-a-100-1	14	10	74,918	114,708	295,442	11,540	22,892	32,929	224	594	1,068	5,657	53,273	58,524	20,124	166,897	211,194
C-LP-a-100-1	14	50	87,287	179,025	450,075	12,078	24,727	36,027	277	942	1,815	7,681	84,571	113,855	29,588	343,062	450,517
C-LP-a-100-1	14	90	151,337	381,601	933,294	13,500	27,215	41,341	591	1,768	4,183	19,471	163,282	287,332	73,712	677,039	1,115,342
C-LP-a-100-2	14	10	74,396	90,197	293,963	11,156	19,221	31,467	260	283	1,017	6,444	21,056	48,993	22,895	74,377	184,305
C-LP-a-100-2	14	50	91,170	120,027	445,681	11,572	19,903	34,100	326	435	1,746	8,895	35,058	99,768	33,076	151,518	394,128
C-LP-a-100-2	14	90	152,427	236,388	905,182	12,511	21,756	38,891	611	1,099	4,049	19,780	95,614	266,975	72,215	368,754	1,016,507
C-LP-a-100-3	14	10	74,513	94,166	294,131	11,229	19,839	31,715	254	346	1,030	6,290	27,020	50,804	22,369	91,176	189,245
C-LP-a-100-3	14	50	90,953	129,966	447,067	11,671	20,612	34,395	320	518	1,763	8,729	43,513	102,362	32,542	177,305	401,960
C-LP-a-100-3	14	90	152,240	254,569	908,626	12,614	22,521	39,208	607	1,223	4,081	19,725	108,903	271,220	72,189	412,378	1,030,628
C-LP-b-400-1	16	10	72,604	95,049	293,051	11,325	22,385	32,555	219	293	987	5,495	24,132	49,851	19,243	78,005	186,298
C-LP-b-400-1	16	50	75,067	113,478	436,301	11,727	23,983	35,646	224	662	1,768	5,691	59,418	110,719	19,968	181,802	416,452
C-LP-b-400-1	16	90	86,650	176,050	878,138	12,658	25,615	40,681	288	1,001	4,039	8,102	91,182	283,565	28,442	311,086	1,068,791

Table 39--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
C-LP-b-400-3	16	10	72,065	86,919	299,737	11,094	19,489	31,666	247	292	1,044	6,000	22,260	51,278	21,020	72,618	190,895
C-LP-b-400-3	16	50	72,925	93,353	447,792	11,229	19,746	34,208	248	354	1,781	6,024	28,241	104,729	21,078	92,510	402,312
C-LP-b-400-3	16	90	81,898	117,054	888,854	11,572	20,520	38,647	293	477	4,015	7,795	40,549	272,933	27,497	137,793	1,033,742
C-LP-b-1000-1	16	10	71,390	91,031	290,347	11,170	21,994	32,247	219	226	966	5,491	17,276	47,723	19,233	58,612	180,280
C-LP-b-1000-1	16	50	73,390	97,072	429,265	11,516	23,553	35,269	219	278	1,642	5,491	22,205	98,954	19,234	74,373	382,302
C-LP-b-1000-1	16	90	76,772	121,541	852,120	12,307	24,964	40,146	228	617	3,867	5,827	54,703	270,349	20,335	173,371	1,019,329
C-LP-b-1000-2	16	10	71,319	82,383	299,383	10,894	18,680	31,242	253	254	1,042	6,150	18,085	50,293	21,531	62,023	188,675
C-LP-b-1000-2	16	50	71,744	83,282	446,225	10,973	18,797	33,707	253	258	1,763	6,150	18,378	102,059	21,531	63,596	394,690
C-LP-b-1000-2	16	90	72,941	87,185	877,568	11,103	19,187	37,903	255	267	3,939	6,230	19,328	265,959	21,763	66,582	1,010,177
Structural Plans																	
HL-a-100-2	12	10	108,455	149,035	338,586	11,823	20,863	32,301	383	659	1,265	11,108	54,462	62,453	38,473	215,737	236,872
HL-a-100-2	12	50	149,022	227,710	516,143	12,752	22,210	35,358	561	1,192	2,141	17,904	107,070	124,142	66,938	424,957	484,336
HL-a-100-2	12	90	321,122	581,849	1,105,752	14,546	25,332	40,911	1,311	2,546	4,810	47,857	233,348	308,789	174,208	900,661	1,175,521
HL-a-100-3	12	10	114,174	165,123	348,747	11,957	21,598	32,670	392	751	1,306	11,387	63,225	65,888	39,506	248,656	249,765
HL-a-100-3	12	50	156,665	253,813	531,418	12,909	23,160	35,824	571	1,333	2,201	18,210	120,478	129,309	68,051	474,604	503,451
HL-a-100-3	12	90	328,788	619,504	1,125,301	14,694	26,280	41,369	1,325	2,720	4,884	48,445	250,001	315,359	176,608	957,077	1,198,084
HL-b-400-2	16	10	107,897	148,398	360,932	11,793	20,817	32,792	382	658	1,355	11,067	54,330	68,501	38,330	215,302	260,700
HL-b-400-2	16	50	119,344	185,594	533,258	11,961	21,070	35,400	407	953	2,193	12,070	85,050	130,492	42,840	333,789	506,430
HL-b-400-2	16	90	133,683	276,244	1,004,882	12,331	21,824	39,851	449	1,028	4,430	13,677	91,678	297,809	48,959	358,909	1,138,062
HL-b-400-3	16	10	113,826	164,708	369,349	11,928	21,555	33,092	391	750	1,388	11,347	63,094	71,271	39,367	248,230	271,101
HL-b-400-3	16	50	127,749	212,740	546,384	12,132	22,054	35,795	419	1,098	2,243	12,427	98,780	134,783	44,142	384,660	522,316
HL-b-400-3	16	90	144,556	320,435	1,024,557	12,560	22,974	40,330	473	1,229	4,504	14,635	110,812	304,067	52,609	423,847	1,159,540
LP-a-100-1	14	10	121,130	244,561	391,222	11,985	24,550	33,978	471	1,148	1,537	14,362	104,937	84,992	49,884	378,350	312,466
LP-a-100-1	14	50	157,004	334,538	582,064	12,596	26,563	37,219	609	1,470	2,379	18,710	133,792	142,360	66,941	523,143	551,201
LP-a-100-1	14	90	243,939	548,885	1,096,444	14,045	29,062	42,568	967	2,330	4,808	32,383	215,798	319,121	121,818	882,092	1,236,690
LP-a-100-2	14	10	104,523	166,900	353,940	11,519	20,534	32,310	442	682	1,360	12,951	61,502	69,344	45,894	250,152	266,397
LP-a-100-2	14	50	133,478	212,871	525,304	11,993	21,293	35,036	521	811	2,097	15,830	72,870	119,818	57,028	295,169	467,416
LP-a-100-2	14	90	203,907	337,843	998,500	12,934	23,154	39,833	829	1,488	4,432	27,606	134,699	288,490	105,147	518,036	1,102,337
LP-a-100-3	14	10	107,443	180,011	360,312	11,613	21,216	32,603	447	755	1,387	13,024	67,955	71,579	46,225	269,023	273,010
LP-a-100-3	14	50	137,186	232,800	534,505	12,113	22,069	35,378	528	904	2,133	15,990	81,830	122,959	57,625	323,069	477,263
LP-a-100-3	14	90	209,058	366,367	1,011,566	13,059	23,988	40,198	840	1,624	4,485	27,990	148,563	293,440	106,432	564,011	1,118,762
LP-b-400-1	16	10	120,732	244,013	397,054	11,979	24,533	34,007	470	1,145	1,553	14,320	104,635	85,395	49,753	377,381	315,702
LP-b-400-1	16	50	152,051	324,020	594,071	12,472	26,309	37,263	589	1,428	2,443	18,050	130,215	147,505	64,749	510,538	572,108

Table 39--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
LP-b-400-1	16	90	195,149	456,694	1,095,511	13,430	27,952	42,333	748	1,900	4,869	24,157	177,690	329,660	90,710	729,463	1,273,236
LP-b-400-3	16	10	105,712	178,081	368,426	11,575	21,159	32,762	441	747	1,417	12,792	67,110	73,335	45,258	265,761	279,857
LP-b-400-3	16	50	120,642	209,524	541,145	11,787	21,496	35,421	468	802	2,184	13,835	72,768	127,911	49,171	289,526	497,108
LP-b-400-3	16	90	141,732	248,048	1,001,366	12,134	22,280	39,867	545	1,017	4,485	16,904	94,317	300,538	65,703	358,659	1,148,084
LP-b-1000-1	16	10	120,732	244,013	397,054	11,979	24,533	34,007	470	1,145	1,553	14,320	104,635	85,395	49,753	377,381	315,702
LP-b-1000-1	16	50	151,951	323,901	593,975	12,458	26,291	37,249	589	1,428	2,443	18,048	130,199	147,499	64,741	510,485	572,088
LP-b-1000-1	16	90	190,719	450,063	1,090,872	13,284	27,753	42,186	716	1,840	4,832	22,910	172,188	327,275	86,246	709,101	1,264,499
LP-b-1000-2	16	10	102,743	164,914	362,727	11,479	20,471	32,500	437	674	1,393	12,717	60,653	71,373	44,918	246,871	274,044
LP-b-1000-2	16	50	116,132	188,716	532,248	11,637	20,666	35,084	460	708	2,152	13,640	63,706	125,103	48,460	261,298	488,299
LP-b-1000-2	16	90	128,013	208,262	981,283	11,770	21,064	39,287	491	807	4,390	14,875	73,794	293,222	58,245	287,497	1,122,462
Non-Structural Plans																	
NS-100	15	10	50,946	137,747	222,231	13,268	26,103	32,854	47	923	750	1,598	90,687	42,411	5,152	366,529	163,644
NS-100	15	50	81,608	279,620	353,950	14,462	28,233	35,717	270	2,314	1,628	9,958	211,692	97,273	38,714	795,459	369,797
NS-100	15	90	244,327	788,563	834,080	16,403	31,885	40,410	948	4,001	3,430	37,043	368,859	196,982	136,739	1,396,225	739,688
NS-400	15	10	27,007	53,634	169,290	12,584	25,031	31,753	1	28	421	25	2,795	13,423	101	10,416	47,677
NS-400	15	50	31,946	78,623	235,915	13,758	27,126	34,583	11	327	722	401	32,565	31,060	2,486	120,541	120,073
NS-400	15	90	86,018	226,942	482,315	15,684	30,760	39,255	326	1,050	1,818	13,465	102,691	88,062	67,017	437,769	364,525
NS-1000	15	10	17,157	38,095	153,413	9,662	18,874	26,564	0	0	411	0	53	12,546	0	171	44,390
NS-1000	15	50	21,334	46,128	213,931	10,797	20,894	29,326	3	59	629	139	6,109	22,572	1,474	23,692	88,939
NS-1000	15	90	40,499	96,577	390,809	12,637	24,348	33,845	132	449	1,414	6,212	46,421	62,488	43,586	237,981	276,328

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 40
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU2-0	NA	10	128,933	986,481	791,776	6,334	20,393	22,019	429	4,288	3,239	19,424	423,469	284,556	152,158	2,039,494	1,460,742
Degraded Coast PU2-0	NA	50	277,720	2,362,345	1,848,273	8,163	28,122	29,484	1,020	11,129	8,264	42,462	1,063,023	704,614	238,059	5,115,575	3,442,747
Degraded Coast PU2-0	NA	90	372,357	2,644,708	2,163,829	8,802	29,269	31,156	1,386	11,508	9,054	56,918	1,100,079	749,163	344,510	5,409,609	3,783,515
Sustained Coast PU1-R	NA*	10	128,933	232,403	338,337	6,334	9,663	15,567	429	903	1,203	19,424	78,812	77,308	152,158	546,117	562,750
Sustained Coast PU1-R	NA*	50	277,720	489,798	722,281	8,163	11,878	19,716	1,020	2,184	2,885	42,462	202,082	186,917	238,059	1,157,967	1,062,974
Sustained Coast PU1-R	NA*	90	372,357	653,695	966,601	8,802	12,624	21,148	1,386	2,780	3,806	56,918	268,914	249,370	344,510	1,646,366	1,520,617
Comprehensive Plans																	
C-G-100-1	11	10	27,160	80,698	231,522	5,276	9,176	14,977	13	260	747	436	18,641	57,924	2,018	100,280	329,522
C-G-100-1	11	50	34,866	127,845	494,788	5,861	9,442	17,773	89	661	2,062	3,104	50,205	147,540	15,440	290,834	751,394
C-G-100-1	11	90	55,231	180,511	632,898	6,416	9,823	19,020	185	894	2,558	7,192	77,380	176,175	35,840	599,694	983,642
C-G-100-4	11	10	23,115	45,710	217,631	3,898	6,574	12,898	13	120	713	433	7,910	54,118	1,998	58,488	315,040
C-G-100-4	11	50	29,479	81,703	476,710	4,330	6,776	15,549	83	402	1,986	2,939	29,475	140,037	14,691	192,602	716,484
C-G-100-4	11	90	48,840	122,785	610,784	4,814	7,192	16,755	188	604	2,484	7,312	53,771	168,047	36,567	484,387	944,920
C-G-400-4	13	10	20,711	32,802	234,405	3,811	6,172	13,140	8	46	781	257	3,391	61,361	1,075	10,425	335,701
C-G-400-4	13	50	23,215	39,601	521,436	4,051	6,230	15,847	9	72	2,097	297	6,320	155,085	1,250	46,701	768,412
C-G-400-4	13	90	26,185	52,223	643,912	4,261	6,308	16,772	17	127	2,492	611	11,272	174,428	3,471	65,520	898,970
C-G-1000-4	13	10	18,209	22,633	228,248	3,650	5,640	12,782	8	43	780	253	3,194	61,295	1,062	8,791	335,180
C-G-1000-4	13	50	19,377	25,362	512,416	3,791	5,689	15,367	8	47	2,088	253	3,649	154,204	1,062	15,436	758,505
C-G-1000-4	13	90	20,632	29,723	630,447	3,962	5,723	16,250	10	68	2,465	309	5,709	172,349	1,485	41,463	889,166
C-R-100-2	11	10	33,718	73,167	228,912	5,143	7,532	14,215	37	230	758	1,295	18,571	58,620	5,655	126,145	333,261
C-R-100-2	11	50	85,536	195,535	555,731	6,210	8,818	17,793	313	1,070	2,403	11,921	108,261	176,393	54,198	729,347	937,101
C-R-100-2	11	90	199,946	373,101	820,868	7,055	9,828	19,510	756	1,836	3,367	29,449	179,667	232,581	133,188	1,085,447	1,245,191
C-R-100-3	11	10	31,051	65,102	226,403	4,437	6,652	13,324	36	193	755	1,279	16,029	57,580	5,555	107,703	327,110
C-R-100-3	11	50	81,961	181,090	550,566	5,496	7,954	16,902	307	945	2,368	11,700	94,442	171,621	53,304	672,391	917,512
C-R-100-3	11	90	195,698	353,727	813,516	6,363	8,999	18,650	756	1,718	3,340	29,433	166,578	228,264	133,157	1,031,735	1,227,721
C-R-100-4	11	10	30,370	62,652	225,807	4,214	6,187	12,971	34	167	752	1,181	13,377	56,575	4,800	90,024	320,791
C-R-100-4	11	50	80,791	175,486	548,822	5,224	7,455	16,497	296	854	2,332	11,169	82,318	166,680	49,412	573,241	877,852
C-R-100-4	11	90	194,329	342,587	810,053	6,057	8,499	18,217	746	1,586	3,307	29,017	150,327	222,563	130,066	910,897	1,185,495
C-R-400-2	13	10	23,696	30,086	226,321	4,878	7,172	14,201	8	9	750	255	738	60,339	1,070	3,086	325,205
C-R-400-2	13	50	27,525	40,024	512,351	5,278	7,593	17,159	12	63	2,068	375	6,046	155,389	1,807	33,582	764,546
C-R-400-2	13	90	38,991	63,991	642,466	5,564	7,924	18,227	50	152	2,481	1,882	14,923	176,516	8,714	94,752	909,335

Table 40--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
C-R-400-3	11	10	21,314	26,909	204,931	4,200	6,325	12,988	8	9	670	255	738	51,668	1,070	3,086	289,446
C-R-400-3	11	50	25,017	36,368	452,721	4,578	6,745	15,664	12	56	1,800	370	5,351	131,521	1,789	30,016	659,943
C-R-400-3	11	90	36,166	59,056	572,768	4,859	7,079	16,679	49	143	2,188	1,828	14,036	151,551	8,503	90,724	799,234
C-R-400-4	13	10	20,691	25,661	227,721	3,976	5,860	13,119	8	9	776	255	725	60,640	1,070	2,997	329,271
C-R-400-4	13	50	24,173	34,585	514,721	4,294	6,232	16,002	11	51	2,098	343	4,870	155,481	1,590	26,183	764,845
C-R-400-4	13	90	34,961	55,978	645,385	4,515	6,533	17,014	46	128	2,522	1,687	12,120	176,625	7,469	76,000	910,179
C-R-1000-4	13	10	18,911	22,816	224,702	3,839	5,693	12,903	8	8	776	252	609	60,601	1,059	2,672	329,160
C-R-1000-4	13	50	20,969	26,047	508,508	4,137	6,039	15,761	9	15	2,084	259	1,283	154,280	1,085	7,226	758,413
C-R-1000-4	13	90	22,343	31,313	625,894	4,228	6,185	16,628	11	30	2,462	334	2,683	172,435	1,589	17,875	886,372
C-WBI-100-1	6	10	34,525	86,795	199,685	5,878	8,976	14,954	39	306	637	1,331	24,233	46,682	5,890	152,359	289,942
C-WBI-100-1	6	50	87,330	222,761	458,805	7,083	10,250	18,200	328	1,287	1,984	12,372	124,260	141,621	56,171	795,428	793,845
C-WBI-100-1	6	90	201,441	424,227	739,028	7,990	11,272	20,047	760	2,136	3,055	29,548	209,531	211,433	134,439	1,242,688	1,182,165
C-WBI-400-1	12	10	24,320	33,698	215,656	5,614	8,618	15,094	8	15	707	255	1,054	56,674	1,070	4,274	309,593
C-WBI-400-1	12	50	28,723	47,069	480,081	6,198	9,080	18,072	13	136	1,930	417	11,630	145,478	2,031	59,029	721,272
C-WBI-400-1	12	90	41,396	82,129	605,080	6,584	9,469	19,210	55	263	2,337	2,084	22,574	167,329	9,812	126,311	869,337
Structural Plans																	
G-100-1	11	10	98,420	193,617	352,174	5,633	10,086	15,688	385	755	1,347	18,317	67,058	94,418	140,994	559,015	638,696
G-100-1	11	50	142,484	266,912	667,254	6,386	10,448	18,715	497	1,049	2,672	22,120	91,006	183,039	161,597	690,097	1,050,782
G-100-1	11	90	181,048	332,049	831,106	6,941	10,829	19,963	659	1,315	3,258	29,071	119,987	215,676	225,046	939,214	1,316,286
G-100-4	11	10	84,121	137,392	319,376	4,256	7,484	13,610	321	518	1,206	16,191	48,652	85,684	128,121	466,139	592,940
G-100-4	11	50	123,703	197,286	625,797	4,855	7,781	16,492	408	711	2,472	19,319	63,355	170,226	145,546	551,470	984,963
G-100-4	11	90	158,241	249,968	781,712	5,339	8,198	17,697	562	946	3,040	25,944	89,476	201,508	206,599	783,073	1,241,864
G-400-4	13	10	84,045	137,314	342,923	4,250	7,478	14,073	321	518	1,303	16,191	48,650	94,537	128,119	466,134	629,592
G-400-4	13	50	121,583	194,954	687,823	4,759	7,665	17,142	399	700	2,760	18,933	62,247	194,812	143,640	545,283	1,094,033
G-400-4	13	90	142,405	231,099	839,048	4,968	7,743	18,067	473	844	3,262	21,951	78,306	220,847	188,765	729,029	1,327,256
G-1000-4	13	10	84,045	137,314	342,923	4,250	7,478	14,073	321	518	1,303	16,191	48,650	94,537	128,119	466,134	629,592
G-1000-4	13	50	121,571	194,942	687,810	4,756	7,661	17,138	399	700	2,760	18,932	62,246	194,812	143,639	545,280	1,094,031
G-1000-4	13	90	142,010	230,695	838,629	4,927	7,694	18,021	472	844	3,261	21,933	78,264	220,821	188,678	728,810	1,327,117
R-100-2	11	10	114,500	174,420	357,399	5,500	8,085	14,816	388	660	1,313	18,072	61,437	92,068	146,308	472,682	609,702
R-100-2	11	50	205,146	338,181	743,722	6,734	9,648	18,681	696	1,438	2,977	30,567	142,243	209,337	198,887	944,450	1,177,689
R-100-2	11	90	324,233	524,313	1,017,136	7,580	10,658	20,398	1,225	2,238	4,056	51,850	220,951	272,301	326,733	1,432,105	1,585,263
R-100-3	11	10	103,178	153,617	340,539	4,794	7,205	13,925	354	592	1,260	17,493	55,040	89,157	140,480	435,568	590,882
R-100-3	11	50	191,592	310,365	722,419	6,020	8,785	17,790	644	1,299	2,883	28,549	127,820	202,216	189,283	878,594	1,144,870

Table 40--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
R-100-3	11	90	309,422	491,416	992,897	6,888	9,829	19,537	1,177	2,105	3,967	50,001	207,259	265,593	317,521	1,369,493	1,553,998
R-100-4	11	10	99,214	144,495	333,930	4,571	6,741	13,571	321	508	1,202	16,203	46,890	85,016	129,819	376,367	559,791
R-100-4	11	50	185,872	296,951	712,785	5,748	8,285	17,385	606	1,166	2,802	27,005	111,769	194,842	176,886	751,300	1,086,268
R-100-4	11	90	302,130	472,286	979,836	6,582	9,329	19,105	1,105	1,945	3,849	47,036	188,291	255,985	295,715	1,232,090	1,484,141
R-400-2	13	10	108,068	165,945	369,843	5,345	7,901	14,989	370	634	1,378	17,458	58,712	98,978	144,096	461,967	639,294
R-400-2	13	50	157,075	274,086	740,608	6,020	8,789	18,421	495	1,143	2,984	22,771	113,258	215,521	167,932	814,452	1,206,132
R-400-2	13	90	193,332	348,560	916,172	6,306	9,120	19,489	637	1,389	3,570	28,204	137,308	246,069	224,571	1,027,346	1,457,707
R-400-3	11	10	96,745	145,142	332,243	4,639	7,021	13,733	337	566	1,236	16,878	52,313	87,628	138,266	424,845	585,029
R-400-3	11	50	143,299	246,021	659,869	5,291	7,908	16,883	443	1,002	2,611	20,723	98,749	184,919	158,191	748,134	1,070,404
R-400-3	11	90	176,822	313,753	820,768	5,573	8,241	17,898	583	1,249	3,173	26,122	122,802	214,447	214,370	961,074	1,316,318
R-400-4	13	10	92,778	136,016	348,573	4,416	6,556	13,863	304	482	1,278	15,588	44,162	92,529	127,601	365,637	593,719
R-400-4	13	50	137,382	232,396	712,103	5,008	7,395	17,220	403	868	2,823	19,125	82,571	202,129	145,384	619,890	1,121,614
R-400-4	13	90	168,145	293,084	878,954	5,229	7,696	18,233	503	1,080	3,366	22,826	103,062	230,207	190,216	818,104	1,359,744
R-1000-4	13	10	92,773	136,011	348,568	4,415	6,555	13,863	304	482	1,278	15,585	44,146	92,521	127,590	365,587	593,694
R-1000-4	13	50	136,746	231,563	711,364	4,989	7,372	17,199	402	866	2,821	19,091	82,415	202,049	145,236	619,242	1,121,282
R-1000-4	13	90	160,686	283,203	870,245	5,081	7,519	18,067	474	1,037	3,331	21,735	98,732	227,914	186,179	800,569	1,350,725
WBI-100-1	6	10	125,684	227,664	352,918	6,235	9,529	15,555	413	876	1,264	18,821	76,325	83,845	149,699	535,359	581,471
WBI-100-1	6	50	226,369	408,454	683,490	7,607	11,080	19,088	779	1,749	2,670	32,912	164,341	178,732	208,240	1,033,066	1,050,285
WBI-100-1	6	90	355,322	615,552	983,303	8,514	12,102	20,935	1,326	2,613	3,883	54,532	256,024	255,873	338,289	1,609,535	1,540,880
WBI-400-1	12	10	119,261	219,199	387,259	6,081	9,347	15,882	396	849	1,431	18,207	73,600	100,727	147,487	524,644	646,803
WBI-400-1	12	50	179,395	345,514	753,673	6,940	10,276	19,334	582	1,457	3,024	25,229	135,661	213,724	177,780	904,454	1,194,423
WBI-400-1	12	90	229,947	446,040	944,492	7,325	10,665	20,472	761	1,795	3,660	31,850	175,600	250,513	241,245	1,222,130	1,486,990
Non-Structural Plans																	
NS-100	15	10	35,556	89,316	158,962	5,977	9,110	14,024	50	329	462	1,762	26,262	23,877	7,662	161,225	166,357
NS-100	15	50	136,550	301,974	443,695	7,639	11,048	17,787	565	1,718	1,890	21,755	161,558	104,561	85,320	918,493	548,991
NS-100	15	90	216,330	460,223	649,380	8,277	11,793	19,187	816	2,298	2,611	31,767	221,978	144,763	139,991	1,277,682	797,076
NS-400	15	10	14,944	23,675	115,478	4,561	6,940	11,761	0	7	306	0	428	13,896	0	1,552	108,297
NS-400	15	50	26,457	46,814	241,005	6,049	8,595	15,241	109	289	935	4,321	26,499	43,149	18,479	130,816	229,957
NS-400	15	90	38,352	81,333	332,115	6,571	9,180	16,460	523	981	1,873	20,815	91,802	92,144	89,557	462,553	487,969
NS-1000	15	10	12,529	19,524	111,480	4,296	6,600	11,358	0	0	304	0	0	13,763	0	0	107,817
NS-1000	15	50	19,042	28,960	227,146	5,699	8,115	14,699	21	47	761	838	4,377	32,385	3,557	23,269	179,887
NS-1000	15	90	22,814	39,909	301,832	6,215	8,693	15,909	42	93	1,058	1,769	9,336	45,210	8,091	52,753	269,540

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 41
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU2-0	NA	10	128,933	2,068,695	1,442,529	6,334	26,930	25,950	429	9,678	6,480	19,424	915,977	580,709	152,158	3,911,340	2,586,312
Degraded Coast PU2-0	NA	50	277,720	2,688,274	2,044,260	8,163	29,487	30,305	1,020	11,544	8,513	42,462	1,102,941	728,618	238,059	5,383,689	3,603,968
Degraded Coast PU2-0	NA	90	372,357	2,845,938	2,284,831	8,802	29,743	31,441	1,386	11,958	9,325	56,918	1,152,082	780,433	344,510	5,714,440	3,966,815
Sustained Coast PU1-R	NA*	10	128,933	346,560	406,981	6,334	10,138	15,853	429	1,431	1,521	19,424	132,458	109,567	152,158	793,215	711,334
Sustained Coast PU1-R	NA*	50	277,720	616,919	798,721	8,163	12,371	20,012	1,020	2,499	3,074	42,462	237,068	207,955	238,059	1,374,197	1,192,997
Sustained Coast PU1-R	NA*	90	372,357	813,553	1,062,726	8,802	13,029	21,392	1,386	3,136	4,020	56,918	311,528	274,994	344,510	1,859,443	1,648,743
Comprehensive Plans																	
C-G-100-1	11	10	27,160	151,266	354,816	5,276	9,789	15,799	13	734	1,396	436	60,412	116,475	2,018	506,384	638,170
C-G-100-1	11	50	34,866	226,942	561,737	5,861	9,960	18,099	89	934	2,203	3,104	76,919	161,199	15,440	586,166	881,559
C-G-100-1	11	90	55,231	303,990	696,996	6,416	10,292	19,250	185	1,136	2,693	7,192	96,327	188,350	35,840	681,767	1,043,970
C-G-100-4	11	10	23,115	81,342	327,145	3,898	6,894	13,607	13	374	1,278	433	33,041	106,303	1,998	378,928	591,458
C-G-100-4	11	50	29,479	141,245	528,242	4,330	7,068	15,789	83	493	2,059	2,939	42,086	148,295	14,691	422,465	821,558
C-G-100-4	11	90	48,840	202,804	658,055	4,814	7,504	16,924	188	644	2,543	7,312	57,234	174,303	36,567	499,189	979,590
C-G-400-4	13	10	20,711	54,367	363,434	3,811	6,403	13,960	8	106	1,406	257	9,596	118,720	1,075	60,254	566,769
C-G-400-4	13	50	23,215	72,787	570,576	4,051	6,466	16,089	9	160	2,176	297	13,317	162,187	1,250	77,633	813,869
C-G-400-4	13	90	26,185	108,656	686,590	4,261	6,564	16,922	17	268	2,590	611	26,174	185,188	3,471	323,973	1,014,856
C-G-1000-4	13	10	18,209	36,246	354,814	3,650	5,813	13,584	8	62	1,393	253	4,768	117,220	1,062	15,427	552,870
C-G-1000-4	13	50	19,377	45,315	557,458	3,791	5,873	15,593	8	87	2,152	253	7,364	160,290	1,062	48,643	804,666
C-G-1000-4	13	90	20,632	58,321	664,505	3,962	5,925	16,383	10	142	2,542	309	12,677	180,651	1,485	71,849	934,417
C-R-100-2	11	10	33,718	137,518	349,888	5,143	7,934	14,942	37	708	1,408	1,295	71,495	121,509	5,655	387,614	594,238
C-R-100-2	11	50	85,536	299,494	623,568	6,210	9,272	18,087	313	1,239	2,503	11,921	120,755	184,782	54,198	794,961	987,193
C-R-100-2	11	90	199,946	496,839	886,226	7,055	10,184	19,688	756	2,060	3,493	29,449	202,403	245,875	133,188	1,162,633	1,301,917
C-R-100-3	11	10	31,051	119,232	343,379	4,437	7,053	14,051	36	582	1,372	1,279	57,592	116,347	5,555	330,201	573,847
C-R-100-3	11	50	81,961	272,432	613,553	5,496	8,409	17,197	307	1,114	2,469	11,700	106,936	180,010	53,304	738,005	967,604
C-R-100-3	11	90	195,698	462,176	873,065	6,363	9,355	18,828	756	1,942	3,466	29,433	189,315	241,558	133,157	1,108,920	1,284,447
C-R-100-4	11	10	30,370	111,041	340,445	4,214	6,465	13,650	34	461	1,334	1,181	42,521	110,675	4,800	213,087	530,099
C-R-100-4	11	50	80,791	257,220	608,070	5,224	7,815	16,755	296	965	2,411	11,169	88,893	172,823	49,412	598,591	912,750
C-R-100-4	11	90	194,329	441,867	866,090	6,057	8,792	18,371	746	1,789	3,424	29,017	170,771	234,957	130,066	967,475	1,233,730
C-R-400-2	13	10	23,696	40,274	353,333	4,878	7,574	15,069	8	63	1,383	255	5,849	118,588	1,070	37,985	553,305
C-R-400-2	13	50	27,525	62,836	559,773	5,278	8,047	17,471	12	157	2,150	375	14,138	162,928	1,807	94,801	816,970
C-R-400-2	13	90	38,991	125,797	689,476	5,564	8,280	18,406	50	479	2,642	1,882	44,616	192,483	8,714	277,882	1,003,498

Table 41--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
C-R-400-3	11	10	21,314	36,701	308,175	4,200	6,727	13,715	8	55	1,181	255	5,206	98,946	1,070	34,558	477,019
C-R-400-3	11	50	25,017	57,460	493,949	4,578	7,200	15,958	12	148	1,876	370	13,250	138,487	1,789	90,727	708,517
C-R-400-3	11	90	36,166	116,846	616,627	4,859	7,435	16,857	49	374	2,316	1,828	34,763	164,223	8,503	231,160	875,551
C-R-400-4	13	10	20,691	34,698	353,558	3,976	6,138	13,943	8	50	1,399	255	4,652	117,688	1,070	30,458	549,903
C-R-400-4	13	50	24,173	54,257	560,171	4,294	6,592	16,281	11	125	2,171	343	10,648	162,062	1,590	69,342	810,078
C-R-400-4	13	90	34,961	111,039	689,282	4,515	6,826	17,170	46	301	2,634	1,687	27,255	187,972	7,469	174,578	976,917
C-R-1000-4	13	10	18,911	26,217	348,793	3,839	5,971	13,727	8	19	1,389	252	1,437	116,689	1,059	6,614	542,508
C-R-1000-4	13	50	20,969	36,940	551,238	4,137	6,399	16,040	9	70	2,152	259	5,501	160,377	1,085	28,657	796,916
C-R-1000-4	13	90	22,343	56,273	660,469	4,228	6,478	16,784	11	119	2,548	334	10,467	181,506	1,589	65,790	937,419
C-WBI-100-1	6	10	34,525	176,119	287,924	5,878	9,451	15,428	39	970	1,137	1,331	89,698	94,835	5,890	461,640	499,612
C-WBI-100-1	6	50	87,330	362,535	537,357	7,083	10,742	18,493	328	1,702	2,186	12,372	164,090	161,839	56,171	1,015,284	911,435
C-WBI-100-1	6	90	201,441	590,875	827,345	7,990	11,678	20,265	760	2,570	3,272	29,548	257,272	235,944	134,439	1,470,847	1,303,093
C-WBI-400-1	12	10	24,320	49,730	334,650	5,614	9,092	15,917	8	136	1,310	255	11,445	111,885	1,070	63,451	528,064
C-WBI-400-1	12	50	28,723	82,199	530,747	6,198	9,573	18,389	13	238	2,021	417	20,693	154,298	2,031	131,871	783,116
C-WBI-400-1	12	90	41,396	170,694	661,851	6,584	9,875	19,407	55	821	2,575	2,084	79,373	192,580	9,812	472,994	1,019,450
Structural Plans																	
G-100-1	11	10	98,420	282,905	481,266	5,633	10,882	16,567	385	1,154	1,973	18,317	100,293	150,325	140,994	813,233	900,302
G-100-1	11	50	142,484	370,555	735,610	6,386	11,066	19,072	497	1,332	2,817	22,120	116,413	196,294	161,597	894,666	1,152,836
G-100-1	11	90	181,048	442,703	891,232	6,941	11,398	20,223	659	1,600	3,407	29,071	143,548	229,281	225,046	1,049,594	1,385,382
G-100-4	11	10	84,121	186,876	433,181	4,256	7,986	14,375	321	712	1,753	16,191	65,588	135,331	128,121	643,718	825,111
G-100-4	11	50	123,703	258,350	677,800	4,855	8,174	16,762	408	818	2,550	19,319	74,858	178,140	145,546	691,289	1,062,150
G-100-4	11	90	158,241	315,345	824,448	5,339	8,610	17,897	562	1,038	3,114	25,944	97,919	209,306	206,599	828,579	1,286,044
G-400-4	13	10	84,045	186,798	480,599	4,250	7,980	14,977	321	712	1,970	16,191	65,586	155,219	128,119	643,713	900,225
G-400-4	13	50	121,583	256,018	745,597	4,759	8,057	17,432	399	807	2,844	18,933	73,750	203,310	143,640	685,102	1,173,214
G-400-4	13	90	142,405	296,477	884,497	4,968	8,155	18,265	473	935	3,344	21,951	86,749	229,606	188,765	774,536	1,377,190
G-1000-4	13	10	84,045	186,798	480,599	4,250	7,980	14,977	321	712	1,970	16,191	65,586	155,219	128,119	643,713	900,225
G-1000-4	13	50	121,571	256,006	745,585	4,756	8,054	17,429	399	807	2,844	18,932	73,749	203,310	143,639	685,099	1,173,212
G-1000-4	13	90	142,010	296,072	884,078	4,927	8,107	18,219	472	935	3,343	21,933	86,707	229,579	188,678	774,317	1,377,051
R-100-2	11	10	114,500	258,433	484,466	5,500	8,487	15,543	388	1,065	1,941	18,072	106,558	152,540	146,308	688,242	856,461
R-100-2	11	50	205,146	433,517	808,888	6,734	10,102	18,975	696	1,600	3,075	30,567	155,992	218,114	198,887	1,028,973	1,233,637
R-100-2	11	90	324,233	650,845	1,083,360	7,580	11,015	20,576	1,225	2,460	4,180	51,850	243,770	285,620	326,733	1,514,398	1,643,572
R-100-3	11	10	103,178	226,399	463,291	4,794	7,607	14,652	354	925	1,860	17,493	92,052	146,515	140,480	621,929	826,426
R-100-3	11	50	191,592	393,017	782,714	6,020	9,239	18,084	644	1,460	2,981	28,549	141,570	210,993	189,283	963,117	1,200,819

Table 41--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
R-100-3	11	90	309,422	603,491	1,053,568	6,888	10,185	19,716	1,177	2,327	4,092	50,001	230,077	278,913	317,521	1,451,786	1,612,306
R-100-4	11	10	99,214	209,750	453,791	4,571	7,019	14,251	321	761	1,772	16,203	72,860	138,133	129,819	473,533	761,079
R-100-4	11	50	185,872	369,355	769,144	5,748	8,645	17,643	606	1,272	2,879	27,005	119,965	201,486	176,886	799,192	1,128,147
R-100-4	11	90	302,130	575,329	1,037,039	6,582	9,622	19,259	1,105	2,143	3,965	47,036	208,561	268,326	295,715	1,286,009	1,531,552
R-400-2	13	10	108,068	249,959	519,719	5,345	8,303	15,857	370	1,039	2,120	17,458	103,832	169,619	144,096	677,526	923,347
R-400-2	13	50	157,075	369,421	810,492	6,020	9,243	18,733	495	1,304	3,087	22,771	127,007	224,813	167,932	898,975	1,265,774
R-400-2	13	90	193,332	475,092	983,229	6,306	9,476	19,668	637	1,612	3,698	28,204	160,127	259,907	224,571	1,109,639	1,520,639
R-400-3	11	10	96,745	217,924	454,996	4,639	7,422	14,459	337	899	1,837	16,878	89,324	144,986	138,266	611,206	820,573
R-400-3	11	50	143,299	328,674	720,163	5,291	8,363	17,177	443	1,164	2,710	20,723	112,499	193,696	158,191	832,657	1,126,352
R-400-3	11	90	176,822	425,828	881,440	5,573	8,598	18,076	583	1,471	3,298	26,122	145,621	227,766	214,370	1,043,367	1,374,626
R-400-4	13	10	92,778	201,270	491,821	4,416	6,834	14,687	304	734	1,966	15,588	70,132	156,404	127,601	462,804	835,940
R-400-4	13	50	137,382	304,800	773,884	5,008	7,755	17,499	403	974	2,906	19,125	90,767	209,458	145,384	667,782	1,168,313
R-400-4	13	90	168,145	396,127	937,711	5,229	7,989	18,389	503	1,278	3,486	22,826	123,332	243,145	190,216	872,022	1,412,651
R-1000-4	13	10	92,773	201,265	491,816	4,415	6,833	14,687	304	734	1,966	15,585	70,115	156,395	127,590	462,753	835,915
R-1000-4	13	50	136,746	303,967	773,145	4,989	7,733	17,478	402	973	2,905	19,091	90,611	209,379	145,236	667,134	1,167,981
R-1000-4	13	90	160,686	386,246	929,003	5,081	7,812	18,223	474	1,235	3,451	21,735	119,002	240,852	186,179	854,488	1,403,631
WBI-100-1	6	10	125,684	341,821	448,848	6,235	10,004	16,029	413	1,404	1,722	18,821	129,971	128,337	149,699	782,457	771,882
WBI-100-1	6	50	226,369	535,575	758,123	7,607	11,573	19,381	779	2,063	2,840	32,912	199,327	197,449	208,240	1,249,296	1,166,752
WBI-100-1	6	90	355,322	775,410	1,069,517	8,514	12,508	21,153	1,326	2,969	4,075	54,532	298,639	278,796	338,289	1,822,613	1,657,137
WBI-400-1	12	10	119,261	333,356	536,644	6,081	9,821	16,705	396	1,378	2,160	18,207	127,246	169,335	147,487	771,742	923,476
WBI-400-1	12	50	179,395	472,635	832,830	6,940	10,769	19,651	582	1,771	3,181	25,229	170,647	230,573	177,780	1,120,684	1,300,676
WBI-400-1	12	90	229,947	605,898	1,023,344	7,325	11,071	20,669	761	2,151	3,836	31,850	218,215	271,370	241,245	1,435,207	1,595,723
Non-Structural Plans																	
NS-100	15	10	35,556	178,640	186,626	5,977	9,585	14,171	50	994	668	1,762	91,727	44,152	7,662	470,506	262,145
NS-100	15	50	136,550	441,748	486,985	7,639	11,540	17,939	565	2,134	2,019	21,755	201,388	116,897	85,320	1,138,349	617,084
NS-100	15	90	216,330	626,871	700,993	8,277	12,199	19,312	816	2,732	2,745	31,767	269,719	159,549	139,991	1,505,841	867,740
NS-400	15	10	14,944	39,707	120,444	4,561	7,415	11,908	0	127	343	0	10,819	17,114	0	60,728	126,625
NS-400	15	50	26,457	81,944	251,885	6,049	9,087	15,394	109	390	966	4,321	35,562	45,956	18,479	203,658	252,517
NS-400	15	90	38,352	169,898	359,545	6,571	9,585	16,586	523	1,539	2,045	20,815	148,601	109,736	89,557	809,236	595,341
NS-1000	15	10	12,529	25,726	113,401	4,296	7,074	11,505	0	12	308	0	976	14,066	0	5,135	109,407
NS-1000	15	50	19,042	44,363	231,916	5,699	8,607	14,852	21	117	783	838	10,208	34,191	3,557	57,395	190,456
NS-1000	15	90	22,814	72,889	312,047	6,215	9,098	16,035	42	319	1,128	1,769	28,050	51,006	8,091	167,615	305,114

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 42
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU1-0	NA	10	175,959	282,285	440,763	14,280	16,883	32,147	607	945	1,503	18,625	82,342	78,200	65,589	314,208	289,961
Degraded Coast PU1-0	NA	50	257,628	477,767	684,100	15,674	19,515	35,876	931	2,247	2,785	31,853	208,415	174,385	120,635	781,701	655,858
Degraded Coast PU1-0	NA	90	465,354	915,397	1,267,205	17,839	27,201	43,832	1,700	4,372	5,246	62,112	407,436	340,666	231,480	1,505,274	1,261,682
Sustained Coast PU1-R	NA*	10	175,959	253,968	423,736	14,280	16,379	31,844	607	887	1,468	18,625	75,475	74,071	65,589	286,346	273,207
Sustained Coast PU1-R	NA*	50	257,628	360,559	613,621	15,674	17,930	34,923	931	1,257	2,189	31,853	111,129	115,885	120,635	424,521	441,079
Sustained Coast PU1-R	NA*	90	465,354	596,568	1,075,488	17,839	20,200	39,623	1,700	3,190	4,536	62,112	297,663	274,657	231,480	1,039,175	981,409
Comprehensive Plans																	
C-HL-a-100-2	12	10	69,326	72,690	256,924	10,937	11,764	27,282	262	269	907	6,379	19,560	36,022	22,513	66,765	128,702
C-HL-a-100-2	12	50	102,135	111,599	387,502	11,862	12,780	29,896	438	497	1,551	13,213	42,370	74,244	51,916	163,724	283,896
C-HL-a-100-2	12	90	277,975	323,398	831,222	13,777	14,821	34,845	1,277	1,529	3,480	46,568	140,622	183,179	170,362	538,044	684,802
C-HL-a-100-3	12	10	69,619	73,669	255,293	11,034	11,933	27,407	257	269	897	6,216	19,854	35,923	21,972	67,810	128,431
C-HL-a-100-3	12	50	102,351	113,903	385,404	11,995	13,079	30,093	434	518	1,549	13,131	44,197	74,780	51,744	170,214	285,948
C-HL-a-100-3	12	90	276,231	325,453	826,836	13,906	15,144	35,048	1,261	1,559	3,468	45,952	144,266	183,675	168,904	552,159	687,392
C-HL-b-400-2	16	10	67,879	70,675	274,408	10,830	11,649	27,820	259	260	964	6,246	18,591	38,830	22,006	63,864	140,129
C-HL-b-400-2	16	50	68,617	71,662	387,297	10,918	11,786	29,799	260	263	1,503	6,270	18,907	71,669	22,168	65,348	268,126
C-HL-b-400-2	16	90	75,786	80,601	683,014	11,271	12,175	33,628	296	307	2,688	7,649	23,029	136,035	28,026	82,301	504,445
C-HL-b-400-3	16	10	68,371	71,663	271,299	10,929	11,819	27,914	253	254	948	6,072	18,243	38,293	21,419	62,662	138,223
C-HL-b-400-3	16	50	69,356	73,239	382,975	11,067	12,102	29,965	255	267	1,489	6,142	19,472	71,361	21,680	66,397	266,671
C-HL-b-400-3	16	90	76,860	83,788	677,865	11,490	12,595	33,867	297	332	2,676	7,799	25,893	136,218	28,191	90,182	503,995
C-LP-a-100-1	14	10	70,076	79,295	263,555	11,477	12,796	28,339	225	240	870	5,643	18,835	36,015	20,078	66,648	131,495
C-LP-a-100-1	14	50	83,389	103,230	377,788	12,088	14,062	30,883	280	420	1,411	7,763	35,485	70,801	27,947	117,181	263,199
C-LP-a-100-1	14	90	149,283	206,000	711,586	13,699	16,142	35,788	643	985	2,869	21,468	86,944	151,821	75,996	303,450	557,174
C-LP-a-100-2	14	10	69,451	73,130	269,847	10,861	11,632	27,582	268	270	943	6,581	19,655	37,908	23,466	68,187	137,230
C-LP-a-100-2	14	50	87,154	93,612	391,426	11,308	12,120	29,762	345	362	1,512	9,491	28,300	71,640	34,734	100,992	269,036
C-LP-a-100-2	14	90	149,309	168,276	720,766	12,277	13,188	33,915	656	763	2,892	21,381	65,477	147,183	76,667	239,774	544,007
C-LP-a-100-3	14	10	69,461	73,809	268,554	10,913	11,780	27,654	261	267	932	6,406	19,626	37,670	22,871	68,764	136,608
C-LP-a-100-3	14	50	86,771	94,466	389,303	11,390	12,326	29,874	338	371	1,503	9,305	29,061	71,598	34,134	104,031	269,045
C-LP-a-100-3	14	90	148,914	170,599	718,323	12,378	13,422	34,048	652	797	2,894	21,329	69,069	148,191	76,675	250,201	546,912
C-LP-b-400-1	16	10	67,664	73,660	266,404	11,249	12,538	28,231	221	222	882	5,496	17,058	36,150	19,380	59,201	132,136
C-LP-b-400-1	16	50	70,501	78,946	371,997	11,712	13,663	30,703	227	255	1,371	5,722	20,112	68,010	20,089	69,162	256,569

Table 42--Continued

Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
C-LP-b-400-1	16	90	83,572	102,627	661,032	12,840	15,230	35,332	306	509	2,581	8,712	44,063	136,855	29,808	144,095	504,798
C-LP-b-400-3	16	10	67,000	70,404	275,114	10,815	11,660	27,852	253	254	952	6,073	18,249	38,378	21,423	62,694	139,108
C-LP-b-400-3	16	50	67,826	71,755	387,877	10,903	11,809	29,818	254	259	1,489	6,086	18,743	71,159	21,462	64,223	266,827
C-LP-b-400-3	16	90	77,239	83,742	684,458	11,246	12,219	33,650	300	344	2,688	7,886	27,159	136,958	28,337	93,651	505,648
C-LP-b-1000-1	16	10	66,556	72,347	264,666	11,200	12,447	28,145	221	221	881	5,495	17,001	36,131	19,377	58,918	132,044
C-LP-b-1000-1	16	50	68,875	75,155	368,927	11,609	13,535	30,547	221	221	1,353	5,495	17,035	66,785	19,377	59,109	252,603
C-LP-b-1000-1	16	90	72,731	82,751	644,536	12,592	14,953	35,039	234	293	2,447	6,003	23,701	128,059	21,003	79,886	477,237
C-LP-b-1000-2	16	10	66,455	69,290	276,103	10,746	11,488	27,765	259	259	964	6,246	18,559	38,742	22,006	63,648	140,384
C-LP-b-1000-2	16	50	66,872	69,821	389,155	10,771	11,546	29,663	259	259	1,502	6,246	18,559	71,431	22,006	63,651	267,835
C-LP-b-1000-2	16	90	68,045	71,093	678,632	10,880	11,701	33,279	262	263	2,651	6,325	18,924	133,837	22,234	64,931	494,594
Structural Plans																	
HL-a-100-2	12	10	103,776	114,635	311,336	11,327	12,195	27,886	380	401	1,089	11,049	31,422	45,311	38,494	108,074	160,711
HL-a-100-2	12	50	145,635	162,068	455,434	12,276	13,261	30,543	559	630	1,738	17,958	53,209	83,306	68,301	207,347	317,107
HL-a-100-2	12	90	325,833	376,975	905,359	14,200	15,302	35,503	1,405	1,689	3,683	51,580	154,507	193,506	187,520	588,804	721,153
HL-a-100-3	12	10	110,026	124,885	319,740	11,451	12,395	28,051	391	426	1,106	11,360	33,957	46,476	39,654	118,160	165,285
HL-a-100-3	12	50	153,982	175,438	466,540	12,438	13,591	30,784	571	670	1,761	18,298	57,069	84,980	69,628	222,037	323,501
HL-a-100-3	12	90	333,966	391,136	916,597	14,358	15,657	35,750	1,413	1,730	3,704	51,875	158,669	195,257	189,640	604,989	728,686
HL-b-400-2	16	10	103,221	114,064	330,339	11,297	12,163	28,540	379	399	1,150	11,006	31,318	48,495	38,342	107,725	173,355
HL-b-400-2	16	50	113,914	126,454	458,729	11,430	12,372	30,596	394	438	1,718	11,632	34,966	83,090	41,401	127,036	310,356
HL-b-400-2	16	90	126,375	141,108	762,580	11,792	12,762	34,436	438	521	2,925	13,354	42,663	148,976	48,079	153,445	550,590
HL-b-400-3	16	10	109,681	124,527	337,341	11,421	12,364	28,675	389	425	1,164	11,318	33,855	49,436	39,507	117,821	177,054
HL-b-400-3	16	50	123,116	140,740	468,519	11,608	12,720	30,806	409	481	1,740	12,091	39,186	84,620	43,054	142,799	316,032
HL-b-400-3	16	90	138,364	159,842	775,370	12,040	13,214	34,720	471	593	2,966	14,676	49,872	151,913	52,711	177,862	560,631
LP-a-100-1	14	10	117,395	146,516	341,268	11,892	13,326	29,002	416	553	1,197	12,939	44,101	52,612	43,091	155,103	186,560
LP-a-100-1	14	50	150,427	194,766	486,741	12,570	14,729	31,669	558	729	1,841	17,412	61,032	90,315	58,995	207,333	328,452
LP-a-100-1	14	90	235,898	313,511	849,025	14,216	16,863	36,632	954	1,282	3,335	32,532	110,581	172,445	112,209	387,645	626,791
LP-a-100-2	14	10	98,874	109,310	316,429	11,189	12,046	28,104	385	410	1,128	11,401	33,061	47,856	38,876	117,356	170,987
LP-a-100-2	14	50	125,132	139,261	451,228	11,685	12,628	30,373	469	511	1,708	14,582	42,217	82,072	51,107	152,884	304,794
LP-a-100-2	14	90	192,360	218,733	788,156	12,657	13,700	34,531	793	908	3,102	26,930	78,963	158,032	96,388	290,547	583,445
LP-a-100-3	14	10	102,005	115,513	320,599	11,264	12,224	28,214	390	424	1,136	11,482	33,923	48,201	39,246	121,281	172,562
LP-a-100-3	14	50	129,117	147,210	456,553	11,791	12,865	30,523	477	528	1,719	14,746	43,422	82,588	51,758	157,753	306,874
LP-a-100-3	14	90	197,899	229,498	795,462	12,783	13,965	34,704	803	951	3,123	27,226	83,023	159,603	97,668	302,875	588,466

Table 42--Continued
Expected and Equivalent Annual Metric Values by Alternative

2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
LP-b-400-1	16	10	116,998	146,094	348,155	11,884	13,319	29,237	415	552	1,217	12,908	43,978	53,400	42,993	154,701	190,104
LP-b-400-1	16	50	145,641	189,015	496,431	12,437	14,587	31,861	538	704	1,884	16,747	58,911	93,283	56,914	200,225	341,436
LP-b-400-1	16	90	187,605	255,028	833,316	13,600	16,208	36,549	730	1,002	3,243	24,077	85,096	168,038	80,182	284,551	608,866
LP-b-400-3	16	10	100,149	113,605	328,351	11,218	12,175	28,496	383	417	1,158	11,199	33,092	49,138	38,053	117,869	176,191
LP-b-400-3	16	50	111,374	127,975	457,650	11,377	12,427	30,580	402	441	1,724	12,021	35,380	83,448	41,553	127,833	310,685
LP-b-400-3	16	90	128,357	147,965	765,810	11,725	12,841	34,419	464	529	2,943	14,399	43,813	149,947	52,481	157,179	554,353
LP-b-1000-1	16	10	116,997	146,094	348,154	11,884	13,319	29,237	415	552	1,217	12,908	43,978	53,400	42,993	154,701	190,104
LP-b-1000-1	16	50	145,543	188,914	496,342	12,425	14,574	31,850	538	704	1,884	16,745	58,902	93,278	56,906	200,194	341,423
LP-b-1000-1	16	90	183,219	249,972	829,171	13,452	16,053	36,414	699	964	3,214	22,874	81,509	166,247	75,633	270,164	601,853
LP-b-1000-2	16	10	96,965	107,348	324,574	11,140	11,995	28,396	378	402	1,151	11,117	32,226	48,831	37,672	113,923	174,791
LP-b-1000-2	16	50	106,520	119,143	452,101	11,241	12,158	30,418	394	423	1,713	11,821	34,098	82,946	40,780	122,683	308,690
LP-b-1000-2	16	90	113,548	126,972	750,649	11,354	12,317	34,039	409	432	2,881	12,413	34,865	146,094	44,536	124,812	539,954
Non-Structural Plans																	
NS-100	15	10	49,720	66,202	201,034	13,635	15,661	30,285	47	221	551	1,632	20,698	21,441	4,641	70,593	73,551
NS-100	15	50	82,667	135,205	317,283	15,002	17,162	33,272	314	567	1,187	11,729	55,910	53,061	41,600	201,440	194,596
NS-100	15	90	252,858	355,887	723,993	17,155	19,428	37,927	1,021	2,696	3,186	39,785	258,211	168,672	145,628	902,084	606,990
NS-400	15	10	26,799	35,097	165,654	12,969	14,964	29,321	1	2	432	21	102	13,252	84	437	46,705
NS-400	15	50	32,315	43,089	232,195	14,312	16,440	32,274	12	61	692	477	5,909	24,937	2,712	24,065	95,980
NS-400	15	90	87,505	121,040	465,521	16,448	18,689	36,904	352	679	1,810	14,555	67,566	81,287	72,987	307,327	341,190
NS-1000	15	10	17,778	25,086	152,421	10,186	11,936	25,257	0	0	430	0	0	13,197	0	0	46,475
NS-1000	15	50	22,539	30,403	217,284	11,496	13,380	28,162	3	6	664	145	714	22,954	1,610	5,781	89,079
NS-1000	15	90	42,674	56,994	395,328	13,559	15,549	32,686	140	241	1,436	6,614	27,028	59,812	47,495	172,032	270,653

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 43
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU1-0	NA	10	175,959	396,560	509,478	14,280	18,425	33,074	607	1,696	1,954	18,625	151,446	119,754	65,589	538,131	424,610
Degraded Coast PU1-0	NA	50	257,628	756,854	851,919	15,674	24,032	38,592	931	3,480	3,526	31,853	316,510	239,384	120,635	1,152,446	878,792
Degraded Coast PU1-0	NA	90	465,354	1,800,937	1,799,694	17,839	32,891	47,254	1,700	10,463	8,909	62,112	1,004,546	699,717	231,480	3,913,514	2,709,795
Sustained Coast PU1-R	NA*	10	175,959	346,908	479,622	14,280	17,670	32,620	607	1,470	1,818	18,625	130,668	107,259	65,589	460,682	378,038
Sustained Coast PU1-R	NA*	50	257,628	465,739	676,868	15,674	19,270	35,729	931	2,530	2,955	31,853	233,236	189,310	120,635	768,498	647,918
Sustained Coast PU1-R	NA*	90	465,354	819,948	1,209,810	17,839	21,800	40,585	1,700	3,755	4,876	62,112	347,855	304,838	231,480	1,190,107	1,072,167
Comprehensive Plans																	
C-HL-a-100-2	12	10	69,326	77,068	270,244	10,937	11,910	27,491	262	305	994	6,379	23,723	44,326	22,513	80,634	156,089
C-HL-a-100-2	12	50	102,135	120,831	418,819	11,862	12,863	30,375	438	529	1,687	13,213	44,689	86,008	51,916	176,048	325,705
C-HL-a-100-2	12	90	277,975	339,634	925,437	13,777	14,955	35,460	1,277	1,559	4,095	46,568	143,118	243,329	170,362	550,763	928,424
C-HL-a-100-3	12	10	69,619	80,563	269,701	11,034	12,267	27,686	257	350	1,000	6,216	28,620	45,826	21,972	98,355	161,562
C-HL-a-100-3	12	50	102,351	130,239	419,406	11,995	13,350	30,641	434	639	1,718	13,131	56,106	89,997	51,744	212,353	338,412
C-HL-a-100-3	12	90	276,231	356,262	926,402	13,906	15,461	35,731	1,261	1,691	4,121	45,952	156,752	247,521	168,904	592,933	941,398
C-HL-b-400-2	16	10	67,879	72,157	291,649	10,830	11,795	28,091	259	262	1,075	6,246	18,789	49,088	22,006	64,981	173,437
C-HL-b-400-2	16	50	68,617	74,243	429,249	10,918	11,868	30,492	260	281	1,690	6,270	20,523	88,104	22,168	74,752	325,666
C-HL-b-400-2	16	90	75,786	86,247	815,585	11,271	12,308	34,510	296	334	3,597	7,649	25,229	225,095	28,026	94,556	864,641
C-HL-b-400-3	16	10	68,371	73,839	288,688	10,929	12,153	28,241	253	263	1,061	6,072	19,154	48,734	21,419	65,478	171,931
C-HL-b-400-3	16	50	69,356	78,623	425,689	11,067	12,373	30,714	255	312	1,683	6,142	24,118	88,628	21,680	84,010	326,442
C-HL-b-400-3	16	90	76,860	95,943	812,269	11,490	12,913	34,803	297	410	3,600	7,799	33,255	226,745	28,191	113,662	867,296
C-LP-a-100-1	14	10	70,076	98,234	284,736	11,477	14,330	29,053	225	414	1,022	5,643	35,900	50,293	20,078	114,281	175,190
C-LP-a-100-1	14	50	83,389	147,152	427,525	12,088	15,731	32,008	280	660	1,644	7,763	57,549	91,556	27,947	188,205	332,830
C-LP-a-100-1	14	90	149,283	294,901	851,071	13,699	17,446	36,932	643	1,223	3,701	21,468	112,280	234,025	75,996	413,374	891,270
C-LP-a-100-2	14	10	69,451	76,890	285,423	10,861	11,833	27,843	268	276	1,038	6,581	20,209	46,617	23,466	69,765	165,392
C-LP-a-100-2	14	50	87,154	99,188	427,847	11,308	12,300	30,381	345	376	1,669	9,491	29,440	85,334	34,734	104,861	316,003
C-LP-a-100-2	14	90	149,309	175,663	832,468	12,277	13,339	34,669	656	774	3,646	21,381	66,557	221,139	76,667	243,918	842,167
C-LP-a-100-3	14	10	69,461	79,489	284,869	10,913	12,101	27,956	261	309	1,039	6,406	23,656	47,546	22,871	79,880	167,971
C-LP-a-100-3	14	50	86,771	105,639	427,686	11,390	12,627	30,534	338	424	1,673	9,305	34,934	86,898	34,134	122,677	321,032
C-LP-a-100-3	14	90	148,914	186,908	833,091	12,378	13,722	34,853	652	851	3,663	21,329	75,364	223,918	76,675	272,951	851,394
C-LP-b-400-1	16	10	67,664	79,586	284,613	11,249	14,051	28,906	221	268	1,005	5,496	21,848	47,654	19,380	72,200	168,719
C-LP-b-400-1	16	50	70,501	94,486	417,360	11,712	15,318	31,862	227	464	1,615	5,722	41,048	90,233	20,089	130,463	329,585
C-LP-b-400-1	16	90	83,572	141,654	802,981	12,840	16,519	36,557	306	752	3,555	8,712	68,578	232,512	29,808	220,979	883,717

Table 43--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
C-LP-b-400-3	16	10	67,000	73,568	292,804	10,815	11,959	28,167	253	286	1,072	6,073	21,552	49,582	21,423	71,477	174,838
C-LP-b-400-3	16	50	67,826	78,435	431,033	10,903	12,096	30,571	254	317	1,689	6,086	24,909	89,002	21,462	84,498	327,766
C-LP-b-400-3	16	90	77,239	95,077	818,817	11,246	12,505	34,577	300	403	3,608	7,886	33,586	227,270	28,337	117,045	869,156
C-LP-b-1000-1	16	10	66,556	76,268	282,254	11,200	13,927	28,809	221	225	992	5,495	17,373	46,267	19,377	59,675	164,835
C-LP-b-1000-1	16	50	68,875	80,990	411,285	11,609	15,173	31,700	221	263	1,545	5,495	21,056	83,769	19,377	71,041	310,329
C-LP-b-1000-1	16	90	72,731	99,792	779,675	12,592	16,222	36,257	234	501	3,410	6,003	44,319	222,508	21,003	141,241	851,346
C-LP-b-1000-2	16	10	66,455	70,376	293,213	10,746	11,663	28,043	259	261	1,075	6,246	18,629	48,986	22,006	64,004	173,613
C-LP-b-1000-2	16	50	66,872	71,014	430,711	10,771	11,711	30,381	259	264	1,685	6,246	18,908	87,535	22,006	65,568	323,284
C-LP-b-1000-2	16	90	68,045	73,516	810,366	10,880	11,837	34,161	262	270	3,555	6,325	19,564	222,424	22,234	67,787	851,990
Structural Plans																	
HL-a-100-2	12	10	103,776	125,373	326,625	11,327	12,379	28,107	380	433	1,175	11,049	34,179	53,180	38,494	123,132	188,465
HL-a-100-2	12	50	145,635	175,357	488,008	12,276	13,354	31,025	559	693	1,883	17,958	58,764	96,073	68,301	228,202	361,558
HL-a-100-2	12	90	325,833	400,200	1,001,738	14,200	15,461	36,126	1,405	1,724	4,300	51,580	157,219	253,723	187,520	603,269	965,316
HL-a-100-3	12	10	110,026	140,881	336,966	11,451	12,770	28,342	391	491	1,204	11,360	39,655	55,428	39,654	143,086	196,676
HL-a-100-3	12	50	153,982	196,978	502,154	12,438	13,874	31,336	571	816	1,937	18,298	70,845	100,775	69,628	267,098	376,871
HL-a-100-3	12	90	333,966	428,637	1,018,235	14,358	16,002	36,442	1,413	1,870	4,360	51,875	171,623	259,248	189,640	648,314	983,482
HL-b-400-2	16	10	103,221	124,803	350,448	11,297	12,347	28,823	379	432	1,271	11,006	34,075	59,546	38,342	122,782	210,981
HL-b-400-2	16	50	113,914	139,742	503,998	11,430	12,466	31,293	394	501	1,919	11,632	40,520	100,745	41,401	147,891	371,443
HL-b-400-2	16	90	126,375	164,333	900,595	11,792	12,921	35,325	438	555	3,837	13,354	45,376	238,195	48,079	167,910	911,470
HL-b-400-3	16	10	109,681	140,523	359,009	11,421	12,739	29,014	389	490	1,295	11,318	39,553	61,360	39,507	142,748	217,610
HL-b-400-3	16	50	123,116	162,280	516,237	11,608	13,003	31,559	409	627	1,966	12,091	52,962	104,715	43,054	187,860	384,305
HL-b-400-3	16	90	138,364	197,343	917,623	12,040	13,559	35,665	471	733	3,910	14,676	62,827	244,172	52,711	221,187	930,078
LP-a-100-1	14	10	117,395	188,995	369,739	11,892	15,018	29,765	416	724	1,347	12,939	60,566	66,704	43,091	201,680	229,929
LP-a-100-1	14	50	150,427	254,915	541,504	12,570	16,496	32,824	558	963	2,072	17,412	81,791	110,666	58,995	274,603	396,920
LP-a-100-1	14	90	235,898	411,453	991,310	14,216	18,213	37,791	954	1,542	4,173	32,532	137,763	255,220	112,209	502,666	962,466
LP-a-100-2	14	10	98,874	120,747	334,383	11,189	12,361	28,401	385	420	1,224	11,401	33,853	56,638	38,876	120,252	199,557
LP-a-100-2	14	50	125,132	149,896	489,216	11,685	12,854	31,006	469	522	1,864	14,582	43,019	95,661	51,107	156,031	351,538
LP-a-100-2	14	90	192,360	229,460	900,893	12,657	13,894	35,298	793	928	3,859	26,930	80,846	232,237	96,388	296,409	882,136
LP-a-100-3	14	10	102,005	131,883	340,224	11,264	12,660	28,552	390	465	1,242	11,482	37,848	58,045	39,246	132,695	204,017
LP-a-100-3	14	50	129,117	165,696	497,201	11,791	13,213	31,198	477	581	1,889	14,746	49,053	97,814	51,758	176,134	358,779
LP-a-100-3	14	90	197,899	250,635	911,725	12,783	14,310	35,522	803	1,018	3,896	27,226	90,273	235,626	97,668	327,997	893,683
LP-b-400-1	16	10	116,998	188,574	377,685	11,884	15,010	29,968	415	723	1,379	12,908	60,443	68,520	42,993	201,279	237,087
LP-b-400-1	16	50	145,641	249,164	555,610	12,437	16,354	33,054	538	937	2,136	16,747	79,670	115,451	56,914	267,495	416,302

Table 43-Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 1
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
LP-b-400-1	16	90	187,605	352,970	993,511	13,600	17,558	37,792	730	1,263	4,223	24,077	112,277	264,520	80,182	399,572	999,597
LP-b-400-3	16	10	100,149	129,976	350,131	11,218	12,612	28,854	383	457	1,281	11,199	37,017	60,535	38,053	129,284	212,736
LP-b-400-3	16	50	111,374	146,461	504,461	11,377	12,775	31,353	402	494	1,922	12,021	41,011	101,125	41,553	146,215	371,037
LP-b-400-3	16	90	128,357	169,101	903,206	11,725	13,186	35,364	464	595	3,865	14,399	51,063	240,513	52,481	182,301	918,397
LP-b-1000-1	16	10	116,997	188,573	377,685	11,884	15,010	29,968	415	723	1,379	12,908	60,443	68,520	42,993	201,279	237,087
LP-b-1000-1	16	50	145,543	249,062	555,521	12,425	16,341	33,043	538	937	2,136	16,745	79,661	115,446	56,906	267,464	416,288
LP-b-1000-1	16	90	183,219	347,914	989,366	13,452	17,403	37,657	699	1,225	4,193	22,874	108,691	262,730	75,633	385,185	992,583
LP-b-1000-2	16	10	96,965	118,785	344,889	11,140	12,310	28,718	378	412	1,265	11,117	33,018	59,299	37,672	116,820	208,807
LP-b-1000-2	16	50	106,520	129,778	496,583	11,241	12,384	31,154	394	434	1,899	11,821	34,900	99,190	40,780	125,831	364,520
LP-b-1000-2	16	90	113,548	137,699	884,955	11,354	12,511	34,940	409	452	3,789	12,413	36,748	235,066	44,536	130,673	898,280
Non-Structural Plans																	
NS-100	15	10	49,720	116,095	216,487	13,635	16,912	30,673	47	867	751	1,632	86,380	41,784	4,641	294,784	142,986
NS-100	15	50	82,667	226,326	345,504	15,002	18,490	33,684	314	2,015	1,636	11,729	191,856	95,166	41,600	625,295	325,870
NS-100	15	90	252,858	609,726	802,610	17,155	21,000	38,414	1,021	3,226	3,351	39,785	305,564	183,338	145,628	1,043,744	650,864
NS-400	15	10	26,799	42,031	167,802	12,969	16,214	29,708	1	25	439	21	2,503	13,996	84	9,169	49,409
NS-400	15	50	32,315	61,103	237,774	14,312	17,768	32,685	12	277	759	477	27,918	31,753	2,712	106,870	121,626
NS-400	15	90	87,505	169,067	480,396	16,448	20,261	37,391	352	822	1,855	14,555	82,674	85,966	72,987	363,488	358,583
NS-1000	15	10	17,778	30,505	154,099	10,186	13,186	25,644	0	0	430	0	44	13,211	0	183	46,532
NS-1000	15	50	22,539	37,014	219,331	11,496	14,707	28,574	3	47	677	145	4,999	24,282	1,610	21,182	93,849
NS-1000	15	90	42,674	74,303	400,689	13,559	17,122	33,173	140	347	1,469	6,614	37,559	63,073	47,495	207,312	281,580

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 44
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU2-0	NA	10	128,022	829,310	695,863	4,595	15,130	16,175	424	3,559	2,793	18,672	351,443	240,089	148,926	1,749,253	1,281,236
Degraded Coast PU2-0	NA	50	281,805	1,941,156	1,601,299	6,405	20,670	22,294	1,033	8,387	6,635	41,729	811,140	552,025	236,551	3,973,115	2,753,445
Degraded Coast PU2-0	NA	90	375,050	2,117,588	1,851,010	7,098	21,381	23,789	1,356	8,637	7,283	54,285	837,737	587,356	333,768	4,217,062	3,049,872
Sustained Coast PU1-R	NA*	10	128,022	220,237	329,618	4,595	6,061	10,722	424	899	1,193	18,672	77,545	75,389	148,926	516,951	540,234
Sustained Coast PU1-R	NA*	50	281,805	412,776	682,259	6,405	7,715	14,505	1,033	1,768	2,655	41,729	160,701	160,906	236,551	954,529	938,321
Sustained Coast PU1-R	NA*	90	375,050	532,880	898,100	7,098	8,358	15,958	1,356	2,199	3,411	54,285	212,598	211,450	333,768	1,337,503	1,318,348
Comprehensive Plans																	
C-G-100-1	11	10	26,359	68,167	211,485	3,436	5,260	10,008	13	251	676	427	17,809	50,621	1,888	82,530	294,089
C-G-100-1	11	50	33,357	103,803	448,995	4,015	5,444	12,546	87	521	1,778	2,885	37,721	119,913	11,541	197,373	611,462
C-G-100-1	11	90	51,599	143,418	568,767	4,483	5,802	13,727	176	694	2,201	6,516	57,159	142,517	30,784	406,655	791,156
C-G-100-4	11	10	22,788	33,565	198,436	2,198	3,112	8,213	13	92	635	425	5,686	46,303	1,867	35,860	277,797
C-G-100-4	11	50	28,659	60,057	432,764	2,613	3,247	10,604	82	277	1,708	2,743	19,241	113,292	10,787	104,757	578,708
C-G-100-4	11	90	46,304	92,027	550,441	2,985	3,558	11,692	176	409	2,125	6,528	34,806	134,718	30,631	288,389	750,175
C-G-400-4	13	10	19,832	24,371	212,543	2,104	2,866	8,471	8	26	690	240	1,198	52,022	1,050	3,643	297,691
C-G-400-4	13	50	21,838	28,058	470,869	2,344	2,904	10,895	8	47	1,793	257	3,486	125,289	1,151	27,005	632,579
C-G-400-4	13	90	23,842	35,927	577,117	2,477	2,961	11,765	14	83	2,127	495	6,571	140,664	3,241	36,752	741,686
C-G-1000-4	13	10	17,397	19,954	208,248	1,950	2,477	8,165	8	24	689	240	1,115	51,996	1,050	2,711	297,402
C-G-1000-4	13	50	18,465	21,377	464,749	2,066	2,509	10,440	8	27	1,787	240	1,428	124,631	1,050	6,962	626,250
C-G-1000-4	13	90	19,171	23,532	567,846	2,165	2,531	11,274	9	46	2,110	279	3,203	139,375	1,411	24,132	735,675
C-R-100-2	11	10	31,481	46,638	203,226	3,336	4,203	9,506	37	186	676	1,303	14,594	50,310	5,388	84,747	289,452
C-R-100-2	11	50	82,529	133,867	495,111	4,361	5,210	12,718	307	714	2,033	11,384	70,956	138,905	48,243	480,373	734,512
C-R-100-2	11	90	183,013	276,497	718,603	5,245	6,035	14,404	741	1,313	2,880	27,877	127,813	185,856	126,391	766,434	1,000,327
C-R-100-3	11	10	29,450	42,616	203,114	2,846	3,662	8,914	37	162	679	1,296	13,344	49,767	5,301	69,471	284,666
C-R-100-3	11	50	80,114	127,014	494,224	3,853	4,676	12,115	304	661	2,031	11,269	64,769	137,243	47,555	443,461	723,192
C-R-100-3	11	90	180,777	266,813	717,315	4,753	5,525	13,823	741	1,263	2,882	27,882	121,972	184,438	126,408	731,826	990,668
C-R-100-4	11	10	28,702	39,397	201,962	2,566	3,011	8,445	35	124	669	1,213	9,332	48,226	4,617	48,967	277,019
C-R-100-4	11	50	78,479	118,633	490,733	3,527	4,009	11,604	293	509	1,969	10,768	46,762	130,029	44,146	336,017	680,311
C-R-100-4	11	90	177,437	247,202	708,602	4,316	4,874	13,231	728	1,074	2,817	27,362	99,892	176,173	123,801	603,454	944,067
C-R-400-2	13	10	22,442	26,323	205,992	3,076	3,932	9,509	8	9	667	243	687	51,815	1,062	3,095	289,562
C-R-400-2	13	50	25,768	31,741	463,262	3,424	4,232	12,110	11	43	1,767	357	3,924	125,145	1,800	23,168	626,296

Table 44--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
C-R-400-2	13	90	35,546	49,896	575,111	3,769	4,492	13,199	51	141	2,130	1,867	13,745	143,357	8,460	73,352	751,377
C-R-400-3	11	10	20,518	23,931	188,869	2,586	3,391	8,575	8	9	604	243	687	44,712	1,062	3,095	259,359
C-R-400-3	11	50	23,731	29,062	412,726	2,909	3,691	10,933	11	40	1,557	356	3,716	106,805	1,791	20,870	542,559
C-R-400-3	11	90	33,274	46,366	516,783	3,248	3,952	11,975	50	137	1,899	1,836	13,344	123,988	8,294	70,591	661,844
C-R-400-4	13	10	19,832	22,602	208,102	2,307	2,740	8,549	8	8	692	243	608	51,996	1,062	2,751	292,910
C-R-400-4	13	50	22,837	27,118	466,376	2,574	3,014	11,085	11	27	1,794	329	2,334	125,145	1,601	15,203	626,299
C-R-400-4	13	90	31,835	42,229	578,878	2,764	3,250	12,058	46	106	2,162	1,658	9,841	142,961	7,246	52,109	749,888
C-R-1000-4	13	10	18,074	20,451	205,324	2,281	2,714	8,511	8	8	692	240	585	51,985	1,050	2,672	292,875
C-R-1000-4	13	50	20,119	22,894	462,105	2,527	2,964	11,021	8	13	1,788	247	1,024	124,659	1,097	6,000	622,910
C-R-1000-4	13	90	21,140	26,223	564,587	2,587	3,065	11,856	10	30	2,110	319	2,558	139,524	1,551	13,228	732,469
C-WBI-100-1	6	10	32,338	59,725	180,485	4,136	5,567	10,244	39	308	611	1,359	24,796	43,835	5,793	133,197	267,173
C-WBI-100-1	6	50	84,475	159,180	411,506	5,307	6,562	13,205	332	1,019	1,761	12,269	96,433	117,697	53,613	640,218	668,049
C-WBI-100-1	6	90	184,626	322,652	650,055	6,243	7,456	15,036	746	1,728	2,703	27,992	169,845	177,422	127,837	1,020,841	1,003,725
C-WBI-400-1	12	10	23,096	29,847	196,575	3,877	5,297	10,433	8	19	636	243	1,447	49,328	1,062	6,027	278,463
C-WBI-400-1	12	50	27,040	38,406	433,936	4,422	5,637	13,083	13	161	1,666	421	14,176	119,407	2,196	71,977	603,625
C-WBI-400-1	12	90	38,118	66,674	540,538	4,862	6,012	14,265	58	329	2,036	2,182	29,237	139,593	10,438	139,007	736,291
Structural Plans																	
G-100-1	11	10	97,366	179,373	331,302	3,792	5,890	10,632	378	716	1,259	17,597	62,202	85,014	138,531	525,099	595,451
G-100-1	11	50	146,163	243,804	627,987	4,565	6,141	13,423	490	887	2,375	21,297	75,834	153,854	156,253	594,312	908,393
G-100-1	11	90	184,019	288,435	772,895	5,033	6,499	14,604	627	1,047	2,852	27,129	92,000	178,091	212,280	697,391	1,099,422
G-100-4	11	10	82,469	121,839	297,533	2,555	3,742	8,837	314	465	1,112	15,501	42,851	75,939	125,961	429,910	549,043
G-100-4	11	50	126,926	175,336	586,618	3,163	3,944	11,481	403	570	2,185	18,620	50,982	142,212	140,905	465,313	846,824
G-100-4	11	90	160,896	211,408	725,195	3,535	4,255	12,569	532	689	2,641	24,156	63,290	164,735	194,681	542,207	1,026,032
G-400-4	13	10	82,393	121,763	317,927	2,550	3,737	9,277	314	464	1,193	15,498	42,840	83,265	125,934	429,825	579,839
G-400-4	13	50	124,760	173,053	639,524	3,079	3,857	12,074	393	558	2,414	18,208	49,778	161,210	138,590	458,222	931,383
G-400-4	13	90	145,200	194,086	772,016	3,212	3,914	12,944	452	599	2,813	20,720	53,620	179,554	178,789	495,962	1,094,979
G-1000-4	13	10	82,393	121,763	317,927	2,550	3,737	9,277	314	464	1,193	15,498	42,840	83,265	125,934	429,825	579,839
G-1000-4	13	50	124,748	173,042	639,512	3,077	3,854	12,072	393	558	2,414	18,208	49,777	161,209	138,589	458,220	931,381
G-1000-4	13	90	144,797	193,679	771,590	3,176	3,876	12,905	451	598	2,812	20,685	53,521	179,494	178,526	495,186	1,094,521
R-100-2	11	10	112,256	159,034	335,157	3,693	4,590	10,055	378	600	1,214	17,202	55,029	81,950	142,548	419,546	558,059
R-100-2	11	50	205,282	276,687	686,937	4,911	5,788	13,558	685	1,059	2,595	29,469	101,421	170,084	190,444	669,531	964,072
R-100-2	11	90	325,823	423,022	935,691	5,795	6,613	15,244	1,186	1,620	3,510	48,983	158,262	220,663	314,016	1,039,003	1,310,335

Table 44--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
R-100-3	11	10	100,473	140,752	318,903	3,203	4,049	9,462	340	539	1,161	16,555	49,396	79,279	135,949	383,039	538,867
R-100-3	11	50	191,530	254,870	667,783	4,403	5,254	12,955	630	989	2,525	27,310	94,548	165,753	179,852	622,500	937,710
R-100-3	11	90	310,915	398,210	914,481	5,303	6,102	14,663	1,132	1,553	3,442	46,904	151,733	216,527	303,594	994,276	1,284,992
R-100-4	11	10	97,231	132,493	313,191	2,923	3,398	8,994	316	460	1,112	15,615	41,436	75,485	128,151	332,713	513,428
R-100-4	11	50	186,430	240,562	658,292	4,077	4,587	12,444	599	807	2,430	26,082	73,721	156,792	170,334	494,843	881,224
R-100-4	11	90	303,063	372,505	898,457	4,866	5,452	14,071	1,074	1,344	3,316	44,553	127,703	205,455	287,547	854,006	1,218,545
R-400-2	13	10	105,409	151,127	344,401	3,526	4,417	10,200	357	575	1,263	16,441	52,497	87,337	140,109	410,462	582,912
R-400-2	13	50	155,566	219,351	677,429	4,165	5,011	13,242	473	811	2,559	21,377	77,153	173,098	159,702	566,931	984,560
R-400-2	13	90	192,252	268,758	831,310	4,510	5,271	14,331	598	936	3,034	26,265	90,520	196,471	213,177	710,844	1,194,957
R-400-3	11	10	93,624	132,844	310,500	3,036	3,875	9,265	319	514	1,135	15,793	46,862	77,709	133,507	373,947	533,462
R-400-3	11	50	141,604	197,316	606,561	3,650	4,469	12,064	417	740	2,262	19,189	70,209	150,042	148,969	519,454	873,936
R-400-3	11	90	175,525	242,025	748,416	3,988	4,730	13,106	541	865	2,715	24,039	83,579	172,436	201,922	663,419	1,078,258
R-400-4	13	10	90,380	124,582	324,509	2,756	3,224	9,240	295	435	1,170	14,854	38,901	81,422	125,706	323,616	542,152
R-400-4	13	50	136,355	182,853	651,096	3,314	3,791	12,216	385	557	2,408	17,912	49,251	160,817	139,024	390,667	907,816
R-400-4	13	90	166,508	215,056	794,328	3,505	4,028	13,189	475	646	2,846	21,388	58,682	181,809	183,225	515,736	1,105,068
R-1000-4	13	10	90,376	124,577	324,505	2,756	3,224	9,240	295	435	1,170	14,850	38,885	81,414	125,694	323,569	542,126
R-1000-4	13	50	135,679	182,074	650,348	3,295	3,772	12,195	383	555	2,406	17,857	49,050	160,707	138,829	389,963	907,431
R-1000-4	13	90	158,719	206,084	785,710	3,355	3,872	13,029	444	610	2,811	20,213	54,973	179,677	179,068	501,490	1,097,127
WBI-100-1	6	10	124,688	216,360	340,034	4,493	5,954	10,792	407	879	1,230	18,069	75,721	79,698	146,542	509,454	552,934
WBI-100-1	6	50	228,904	350,051	644,275	5,857	7,139	14,045	788	1,470	2,449	32,508	133,834	153,615	204,204	854,997	915,632
WBI-100-1	6	90	360,465	513,995	920,737	6,793	8,034	15,876	1,300	2,121	3,491	52,035	206,216	217,595	327,179	1,316,365	1,334,931
WBI-400-1	12	10	117,850	208,463	365,822	4,327	5,781	11,124	386	855	1,349	17,308	73,189	92,065	144,103	500,370	603,552
WBI-400-1	12	50	180,377	293,931	697,439	5,162	6,415	14,215	580	1,227	2,678	24,560	109,937	178,089	174,167	754,302	1,021,719
WBI-400-1	12	90	232,886	366,076	867,445	5,603	6,790	15,397	747	1,476	3,220	30,792	142,725	209,142	235,409	1,015,504	1,278,247
Non-Structural Plans																	
NS-100	15	10	33,569	61,499	147,468	4,238	5,674	9,774	51	323	458	1,793	26,172	23,351	7,459	138,745	156,875
NS-100	15	50	135,353	219,882	419,821	5,855	7,138	13,326	573	1,313	1,783	21,325	122,866	91,576	85,259	737,855	491,908
NS-100	15	90	197,170	339,496	592,376	6,548	7,780	14,794	798	1,802	2,415	30,076	175,792	126,694	133,726	1,040,085	708,840
NS-400	15	10	14,302	20,886	113,248	3,008	4,375	7,989	0	11	303	0	847	13,493	0	3,307	106,550
NS-400	15	50	25,138	37,337	239,483	4,463	5,668	11,306	110	277	942	4,194	25,518	42,183	18,075	125,697	226,849
NS-400	15	90	34,599	63,800	324,378	4,989	6,136	12,534	527	881	1,826	20,170	82,787	86,762	87,526	395,477	457,302
NS-1000	15	10	12,022	17,640	109,682	2,908	4,270	7,845	0	0	300	0	0	13,231	0	0	105,526
NS-1000	15	50	18,579	25,527	228,458	4,286	5,482	11,051	21	43	769	805	3,976	31,704	3,445	20,935	177,969
NS-1000	15	90	21,821	33,310	300,582	4,810	5,948	12,275	40	95	1,035	1,617	9,483	43,218	7,770	49,747	260,637

Source: GIS Economic Application Databases
* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 45
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU2-0	NA	10	128,022	1,730,382	1,237,692	4,595	20,040	19,128	424	7,288	5,035	18,672	701,053	450,314	148,926	3,145,439	2,120,786
Degraded Coast PU2-0	NA	50	281,805	2,166,127	1,736,577	6,405	21,468	22,774	1,033	8,794	6,880	41,729	852,224	576,730	236,551	4,270,103	2,932,029
Degraded Coast PU2-0	NA	90	375,050	2,244,316	1,927,214	7,098	21,614	23,929	1,356	8,972	7,484	54,285	878,751	612,019	333,768	4,538,312	3,243,045
Sustained Coast PU1-R	NA*	10	128,022	287,949	370,334	4,595	6,445	10,953	424	1,298	1,433	18,672	117,455	99,388	148,926	762,890	688,121
Sustained Coast PU1-R	NA*	50	281,805	509,000	740,121	6,405	8,036	14,697	1,033	2,104	2,857	41,729	200,660	184,934	236,551	1,233,532	1,106,090
Sustained Coast PU1-R	NA*	90	375,050	638,391	961,545	7,098	8,524	16,058	1,356	2,459	3,568	54,285	246,439	231,800	333,768	1,613,454	1,484,281
Comprehensive Plans																	
C-G-100-1	11	10	26,359	117,968	311,088	3,436	5,842	10,671	13	652	1,152	427	51,032	93,445	1,888	375,911	517,924
C-G-100-1	11	50	33,357	172,466	495,509	4,015	5,942	12,812	87	856	1,943	2,885	69,978	135,774	11,541	506,855	748,723
C-G-100-1	11	90	51,599	217,293	608,463	4,483	6,184	13,899	176	1,103	2,388	6,516	95,043	160,722	30,784	668,099	919,704
C-G-100-4	11	10	22,788	51,925	285,629	2,198	3,323	8,734	13	296	1,036	425	25,309	83,950	1,867	248,434	471,403
C-G-100-4	11	50	28,659	93,129	465,383	2,613	3,433	10,750	82	363	1,779	2,743	29,989	120,926	10,787	266,225	659,227
C-G-100-4	11	90	46,304	126,367	574,836	2,985	3,758	11,794	176	475	2,182	6,528	41,121	140,859	30,631	318,661	790,217
C-G-400-4	13	10	19,832	33,162	316,850	2,104	3,026	9,081	8	120	1,140	240	10,740	94,360	1,050	53,760	471,481
C-G-400-4	13	50	21,838	40,434	501,253	2,344	3,053	11,041	8	149	1,875	257	12,255	132,982	1,151	63,280	679,435
C-G-400-4	13	90	23,842	52,182	597,785	2,477	3,125	11,853	14	218	2,210	495	20,225	149,796	3,241	217,697	834,887
C-G-1000-4	13	10	17,397	23,564	310,950	1,950	2,591	8,760	8	82	1,128	240	6,706	93,110	1,050	27,685	463,406
C-G-1000-4	13	50	18,465	26,687	492,945	2,066	2,615	10,573	8	103	1,860	240	8,780	131,885	1,050	49,970	675,191
C-G-1000-4	13	90	19,171	32,719	586,326	2,165	2,652	11,349	9	135	2,178	279	11,787	146,935	1,411	61,436	784,388
C-R-100-2	11	10	31,481	79,612	295,272	3,336	4,463	10,036	37	471	1,106	1,303	46,632	92,583	5,388	268,192	478,423
C-R-100-2	11	50	82,529	200,145	540,314	4,361	5,438	12,876	307	858	2,121	11,384	82,588	146,835	48,243	544,911	784,797
C-R-100-2	11	90	183,013	354,499	759,339	5,245	6,181	14,481	741	1,383	2,936	27,877	134,514	192,022	126,391	816,003	1,047,702
C-R-100-3	11	10	29,450	70,750	293,174	2,846	3,921	9,443	37	417	1,099	1,296	40,376	90,392	5,301	230,840	465,984
C-R-100-3	11	50	80,114	183,931	535,779	3,853	4,905	12,273	304	805	2,119	11,269	76,402	145,173	47,555	507,999	773,477
C-R-100-3	11	90	180,777	332,170	753,216	4,753	5,671	13,899	741	1,333	2,938	27,882	128,673	190,604	126,408	781,395	1,038,044
C-R-100-4	11	10	28,702	58,719	288,530	2,566	3,195	8,945	35	226	1,031	1,213	18,266	81,974	4,617	101,431	417,056
C-R-100-4	11	50	78,479	156,892	525,086	3,527	4,184	11,741	293	595	2,035	10,768	52,073	135,551	44,146	354,870	713,243
C-R-100-4	11	90	177,437	292,139	736,667	4,316	4,989	13,296	728	1,113	2,861	27,362	103,101	180,984	123,801	616,377	976,954
C-R-400-2	13	10	22,442	31,270	309,300	3,076	4,192	10,146	8	79	1,112	243	7,341	93,716	1,062	30,070	458,758
C-R-400-2	13	50	25,768	44,812	495,211	3,424	4,461	12,279	11	160	1,853	357	14,451	133,396	1,800	71,001	676,606
C-R-400-2	13	90	35,546	72,885	599,518	3,769	4,638	13,277	51	402	2,251	1,867	36,845	155,358	8,460	216,472	833,659

Table 45--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
C-R-400-3	11	10	20,518	28,662	271,680	2,586	3,650	9,104	8	76	966	243	7,188	78,978	1,062	27,913	398,385
C-R-400-3	11	50	23,731	41,206	440,415	2,909	3,919	11,090	11	156	1,637	356	14,047	114,332	1,791	68,188	587,510
C-R-400-3	11	90	33,274	67,384	538,951	3,248	4,098	12,051	50	369	2,005	1,836	34,696	134,692	8,294	189,966	730,840
C-R-400-4	13	10	19,832	26,552	310,368	2,307	2,923	9,160	8	57	1,124	243	5,225	92,463	1,062	20,713	454,406
C-R-400-4	13	50	22,837	37,321	496,162	2,574	3,188	11,235	11	99	1,864	329	7,871	131,586	1,601	41,944	668,197
C-R-400-4	13	90	31,835	59,580	600,113	2,764	3,366	12,125	46	219	2,236	1,658	18,834	150,433	7,246	103,251	801,842
C-R-1000-4	13	10	18,074	22,766	307,084	2,281	2,897	9,121	8	27	1,114	240	2,230	91,532	1,050	6,918	450,123
C-R-1000-4	13	50	20,119	28,583	490,493	2,527	3,139	11,172	8	74	1,854	247	5,785	130,860	1,097	20,499	661,017
C-R-1000-4	13	90	21,140	37,279	583,873	2,587	3,180	11,922	10	98	2,170	319	8,008	145,899	1,551	42,538	777,661
C-WBI-100-1	6	10	32,338	115,582	243,203	4,136	5,951	10,613	39	860	991	1,359	78,104	80,470	5,793	448,581	461,105
C-WBI-100-1	6	50	84,475	259,398	468,440	5,307	6,882	13,392	332	1,498	1,986	12,269	145,162	141,626	53,613	951,803	826,626
C-WBI-100-1	6	90	184,626	443,252	711,409	6,243	7,622	15,126	746	2,077	2,871	27,992	209,613	197,451	127,837	1,317,096	1,157,882
C-WBI-400-1	12	10	23,096	39,723	292,971	3,877	5,681	11,061	8	197	1,084	243	17,607	91,348	1,062	78,898	453,935
C-WBI-400-1	12	50	27,040	62,131	469,243	4,422	5,957	13,281	13	301	1,770	421	27,315	129,896	2,196	146,373	672,499
C-WBI-400-1	12	90	38,118	113,460	573,790	4,862	6,178	14,350	58	894	2,259	2,182	87,938	163,828	10,438	547,224	910,781
Structural Plans																	
G-100-1	11	10	97,366	249,957	437,343	3,792	6,599	11,334	378	1,053	1,715	17,597	87,890	125,505	138,531	668,578	772,860
G-100-1	11	50	146,163	318,319	676,313	4,565	6,708	13,711	490	1,232	2,543	21,297	106,394	169,190	156,253	801,359	1,013,929
G-100-1	11	90	184,019	365,295	813,516	5,033	6,950	14,798	627	1,465	3,042	27,129	130,716	196,553	212,280	958,774	1,227,951
G-100-4	11	10	82,469	156,462	389,762	2,555	4,080	9,397	314	622	1,499	15,501	55,558	111,445	125,961	503,435	699,584
G-100-4	11	50	126,926	211,231	620,111	3,163	4,199	11,649	403	674	2,261	18,620	60,491	149,463	140,905	525,760	896,055
G-100-4	11	90	160,896	247,164	750,028	3,535	4,525	12,693	532	778	2,704	24,156	71,248	171,384	194,681	576,165	1,067,215
G-400-4	13	10	82,393	156,386	430,234	2,550	4,075	9,942	314	622	1,663	15,498	55,548	126,583	125,934	503,350	760,879
G-400-4	13	50	124,760	208,948	677,192	3,079	4,111	12,253	393	663	2,496	18,208	59,287	169,132	138,590	518,669	985,725
G-400-4	13	90	145,200	229,842	798,724	3,212	4,183	13,065	452	688	2,882	20,720	61,578	186,921	178,789	529,921	1,142,656
G-1000-4	13	10	82,393	156,386	430,234	2,550	4,075	9,942	314	622	1,663	15,498	55,548	126,583	125,934	503,350	760,879
G-1000-4	13	50	124,748	208,937	677,180	3,077	4,109	12,250	393	663	2,496	18,208	59,287	169,132	138,589	518,667	985,723
G-1000-4	13	90	144,797	229,434	798,298	3,176	4,145	13,026	451	686	2,880	20,685	61,479	186,861	178,526	529,144	1,142,198
R-100-2	11	10	112,256	198,061	429,078	3,693	4,850	10,584	378	803	1,619	17,202	78,236	121,487	142,548	552,049	731,252
R-100-2	11	50	205,282	343,511	732,309	4,911	6,016	13,716	685	1,166	2,671	29,469	111,220	177,447	190,444	727,108	1,012,201
R-100-2	11	90	325,823	496,680	975,082	5,795	6,759	15,321	1,186	1,687	3,565	48,983	164,958	226,828	314,016	1,091,223	1,358,532
R-100-3	11	10	100,473	173,219	410,304	3,203	4,308	9,992	340	732	1,562	16,555	71,294	118,314	135,949	504,578	707,849
R-100-3	11	50	191,530	311,639	709,293	4,403	5,482	13,113	630	1,095	2,601	27,310	104,347	173,115	179,852	680,077	985,839

Table 45--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 2
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
R-100-3	11	90	310,915	459,501	949,122	5,303	6,248	14,740	1,132	1,620	3,497	46,904	158,430	222,692	303,594	1,046,496	1,333,189
R-100-4	11	10	97,231	154,715	400,658	2,923	3,581	9,494	316	511	1,458	15,615	46,224	107,950	128,151	352,701	643,408
R-100-4	11	50	186,430	278,164	692,441	4,077	4,762	12,581	599	858	2,485	26,082	77,460	161,826	170,334	509,343	912,808
R-100-4	11	90	303,063	413,469	925,291	4,866	5,567	14,136	1,074	1,377	3,358	44,553	130,723	210,208	287,547	864,003	1,250,525
R-400-2	13	10	105,409	190,154	458,264	3,526	4,676	10,837	357	778	1,749	16,441	75,703	134,364	140,109	542,965	784,791
R-400-2	13	50	155,566	286,175	726,026	4,165	5,239	13,411	473	918	2,642	21,377	86,951	181,123	159,702	624,508	1,037,888
R-400-2	13	90	192,252	342,417	871,411	4,510	5,417	14,409	598	1,002	3,095	26,265	97,216	203,392	213,177	763,065	1,249,087
R-400-3	11	10	93,624	165,311	401,901	3,036	4,134	9,795	319	708	1,536	15,793	68,759	116,744	133,507	495,486	702,444
R-400-3	11	50	141,604	254,085	648,071	3,650	4,697	12,222	417	847	2,338	19,189	80,007	157,404	148,969	577,030	922,065
R-400-3	11	90	175,525	303,316	783,056	3,988	4,876	13,182	541	932	2,770	24,039	90,275	178,600	201,922	715,639	1,126,455
R-400-4	13	10	90,380	146,804	432,434	2,756	3,408	9,850	295	486	1,602	14,854	43,689	121,942	125,706	343,605	704,276
R-400-4	13	50	136,355	220,454	689,368	3,314	3,966	12,366	385	608	2,471	17,912	52,990	166,701	139,024	405,168	945,923
R-400-4	13	90	166,508	256,019	822,877	3,505	4,143	13,256	475	680	2,895	21,388	61,703	187,432	183,225	525,733	1,144,279
R-1000-4	13	10	90,376	146,799	432,430	2,756	3,407	9,850	295	486	1,602	14,850	43,674	121,934	125,694	343,557	704,250
R-1000-4	13	50	135,679	219,675	688,619	3,295	3,946	12,346	383	606	2,469	17,857	52,789	166,591	138,829	404,464	945,538
R-1000-4	13	90	158,719	247,047	814,259	3,355	3,988	13,096	444	643	2,860	20,213	57,994	185,300	179,068	511,487	1,136,338
WBI-100-1	6	10	124,688	284,072	406,423	4,493	6,338	11,162	407	1,278	1,563	18,069	115,631	112,183	146,542	755,393	725,358
WBI-100-1	6	50	228,904	446,275	699,972	5,857	7,460	14,233	788	1,805	2,629	32,508	173,793	174,828	204,204	1,134,000	1,064,118
WBI-100-1	6	90	360,465	619,506	977,418	6,793	8,200	15,966	1,300	2,381	3,632	52,035	240,057	235,788	327,179	1,592,316	1,482,799
WBI-400-1	12	10	117,850	276,175	480,131	4,327	6,165	11,752	386	1,254	1,866	17,308	113,099	141,441	144,103	746,309	832,626
WBI-400-1	12	50	180,377	390,156	755,201	5,162	6,735	14,412	580	1,562	2,842	24,560	149,896	196,885	174,167	1,033,305	1,153,962
WBI-400-1	12	90	232,886	471,587	918,885	5,603	6,956	15,481	747	1,735	3,349	30,792	176,567	225,677	235,409	1,291,455	1,411,772
Non-Structural Plans																	
NS-100	15	10	33,569	117,355	164,768	4,238	6,058	9,893	51	875	628	1,793	79,479	39,861	7,459	454,129	254,554
NS-100	15	50	135,353	320,100	450,859	5,855	7,458	13,425	573	1,792	1,931	21,325	171,594	106,668	85,259	1,049,441	588,411
NS-100	15	90	197,170	460,096	629,727	6,548	7,946	14,846	798	2,151	2,523	30,076	215,561	139,011	133,726	1,336,339	800,594
NS-400	15	10	14,302	30,762	116,307	3,008	4,759	8,108	0	189	359	0	17,007	18,498	0	76,178	129,120
NS-400	15	50	25,138	61,061	246,830	4,463	5,988	11,406	110	417	985	4,194	38,657	46,252	18,075	200,093	249,890
NS-400	15	90	34,599	110,585	338,868	4,989	6,302	12,585	527	1,446	2,001	20,170	141,487	104,942	87,526	803,694	583,732
NS-1000	15	10	12,022	22,115	111,068	2,908	4,654	7,963	0	24	307	0	2,104	13,883	0	6,216	107,451
NS-1000	15	50	18,579	34,590	231,265	4,286	5,802	11,150	21	122	794	805	10,610	33,759	3,445	46,640	185,930
NS-1000	15	90	21,821	51,640	306,259	4,810	6,114	12,326	40	424	1,137	1,617	38,803	52,299	7,770	206,841	309,291

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 46
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
Without Project																	
Degraded Coast PU3a-0	NA	10	183,351	347,564	491,402	4,662	8,761	12,448	774	1,892	2,329	33,862	192,853	168,121	183,499	974,858	868,832
Degraded Coast PU3a-0	NA	50	281,375	529,489	751,778	6,359	11,218	16,540	1,372	3,038	3,941	60,436	292,433	268,932	317,813	1,448,673	1,360,623
Degraded Coast PU3a-0	NA	90	386,427	719,878	1,028,069	7,552	12,368	19,069	1,859	4,322	5,462	79,029	408,473	367,345	393,115	1,986,686	1,800,122
Sustained Coast PU1-R	NA*	10	183,351	345,837	490,363	4,662	8,774	12,456	774	1,872	2,317	33,862	190,678	166,813	183,499	967,069	864,148
Sustained Coast PU1-R	NA*	50	281,375	526,281	749,849	6,359	11,304	16,592	1,372	3,019	3,929	60,436	290,472	267,752	317,813	1,443,086	1,357,263
Sustained Coast PU1-R	NA*	90	386,427	718,067	1,026,980	7,552	12,445	19,115	1,859	4,303	5,451	79,029	406,402	366,100	393,115	1,980,028	1,796,119
Comprehensive Plans																	
C-M-100-1	10	10	13,736	19,480	191,472	1,045	1,188	5,906	69	246	933	3,067	28,898	56,970	17,297	159,332	303,944
C-M-100-1	10	50	21,571	26,322	296,096	1,142	1,320	7,646	277	314	1,718	14,526	36,465	98,891	81,966	190,170	516,738
C-M-100-1	10	90	42,123	53,925	425,799	1,403	1,687	9,095	375	414	2,332	18,767	45,620	129,778	100,885	230,307	651,495
C-M-100-2	10	10	13,424	33,786	196,351	929	1,766	6,042	53	302	942	2,726	38,640	60,555	19,364	199,068	321,016
C-M-100-2	10	50	33,247	69,723	322,411	1,318	2,265	8,171	295	424	1,775	15,916	50,836	105,767	90,805	253,903	549,037
C-M-100-2	10	90	74,872	131,069	482,902	1,820	2,898	9,925	488	577	2,490	25,174	65,120	142,825	129,892	336,637	716,606
C-G-400-2	10	10	17,082	31,593	198,415	917	1,745	5,990	56	99	873	2,262	10,169	51,070	16,158	61,567	274,055
C-G-400-2	10	50	27,233	57,929	310,858	1,204	2,123	7,986	70	135	1,412	3,066	13,459	78,737	20,272	82,209	410,972
C-G-400-2	10	90	41,781	84,728	433,591	1,469	2,472	9,429	112	174	1,938	5,170	17,500	104,466	31,766	103,922	528,499
C-G-1000-2	10	10	10,578	21,491	189,059	747	1,522	5,747	23	52	828	962	5,748	48,247	10,222	41,887	261,348
C-G-1000-2	10	50	19,447	41,236	297,920	1,033	1,899	7,742	34	69	1,357	1,659	7,124	75,193	13,704	53,424	394,684
C-G-1000-2	10	90	31,033	62,730	415,491	1,286	2,235	9,168	70	94	1,871	3,377	9,396	99,920	23,200	64,432	506,523
Structural Plans																	
M-100-1	10	10	42,227	53,738	236,338	1,053	1,198	5,918	123	321	1,022	5,499	36,942	62,386	31,851	196,761	333,037
M-100-1	10	50	51,439	61,269	342,831	1,149	1,330	7,658	330	343	1,790	16,783	39,045	102,403	95,887	206,970	538,679
M-100-1	10	90	73,672	87,565	474,151	1,410	1,697	9,106	459	447	2,444	22,962	48,475	135,707	117,597	247,116	676,795
M-100-2	10	10	44,413	71,835	245,395	937	1,776	6,053	112	381	1,036	5,371	47,194	66,384	38,017	247,330	358,391
M-100-2	10	50	66,079	108,757	373,976	1,326	2,275	8,182	352	457	1,854	18,389	53,995	109,719	108,836	281,664	579,313
M-100-2	10	90	109,966	169,121	536,883	1,827	2,908	9,937	576	611	2,606	29,585	68,078	149,044	150,703	353,804	746,945
G-400-2	10	10	50,638	79,220	253,511	1,055	1,928	6,212	144	425	1,081	6,666	51,331	69,113	43,917	265,909	370,719
G-400-2	10	50	68,683	112,105	377,475	1,343	2,308	8,210	363	476	1,871	18,847	55,844	110,839	111,089	290,023	584,528

Table 46--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
G-400-2	10	90	92,165	149,034	514,086	1,611	2,662	9,659	484	507	2,489	26,064	58,454	142,273	134,446	308,309	715,257
G-1000-2	10	10	44,637	72,072	245,675	934	1,772	6,050	111	380	1,036	5,366	47,183	66,375	37,988	247,263	358,339
G-1000-2	10	50	62,682	104,956	369,638	1,222	2,151	8,047	331	432	1,826	17,548	51,696	108,102	105,161	271,377	572,149
G-1000-2	10	90	86,016	141,747	506,072	1,487	2,503	9,493	451	462	2,442	24,721	54,229	139,469	128,373	289,391	702,650
Non-Structural Plans																	
NS-100	15	10	32,372	94,031	195,405	4,577	8,662	11,127	84	838	902	3,509	84,239	54,025	18,505	412,764	278,648
NS-100	15	50	61,513	190,489	327,470	6,275	11,191	15,021	290	2,415	2,047	11,802	230,560	127,488	58,608	1,126,765	640,004
NS-100	15	90	105,731	384,866	511,778	7,468	12,332	17,559	479	3,950	3,078	18,586	374,085	192,734	85,423	1,799,003	931,683
NS-400	15	10	16,846	33,998	159,372	3,481	7,198	9,442	18	111	603	832	11,396	28,457	4,968	57,465	153,402
NS-400	15	50	27,110	60,726	248,637	5,178	9,677	13,320	54	373	1,149	2,239	33,972	55,861	11,880	162,155	288,763
NS-400	15	90	45,266	129,510	364,773	6,371	10,817	15,858	147	1,040	1,805	6,171	101,416	94,340	29,263	480,976	460,389
NS-1000	15	10	12,556	24,904	151,736	2,739	5,970	8,229	3	19	557	118	1,913	24,719	555	9,533	133,600
NS-1000	15	50	21,258	39,216	235,401	4,383	8,444	12,045	11	72	1,007	423	6,655	45,360	2,153	30,033	236,917
NS-1000	15	90	32,077	64,629	329,863	5,546	9,565	14,544	60	232	1,457	2,258	20,842	64,990	9,325	96,814	319,015

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 47
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
Without Project																	
Degraded Coast PU3a-0	NA	10	183,351	521,763	596,150	4,662	11,880	14,323	774	2,795	2,872	33,862	283,638	222,712	183,499	1,410,714	1,130,919
Degraded Coast PU3a-0	NA	50	281,375	795,008	911,438	6,359	13,846	18,121	1,372	4,719	4,951	60,436	455,524	367,001	317,813	2,226,625	1,828,417
Degraded Coast PU3a-0	NA	90	386,427	1,038,601	1,219,722	7,552	14,705	20,475	1,859	5,246	6,018	79,029	501,550	423,314	393,115	2,465,641	2,088,125
Sustained Coast PU1-R	NA*	10	183,351	519,275	594,654	4,662	11,882	14,325	774	2,796	2,873	33,862	283,832	222,828	183,499	1,410,811	1,130,977
Sustained Coast PU1-R	NA*	50	281,375	792,760	910,087	6,359	13,953	18,185	1,372	4,720	4,952	60,436	455,583	367,036	317,813	2,226,995	1,828,640
Sustained Coast PU1-R	NA*	90	386,427	1,040,881	1,221,093	7,552	14,785	20,522	1,859	5,257	6,024	79,029	502,829	424,083	393,115	2,469,191	2,090,260
Comprehensive Plans																	
C-M-100-1	10	10	13,736	25,323	207,273	1,045	1,208	6,153	69	438	1,075	3,067	52,249	72,757	17,297	281,210	384,154
C-M-100-1	10	50	21,571	34,932	319,836	1,142	1,368	7,866	277	456	1,903	14,526	54,088	118,430	81,966	290,872	616,480
C-M-100-1	10	90	42,123	66,168	454,894	1,403	1,687	9,273	375	572	2,466	18,767	65,121	144,705	100,885	339,153	731,722
C-M-100-2	10	10	13,424	68,017	223,567	929	2,326	6,504	53	579	1,118	2,726	73,261	80,910	19,364	365,313	420,421
C-M-100-2	10	50	33,247	115,196	360,947	1,318	2,692	8,542	295	629	1,986	15,916	77,842	129,041	90,805	401,007	667,226
C-M-100-2	10	90	74,872	178,210	525,877	1,820	3,163	10,209	488	789	2,646	25,174	93,114	161,186	129,892	475,659	809,784
C-G-400-2	10	10	17,082	57,653	223,101	917	2,305	6,452	56	142	977	2,262	14,601	62,076	16,158	87,788	330,094
C-G-400-2	10	50	27,233	92,722	346,086	1,204	2,550	8,358	70	216	1,584	3,066	25,094	97,251	20,272	125,903	497,134
C-G-400-2	10	90	41,781	117,776	472,201	1,469	2,737	9,714	112	263	2,056	5,170	30,214	118,095	31,766	150,293	592,982
C-G-1000-2	10	10	10,578	40,707	211,625	747	2,082	6,210	23	80	927	962	8,692	58,792	10,222	61,150	315,231
C-G-1000-2	10	50	19,447	69,930	331,260	1,033	2,326	8,114	34	100	1,514	1,659	10,291	91,084	13,704	68,864	472,095
C-G-1000-2	10	90	31,033	90,936	452,602	1,286	2,500	9,453	70	154	1,980	3,377	16,590	111,839	23,200	101,928	568,257
Structural Plans																	
M-100-1	10	10	42,227	61,282	252,666	1,053	1,218	6,165	123	466	1,149	5,499	54,822	76,479	31,851	297,936	406,834
M-100-1	10	50	51,439	69,991	366,606	1,149	1,377	7,878	330	489	1,977	16,783	56,943	122,027	95,887	307,681	638,424
M-100-1	10	90	73,672	98,114	502,721	1,410	1,697	9,285	459	606	2,578	22,962	68,087	150,669	117,597	356,688	757,246
M-100-2	10	10	44,413	108,333	273,313	937	2,336	6,516	112	615	1,199	5,371	76,974	85,240	38,017	408,715	456,291
M-100-2	10	50	66,079	154,776	412,682	1,326	2,701	8,554	352	663	2,065	18,389	81,045	133,006	108,836	427,362	697,067
M-100-2	10	90	109,966	213,572	579,025	1,827	3,173	10,221	576	827	2,763	29,585	96,564	167,557	150,703	503,168	843,326
G-400-2	10	10	50,638	115,719	281,429	1,055	2,489	6,675	144	659	1,243	6,666	81,111	87,969	43,917	427,294	468,619

Table 47--Continued

Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
G-400-2	10	50	68,683	158,124	416,180	1,343	2,735	8,582	363	683	2,082	18,847	82,894	134,126	111,089	435,721	702,282
G-400-2	10	90	92,165	193,485	556,228	1,611	2,927	9,943	484	722	2,645	26,064	86,940	160,787	134,446	457,672	811,638
G-1000-2	10	10	44,637	108,570	273,594	934	2,332	6,512	111	615	1,199	5,366	76,963	85,232	37,988	408,647	456,240
G-1000-2	10	50	62,682	150,974	408,344	1,222	2,578	8,419	331	639	2,038	17,548	78,746	131,389	105,161	417,075	689,903
G-1000-2	10	90	86,016	186,198	548,214	1,487	2,768	9,778	451	677	2,599	24,721	82,714	157,982	128,373	438,754	799,030
Non-Structural Plans																	
NS-100	15	10	32,372	188,422	224,639	4,577	11,769	12,090	84	1,654	1,154	3,509	170,653	80,788	18,505	827,275	407,028
NS-100	15	50	61,513	443,973	405,977	6,275	13,841	15,841	290	4,041	2,550	11,802	385,259	175,401	58,608	1,839,957	860,889
NS-100	15	90	105,731	749,281	624,642	7,468	14,672	18,284	479	4,707	3,313	18,586	442,607	213,956	85,423	2,124,425	1,032,471
NS-400	15	10	16,846	53,545	165,426	3,481	10,255	10,389	18	192	628	832	19,378	30,930	4,968	95,097	165,058
NS-400	15	50	27,110	128,427	269,605	5,178	12,326	14,140	54	976	1,335	2,239	95,215	74,829	11,880	448,956	377,589
NS-400	15	90	45,266	253,710	403,240	6,371	13,158	16,583	147	1,645	1,992	6,171	162,074	113,126	29,263	762,977	547,729
NS-1000	15	10	12,556	35,479	155,011	2,739	8,980	9,161	3	96	581	118	9,573	27,091	555	46,439	145,030
NS-1000	15	50	21,258	64,090	243,105	4,383	11,052	12,852	11	280	1,071	423	26,600	51,538	2,153	127,802	267,198
NS-1000	15	90	32,077	109,132	343,646	5,546	11,883	15,262	60	1,106	1,727	2,258	106,356	91,475	9,325	500,311	443,983

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 48
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU3b-0	NA	10	75,289	144,002	202,555	1,628	3,032	4,331	464	768	1,176	20,497	77,484	78,163	91,491	336,385	343,192
Degraded Coast PU3b-0	NA	50	126,488	218,681	326,320	2,468	3,929	6,163	796	1,037	1,849	37,053	101,280	117,972	149,395	453,733	502,943
Degraded Coast PU3b-0	NA	90	185,226	306,294	469,473	3,153	4,654	7,655	960	1,279	2,248	42,953	124,383	140,952	183,408	550,497	613,517
Sustained Coast PU1-R	NA*	10	75,289	144,155	202,647	1,628	3,025	4,326	464	769	1,177	20,497	77,534	78,193	91,491	336,757	343,416
Sustained Coast PU1-R	NA*	50	126,488	218,988	326,505	2,468	3,927	6,162	796	1,033	1,847	37,053	100,951	117,774	149,395	452,677	502,308
Sustained Coast PU1-R	NA*	90	185,226	306,187	469,410	3,153	4,654	7,655	960	1,279	2,247	42,953	124,254	140,874	183,408	550,108	613,283
Comprehensive Plans																	
C-F-100-1	10	10	7,235	11,303	80,217	223	341	1,904	4	11	432	264	1,118	23,003	548	3,376	100,994
C-F-100-1	10	50	13,507	21,767	137,223	326	500	2,825	30	70	773	1,376	6,707	41,604	5,111	27,506	170,912
C-F-100-1	10	90	38,801	61,468	229,238	625	853	3,839	111	196	1,046	4,477	19,019	55,792	19,117	77,621	238,359
C-F-400-1	12	10	5,672	8,605	85,020	218	336	2,092	3	6	482	196	699	26,022	284	1,641	114,510
C-F-400-1	12	50	7,126	11,457	140,995	249	406	3,014	6	9	821	270	961	43,986	549	3,172	180,910
C-F-400-1	12	90	9,788	20,314	208,578	315	490	3,801	10	51	1,017	469	5,485	53,588	1,724	19,989	229,252
C-F-1000-1	14	10	5,185	7,508	91,138	216	333	2,269	3	3	530	181	393	29,030	238	670	128,013
C-F-1000-1	14	50	6,498	10,008	152,424	246	403	3,280	3	5	900	190	569	48,854	287	1,801	201,660
C-F-1000-1	14	90	8,559	14,412	224,224	307	480	4,128	7	16	1,104	329	1,780	58,293	1,137	7,384	250,885
C-G-100-1	10	10	4,652	6,780	77,846	27	41	1,624	1	3	432	50	312	22,639	233	1,368	100,393
C-G-100-1	10	50	6,459	9,395	128,505	51	78	2,429	6	30	744	275	3,016	39,400	1,304	13,377	162,848
C-G-100-1	10	90	12,114	16,439	191,469	148	210	3,191	30	53	928	1,266	5,121	47,761	6,169	25,399	207,515
C-RL-100-1	10	10	14,714	25,942	90,998	700	1,367	2,711	37	54	472	1,738	6,693	26,319	11,720	42,947	125,877
C-RL-100-1	10	50	25,175	46,383	154,128	950	1,662	3,807	72	172	841	3,234	18,033	47,384	18,294	86,262	204,426
C-RL-100-1	10	90	45,784	96,543	244,217	1,392	2,148	4,988	127	284	1,085	5,255	28,809	59,951	27,637	136,063	267,098
C-RL-400-1	12	10	10,010	14,783	87,810	652	1,303	2,767	19	21	492	1,087	3,640	27,472	7,993	27,691	128,954
C-RL-400-1	12	50	13,031	20,177	143,368	841	1,528	3,864	22	32	832	1,210	4,609	45,774	8,529	32,064	196,263
C-RL-400-1	12	90	20,101	35,018	213,341	1,119	1,830	4,882	41	79	1,037	1,915	9,049	55,759	11,656	50,327	246,597

Table 48--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
F-100-1	10	10	23,729	32,446	106,597	257	381	1,958	81	80	546	3,610	7,003	28,850	14,834	29,252	126,185
F-100-1	10	50	32,626	43,942	167,079	360	550	2,881	105	108	875	4,582	9,623	46,362	19,024	41,982	192,125
F-100-1	10	90	59,552	83,311	260,953	670	903	3,909	186	234	1,148	7,704	21,941	60,578	33,172	92,119	259,748
F-400-1	12	10	23,673	32,389	114,030	253	376	2,146	81	80	598	3,591	6,964	32,044	14,769	29,089	140,427
F-400-1	12	50	28,535	38,942	175,249	283	456	3,071	85	85	940	3,693	7,387	50,092	15,354	32,200	207,702
F-400-1	12	90	34,332	52,431	248,036	360	541	3,871	90	124	1,135	3,881	11,630	59,594	16,545	47,862	255,704
F-1000-1	14	10	23,673	32,389	121,073	253	376	2,327	81	80	647	3,591	6,964	35,164	14,769	29,089	154,286
F-1000-1	14	50	28,532	38,940	187,876	283	456	3,340	85	85	1,023	3,693	7,387	55,178	15,354	32,200	229,190
F-1000-1	14	90	34,216	52,315	266,811	354	534	4,201	89	123	1,236	3,846	11,557	65,550	16,371	47,455	281,612
G-100-1	10	10	14,760	19,042	93,796	51	64	1,660	57	52	514	2,782	5,160	27,425	12,074	22,282	121,107
G-100-1	10	50	17,822	22,511	146,228	75	101	2,465	59	55	816	2,868	5,464	43,276	12,586	25,254	180,092
G-100-1	10	90	24,399	29,634	210,327	172	232	3,227	83	77	1,000	3,860	7,569	51,638	17,462	37,276	224,771
RL-100-1	10	10	38,815	64,327	131,863	743	1,440	2,785	132	150	615	6,063	15,079	34,115	29,316	80,051	158,525
RL-100-1	10	50	56,492	89,916	205,265	993	1,746	3,885	169	224	974	7,548	22,275	53,885	36,880	109,664	234,019
RL-100-1	10	90	84,336	138,228	303,480	1,457	2,232	5,093	228	330	1,221	9,749	32,478	66,491	47,568	155,814	297,178
RL-400-1	12	10	36,774	61,573	134,482	695	1,377	2,842	118	133	646	5,594	13,652	35,991	26,387	71,240	164,558
RL-400-1	12	50	50,119	82,254	207,186	885	1,612	3,943	132	178	1,009	6,058	17,946	55,733	29,376	88,182	238,709
RL-400-1	12	90	69,394	120,664	299,133	1,184	1,915	4,988	162	259	1,238	7,137	25,825	67,234	34,683	122,577	296,660
Non-Structural Plans																	
NS-100	15	10	15,256	35,012	81,328	1,585	2,951	3,848	23	94	383	990	9,275	18,509	4,513	40,178	82,342
NS-100	15	50	30,208	73,449	146,308	2,424	3,843	5,662	96	592	855	4,045	56,281	48,230	17,322	257,043	204,926
NS-100	15	90	54,320	170,176	244,970	3,088	4,570	7,118	153	936	1,142	6,300	89,968	65,376	31,854	395,758	288,312
NS-400	15	10	11,373	20,007	72,320	1,585	2,951	3,848	1	8	333	47	828	14,833	193	3,400	66,098
NS-400	15	50	17,546	32,647	119,447	2,424	3,843	5,661	14	59	598	579	5,961	28,752	2,934	30,879	118,718
NS-400	15	90	29,111	60,352	182,639	3,087	4,570	7,117	44	164	781	1,707	16,177	37,363	8,168	75,387	162,483
NS-1000	15	10	10,132	17,693	70,209	1,525	2,871	3,755	0	1	329	10	115	14,571	37	426	65,003
NS-1000	15	50	15,189	24,400	114,245	2,358	3,762	5,562	2	8	568	53	718	26,537	235	3,435	107,186
NS-1000	15	90	21,243	35,681	166,161	3,019	4,489	7,016	10	45	705	397	4,072	32,142	1,978	19,533	138,231

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 49
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU3b-0	NA	10	75,289	209,624	242,014	1,628	3,899	4,852	464	1,052	1,347	20,497	103,074	93,550	91,491	452,552	413,046
Degraded Coast PU3b-0	NA	50	126,488	305,869	378,748	2,468	4,939	6,771	796	1,316	2,017	37,053	127,069	133,479	149,395	567,057	571,087
Degraded Coast PU3b-0	NA	90	185,226	405,511	529,135	3,153	5,801	8,345	960	1,462	2,357	42,953	139,839	150,245	183,408	636,295	665,109
Sustained Coast PU1-R	NA*	10	75,289	209,814	242,128	1,628	3,903	4,854	464	1,052	1,347	20,497	103,091	93,560	91,491	452,692	413,130
Sustained Coast PU1-R	NA*	50	126,488	306,170	378,928	2,468	4,923	6,761	796	1,315	2,017	37,053	127,056	133,472	149,395	567,029	571,070
Sustained Coast PU1-R	NA*	90	185,226	405,658	529,223	3,153	5,800	8,344	960	1,463	2,358	42,953	139,933	150,302	183,408	636,574	665,276
Comprehensive Plans																	
C-F-100-1	10	10	7,235	16,341	87,454	223	418	2,002	4	46	465	264	4,388	26,002	548	16,943	114,289
C-F-100-1	10	50	13,507	32,029	148,076	326	580	2,934	30	104	808	1,376	10,424	45,066	5,111	41,008	184,999
C-F-100-1	10	90	38,801	73,668	241,653	625	1,003	3,987	111	197	1,060	4,477	19,093	57,007	19,117	78,080	245,130
C-F-400-1	12	10	5,672	10,879	92,662	218	413	2,207	3	7	511	196	786	28,607	284	2,003	126,284
C-F-400-1	12	50	7,126	16,813	151,959	249	486	3,144	6	45	862	270	4,964	48,004	549	17,852	197,504
C-F-400-1	12	90	9,788	29,012	221,797	315	640	3,970	10	53	1,036	469	5,598	55,163	1,724	20,638	238,011
C-F-1000-1	14	10	5,185	9,486	100,048	216	410	2,403	3	7	566	181	754	32,305	238	1,826	142,754
C-F-1000-1	14	50	6,498	13,178	164,473	246	484	3,431	3	11	937	190	1,271	52,358	287	5,410	217,140
C-F-1000-1	14	90	8,559	20,118	238,555	307	630	4,320	7	51	1,137	329	5,491	61,351	1,137	19,650	265,279
C-G-100-1	10	10	4,652	8,414	83,669	27	58	1,697	1	28	461	50	2,778	25,363	233	11,602	112,545
C-G-100-1	10	50	6,459	12,186	136,352	51	100	2,515	6	33	766	275	3,274	41,473	1,304	16,316	172,682
C-G-100-1	10	90	12,114	20,138	200,540	148	233	3,288	30	53	942	1,266	5,155	48,955	6,169	25,642	214,167
C-RL-100-1	10	10	14,714	41,626	103,046	700	1,625	2,882	37	167	535	1,738	17,915	32,371	11,720	83,904	149,720
C-RL-100-1	10	50	25,175	79,754	174,261	950	2,016	4,026	72	237	889	3,234	24,510	52,027	18,294	115,025	224,666
C-RL-100-1	10	90	45,784	140,292	269,044	1,392	2,658	5,280	127	309	1,110	5,255	31,262	62,249	27,637	144,033	277,270
C-RL-400-1	12	10	10,010	18,472	96,871	652	1,561	2,949	19	27	525	1,087	4,231	30,596	7,993	29,736	142,588
C-RL-400-1	12	50	13,031	27,037	156,173	841	1,882	4,095	22	49	869	1,210	6,355	49,304	8,529	38,596	211,259
C-RL-400-1	12	90	20,101	46,857	229,243	1,119	2,340	5,184	41	82	1,058	1,915	9,359	57,619	11,656	51,464	256,203

Table 49--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
F-100-1	10	10	23,729	39,765	114,540	257	468	2,059	81	85	569	3,610	7,347	30,942	14,834	31,663	136,024
F-100-1	10	50	32,626	55,147	178,225	360	631	2,991	105	142	910	4,582	13,386	49,838	19,024	55,756	206,296
F-100-1	10	90	59,552	94,984	273,205	670	1,054	4,057	186	236	1,163	7,704	22,067	61,809	33,172	92,947	266,634
F-400-1	12	10	23,673	39,708	123,234	253	464	2,264	81	84	628	3,591	7,307	34,708	14,769	31,501	152,836
F-400-1	12	50	28,535	50,147	188,024	283	538	3,201	85	119	980	3,693	11,150	54,036	15,354	45,974	224,016
F-400-1	12	90	34,332	64,104	262,176	360	692	4,041	90	126	1,154	3,881	11,757	61,173	16,545	48,690	264,518
F-1000-1	14	10	23,673	39,708	131,638	253	464	2,463	81	84	684	3,591	7,307	38,433	14,769	31,501	169,416
F-1000-1	14	50	28,532	50,144	202,414	283	538	3,492	85	119	1,069	3,693	11,150	59,631	15,354	45,974	247,819
F-1000-1	14	90	34,216	63,988	282,990	354	684	4,394	89	125	1,259	3,846	11,684	67,497	16,371	48,283	292,463
G-100-1	10	10	14,760	22,402	100,154	51	80	1,733	57	52	536	2,782	5,226	29,407	12,074	23,479	130,460
G-100-1	10	50	17,822	26,067	154,313	75	124	2,551	59	58	838	2,868	5,722	45,349	12,586	28,193	189,925
G-100-1	10	90	24,399	33,449	219,433	172	256	3,324	83	78	1,014	3,860	7,603	52,832	17,462	37,519	231,423
RL-100-1	10	10	38,815	88,363	146,498	743	1,709	2,959	132	216	664	6,063	21,945	38,819	29,316	105,264	177,493
RL-100-1	10	50	56,492	124,542	225,787	993	2,101	4,104	169	298	1,025	7,548	29,640	58,804	36,880	139,192	254,497
RL-100-1	10	90	84,336	179,042	327,398	1,457	2,742	5,385	228	372	1,252	9,749	36,420	69,250	47,568	168,503	308,812
RL-400-1	12	10	36,774	85,609	149,845	695	1,646	3,027	118	199	698	5,594	20,517	41,058	26,387	96,454	185,368
RL-400-1	12	50	50,119	116,880	228,590	885	1,968	4,174	132	252	1,064	6,058	25,312	61,004	29,376	117,710	260,826
RL-400-1	12	90	69,394	161,478	324,010	1,184	2,425	5,289	162	301	1,272	7,137	29,768	70,220	34,683	135,266	309,843
Non-Structural Plans																	
NS-100	15	10	15,256	64,186	90,364	1,585	3,819	4,117	23	499	509	990	48,325	30,603	4,513	217,027	137,114
NS-100	15	50	30,208	160,982	173,418	2,424	4,838	5,970	96	967	971	4,045	94,201	59,974	17,322	411,492	252,761
NS-100	15	90	54,320	292,126	282,740	3,088	5,715	7,473	153	1,221	1,230	6,300	116,607	73,627	31,854	512,710	324,533
NS-400	15	10	11,373	27,268	74,569	1,585	3,819	4,116	1	26	338	47	2,534	15,361	193	10,965	68,442
NS-400	15	50	17,546	50,526	124,984	2,424	4,838	5,969	14	114	615	579	11,273	30,397	2,934	54,262	125,960
NS-400	15	90	29,111	93,592	192,934	3,087	5,714	7,472	44	373	845	1,707	37,422	43,943	8,168	183,528	195,976
NS-1000	15	10	10,132	22,775	71,783	1,525	3,738	4,024	0	3	330	10	307	14,630	37	1,031	65,190
NS-1000	15	50	15,189	32,467	116,744	2,358	4,757	5,870	2	30	575	53	2,598	27,119	235	11,419	109,659
NS-1000	15	90	21,243	50,255	170,675	3,019	5,634	7,370	10	101	723	397	9,959	33,966	1,978	42,565	145,364

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 50
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU4-0	NA	10	95,289	116,535	216,843	1,115	1,519	2,630	326	312	690	16,543	34,768	46,387	93,449	185,471	255,462
Degraded Coast PU4-0	NA	50	123,250	154,485	282,730	1,563	2,300	3,791	373	361	792	17,922	40,344	51,863	104,156	214,835	289,611
Degraded Coast PU4-0	NA	90	159,386	212,273	373,137	2,038	2,683	4,752	425	568	996	20,065	59,437	66,646	113,242	316,757	364,892
Sustained Coast PU1-R	NA*	10	95,289	116,306	216,705	1,115	1,510	2,625	326	316	692	16,543	35,227	46,663	93,449	189,235	257,725
Sustained Coast PU1-R	NA*	50	123,250	154,321	282,631	1,563	2,298	3,790	373	359	791	17,922	40,270	51,819	104,156	214,573	289,453
Sustained Coast PU1-R	NA*	90	159,386	211,707	372,797	2,038	2,685	4,753	425	567	996	20,065	59,433	66,644	113,242	316,740	364,882
Comprehensive Plans																	
C-G-100-1	10	10	21,956	25,261	98,432	658	763	1,811	26	51	267	846	3,634	16,530	3,990	20,721	91,459
C-G-100-1	10	50	28,407	35,987	131,374	831	1,055	2,506	55	82	344	1,957	6,307	20,286	9,423	38,092	113,521
C-G-100-1	10	90	40,695	55,938	181,956	1,048	1,279	3,197	86	274	490	3,056	24,503	30,734	15,442	148,139	173,407
C-G-100-2	10	10	29,631	36,273	108,540	738	890	1,929	100	143	363	6,637	16,717	26,493	35,276	84,195	142,434
C-G-100-2	10	50	36,631	48,000	142,341	915	1,188	2,629	132	177	445	7,896	19,671	30,484	41,338	102,008	165,194
C-G-100-2	10	90	49,499	69,231	193,917	1,137	1,415	3,325	162	369	590	8,936	37,752	40,837	47,047	211,406	224,563
C-G-400-3	10	10	24,742	28,778	100,139	792	974	1,979	25	45	243	895	3,544	15,508	3,114	13,564	81,887
C-G-400-3	10	50	28,310	34,504	128,276	906	1,200	2,599	35	66	295	1,307	5,604	18,242	5,139	24,671	97,788
C-G-400-3	10	90	38,154	48,181	173,729	1,118	1,415	3,282	68	133	404	2,467	11,817	25,058	10,034	67,420	135,507
C-G-1000-3	10	10	16,416	18,735	87,017	713	878	1,855	20	31	232	596	1,653	14,564	1,803	5,434	77,793
C-G-1000-3	10	50	19,189	22,452	113,593	824	1,101	2,471	22	37	271	639	2,219	16,391	2,015	7,080	88,584
C-G-1000-3	10	90	24,163	29,046	151,844	986	1,257	3,089	28	60	337	850	4,395	20,855	3,123	19,075	112,322
C-RL-100-1	10	10	25,944	35,328	104,718	1,080	1,416	2,421	32	113	272	1,256	12,098	18,660	6,174	61,864	100,847
C-RL-100-1	10	50	37,295	54,040	143,563	1,394	2,011	3,355	64	153	351	2,465	16,048	22,685	11,932	87,356	124,853
C-RL-100-1	10	90	52,943	88,745	200,938	1,771	2,344	4,221	94	382	515	3,430	37,050	34,398	17,954	204,852	188,879
C-RL-400-1	12	10	23,038	27,753	98,626	1,017	1,355	2,294	21	35	232	629	2,322	14,633	2,056	8,740	78,271
C-RL-400-1	12	50	28,560	35,281	128,134	1,256	1,865	3,156	26	54	275	845	4,080	16,884	3,249	19,468	92,444
C-RL-400-1	12	90	38,667	51,260	173,473	1,623	2,186	4,020	60	128	396	2,013	10,837	24,398	8,161	64,934	132,233
C-RL-1000-1	14	10	20,383	24,840	94,197	937	1,277	2,145	20	30	227	566	1,581	14,149	1,713	5,124	75,898
C-RL-1000-1	14	50	25,244	30,147	122,820	1,174	1,785	3,027	20	31	260	570	1,690	15,708	1,734	5,624	85,702
C-RL-1000-1	14	90	29,844	37,072	161,187	1,492	2,049	3,849	25	55	338	751	3,932	20,891	2,608	17,814	110,913

Table 50--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, Low Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
G-100-1	10	10	88,285	95,136	199,823	962	1,050	2,266	262	232	607	10,804	21,373	33,997	61,536	120,707	191,617
G-100-1	10	50	104,419	112,971	246,610	1,135	1,343	2,961	298	276	697	11,786	25,581	38,073	69,752	143,046	218,563
G-100-1	10	90	123,912	138,191	307,487	1,366	1,577	3,672	355	396	851	13,794	36,505	47,362	79,269	217,423	271,607
G-100-2	10	10	98,605	109,749	214,228	1,043	1,178	2,384	342	329	712	16,943	35,066	44,566	94,706	187,885	246,004
G-100-2	10	50	115,307	128,689	261,927	1,220	1,476	3,085	381	376	806	18,072	39,555	48,878	103,551	210,667	273,648
G-100-2	10	90	135,402	155,292	323,857	1,455	1,713	3,800	437	496	959	20,021	50,365	58,071	112,758	284,395	326,176
G-400-3	10	10	99,317	110,447	215,097	1,190	1,352	2,576	342	329	712	16,940	35,055	44,560	94,702	187,850	245,986
G-400-3	10	50	114,737	127,652	261,040	1,305	1,578	3,196	373	366	796	17,788	38,789	48,336	102,979	209,079	272,539
G-400-3	10	90	135,428	155,093	323,798	1,530	1,803	3,899	436	494	958	19,961	50,469	58,063	113,406	287,521	327,965
G-1000-3	10	10	99,317	110,447	215,097	1,190	1,352	2,575	342	329	712	16,940	35,055	44,560	94,702	187,850	245,986
G-1000-3	10	50	114,672	127,567	260,952	1,303	1,575	3,193	373	366	795	17,786	38,783	48,332	102,967	209,036	272,512
G-1000-3	10	90	132,092	150,879	319,347	1,479	1,744	3,832	419	470	935	19,432	48,712	56,922	111,432	280,454	323,499
RL-100-1	10	10	98,275	118,362	217,402	1,389	1,708	2,883	346	342	720	17,047	36,246	45,125	95,166	193,323	248,562
RL-100-1	10	50	124,104	148,985	277,344	1,704	2,304	3,817	396	382	821	18,578	40,015	49,482	105,970	215,702	277,669
RL-100-1	10	90	152,449	190,645	352,140	2,094	2,647	4,704	439	547	982	20,068	54,961	59,951	113,892	303,696	334,843
RL-400-1	12	10	97,605	117,601	216,109	1,384	1,702	2,843	344	340	716	17,004	36,114	44,787	94,916	192,531	246,844
RL-400-1	12	50	121,391	145,818	273,984	1,623	2,213	3,705	386	369	806	18,210	38,902	48,547	105,078	213,010	274,820
RL-1000-1	14	50	121,326	145,732	274,142	1,621	2,210	3,696	386	369	805	18,208	38,896	48,438	105,065	212,967	274,159
RL-1000-1	14	90	147,901	185,176	349,003	1,953	2,486	4,539	421	521	958	19,472	53,311	58,694	112,338	299,240	330,007
Non-Structural Plans																	
NS-100	15	10	22,410	32,425	102,734	805	1,218	2,072	12	87	272	701	11,079	15,940	4,379	57,769	89,028
NS-100	15	50	34,690	55,001	143,334	1,254	2,005	3,138	41	122	349	1,807	14,582	19,245	10,112	83,350	110,976
NS-100	15	90	54,199	103,818	205,972	1,714	2,381	4,106	71	402	505	2,808	41,522	30,232	16,250	217,896	165,979
NS-400	15	10	19,821	24,423	97,349	748	1,163	1,990	1	7	234	79	938	12,101	427	4,535	68,101
NS-400	15	50	26,302	33,919	127,382	1,196	1,950	3,056	7	29	282	339	3,014	14,013	1,725	16,189	80,755
NS-400	15	90	35,588	51,353	168,818	1,656	2,326	4,024	33	101	369	1,222	9,950	18,672	5,354	60,236	104,912
NS-1000	15	10	17,164	21,485	93,454	668	1,085	1,876	0	1	232	16	184	11,797	84	894	66,587
NS-1000	15	50	22,817	27,897	121,602	1,116	1,872	2,942	0	3	266	22	319	12,822	115	1,485	74,393
NS-1000	15	90	28,441	37,199	156,407	1,576	2,248	3,911	8	36	321	269	3,240	15,523	1,196	15,751	86,463

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 51
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU4-0	NA	10	95,289	151,991	238,163	1,115	2,134	3,000	326	360	719	16,543	39,397	49,170	93,449	216,048	273,849
Degraded Coast PU4-0	NA	50	123,250	212,719	317,747	1,563	2,723	4,046	373	584	926	17,922	62,920	65,439	104,156	357,397	375,335
Degraded Coast PU4-0	NA	90	159,386	285,052	416,901	2,038	3,559	5,278	425	707	1,080	20,065	74,509	75,709	113,242	483,060	464,893
Sustained Coast PU1-R	NA*	10	95,289	151,883	238,098	1,115	2,139	3,003	326	378	729	16,543	41,652	50,526	93,449	233,385	284,274
Sustained Coast PU1-R	NA*	50	123,250	212,322	317,508	1,563	2,712	4,039	373	584	926	17,922	62,920	65,439	104,156	357,397	375,335
Sustained Coast PU1-R	NA*	90	159,386	284,214	416,397	2,038	3,559	5,279	425	707	1,080	20,065	74,515	75,713	113,242	483,088	464,909
Comprehensive Plans																	
C-G-100-1	10	10	21,956	30,311	104,218	658	974	1,943	26	61	279	846	4,516	17,750	3,990	33,969	101,823
C-G-100-1	10	50	28,407	48,243	141,612	831	1,165	2,584	55	254	427	1,957	23,677	28,711	9,423	161,166	172,918
C-G-100-1	10	90	40,695	82,669	198,331	1,048	1,456	3,335	86	335	529	3,056	31,497	35,133	15,442	277,027	240,285
C-G-100-2	10	10	29,631	45,070	115,849	738	1,109	2,065	100	156	377	6,637	17,943	27,851	35,276	98,102	153,062
C-G-100-2	10	50	36,631	64,459	154,277	915	1,300	2,708	132	350	527	7,896	37,043	38,910	41,338	225,145	224,616
C-G-100-2	10	90	49,499	99,962	211,904	1,137	1,595	3,465	162	430	628	8,936	44,749	45,237	47,047	340,357	291,467
C-G-400-3	10	10	24,742	32,878	105,993	792	1,193	2,115	25	79	263	895	8,747	18,098	3,114	35,425	94,977
C-G-400-3	10	50	28,310	40,398	136,940	906	1,313	2,678	35	116	340	1,307	12,951	23,563	5,139	70,862	133,379
C-G-400-3	10	90	38,154	57,607	185,117	1,118	1,595	3,422	68	162	433	2,467	16,425	28,719	10,034	83,572	167,475
C-G-1000-3	10	10	16,416	20,891	92,269	713	1,092	1,989	20	39	244	596	2,660	15,854	1,803	9,313	85,314
C-G-1000-3	10	50	19,189	25,078	121,245	824	1,209	2,549	22	48	304	639	3,417	19,807	2,015	13,222	111,772
C-G-1000-3	10	90	24,163	34,631	162,043	986	1,435	3,228	28	77	362	850	6,035	23,596	3,123	26,869	141,702
C-RL-100-1	10	10	25,944	50,700	115,056	1,080	1,877	2,654	32	136	288	1,256	14,417	20,279	6,174	84,201	113,981
C-RL-100-1	10	50	37,295	87,694	162,534	1,394	2,329	3,516	64	366	450	2,465	36,912	32,620	11,932	219,972	188,632
C-RL-100-1	10	90	52,943	146,701	229,699	1,771	2,838	4,486	94	451	557	3,430	44,511	39,021	17,954	335,170	256,440
C-RL-400-1	12	10	23,038	32,706	105,535	1,017	1,815	2,526	21	44	242	629	3,209	15,722	2,056	16,060	86,084
C-RL-400-1	12	50	28,560	43,065	138,975	1,256	2,181	3,315	26	89	319	845	7,940	21,451	3,249	53,883	124,898
C-RL-400-1	12	90	38,667	68,383	189,392	1,623	2,679	4,289	60	145	421	2,013	11,989	27,002	8,161	68,850	159,332
C-RL-1000-1	14	10	20,383	28,979	100,768	937	1,737	2,377	20	34	236	566	2,246	15,101	1,713	8,357	81,912
C-RL-1000-1	14	50	25,244	34,603	132,690	1,174	2,100	3,187	20	44	296	570	3,037	19,468	1,734	12,305	109,128
C-RL-1000-1	14	90	29,844	46,465	174,747	1,492	2,541	4,124	25	81	366	751	6,188	23,819	2,608	27,472	139,047

Table 51--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
High Employment, Dispersed Land Use, High Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
G-100-1	10	10	88,285	111,845	209,221	962	1,277	2,403	262	289	633	10,804	27,927	36,974	61,536	164,024	211,293
G-100-1	10	50	104,419	134,967	259,864	1,135	1,472	3,045	298	409	767	11,786	40,155	45,632	69,752	257,713	275,356
G-100-1	10	90	123,912	166,191	324,255	1,366	1,763	3,813	355	497	902	13,794	48,443	53,292	79,269	374,766	347,298
G-100-2	10	10	98,605	130,454	225,225	1,043	1,413	2,525	342	390	740	16,943	41,964	47,682	94,706	231,862	265,944
G-100-2	10	50	115,307	155,072	276,938	1,220	1,608	3,170	381	510	876	18,072	54,131	56,438	103,551	325,397	330,467
G-100-2	10	90	135,402	187,404	342,271	1,455	1,902	3,943	437	597	1,010	20,021	62,305	64,002	112,758	441,801	401,892
G-400-3	10	10	99,317	131,152	226,094	1,190	1,586	2,716	342	390	740	16,940	41,953	47,675	94,702	231,826	265,926
G-400-3	10	50	114,737	154,036	276,050	1,305	1,709	3,281	373	499	866	17,788	53,366	55,896	102,979	323,809	329,358
G-400-3	10	90	135,428	187,205	342,213	1,530	1,992	4,041	436	595	1,009	19,961	62,409	63,994	113,406	444,926	403,681
G-1000-3	10	10	99,317	131,152	226,094	1,190	1,586	2,716	342	390	740	16,940	41,953	47,675	94,702	231,826	265,926
G-1000-3	10	50	114,672	153,950	275,962	1,303	1,707	3,278	373	499	866	17,786	53,359	55,892	102,967	323,766	329,330
G-1000-3	10	90	132,092	182,991	337,761	1,479	1,933	3,975	419	571	986	19,432	60,652	62,853	111,432	437,860	399,215
RL-100-1	10	10	98,275	150,027	232,787	1,389	2,185	3,121	346	396	745	17,047	42,289	47,898	95,166	236,144	268,040
RL-100-1	10	50	124,104	194,229	299,905	1,704	2,642	3,985	396	565	911	18,578	59,308	58,929	105,970	346,118	340,767
RL-100-1	10	90	152,449	248,610	380,904	2,094	3,151	4,972	439	658	1,037	20,068	67,773	66,231	113,892	463,699	411,599
RL-400-1	12	10	97,605	149,260	231,289	1,384	2,178	3,079	344	394	740	17,004	42,157	47,472	94,916	235,352	265,652
RL-400-1	12	50	121,391	191,046	296,422	1,623	2,550	3,871	386	552	896	18,210	58,195	57,894	105,078	343,427	337,006
RL-1000-1	14	50	121,326	190,960	296,640	1,621	2,547	3,862	386	552	894	18,208	58,188	57,755	105,065	343,384	335,908
RL-1000-1	14	90	147,901	243,065	377,582	1,953	2,988	4,817	421	632	1,013	19,472	66,123	64,891	112,338	459,243	404,705
Non-Structural Plans																	
NS-100	15	10	22,410	50,032	108,187	805	1,831	2,262	12	113	280	701	13,618	16,727	4,379	80,903	96,193
NS-100	15	50	34,690	99,724	157,185	1,254	2,399	3,260	41	381	429	1,807	40,387	27,237	10,112	230,792	156,641
NS-100	15	90	54,199	177,572	228,815	1,714	3,246	4,374	71	500	535	2,808	51,253	33,246	16,250	354,558	208,306
NS-400	15	10	19,821	30,173	99,129	748	1,776	2,180	1	17	237	79	1,984	12,425	427	12,199	70,474
NS-400	15	50	26,302	44,745	130,735	1,196	2,344	3,178	7	71	295	339	7,661	15,452	1,725	53,275	92,241
NS-400	15	90	35,588	73,743	175,753	1,656	3,191	4,292	33	123	376	1,222	11,529	19,161	5,354	65,998	106,696
NS-1000	15	10	17,164	26,195	94,913	668	1,698	2,066	0	6	233	16	870	12,009	84	4,186	67,607
NS-1000	15	50	22,817	33,704	123,401	1,116	2,265	3,063	0	18	271	22	1,886	13,308	115	9,064	76,740
NS-1000	15	90	28,441	49,158	160,111	1,576	3,113	4,178	8	67	331	269	5,900	16,347	1,196	26,793	89,883

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 52
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU3a-0	NA	10	180,802	330,513	477,224	4,299	6,904	10,774	777	1,765	2,259	34,234	179,576	160,711	185,715	927,221	843,601
Degraded Coast PU3a-0	NA	50	276,742	493,603	723,064	6,098	9,189	14,918	1,384	2,790	3,809	60,891	270,600	256,504	315,719	1,305,334	1,271,205
Degraded Coast PU3a-0	NA	90	376,456	643,209	966,609	7,246	10,104	17,236	1,854	3,844	5,167	78,911	364,993	341,019	389,722	1,719,645	1,634,320
Sustained Coast PU1-R	NA*	10	180,802	329,211	476,441	4,299	6,894	10,768	777	1,764	2,258	34,234	179,480	160,653	185,715	925,626	842,641
Sustained Coast PU1-R	NA*	50	276,742	491,513	721,807	6,098	9,255	14,958	1,384	2,790	3,809	60,891	270,694	256,560	315,719	1,305,928	1,271,562
Sustained Coast PU1-R	NA*	90	376,456	643,314	966,672	7,246	10,168	17,274	1,854	3,837	5,163	78,911	364,301	340,603	389,722	1,717,019	1,632,741
Comprehensive Plans																	
C-M-100-1	10	10	13,207	19,090	187,700	918	895	5,238	64	275	937	2,865	32,401	57,626	16,215	180,403	310,309
C-M-100-1	10	50	20,691	25,808	288,818	1,006	996	7,030	261	353	1,711	13,678	41,204	98,844	77,301	214,419	510,524
C-M-100-1	10	90	40,158	50,549	408,904	1,257	1,269	8,377	359	437	2,290	17,915	48,938	127,074	96,188	248,727	632,476
C-M-100-2	10	10	12,929	33,676	192,697	798	1,372	5,330	49	336	948	2,519	42,954	61,528	18,118	231,218	331,629
C-M-100-2	10	50	32,631	69,066	315,265	1,202	1,755	7,496	277	475	1,773	14,945	57,256	106,288	85,476	299,188	550,643
C-M-100-2	10	90	73,790	124,930	465,556	1,695	2,260	9,137	467	616	2,449	23,887	70,354	140,520	124,643	373,702	704,455
C-G-400-2	10	10	15,688	29,257	193,173	783	1,356	5,275	55	106	874	2,253	11,149	51,165	16,073	75,864	280,148
C-G-400-2	10	50	26,216	55,737	302,859	1,100	1,652	7,334	68	153	1,418	3,015	15,652	78,992	19,968	108,490	412,424
C-G-400-2	10	90	41,723	80,602	417,980	1,372	1,935	8,700	112	193	1,917	5,141	19,852	102,818	32,594	130,725	520,453
C-G-1000-2	10	10	9,983	20,639	185,077	614	1,175	5,049	21	59	828	885	6,580	48,298	9,483	48,132	264,548
C-G-1000-2	10	50	19,023	39,828	290,714	930	1,470	7,106	32	80	1,361	1,550	8,358	75,165	12,811	62,708	390,552
C-G-1000-2	10	90	31,205	58,806	400,058	1,189	1,741	8,455	64	111	1,843	3,104	11,366	97,940	20,912	83,176	492,614
Structural Plans																	
M-100-1	10	10	40,676	51,942	230,901	925	903	5,249	111	350	1,017	4,970	40,463	62,654	27,872	212,661	334,317
M-100-1	10	50	49,418	59,047	333,652	1,013	1,004	7,041	308	377	1,776	15,689	43,284	101,906	88,593	227,511	528,156
M-100-1	10	90	70,507	82,317	455,234	1,264	1,276	8,388	436	466	2,392	21,753	51,344	132,433	110,108	262,162	653,374
M-100-2	10	10	43,022	70,598	240,314	805	1,379	5,341	100	415	1,034	4,856	51,574	67,007	34,253	275,310	364,685
M-100-2	10	50	64,474	106,684	365,202	1,209	1,763	7,507	329	503	1,844	17,192	59,967	109,830	101,256	324,254	577,380
M-100-2	10	90	107,889	161,088	517,753	1,702	2,268	9,148	548	646	2,556	27,959	72,873	146,196	143,041	387,528	730,858
G-400-2	10	10	48,339	76,267	246,991	923	1,506	5,489	134	452	1,077	6,214	55,049	69,524	40,746	292,056	376,771

Table 52--Continued

Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s 2010	Expected Annual Damage $1000s 2075	Equivalent Annual Damage $1000s	Expected Annual Population Impacted 2010	Expected Annual Population Impacted 2075	Equivalent Annual Population	Expected Annual Employees Impacted 2010	Expected Annual Employees Impacted 2075	Equivalent Annual Employment	Expected Annual Wages Impacted $1000s 2010	Expected Annual Wages Impacted $1000s 2075	Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s 2010	Expected Annual Output Impacted $1000s 2075	Equivalent Annual Output $1000s
G-400-2	10	50	66,562	109,052	367,880	1,240	1,803	7,549	341	518	1,860	17,707	61,349	110,810	104,077	331,533	582,632
G-400-2	10	90	91,058	143,679	496,833	1,517	2,090	8,923	456	547	2,441	24,450	63,685	139,609	127,483	344,657	700,801
G-1000-2	10	10	43,166	70,747	240,493	803	1,378	5,339	100	415	1,034	4,851	51,563	66,999	34,226	275,248	364,638
G-1000-2	10	50	61,387	103,532	361,382	1,121	1,675	7,399	308	481	1,817	16,345	57,864	108,286	97,556	314,726	570,499
G-1000-2	10	90	85,733	138,022	490,154	1,393	1,959	8,768	422	509	2,397	23,047	60,108	137,014	120,828	327,526	688,426
Non-Structural Plans																	
NS-100	15	10	31,874	81,069	189,025	4,193	6,780	9,856	85	662	852	3,584	66,546	48,893	19,228	336,027	257,265
NS-100	15	50	60,076	159,446	312,959	5,991	9,141	13,882	303	2,158	1,989	12,291	207,968	121,363	57,149	977,224	590,567
NS-100	15	90	99,813	313,221	475,876	7,139	10,054	16,267	480	3,466	2,926	18,522	330,368	179,039	83,621	1,528,436	843,457
NS-400	15	10	16,144	30,770	155,777	3,123	5,635	8,300	20	99	604	895	10,334	28,463	5,331	53,192	154,057
NS-400	15	50	26,194	53,763	242,169	4,922	7,969	12,317	59	354	1,157	2,461	33,219	56,199	12,197	161,545	287,446
NS-400	15	90	42,106	109,022	347,812	6,069	8,882	14,702	135	983	1,770	5,639	98,114	92,636	28,029	501,253	462,880
NS-1000	15	10	11,976	22,954	148,674	2,530	4,778	7,368	3	16	560	148	1,624	24,927	635	8,490	134,937
NS-1000	15	50	20,412	35,043	229,877	4,276	7,110	11,326	9	59	1,009	368	5,487	45,259	2,061	27,877	234,663
NS-1000	15	90	30,053	54,026	317,241	5,397	8,011	13,678	45	192	1,424	1,608	17,396	63,109	8,282	100,502	316,580

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 53
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU3a-0	NA	10	180,802	484,804	570,001	4,299	9,216	12,164	777	2,756	2,854	34,234	280,336	221,299	185,715	1,421,011	1,140,524
Degraded Coast PU3a-0	NA	50	276,742	713,448	855,260	6,098	11,142	16,092	1,384	4,298	4,715	60,891	418,328	345,335	315,719	1,991,273	1,683,671
Degraded Coast PU3a-0	NA	90	376,456	890,801	1,115,490	7,246	11,660	18,171	1,854	4,876	5,787	78,911	471,417	405,013	389,722	2,232,899	1,942,948
Sustained Coast PU1-R	NA*	10	180,802	482,811	568,803	4,299	9,227	12,171	777	2,753	2,853	34,234	280,241	221,242	185,715	1,419,952	1,139,887
Sustained Coast PU1-R	NA*	50	276,742	712,955	854,964	6,098	11,225	16,142	1,384	4,298	4,716	60,891	418,310	345,324	315,719	1,991,246	1,683,654
Sustained Coast PU1-R	NA*	90	376,456	893,438	1,117,076	7,246	11,719	18,207	1,854	4,878	5,789	78,911	471,840	405,268	389,722	2,233,976	1,943,595
Comprehensive Plans																	
C-M-100-1	10	10	13,207	25,377	202,133	918	912	5,422	64	497	1,097	2,865	59,581	75,661	16,215	319,573	401,999
C-M-100-1	10	50	20,691	34,671	309,155	1,006	1,015	7,187	261	516	1,892	13,678	61,475	118,274	77,301	329,766	609,130
C-M-100-1	10	90	40,158	61,462	432,013	1,257	1,269	8,496	359	619	2,442	17,915	71,438	144,223	96,188	374,317	722,032
C-M-100-2	10	10	12,929	68,178	218,480	798	1,821	5,687	49	654	1,147	2,519	82,703	84,636	18,118	427,123	447,132
C-M-100-2	10	50	32,631	112,897	349,634	1,202	2,084	7,777	277	706	1,981	14,945	87,576	129,718	85,476	463,589	668,746
C-M-100-2	10	90	73,790	168,562	501,673	1,695	2,421	9,320	467	861	2,626	23,887	102,454	161,549	124,643	536,775	809,968
C-G-400-2	10	10	15,688	54,966	216,232	783	1,806	5,632	55	162	992	2,253	16,973	63,766	16,073	114,911	347,070
C-G-400-2	10	50	26,216	88,532	333,810	1,100	1,982	7,615	68	243	1,583	3,015	28,483	97,005	19,968	160,073	495,586
C-G-400-2	10	90	41,723	111,621	450,191	1,372	2,096	8,884	112	292	2,049	5,141	33,791	118,222	32,594	185,347	592,377
C-G-1000-2	10	10	9,983	38,626	205,744	614	1,625	5,405	21	94	939	885	10,208	60,219	9,483	71,860	326,725
C-G-1000-2	10	50	19,023	65,266	319,387	930	1,800	7,387	32	123	1,511	1,550	13,064	90,662	12,811	94,286	467,518
C-G-1000-2	10	90	31,205	84,438	430,601	1,189	1,902	8,638	64	187	1,968	3,104	20,520	111,863	20,912	137,859	564,556
Structural Plans																	
M-100-1	10	10	40,676	59,660	245,777	925	920	5,433	111	521	1,161	4,970	61,652	78,833	27,872	332,590	420,048
M-100-1	10	50	49,418	67,853	353,972	1,013	1,023	7,198	308	545	1,958	15,689	63,882	121,437	88,593	343,201	626,868
M-100-1	10	90	70,507	91,312	477,749	1,264	1,277	8,507	436	649	2,544	21,753	73,967	149,619	110,108	388,546	743,176
M-100-2	10	10	43,022	107,136	266,728	805	1,829	5,698	100	685	1,218	4,856	85,786	88,400	34,253	464,128	477,993
M-100-2	10	50	64,474	150,832	399,669	1,209	2,092	7,788	329	737	2,053	17,192	90,362	133,283	101,256	487,452	695,110
M-100-2	10	90	107,889	201,815	552,971	1,702	2,429	9,331	548	895	2,735	27,959	105,511	167,391	143,041	561,898	839,869
G-400-2	10	10	48,339	112,805	273,404	923	1,955	5,846	134	722	1,260	6,214	89,260	90,916	40,746	480,873	490,079

Table 53--Continued

Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 3a
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
G-400-2	10	50	66,562	153,200	402,348	1,240	2,132	7,830	341	752	2,069	17,707	91,744	134,263	104,077	494,731	700,362
G-400-2	10	90	91,058	184,407	532,051	1,517	2,251	9,106	456	796	2,619	24,450	96,323	160,804	127,483	519,027	809,812
G-1000-2	10	10	43,166	107,285	266,907	803	1,827	5,696	100	685	1,218	4,851	85,775	88,392	34,226	464,066	477,946
G-1000-2	10	50	61,387	147,679	395,849	1,121	2,004	7,680	308	715	2,026	16,345	88,259	131,739	97,556	477,923	688,229
G-1000-2	10	90	85,733	178,750	525,372	1,393	2,120	8,951	422	758	2,575	23,047	92,745	158,209	120,828	501,895	797,437
Non-Structural Plans																	
NS-100	15	10	31,874	156,047	212,247	4,193	9,113	10,579	85	1,528	1,120	3,584	158,568	77,394	19,228	793,250	398,873
NS-100	15	50	60,076	367,471	377,387	5,991	11,111	14,492	303	3,563	2,424	12,291	342,055	162,892	57,149	1,573,755	775,321
NS-100	15	90	99,813	604,831	566,192	7,139	11,605	16,747	480	4,290	3,181	18,522	407,001	202,774	83,621	1,864,559	947,559
NS-400	15	10	16,144	47,312	160,900	3,123	7,941	9,014	20	186	631	895	19,245	31,223	5,331	108,489	171,184
NS-400	15	50	26,194	112,704	260,424	4,922	9,939	12,927	59	957	1,343	2,461	95,866	75,602	12,197	489,786	389,107
NS-400	15	90	42,106	212,681	379,917	6,069	10,432	15,183	135	1,707	1,995	5,639	171,637	115,407	28,029	802,731	556,251
NS-1000	15	10	11,976	31,800	151,414	2,530	7,065	8,076	3	79	579	148	7,922	26,878	635	40,890	144,972
NS-1000	15	50	20,412	55,596	236,242	4,276	9,063	11,931	9	264	1,073	368	25,668	51,509	2,061	147,258	271,636
NS-1000	15	90	30,053	91,838	328,952	5,397	9,557	14,157	45	1,030	1,683	1,608	102,067	89,333	8,282	533,828	450,787

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 54
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU3b-0	NA	10	75,126	142,294	201,276	1,532	2,819	4,055	434	848	1,178	19,182	85,856	81,172	86,675	377,284	360,369
Degraded Coast PU3b-0	NA	50	125,537	215,090	322,696	2,363	3,698	5,863	747	1,123	1,826	34,947	109,071	119,413	141,673	509,639	524,667
Degraded Coast PU3b-0	NA	90	182,822	296,753	460,035	3,035	4,394	7,317	900	1,366	2,207	40,561	131,697	141,665	175,335	623,443	644,946
Sustained Coast PU1-R	NA*	10	75,126	142,456	201,374	1,532	2,813	4,051	434	849	1,179	19,182	85,914	81,207	86,675	377,715	360,628
Sustained Coast PU1-R	NA*	50	125,537	215,391	322,877	2,363	3,696	5,862	747	1,119	1,823	34,947	108,664	119,168	141,673	508,217	523,811
Sustained Coast PU1-R	NA*	90	182,822	296,639	459,966	3,035	4,393	7,316	900	1,366	2,207	40,561	131,613	141,615	175,335	623,260	644,836
Comprehensive Plans																	
C-F-100-1	10	10	7,147	10,870	79,718	195	316	1,775	4	8	414	255	837	22,584	488	2,588	100,395
C-F-100-1	10	50	13,099	20,881	135,488	292	453	2,672	25	75	739	1,224	7,102	40,598	4,673	30,496	170,129
C-F-100-1	10	90	36,558	56,256	222,562	581	808	3,666	83	167	970	3,488	15,476	52,242	16,704	74,240	234,410
C-F-400-1	12	10	5,580	8,203	84,491	192	311	1,953	2	3	464	190	351	25,656	236	574	114,326
C-F-400-1	12	50	6,971	10,762	139,431	221	363	2,857	3	7	785	201	698	42,822	313	2,617	179,643
C-F-400-1	12	90	9,297	16,192	203,586	279	449	3,624	8	21	960	400	2,118	50,966	1,528	11,293	226,383
C-F-1000-1	14	10	5,161	7,427	90,754	190	309	2,119	2	3	512	190	341	28,869	233	469	128,741
C-F-1000-1	14	50	6,453	9,673	150,982	219	360	3,112	3	5	866	198	586	47,882	282	2,045	201,599
C-F-1000-1	14	90	8,277	13,064	220,125	272	440	3,939	6	15	1,057	324	1,558	56,793	1,142	7,737	252,367
C-G-100-1	10	10	4,667	6,855	77,648	27	38	1,526	1	4	415	47	371	22,336	219	1,625	100,167
C-G-100-1	10	50	6,529	9,473	127,561	51	72	2,322	5	36	713	262	3,601	38,549	1,246	16,085	162,115
C-G-100-1	10	90	12,331	16,485	188,973	146	197	3,066	27	61	887	1,152	5,932	46,641	5,842	30,464	208,511
C-RL-100-1	10	10	14,148	24,431	89,649	599	1,259	2,487	35	54	455	1,733	6,659	26,038	11,789	45,369	126,785
C-RL-100-1	10	50	24,022	43,178	150,767	837	1,549	3,563	64	167	802	3,006	17,452	45,999	17,915	91,159	204,691
C-RL-100-1	10	90	43,326	87,908	235,846	1,258	2,010	4,704	103	255	1,014	4,441	25,110	56,577	25,848	137,944	266,153
C-RL-400-1	12	10	9,870	14,507	87,297	548	1,189	2,537	20	21	478	1,182	3,823	27,441	8,733	29,961	130,810
C-RL-400-1	12	50	12,760	19,250	141,732	726	1,408	3,613	23	33	801	1,288	4,826	44,925	9,187	34,760	197,059
C-RL-400-1	12	90	19,039	31,666	208,453	982	1,684	4,591	37	68	990	1,839	7,880	53,970	11,803	51,386	247,903

Table 54--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
F-100-1	10	10	23,629	32,117	106,114	230	356	1,829	75	85	523	3,354	7,458	28,360	13,734	31,532	125,285
F-100-1	10	50	32,156	43,094	165,281	327	501	2,729	94	118	835	4,191	10,433	45,196	17,532	46,882	190,665
F-100-1	10	90	57,170	77,610	253,958	625	856	3,734	153	210	1,067	6,471	18,813	56,862	29,672	90,684	255,096
F-400-1	12	10	23,570	32,057	113,509	227	352	2,008	74	84	575	3,333	7,414	31,622	13,663	31,354	140,003
F-400-1	12	50	28,252	38,088	173,480	256	412	2,914	76	94	899	3,366	8,115	48,925	13,986	35,940	206,403
F-400-1	12	90	33,541	47,320	242,377	323	498	3,692	81	105	1,074	3,549	9,217	56,951	15,185	43,344	252,731
F-1000-1	14	10	23,570	32,057	120,516	227	352	2,178	74	84	624	3,333	7,414	34,838	13,663	31,354	154,455
F-1000-1	14	50	28,249	38,085	185,988	256	412	3,172	76	94	981	3,366	8,115	54,023	13,986	35,940	228,573
F-1000-1	14	90	33,420	47,198	260,928	318	491	4,011	80	104	1,173	3,512	9,136	62,973	15,008	42,894	279,927
G-100-1	10	10	14,709	19,150	93,530	51	59	1,562	54	61	496	2,620	6,059	27,192	11,371	26,141	121,168
G-100-1	10	50	17,817	22,682	145,224	75	92	2,357	56	65	782	2,704	6,429	42,362	11,871	29,841	179,151
G-100-1	10	90	24,523	29,786	207,752	170	218	3,101	78	90	957	3,595	8,760	50,454	16,477	44,220	225,559
RL-100-1	10	10	38,403	63,366	130,870	643	1,340	2,565	120	152	587	5,593	15,315	33,361	27,653	83,959	157,810
RL-100-1	10	50	55,677	87,521	202,562	882	1,637	3,644	151	224	925	6,879	22,098	52,095	34,753	116,229	232,700
RL-100-1	10	90	82,423	130,303	295,984	1,325	2,098	4,811	195	308	1,141	8,463	29,291	62,708	43,793	160,119	294,597
RL-400-1	12	10	36,518	60,620	133,619	592	1,270	2,616	108	133	618	5,171	13,657	35,283	25,237	74,158	164,342
RL-400-1	12	50	49,276	79,389	204,263	771	1,496	3,695	119	172	960	5,560	17,177	53,888	27,887	90,685	236,864
RL-400-1	12	90	66,786	110,655	290,325	1,048	1,772	4,698	139	229	1,163	6,273	21,960	63,663	32,032	120,524	293,639
Non-Structural Plans																	
NS-100	15	10	14,783	33,465	80,202	1,488	2,733	3,603	19	95	358	838	9,273	17,406	4,149	44,577	79,884
NS-100	15	50	28,842	70,165	143,082	2,318	3,608	5,396	80	625	812	3,414	58,543	46,730	15,701	289,310	207,627
NS-100	15	90	51,349	160,806	237,028	2,969	4,305	6,818	127	975	1,082	5,349	92,529	63,406	29,630	447,428	296,097
NS-400	15	10	11,222	19,782	71,964	1,487	2,732	3,602	1	7	311	39	721	13,860	161	3,295	62,618
NS-400	15	50	17,294	31,821	118,235	2,318	3,607	5,395	11	60	560	464	6,046	27,157	2,550	34,460	113,924
NS-400	15	90	28,132	57,104	178,831	2,968	4,304	6,818	35	164	727	1,355	15,933	35,197	6,959	83,266	157,845
NS-1000	15	10	9,975	17,493	69,855	1,432	2,664	3,519	0	1	308	8	118	13,638	30	444	61,588
NS-1000	15	50	14,994	24,134	113,271	2,262	3,539	5,311	1	9	534	49	805	25,068	219	4,022	101,879
NS-1000	15	90	20,990	35,100	163,993	2,910	4,236	6,732	9	47	662	340	4,196	30,423	1,798	22,455	133,214

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 55
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU3b-0	NA	10	75,126	205,601	239,344	1,532	3,677	4,571	434	1,105	1,332	19,182	107,195	94,003	86,675	495,353	431,365
Degraded Coast PU3b-0	NA	50	125,537	298,552	372,883	2,363	4,665	6,445	747	1,408	1,997	34,947	134,973	134,989	141,673	642,664	604,656
Degraded Coast PU3b-0	NA	90	182,822	389,376	515,730	3,035	5,529	8,000	900	1,584	2,338	40,561	150,125	152,746	175,335	724,867	705,934
Sustained Coast PU1-R	NA*	10	75,126	205,823	239,477	1,532	3,683	4,574	434	1,105	1,332	19,182	107,175	93,991	86,675	495,295	431,331
Sustained Coast PU1-R	NA*	50	125,537	298,838	373,055	2,363	4,656	6,440	747	1,408	1,997	34,947	134,957	134,979	141,673	642,630	604,636
Sustained Coast PU1-R	NA*	90	182,822	389,683	515,915	3,035	5,527	7,998	900	1,585	2,339	40,561	150,242	152,816	175,335	725,258	706,169
Comprehensive Plans																	
C-F-100-1	10	10	7,147	15,446	86,597	195	376	1,866	4	50	447	255	4,673	25,455	488	18,458	114,657
C-F-100-1	10	50	13,099	29,050	145,175	292	533	2,779	25	81	763	1,224	7,797	42,860	4,673	35,744	182,421
C-F-100-1	10	90	36,558	65,749	233,415	581	928	3,801	83	177	991	3,488	16,486	54,059	16,704	77,265	243,402
C-F-400-1	12	10	5,580	10,230	91,803	192	372	2,061	2	4	490	190	480	27,847	236	1,073	126,402
C-F-400-1	12	50	6,971	14,345	149,324	221	444	2,983	3	16	816	201	1,717	45,751	313	9,196	195,200
C-F-400-1	12	90	9,297	22,878	215,385	279	569	3,781	8	32	985	400	3,171	53,182	1,528	14,523	237,641
C-F-1000-1	14	10	5,161	9,184	99,298	190	369	2,246	2	4	545	190	444	31,547	233	869	143,517
C-F-1000-1	14	50	6,453	12,236	162,310	219	441	3,258	3	9	903	198	1,166	51,274	282	5,806	219,315
C-F-1000-1	14	90	8,277	17,578	233,203	272	560	4,119	6	30	1,088	324	3,050	59,556	1,142	13,379	266,709
C-G-100-1	10	10	4,667	8,526	83,321	27	52	1,597	1	33	444	47	3,311	24,884	219	13,825	113,096
C-G-100-1	10	50	6,529	12,255	135,124	51	92	2,404	5	40	736	262	3,960	40,672	1,246	20,263	173,950
C-G-100-1	10	90	12,331	20,173	197,542	146	221	3,162	27	62	904	1,152	5,986	48,071	5,842	30,832	216,406
C-RL-100-1	10	10	14,148	37,658	100,566	599	1,517	2,657	35	137	504	1,733	14,432	30,405	11,789	77,718	147,400
C-RL-100-1	10	50	24,022	71,122	168,448	837	1,874	3,767	64	207	841	3,006	20,868	49,411	17,915	113,920	224,064
C-RL-100-1	10	90	43,326	123,311	256,830	1,258	2,485	4,981	103	283	1,044	4,441	27,751	59,153	25,848	146,422	277,677
C-RL-400-1	12	10	9,870	17,784	95,876	548	1,447	2,718	20	24	506	1,182	4,038	29,836	8,733	30,955	143,849
C-RL-400-1	12	50	12,760	25,043	153,520	726	1,732	3,829	23	43	836	1,288	5,809	48,042	9,187	39,666	213,172
C-RL-400-1	12	90	19,039	41,693	222,652	982	2,159	4,878	37	75	1,016	1,839	8,597	56,247	11,803	53,520	259,368

Table 55--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 3b
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
F-100-1	10	10	23,629	39,021	113,715	230	424	1,922	75	93	546	3,354	8,051	30,227	13,734	35,146	135,751
F-100-1	10	50	32,156	51,718	175,109	327	582	2,836	94	124	859	4,191	11,178	47,473	17,532	52,453	203,057
F-100-1	10	90	57,170	86,851	264,733	625	976	3,869	153	221	1,088	6,471	19,876	58,696	29,672	94,065	264,198
F-400-1	12	10	23,570	38,962	122,332	227	420	2,118	74	93	604	3,333	8,008	33,957	13,663	34,968	153,043
F-400-1	12	50	28,252	46,711	184,935	256	493	3,040	76	101	930	3,366	8,860	51,768	13,986	41,512	221,648
F-400-1	12	90	33,541	56,561	254,967	323	619	3,849	81	116	1,099	3,549	10,280	59,170	15,185	46,725	264,035
F-1000-1	14	10	23,570	38,962	130,655	227	420	2,307	74	93	659	3,333	8,008	37,668	13,663	34,968	170,226
F-1000-1	14	50	28,249	46,708	199,193	256	493	3,319	76	101	1,019	3,366	8,860	57,466	13,986	41,512	246,850
F-1000-1	14	90	33,420	56,439	275,470	318	612	4,191	80	115	1,204	3,512	10,200	65,604	15,008	46,275	293,569
G-100-1	10	10	14,709	22,670	99,775	51	72	1,633	54	62	516	2,620	6,139	28,854	11,371	27,581	130,764
G-100-1	10	50	17,817	26,275	153,037	75	113	2,439	56	69	806	2,704	6,788	44,484	11,871	34,019	190,986
G-100-1	10	90	24,523	33,654	216,376	170	242	3,198	78	90	973	3,595	8,814	51,884	16,477	44,588	233,454
RL-100-1	10	10	38,403	85,263	144,472	643	1,605	2,737	120	192	623	5,593	18,942	36,443	27,653	101,366	173,798
RL-100-1	10	50	55,677	116,770	220,646	882	1,963	3,848	151	272	966	6,879	26,247	55,735	34,753	140,089	252,413
RL-100-1	10	90	82,423	162,798	316,068	1,325	2,574	5,088	195	349	1,174	8,463	33,151	65,661	43,793	172,816	307,428
RL-400-1	12	10	36,518	82,517	147,964	592	1,535	2,799	108	173	658	5,171	17,284	38,735	25,237	91,565	182,464
RL-400-1	12	50	49,276	108,637	223,316	771	1,821	3,911	119	220	1,006	5,560	21,327	57,986	27,887	114,544	258,846
RL-400-1	12	90	66,786	143,150	311,482	1,048	2,248	4,986	139	271	1,200	6,273	25,820	66,912	32,032	133,221	308,375
Non-Structural Plans																	
NS-100	15	10	14,783	60,267	88,503	1,488	3,595	3,870	19	482	478	838	45,421	28,601	4,149	229,835	137,261
NS-100	15	50	28,842	153,489	168,888	2,318	4,567	5,693	80	1,016	933	3,414	98,093	58,979	15,701	467,083	262,686
NS-100	15	90	51,349	275,026	272,403	2,969	5,438	7,169	127	1,318	1,188	5,349	124,466	73,297	29,630	586,714	339,235
NS-400	15	10	11,222	26,741	74,120	1,487	3,594	3,869	1	23	316	39	2,142	14,300	161	10,523	64,856
NS-400	15	50	17,294	48,572	123,423	2,318	4,567	5,692	11	115	577	464	11,252	28,769	2,550	59,141	121,569
NS-400	15	90	28,132	88,466	188,544	2,968	5,438	7,169	35	362	788	1,355	36,210	41,477	6,959	200,162	194,049
NS-1000	15	10	9,975	22,510	71,409	1,432	3,526	3,786	0	3	309	8	249	13,679	30	865	61,719
NS-1000	15	50	14,994	31,962	115,695	2,262	4,498	5,609	1	31	540	49	2,638	25,635	219	12,575	104,528
NS-1000	15	90	20,990	49,284	168,386	2,910	5,369	7,083	9	105	680	340	10,193	32,280	1,798	47,339	140,921

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 56
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU4-0	NA	10	95,399	127,777	223,772	1,045	1,565	2,551	316	392	722	15,517	42,356	49,370	87,821	226,906	271,708
Degraded Coast PU4-0	NA	50	125,378	171,491	296,234	1,471	2,225	3,603	360	451	825	16,765	49,202	55,408	98,080	261,401	308,252
Degraded Coast PU4-0	NA	90	165,749	235,205	396,727	1,877	2,562	4,432	416	642	1,027	19,125	66,216	69,273	107,468	351,027	376,605
Sustained Coast PU1-R	NA*	10	95,399	127,504	223,608	1,045	1,555	2,545	316	403	729	15,517	43,668	50,159	87,821	236,419	277,429
Sustained Coast PU1-R	NA*	50	125,378	171,482	296,229	1,471	2,219	3,600	360	451	825	16,765	49,273	55,451	98,080	262,021	308,625
Sustained Coast PU1-R	NA*	90	165,749	229,709	393,422	1,877	2,563	4,432	416	642	1,027	19,125	66,243	69,290	107,468	351,226	376,725
Comprehensive Plans																	
C-G-100-1	10	10	24,209	28,059	103,028	588	763	1,702	31	52	273	1,005	3,760	17,071	3,823	18,279	92,465
C-G-100-1	10	50	31,490	41,140	138,465	750	1,002	2,339	58	76	345	2,099	5,775	20,586	9,376	33,185	114,095
C-G-100-1	10	90	45,840	60,957	195,934	969	1,245	2,980	89	273	496	3,182	23,850	30,764	15,350	131,216	167,086
C-G-100-2	10	10	30,932	38,040	112,117	648	867	1,794	88	140	354	5,421	16,272	25,690	27,678	78,990	136,308
C-G-100-2	10	50	38,676	51,829	148,223	814	1,112	2,436	117	167	430	6,627	18,611	29,428	33,711	94,444	158,555
C-G-100-2	10	90	53,478	72,488	206,405	1,037	1,358	3,081	147	364	580	7,665	36,587	39,529	39,449	191,922	211,129
C-G-400-3	10	10	26,584	30,867	104,470	694	923	1,829	30	47	256	1,036	3,929	16,595	3,295	14,480	87,016
C-G-400-3	10	50	29,940	35,873	132,996	810	1,114	2,408	38	64	305	1,378	5,529	19,121	5,060	22,990	102,112
C-G-400-3	10	90	39,633	48,514	182,476	1,019	1,345	3,035	74	122	417	2,642	10,884	25,564	10,177	58,341	134,589
C-G-1000-3	10	10	18,526	21,031	91,736	614	812	1,698	27	33	248	808	2,062	15,743	2,293	6,392	83,306
C-G-1000-3	10	50	21,215	24,572	119,024	727	1,000	2,273	28	39	285	849	2,604	17,579	2,484	7,882	94,334
C-G-1000-3	10	90	25,917	30,542	161,281	891	1,178	2,842	33	56	353	1,050	4,128	21,632	3,508	16,721	113,914
C-RL-100-1	10	10	28,006	37,550	109,206	943	1,367	2,238	37	121	288	1,377	13,119	19,963	5,617	63,266	105,421
C-RL-100-1	10	50	39,722	57,841	150,905	1,258	1,834	3,092	67	169	366	2,567	17,972	24,282	11,483	93,610	131,122
C-RL-100-1	10	90	57,086	90,713	212,072	1,587	2,156	3,855	104	393	534	3,785	37,828	35,477	18,107	192,750	186,632
C-RL-400-1	12	10	25,195	30,230	102,965	885	1,303	2,122	27	38	246	831	2,756	15,713	2,482	9,868	83,309
C-RL-400-1	12	50	30,540	37,072	134,006	1,136	1,702	2,918	31	52	286	1,016	4,041	17,870	3,587	18,099	96,885
C-RL-400-1	12	90	40,648	52,612	181,702	1,452	2,009	3,672	68	119	404	2,278	10,026	24,864	8,717	56,683	131,800
C-RL-1000-1	14	10	22,499	27,137	98,138	804	1,211	1,972	26	32	240	783	1,987	15,140	2,218	6,076	80,557
C-RL-1000-1	14	50	27,295	32,147	128,526	1,053	1,606	2,786	26	33	273	786	2,042	16,803	2,232	6,358	90,716
C-RL-1000-1	14	90	31,618	38,176	168,836	1,324	1,865	3,502	31	50	346	948	3,640	21,494	3,018	15,340	112,552

Table 56--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, Low Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
G-100-1	10	10	92,534	113,416	211,614	894	1,108	2,178	278	323	654	11,447	30,519	37,913	64,076	169,836	211,849
G-100-1	10	50	114,205	139,058	268,243	1,057	1,348	2,815	312	365	739	12,370	34,436	41,812	72,450	194,702	239,956
G-100-1	10	90	138,122	187,566	346,101	1,288	1,602	3,474	356	448	871	14,016	41,279	49,188	80,882	237,757	278,875
G-100-2	10	10	101,233	126,254	223,964	955	1,213	2,271	339	416	741	16,128	43,573	47,019	89,368	233,888	258,454
G-100-2	10	50	123,382	152,683	281,304	1,122	1,458	2,913	375	462	830	17,164	47,815	51,141	98,222	259,303	287,178
G-100-2	10	90	147,768	202,112	359,920	1,356	1,716	3,576	418	543	961	18,764	54,559	58,440	106,417	301,804	325,680
G-400-3	10	10	101,921	126,921	224,801	1,097	1,377	2,454	338	415	741	16,112	43,511	46,981	89,250	233,453	258,182
G-400-3	10	50	122,466	151,327	280,002	1,213	1,568	3,033	365	450	818	16,790	46,890	50,461	97,064	256,030	284,909
G-400-3	10	90	147,187	201,299	359,114	1,435	1,810	3,679	416	541	958	18,660	54,515	58,336	106,711	303,304	326,524
G-1000-3	10	10	101,921	126,920	224,801	1,097	1,376	2,454	338	415	741	16,112	43,511	46,981	89,250	233,453	258,182
G-1000-3	10	50	122,390	151,219	279,896	1,211	1,565	3,030	365	450	818	16,783	46,859	50,443	97,043	255,923	284,849
G-1000-3	10	90	143,936	197,410	354,862	1,388	1,759	3,620	398	519	934	18,057	52,850	57,170	104,445	296,552	321,943
RL-100-1	10	10	100,552	131,820	225,627	1,255	1,718	2,721	342	434	752	16,259	45,341	47,835	89,759	241,102	261,666
RL-100-1	10	50	128,509	168,992	292,082	1,570	2,186	3,576	390	475	848	17,687	49,241	52,146	100,519	263,813	290,888
RL-100-1	10	90	161,806	212,348	375,654	1,912	2,520	4,358	440	601	1,002	19,429	59,829	61,101	108,953	322,272	335,976
RL-400-1	12	10	99,821	130,956	223,888	1,249	1,712	2,687	340	429	744	16,156	44,882	47,184	89,321	239,162	258,736
RL-400-1	12	50	125,494	165,560	287,969	1,501	2,111	3,483	377	459	829	17,188	47,798	50,866	98,980	258,945	286,174
RL-1000-1	14	50	125,419	165,452	287,791	1,499	2,108	3,477	377	459	826	17,182	47,767	50,678	98,959	258,839	285,212
RL-1000-1	14	90	156,675	206,430	371,308	1,783	2,379	4,213	417	572	972	18,640	57,757	59,527	106,615	315,514	330,079
Non-Structural Plans																	
NS-100	15	10	22,322	32,410	102,709	734	1,204	1,938	10	90	263	579	11,445	15,191	3,594	58,576	84,408
NS-100	15	50	34,886	56,057	145,389	1,159	1,867	2,922	37	136	339	1,642	16,108	18,713	9,037	88,648	107,104
NS-100	15	90	55,471	102,203	211,409	1,552	2,198	3,755	70	434	508	2,798	44,242	30,396	15,459	221,704	162,179
NS-400	15	10	19,869	24,627	97,544	681	1,147	1,861	1	7	227	61	981	11,368	329	4,780	64,079
NS-400	15	50	26,163	33,240	128,524	1,106	1,809	2,845	6	25	270	293	2,625	13,021	1,558	14,277	75,670
NS-400	15	90	35,440	49,759	172,667	1,500	2,141	3,678	30	89	357	1,169	8,731	17,568	5,034	51,972	97,901
NS-1000	15	10	17,172	21,511	93,549	600	1,054	1,741	0	1	225	12	200	11,071	65	966	62,600
NS-1000	15	50	22,742	27,525	122,911	1,025	1,717	2,725	0	3	256	19	322	12,001	88	1,481	70,055
NS-1000	15	90	28,025	35,712	159,986	1,418	2,048	3,558	7	30	312	259	2,739	14,691	1,104	12,884	81,380

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 57
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Without Project																	
Degraded Coast PU4-0	NA	10	95,399	168,561	248,296	1,045	2,090	2,866	316	471	770	15,517	50,470	54,249	87,821	281,500	304,537
Degraded Coast PU4-0	NA	50	125,378	242,166	338,732	1,471	2,638	3,851	360	678	961	16,765	71,807	69,001	98,080	393,996	387,983
Degraded Coast PU4-0	NA	90	165,749	346,073	463,393	1,877	3,278	4,862	416	772	1,104	19,125	80,518	77,874	107,468	493,091	462,031
Sustained Coast PU1-R	NA*	10	95,399	168,696	248,377	1,045	2,095	2,870	316	490	782	15,517	52,939	55,734	87,821	295,548	312,984
Sustained Coast PU1-R	NA*	50	125,378	234,496	334,120	1,471	2,635	3,850	360	679	962	16,765	71,929	69,074	98,080	394,636	388,368
Sustained Coast PU1-R	NA*	90	165,749	348,037	464,574	1,877	3,279	4,863	416	772	1,105	19,125	80,524	77,877	107,468	493,116	462,046
Comprehensive Plans																	
C-G-100-1	10	10	24,209	34,554	110,354	588	938	1,815	31	59	289	1,005	4,425	18,713	3,823	29,397	105,532
C-G-100-1	10	50	31,490	54,846	152,431	750	1,154	2,433	58	249	426	2,099	22,341	28,513	9,376	132,730	162,690
C-G-100-1	10	90	45,840	106,249	224,658	969	1,445	3,116	89	305	524	3,182	27,470	33,958	15,350	222,288	218,160
C-G-100-2	10	10	30,932	47,669	120,731	648	1,050	1,909	88	152	371	5,421	17,309	27,482	27,678	90,821	149,661
C-G-100-2	10	50	38,676	68,830	163,538	814	1,266	2,532	117	341	510	6,627	35,180	37,356	33,711	194,057	207,178
C-G-100-2	10	90	53,478	120,958	236,426	1,037	1,559	3,217	147	396	608	7,665	40,209	42,723	39,449	283,061	262,230
C-G-400-3	10	10	26,584	34,583	111,254	694	1,106	1,944	30	80	280	1,036	9,183	19,692	3,295	35,359	103,171
C-G-400-3	10	50	29,940	41,412	144,762	810	1,269	2,503	38	109	346	1,378	12,450	24,061	5,060	63,000	132,275
C-G-400-3	10	90	39,633	59,099	200,763	1,019	1,546	3,171	74	156	446	2,642	16,210	29,286	10,177	76,318	163,031
C-G-1000-3	10	10	18,526	23,235	98,051	614	989	1,811	27	42	264	808	3,147	17,549	2,293	10,570	94,289
C-G-1000-3	10	50	21,215	27,012	129,830	727	1,149	2,367	28	48	315	849	3,630	20,693	2,484	13,365	113,803
C-G-1000-3	10	90	25,917	35,977	177,973	891	1,377	2,978	33	69	375	1,050	5,420	24,105	3,508	23,598	138,919
C-RL-100-1	10	10	28,006	53,867	120,773	943	1,755	2,435	37	155	311	1,377	16,626	22,469	5,617	90,454	123,233
C-RL-100-1	10	50	39,722	91,361	171,198	1,258	2,162	3,257	67	371	460	2,567	36,764	33,278	11,483	195,680	182,026
C-RL-100-1	10	90	57,086	165,771	252,880	1,587	2,627	4,099	104	427	563	3,785	41,575	38,767	18,107	284,243	237,990
C-RL-400-1	12	10	25,195	34,987	110,684	885	1,690	2,318	27	43	260	831	3,307	17,206	2,482	14,940	93,677
C-RL-400-1	12	50	30,540	45,347	146,501	1,136	2,029	3,081	31	81	327	1,016	7,213	22,033	3,587	45,670	124,508
C-RL-400-1	12	90	40,648	69,678	203,869	1,452	2,479	3,917	68	133	427	2,278	11,225	27,326	8,717	60,235	154,874
C-RL-1000-1	14	10	22,499	31,269	105,533	804	1,597	2,168	26	37	254	783	2,701	16,618	2,218	9,548	90,034
C-RL-1000-1	14	50	27,295	36,282	139,962	1,053	1,932	2,948	26	43	308	786	3,197	20,411	2,232	12,266	111,821
C-RL-1000-1	14	90	31,618	46,979	188,137	1,324	2,333	3,749	31	70	371	948	5,469	24,156	3,018	23,584	136,514

Table 57--Continued
Expected and Equivalent Annual Metric Values by Alternative
2010, 2075, and 2025 Equivalent Annual Value in 2007 Price Level
Business As Usual Employment, Compact Land Use, High Sea Level Rise Scenario
Planning Unit 4
Louisiana Coastal Protection and Restoration

Alternative	Years to Implement	% Chance Less than Indicated Value	Expected Annual Damage $1000s		Equivalent Annual Damage $1000s	Expected Annual Population Impacted		Equivalent Annual Population	Expected Annual Employees Impacted		Equivalent Annual Employment	Expected Annual Wages Impacted $1000s		Equivalent Annual Wages $1000s	Expected Annual Output Impacted $1000s		Equivalent Annual Output $1000s
			2010	2075		2010	2075		2010	2075		2010	2075		2010	2075	
Structural Plans																	
G-100-1	10	10	92,534	137,685	224,444	894	1,303	2,296	278	403	692	11,447	39,528	42,140	64,076	230,025	240,114
G-100-1	10	50	114,205	186,767	292,741	1,057	1,523	2,917	312	472	800	12,370	46,241	48,265	72,450	278,982	283,824
G-100-1	10	90	138,122	256,288	382,081	1,288	1,814	3,614	356	539	917	14,016	52,095	54,611	80,882	370,379	342,818
G-100-2	10	10	101,233	154,034	238,200	955	1,415	2,391	339	500	781	16,128	52,955	51,395	89,368	294,791	287,005
G-100-2	10	50	123,382	204,017	307,253	1,122	1,635	3,015	375	569	891	17,164	59,622	57,595	98,222	343,650	331,073
G-100-2	10	90	147,768	274,287	397,282	1,356	1,928	3,716	418	635	1,007	18,764	65,377	63,863	106,417	434,493	389,650
G-400-3	10	10	101,921	154,701	239,037	1,097	1,578	2,574	338	499	781	16,112	52,893	51,357	89,250	294,355	286,733
G-400-3	10	50	122,466	202,661	305,951	1,213	1,745	3,135	365	557	878	16,790	58,697	56,914	97,064	340,378	328,803
G-400-3	10	90	147,187	273,475	396,476	1,435	2,022	3,818	416	632	1,005	18,660	65,333	63,760	106,711	435,993	390,494
G-1000-3	10	10	101,921	154,700	239,037	1,097	1,578	2,574	338	499	781	16,112	52,893	51,357	89,250	294,355	286,733
G-1000-3	10	50	122,390	202,553	305,845	1,211	1,742	3,132	365	557	878	16,783	58,666	56,897	97,043	340,271	328,744
G-1000-3	10	90	143,936	269,585	392,224	1,388	1,971	3,759	398	610	980	18,057	63,668	62,593	104,445	429,241	385,913
RL-100-1	10	10	100,552	169,322	243,756	1,255	2,124	2,924	342	512	789	16,259	54,176	51,992	89,759	298,726	288,904
RL-100-1	10	50	128,509	218,800	317,420	1,570	2,538	3,748	390	628	927	17,687	65,242	60,278	100,519	364,939	341,500
RL-100-1	10	90	161,806	312,698	424,295	1,912	3,003	4,607	440	697	1,050	19,429	71,276	66,776	108,953	456,580	400,594
RL-400-1	12	10	99,821	168,453	241,747	1,249	2,118	2,888	340	508	780	16,156	53,717	51,244	89,321	296,786	285,380
RL-400-1	12	50	125,494	215,351	313,322	1,501	2,463	3,653	377	612	908	17,188	63,775	58,995	98,980	360,015	336,560
RL-1000-1	14	50	125,419	215,243	313,367	1,499	2,460	3,647	377	612	906	17,182	63,744	58,876	98,959	359,909	335,790
RL-1000-1	14	90	156,675	306,702	418,939	1,783	2,861	4,464	417	668	1,020	18,640	69,204	65,167	106,615	449,822	393,085
Non-Structural Plans																	
NS-100	15	10	22,322	50,781	108,399	734	1,725	2,099	10	128	275	579	15,211	16,357	3,594	86,681	93,112
NS-100	15	50	34,886	101,114	159,344	1,159	2,259	3,044	37	417	426	1,642	43,300	27,134	9,037	224,870	149,294
NS-100	15	90	55,471	196,473	240,605	1,552	2,902	3,973	70	502	529	2,798	50,822	32,434	15,459	320,779	192,864
NS-400	15	10	19,869	30,099	99,239	681	1,667	2,022	1	14	229	61	1,669	11,581	329	10,183	65,752
NS-400	15	50	26,163	44,216	131,923	1,106	2,201	2,967	6	63	281	293	6,678	14,277	1,558	45,218	85,253
NS-400	15	90	35,440	72,039	179,567	1,500	2,845	3,896	30	110	363	1,169	10,327	18,062	5,034	56,976	99,451
NS-1000	15	10	17,172	26,143	94,983	600	1,574	1,902	0	7	226	12	924	11,296	65	4,467	63,685
NS-1000	15	50	22,742	32,906	124,577	1,025	2,107	2,846	0	18	261	19	1,945	12,503	88	9,060	72,403
NS-1000	15	90	28,025	46,863	163,440	1,418	2,751	3,776	7	55	320	259	4,993	15,389	1,104	23,541	84,681

Source: GIS Economic Application Databases

* The Louisiana coastline is sustained at 2010 conditions throughout the analysis.

Table 58
Percentage of Expected Annual Damages by Damage Category for each Planning Unit
Without Structural Action Sustained Coastline Alternative
2010 & 2075 (2007 Price Level)
Louisiana Coastal Protection and Restoration

Planning Unit	Residential (%)	Non Residential (%)	Emergency Activities (%)	Agricultural Resources (%)	Transportation Infrastructure (%)
High Employment Future Development Dispersed Land Use Allocation Low Sea Level Rise Scenario					
2010					
1	64	10	19	2	5
2	55	18	22	2	3
3a	51	22	20	2	4
3b	49	21	20	5	5
4	33	27	17	11	12
2075					
1	64	12	19	1	3
2	59	18	19	1	2
3a	55	22	19	1	3
3b	53	20	19	4	4
4	42	21	18	9	10
Business As Usual Future Development Compact Land Use Allocation Low Sea Level Rise Scenario					
2010					
1	64	11	19	2	5
2	53	20	22	2	3
3a	51	22	21	2	3
3b	49	20	20	6	5
4	31	32	16	11	11
2075					
1	63	11	20	1	4
2	55	21	20	2	2
3a	53	23	20	1	3
3b	50	23	20	4	4
4	36	31	16	8	9

Source: GIS Economic Application Databases

Note: Percentage of total expected annual damages for each damage category by planning unit with a sustained coast and low sea level rise scenario.

Table 59
Coastal Restoration Costs by Planning Unit
Life-Cycle Costs, Total Present Value and Annual Equivalent
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative	PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)	Alternative	PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
Low Sea Level Rise Scenario SLR 1			**High Sea Level Rise Scenario SLR 2**		
Planning Unit 1					
R1	$ 9,476,216,146	$ 483,897,372	R1	$ 9,709,760,355	$ 495,823,169
R2	10,665,775,709	544,641,527	R2	10,899,319,919	556,567,324
R3	15,208,149,906	776,595,179	R3	15,618,392,295	797,543,963
R4	7,877,277,687	402,248,525	R4	8,086,372,307	412,925,818
R5	860,347,505	43,933,136	R5	873,240,040	44,591,486
Planning Unit 2					
R1	15,000,587,972	765,996,151	R1	15,032,520,906	767,626,788
R2	15,656,858,627	799,508,224	R2	15,688,791,562	801,138,860
R3	18,244,990,105	931,669,627	R3	18,355,142,891	937,294,514
R4	21,014,813,079	1,073,108,999	R4	21,095,749,145	1,077,241,951
R5	7,910,967,053	403,968,853	R5	7,943,451,547	405,627,654
Planning Unit 3a					
R1	23,275,709,069	1,188,560,315	R1	23,703,011,871	1,210,380,280
R2	22,767,146,032	1,162,590,844	R2	23,194,448,834	1,184,410,809
Planning Unit 3b					
R1	4,755,693,600	242,846,680	R1	4,796,312,058	244,920,838
R2	6,907,066,410	352,705,260	R2	6,974,894,697	356,168,872
Planning Unit 4					
R1	10,783,189,179	550,637,177	R1	11,077,439,106	565,662,875
R2	13,308,834,086	679,607,740	R2	13,708,099,109	699,995,972

Source: USACE cost estimates

Table 60
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 1 and 2
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
		Planning Unit 1	
LP-1b-400-3	Total	$ 41,002,489,553	$ 2,093,767,874
	TSLR1	45,080,731,719	2,302,020,897
	TSLR2	45,237,657,978	2,310,034,245
	TDSLR1	45,252,687,240	2,310,801,705
	TDSLR2	45,729,618,144	2,335,155,899
	TD	44,628,890,709	2,278,947,904
LP-1a-100-3	Total	18,884,138,104	964,307,341
	TSLR1	21,091,812,926	1,077,040,950
	TSLR2	21,278,697,396	1,086,584,095
	TDSLR1	21,144,196,998	1,079,715,912
	TDSLR2	21,240,362,519	1,084,626,547
	TD	21,127,991,997	1,078,888,413
LP-1a-100-1	Total	6,351,779,267	324,349,851
	TSLR1	7,023,873,129	358,669,926
	TSLR2	7,132,174,353	364,200,264
	TDSLR1	7,102,779,099	362,699,213
	TDSLR2	7,117,989,706	363,475,933
	TD	7,076,147,767	361,339,300
LP-1b-1000-2	Total	54,130,685,904	2,764,151,455
	TSLR1	59,397,725,297	3,033,109,706
	TSLR2	59,605,080,201	3,043,698,161
	TDSLR1	59,911,487,303	3,059,344,658
	TDSLR2	60,303,778,508	3,079,376,777
	TD	58,991,397,522	3,012,360,818
LP-1b-400-1	Total	23,272,685,805	1,188,405,934
	TSLR1	25,537,741,834	1,304,069,680
	TSLR2	25,620,106,214	1,308,275,568
	TDSLR1	25,458,781,759	1,300,037,631
	TDSLR2	25,918,836,489	1,323,530,053
	TD	24,914,869,799	1,272,263,087

Table 60--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 1 and 2
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
LP-1b-1000-1	Total	30,579,363,007	1,561,517,082
	TSLR1	33,338,727,846	1,702,422,416
	TSLR2	33,561,511,551	1,713,798,734
	TDSLR1	33,557,248,171	1,713,581,027
	TDSLR2	33,927,996,866	1,732,513,090
	TD	32,937,377,640	1,681,927,705
HL-1a-100-3	Total	14,611,578,492	746,131,612
	TSLR1	15,893,412,618	811,587,714
	TSLR2	15,927,954,706	813,351,585
	TDSLR1	15,927,026,713	813,304,197
	TDSLR2	16,138,961,617	824,126,527
	TD	15,893,190,720	811,576,383
HL-1b-400-3	Total	41,624,535,916	2,125,532,303
	TSLR1	44,894,897,434	2,292,531,380
	TSLR2	45,102,928,020	2,303,154,339
	TDSLR1	45,706,077,473	2,333,953,809
	TDSLR2	46,335,055,857	2,366,072,217
	TD	44,988,328,577	2,297,302,386
LP-1a-100-2	Total	20,291,496,420	1,036,173,261
	TSLR1	22,443,195,110	1,146,048,482
	TSLR2	22,582,076,265	1,153,140,366
	TDSLR1	22,710,149,477	1,159,680,349
	TDSLR2	22,815,125,785	1,165,040,902
	TD	22,535,350,313	1,150,754,333
HL-1a-100-2	Total	17,506,588,315	893,963,576
	TSLR1	19,193,842,960	980,122,237
	TSLR2	19,250,908,409	983,036,250
	TDSLR1	19,227,457,055	981,838,720
	TDSLR2	19,461,915,320	993,811,193
	TD	18,788,200,543	959,408,346

Table 60--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 1 and 2
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
HL-1b-400-2	Total	45,741,098,175	2,335,742,120
	TSLR1	49,568,537,217	2,531,188,031
	TSLR2	49,807,516,554	2,543,391,369
	TDSLR1	50,379,717,256	2,572,610,459
	TDSLR2	51,039,644,391	2,606,309,248
	TD	49,104,890,836	2,507,512,202
Planning Unit 2			
G-1-100-4 Mod	Total	13,324,704,326	680,418,145
	TSLR1	14,521,411,827	741,527,305
	TSLR2	14,699,942,386	750,643,862
	TDSLR1	14,798,120,600	755,657,275
	TDSLR2	14,877,313,201	759,701,197
	TD	14,627,479,624	746,943,593
G-1-400-4 Mod	Total	31,977,328,376	1,632,903,357
	TSLR1	34,745,450,470	1,774,255,875
	TSLR2	34,880,253,459	1,781,139,509
	TDSLR1	34,874,999,831	1,780,871,236
	TDSLR2	35,051,652,952	1,789,891,923
	TD	33,433,655,186	1,707,269,824
G-1-1000-4 Mod	Total	38,903,051,804	1,986,561,328
	TSLR1	42,334,822,310	2,161,802,659
	TSLR2	42,457,433,306	2,168,063,716
	TDSLR1	42,502,228,645	2,170,351,163
	TDSLR2	42,685,102,247	2,179,689,496
	TD	40,720,031,546	2,079,344,323
G-1-100-1 Mod	Total	7,093,684,425	362,234,799
	TSLR1	7,604,471,817	388,317,855
	TSLR2	7,747,826,987	395,638,202
	TDSLR1	7,825,001,790	399,579,088
	TDSLR2	7,837,462,975	400,215,410
	TD	7,721,802,251	394,309,264

Table 60--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 1 and 2
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
S-1-100-4	Total	12,283,125,381	627,230,532
	TSLR1	13,347,656,638	681,590,190
	TSLR2	13,419,759,181	685,272,064
	TDSLR1	13,480,639,860	688,380,900
	TDSLR2	13,569,116,884	692,898,926
	TD	13,402,780,231	684,405,044
S-1-400-4	Total	28,761,420,852	1,468,684,942
	TSLR1	31,466,448,269	1,606,815,567
	TSLR2	31,605,204,008	1,613,901,046
	TDSLR1	31,716,753,695	1,619,597,265
	TDSLR2	31,895,295,224	1,628,714,383
	TD	30,583,044,886	1,561,705,095
S-1-1000-4	Total	36,465,926,824	1,862,110,982
	TSLR1	39,174,221,170	2,000,408,430
	TSLR2	39,773,613,631	2,031,016,052
	TDSLR1	39,911,476,988	2,038,055,962
	TDSLR2	40,094,969,319	2,047,425,890
	TD	39,057,807,756	1,994,463,848
S-1-100-2	Total	7,281,907,277	371,846,287
	TSLR1	7,729,640,102	394,709,499
	TSLR2	7,770,111,956	396,776,170
	TDSLR1	7,808,851,152	398,754,365
	TDSLR2	7,834,066,799	400,041,987
	TD	7,762,622,212	396,393,711
S-1-400-2	Total	23,344,649,676	1,192,080,726
	TSLR1	25,409,065,722	1,297,498,910
	TSLR2	25,514,969,596	1,302,906,829
	TDSLR1	25,570,671,112	1,305,751,193
	TDSLR2	25,683,508,911	1,311,513,189
	TD	24,469,814,168	1,249,536,585

Table 60--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 1 and 2
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
WBI-100-1	Total	949,899,327	48,506,048
	TSLR1	999,127,829	51,019,872
	TSLR2	1,023,742,080	52,276,783
	TDSLR1	1,072,970,582	54,790,607
	TDSLR2	1,100,319,750	56,187,176
	TD	1,023,742,080	52,276,783
S-1-100-3	Total	9,419,445,296	480,998,401
	TSLR1	10,146,620,609	518,131,180
	TSLR2	10,201,422,847	520,929,623
	TDSLR1	10,209,194,089	521,326,457
	TDSLR2	10,304,069,727	526,171,225
	TD	10,189,633,988	520,327,631
S-1-400-3	Total	25,947,102,046	1,324,973,416
	TSLR1	28,317,944,647	1,446,039,091
	TSLR2	28,439,562,703	1,452,249,445
	TDSLR1	28,522,866,427	1,456,503,302
	TDSLR2	28,666,244,493	1,463,824,818
	TD	28,106,117,780	1,435,222,278
W-1-400-1	Total	18,244,876,972	931,663,850
	TSLR1	18,294,179,839	934,181,472
	TSLR2	18,318,831,273	935,440,282
	TDSLR1	18,368,134,140	937,957,904
	TDSLR2	18,395,524,622	939,356,583
	TD	18,318,831,273	935,440,282

Source: USACE cost estimates

Notes:
Total = Costs Under 2010 Conditions
TSLR1 = Costs with Sustain Coastline with Sea Level Rise Option 1 (Low Sea Level Rise)
TSLR2 = Costs with Sustain Coastline with Sea Level Rise Option 2 (High Sea Level Rise)
TDSLR1 = Costs with Degraded Coastline and Sea Level Rise Option 1 (Low Sea Level Rise)
TDSLR2 = Costs with Degraded Coastline and Sea Level Rise Option 2 (High Sea Level Rise)
TD = Costs with Degraded Coastline Conditions

Table 61
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 3a, 3b, and 4
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
Planning Unit 3a			
PU3a-M-100-2	Total	$ 18,113,975,186	$ 924,979,428
	TSLR1	18,982,639,808	969,337,273
	TSLR2	19,097,861,585	975,221,004
	TDSLR1	19,003,679,214	970,411,638
	TDSLR2	19,118,900,991	976,295,370
	TD	18,113,975,186	924,979,428
PU3a-M-400-2	Total	32,341,913,836	1,651,520,698
	TSLR1	33,765,451,792	1,724,212,822
	TSLR2	34,083,529,240	1,740,455,258
	TDSLR1	33,790,248,762	1,725,479,065
	TDSLR2	34,108,326,210	1,741,721,501
	TD	32,341,913,836	1,651,520,698
PU3a-M-1000-2	Total	42,454,767,932	2,167,927,611
	TSLR1	44,199,165,497	2,257,004,240
	TSLR2	44,271,710,180	2,260,708,691
	TDSLR1	44,236,100,272	2,258,890,293
	TDSLR2	44,341,045,410	2,264,249,254
	TD	42,454,767,932	2,167,927,611
PU3a-G-400-2	Total	23,980,293,148	1,224,539,484
	TSLR1	25,212,348,239	1,287,453,649
	TSLR2	25,284,574,961	1,291,141,863
	TDSLR1	25,255,436,245	1,289,653,912
	TDSLR2	25,450,444,260	1,299,611,881
	TD	23,980,293,148	1,224,539,484
PU3a-G-1000-2	Total	26,285,582,200	1,342,257,706
	TSLR1	27,625,147,579	1,410,661,820
	TSLR2	27,702,581,935	1,414,615,959
	TDSLR1	27,672,021,584	1,413,055,413
	TDSLR2	27,776,971,438	1,418,414,615
	TD	26,285,582,200	1,342,257,706

Table 61--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 3a, 3b, and 4
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
PU3a-M-100-1	Total	20,559,835,693	1,049,875,848
	TSLR1	21,412,231,587	1,093,402,940
	TSLR2	21,928,172,989	1,119,749,182
	TDSLR1	21,441,726,777	1,094,909,094
	TDSLR2	21,956,876,639	1,121,214,917
	TD	20,559,835,693	1,049,875,848
PU3a-M-400-1	Total	37,191,919,750	1,899,183,381
	TSLR1	38,699,958,870	1,976,190,507
	TSLR2	38,999,788,009	1,991,501,104
	TDSLR1	38,742,586,154	1,978,367,243
	TDSLR2	39,040,505,418	1,993,580,315
	TD	37,191,919,750	1,899,183,381
PU3a-M-1000-1	Total	50,311,083,067	2,569,105,695
	TSLR1	52,221,422,825	2,666,656,065
	TSLR2	52,261,232,244	2,668,688,910
	TDSLR1	52,279,045,426	2,669,598,529
	TDSLR2	52,346,720,979	2,673,054,341
	TD	50,311,083,067	2,569,105,695
Planning Unit 3b			
PU3b-RL-100-1	Total	10,433,139,439	532,762,094
	TSLR1	11,579,104,009	591,280,097
	TSLR2	11,611,788,200	592,949,095
	TDSLR1	11,608,031,639	592,757,269
	TDSLR2	11,633,987,670	594,082,698
	TD	10,433,139,439	532,762,094
PU3b-RL-400-1	TOTAL	16,966,452,078	866,381,839
	TSLR1	17,996,217,325	918,966,192
	TSLR2	18,024,048,819	920,387,390
	TDSLR1	18,033,986,523	920,894,854
	TDSLR2	18,060,798,625	922,263,997
	TD	16,966,452,078	866,381,839

Table 61--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 3a, 3b, and 4
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
PU3b-RL-1000-1	Total	21,092,083,124	1,077,054,747
	TSLR1	22,318,092,931	1,139,660,213
	TSLR2	22,368,524,012	1,142,235,447
	TDSLR1	22,419,122,645	1,144,819,236
	TDSLR2	22,074,288,458	1,127,210,482
	TD	21,092,083,124	1,077,054,747
PU3b-G-100-1	Total	13,875,503,041	708,544,355
	TSLR1	15,213,991,328	776,893,467
	TSLR2	15,238,204,179	778,129,882
	TDSLR1	15,213,991,328	776,893,467
	TDSLR2	15,245,100,038	778,482,015
	TD	13,875,503,041	708,544,355
PU3b-G-400-1	Total	21,402,662,628	1,092,914,306
	TSLR1	22,899,693,909	1,169,359,323
	TSLR2	22,972,759,898	1,173,090,395
	TDSLR1	22,899,693,909	1,169,359,323
	TDSLR2	22,972,759,898	1,173,090,395
	TD	21,402,662,628	1,092,914,306
PU3b-G-1000-1	Total	29,519,480,305	1,507,394,799
	TSLR1	31,690,702,400	1,618,266,971
	TSLR2	31,761,540,761	1,621,884,290
	TDSLR1	31,690,702,400	1,618,266,971
	TDSLR2	31,761,540,761	1,621,884,290
	TD	29,519,480,305	1,507,394,799
PU3b-F-100-1	Total	12,589,465,638	642,873,615
	TSLR1	13,918,228,814	710,726,122
	TSLR2	13,954,617,339	712,584,280
	TDSLR1	13,952,010,594	712,451,168
	TDSLR2	13,997,918,488	714,795,427
	TD	12,589,465,638	642,873,615

Table 61--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 3a, 3b, and 4
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
PU3b-F-400-1	Total	22,069,176,757	1,126,949,456
	TSLR1	23,444,549,384	1,197,182,045
	TSLR2	23,639,274,027	1,207,125,544
	TDSLR1	23,470,259,830	1,198,494,935
	TDSLR2	23,638,106,727	1,207,065,937
	TD	22,069,176,757	1,126,949,456
PU3b-F-1000-1	Total	29,280,034,085	1,495,167,620
	TSLR1	31,073,875,930	1,586,769,093
	TSLR2	31,087,396,414	1,587,459,508
	TDSLR1	31,106,844,871	1,588,452,632
	TDSLR2	31,114,259,713	1,588,831,267
	TD	29,280,034,085	1,495,167,620
Planning Unit 4			
PU4-RL-100-1	Total	2,373,687,756	121,210,962
	TSLR1	2,701,601,680	137,955,692
	TSLR2	2,719,819,121	138,885,954
	TDSLR1	2,728,696,431	139,339,270
	TDSLR2	2,737,805,151	139,804,400
	TD	2,373,687,756	121,210,962
PU4-RL-400-1	Total	3,056,534,710	156,080,137
	TSLR1	3,470,747,702	177,231,678
	TSLR2	3,493,759,535	178,406,763
	TDSLR1	3,504,156,698	178,937,689
	TDSLR2	3,516,771,368	179,581,850
	TD	3,056,534,710	156,080,137
PU4-RL-1000-1	Total	3,299,222,878	168,472,864
	TSLR1	3,756,449,865	191,820,890
	TSLR2	3,798,570,346	193,971,748
	TDSLR1	3,793,804,992	193,728,408
	TDSLR2	3,834,505,259	195,806,743
	TD	3,299,222,878	168,472,864

Table 61--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 3a, 3b, and 4
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
PU4-G-100-1	Total	10,907,164,470	556,967,901
	TSLR1	11,989,407,009	612,231,976
	TSLR2	12,271,970,936	626,660,936
	TDSLR1	12,055,367,103	615,600,190
	TDSLR2	12,315,049,503	628,860,718
	TD	10,907,164,470	556,967,901
PU4-G-400-1	Total	16,208,936,970	827,699,777
	TSLR1	18,061,358,705	922,292,598
	TSLR2	18,148,409,469	926,737,794
	TDSLR1	18,160,529,349	927,356,688
	TDSLR2	18,217,802,110	930,281,287
	TD	16,208,936,970	827,699,777
PU4-G-1000-1	Total	21,546,382,413	1,100,253,272
	TSLR1	24,033,882,787	1,227,276,007
	TSLR2	24,161,955,356	1,233,815,957
	TDSLR1	24,173,128,003	1,234,386,481
	TDSLR2	24,231,465,161	1,237,365,435
	TD	21,546,382,413	1,100,253,272
PU4-G-100-2	Total	10,736,160,334	548,235,677
	TSLR1	11,784,788,679	601,783,263
	TSLR2	12,065,485,151	616,116,862
	TDSLR1	11,850,748,774	605,151,476
	TDSLR2	12,115,929,047	618,692,749
	TD	10,736,160,334	548,235,677
PU4-G-400-2	Total	15,946,166,377	814,281,552
	TSLR1	17,738,183,989	905,789,872
	TSLR2	17,825,959,478	910,272,075
	TDSLR1	17,837,354,632	910,853,962
	TDSLR2	17,901,638,110	914,136,560
	TD	15,946,166,377	814,281,552

Table 61--Continued
Costs of Structural Alternatives
Life-Cycle Costs, Total Present Value and Annual Equivalent
Planning Unit 3a, 3b, and 4
2007 Price Levels, Base Year 2025, 4.875 Percent Federal Discount Rate
Louisiana Coastal Protection and Restoration

Alternative		PV Life-Cycle Costs 2025 ($)	Annual Equivalent 2025 ($)
PU4-G-1000-2	Total	20,861,148,556	1,065,262,210
	TSLR1	23,283,349,147	1,188,950,451
	TSLR2	23,412,836,268	1,195,562,634
	TDSLR1	23,422,594,363	1,196,060,926
	TDSLR2	23,497,747,924	1,199,898,598
	TD	20,861,148,556	1,065,262,210
PU4-G-400-3	Total	10,691,853,094	545,973,153
	TSLR1	11,731,773,662	599,076,082
	TSLR2	12,011,986,368	613,384,978
	TDSLR1	11,803,916,746	602,760,025
	TDSLR2	11,909,909,139	608,172,465
	TD	10,691,853,094	545,973,153
PU4-G-1000-3	Total	11,119,090,351	567,789,772
	TSLR1	12,205,327,721	623,257,840
	TSLR2	12,488,113,583	637,698,133
	TDSLR1	12,282,164,058	627,181,443
	TDSLR2	12,401,350,205	633,267,613
	TD	11,119,090,351	567,789,772

Source: USACE cost estimates

Notes:
Total = Costs Under 2010 Conditions
TSLR1 = Costs with Sustain Coastline with Sea Level Rise Option 1 (Low Sea Level Rise)
TSLR2 = Costs with Sustain Coastline with Sea Level Rise Option 2 (High Sea Level Rise)
TDSLR1 = Costs with Degraded Coastline and Sea Level Rise Option 1 (Low Sea Level Rise)
TDSLR2 = Costs with Degraded Coastline and Sea Level Rise Option 2 (High Sea Level Rise)
TD = Costs with Degraded Coastline Conditions

Attachment 2 –
Other Social Effects Report

Expanding the Identification and Measurement of the Human Consequences of Disastrous Flooding:
Toward the Refinement of the “Other Social Effects” Account

Submitted to the

U.S. Army Corps of Engineers

by

Shirley Laska, Ph.D.
Center for Hazards Assessment, Response & Technology (CHART)
University of New Orleans

and

Robert Gramling, Ph.D.
Director, Socio-Economic Research Center
University of Louisiana at Lafayette

with

Chad M. Berginnis, C.F.M.; Monica Farris, Ph.D.; William Freudenburg, Ph.D.; Michelle Gremillion, M.A.; Pam Jenkins, Ph.D.; Richard Krajeski, M. Div., ABD; Harriet McCombs Ph.D.; Nancy Mock, Ph.D.; Betty Morrow, Ph.D.; Brad Ott; Kristina Peterson, ST. M., M.Div.; and Henry Taylor, M.D., MPH.

September 8, 2008

Executive Summary

The **social** effects of water resources projects are equally as important as are their economic and environmental counterparts. When viewed from the community level, the supportive role which projects can play in social dynamics and quality of life make the social effects key to the reasoning for the creation and ongoing support of the projects. EC 1105-2-400, May 2005, "Planning in a Collaborative Environment" reiterates the importance of Other Social Effects (OSE) and that any alternate plan can be selected and recommended if it has net beneficial effects considering NED, EQ, RED, and **OSE** accounts.

In order for water resources projects to be assessed on the basis of the contribution which they may make to community/regional function, ***it is necessary to revisit the OSEs with renewed vigor.*** This report attempts to make a contribution to this effort both conceptually and practically in terms of implementation.

Measuring OSEs has always been challenging; recent expanded conversation about what comprises a successful community, and how to determine whether the qualities exist, has made doing so even more difficult. Resiliency, social well being, community capital, social capital are terms recently introduced to the more traditional and still used project effect analysis dominated (outside of the Corps) for the last few decades by Social Impact Assessment (SIA).

The "Handbook on Applying 'Other Social Effects' Factors in Corps of Engineers Water Resources Planning" states the importance of defining the social life in the local and regional area. "Social statistics" can be used to describe the quality of life in the area. As an appendix report to the LACPR, this document proposes a framing of OSEs, and describes the way they can be applied both in a qualitative and quantitative way, including per capita measures, to understand what social impact Hurricane Katrina and the consequent levee breaches and overtopping had. The case of this hurricane can demonstrate on a quantified basis how the viability of a community, and changes in that viability, can be measured through changes in social statistics. Two examples are a comparison of alcoholism per capita before and after hurricane Katrina and the suicide rate per capita before and after the storm. Increases and decreases in social statistics can be used as indicators of social well being and resiliency.

Whether the proposed concepts can stand the test of a summary, easy to appreciate, efficiently measured "capture" of OSE needed for Corps work will require more discussion than the recent IWR "white paper," the new "Handbook on Applying 'Other Social Effects'" and the ideas contained within this report can offer. These, it is proposed, however, are a substantial start.

The contribution that this specific post-Katrina report hopes to achieve is to argue not only for the importance of augmenting the current limited OSE account elements — residual population and historic districts — with enhanced measures but also for revising the means of engagement of the community in the application of the expanded OSEs. Simply, we propose that to be most effective the expanded OSEs must be used to engage the affected community in a robust, collaborative process that begins way in advance of the usual Corps engagement schedule – from the earliest consideration of the prospect of a water resources project benefiting a community -- and also continuing throughout all of the phases. From this process will emerge the most important social effects -- as defined by the community itself. Then what is valued will be known and from that know what needs to be the focus of flood risk reduction. Expanded OSEs without the community engagement will produce very little improvement over the slim OSE effort undertaken before Katrina.

Additionally this report argues for the consideration of the contribution that a water resources project can make to the viability/sustainability of a community within a collaborative context of multiple resource stakeholders of which the Corps is one. While existing legislation and their promulgated rules reinforce "silo" insularity in bringing resources to a community, it is incumbent upon the Corps to encourage the weighing of the respective contributions of each of the possible resource stakeholders and in taking the lead in garnering them in a collaborative manner. The Planning in a Collaborative Environment EC in fact already recognizes that the Corps can help facilitate bringing together various agencies and programs to solve water resources problems. We present an example from the New Orleans office to demonstrate that the Corps already has acted in this leadership manner for a related goal – Louisiana coastal restoration.

Finally, the report recommends the required use of the OSEs in a community collaborative process of assessing the impacts of structure breaches or overtopping after every federally declared flood disaster involving a Corps project.

Overview of the Report

What was the logic of work? How it was done? And what is the focus?

"Planning in a Collaborative Environment" (EC 1105-2-409) initiated a new awareness for the need for the assessment of Other Social Effects (OSEs) within the efforts of the Interagency Performance Evaluation Taskforce (IPET). The impacts of the levees overtopping and breaching during Hurricanes Katrina and Rita reinforced the need to re-introduce social effects to the core considerations (national and regional economic, environmental and **social**) when reviewing potential projects or when reviewing the performance of existing ones. This University of New Orleans-led team of social scientists proposed to support the renewed interest by refining the OSEs that have been used over the last few decades utilizing observations following the two storms. The team's work is an extension of that presented in recently prepared preliminary white papers that were produced by the Institute of Water Resources in anticipation of an OSE handbook, now released (Dunning, 2008).

Once the preliminary OSEs proposed by Dunning and Durden (2007) had been reviewed, the team suggested revisions based primarily upon the OSEs proposed in the internationally-recognized process called Social Impact Assessment. This revised list was then reviewed for additions from more recent work on social resiliency, social well-being and social/community capital to produce a list of impacts the team felt was representative and captured the core impacts that would occur both for the construction of a Corps civil project and for the "post-mortem" assessment of harmful impacts of an overtopping or breaching of a protective structure, especially one that is as catastrophic as Hurricane Katrina.

In order to demonstrate how such OSEs could be examined for a catastrophic event, the next step was to describe, in narrative form, what the OSEs were in Hurricane Katrina, then to quantify these impacts as much as possible to achieve the Corps' goal of numeric assessment and impact comparison. Appendices were developed to provide additional narrative detail about Katrina to reinforce the social impact perspective and to add quantitative detail to the OSEs.

In addition to proposing refined categories and specific OSEs, the team included an expanded description of the Social Impact Assessment (SIA) process. The team feels very strongly that this method can bring to the planners a useful representation of project impacts – both positive and negative – as they are viewed by the affected community and its active stakeholders. While it is important to have the assessment process be led by a professional SIA specialist, the process engages the community to express a common vision and to thereby identify what flood safety means. The linkage between the method and the planning process was described.

In addition, the SIA process put into place must engage the entire community rather than just a project sponsor or highly visible stakeholders. This engagement should occur much earlier than is done now. The purpose of the early timing is to be sure that

- there is consensus about what the community considers the most important elements/functions to protect,
- determination that a structural solution is the best option,

- how the structural can be combined with non-structural to effect the greatest safety including through redundancy, and
- to engage all of the possible “resource stakeholders” into the conversation for the best flood protection achievable at an early enough time that the definition of the protection system has not “hardened” to only the structural measure.

It is believed that a list of OSEs is most important in its suggestive role, rather than in any definitive representation of what absolutely has to be addressed as of concern in any project. Because of this belief, community-based assessment procedures that would support this assumption are offered and advocated.
Robust community engagement also reduces the likelihood that resistance by community subgroups to the project will afflict the entire project and decision-making process, as occurs today.

Finally, four additional application issues relevant to the more productive use of the OSEs are considered in the report:

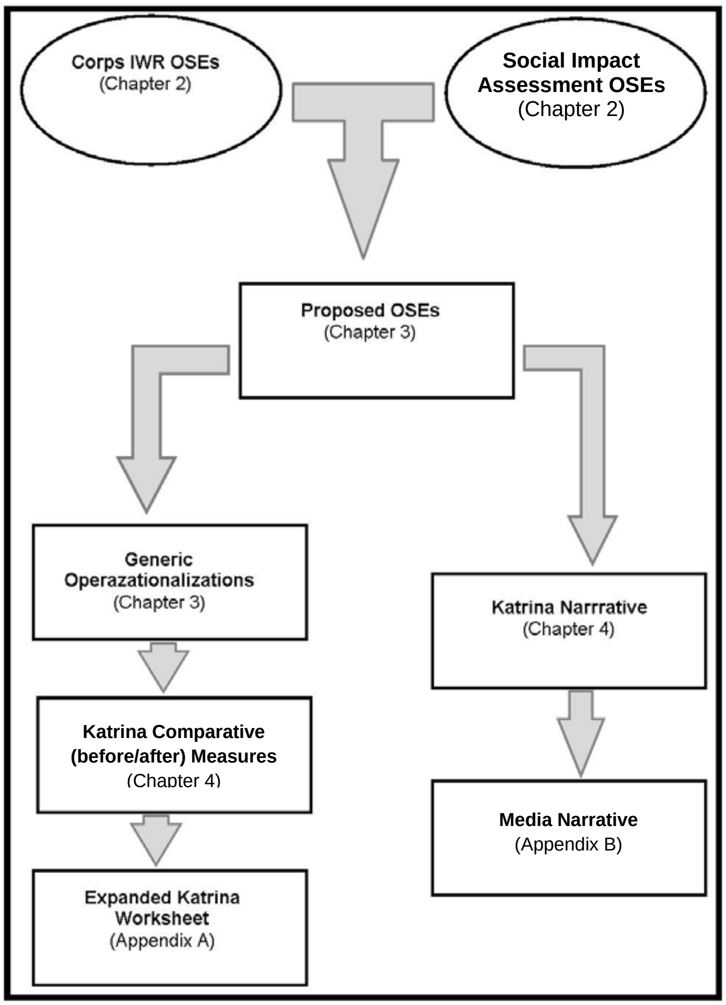
- The first is to incorporate the SIA approach of eliciting OSEs into the “defining and bounding the problem” approach the Corps already uses regularly.
- The second is for the Corps to utilize the results of the SIA process to collaborate with other resource stakeholders to conceive and implement the best package of risk reduction actions, the Corps’ structural and non structural being just two.
- The third is to review the proposed OSEs and to embrace a more comprehensive array of them within the Multi-Criteria Decision Analysis (MCDA) currently being utilized by the Corps in the LACPR project selection process.
- The fourth is to use the OSEs and the SIA approach to refine the post-mortem assessment of flood disasters and to require legislatively such an analysis after every declared flood disaster.

In addition a description of the use of historical community analysis as part of the SIA is offered in an appendix.

What has not been considered in this report is the range of impacts from modest residual (overtopping) to major deep flooding caused by a breach and rapidly flowing water. This will be undertaken in Phase II of this project because it requires a project case, preferably case comparisons, to analyze the differences in degree of impact. Generally, the lower the level of flooding, the less impact; however, it is evident from Katrina that the higher ground, less-flooded areas suffer from co-dependency impacts with the more-deeply flooded such as being the recipient of those driven out of the deeply flooded areas.

Special thanks go to team members, Michelle Gremillion, a recent University of New Orleans Sociology masters graduate, who located all of the quantitative measures and prepared the quantitative portions of the report and Brad Ott, a current Sociology graduate student, who located the media vignettes and prepared that appendix to the report. The Association of State Floodplain Managers Foundation provided support for the participation of team member Chad Berginnis who brought the perspective of a participating mitigation expert with experience at the local and state level. In addition, the group would like to thank Joyce Broden-Douglas, UNO-CHART office coordinator, for logistical assistance for team meetings and Carrie Beth Lasley, UNO-CHART Research Associate, for managing the details of the report and for using Microsoft Word 2007 to its ultimate capacity in preparing the final document.

Report Flowchart



Contributors

University of New Orleans

Shirley Laska, Ph.D.
Professor of Sociology
Director, CHART

Pamela Jenkins, Ph.D.
Professor of Sociology

Monica Farris, Ph.D.
Assistant Professor/Research
Assistant Director, CHART

Michelle Gremillion, M.A.
Instructor of Sociology

Kristina Peterson, ST. M., M.Div.
Graduate Research Assistant
Doctoral Student (Urban and Regional Studies)

Brad Ott
Graduate Research Assistant
Masters Student (Sociology)

Other Institutions and Academic Consultants

Chad M. Berginnis, C.F.M.
Hazard Mitigation Officer
Emergency Management Branch
State of Ohio

William Freudenburg, Ph.D.
Dehlsen Professor of Environment and Society
Environmental Studies Program
University of California-Santa Barbara

Robert Gramling, Ph.D.
Professor of Sociology
Director, Socio-Economic Research Center
University of Louisiana at Lafayette

Richard Krajeski, M. Div., ABD
Community Responsive Management (CRM)
Houma, La.

Harriet G. McCombs, Ph.D.
Public Health Consultant

Nancy Mock, Ph.D.
Director, Center for International
Resource Development
School of Public Health & Tropical Medicine
Tulane University

Betty Morrow, Ph.D.
Professor of Sociology Emeritus
Florida International University

Henry Taylor, M.D., M.P.H.
Senior Associate, Interdepartmental Program in Applied Health and Department of Health Policy Management
Johns Hopkins Bloomberg School of Public Health

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Chapter 1: Introduction and Background of the Project

The U.S. Army Corps of Engineers has been specifying the benefits of their flood control projects for at least 72 years to determine which possible projects are appropriate for implementation. Over the decades four non-physical benefit "accounts" have been defined: National Economic Development (NED), Regional Economic Development (RED), Environmental Benefits (ENV) and Other Social Effects (OSEs). Interest in the Other Social Effects (OSEs) has vacillated over the decades but has never had much attention or refinement. The tremendous social impacts of the flooding caused by the breaching and overtopping of the hurricane protection levees surrounding New Orleans and its vicinity during Hurricane Katrina in late August of 2005 have prompted another surge of interest in the OSEs by the Corps. This project and report stem from that interest. The report team shares with the Corps the goal of contributing to the refinement of the OSEs in a manner that will make permanent a balanced consideration and use of all four accounts from now into the future.

A. History of OSEs

The Flood Control Act of 1936 differentiated between "tangible" effects – prevention of flood damage, 'higher' use of land and collateral benefits related to water and navigation – and "intangible" – loss of life, personal injury, sickness and epidemic, general preservation of community morale, recreation and wildlife (U.S. Army Corps of Engineers, 1943). While this early description only contains the concept "community morale," the text does make mention that the intangible benefits consist of the remaining "physical, social and economic security of the people."

It is not surprising for there to have been an underestimation of the importance of the social effects of flood-control measures when this legislation was implemented; the Corps was a physical science/engineering agency and the social sciences were in their infancy. However, as social sciences developed and attention was brought by their efforts to community processes and functioning during the mid-to-late 20th Century, a similar growing consideration and use of what the social sciences could reveal was not forthcoming in the Economic and Environmental Principles and Guidelines for Water and related Land Resources Implementation Studies of 1983, the guidance of Corps projects. As Dunning and Durden (2007:2) explain:

> "(G)uidance and plan selection criteria did not support the effects in the RED or OSE accounts as of primary importance to plan selection so such (prospective, *sic.)*) plans were marginalized and not the basis of plan formulation, selection or recommendation. In nearly all cases, this meant that such plans were not even developed or few resources were expended on them."

B. Recent Effort Pre-Dating This Report: IPET Report

"Planning in a Collaborative Environment" (EC 1105-2-409) initiated a new awareness for the need for the assessment of OSEs within the Interagency Performance Evaluation Task Force (IPET) although there was no specific requirement in the charge to the study team. Hurricane Katrina functioned as a wake-up call and reinforced this need. Recognition of the deficiencies in assessing projects absent of OSEs became clearly evident, but the lack of the OSEs being required placed the report as an appendix rather than part of the body of the report: Appendix 4. "Social, Cultural, and Historic Consequence," (U.S. Army Corps, 2006) although a "Social and Cultural Consequences Assessment Digest" was included in Vol. VII of the report. A very wide array of OSEs are represented therein grouped into **social, institutional/cultural and population**. Its focus is the impacts of the early recovery period and as such, contributes most to an appreciation of those very first effects. This report benefited from and draws from the IPET effort. Of special interest is the use and application by the IPET social science team of the concept "social well being."

C. Concurrently to IPET: IWR Documents

While this report was being developed, the latest Corps document considering OSEs was in its final edit stages. The research team for this report reviewed the two "white papers" that preceded the handbook's final draft (Dunning and Durden, 2007; Institute of Water Resources, 2007). Then, following completion of this first draft we reviewed the draft of the handbook (Dunning, 2008) and include comments herein responding to that document.

The two white papers by Dunning and Durden, prepared post-Katrina in 2006 and 2007, focused on OSEs, one a review of the Guidance and Procedures (G&P) and the second a review of the theoretical underpinnings of the OSEs. They surveyed numerous approaches for measuring social well-being, including human-needs literature, environmental justice, civic indices, quality-of-life assessments, and social-connectedness literature. They concluded that there were five key domains of well-being: material, distributive justice, status/recognition, health and safety, and connectedness. They also conclude that further work and an increased emphasis on OSE will be required in coming years. We draw heavily from their work because we support their intellectual arguments and believe that our best contribution to this effort comes in extending previous work to encourage important refinements with regard to honing framings of social impacts and arguing the importance of some as core elements.

D. Additional Frameworks for Informing the OSE Process

1. Social Impact Assessment

We emphasize an approach to assessing social effects that was not a focus either of the IPET report or the IWR work -- Social Impact Assessment (SIA). We believe that the SIA approach can be a very useful approach for the Corps to implement the community- and issue-engagement processes required for a full and successful consideration of the OSE account.

Accordingly, this report is aimed at extending the OSE analysis in two ways. First, the overall organization of the report is designed to show how SIA can be utilized to result in concrete measurable social effects co-evolved by the community and the Corps team. Second, we show how to extend the SIA methodology – usually used in <u>future</u> planning --to <u>post-event</u> analysis in order to examine after-the-fact extreme events such as Katrina.

Created initially in the 1970s, SIA has evolved and gained support and momentum from practitioners whose responsibility it is to consider the benefits/damages of community/regional projects, namely development. During its 40-year existence SIA specialists have created an international organization –

International Association for Impact Assessment – and gained an active international following with an annual conference. We appreciate that this approach was considered earlier by the Corps when the earlier interest in OSE prompted such methodology needs; however, we have been told that those who proposed it did not adequately connect it to the planning process existing at the time and thus it was found wanting. The approach we demonstrate will make that SIA/planning connection.

> Social Impact Assessment
>
> Social Impact Assessment: Determining in advance the consequences of an action to the way human populations live, work, play, interrelate, organize and cope, as well as the changes to societal norms, values beliefs routines and self-sustainability.
>
> For more information visit the International Association for Impact Assessment: http://www.iaia.org/modx/

Social Impact Assessment (SIA) came out of the National Environmental Policy Act (NEPA) which required federal agencies, or agencies using federal funds, to assess and attempt to mitigate the environmental effects of their proposed actions. NEPA calls for a systematic, interdisciplinary approach to measure environmental impacts. NEPA led to a variety of social impact assessment techniques, summarized by Burdge (1994) and condensed into guidelines by the Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment (1993; 2003). The Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment (1993) is the most generally agreed upon, and in practice, used, description of the process of SIA.

There are two fundamentals to keep in mind. First, SIA is a process. Second, SIA was developed as a predictive tool. The process attempts to assess or estimate in advance what will happen if a particular action is taken. Gramling and Freudenburg (1992) developed a format (discussed below) to extend the assessment process temporally, but the original process is discussed with its focus on projection. In the next chapter the process of extracting relevant indicators and processes from SIA is discussed.

The Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment argues that social impact assessment itself should occur as a series of steps. The steps below are selected from these guidelines which are patterned after the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508). The relevant steps are paraphrased below. As you read them, think “water/flood protection project.”

1. Public Involvement: Develop a plan to involve potentially affected community stakeholders. This step involves identifying and working with potentially affected groups. This should occur at the very beginning of conceptualizing a potential project.

2. Baseline Conditions: Describe the relevant human environment, the potential area of impact – both positive and negative -- and the baseline conditions. The baseline conditions are those existing conditions associated with the human environment in which the proposed activity is to take place. These would generally include:

- Relationships with the biophysical environment, including the ecological setting and those aspects of the environment that are seen as resources or problems; areas having economic, recreational, aesthetic or symbolic significance to specific people.

- Historical background, including initial settlement and subsequent shifts in population; developmental events and eras; general employment trends past or present; past or current application of particular technology (harvest techniques, hazard mitigation) relating to the environment.[1]
- Political and social resources, including the capacities of relevant systems or institutions (e.g., the school system); levels of residential stability; distributions of socio-demographic characteristics such as age and ethnicity; presence of distinctive or potentially vulnerable groups (e.g., low income).
- Culture, attitudes and community norms concerning the role of humans in the environment.
- Population characteristics including major economic activities; the labor markets and available work force; unemployment and underemployment; availability of housing, infrastructure and services; and seasonal migration patterns.

The level of effort devoted to the description will be commensurate with the size, cost, and/or degree of expected impacts of the proposed action. On-site investigations and the use of previous field studies and surveys, if appropriate, will be used. The specific variables to be measured are in Chapter 2.

3. Scoping: After obtaining a technical understanding of the proposal and the baseline, identify the range of probable social impacts to be addressed based on discussion with those potentially affected. During this step the specific SIA variables for further assessment will be selected. Ideally, all affected people or groups will contribute to the selection of the variables. The potential core variables are outlined in Chapter 2.

Relevant criteria for selecting significant impacts spelled out in the CEQ Regulations (40 CFR 1508.27) include the:

- Probability of the event occurring;
- Number of people including local populations that will be affected;
- Duration of impacts (long-term vs. short-term);
- Value of benefits and costs to impacted groups;
- Extent that the impact is reversible or can be mitigated;
- Uncertainty over possible effects; and
- Presence or absence of controversy over the issue.

Throughout the scoping process it must be realized that all communities are different, and that variables that, ultimately, prove to be very important in one community might not be so important in another. Ultimately which variables are critical involves some type of judgment, and by involving the affected population in making those judgments, the Corps practitioner ensures that the process to determine the social effects of the proposed project are the ones relevant to the community and thus will form the basis of the most successful project. The job of the Corps practitioner is also to suggest potential omissions for consideration and to assess the reasoning behind the community perspective. Sometimes, community frustrations with perceived lack of attention to community concerns, leads to resistance to an aspect of a project or the project *in toto*. This is the stage in the OSE process where real attention to community concerns can lead to a “buy in” to the subsequent actions. Avoidance of the concerns will inevitably lead to conflict among community members and between them and the Corps. Early partnering with responsiveness can build the basis for effective, successful project partnerships.

1 Note that we advocate for a full history of the community being conducted in Phase One when the project(s) considered to address the community’s funding are large. See Appendix C of this report for a recommended approach to compiling such a history.

4. Projection of Estimated Effects: Investigate the probable impacts. The probable social impacts will be formulated in terms of predicted conditions without the actions (baseline projection); predicted conditions with the actions; and predicted impacts which can be interpreted as the differences between the future with and without the proposed action. This approach fully mimics the usual Corps planning process.

The empirical procedures are based on five major sources of information:

- Data from project proponents;
- Records of previous experience with similar actions as represented in reference literature as well as in Environmental Impact Statements;
- Census and vital statistics;
- Documents and secondary sources;
  Field research, including informant interviews, hearings, group meeting, and surveys of the general population. [2]

5. Predicting Responses to Impacts: Determining the significance to the identified social impacts. After direct impacts have been estimated the next step is to estimate how the affected people will respond. The actions of affected groups will be estimated using comparable cases and interviews with affected people about what they expect to do. Adaptation and response of affected parties can have positive or negative consequences of their own, both for the agency that proposes an action and for the affected communities, whether in the short-term or in the long-term.

6. Indirect and Cumulative Impacts: Estimate subsequent impacts and cumulative impacts. Indirect impacts are those caused by the direct impacts; they often occur later than the direct impact or farther away.

> **Information Sources**
>
> The following resources can be invaluable in collecting data for OSEs:
>
> - U.S. Census Bureau: http://www.census.gov.
> - FedStats: http://www.fedstats.gov
> - National Park Service: History and Culture: http://www.nps.gov/history/
> - Public Meetings
> - Local Newpapers
> - Local Historians
> - Local Telephone Books
> - Surveys

[2] Methods of projecting the future lie at the heart of social assessment, and much of the process of refined analysis is tied up in this endeavor. In spite of the long lists of methods available, most useful to the Corps OSE assessment, as to the other Corps "accounts," needs fall into the following categories:

- Comparative method, comparisons to other projects with known effects;
- Trend projections (straight line or curvilinear), taking an existing trend and simply projecting the same range of change into the future;
- Population multiplier methods, each specified increase in population implies designated multiples of some other variable, e.g. jobs, housing units;
- Scenarios, (1) logical-imaginations based on construction of hypothetical futures through a process of mentally modeling the assumptions about the variables in question; and (2) fitted empirical-similar past cases used to analyze the present case with experts adjusting the scenario by taking into account the unique characteristics of the present case;
- Expert testimony, experts can be asked to present scenarios and assess their implications;
- Computer modeling, involving the mathematical formulation of premises and a process of quantitative weighing of variables;

Cumulative impacts are those impacts which result from the incremental impacts of an action added to other past, present and reasonably foreseeable future actions regardless of which agency or person undertakes them (see 40 CFR 1508.7). A community residential and retail growth and pressures on government services following the siting of a major project are examples of indirect and cumulative impacts.

7. Mitigation: Where appropriate, explore a mitigation plan. Social Impact Assessment cannot only forecast impacts, but also identify means to mitigate undesirable impacts and enhance desirable impacts. Mitigation may be accomplished by modifying the project or how it is implemented, or by supplying additional information or support for the potentially impacted population or community. Mitigation potential should be identified early on as clearly as possible to assist project management to avoid problems where possible.

8. Monitoring: Develop a monitoring program where positive or negative impacts are expected to occur. A monitoring program should be able to identify deviations from the expected impacts from the project (i.e. unanticipated impacts). The monitoring plan should be able to compare real impacts with projected impacts. Recognizing the potential for unanticipated consequences and identifying some early warning signs of deviation from the expected is an important first step toward mitigating unanticipated consequences. While the response to these impacts may ultimately be done by the community, county or state government rather than the Corps, the consideration of the potential impacts during the creation of the project will assist those governments to be responsive.

a) Increasing Temporal Flexibility for SIA

Assessing impacts of development activities after they happen has a long history, particularly in rural sociology (Field and Birch 1988; see Landis 1933). This focus was sharpened in the early 1970s with studies of the effects of the construction of coal-fired generating plants in areas with large deposits of coal in the rural western United States. This "boomtown" model focused on population growth, which led to a host of associated and, frequently deemed, undesirable effects (Brabant and Gramling, 1986).

In specifically attempting to provide a more flexible tool for assessing socioeconomic impacts Gramling and Freudenburg (1992) developed a typology that allowed assessment over both time and the various human systems that are affected by the types of changes potentially brought about by developmental activities. Both of these traditions were combined in the National Research Council's *Cumulative Environmental Effects of Alaska North Slope Oil and Gass Activities.* (National Research Council, 2003).

This focus on post event assessment expands the analytical ability of the Handbook on Applying "Other Social Effects" Factors in Corps of Engineers Water Resources Planning **(**Dunning 2008). The SIA approach to OSE's will be applied in Chapter 2, by comparing its concepts with those proposed by Dunning and Durden, culminating in a set of OSE concepts, combining those proposed by the SIA and those proposed by Dunning and Durden.

2. Social Capital

Some relevant elements, such as natural capital, economic capital and physical capital, are measured, at least in part, when the Corps does economic and environmental assessments. The two most related to Other Social Effects are human capital and social capital. At the community level, human capital refers to the aggregate of individual capital such as education, knowledge and skills present in a community. **Social capital** is more complex and difficult to measure. The current state-of-the-science measure of social capital focuses on interpersonal relationships and involves a complex series of survey questions about the individual's involvement in social networks. Obtaining adequate data to create valid social capital metrics to evaluate the performance of alternative plans, or even of the effects of a no-action plan, would be difficult. Because we believe that social capital is extremely important in the successful functioning of a community, we present the concept and its content below for appreciation of its importance and for consideration of possible future use. In addition, it is possible to appreciate the harm done to the social capital of New Orleans and communities in the vicinity by the levee breaks during Katrina in the narrative impact descriptions in Chapter 5 and Appendix B.

The concept has been gaining popularity, particularly over the past decade. Social capital can be defined as "the networks, norms and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam 1995: 67). It is the quality and quantity of social interaction that define a given geographical location as a community. Social capital is not just the sum of a community's resources or institutions; it is the glue that binds them together.

Due to increasing evidence of the crucial role of social capital in economic prosperity and sustainable development, the World Bank now uses a Social Capital Implementation Framework for its projects, convinced that it enhances their quality, effectiveness and sustainability (http://go.worldbank.org/C0QTRW4QF0). This framework defines four dimensions of social capital:

- Groups and networks (collections of individuals that promote and protect personal relationships that improve welfare);
- Trust and solidarity (elements of interpersonal behavior that foster greater cohesion and more robust collective action);
- Collective action and cooperation (ability to work together to resolve community issues);
- Information and communication (open dialogue that includes both downward and upward flows of information).

Social capital is more complex and thus more difficult to measure than other types of capital. Measurement examples are available, however, such as those developed for the World Bank (Grootaert, et al., 2004). While the concept of social capital is a promising one, detailed examination of the Worlds Bank's measurement process has convinced us that this assessment process is not yet refined to the point that it would be appropriate for Corps projects.

We do believe that the concept of "community interpersonal capital" is a useful one, however, because it can be measured at the community level sometimes with already available secondary data. In Chapter 2 we detail this concept, which breaks out into two elements: 1) Ideal community interpersonal conditions and 2) interaction means to achieve the conditions.

3. Community Capital and Social Resilience

A community can be described in terms of its capital or assets. These assets run the gamut from natural resources to social networks to cultural norms and together they describe the well-being or quality of life of a community. A capital-based approach is often used when assessing a community's sustainability and resilience (cf. Callaghan and Colton 2006). Emphasis on sustainability, simply defined as being able to meet today's needs without compromising the ability of future generations to meet theirs, has given way to the more complex concept of resilience.

A simple but useful definition of resilience is "the capacity of a system to absorb disturbance and re-organize while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks" (Walker et al., 2004: 5:1). When a community has high and sustainable levels of capital, it also will be more resilient. Measuring the total effects of an event/activity/incident/episode (hereafter event) requires looking at communities in a more comprehensive and collective manner. This can be accomplished by examining the component categories of capital that make up a community.

The group believes that an important consideration for any proposed project is how well and in what way it contributes to the sustainability and resilience of the community, and that these considerations should be forefront in Corps practitioners' minds as they work with community members to identify potential project impacts, both positive and negative.

These principles of sustainability and resilience are values. While such value decisions are negotiated in the process of the community considering the "neutral" concepts offered by the SIA approach, recent work evolving in parallel with SIA work argues that the values should be stated in the approach, not taken for granted.

E. Regulatory Guidance

The social science experts comprising the team for this project commend the Corps of Engineers for recognizing the needs that have been articulated — in Congress, in affected regions, and in the expert community itself — to address the social impacts and effects of Corps projects. In particular, the team noted the importance of the planning objectives identified by the Corps — including reductions in risk to public safety as well as the economy from catastrophic storm inundation, and sustaining the unique heritage of coastal Louisiana by supporting traditional cultures.

Where the team saw a greater need is in the relatively specific performance metrics for achieving these planning objectives. This process is aided by the existence of two key resources. The first is the clear regulatory guidance, in the Regulations for Implementing the National Environmental Policy Act of 1970, as amended (42 U.S.C. 4371 et seq.), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609) and E.O. 11514, Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977) (see 43 CFR [Code of Federal Regulations] 1500 *et seq*; online at http://www.nepa.gov/nepa/regs/ceq/1500.htm.

The second is the additional guidance provided by the professional community — the internationally recognized *Guidelines and Principles For Social Impact Assessment*, (paraphrased above) initially prepared by the Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment (SIA), and subsequently published both in the peer-reviewed technical literature and in the form of agency guidance (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment 1994). For online access, see http://www.nmfs.noaa.gov/sfa/social_impact_guide.htm.

One of the principles that comes through clearly from both the CFR regulations and from the *Guidelines and Principles* is that assessments should focus on the impacts that are most important, and not those which are simply easiest to measure or for which there is "low hanging" data. In the language of 43 CFR 1502.2(b), "(i)mpacts shall be discussed in proportion to their significance." This significance for SIA is arrived at during the scoping process discussed above. The issue of significance also receives a clear definition (see 43 CFR 1508.27), as requiring considerations of both context and intensity:

"(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

"(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action." The considerations identified in the regulations for evaluating intensity include, among others,

- the degree to which the proposed action affects public health or safety,
- the degree to which the effects are likely to be highly controversial, and notably,
- the degree to which possible effects are uncertain or involve unique or unknown risks (CITATION: 43 FR 56003, Nov. 29, 1978; 44 FR 874, Jan. 3, 1979).

The regulations also specify that "significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment." Lest there be any ambiguity, the following clarification is provided in the next sentence of the regulations: "Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts" (43 CFR 1502.27(b)7).

A comparable theme is picked up and spelled out in *Guidelines and Principles*, having to do with the importance of clearly identifying both those who will win and those who will lose — a process that, based on decades of accumulated experience, requires an emphasis on vulnerable and under-represented groups:

"Impacts should be specified differentially across affected groups and not just measured in the aggregate. Identification of all groups likely to be affected by an agency action is central to the concept of impact equity.... [N]o category of persons, particularly those that might be considered more sensitive or vulnerable as a result of age, gender, ethnicity, race, occupation or other factors, should have to bear the brunt of adverse social impacts.... SIA has a special duty to identify those whose adverse impacts might get lost in the aggregate benefits."

Sec. 1502.6 Interdisciplinary preparation. Environmental impact statements shall be prepared using an interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts (section 102(2)(A) of the Act). The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process (Sec. 1501.7).

Chapter 2: Proposed Other Social Effects

Recommending a framework of OSEs for selective application to assessment of projects and impacts is extremely challenging. One can run the gamut from declaring, only in abstraction, the principles upon which to undertake the assessment and encouraging the iteration of them in practice, to over-specifying the concepts that should be considered in an attempt to provide assistance in appreciating the possibilities. While we want to emphasize that the community in conjunction with the Corps should select their measures of project success, we want to also participate in the "conversation" begun by IPET and the IWR documents about the key OSEs.

A. Selecting Other Social Effects (OSEs) Assessment Concepts Using the Social Impact Assessment (SIA) Approach

Measuring "other social effects" of an event involves two conditions. First, for an effect to occur there must be a change in social conditions. Second, in order to determine the existence and extent of change there must be measurement before and after the event or project. Measuring this change requires assessments at two points in time, each requiring different tasks. If assessment occurs before the event (such as the building of a levee), measurement of both current conditions and a projection of post-event conditions with various scenarios, if appropriate, are needed.

The measurement of current conditions in this case is the "without project" condition and the various projections are the "comparisons of different alternatives."

If assessment occurs after the event (such as the overtopping of a levee), a measurement of current conditions and an historical measure of pre-event conditions are necessary. The comparison of various scenarios in this case is not appropriate because the actual facts of the historical event dictate the "after" scenario. One comparison that can be made is the early post-event condition and then the later, i.e. short- and long-term impacts.

Two conditions are important when selecting social indicators. First, they need to be available historically, currently, and be possible to project for the future. Second, social effects are virtually infinite; they can range from psychological states influenced by social dynamics to national economics. Katrina, as discussed in Chapter 3 and Appendix B, is a major event that has affected both of these and everywhere in-between. Thus, it is almost impossible to capture all social impacts (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment 1993; 2003).

Therefore, parsimony is critical in the selection of indicators. Individual level changes would be impossible to measure because individuals respond differently. National indicators are likely to go beyond the scope of most events and thus not be relevant (Katrina being an exception). For these reasons, it is most appropriate to measure Other Social Effects at the community level.

In developing OSE indicators for this project, it was important to build on earlier efforts. For this reason we used relevant indicators from the SIA literature as a starting point, particularly those referenced in the Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, the most widely recognized standard. These were then compared to indicators previously identified by the Corps' Institute of Water Resources social scientists as Other Social Effects (Durden & Dunning, 2007). In many cases they were virtually identical; in others, differences are in the level of detail, but in some cases, one set addressed an issue that the other did not. The two sets of indicators are arranged side by side in the following table for comparison purposes.

Table 2.1: Comparison of SIA and Corps IWR OSE Concepts

SIA OSEs	Corps IWR OSEs
Population Characteristics	**Population Characteristics**
Population	Population size, population density
Ethnic, racial and gender distribution	Community homogeneity or diversity
	Ethnic diversity
	Age diversity
Identification of vulnerable populations	
Influx or outflows of temporary workers	Net migration, internal migration
Seasonal residents	
Displacement/relocation	Displacement, people, businesses and farms
Community and Institutional Structures and Resources	**Community**
Housing characteristics	Housing supply
	Neighborhood quality
	Social institutional stability
	Housing costs
Voluntary associations	Community ties
	Strength of community identification
	Community values
Residential stability	Residential stability
Commercial/business stability	
Industrial/commercial diversity	
Interest group activity	
Identifications of stakeholders	

SIA OSEs	Corps IWR OSEs
Identifications of stakeholders	
Employment/jobs/income characteristics	**Income and Employment Measures**
	Income opportunities
	Personal income
	Income dispersion
	Income stability
	Labor force characteristics
	Economic activity of the population
	Employment distribution (especially to minorities)
	Labor/job stability
	Occupational distribution
Local/regional/national linkages	
Historical experience with change	
Income equality (e.g. Gini coefficient, % below poverty)	Socioeconomic diversity
Density of acquaintanceship	
Family and friendship networks	
Informal exchange networks	
Perceptions of risk, health, and safety	
Community infrastructure	Other community services
	Adequacy of water supply and utility service
	Adequacy of transportation infrastructure
	Adequacy of other community services
Educational infrastructure and personnel	Educational opportunities
	School enrollment
	Protection of educational facilities

SIA OSEs	Corps IWR OSEs
Health/medical care facilities and personnel	**Life, Health and Safety Measure**
	Personal health and safety
	Risk of injury
	Morbidity, especially exposure to water and air pollution
	Mortality [death dates moved to “population” in proposed column]
	Population segment differences in health and safety
	Safety of property
	Risk of property damage
	Effects of damage on quality of life
	Population segment differences in risk to property
	Institutional protection
	Adequacy of medical facilities and personnel
	Adequacy of emergency protection
	Population segment differences in access to institutional protection
Community social services	
Land use patterns	
Access/proximity to basic goods and supplies	
Effects on cultural, historical, and archaeological resources	
	Recreational and Cultural Opportunities
	Recreational and cultural participation
	Diversity of recreational and cultural opportunities
	Adequacy of recreation areas and cultural opportunities
Political and Organizational Resources	Fiscal condition of state, regional and local government
Size and structure of local government	
Planning and zoning environment	
Interested and affected publics	
Leadership capability and characteristics	

SIA OSEs	Corps IWR OSEs
NGOs, local associations	**Emergency Preparedness Measure**
	Water transportation needs
	Waterway accessibility of major distributive centers
	Efficiency of the water transportation system
	Water transportation protection
	Water supply needs
	Quality of water supply
	Quantity of water supply
	Diversion potential of water supply
	Power supply needs
	Overload capacities of power supply
	Efficiency of water-related energy sources
	Protection of infrastructure
	International treaty requirements
	Compliance with water-related treaty requirements
	Aesthetics Measure
	Resources
	Visual unity
	Visual compatibility
	View shed
	Fragility/scarcity
	Naturalness
	Social
	Preferences
	Community values

As a final step, we compiled a new refined list of what the team considered to be relevant indicators. They are grouped under three broad concepts labeled as population characteristics, community capacity (institutional resources) and community capital.

One additional source of ideas for the indicators also was utilized because of the quality of the effort. The U.S. Forest Service (Bright, Cordell, Hoover, and Tarrant 2003) has developed a human dimensions framework, a set of guidelines for conducting social assessments. The guidelines are organized around the five concepts: 1) historical background, 2) population characteristics, 3) cultural, 4) social organization structures and processes, and 5) public perceptions and well-being. Because of their level of specificity and their focus on Forest Service concerns we did not incorporate the guidelines into this document. However, because we feel that doing an initial historical analysis of the affected community is such an important beginning step, Appendix C provides an example of the way in which this federal agency approaches the dimension of "historical background" (Appendix C).

Chapter 3: Proposed OSEs and Sample Operationalizations

This chapter is comprised of the list of proposed OSEs created with the assistance of the SIA literature and those suggested by Durden and Dunn at the Corps' Institute of Water Resources. Following the list, a second list shows a sample of operationalizations of these OSEs.

In Chapter 4, following the narrative description of the OSEs in New Orleans after Katrina, some of the OSEs are applied quantitatively showing the calculated differences in them before and after the storm.

> **Childhood Anxiety**
>
> 34% of New Orleans' children were separated from their primary caregiver after Katrina.
> 14% of New Orleans' children saw family members or friends killed during Katrina
> For more Katrina social statistics, view Appendix A

Finally, the detailed list of OSEs quantitatively applied to Katrina in New Orleans is found in Appendix A followed by the qualitative vignettes from the media.

Figure 3.1 Proposed OSEs: Population Characteristics

1. POPULATION CHARACTERISTICS

- Size, density, births, deaths
- Ethnic, racial, age and gender composition
- Vulnerable populations (culturally unique populations)
- Permanent and temporary (im/e)migration
- Transient residents (including tourists, seasonal residents, and migrant workers. Homeless persons are a unique transient population considered under housing.)

Figure 3.1.2 Proposed OSEs: Community and Institutional Structures and Resources

2. Community and Institutional Structures and Resources

Education

- Educational opportunities
- Educational physical infrastructure and personnel
- Traditional knowledge, especially ecological

Criminal Justice

- Community crime/violence safety
- Police, court, incarceration, domestic violence shelter facilities and personnel
- Informal 'policing' by community members

Neighborhood/Housing

- Housing characteristics: supply, cost, condition, tenancy (rent vs. own)
- Residential stability
- Community sub-area infrastructure, public service and neighborhood businesses
- Homelessness
- Historic buildings and districts

Household/Family

- Density/Home sharing
- Dissolution

Business

- Commercial/business stability/diversity
- Small business sector
- Informal exchange (bartering) networks
- Family livelihood systems

Income, Employment, Labor Force

- Economic activity of population
- Livelihood activities of community
- Personal/household income
- Personal household livelihood
- Employment/income dispersion/stability
- Occupational diversity
- Community socioeconomic characteristics

2. Community and Institutional Structures and Resources

Health and Physical Safety

- Healthy lifestyle
- Access to clinical care services (especially: trauma, gastrointestinal, neurological, diarrheal outbreak investigation, poison control referrals, national pharmaceutical stockpile, etc.)
- Access to disaster mental health services (especially: psychological first aid, mental-health referral)
- Access to environmental health services (especially: septic and water inspections, food service inspections, surveillance for vector-borne diseases)
- Access to specialized high-technology lifesaving equipment and therapy (e.g.: dialysis, ventilators, ACLS, ATLS, etc.)
- Informal care-giving systems
- Access to specialized services for vulnerable populations unable to physically or psychologically access necessary care
- Community health risk factors – environmental, mental health exposure, vulnerable populations

Mortality rates, causes

- Surge facilities and personnel (e.g.: emergency-worker liability, ESAR-VHP volunteer call-up systems)

Governmental Organization

- Organizational structure and functioning of government
- Sustained critical infrastructure (especially: telecommunications, water, sewage, power, streets, public buildings, etc.)
- Provision of public services (e.g.: planning, taxation, permitting, public transportation, education, public health, emergency ops/incident command, etc.)
- Exercise of democratic participation (e.g.: voting, letters to the editor, civil action groups, billboards and posters, etc.)

Community Social Services

- Availability and access to basic range of formal social service programs (e.g.: family counseling, parenting, family violence, seniors, chemical dependency, children services including child care, disabilities, welfare benefits/job training, foster care, mental health, disabled transportation, etc.)
- Informal instrumental support services, especially for the children, elderly, physically or mentally disabled, and other vulnerable populations. (e.g.: extended family members caring for the young and the old, or faith communities providing meals-on-wheels, home repair, shopping, transportation, or emergency first response.)

Figure 3.1.3 Proposed OSEs: Community Interpersonal Capital

3. COMMUNITY INTERPERSONALCAPITAL

Ideal Interpersonal Conditions

- Trust of government
- Community identification/attachment
- Community cohesiveness
- Community cooperation and tolerance
- Density of social networks and linkages between networks
- Distribution and sharing of resources and power
- Civil and human rights
- Environmental justice
- Community diversity
- Shared narratives, places, meanings, histories and spirit

Interaction Means to Achieve Conditions (Social Structures Mediating Human Interactions)

- Community leadership – informal and formal
- Informal governance
- Political organizations and citizen political involvement
- NGO adequacy vis-à-vis community needs
- Voluntary associations and membership
- Religious organizations
- Neighborhood (place based) voluntary organizations and sharing
- Friendship/family networks
- Regional/national linkages
- Print and electronic media array, diversity, access

Following the development of a consensus for the important OSEs, the next step is to develop agreed-upon generic operationalizations of the concepts, utilizing the common ways developed by the relevant social sciences and economics. While not applied to each of the examples below, many operationalizations can be calculated based on a rate per number of residents. The use of such a rate permits comparison of the affected area with itself before the event, or before the structure is built and between it and other communities.

Table 3.1.1 Operationalization Examples of Proposed Population OSEs

Population Characteristics	
Dimension	Examples of Generic Operationalization
Population Patterns	▪ Population estimates. ▪ Number of birth & deaths per 1,000 residents.
Demographics	▪ Number of males per 100 females. ▪ Racial and age breakdowns of the area's population.
Vulnerable Populations	▪ Number of residents living below the national poverty line. ▪ Number of residents over 65 years of age. ▪ Number of disabled residents.
Immigration & Emigration	▪ Number of residents moving out of the area each year. ▪ Number of new people moving in each year.
Transient residents	▪ Number of tourists to the community per year. ▪ Estimated number of migrant workers to the area per year.

Table 3.1.2 Operationalization Examples of Proposed Community Capacity OSEs

Community Capacity	
Dimension	Examples of Generic Operationalization
Education	▪ Number of Students enrolled in school (by type). ▪ Educational Achievement (measured by standardized test scores). ▪ Number of open schools. ▪ Number of educators employed.
Criminal Justice	▪ Number of violent crimes per 1,000 residents. ▪ Number of police officers and court personnel employed.
Neighborhood/Housing	▪ Average home values. ▪ Number of home sales per month. ▪ Average monthly rent. ▪ Breakdown by housing type (Single-family, multi-family, etc.). ▪ Tenancy (percentage owner-occupied and rental). ▪ Estimated number of homeless people in area.
Business	▪ Number of employers total and by sector. ▪ Number of small businesses in the area.
Income, Employment & Labor Force	▪ Local sales-tax collection. ▪ Median individual & household income. ▪ Median income by age, race and gender.
Health & Physical Safety	▪ Analysis of the types of medical services offered (ex: MRI). ▪ Number of hospital beds per 1,000 residents. ▪ Number of hospitals, pharmacies, mental-health facilities and nursing homes. ▪ Number of licensed healthcare professionals practicing in the area.
Governmental Organization	▪ Resident satisfaction with local government.
Community Social Services	▪ Number of childcare facilities. ▪ Access to public transportation. ▪ Number of chemical-dependency treatment centers ▪ Number of job-training centers, etc.
Cultural, Historical Landmarks, Aesthetic Support	▪ Number of county/parish-run parks, playgrounds, community centers, senior centers and other facilities. ▪ Number of museums, parks, arenas, etc. ▪ Number of annual festivals held.

Table 3.1.3: Operationalization Examples of Community Interpersonal Capital OSEs

Community Interpersonal Capital	
Dimension	Generic Operationalization
Ideal Interpersonal Conditions	▪ Attachment to place, likelihood residents will leave the area. ▪ Participation at public meetings. ▪ Environmental justice, civil rights and sexual harassment lawsuits. ▪ Ethnic breakdown of the area.
Interaction Means to Achieve Conditions	▪ Approval ratings of leading local officials. ▪ Number of non-profits. ▪ Charitable giving. ▪ Voter turnout. ▪ Number of religious/worship centers.

Chapter 4: Applying the OSE Concepts to Hurricane Katrina Impacts: A New Orleans Example

Increased Homelessness
13.22/1,000 Estimated homeless rate in New Orleans prior to Katrina
50.18/1,000 Estimated homeless rate in New Orleans after Katrina
For more Katrina social statistics see Appendix A.

This chapter provides an extended example of the considerations that would be necessary in order to apply the proposed OSE indicators to what might be considered an almost worst-case scenario: the overtopping and breaching of the levees and flood walls in New Orleans during Hurricane Katrina. As such it does ***not*** represent an OSE analysis of that event, but an example of the types of measures that would be core. An actual OSE analysis of the overtopping and breaching of the levees and flood walls in New Orleans during Hurricane Katrina would involve the actual data collection associated with each of the potential indicators which are discussed in a conceptual format below. There would then be a comparison of before/after to see what the effect had been. We have attempted to demonstrate such data collection at the end of this chapter. While we have not captured measures of all of the OSEs that may be useful in understanding the impact, we have provided, we believe, sufficient numbers to demonstrate the approach and selected effects. It is also important to remember that the final list of variables/indicators would be arrived at in conjunction with the affected population, not done in this fashion, i.e. by the team without input from them.

Borrowing from the SIA approach, each indicator is considered to be "neutral," (neither negative nor positive), while it is understood that the difference between pre- and post-event measurements will be considered differentially "good" or "bad" and by different segments of the population. By taking this approach the process is useful for the analysis of projects – both benefits and drawbacks – of proposed actions and structures, and for assessing the residual damage, and breach damage, of different existing risk reduction actions and structures.

For the sake of the example presented herein, the first author of this report has made a value judgment as to what "direction" of the concept is negative, for example, **increased** rate of homelessness, a **decreased** rate of hospital beds per a specific number of residents. Each of the indicators is discussed based on local knowledge about the effects of the flooding associated with Katrina It is compiled out of conversations with other locals over the past

three years and from media reports. Because the author's expertise and access to information about each of these categories of variables has not been uniform, the level of detail in the discussions varies. And the economic variables that are socially relevant have not been described because they are not her specialty. However these discussions are examples both of the types of issues that Corps practitioners would take into the field to decide which indicators are most critical in order to inform data collection and an example of the wealth of local knowledge that is available to residents and investigators.

A. Population Characteristics

- *Size, density, births, deaths*
- *Ethnic, racial, age and gender composition*
- *Vulnerable populations (culturally unique populations)*
- *Permanent and temporary (im/e)migration*
- *Transient residents (including tourists, seasonal residents and migrant workers)*
- *[Note: Homeless persons are a unique transient population considered under Housing.]*

Currently, the OSE account is represented by only two human social effects and their measures, the one relevant to this grouping being the concept "Residual Population Impacted." This is the population affected by the proposed project, either benefited or negatively affected. For damage from an overtopping (or breach), the same term can be applied. What population was harmed due to the overtopping or the breach that would not have been if the structure had been higher or had not breached.

Population size, density, births and deaths. These include the size of the population, its density, and birth and death rates. Because flood reduction projects are community (space) based, density fluctuations must be considered along with the basic birth and death rates.

The flooding of Hurricane Katrina has reduced the population within New Orleans about 30 percent at the three-year-out date. This population reduction has been caused by all of the measures mentioned within this section:

- **Birth decline** due to the absence of the population, especially women of child-bearing age, the severe damage to hospitals with maternity wards and anticipated lack of child care and other support services.
- **Death increase** due to those killed by initial force of water through the breaches, those who drowned as waters rose in residents' homes and those who died of heat prostration as they remained in their homes trapped by the surrounding flood waters. In addition, the deaths, especially of those elderly and medically frail, in the evacuation process and shortly thereafter, contributed to the mortality impact of the breaching. In addition, indirect mortality due to mental stress and disruption of care has been documented, though the magnitude of mortality remains controversial.
- Residential, commercial and neighborhood **density** were affected in the flooded areas as they initially became ghost towns and now continue to suffer from limited, and scattered recovery. Termed "the jack o' lantern affect" – lights scattered widely at night, reduction in density challenges the ability of the community to provide public and commercial services economically and adequately and to have neighborhood family and friends contribute supportively such as in child care, crime alerts, assistance to the elderly, etc. It also lowers the streetscape expectations of urban residents.

Ethnic, racial and gender composition reflect a community's identity and in terms of gender, functionality with regard to reproduction. The authors of this report make the assumption that the **ethnic** and **racial** groups represented within a community prior to a disaster should have equal rights to return to the community to which they are attached and to the homes and businesses which they own and the apartments many inhabit. A similar assumption is made with regard to **gender** composition; when it shifts significantly after a disaster, there is a need to ask if the shift was forced rather than being due to choices people are making:

- Following Katrina, the **African-American** composition of New Orleans declined significantly. To a great extent this was due to their residential location in two large areas that received dramatic damage: the Lower Ninth Ward and New Orleans East. However, for lower-income African Americans the ability to return also was reduced by the limited personal resources upon which to base the initial capacity to return. The vast majority of lower-income residents were not homeowners. Public housing was shuttered and then demolished, reducing the ability of the very poor from the beginning to re-establish themselves in inner-city neighborhoods. Rental housing was slower to recover as this was not prioritized in recovery programs.
- For upper-income African Americans in New Orleans East, professional training and some personal wealth permitted families to relocate to urban business centers within the south such as Houston, Dallas and Atlanta where new beginnings could occur.
- The group most severely impacted by the flooding of the city were lower-income, pre-dominantly African-American female-headed households, many of whom continue to live as displaced persons. This impact reduced the **ratio of women to men** within the city. In addition, construction labor, coming to the city without families, enhanced the ratio of men to women. Both of these dynamics continue at this report time, three years after the floods.

<u>Vulnerable populations</u>. This concept, like the right of original racial/ethnic groups to return to their homes and neighborhoods, must be analyzed in order to ascertain a community's value system vis-à-vis it. However, general assumptions can be made that certain groups within the population are more vulnerable to harm, in terms of a disaster, than others. Vulnerable groups include the poor, children, the elderly, the infirmed, the physically and mentally ill and mentally challenged, women subject to domestic violence by their partners, ethnic groups whose dominant language is not English, and undocumented workers who fear legal impacts. The manner in which residual or breach flooding affects the vulnerable populations became extremely evident in Katrina:

> **Katrina's impact on the elderly**
>
> Recalling neighbors who have left New Orleans following Hurricane Katrina, a reporter writes: "Some of our relatives and friends were too old and feeble to rebuild. They are gone from the city for good, and we ache for them. Others were too angry to stay, overcome by the levees' unnecessary failures. We understand their need to move on." (Saulny, 2007)
>
> Vulnerable Populations > More, pages 81-82.

- The **poor** did not have cars, money for gas, lodging, food etc., for an evacuation, not to mention an extended period away from the city.
- The fate of lower-income **children** was extended out from the initial need to safely evacuate: access to adequate temporary and long-term housing, to child care, enrollment in school, health care, mental health assistance, and adequate/healthy food, etc.
- The **elderly** resisted evacuation because of the uncertainties of being able to negotiate the experience, not knowing where they were being taken, lacking significant others to care for them, access to health care of familiar caretakers, etc. Many died prematurely or were subject to being in dependency situations with relatives who were not expecting it to occur at their age. The elderly in nursing homes were subject to inadequate evacuation plans. Some facilities never attempted to evacuate their residents. Others discovered that their contracts for evacuation vehicles were not honored because the same vehicles had been contracted to other homes as well. Still others who were evacuated were too frail and sickly to survive the trip.
- **Special-needs populations**, defined as those whose illnesses required special equipment and special handling, were challenged by inadequate vehicles, illnesses that precluded moving and decisions about the

safety and functionality of hospitals that did not bear out with the severity of the flooding and the lengthy delays in rescue.

- **Domestic violence victims** lost the judicial protection with the loss of the criminal-justice system. Additionally, some victims were placed in situations where they had to share evacuation with the partner who abused them. Similarly, domestic violence specialists believe that more violence occurred within the inordinately tight and stressful living conditions that prevailed. Also, the inability of men to protect and provide for their families, a traditional cultural expectation on men, put stress on them that may have led to more domestic violence in the evacuation and long-term temporary housing situations.
- **Foreign language-speaking ethnic groups.** The inadequate information translation and communication into other languages reduced access by ethnic groups to necessary evacuation and recovery information.
- **Undocumented construction workers.** The disaster encouraged the in-migration of undocumented workers who did not have access to legal protection from wage and rental abuse. Health care was difficult for them to access. In the event of another disaster, these in-migrant groups suffer from inadequate evacuation knowledge and reluctance to participate in the public evacuation process for fear of being discovered as illegal immigrants. In addition, the desire to benefit from employment opportunities immediately post storm will lead to the undocumented workers remaining here if another storm threatens.

Permanent and temporary (im/e)migration. Population changes occur after a flood disaster. Pre-storm residents leave temporarily and out-of-town residents decide to come temporarily to volunteer and for the purpose of recovery-related employment. In addition, both original population and in-migrant members decide to leave or come into the community for permanent relocation.

The **decimation of the population** within New Orleans (Orleans Parish) was striking. Its recovery has been slow, still one-third smaller than pre-Katrina, though the greater New Orleans area appears currently to be down about 10 percent. The storm appeared to exacerbate a trend of longer-term population decline in Orleans Parish. Labor shortages slowed recovery immediately after the flood as some businesses recovered and recovery jobs began to be identified.

- The **in-migration** of new residents positively contributes to human resources but it also requires adjustments: competition for housing with original residents trying to return; increasing cost of rental housing due to this competition; competition for jobs held by original residents before the event; adjustment in translation needs as immigrants come from new ethnic groups; even provision of food such as was demonstrated by the public debate about taco trucks functioning as restaurants for the in-migrant Hispanic construction laborers. Ethnic tensions also may occur as was demonstrated by the resistance to allowing the trucks to continue operating.
- New Orleans is notable in having the highest nativity rate of any major metropolitan area of the country. This resulted in special difficulties associated with immediate and prolonged displacement. Many of not all of the households in the extended families were local and thus also flooded.
- For those original residents who had to remain in temporary housing away from the city for extended periods of time, the struggle to maintain adequate employment, child care, schooling of children, ability to supervise house repair, participate in neighborhood association activities, etc., was overwhelming to many. Some were able to succeed in achieving balance until they were able to return. Others were not and evolved to a decision not to return.
- When elderly family members yearned to be back in familiar surroundings, the challenges for them and their younger family members in making return/relocation decisions was (is, as the dilemma continues for many) tremendously taxing. When the decision of the elderly and the younger family members deviates, the elderly return to a situation much more at risk to crime and inadequate evacuation than was the case before the storm.
- For those who decided **to emigrate** permanently out of the city, the pain of loss of place in a city that may in fact warrant its self-proclaimed title as the most place-attached city in the country, has haunted many. Visits by former residents to the city to participate in festivals are a reflection of the continued attachment.

Transient population for New Orleans is the tourists, who support the prime economic sector, and the homeless, some of whom come during the mild winters. No agriculture exists within the city and consequently agricultural labor is not an issue for the area. Since the storm, tourism has been challenged to return to pre-storm levels, especially the larger conventions and most particularly during hurricane season. This decline in the recreational/convention population is a dramatic threat to the economic viability of the tourism-based economy. Especially at risk are the internationally renowned restaurants within the tourist sector. Unlike other businesses whose employees can fluctuate with the rhythm of the tourists, fluctuating restaurant staffs is much more difficult for these businesses. The lack of tourists during hurricane seasons may plunge the city into an economic recession after the burst of reconstruction activity recedes in a few years.

B. Community Capacity

1. Education

- *Educational opportunities*
- *Educational physical infrastructure and personnel*
- *Traditional knowledge, especially ecological*

Educational opportunity within the city came to a full halt following the storm.

> Disaster capitalism?
>
> New Orleans' public school system was in crisis even before Hurricane Katrina devastated it. Since then said a report, a grand educational experiment has unfolded. Officials converted 43 salvaged schools to free-market charter schools – with varying levels of results.. (Berger, 2007)
>
> Schools More, page 83.

- The public school system has been divided following the flood between city schools, state-controlled (those who were below state standards before the storm) and charter schools within both systems. This change to a predominantly charter system may, in the future, be assessed as beneficial, but the assessment has not yet been made; it is feared that the achievement of the students within them is due the informal selection process and may preclude some children from public education. To have to make such a **dramatic organizational change** post-catastrophe put severe strain on the K-12 system. The truancy rate for the children who have returned to the city has been reported to be extremely high. However, the storm also opened the opportunity for needed structural change in the educational system, one recognized to be among the most failed systems in the country.
- Following the storm, all public school **teachers and staff** were put on furlough without pay because of the lack of funds and the uncertainty of need. This financial hardship caused many to leave the area, not to return when the schools finally re-opened. Recruitment of teachers has been a challenge. Bonuses have been necessary to attract out-of-town teachers. An extensive planning process was required to identify where new schools should be built. Financing a charter system has posed some cash-flow problems. Cafeteria and bus services have been restricted. The mental-health challenges of the children, because of storm stress, have put extreme pressure on school counseling. Similarly, parents struggle with transportation issues to get their children to schools not located in the neighborhoods in which they live. And some teenagers are living alone in order to return to New Orleans schools while their adult family members are still within the diaspora living somewhere else.

The educational **infrastructure** of the city was severely damaged, the personnel were scattered and many were terminated from employment.

- The three historically black colleges/universities received the most serious damage from the flooding. One --Southern University of New Orleans-- continues to hold classes in prefab buildings while repairs proceed slowly. Dillard University held classes and housed faculty and staff in downtown hotels for a year.
- Public, private, religious K-12 and colleges/universities (except for Loyola University and Holy Cross College) all suffered very expensive **damage** from the flooding. Many of the public school buildings have not been restored; rather, they will be demolished.
- **Enrollment** efforts remain challenged at several of the colleges and universities, namely Dillard, the University of New Orleans and Southern University of New Orleans. All the universities experienced some degree of flooding and wind damage and have taken varying lengths of time to recover. The devastation of the surrounding neighborhoods has discouraged students from returning to “isolated” campuses.

Much knowledge that a society holds is acquired by citizens by virtue of their interaction with their surroundings; especially important is knowledge of the ecosystem in which it lives. This is called **traditional knowledge, especially ecological (TEK).** The storm and the floods threatened this knowledge by virtue of the physical destruction of the communities, and thus, the fracturing of the interpersonal and human/ecosystem dynamics. This then threatens the acquisition of such knowledge by the younger generation who is removed from that learning environment which would be provided by elders. Such subtle, fragile learning processes may not be able to be reconstituted. The local natural-resource extractors, would be an example of a group who holds TEK and whose knowledge base is threatened. An example is the Louisiana coastal shrimpers, including the fleet within Orleans parish. It might even be proposed that a paramount example of such traditional knowledge is that of jazz. Emanating from the neighborhoods, this unique indigenous American music and a core New Orleans cultural element, has been severely threatened.

2. Criminal Justice

- *Community crime/violence safety*
- *Police, court, incarceration, domestic violence shelter facilities and personnel*

Issues of **community safety** weighed heavily on residents from the very inception of the levee/flood wall breaches and remain among the most significant concern for the community. Concern with private property – homes and their content, commercial buildings and their content – all challenged the available police force. In fact, fear of harm to emergency personnel prevented the earlier evacuation of those trapped in the city. All of the facilities that support community safety were badly damaged or totally destroyed -- police headquarters, prisons, precinct buildings, courts and domestic-violence shelters. Except for the police force, all security personnel evacuated, some remaining during the first week, trapped along with the prisoners whom they guarded. Others shifted from permanent positions to assist in emergency efforts.

> **Violent Crime Skyrockets**
>
> New Orleans violent crime rates:
> 2005: 229.5/ 1,000 residents
> 2007: 380.4/1,000 residents
> 2008: 292.5.1,000residents
> For more Katrina social statistics see Appendix A.

Rates of violent crime have soared post-Katrina in a city that already had among the highest levels of violent crime in the country. The increase in crime is due to a number of factors, including changes in the dynamics of the illicit drug trade, increase in abandoned/blighted property, and the slow recovery of the **criminal justice system**. When the full system – crime investigation, arrest, temporary incarceration, court hearings and trials and sentencing are not all available, the criminal justice system flounders. Concerns with crime have kept residents and businesses from returning and rebuilding, tourists from visiting, and prospective new in-migrants and businesses from moving to the city. Fractured neighborhoods have reduced the **informal community policing** that occurs within stable neighborhoods.

3. Neighborhood/Housing

- *Housing characteristics: supply, cost, condition, storm resistance*
- *Residential stability*
- *Community sub-area infrastructure, public services and neighborhood businesses*
- *Homelessness*
- *Historic buildings and districts*

Some 80 percent of the **housing** within New Orleans was damaged by flood water; much of the remaining had wind damage (as noted by the number of visible "blue roofs" – temporary tarp protection applied by FEMA contractors). Never before in the history of the United States had such devastation occurred to a city's neighborhood system and its housing stock:

- Flood waters entered the homes and created mini whirlwinds of water moving furniture and appliances with unbelievable force.
- The water remained in some homes for many weeks, weakening wood and other permeable materials.
- Equally damaging was the mold which began to grow almost immediately in the humid heat of September, un-mitigated by air conditioning. All materials that contained organic matter were damaged beyond repair.
- Houses could not be inhabited without threat to the health of the occupants due to the mold.
- Later it was discovered that those who occupied FEMA trailers, when they did return, are now determined to be subject to health risks from the formaldehyde contained within the trailers.
- Housing that was not flooded has been in such demand that the value – both in sales and rent – has remained extremely high and thus prevented lower-income residents from returning.
- It is feared that some lower-income residents have returned to unhealthy housing conditions because they could not afford to have the mold remediated; others because they do not appreciate the danger; still others because they were not able to hire mold remediation contractors due to the demand.
- In reconstruction of the housing, there is concern that care will not be taken to build the housing up to the International Building Codes, which are now required, and to the National Flood Insurance Program.

> Rent hikes prompt homelessness
>
> Many former renters whose New Orleans-area apartments flooded or were evicted after the storm by landlords seeking higher rents, found themselves literally 'under the bridge' and homeless. Hundreds of people remain camped out in parks, backyards, and in one infamous concentration, underneath the Interstate 10 expressway towering over Claiborne Avenue. (Thomas, 2008)
>
> Homelessness More, pages 85-86.

The term **residential stability** has taken on an entirely different meaning since the floods. No neighborhood that was severely flooded has shown a high degree of resident retention. To the extent that long-term neighborhood attachment and friendship ties are seen as important to a neighborhood, each New Orleans neighborhood has declined in social capital potential. The rate of return of the original residents for most neighborhoods is still uncertain. It is anticipated that residential stability will have to be re-established over the next decades. This will be challenged by residents who change their mind about returning and those new in-migrants who also decide not to stay. Future threat of hurricanes and flooding will play a big role in determine the neighborhoods' future.

For most of the 70 square miles of flooded neighborhoods within the city, **infrastructure** was severely damaged – water in the gas lines, broken water lines, clogged drains, streets broken and with cave ins. In addition, post offices, bus lines, other **public services** were not available and most **neighborhood businesses** were damaged and have not returned.

Homelessness was increased by the storm, even for some who owned their homes before the storm. Twice as many people are homeless in New Orleans post-storm than they were pre-storm. Some of those who were marginal in their housing before the storm lost it. Others came to the city seeking employment in the recovery and were not able to get housing, even if they became employed. Still others became homeless due to the stress of the storm which incapacitated them in terms of employment.

Finally, the flooding has challenged the **historic districts and the historic housing**, the largest such stock in any city in the country. The historic housing is seen as the base of the unusual and much coveted culture which is practiced and revered here. To lose it is to lose that base. Much concern is focused on repairing it to retain its historic appearance at the same time attempting to repair it more safely. Currently, funds for historic preservation are grossly inadequate in comparison with the size of historical assets that New Orleans possesses.

4. Household/Family

- *Density/Home sharing*
- *Dissolution*

The effects on the **household/family** were startlingly dramatic. First, when an extended family did not have members located outside of the area, arrangements had to be made in shelters or motels for multiple members per room. When the extended family had members located outside, the doubling up was beyond belief for the American experience. A remarkable accounting of such a situation can be seen in the documentary by Dr. Kate Brown, Professor of Anthropology at Colorado State University. "Still Waiting: Life after Katrina" shows the reception of 150 family members by one couple in Dallas. For many families this doubling up lasted several months, or it continues. And, it also had the effect of placing one family member in a position of dependency upon another in ways that challenged them. The independent elderly were especially frustrated by being put into a dependent situation with their grown children. Much of the desire by the elderly to go home was to return to that independent condition.

Couple and extended-family dissolution appeared to increase. The tensions of the evacuation and recovery experiences – all domains of post-Katrina decisions – placed inordinate stress on relationships. Additionally the separation of partners/spouses and extended family members broke family bonds. Even the decision whether to return to New Orleans and the coast or not became the "last straw" for fractured marriages/relationships. The extended family is a very important family form in coastal Louisiana, including New Orleans. As family members spread out from the regular, easy social interaction which they experienced here, those ties weakened. As Dr. Brown's documentary demonstrates, visiting and assisting one another regularly was altered to "We'll see you when we see you." Having to say that devastates members of these tight extended families.

5. Business

- *Commercial/business stability/diversity*
- *Small business sector*
- *Informal exchange (bartering) networks*

An estimated 110,000 **businesses** were impacted in Louisiana by Katrina, many of them by flooding within the levee system. The pattern of business recovery in some sectors was striking. Local businesses returned before regional businesses, which, in turn, returned before national chains. This pattern demonstrates the importance of community capabilities to restore and recover as a precondition for attracting back national business enterprises.

This damage began the spiral of economic impact as so many residents were unable to return to work in the area because the companies they worked for were no longer in business. Similarly, former residents desiring to return were confronted by a lack of services and products available to them. As these dynamics continued, businesses that attempted to open were unable to locate employees trained in the skills that their businesses required. Especially evident were the restaurants that were staffed with skeleton crews, reduced hours of being open and speed of service, and limited menu options.

> Restaurant owners face daunting challenge
>
> Celebrated culturally for providing visitors and residents alike the food that New Orleans is acclaimed the world over for, restaurants were amongst the first businesses which reopened following Hurricane Katrina, said a national news story. Nevertheless as businesses they face indomitable odds staying in business. While finding and retaining workers with decent wages remains a challenge, returning owners also grappled with sporadic power outages and even water in natural gas lines, which threatened to damage kitchen equipment. Said one proprietor: "I know people say, 'My God, a year later and you're not any further than this?' They just don't understand. We're all taking a whipping down here." (Severson, 2006)
>
> Small Business More, pages 87-89.

An often-seen pattern of business recovery was that the original businesses did not re-open and other, new ones took their place. Thus **business stability** was dramatically interrupted. In addition, the **diversity of businesses** was initially limited and focused on the needs of recovery and rebuilding. Another constraint was the rebuilding of the building occupied by the business. An example of a critical gap was in grocery stores, large structures that required significant time for rebuilding. Most box grocery stores around the city were destroyed; to this date many broad areas of the city are without access to them. This challenge leads the residents to live on fast-food chain and corner-store fare, none of which is likely healthy for them. This is especially critical for children and the poor without cars and thus unable to travel the longer distances to the existing stores.

Small businesses in neighborhoods were especially hard hit but were particularly key to the city's recovery. Their loss diminished the motivation of residents to return; they were pre-storm anchor activities for the neighborhoods and their absence symbolically labels the neighborhoods as challenged for recovery.

Some activities within a community are conducted by individuals in a **barter mode**. Most commonly recognized in rural communities where seafood catches might be swapped for vegetables grown in someone's garden, some bartering activities, informal exchange of goods and services, also occur in urban neighborhoods, child care for hair care for example. These activities were reflective of the support systems within the neighborhoods before the storm that just about halted completely after the residents were scattered.

- *Personal household livelihood*
- *Employment/income dispersion/stability*
- *Occupational diversity*
- *Community socioeconomic characteristics*

7. Health and Physical Safety

- *Healthy lifestyle*
- *Access to clinical care services (especially: trauma, gastrointestinal, neurological, diarrheal outbreak investigation, poison control referrals, national pharmaceutical stockpile, etc.)*
- *Access to disaster mental health services (especially: psychological first aid, mental health referral)*
- *Access to environmental health services (especially: septic and water inspections, food-service inspections, surveillance for vector-borne diseases)*
- *Access to specialized high-technology lifesaving equipment and therapy (e.g.: dialysis, ventilators, ACLS, ATLS, etc.)*
- *Informal care giving systems*
- *Access to specialized services for vulnerable populations unable to physically or psychologically access necessary care*
- *Community health risk factors – environmental, mental health exposure, vulnerable populations*
- *Mortality rates, causes*
- *Surge facilities and personnel (e.g. including emergency worker liability, ESAR-VHP volunteer call-up systems.)*

Both residents who remained away from the city for a long period of time and those who returned were likely to be unable to maintain a **healthy lifestyle**. Overcrowding, use of alcohol and drugs to quell anxiety, lack of grocery stores to buy fresh produce, extreme over work and limited opportunities to exercise, etc., posed risks to health.

> No room for the sick
>
> 3.26/1,000 residents is the rate of hospital beds allocated nationally
> 3.03/1,000 residents was the rate of hospital beds allocated in New Orleans prior to Katrina
> 1.99/1,000 residents is the rate of hospital beds in post-Katrina New Orleans
> For more Katrina social statistics see Appendix A.

The health sector was particularly vulnerable to the effects of the storm, which rendered the **health and medical services** almost nonexistent early on. Because of the massive population displacement, many health care personnel were terminated by their employers. Others left for fear of termination because of the reduced population size. The health care system recovery was problematic as its underlying economics are built around a population base, whose return was difficult to predict. While acute and ambulatory care facilities have been slow to return, they are currently judged to be generally adequate, except in specialty areas.

Access to health/medical services was severely affected by the storm immediately after the storm due to the particular nature of New Orleans' public health care system. The Charity Hospital system was the major source of care for low-income residents. The primary hospital was severely damaged by the storm. Care was disrupted, and private providers were particularly affected by a larger burden of uninsured residents. New Orleans, before the storm, had among the highest levels of uninsured residents in the country. Especially lacking post storm were **mental health services** and **clinical/high-tech equipment and therapy** because all hospitals in the city had suffered building damage.

Closed hospital psychiatric facility leads to death

Depressed about his brother who suffered from sickle cell anemia, a young man "tried to inhabit his sibling's world and take the mantle of his pain. He could not sleep or eat and began disappearing on rambling walks." Just days later "his family took him to the hospital for a psychiatric evaluation, initiating a tragic chain of events that would end with him becoming the latest patient to suffer or perish because of the dearth of mental health beds in the city, especially for patients without health insurance." The 23-year-old died after jumping from the back of an ambulance that carried him from University Hospital in downtown New Orleans which lacked mental health beds, to go almost fifty miles away to a state psychiatric hospital in Mandeville, according to a front-page newspaper report. (Moran, 2007)

Healthcare Access More, pages 91-93.

A myriad of **community health risks** – environmental, emotional/behavioral, and an exacerbation of risk conditions of those in vulnerable populations arose. Katrina resulted in a number of concerns related to environmental contamination, accidents, and mental health risks. Ultimately, mental health effects are believed to be the most widespread of these issues. Suicide rates and substance-abuse rates have increased greatly.

Environmental exposures have been less than initially suspected although some new analyses of the environmental contamination data suggests there were more risks than had been previously thought. The lack of **environmental monitoring** prevented the government and the public from getting accurate assessments of their environmental exposure. The delayed release of information on the high level of formaldehyde in the FEMA trailers is an example of flawed monitoring. In addition, various risks are compounded within **vulnerable populations**. Recent research found that 60 percent of the homeless are more at risk from dying from chronic diseases than the population in general. Their homelessness is exacerbating their health conditions and their homelessness reduces their access to health care.

The slow recovery of the health care system was striking, and it retarded the re-establishment of population initially. Many hospitals were severely damaged, some to the point where they were demolished. In some, so many patients died that it will take time for the public to want to enter them for service. Another large hospital used for indigent patients was kept closed in order to speed the creation of a new public hospital. This left a huge gap that continues while the smaller public hospital struggles to develop additional "temporary" space for services such as adequate mental health intake.

Examination of the availability of **informal care-giving systems** showed that most were fractured. As families scattered, support systems for those who needed health care stopped. As in all communities such informal assistance serves as a basic contribution to the vulnerable being able to live in their own homes or to at least not having to be placed in a hospital or long-term care facility.

Two final impacts are of important note. The first is the identification of the causes of deaths post-Katrina and the death rate. Anecdotally it is believed that many have died from stress, inducing both physical causes of death as well as psychological. The difficulty in determining the post-Katrina death rate prompted the city's health director to use newspaper obituary data to demonstrate that increase rate.

The last indicator of health and physical safety social effects is that of what Katrina has done to place the area at likely more risk if another disaster befalls it. While it might be expected that the earlier disaster would result in a better response, the challenge to the medical system, like the challenge to the other parts of emergency response, may reduce response capability such as **surge facilities and personnel.** The struggle the city had in "mounting" a full-service emergency room trauma facility is such an example. Temporarily, it was located in the suburbs.

8. Governmental Organization

- *Organizational structure and functioning of government*
- *Sustained critical infrastructure (especially: telecommunications, water, sewage, power, streets, public buildings, etc.)*
- *Provision of public services (e.g.: planning, taxation, permitting, public transportation, education, public health, emergency ops/incident command, etc.)*
- *Exercise of democratic participation (e.g.: voting, letters to the editor, civil action groups, billboards and posters, etc.)*

All of the **governmental functions** came to a halt after Katrina. Residents watched, first from afar and after returning, from within the city, as the government struggled to be reconstituted. Even three years from the storm, some **governmental services, infrastructure and basic functions** have not been restored. Similarly, exercise of **democratic participation** faltered and took more than two years to recover. Some argue it has not completely done so because residents living in other communities are being purged from voter roles in New Orleans.

9. Community Social Services

- *Availability and access to basic range of formal social service programs (e.g. family counseling, parenting, family violence, seniors, chemical dependency, children services including child care, disabilities, welfare benefits/job training, foster care, mental health, disabled transportation, etc.)*
- *Informal instrumental support services, especially for the children, elderly, physically or mentally disabled, and other vulnerable populations (e.g.: extended family members caring for the young and the old, or faith communities providing meals-on-wheels, home repair, shopping, transportation, or emergency first response.)*

Availability and access to basic range of social services was cut completely after the flood. Gradually the government has been able to reinstate the services, but at a slow pace. As described within the non-governmental section below, some of New Orleans' major private-sector social-service providers were able to come back quite quickly because their facilities were not in the severely flooded areas. These included Kingsley House and Catholic Charities. However, those which were in the flooded area such as the American Red Cross had to relocate to the suburbs and have struggled with their temporary facility since that forced relocation. With such challenges, the availability and access to social services was curtailed for quite some time. Such social-service limitations then reduced the ability of lower-income residents and those, for example with mobility challenges, from returning to New Orleans. When one considers returning home a human right, these limitations challenged those rights.

10. Cultural, Historical Landmarks, Aesthetic Support

- *Recreational and cultural opportunities and participation*
- *Diversity of recreational and cultural opportunities*
- *Museum, sports, recreational facilities and personnel*
- *Historical landmark condition, access*
- *Festival infrastructure and voluntary/commercial personnel*
- *Maintenance of valued cultural characteristics*

Prior to Katrina, it may have been thought that this category of OSEs was less important than the others. However, it quickly became evident that the desire to repopulate the area had much to do with the expectation that the **unique cultural and historical characteristics** of the area would be restored and continued. These behaviors when defined within New Orleans include so many daily neighboring, eating, music, public activities not “culture” as in a performance event within an arena or stadium. It is what most residents of all incomes value about living in this community. Damage to so much of the culture infrastructure threatened the very future of the city as former

Festival brings reunion

A national news report noted the healing power of the old Louisiana festival tradition: "Jazzfest's essence was in the gathering of a 50-woman choir from the Franklin Avenue Baptist Church, which sustained $9 million in damage and now holds services for parts of its congregation in Houston and Baton Rouge as well as New Orleans. Some choir members had not seen one another since the hurricane. They, and other performers at the festival, kept saying, "It's like a reunion." (Pareles, 2006)

Community Activities More, page 97.

residents and those considering moving to the city measure the recovery progress in terms of the restoration of the valued cultural qualities.

One need go no further than the powerful desire to continue creating jazz musicians and jazz music to appreciate the point. Habitat for Humanity concentrated their efforts on building housing for the musicians. Tipitinas Foundation assisted musicians in getting paid to play within the city, and the Musicians Clinic was reinstated and funded by donations so that the musicians would have access to health care. The effect of the storm was very threatening to so many aspects of this prized culture.

C. Community Interpersonal Capital

1. Ideal Interpersonal Conditions

- *Community identification/attachment*
- *Community cohesiveness*
- *Distribution of resources and power*
- *Civil and human rights*
- *Environmental justice*

Recent consideration of the community conditions that create community resilience has spot lighted the ability of the residents and their leaders to use their own personal skills and talents in conjunction with other residents to achieve community goals collaboratively. Realization that **community interpersonal capital** is the underpinning of the more formal institutions described above has brought some applied scholars to argue that they require more identification and appreciation than those institutions.

The research team of this project contends that community interpersonal capital is the underpinning of the social institutions that cannot function successfully and cannot serve the residents in the most effective, egalitarian manner if the social capital is not fully in place. The two – more formal community capacity and community social capital – must be considered as they support one another.

Rationale – first five concepts. The strength of community interpersonal capital can often be seen by the degree to which residents **identify with their community and declare attachment** to it: desire to stay, to brag about it, to work on behalf of it. Similarly, a community using its interpersonal capital effectively will demonstrate **community cohesiveness** among its members. While not always agreeing, nor sharing common vested interests, successful community members "agree to disagree" and to negotiate compromises among the different interests, to declare social identification with other residents and groups. When residents perceive that the **available resources and power to control the resources** are fairly distributed among groups and individuals, it is more likely that they will work toward and be able to utilize the cohesiveness.

Attachment to Place

New Orleanians asked to evacuate ahead of Hurricane Katrina typically struggled to find a suitable place to go. City residents and other Louisianans remain close to their birthplace at rates higher than the typical American. This leaves many residents with no place to go for a self-evacuation except to other places in harm's way. Other states with similar nativity rates include New York, Michigan and Pennsylvania, all areas much less likely to experience a mass evacuation. Fellow Gulf states have nativity rates that ranged from Florida's 32.7 to Mississippi's 74.3, according to the 2000 Census.

Staying Close to Home			
	N.O.	La.	U.S.
Born in State of Residence	77.4	79.4	60
Born in Different State in the South	10.2	11.1	9
Same House for past 5 years	56.8	59	54.1
Same County or Parish for past 5 years	85.4	83.5	79
Same State for past 5 years	91.4	92.8	88.7

Source: U.S. Census 2000.

Members of minority groups often struggle to share community resources and power. They are skeptical that their interests will be served when resources are distributed. Key to engendering that trust is when a community is able to give solid respect to the **civil and human rights** of those in a minority status. Within that framework, **environmental justice** is seen as an example of such equity.

More difficult to place in the usual vocabulary of Corps "accounts" than are the institutional structures and resources outlined above under community capacity, it is possible to ask and to answer these questions:

- How can a Corps' project enhance (or detract) from a community's interpersonal capital?
- How can the residual damage or damage from the failure of a Corps project impact community interpersonal capital?

As more research demonstrates the importance of community interpersonal capital in the resiliency and sustainability of communities, it is incumbent on Corps OSE experts to understand how such capital can be threatened by residual/structural failure damage, as well as how Corps projects can contribute to its enhancement.

<u>Katrina examples – first five concepts</u>. The following paragraphs will demonstrate how damage to community interpersonal capital occurred in the flooding of Hurricane Katrina. However, while this damage did occur to the interpersonal capital, it is important to appreciate that disasters also engender, at least for a period of time, the enhancement of such capital because residents "pull together" to address the challenges which they face. Following Katrina such an enhancement occurred in many dramatic ways. It is yet to be determined whether that enhancement will continue after the reconstruction phase. As local victims are wont to say: "Why did we have to have a Katrina to pull us together as a community?" They also say, "We did what we had to do; we pulled together and got it done."

Examples of the damage done to pre-existing community interpersonal capital have been seen in terms of who benefits most quickly and most effectively from the recovery efforts. Questions are asked about whose area of the city is patrolled more by police, where was debris first cleaned up, plans for rebuilding identified and accomplished.

Expressions of concern about government leadership at all levels discourage former residents from retaining their **attachment** and commitment. Social class and racial divisions in terms of whose interests are being served reduce **cohesiveness**. For example, lower-income residents ask why the public housing (**resources**) was demolished when much of it could have been re-occupied, at least until new rental housing was made available. Similarly, mental health services for lower-income residents have been non-existent due to lack of facilities, but Charity Hospital has numerous floors that were not damaged. The poor ask why. They try to exert **power** over garnering these resources by public protest and lawsuits.

Particularly striking in the Katrina event was the realization that not only the **civil rights** of the residents might have been harmed – such as loss of polling equipment, polling sites and long distances between the evacuees' temporary homes and their polling booths, their **human rights** also were threatened. Cited are the delays in rescuing those trapped in the city when the breaches occurred. How could it have taken so long to rescue Americans at risk on U.S. soil? Also, the prohibition of housing-development occupants to return to their apartments to get their personal belongings is a clear violation of basic human rights. One would have expected for all residents of a flooded American community, especially because the developments' buildings were not compromised and could have been entered without harm to the residents.

An important concept in the lexicon of human rights is that of **environmental justice**. Created originally to apply to the disproportionate threat of chemical plants and waste sites to the health of minority residents, the term is relevant to the Katrina flooding in two ways. The first is the concern that contaminants might have more likely been in the water that flooded lower-income areas. The second is the fact that the needed height of levee/flood wall flood protection was lower in areas that were inhabited predominantly by minorities – the Lower 9th Ward and New Orleans East. Minority victims see the latter as an example of environmental racism, similar to the threat of disproportionate toxic contamination.

We turn now to the means to achieve such community interpersonal social capital. We will note the impacts that Katrina had on these means and the ways in which the community had to exert itself in times crisis to hold the social capital together and functioning by implementing, augmenting and over using these means.

2. Interaction Means to Achieve Conditions

- *Community leadership*
- *Political organizations and citizen political involvement*
- *Non Governmental Organizations adequacy vis-à-vis community needs*
- *Voluntary associations and membership*
- *Religious organizations*
- *Neighborhood (place-based) voluntary organizations*
- *Friendship/family networks*
- *Regional/national linkages*
- *Print and electronic media array, diversity, access*

Post-storm local **community leadership** has run the gamut in terms of citizen evaluations of performance. Some systematic analysis suggests a dichotomy from leaders who enhance their assertiveness after the storm and accomplished significant outcomes to others who seemed stunned by it. Either example puts an extreme stress price on the psyche of the leadership. In some cases the leadership has acted in an autocratic manner in order to overcome the challenges of negotiating with the large governmental agencies. What lasting negative legacy this has on egalitarian community dynamics is yet to be learned.

The Power of Friendship

A national news article quoted a mourner commemorating the second anniversary of Hurricane Katrina: "Most of my good friends are not here any longer. That's one of the things that's wrong. The fabric of this city will never be the same." (Nossiter, 2006)

Informal Networks More, pages 99-100.

Like the community leadership observations, the storm revealed both negative impacts and positive ones with regard to **political organizations and citizen political involvement**. With the population decimated, political participation was hampered but citizens tried their best to vote, even those who were living many miles away from New Orleans. This commitment, however, declined in the second election following the storm. Frustrations were experienced in trying to have access to voting and some in the diaspora felt more effort should have been undertaken. Overall the state spent significant resources to try to make satellite voting successful.

The post-Katrina status of **non-governmental organizations** is a very fascinating situation. Some NGOs floundered, even closing their doors. Others thrived. Research by Dr. Pamela Jenkins of this team suggests that the successful ones learned to evolve by providing their services in a manner unique to a post-catastrophe situation. Oftentimes that meant undertaking entirely different activities such as building homes when home building was never part of pre-storm activities.

Initially the adequacy of the **service provision vis-à-vis community needs** was extremely poor. Day care for anyone, but especially lower-income parents, was non-existent. The strain this put on the capacity of parents of young children to work was extreme; this was especially true of single parents. Gradually the NGOs reconstituted themselves, identified buildings in which to provide their service or repaired their original structures, and began trying to locate their clients to assess the change in needs.

Organizations such as the Greater New Orleans Community Data Center tried to document the return with accompanying maps so that residents could learn where the services were available. The duration of the decline, the loss of NGOs, the post-storm service provision capacity all are still being examined.

Most active post-storm were **voluntary associations** that were providing a service that the community needed. Some political action groups formed or grew and advocated for reforms that were glaringly needed. Some focused on inadequate treatment of lower-income residents, others on the causes of the disasters such a levee construction or inadequate treatment of homeowners who were trying to get their funds from the state program in order to rebuild. Given the weight of recovery which each resident experienced, membership in such organizations was not overwhelming, but was sufficient for the groups to have public visibility about their issues.

The contradiction of the experience of the **faith-based organizations** was symbolic of what happened after the storm. The congregations were struck a serious blow as many of them were located in buildings that sustained serious flooding or were not retrofitted for the winds. Yet, they have been one of the most important providers of support –spiritual, emotional and material – of any other type of organization. Much of this support has occurred with congregations doubling up and others having a diaspora location while they rebuild their local one. In addition, the faith-based organizations from outside of the area have provided the most consistent and large contribution to the recovery of the region by virtue of their donations but especially their volunteerism to undertake the most menial but so useful roles. While the faith community has always been present at disasters, the response to Katrina has exceeded expectation.

> **'Hurricanes' Spirit**
>
> "The Hurricanes" defiantly faced the wreckage of their school and community, this report continued: Little has returned to normal in the two and a half years since Katrina destroyed the tiny fishing, oil and citrus villages of Port Sulphur, Buras, Boothville and Venice in lower Plaquemines Parish, where the Mississippi River runs to the Gulf of Mexico. "Football is the only thing that will bring this community together; there's nothing else here," said Corey Buie, an assistant coach and the recreation director of Plaquemines Parish. (Longman, 2007)
>
> Voluntary Associations More, page 100.

The tension about whether residents of particularly hard-hit neighborhoods should be permitted to rebuild sparked unbelievable growth and solidification of **neighborhood voluntary organizations**. While New Orleans neighborhoods pride themselves on being friendly places, they have never been known for high concentrations of civic involvement. This characterization changed completely after Katrina. While that involvement has waned somewhat as it would be expected to do, the contribution which the post-storm involvement made to planning for and implementing recovery has been remarkable and without precedent nationally. The city has rewritten the books about neighborhood civic involvement. Similarly, when possible, friendship networks were strengthened by the self-help dynamics that were required for survival post-Katrina.

The outpouring of concern and assistance from regional, national and international organizations and governments resulted in incredible donations many of which never reached the affected area because the federal government did not dispense them. Those governments and organizations that went directly to the locals to aid them were successful in achieving their goals. The plus side of the interest did result in collaboration and offers for partnership that were pursued by both the governor and lieutenant governor as well as universities and non-governmental organizations.

Finally, the print and electronic media were both extremely damaged but also managed to be the lifeline for the community. This was especially true of the print and the radio. The diaspora relied on both for detailed information about the rescue and recovery. The intense reporting went on throughout the event and is still going on today, especially by the radio. Without these media, the community would have floundered beyond belief.

D. Postscript on the OSE of Community Interpersonal Capital

This last major section discusses both the harm to interpersonal community capital that occurred and the "therapeutic community" that arose after the disaster. We want to point out, however, that that enhancement was not without incredible cost. It occurred at a price to the residents. In fact, it actually took lives from stress, mental illness, drug/alcohol abuse, car accidents and loss of jobs because so much work was put toward these social capital activities. Slower personal recovery occurred because the energy was going toward the communal efforts, family tensions were enhanced because people were" spreading themselves so thin," etc. The list is very, very long. The price to the residents to create, sustain and enhance interpersonal social capital has been tremendous, and higher than some could bear. If the severe flooding had not occurred, such an inordinate level of effort would not have had to be expended and the negative social, psychological and health effects on the residents to retain and enhance community interpersonal capital would not have had to be expended.

The second point is that not all residents were in a position to participate in holding together and in enhancing their community social capital within the area. The forced absence of the poor by virtue of their inability to return and for public-housing residents, the demolition of their housing, made it extremely difficult for them to participate. Social capital for the poor is often very important and informal, communicating across a stoop with a neighbor, checking on an elderly neighbor, watching a neighbor's children while the mother goes to the corner store or to work, participating in a Sunday social and pleasure club parade, etc. The dispersal of the New Orleans poor all around the country slowed this place-specific community capital and it is only gradually coming back as residents struggle to return and re-establish that connectivity. In substitution they are trying to hold it together in the diaspora by long commutes to work within the city while having to live outside and by extended visits to returned family members and thus to over crowed conditions, to name just two. Their efforts to hold such social capital together long distance is another full story to be told..

Table 4.1.1 Sample Pre-Post Comparative Measures of New OSEs for New Orleans Katrina Example: Population Characteristics

Population Characteristics			
Dimension	New Orleans Pre-Katrina	New Orleans Post-Katrina	Total Loss
Population Patterns	▪ 2005 census estimate-453,726 ▪ 11.3 deaths/1,000 residents.	▪ 2007 census estimate-239,124 ▪ 14.3 deaths/1,000 residents.	▪ 214,602 population loss (47.3%) ▪ 3.0 deaths/1,000 residents.
Demographics	▪ 53 female/100 residents	▪ 46 female /100 residents	▪ 7 females/100 residents
Transient residents	▪ 8.5 million tourists/year	▪ 3.7 million/year (2006)	▪ 4.7 million tourists/year.

Table 4.1.2 Sample Pre-Post Comparative Measures of New OSEs for New Orleans Katrina Example : Community Capacity

Community Capacity			
Dimension	New Orleans Pre-Katrina	New Orleans Post-Katrina	Total Loss
Education	▪ 66,372 students (public). ▪ 26,008 students (private). ▪ 64,348 students (university). ▪ 128 open public schools. ▪ 93 open private schools.	▪ 32,887 students (public). ▪ 18,151 students (private). ▪ 47,674 students (university). ▪ 79 open public schools. ▪ 63 open private schools.	▪ 33,485 students (public). ▪ 7,857 students (private). ▪ 16,674 students (university). ▪ 49 open public schools. ▪ 30 open private schools.
Criminal Justice	▪ 229.3 violent crimes/1,000 residents (2005). ▪ 1,668 police officers.	▪ 368.4 violent crimes/1,000 residents (2007). ▪ 1,470 police officers.	▪ 139.1 violent crimes per 1,000 residents. ▪ 198 police officers.
Neighborhood/ Housing	▪ $244,793 average house sale price. ▪ $531 monthly rent for one-bedroom. ▪ 13.22 homeless/1,0000 residents	▪ $180,793 average house sale price (2008). ▪ $846 monthly rent for one-bedroom. ▪ 50.18 homeless/1,000 residents	▪ $64,000 loss in property sale price. ▪ $315 increase in monthly rent. ▪ 36.96 homeless/1,000 residents ▪ Estimated loss of 11,000 historic buildings.
Business	▪ 9,592 employers (second quarter 2005).	▪ 7,482 employers (second quarter 2007).	▪ 2,110 employers.

Community Capacity			
Dimension	New Orleans Pre-Katrina	New Orleans Post-Katrina	Total Loss
Income, Employment & Labor Force	▪ $13,562,270 local sales-tax collection (Jan. 2005).	▪ $8,520,490 local sales-tax collection (Jan. 2006).	▪ $5,041,780 local sales-tax collection.
Health & Physical Safety	▪ 3.03 hospital beds/1,000 residents. ▪ 51.82 physicians/10,000 residents.	▪ 1.99 hospital beds/1,000 residents. ▪ 35.95 physicians/10,000 residents (2006).	▪ 1.04 hospital beds per 1,000 residents. ▪ 15.87 physicians/10,000 residents.
Community Social Services	▪ 275 childcare facilities. ▪ 8.11 operational buses/10,000 residents.	▪ 98 childcare facilities (2007). ▪ 2.88 operational buses/10,000 residents.	▪ 177 childcare facilities. ▪ 5.23 operational buses/10,000 residents.

Table 4.1.3 Sample Pre-Post Comparative Measures of New OSEs for New Orleans Katrina Example: Community Interpersonal Capital

Community Interpersonal Capital			
Dimension	New Orleans Pre-Katrina	New Orleans Post-Katrina	Total Loss
Interaction Means to Achieve Conditions	▪ 47 percent approval for Mayor Nagin/black voters. ▪ 84 percent approval for Mayor Nagin/white voters. ▪ 46 percent of registered voters (mayoral 2002).	▪ 61 percent approval for Mayor Nagin/black voters. ▪ 23 percent approval for Mayor Nagin/white voters. ▪ 36 percent of registered voters (mayoral 2006).	▪ 14 percent increase in approval. ▪ 61 percent decrease in approval. ▪ 10 percent registered voters.

Chapter 5: Application Issues of Proposed OSEs

A. Introduction

Recognition that the Other Social Effects (OSEs) are as integral a part in determining projects as Economic (NED, RED) and Environmental (ENV) effects is extremely important. This conclusion leads to the question: How to use the OSEs most effectively?

Four uses are seen by this study team as key to the Corps' success in contributing to flood risk reduction.

1. The first is to incorporate the SIA approach of eliciting OSEs into the "defining and bounding the problem" approach the Corps already uses regularly.
2. The second is for the Corps to utilize the results of the SIA process to collaborate with other resource stakeholders to conceive and implement the best package of risk reduction actions, the Corps structural and non structural being just two. This approach would be an extension of the collaborative dynamics developed by co-located collaborative agencies piloted by the Corps' New Orleans office to address coastal restoration.
3. The third is to review the proposed OSEs and to embrace a more comprehensive array of them within the Multi-Criteria Decision Analysis (MCDA) currently being utilized by the Corps in the LACPR project selection process. Now there are only four – population, historic buildings and districts and archaeological sites, the latter being considered due to NEPA regulations.
4. The fourth is to use the OSEs and the SIA approach to refine the post-mortem assessment of flood disasters and to require legislatively such an analysis after every declared disaster.

Each application issue will be discussed below.

To reiterate, the study team believes that the most effective role of this study effort is to propose extensions and refinements of existing Corps processes rather than 180-degree changes. The declared commitment by the Corps' Institute of Water Resources and the New Orleans Corps to refine the OSE's demonstrates an appreciation that adding a robust "account" of OSEs to their efforts is imperative. The charge at hand is to do so with clarity, focusing on key OSEs and then their robust use through appropriate processes of community and stakeholder engagement to identify them. The remainder of this chapter will include discussion of these four uses of OSEs and how they might be implemented effectively.

1. Using the (Broader) Community's Flood Protection Goals When Identifying Prospective Corps Projects

Two key points will be made in this section. The first point is that the Initial Reconnaissance should include an active, detailed engagement of the **broader** community to identify the flood risks that they perceive—what is at risk, what does the community want to protect, and how the Corps might be able to assist in addressing the **broader** community's concerns. The Corps does this already with local sponsors who are representatives of **particular** community-stakeholder interests. Often they are community elites. These meetings take place before a study is funded by Congress and initiated.

However, it is clear that the Corps recognizes that there is a disparity of interests and opinions about what should be protected. Why, then, does the Corps hold risk decision-making meetings, to which they invite the **broader** community, *after* they develop alternative plans in partnership with **particular** community-stakeholder interest? We propose the same diversity of interests holds true early on, when the initial project decision is made – to "levee" or not to levee at all. Those who represent the interests of **particular** community-stakeholders do not possess an understanding of the entire breadth of risk and safety aspects that could be discussed. As the Corps does not currently hold **broad** public meetings to discuss the same "problems and opportunities" as it does with **particular** community-stakeholders, this study team suggests that it should, so that the broader public can contribute to identifying flood risk and solutions along with the parish officials, water and levee boards, and state water resource agencies. Such meetings also would alert the Corps to the disparity of interests and opinions that exists among *all* stakeholders, thus enhancing the efficient development of a consensus of support for one project or another earlier in the process.

Public meetings are a required part of NEPA compliance, but they currently take place *after* alternative plans have been developed, and only then does the broader public have an opportunity to share its perspectives. Richard Burroughs (1999) suggests that the shift from holding public hearings to the engagement of stakeholders in the broader community leads to the formulation of more tenable plans, to which the broader community is amenable. Similarly, we propose that a more fruitful approach would be for the Corps to hold risk assessment and **possible** solution formulation meetings with representatives of *all* stakeholder groups (not necessarily organized with formal organizations) at the table. Additionally, we suggest the utilization of the OSEs proposed in this report to facilitate that community participation. What does the community value? What do community members have consensus on that they want protected and/or enhanced?

We refer the reader to the Dunning and Durden white paper prepared in March, 2007 entitled "Theoretical Underpinnings of the Others Social Effects Account" in which they present the comprehensive table "A Comparison of the Role of OSE Information in the Current Planning Framework with the 4-Account Planning Framework." The first row, "define and bound the problem" is presented here for discussion. What follows below is a reinforcement of what they present here on Row One. **We concur and offer the steps already in existence in the Social Impact Assessment (SIA) approach that can be used to accomplish the new goals of OSE in the new Corps planning approach:** "identification and analysis of social conditions and stakeholder identification and analysis." It continues: "'Consensus-forming activities' help build common definitions of problems, opportunities, and constraints, and help determine planning objectives" (Dunning and Durden, 2007: 27) In this way, the community and the Corps contribute to the analysis and understanding of the desired change.

Figure 5.1. A Comparison of the Role of OSE Information in the Current Planning Framework with the 4-Account Planning Framework. [Line one, excerpted from Dunning and Durden, 2007: 27.]

Planning step	Current planning framework	Role of OSE/ social information in current framework	4-Account planning framework	Role of OSE/ social information in 4-account framework
Define and bound the problem * Opportunities * Constraints * Planning Objectives	Current paradigm defines problems narrowly, according to specified authorities. Projects are largely single purpose Problems, constraints, and planning objectives are defined by Sponsor/Corps	Role may include conducting scoping workshops, generally as part of the EIS process	4-account framework defines problems more broadly and focuses on the full range of water resources problems that are beyond traditional authorities. Multipurpose/ multi-agency involvement	Role includes identification and analysis of social conditions and stakeholder identification and analysis. "Consensus-forming activities" help build common definitions of problems, opportunities, and constraints, and help determine planning objectives

The pre-alternative assessment process assumes that 'one size does NOT fit all.' In each situation, not all variables are equally important. Each project or event will be different, as will each community or neighborhood. For example, one community may be focused on farming while another on fishing. Therefore, there is range of effects and a variety of methods to measure them.

Each of these effects proposed in Chapter 2 – 4 has a history in the disaster, community, or social impact literature and each method has been tested in other communities. In other words, the outcomes using these measures and methods can be compared to other research, ensuring both reliability and, to some degree, validity. However, validity will be enhanced by the input of communities who will serve as checks for the measures, the methods, and the findings.

Community engagement is a process that is well documented in the literature including several important recent works (Burroughs, 1999; Selin *et al*., 2000 and Bryson *et al*., 2004). As with the measures and methods, there are a variety of ways to engage the community. The model for this process usually involves: 1) identifying community residents with critical knowledge; 2) identifying the groups in the community; 3) identifying formal leaders and informal leaders in the community; and 4) providing opportunities for groups and leaders to speak about their community. Burroughs' (1999) work finds that focusing on inclusively-defined stakeholders from the beginning of the process increases participation and knowledge about the issues (both agency and local) and gives good feedback to the agency on citizen preferences. While this process appears to be, and is, labor intensive, getting the broader community invested at the beginning ensures accountability from the onset of a project or after an event. We propose it will also reduce the high degree of conflict that emerges in the Feasibility and Project Implementation phases when the unaddressed issues of the project emerge. In sum "front loading" the early effort reduces the later effort and, perhaps even more importantly, the contentious relationship between the Corps and residents that seems to occur with great regularity around projects and their realities, which tend to be objected to later in the process of selection, implementation and outcome.

Key to the success of the process we support is its inclusionary quality. Success relies on the inclusion of representatives of all segments of the broader community, not just the leaders and those who represent formal groups and are comfortable advocating for them. Using regression statistical techniques, Selin et al.(2000) examined the components of collaborative projects that included the U.S. Forest Service. Participants perceived that successful projects had included good leadership, willingness to compromise, and a **broad** representation of stakeholders. Phrased in more negative terms, Bryson (2004: 23) states, “Failure to attend to the information and concerns of stakeholders clearly is a kind of flaw in thinking or action that too often and too predictably leads to poor performance, outright failure or even disaster.”

The decision about how to define stakeholders is critical. Mitchell, et al. (1997) emphasize that equitably identifying stakeholders is consequential, as it affects *who* and *what* counts. In the case of Corps projects: who will be protected, what social and physical assets count, and to whom? Taking care to cast a broad net and to appreciate that such an effort will eventuate in the best community plan, and thus the one most accepted and advocated for, are critical.

2. Resource Partners: Creating Multiple Agency/Jurisdiction Efforts to Address the Flooding

With the Social Impact Assessment Process (SIA) of eliciting honed risk reduction goals from the community— what of the OSEs are important to <u>them</u> – comes the opportunity to examine a comprehensive system of protection. Needless to say, the Corps cannot, should not, be responsible for providing the entire system. This conundrum requires collaboration of the Corps’ leadership and staff, with other governmental agencies at all levels and with the public themselves – all of the above being <u>resource stakeholders</u>.

One of the most significant challenges to solving complex water resource problems in a given area is that each governmental department/agency is in a silo/stovepipe, oftentimes working on the same challenges but failing to collaborate for the best outcome for citizens and communities. Such agencies are working under an array of authorities, rules, cultures and processes with the well-intended goal of reducing misery, economic loss, etc. Unfortunately, the increasing numbers of programs that are intended to help have actually led to an increasingly complex system of assistance not adequately synthesized at the local level to solve a water resource problem.

Post-Katrina, if not before, it became increasingly evident that reducing risk of flooding <u>should never be approached with the one solution of a structure – levee, flood wall or dam</u>. Rather, all possible risk-reducing “resources” should be considered. In a geographically expansive area such as the southern Louisiana coast, where it is evident that a number of risk-reduction actions are part of the overall solution, finding ways to blend the resources is in the opinion of this team, the only appropriate approach. Please refer to column four of Table 1 where mention is made of “Multi-purpose/multi-agency involvement.” Dunning and Durden (2007: 27) also make reference to a “range of stakeholders and participating agencies” in the plan formulation phase (not repeated in this document).

The leadership role in a multi-agency resource partnering has been implemented by the New Orleans Corps in its coastal restoration work for the Louisiana Coastal Area (LCA) work pre- and post-Katrina and also other follow-on restoration efforts. The agencies included in this collaboration are those with a mission responsibility for coastal areas: the U.S. Environmental Protection Agency (EPA), U.S. Geological Survey (USGS), NOAA’s National Marine Fisheries Service (NMFS), the U.S. Department of Agriculture Natural Resources Conservation Services

(NRCS) and the U.S. Fish and Wildlife Service. Nationally, a similar initiative coined the "Silver Jackets" is being used in other states and Corps districts to bring various federal and state entities together for collaboration and partnering. The Corps is in a key position to ensure such resource stakeholder coordination occurs as it has both rigor in its project review process and institutional expertise to undertake a broad evaluation of the effects of a proposed project.

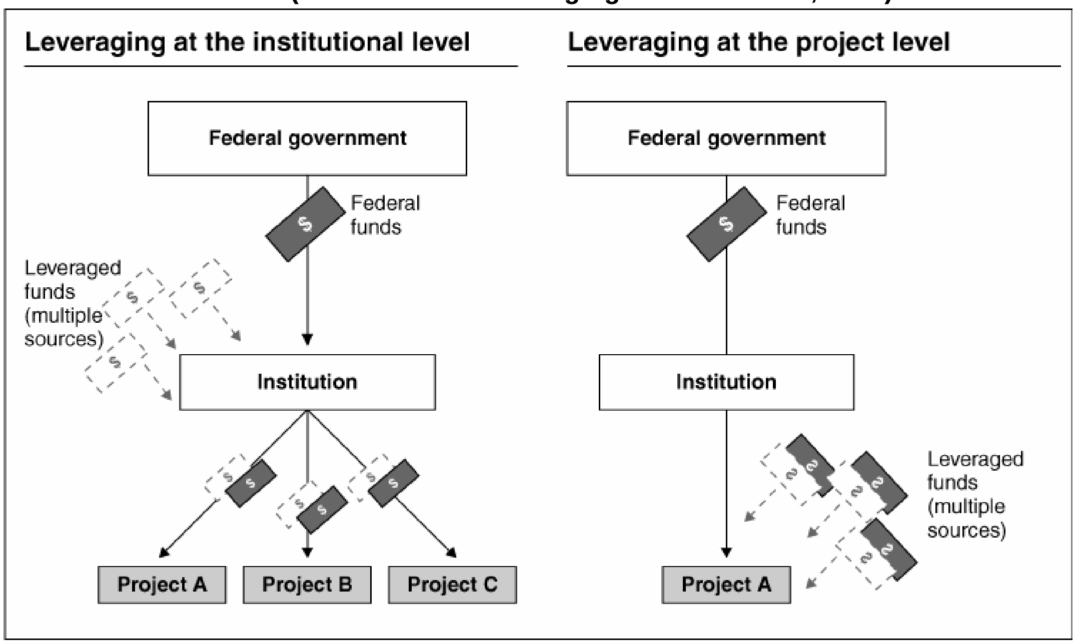
Collaboration of resource partners through interagency networking to leverage resources to respond to community flood risk-reduction issues interface the missions, authorities and programs of the multiple agencies and can offer the opportunity for unprecedented opportunities to address other social effects (OSE). Leveraging has been defined or conceptualized as using one source of funds to attract additional sources of funds. Leveraging also can be thought of broadly to mean the combining of multiple sources of funds and non-monetary resources, such as land-use planning regulations or non-structural mitigation for individual homeowners.

It is useful to pause in focusing on the details of possible collaboration to consider the broader prospect and ideas. We will weave this more general discussion in to the specifics at the end of this section.

The General Accounting Office (GAO, 2007) has considered agency partnering in depth. We describe their framing and apply it to the topic at hand. Leveraging and collaborative activities relieve the pressures on single organizations, such as the Corps, to deliver results on highly visible projects to protect and sustain community development and community capital. Collaboration, networking and leveraging the resources of federal programs make it easier for states and regions to obtain the flexibility to use federal resources effectively. It also encourages contributions from state and local governments and the citizenry. Networking and leveraging are useful tools to stretch scarce federal funds and promote partnerships between the agencies to improve outcomes of institutions and projects in communities. Networking and leveraging can occur at the institutional or at the project level.

At the institutional level, an institution or organization pools funds and other resources from multiple sources, which later are used to support individual projects. In comparison, at the project level, a community or other development authority leverages resources as necessary for discrete projects. The point is further refined by noting that the resources should include all opportunities, monetary and non-monetary such as land-use regulation, in the most creative and productive ways conceivable. Again, the experiences from the co-located coastal restoration agencies at the New Orleans Corps should give insight as to how to elicit and bundle the resources.

Figure 5.2: Leveraging at the Institutional and Project Levels
(GAO-07-768R Leveraging Federal Funds, 2007)



Source: GAO.

Leveraging of resources would be directed to all aspects of the flooding risk-reduction efforts and expand to a broader community risk reduction approach, i.e. reducing risk from social/economic and political threats as well as from flooding. After a strategy is in place, the Corps could support the process of leveraging federal resources in support of the common regional and national economic development as well as OSE goals. The GAO goes on to suggest that these resources could even be used in a significantly broader way to bolster small businesses, promote sustainable entrepreneurship, educational, research, health and social programs designed to help identify and analyze formal and informal community networks as part of the development of a resilient community better able to sustain itself if a disaster were to hit. Imagine a New Orleans that had fully benefitted from such an enhanced approach to leveraging for comprehensive community sustainability before Katrina. Interagency networking and cooperation is needed to effectively identify available resources which are available to the social capital opportunities presented by the stakeholders.

The collaboration may consist of statutory-related, geography-related, population, problem-related programs -- or any connected entities. Once the available federal agency resources are identified, proactive, collaborative efforts can bring agencies to partner with diverse stakeholders in impacted communities to mobilize existing resources (i.e., social, human, regulatory and financial resources) for the purpose of protecting communities.

The strategy for protecting critical infrastructure and community assets requires viewing the **collaboration as a system**, i.e. an integrated network and the outcome of risk reduction also as a system. The federal government has long organized agencies by functional responsibility. For example, the U.S. Department of Housing and Urban

Development is authorized to provide resources for housing and community development. Likewise, U.S. Department of Transportation is authorized to provide resources to ensure the transportation system. The Corps has an opportunity to create a matrix of resources from agencies by building upon the mosaic of functional responsibility areas which reflect the system of social interactions of transportation, education, social services, housing, and health that are impacted by critical incidents such as major floods. Identifying synergistic opportunities for federal involvement in protecting the public and infrastructures through connected functional assignments is an effective way to leverage resources for this specific project or at an institutional level. While networking and collaboration among federal agencies can take many different forms, the practices generally consist of two or more agencies.

The Corps can engage departments and administrations to identify opportunities that are consistent with agency roles (e.g. responsibilities, commitment of staff, funding resources, and other contributions) securing commitments to work collaboratively. The Corps can point out the OSE elements on which agencies can work together suggesting mechanisms to monitor and evaluate results of joint effort.[3]

To the extent permitted by law, the agencies can (a) formulate and recommend interagency compacts and cooperative agreements between Federal agencies and the City of New Orleans, or the State of Louisiana; (b) develop, on a continuing basis, a comprehensive and coordinated plan to establish priorities to promote long-term community stability, (c) identify points of synergistic collaboration for Federal programs, technical assistance, and other support.

To overcome significant differences in agency missions, cultures, and established ways of doing business, the other agencies must have a clear and compelling rationale to work together. The compelling rationale for agencies to collaborate can come from the agencies' own perceptions of the benefits they can obtain from working together. It allows agencies to identify synergistic activities to move the project forward and to articulate the common federal outcome or purpose they are seeking to achieve that is consistent with their respective agency goals and missions.

Some of the possible collaborations would require legislative or administrative changes in the Corps' roles and responsibilities. However, many could come, such as in the LCA (Louisiana Coastal Area) co-location of federal agencies at the New Orleans Corps, by sheer agreement that there are benefits to communities for the agencies, non governmental organizations and the various levels of government to try to work together. And some of the resources already are coordinated by FEMA. The point of this report is to direct thinking to the amazing array of the

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[3] Examples include:

- Defining and articulating a common outcome; along with an understanding of the importance of accomplishing the goal and agreement about "success", i.e., the specific outcomes and efficiency levels it desires;
- Establishing mutually reinforcing or joint strategies to achieve the outcome along with a realistic, aggressive action plan that leads to achieving the goal;
- Identifying and addressing needs by leveraging resources;
- Agreeing upon agency roles and responsibilities;
- Establishing compatible policies, procedures, and other means to operate across agency boundaries;
- Developing mechanisms to monitor, evaluate, and report the results of collaborative efforts;
- Emphasizing that consistent with their statutory responsibility, Federal agencies (e.g. Housing and Urban Development; Health and Human Services; Labor; Transportation; Treasury; Education; the Interior; Environmental Protection Agency; Commerce; Agriculture; Small Business Administration; Social Security; FEMA; and Energy) have the opportunity to connect with the project.

possible resources that could be brought to the community's discussion of how to reduce flooding risk. This array, of course, includes the resources of the community itself as well as the county and state jurisdictions.

Will such flooding risk reduction collaborations make a difference? It depends on what resources are leveraged and how they are utilized. In terms of measuring or expressing the extent or amount or level of collaboration, leveraging that occurs at either the institutional or the project level is with a leverage ratio. A leverage ratio relates the dollars and resources agencies provide to the dollars and resources of the Corps initiative. For example, the leverage ratio for a particular project may be 1:1, meaning that the other sources collectively contributed a dollar for every program dollar contributed to the project by the Corps. In general, an institution or project with a high leverage ratio is one in which the investment of all other funds is large relative to the investment of program funds (for example, 10:1 or 25:1). Similarly, an institution or project with a low leverage ratio is one in which the investment of all other funds is reasonably small relative to the investment of program funds (for example, 2:1 or 0.5:1) (GAO, 2007).

Given the challenge of using only structures to protect communities from flooding – changing flood risk conditions due to development and impermeable surface construction, wetland takings, sea-level rise risk, aging structures, flooding greater than the magnitude of safety provided, etc. – commitment to such a resource partnering approach is advisable, if not absolutely mandatory given the expected future challenges. The latest report by the Association of State Floodplain Managers (2007) on floodplain management challenges the society to get serious about flood control (Association of State Floodplain Managers, Nov. 6-7, 2007).

One of this team's members is the floodplain manager for the state of Ohio. He is currently engaged in working with a community that would benefit from a combined program of FEMA (the Hazard Mitigation Grant Program) and the Corps (Non Structural) resources. During the committee's meetings he forcefully argued for and gave examples of the exciting ways he was imagining that such collaborations would be possible. One of the barriers to doing so is the fear that it would violate the federal prohibition of duplication of benefits (DOB) that forbids the federal government from paying twice for the same loss. Given the need for a combination of resources, there has to be a way to approach rule interpretation or modification to overcome this issue. Leveraged, combined resources should be sheltered from the accusation of duplication of benefits..

Pushed to some of the interesting extremes discussed here, such collaborations may sound "unrealistic" but consider how unrealistic "silos of influence and action" sound when their isolated, non-coordinated efforts contribute to a catastrophe such as Katrina. "Can't we all work together?" was asked by Rodney King after the Watts riots. How can we consider silos of effort reasonable when they have led to disjointed efforts that beg for system consideration? One levee alone does not provide adequate protection. Levees alone do not. The benefits to the Corps, on top of the benefits to the communities at risk, of pushing the collaboration envelope further than the coastal restoration example that is already in place at the New Orleans Corps, may be incredibly significant.

Finally, such a leveraging also might include requirements for non-monetary and/or non structural resource commitments: a levee might not be constructed if a community is not also willing to prohibit expanded development behind it, i.e. a buffer zone. Or an additional height for elevating homes might be added to the Base Flood Elevation when a levee is built rather than reductions in flood insurance requirements as is being proposed in Congress today. One act represents false security, the other reminds citizens that levees can fail. This is similar to the National Flood Insurance Program (NFIP) requiring communities to adopt the Base Flood Elevation into the housing ordinances and to enforce the regulation if the community is to be eligible for flood insurance. The levee construction could be conditional upon satisfying these additional risk-reduction requirements, just like the current local match is a monetary requirement for Corps levees. There are a myriad of risk reducing options from a myriad of resource stakeholders that are out there to consider in a combined system of risk reduction. Isn't the lack of implementation of such risk reducing opportunities the unrealistic path?

3. Inclusion of OSEs in Risk Decision Making Processes When Large Areas Include Multiple Stakeholders

"MCDA (Multi-Criteria Decision Analysis) provides a systematic approach for integrating risk levels, uncertainty, and valuation—however, few MCDA approaches are specifically designed to incorporate multiple stakeholder perspectives or competing value systems" (Linkov, Satterstrom et al., 2006). "Furthermore, where structured approaches … are employed, they may be perceived as lacking the flexibility to adapt to localized concerns or faithfully represent minority viewpoints. A systematic method of combining quantitative and qualitative inputs from scientific studies of risk, cost and cost–benefit analyses, and stakeholder views has yet to be fully developed for environmental decision-making. As a result, decision-makers often do not optimally use all available and useful information in choosing between identified project alternatives."

Our concerns about the use of OSE within this framework revolve around two issues. First, that the OSEs be expanded to include more than just the two currently used. At least the three proposed umbrella terms should be included – population, community capacity and community interaction capital. Second that the concepts be clearly defined to the stakeholders asked to evaluate projects using them; similarly the NED, RED and EQ also should be clearly explained. Of the four, the OSEs are likely to be the ones that are most unfamiliar to the respondents but all technical terms require clear, lay person definitions. Technical experts always presume that others are as comfortable with their favorite concepts as they are.

The following is the list of project effects the Corps currently permits the stakeholders to consider (two OSEs in bold):

- Residual Damages in dollars (NED)
- Life-cycle Cost in dollars (NED)
- Construction Time in years (NED)
- Spatial Integrity (EQ)
- Direct Wetland Impacts in acres (EQ)
- Wetlands Restored and/or Protected in acres (EQ)
- Indirect Impacts (Minimization of Impacts to the Environment) (EQ)
- Gross Regional Output Impacted in dollars (RED)
- Employment Impacted in numbers of people (RED)
- People's Earned Income Impacted in dollars (RED)
- **Residual Population Impacted in numbers of people (OSE)**
- Archeological Sites Protected in numbers of sites (EQ)
- Historic Properties Protected in numbers of properties (EQ)
- **Historic Districts Protected in numbers of districts (OSE)**

Figure 5.3 4-Account Framework

Accounts → / Levels ↓	Economic	Environmental	Social
National	NED		
Regional	RED	Envt Quality	Historic Districts Residual Popln
Community		Envt Quality	Historic Districts Residual Popln

Our project team felt these could be better portrayed in the figure above which reveals the geographic dimension of the Performance Metrics, i.e. to what level – national, regional or local is the analysis most relevant. The economic indicators are aggregates of community level data from employers, workers, vendors and governments. Many of the environmental indicators are also aggregates of smaller units of analysis. In a similar manner, we propose that the Community Social Indicators are best measured for small geographic areas, such as neighborhoods and communities although some regional OSEs are important. Social science methods can be used at the community level to obtain prospective data on perceived values and vulnerabilities. Traditional cultural groups will be able to articulate what reflects the essential characteristics of their community. Although other groups may choose different indicators, a properly designed framework for aggregation should be able to blend these types of social variables into more unified metrics, which we propose to be called Community Capacity and Interpersonal Capital.

While the method of Multi-Criteria Decision Analysis has been evolving and lauded because it can capture stakeholder values efficiently and allows easy statistical calculations, the process "dictates" the basis of the project evaluation rather than giving the stakeholders the opportunity to select their own criteria. Ironically, before the actual exercise began in the summer 2008 implementations an example was presented to the participants to clarify the process that challenges the logic used in the process. A family selects a series of criteria for determining what make and model of car to buy. Once they agree on the criteria, each family member then ranks the cars and weighs the rankings based upon the agreed upon criteria. However, in the real stakeholder exercise, the Corps selects the criteria and requires that the stakeholders draw from them, not propose their own. It is exactly the family example -- the communities participating in the criteria identification -- that this report advocates.

In addition, the Corps criteria, so long used by the Corps professionals implementing the projects that they are second nature, are not only not created by the stakeholders but they are confusing to them. Some even have different signs (+/- directions of the outcomes) and thus the novice stakeholder must remember the definitions and then decide which direction is a positive or negative value. An example is that the environment can be harmed by the structural project, the usual orientation that the choices reflect, or the project can help the environment (such as protecting wetlands from salt intrusion). No examples to clarify the reverse direction of some of the criteria were offered or warnings given that the stakeholders would encounter them. Thus, stakeholder becomes confused about what s/he is expressing in giving a particular rating on the scale. But then the answers are tabulated and analyzed statistically as if there is no confusion or confusion about sign direction. The findings that result with such problems in the administration process, must be challenged.

4. Residual and Breach Flood Damage Assessment: Applying Approach to Hurricanes Katrina and Rita

The impetus to undertake this work was the tremendous, unprecedented OSEs of Hurricanes Katrina and Rita. There was no contesting that the social effects were massive. As described generally in Chapter 1, the IPET social science team undertook examination of some of the OSEs evident at the time of their work, shortly after the events. The decisions about which impacts to consider were made by the experts impaneled to complete the report. To our knowledge no systematic process of seeking community input to that decision-making process was undertaken, although primary data was collected on the return process. It might be argued that because the impacts were so obvious such a community process was not needed.

The team for this project would propose that a post flood impact study be **required** after each major flood event and that it be done in conjunction with the community and its residents, the latter so that the learning process can be wider than just the Corps experts and officials. Second, we propose that an important part of that assessment be to examine the OSEs. Such a process would be useful for three purposes:

- To know from the position of the victims what the impacts are. The unanticipated impacts, not within the experience of the society in general, and thus the social scientists directed to determine them, cannot have emerged as important so quickly without local input. This observation became evident as the catastrophe unfolded and the frequent comment made by victims was: “The rest of the country just doesn’t understand.” It couldn’t because of the extreme disparity of experience. That inability continues although (inter)national media reporting has reduced the incredulity of the impacts.
- To begin immediately partnering with the community to assess the impacts that occur when so high expectations are placed on one type of flood protection. By going through the assessment process with the Corps, both the agency and the community are required to ask and answer, “What harm came from emphasis predominantly on one single structural measure?” “What future decisions can be made to accomplish a system of risk reduction that facilitates less massive damage when a part fails?” When no systematic assessment is required, and then when it can haphazardly happen, and only the “experts” are called upon to make the assessment, this important reflexive process does not occur.
- Of course, the opportunity to gather data that will be beneficial to decisions about repair of the structures and for consideration of new risk reduction elements is best captured in the post-event time line that will reflect the impacts.

b. Emphasis and Prioritization

The Proposed OSEs exist as a skeleton to work from. As noted in Chapter 3, “one size does not fit all” Corps uses, nor all communities. One critical prioritized OSE list cannot be declared. What can is a comprehensive, representative list of the key components of a successful community. Then from that framework can be selected those elements most important to the assessment, determined together by the community and the agency’s social science experts.

Let us consider an example applying one concept category from the Proposed OSE List in Chapter 3: *Community health risk factors* (under the heading Health and Physical Safety). For a catastrophic flood, this concept rises immediately to the top of consideration. The IPET report lists the "Human Health and Safety Consequences" observed in Katrina and Rita:

Short-Term

- Environmental health exposure
- Exposure to floodwaters
- Mold
- Heavy Metals in sediments and seafood
- Other potential environmental causes of morbidity and mortality
- Smoke from fires & debris
- Natural gas leaks
- Accidents
- Industrial fires/chemical emergencies
- Residential/commercial fires
- Specific health-related exposures
- Mortality (causes) *[Health & Physical Safety -Mortality]*

Long-Term

- Health insurance coverage *[Access to health/medical services]*
- Health care needs *[Access to health/medical services]*
- Missing children *[Health & Physical Safety – Mortality]*
- Housing and food instability *[Housing]*
- Overcrowded conditions
- Resentment *[Mental health exposure]*
- Mental health exposures
- Depression
- Substance abuse
- Interruptions in mental health service delivery *[Health & Physical Safety – Adequacy of health/medical services]*
- Suicides *[Mental health exposure]*
- Mortality (causes) *[Health and Physical Safety – Mortality]*
- Absence and discontinuity in vital records resulting in denial or long waits for services

In addition to the prime concept of *community health risk factors*, other concepts are also important. We have listed them in parentheses next to the impacts identified in the IPET report. It would be possible to list all of these OSE's in a Corps handbook or reference document but would not be easily usable. Perhaps it could be used as a reference guide, but the OSEs will emerge if the assessment process is inclusive in terms of including community observers along with the social science experts within the Corps.

C. Steps in examining OSEs in Post-Disaster Assessment

1. Public Involvement - Develop an effective public plan to involve all affected or potentially affected publics.

It is at this first stage, *in conjunction with the affected, or potentially affected, community* that the dimensions of the impacting event are defined. Social effects can vary in their duration; the number of people that have, or will be affected; the extent to which they are reversible or can be mitigated; the extent to which they lead to cumulative effects; and by the value of benefits and costs to different groups and populations. The proposed OSEs are the starting point for this determination.

> Cumulative Effects: When frustration mounts
>
> The New Orleans CityBusiness reported 11 months after Katrina that suicide rates had tripled. Since the storm, there had been 30 documented suicides, many more were likely attributed to accidents -- all this in a city that had lost more than two-thirds of its population. (Saulny, 2006). A Harvard Medical study claimed that 30 percent of residents showed some form of mental illness, a rate twice as high as pre-storm numbers (Hurricane Katrina Community Advisory Group, 2006).

Again, this is NOT a case of one size fits all. Considering the effects that Katrina had on Buras (where the eye first came ashore) virtually all of the cells in the table will deserve careful consideration. Considering the repair of an existing levee in Belle Chasse, a much smaller set of potential effects would be appropriate. The level of effort devoted to this description should be commensurate with potential or actual impacts. It is during this period that an appropriate interdisciplinary assessment team should be identified; with the size and expertise of the team commensurate with the potential or actual impacts.

In the case of proposed activities, effects start happening with the first considerations. As Gramling and Freudenburg (1992: 217) note:

> "In the biological or physical sciences, it may be true that's impacts do not take place until concrete alterations of physical or biological conditions have occurred. With the human environment, however, measurable impacts begin as soon as there are changes in social conditions – often from the time when information about a project first becomes available…Speculators buy property, politicians maneuver for position, interest groups form or redirect their energies, stress mounts, and a variety of other social and economic impacts take place…"

2. Assessment before and after the event.

Once the assessment team is established and the appropriate level of assessment is determined, then the appropriate concepts are measured before and after the event. Part of the assessment should include an historical background with the amount of effort commensurate with the effect, or potential effect, of the event. If the event is a proposed drainage canal then the identification of the historical causes of the problem, as identified by all stakeholders, is probably sufficient. If, however, the event is a serious flooding of a coastal community, then an extended analysis of the community's historical relationship to its setting will be necessary. Knowing how the community functioned in its environment prior to the event will be invaluable in addressing restoration and resiliency issues. See Appendix C for an example of how the U.S. Forest Service (Bright, Cordell, Hoover, and Tarrant 2003) approaches "historical background."

If the event has happened (e.g. Katrina) then we must establish an historical baseline and the current conditions. If the event is a planned alteration then the current conditions must be established and projections made of post-event conditions. Reviews of the existing social science literature, public scoping, public surveys, and public participation techniques are the principal methods used by experts.. In addition to interviews of the affected population, published scientific literature, primary data, and secondary data from the affected area's historical documents, census, maps and photographs can all be used to describe the physical and human environment before and after the event.

3. Compare before and after and assess effects.

There will be gaps in the data. While current conditions are easier to assess than historical baselines or future projections, even here such gaps as out-of-date census data, and data aggregation at coarser levels than ideal will lead to imprecision. The rule of thumb here is that it is more important to identify significant change – and hence significant social effects – than it is to precisely quantify the more obvious ones (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment. 1993; 2003). In a Katrina-like situation if we know that 95 percent of the community housing stock was lost, it probably doesn't make much sense to spend a whole lot of time trying to get an exact count. Likewise, if an improved levee will potentially lead to land development behind that levee, then the exact form of development is less important than the implications of developing in that location.

4. Consider indirect and cumulative effects.

Indirect effects are those that follow from the initial, or direct effects, and cumulative effects result from the incremental impacts of past, present, or reasonably foreseeable future effects.

<u>Considering the probable future through the inclusion of a futuring process</u>. Futuring is an anticipatory decision-making process that leads to planning and program development (Sobrero, 2004). It looks forward 10, 20, or 30 years, while planning looks ahead just 1 to 4 years. The process assures that social, economic, political, environmental, and technological changes are analyzed using existing county, state, and national data centers as well as the voices of local stakeholders. It allows communities to identify issues as well as the perceived relevance and value of those issues. During the process, communities share perceptions of their observations of the critical indicators of change and determine current relevance. As communities look forward 10 years or 30 years, they point out external driving forces and the stakeholder assumptions related to relevancy, priorities and societal trends, as well as the mission of the project and availability of resources. A strength of the process is that it allows everyone involved to understand the community and culture before implementing any projects. Communities can develop scenarios for each OSE where change is likely to occur. The scenarios should range from a very desirable future to an undesirable or even catastrophic future. From these scenarios, estimates of resource allocation can be generated

5. Develop a mitigation plan.

Where the assessment involves a proposed action, not only can the assessment project likely determine effects, but it can be used to identify those effects that the community considers adverse. Once identified these adverse effects can be mitigated by "avoiding the impact by not taking or modifying an action; minimizing, rectifying, or reducing the impacts through the design or operation of the project or policy; or compensating for the impact by providing substitute facilities, resources, or opportunities (see 40 CFR 1508.20)" (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment.1993:18).

D. Short and Long-Term Impacts

There are dramatic differences in type and quantity of OSEs as the time distance from the flood event plays out. For purposes of anticipating emergency response and recovery activities in a flood disaster, the early-stage OSEs are extremely important. In these phases the impacts are often life threatening – evacuation, toxic contamination,

extreme emotional and physical stress from evacuation and relocation. However, the longer-term impacts are equally important as one considers the possibility of community recovery and future successful functioning. We, therefore, recommend that this dimension be definitely included in the post-flood analysis just as the Social Impact Assessment approach recommends its use to assess proposed flood risk-reduction actions.

Chapter 6: Conclusions and Recommendations

The conclusions and recommendations about the enhancement of OSEs from the experiences of the communities devastated by the flooding of Hurricanes Katrina and Rita within the levees are expressed below in a series of 12 observations and recommendations.

1. Full inclusion of other social effects is necessary in Corps project planning.

OSEs are now seen as a much more important account then when initially proposed in the P&G in the 1980s. Societal norms have shifted to place much more emphasis on the function and importance of “community” and “society” than in that era. Because the OSE account is not mandatory for analyzing Corps projects, bringing attention to the impacts represented by OSEs is made more difficult. Over the last 30 years, societal priorities have shifted. This team believes that all four Corps accounts (Other Social Effects, Environmental Effects, Regional Economic Development Effects, and National Economic Development Effects) should be considered co-equal and mandatory. Economic and environmental dimensions remain important but must be considered with the social. Otherwise, the project analysis process is incomplete and thus will result in faulty decision-making about the appropriateness of a Corps project and the best configuration of it vis-a-vis community-safety needs.

2. Capacity to do so very available.

The social sciences are more advanced in the refinement of OSEs than in the 1980s, and thus able to provide the technical assistance to do so. By combining a well-tested, internationally accepted approach such as Social Impact Assessment (SIA) with the newer focus on community capital, the Corps will be able to develop a fully supported OSE process to accompany the new planning process revisions. The OSE account should be able to be fully utilized. This team has proposed for this social account OSEs grouped into three major categories: Population Characteristics, Community Social Institution Capacity and Community Interpersonal Social Capital.

3. To accomplish successfully the implementation of the OSE account, a full social science staff must be put into place within the Corps.

As outsourcing engineering when there is inadequate engineering supervision has led to disastrous outcomes for the Corps, so too expecting any social planning process to be fully successful when the Corps has not committed to a full internal professional staff of social scientists – namely sociologists, social anthropologists, risk mitigation planners and dispute resolution specialists – is to ignore the reason our society believes in professional training and agency leadership. No different than the engineering, hydrology and geology expertise required to build Corps projects, the social process expertise exists and must be hired. Thus, the Corps, like the other physical mission agencies such as MMS (Minerals Management Service) (Luton & Cluck, 2000) http://www.mms.gov/eppd/socecon/files/luton-cluck.pdf http://www.gomr.mms.gov/homepg/regulate/environ/ongoing_studies/gom-se.html , NOAA, USGS, who have successfully developed applied social science capacity, should employ social scientists as well. There is no reason why the Corps cannot join these other physical mission agencies in appreciating and committing to such a professional unit within the revised planning structure. Currently, at least in the New Orleans District, the only social scientists are anthropologists, who are employed almost exclusively to satisfy the regulatory requirement that the Corps document archaeological artifacts when projects are considered, investigate environmental-justice challenges when doing the Environmental Impact Statements required by the EPA and conform to federal requirements regarding historic districts, buildings and sites. The whole idea of resurrecting the OSEs in light of the Katrina event is to bring the social effects into their own front-and-center full-fledged role, not simply to conform to specific regulations.

4. OSE process must be done very early in project conceptualization.

The timing of using the OSE analysis process is critical. When used to assess a project, it should begin at the very first stage of considering whether the Corps' resources can possibly be used to assist a community in reducing its flood risk. The reason why this team advocates such an early start is that assumptions about the appropriateness of the project (whether a Corps project will benefit the community or not) and the configurations of the structures (which alternative) begin very, very early in the process of discussion. That is one of the powerful lessons that the Social Impact Assessment process tell us. In addition, collaboration with the community should continue into each of the phases of the project so that knowledge about the project's progress can be shared and adjustments made. An example of a Corps community engagement process that includes more such community engagement than previously common is now underway for the pump stations to be placed at the lake end of the New Orleans drainage canals.

5. The finite nature of government resources begs a process to use them more effectively for flood risk reduction.

Government resources are finite and very valuable to communities to address flooding. Therefore, the OSE assessment process enables the Corps to identify with the community as a partner the best use of those resources for **the community's sustainability and resiliency.** It is very important to use these two goals – a sustainable, resilient community – to determine the impacts to be examined and then to decide how best to spend the funds and select the project based on this assessment. Especially in today's economy, no government resources should be wasted when communities need to develop flood protection.

6. The full community must be engaged for project success.

The full community, not just the geographically proximate or community leadership stakeholders, should always be involved in the assessment. Not all stakeholders have ready access to being recognized nor engaged in project development. Due to differences in wealth and political connectivity, some groups will not have equal access to the decision-making process. However, for the sake of the most successful project, social equity of participation my be a key tenant of engaging the community.

7. Building consensus will be challenging but is doable.

This team does not naïvely believe that consensus of protection goals will always come easily. While dispute resolution will likely have to be used**,** as indicated in the IWR manuscripts and the draft handbook, the tensions among different sub-group goals must be aired and resolved, not ignored and left to fester. When the Corps has not aggressively approached the community with the OSE conversation in the project planning process in the past, inordinate amounts of time, energy and agency prestige have been wasted in addressing the public response. These outcomes have directly threatened the projects. As has been evident with the post-Katrina public meetings, the force of the opposition or criticism will only build if the community's involvement in the process is delayed to post-project option decision making.

8. The SIA process will resolve differences if done correctly by social process specialists.

If done with care and commitment to the steps developed over the 30 years of its existence, the SIA process will facilitate consensus building for the proposed project. That is one of the reasons why interest in SIA has grown over the decades and its use has spread internationally. It works.

9. Dispute resolution specialists should be key part of social science unit.

There is a plethora of dispute resolution professionals and groups within major universities around the country and in private firms who can assist in the SIA process of early, consistent community engagement. In fact, some may be the ones currently engaged by the Corps to manage the after-alternative public meeting process currently implemented by the Corps. The involvement must be managed by a full internal social science staff.

10. There should be total commitment to post-disaster OSE assessment with the affected community(ies) of failed or protection-surpassed projects for every federally declared disaster.

The OSE factors, as well as impacts to the environment and cataloging the physical damage that occurred, should be part of that assessment. Such a post-mortem process provides an excellent opportunity to engage community and agency stakeholders in a critical analysis of community sustainability and the role of the project in enhancing or detracting from that goal. Additionally, such an assessment will provide information and data that will be extremely useful in the repair and rebuilding of the structure.

Important Example: An interesting example has been occurring with the development of alternative locations for the pump stations in canals that drain to the lake in New Orleans. As the interaction between the Corps and the community has evolved it has become evident that interest in safety over aesthetics has emerged although at first the emphasis of those who spoke was mostly the opposite. If the Corps had held only one or two meetings with the residents, that fact may not have emerged because the aesthetic concerns were expressed so loudly at first; the residents had an initial "knee-jerk" push back because of the beauty of their neighborhood. "On second thought," the residents are now requesting loudly to have the Corps place safety first. The longer community engagement process may "permit" the community to think through the values they want to achieve. Ultimately it will enable the Corps to move more quickly on the most safe alternative – defined not only in ultimate 1/100 protection that all alternatives will have, but in the speed of being able to implement the construction and thus to protect in sooner hurricane seasons.

11. Robust, central OSEs should be added to stakeholder MCDA exercise.

When it is determined that the process of selecting from different project options is benefited by engaging stakeholders in a comparative risk-assessment process that asks them to choose weightings from among the four accounts (Multi Criteria Decision Analysis), it is imperative that all four accounts be fully represented clearly and explained fully to the stakeholder participants. Even in its recent refinement much more effort has been devoted to the calculation and computer software aspects (more relevant to engineering expertise) than to the content, i.e. what concepts are being offered to the stakeholders for their consideration, i.e. the social process aspects? Critical OSE concepts must be added to the exercise for it to have validity as a stakeholder decision tool. Currently their minimal presence strongly challenges the tools validity.

12. Expanded Corps leadership to partner and engage other relevant government agencies and the citizens -- i.e. resource stakeholders – is mandatory to achieve nation flood risk reduction.

If a true comprehensive assessment of risk reduction is undertaken using the SIA approach, a combination – a system -- of structural and non structural methods will be revealed and appreciated for their combined, interactive benefit. The structural resource will be one. Interagency collaboration is essential on large complex water resource projects in order to bring all of the potential resources to its solution, including those that local communities and citizens can contribute and those that are not monetary such as enhanced risk avoidance land use regulations and home elevation.

The Corps is poised to be the key facilitator of this effort and cannot only ensure OSEs are integrated into the analyses, but can also facilitate the coordination necessary to leverage all possible agency resources. Stovepipes for different federal program resources are hurdles that must be overcome. Efforts by the New Orleans District – in the co-location of federal agencies key to coastal restoration -- and Corps efforts elsewhere -- under the “Silver Jackets” initiative -- show the success of this type of collaboration. These best practices and agency resources must be “packaged” for each flood risk reduction project and concerns that such packaging might be seen as “duplication of benefits’ overcome through agency and Congressional negotiations. This project team, which includes a national floodplain manager leader, believes that such packaging is possible with a strong commitment to do so. And it is mandatory if truly successful community flood risk reduction is to be accomplished.

Appendix A: Measuring Proposed New OSEs for Hurricane Katrina

Population Characteristics					
Dimension	**Indicators**	**Generic Operationalization**	**Generic Sources**	**Katrina Operationalization**	**Katrina Sources**
Population Patterns	Population size, density, birth & death rates	Population estimates. Number of births & deaths per 1,000 residents	US Census Bureau & Center for Disease Control	Total Population Estimates: Orleans 2005 estimate 453,726 * Orleans 2007 estimate 239,124 **Total loss of Population 214,124**	US Census Bureau & Center for Disease Control
Demographics	Gender, racial, & age distributions	Number of males per 100 females. Racial and age breakdowns of the areas population.	US Census Bureau	Gender shift from 53% female to 46% female. Before Katrina 53 females per 100 residents. After the storm 46 females per 100 residents.	"The Calm in the Storm: Women Leader in Gulf Coast Recovery.", Women's Funding Network and the Ms. Foundation for Women, August 27,
Vulnerable Populations	Impoverished, Elderly, Children, & Disabled	Number of residents living below the national poverty line. Number of residents over 65. Number of residents under 18. Number of disabled residents.	US Census Bureau	Traumatic experiences reported by children showed that 34% were separated from their primary caregiver while displaced; many attended multiple schools (average of 2 and up to 9 schools), 21% saw family members or friends injured; 14% saw family members or friends killed; and almost all saw hurricane damage to	"Resilience in Katrina's Children" Medscape Today by Allan Chrisman MD
Immigration & Emigration	Population trends of the community	Number of residents moving out of the area each year. Number of new people moving in each year.	US Census Bureau	Orleans Parish was already a shrinking city before Katrina. In 1990 there were 496,938 residents. By 2000 that number had fallen to 484,674 residents. And in July 2005 had reached a pre-storm low of 453,726. **Total 15 year loss = 43,212 residents**	US Census Bureau
Mortality	Increase in the death rate of the affected region	Number of deaths per 1,000 residents	Department of Health and Computer modeling	Deaths per 1,000 residents in 2004- 11.3 * Deaths per 1,000 residents in 2006- 14.3	New Orleans Department of Health
Transient Residents	Tourists & migrant workers	Number of Tourists to the community per year • Estimated number of migrant workers to area per year	Local Tourism Bureau, US Department of Labor & Statistics	On average, pre-Katrina, New Orleans hosted 8.5 million tourists per year. In 2006, that number fell to 3.7 million. By 2007, tourism was on the rise and reached 7.1 million visitors.	"N.O.. tourism industry counts on locals during slow summers" New Orleans City Business by Dean
Fatalities	Deaths linked directly and indirectly to the event	Number of residents killed as direct result of the event. And the number of residents that may die as a result of: stress, suicide, pollution, contamination, impoverishment, and devastation of the health care sector.	Computer modeling	Total event direct deaths-1,723 * Total event indirect deaths- 2,358 Total deaths - 4,081	"Post Katrina Health Care: Continuing Concerns and Immediate Needs in the New Orleans Region" A testimony to the US House of Representatives by Robert Linsay

Community Capacity					
Dimension	**Indicators**	**Generic**	**Generic Sources**	**Katrina Operationalization**	**Katrina Sources**
Education	Educational opportunities	Number of students enrolled in school (by type). Educational Achievement (measured by standardized test scores)	Department of Education & the local universities	Public School Enrollment in Orleans Parish: Fall 2004_ 66,372 * Fall 2007_ 32,887 * Loss of 33,485 Students • Private School Enrollment in Orleans Parish: Fall 2004_ 26,008 * Fall 2007_ 18,151 * Loss of 7,857 Students •New Orleans University Enrollment: Fall 2004_ 64,348 * Fall 2007_ 47,674 * Loss of 16,674 Students **Total Loss of Students: 58,016** •Orleans Parish LEAP Pass rate: Spring 2005_64% * Spring 2006_43% * Spring 2007_57%	Louisiana Dept. of Education & the Local Universities
	Educational physical infrastructure & personnel	Number of open public schools, private schools, & universities as well as the number of educators employed	Department of Education	Number of open public schools in Orleans fell from 128 before the storm to 79 in Spring 2008 (38% reduction). Number of open private schools in Orleans fell from 93 before the storm to 63 in 2007-08 (32% reduction).	Louisiana Dept. of Education, Recovery School District, & Orleans Parish Schools
Criminal Justice	Community crime/ violence safety	Number of violent crimes per 100,000 residents	Local Police Department	2005 Orleans Violent crime rate 229.3/100,000 residents 2006 Orleans Violent crime rate 292.5/100,000 residents 2007 Orleans Violent crime rate 368.4/100,000 residents	NOPD
	Police, court, incarceration, domestic violence, shelter facilities, and personnel	Number of police officers and court personnel employed	Local police Department and court houses	Now at 1,470 officers -- down from the pre-flood 2005 total of 1,668 officers -- the Police Department seeks 1,600 officers by next summer and, ultimately, 1,700	Times-Picayune

Community Capacity					
Dimension	**Indicators**	**Generic Operationalization**	**Generic Sources**	**Katrina Operationalization**	**Katrina Sources**
Neighborhood/ Housing	Housing characteristics: supply, cost, condition	Average Home Values • Number of Active Listings • Number of Home Sales Per Month • Average Monthly Rent • Breakdown by housing Type (Single-family, multi-family, etc)	US Department of Housing & Urban Development, Large Local Realtor	Avg. Home Sale Price Orleans East bank: Aug. 2005_ $244,793 * Feb. 2006_ $180,793 Home Prices fell 26% Number of Active Listings in Orleans East bank: First Quarter of 2005_1,798 First Quarter of 2006_2,527 Fair Market Rents for New Orleans MSA for a 1 bdrm apt. went from $531 in 2004 to $846 in2006	New Orleans Metropolitan Association of Realtors (NOMAR) Latter & Blum Research Division US Department of Housing and Urban Development, Fair market Rent History 2000 to 2005 and County Level Data File for 2006-06
	Residential stability	Tenancy (percentage owner-occupied and rental)	US Census Bureau	Not available	Not available
	Homelessness	Estimated number of homeless people within the area	Local Homeless centers and charitable organizations	Estimated homelessness before the event 13.22/1,000 Estimated homelessness after the event 50.18/1,000	New Orleans Mission
	Historic buildings & districts	Number of historic buildings and districts	US Department of Interior	"There are 38,000 buildings in the New Orleans' 20 historic districts, and we estimate that 8,000 to 10,000 of these were damaged by flooding. Another 2,000 to 4,000 or so buildings are eligible to be listed in the National Register districts. If you add these in, the total number of buildings that were impacted by flooding or winds is 10,000 to 12,000	Preservation Resource Center of New Orleans
Business	Commercial/ business stability & diversity	Number of Employers total and by sector	US Department of Labor	Net Change in the total number of employers in Orleans Parish: 2005 Q2_9,592 * 2007 Q2_7,482 a loss of 2,110 employers.	US Department of Labor Terrell, Dek and Ryan Bilbo "A Report on the Impact of Hurricanes Katrina and Rita on Louisiana Businesses"
	Small business sector	Number of small businesses in the area	Local Planning Commission	In the aftermath of Hurricane Katrina, an estimated 57,000 New Orleans small businesses are expected to have been destroyed and/or put out of business. With small business accounting for approximately 75% of all net new jobs in the United States, helping the redevelopment of this sector will be a top priority for New Orleans.	Urban & Regional Planning Economic Handbook

Community Capacity

Dimension	Indicators	Generic Operationalization	Generic	Katrina Operationalization	Katrina Sources
Income, Employment, Labor Force	Economic activity of population	Local sales tax collection	Local Government Finance Department	City of New Orleans Sales Tax Collections Jan 05_ $13,562,270 * Jan 06_$8,520,490 * Jan 07_$11,906,003 * Jan 08_$11,822,158. At it's worst a loss of $5,041,780 in monthly sales tax revenue.	City of New Orleans Finance Department
	Personal/ household	Median individual & household income	US Bureau of Labor & Statistics	Avg. Weekly income in New Orleans rose from $742 a week in 2005 Q3 to $887 a week in 2007 Q3	US Bureau of Labor & Statistics
	Employment/ income dispersion & stability	Median income by age, race, & gender.	US Bureau of Labor & Statistics	Women's incomes in New Orleans fell from $30,264 to $28,932; Men saw an increase in income. •In 2006, 37% of Orleans residents and 24% of Jefferson residents reported their family income decreased since Katrina.	"Pay gap between genders is the worst in LA, study shows", The Times-Picayune, April 24, 2007 Susan Howell's QOL Report
	Occupational diversity	Number of non-farm jobs/ Number of non-farm jobs by sector	US Bureau of Labor & Statistics	Number of Non-farm jobs in the New Orleans MSA Aug. 05_603,700 * Feb. 08_520,400 * **A loss of 83,300 jobs.**	Louisiana Department of Labor
	Community socioeconomic characteristics	Analysis of standard deviation of the average income	US Bureau of Labor & Statistics	not available	not available
Health & Physical Safety	Adequacy of health/ medical services	Analysis of the types of medical services offered (ex. MRI's)	Local medical centers & hospitals	not available	not available
	Access to health/ medical services	Number of hospital beds per 1,000 residents	Us Department of Health & Human Services	Nationally there are 3.26 hospital beds per 1,000 people. Before the storm in New Orleans there were 3.03 beds per 1000. In April of 2006, there were 1.99 hospital beds per 1000 New Orleanians. That's 2000 of the 4400 pre-storm beds.	"After the Storm- Health Care Infrastructure in Post-Katrina New Orleans" by Ruth E Berggren & Tyler J Curiel. The New England Journal of Medicine
	Community health risk factors- environmental, behavioral, vulnerable populations	Potentially harmful exposure, stress related illnesses	Centers for Disease Control	**Metal Illness**: In 2003 16/100 New Orleanians suffered from a mental illness. After the storm in 2005 31/100 New Orleanian residents suffered from mental illness. **Suicide Rates**: Before the storm the suicide rate in New Orleans was 11/100,000 per year or 0.75/100,000 per month. In the four months following the storm there were 26 suicides per 100,000 residents or 6.5/100,000 per month. **Alcohol Consumption**: 11% of New Orleans' residents report they have increased their alcohol consumption as a result of hurricane Katrina.	Harvard Medical School Dr. Jeffrey Rouse the Deputy New Orleans Coroner. Kaiser Family Foundation & Secretary of the Louisiana Department of Health and Hospitals
	Health/ medical facilities and personnel	Number of hospitals, pharmacies, Mental Health facilities, and Nursing homes. • Number of licensed health care professionals practicing in the area.	US Department of Health & Human Services & Blue Cross/ Blue Shield. State Health Department	53% of the 23 pre-Katrina state licensed hospitals have re-opened. • The number of Blue Cross/ Blue Shield physicians in Orleans dropped from 2,351 in 2005 to 755 in 2006. • 65% of Orleans Parish pharmacies remain closed.	Louisiana Healthcare Redesign Collaborative: Region 1 Health Care Profile: A Health Care Needs Assessment of Orleans, Jefferson, Plaquemines and St Bernard Parishes

Community Capacity

Dimension	Indicators	Generic Operationalization	Generic Sources	Katrina Operationalization	Katrina Sources
Governmental Organization	Organizational functioning & adequacy of government	Residents satisfaction with local government	Survey the population	In 2004, 78% of residents rated local government services as fair or poor.	Susan Howell's QOL poll
Community Social Services	Availability & access to the a basic range of social services	Number of childcare facilities, access to public transportation, chemical dependency treatment centers, job training centers, etc.	Department of Social Service, Department of Transportation	61% of Child Care Facilities remain closed. 19% reduction in the number of NOPD officers. 52% reduction in the number of bus routes in Orleans and an 81% reduction in the number of buses. Only 3 of the metro areas 5 ferries are currently running *Number of busses per resident before event 8.11/10,000 Number of busses per resident after event 2.88/10,000	Department of Social Service, Department of Transportation, Regional Transit Authority
Cultural, Historical Landmarks, Aesthetic Support	Recreational & cultural opportunities & participation	Number of county/ parish run parks, playgrounds, community centers, senior groups & other organizations	County/ parish parks and recreation departments	not available	not available
	Museum, sports, recreational facilities & personnel	Number of Museums, parks, arenas, etc.	Local phone directory	not available	not available
	Festival infrastructure & voluntary/ commercial personnel	Number of annual festivals held	Local tourism bureau	not available	not available

Community Interpersonal Capital

Dimension	Indicators	Generic Operationalization	Generic Sources	Katrina Operationalization	Katrina Sources
Ideal Interpersonal Conditions	Community identification/ attachment	Attachment to place, likelihood residents will leave the area	Survey the population	1/3 of area residents say they are likely to leave the area in the next two years.	Susan Howell's QOL Report 2006
	Community cohesiveness	Satisfaction with life in the area	Survey the population	In 2004, 59% of New Orleans ' residents were satisfied with their lives. By 2006, the number fell to 48%.	2004 and 2006 QOL Reports Dr. Susan Howell
Interaction Means to Achieve Conditions	Community leadership	Approval ratings of leading local officials	Local opinion polls (local newspapers)	In 2004, 84% of white New Orleanians and 47% of black New Orleanians approved of Mayor Nagin. In 2006, 23% of white residents and 61% of black residents approved of Mayor Nagin.	2004 and 2006 QOL Reports Dr. Susan Howell
	Political organizations & citizen political involvement	Voter turn out	Local elections division	In the 2002 mayoral election voter turnout, was 46% (133,601). It fell to 36% (108,348 of 297,909) in the 2006 mayoral election. • 43% of Jefferson Parish registered voters have not voted since the storm.	Louisiana Elections Division and WWLTV (Maya Rodriguez)
	Voluntary associations & membership	Volunteer Membership rates	Survey the population	Not available	Not available
	Religious organizations	Number of religious/ worship centers	Number of religious/ worship centers listed in the local phonebook	In April 2008, the Catholic Church announced 27 church parishes would be closed or merged with other parishes. Phone book comparisons reveal a net change in the number of religious centers.	Times Picayune
	Friendship/ family networks	Average number of friends/ family members living in the area	Survey the population	Divorce rates are up 10% in Jefferson Parish & 7% in St Tammany Parish since Katrina.	"Untying the Knot: Divorce filings increase after Katrina" Fritz Esker
	Print & electronic media array, diversity, access	Number of local TV news stations and news papers	Federal Communications Commission	Not available	Not available

Appendix B: Vignettes from Hurricane Katrina Reported in Media

1. Population Characteristics

- *Size, density, births, deaths*
- *Ethnic, racial, age and gender composition*
- *Vulnerable populations*
- *Permanent and temporary (im/e)migration*
- *Transient residents (including tourists)*

Potential reconstitution of racial and class composition following disasters: A civil rights lawyer suggested in a news report that the dislocation of many African American residents indicated that "it's very clear that there are those who are interested in reconstituting the demographic and literally changing the face of Orleans Parish" (Tilove, 2005).

Population dislocation impacts public transportation: New Orleans' daily newspaper displayed the tension between restoring transit service and justifying its expenditures: In October 2006, the Regional Transit Authority had daily weekday average between 20,000 to 23,000 riders. Before the hurricane 125,000 people rode on weekdays and 35,000 on the weekends. Commissioner Barbara Major explained that "we need to show (FEMA) proof that the population has grown. But they (riders) can't come back if they can't ride. That leaves us stuck between a rock and a hard place" (Donze, 2006).

Restoration of the streetcar line provokes uncertainty about the return of people back to the city: A news report worried about the solvency of the reopened St. Charles Streetcar line: "Will there still be people for it in a city missing much of its population? Less than a quarter of pre-storm riders are using the transit system, buses included. On a recent morning, tourists in town for a football game packed the streetcar going Uptown. But going downtown, in the direction of the jobs, the old wooden benches were sparsely filled: a maintenance man here, a construction worker there, a housewife or two and the odd professional" (Nossiter, 2007).

Vulnerable Populations **African-American middle class dislocation:** A reporter for a national newspaper reminisces about the suburban New Orleans East neighborhood she grew up in – and yet exposes the vast uncertainty that still inundates the city two years after Hurricane Katrina: "One of my parents' favorite talk-over-the-fence neighbors, Michael Darnell, a lawyer, is not over the fence any more. (Not that there's a fence any more, either.) Mr. Darnell has been unable to repair his house because of delays hampering the Road Home, the state grant program for people who lost their homes. "From the perspective of African-American professionals, there's still a question about where this city is going," said Mr. Darnell, who is renting an apartment elsewhere in New Orleans. "I'm seeing a disintegration of what this community stood for, and people are still traumatized" (Saulny, 2007).

Vulnerable Populations **The storm's impact upon the elderly:** Recalling neighbors who have left New Orleans following Hurricane Katrina, the reporter writes: "Some of our relatives and friends were too old and feeble to rebuild. They are gone from the city for good, and we ache for them. Others were too angry to stay, overcome by the levees' unnecessary failures. We understand their need to move on" (Saulny, 2007).

Vulnerable Populations **Displacement separates teenagers from their parents:** An increasing number of students attending New Orleans public schools before the storm have returned afterwards – without their parents or permanent guardians. One report underscores the potentially volatile consequences: “They are here on their own,” Wanda Daliet, a science teacher said. “They are raising themselves. And they are angry” (Nossiter, 2006).

Vulnerable Populations **Teens with their families, too, are growing up fast:** A 17-year-old Chalmette girl, living with her family in a trailer outside their damaged home, discloses to a reporter about the emotional change in her life since Hurricane Katrina: “I don’t plan anymore. I learned tomorrow may never come. I want to know, when I look back, that I had lived life to the fullest” (Bohrer, 2007).

Vulnerable Populations **Children relive the flood trauma:** Hurricane Katrina continues to a major impact upon young children – illustrating lingering fears of reliving the horror they experienced in escaping its ravaging floodwaters, or even just viewing media images of people doing so. A news report focused upon therapists utilizing art to understand this trauma: “One of the most common images in children’s art is the house: a square, topped by a pointy roof, outfitted with doors and windows. So Karla Leopold, an art therapist from California, was intrigued when she noticed that for many of the young victims of Hurricane Katrina, the house had morphed into a triangle. “At first we thought it was a fluke, but we saw it repeatedly in children of all ages. Then we realized the internal schema of these children had changed. They weren’t drawing the house as a place of safety, they were drawing the roof” (Dewan, 2007).

Vulnerable Populations **Disproportionate impact of Hurricane Katrina upon the elderly:** A newspaper report highlighted that over 70% of the dead were aged 60 or older, nearly half were aged 75 or older, and that post-storm housing, healthcare and services have largely failed to return, or is too expensive: “There is simply no place for them to go in New Orleans,” said a Houston, Texas advocate working with more than 2,000 households displaced by last year’s hurricanes (Lyman, 2006).

Vulnerable Populations **Recovery from disaster much harder for the elderly:** “At no point in your life is it easy to pick up and be displaced, but it’s especially tough for senior citizens,” said an elder advocate. “There are lots of evacuee issues that affect everybody, but they seem to affect seniors especially, because they can’t bounce back so easily” (Lyman, 2006).

Vulnerable Populations **Disasters’ impact upon house pets and companion animals:** Hurricane Katrina also profoundly affected human evacuees’ animal companions. Many people thought they would only be away from home a short time, so many pets were left behind. Animal control organizations rescued thousands of these animals, according to a newspaper story. “We went with the military on their search-and-rescue,” said an animal control officer. “When they went house-to-house, we went with them” (Persica, 2005).

2. Community Capacity

Education

- *Educational opportunities*
- *Educational physical infrastructure and personnel*

The long road towards recovery: A national newspaper noted: "The smell of gasoline fills the ruined gym each evening as a generator sputters to life. A string of bulbs provides thin lighting above the weight-lifting equipment that sits on a warped and abandoned basketball court. A makeshift dressing area for the South Plaquemines High football team spreads beneath one backboard, where floodwaters from Hurricane Katrina rose above the rim ten feet off the floor" (Longman, 2007).

Schools **Children carry the trauma of disaster into school:** The continuing impact of Hurricane Katrina was recounted: "Countless articles and at least five major studies have focused on the lasting trauma experienced by Hurricane Katrina survivors, warning of anxiety, difficulty in school, even suicidal impulses. But few things illustrate the impact as effectively as the art that has come out of sessions under the large white tent that is the only community gathering spot at Renaissance Village, a gravel-covered former cow pasture with high truancy rates and little to occupy youngsters who do not know when, or if, they will return home" (Dewan, 2007).

Youth return without their parents, negatively impacting education: A national news report notes that a New Orleans high school teacher and a guard "were beaten so badly that they were hospitalized. The surge hints a far-reaching phenomenon after Hurricane Katrina, educators here say. Teenagers in the city are living alone or with older siblings or relatives, separated by hundreds of miles from their displaced parents" (Nossiter, 2006).

Schools **In disaster's wake, disaster capitalism?** New Orleans' public school system was in crisis even before Hurricane Katrina devastated it. Since then said a report, a grand educational experiment has unfolded. Officials converted 43 salvaged schools to free-market charter schools – with varying levels of results. Persistent problems include the lack of instructional materials, library books, janitorial services and buses to transport students to and from school (Berger, 2007).

Schools **Public schools nevertheless emerge:** The same report analyzed that "at one such school, Lafayette Academy, the experience of a charter group with the profit-making company it hired to manage instruction offers a cautionary tale of how well-meaning trustees can easily stumble, and of how privatizing management is often far from a panacea. It also offers lessons in how a nimble, determined organization of amateurs can turn things around. Lafayette's trustees eventually booted out the national company and installed a veteran principal with New Orleans gumbo in his veins. This year Lafayette is by all appearances humming like the solid school it was meant to be" (Berger, 2007).

Schools **Resilience in the face of obstacles:** Other schools which have returned seemingly intact following Hurricane Katrina have been closed and relocated, due to the discovery of mold and safety issues. One report quoted the principal of a Treme elementary school: "The first move was unexpected, but certainly the process was seamless. It was just as if the kids went home for Thanksgiving break and that Monday morning, they were back in class" (Simon, 2008).

Schools **Higher education adversely impacted by disasters:** Uncertainty over how higher education institutions would fare following Hurricane Katrina commanded several news stories. Aside from the University of New Orleans, all colleges and universities in the city were closed for the fall 2005 semester. One university president said: "I think people realize that we have gone through an unbelievably traumatic experience, and that is going to have an impact on us at least in the short run, perhaps academically, and for sure, financially" (Warner, 2005).

Criminal Justice

- *Community crime/violence safety*
- *Police, court, incarceration, domestic violence shelter facilities and personnel*

Domestic violence in the wake of disasters: Domestic violence escalated in the aftermath of Hurricane Katrina, yet the network of shelters and crisis support groups were also devastated by the storm. A news report quoted the executive director of one program: "People are at the end of their rope, and this storm has just made them snap" (Hunter, 2005).

Crisis lines overwhelmed: Crisis lines too were inundated with unprecedented call volumes, all the while counselors listen for unspoken pain, noted another report. A call center director defined the crisis: "Housing and financial issues, plus the lack of basic services and limited resources have made the situation here more desperate" (Bynum, 2007).

Crisis personnel empathize through their own losses: The counselors themselves empathize so well in part because the callers reflect pain they experienced themselves, said the same report. One phone representative noted: "I was a renter, but I lost my home and contents. I can relate to callers because I know what it's like to lose everything. When people call, the focus isn't on me, but in the long run, I think it helps me as well" (Bynum, 2007).

Restoration of crisis services following disasters: The crisis line in New Orleans never went down during Hurricane Katrina, said this report. But it had to be rerouted to Monroe, Louisiana and operated by volunteers from around the country. Its database had to be restored from scratch and is constantly updated. Phone counselors and callers alike continue to need the service: "We still have New Orleanians in 50 states who just want to talk to someone who understands" (Bynum, 2007).

Property crimes following disasters: In the months following Hurricane Katrina with most residents absent, a police officer remarked in a news story about thefts of the remaining possessions upstairs and the impact on their owners: "Those people out there who are stealing are taking the last of people's belongings and dignity. And that's all some people have left" (Lee, 2005).

Emotional challenges faced by rescue personnel: A report underscored the tremendous personal losses rescue workers and animal control personnel endured following the hurricane, leading to the loss of many staff, said an SPCA executive director: "We've lost our entire animal control staff. They've seen so many horrific things. They've seen dead people, dead pets, animals that are chained that drowned on the chain. And they just say, "You know, we need a break and I don't want to be here for a while'" (Persica, 2005).

Collapse of mental health services in the wake of Hurricane Katrina: A paranoid schizophrenic walked out of the Touro Infirmary ER, declining treatment from a physician, went home and "repeatedly stabbed his 77-year-old mother in the driveway of their Uptown home." Interviewed by police from her hospital bed, the mother said her 40-year-old son "had been off his medication for months." The man, "like many emotionally disturbed New Orleanians these days, ended up in jail because psychiatric services have all but collapsed since Hurricane Katrina" (Maggi, 2007).

What police face every day: "Here's a typical day at work for the NOPD Crisis Intervention Unit: A 20-year-old woman puts her 1-year-old and 5-month-old to sleep as she prepares to take her own life. A 48-year-old man, homeless and wracked by his mental illness, roams the streets naked, covered in feces. A 38-year-old man, diagnosed as a paranoid schizophrenic, barricades himself in his home after running through the streets with a knife, threatening to harm his neighbors. A young 14-year-old in utter despair and anger attempts to set his school on fire. They are all ticking time bombs, poised to harm themselves or someone else." (Tebo, 2007)

'Ticking time bomb' explodes: a man described by New Orleans police as a mentally ill vagrant allegedly wrestled a gun from a police officer and shot her to death, another news story reports. The suspect's family said he was diagnosed as a paranoid schizophrenic with violent tendencies when he was 19. Homeless and bounced around mental facilities, he's now at Orleans Parish Prison – He has plenty of company there. In post-Hurricane Katrina New Orleans, where hospitals are still not operating at capacity, the prison's 60 psychiatric beds make it the largest acute-care psychiatric facility in the city with only one full-time psychiatrist and two working part-time (Foster, 2008).

Following Hurricane Katrina, people are jailed because of the lack of psychiatric care: "We have read recently of New Orleans' lack of mental health facilities and resources, and it is with utter amazement that this particular need – and the needs of those who suffer from the medical disability of mental illness – has been met with total neglect from some hospital administrators. As it stands today, more than 300 prisoners in Orleans Parish Prison suffer from debilitating mental illnesses. As a mental health professional, I would venture to say that had they received proper treatment, most of them would not have found themselves in jail. Family members will tell you that they are not bad people, they simply are too sick to understand right from wrong. With proper treatment, they are good people and good citizens of our community" (Tebo, 2007).

Neighborhood/Housing

- *Housing characteristics: supply, cost, condition, tenancy (rent vs. own)*
- *Residential stability*
- *Community sub-area infrastructure, public service and neighborhood businesses*
- *Homelessness*
- *Historic buildings and districts*
- *Household/Family*
- *Density*
- *Dissolution*

Rents skyrocket in the wake of disasters: An attorney decried mass evictions of tenants in a news report: "throwing people out so you can raise the rents in a time of disaster and a shortage of housing clearly flies in the face of elementary fairness" (Tilove, 2005).

Homelessness **Rent hikes prompt homelessness following disasters:** Many former renters whose New Orleans-area apartments flooded or were evicted after the storm by landlords seeking higher rents, found themselves literally 'under the bridge' and homeless. Hundreds of people remain camped out in parks, backyards, and in one infamous concentration, underneath the Interstate 10 expressway towering over Claiborne Avenue (Thomas, 2008).

Damage from disasters prompt residential rearrangements: Flooding from breached floodwalls inundated the first floors of most homes and apartments, but left many second floors spared a newspaper story reported. Rather than staying on relatives' couches, in motels or FEMA trailers, "uncounted multitudes in the New Orleans area consigned to a second-floor lifestyle" (Waller, 2005).

Homelessness **Living in part of their homes better than being homeless:** Second floor dwellers adjusted to the loss of electricity, hot water, kitchens and other areas, said an accompanying report. One man living in Broadmoor rigged up two car batteries to power fans, and brought to his electrified workplace items like laptop computers, electric razors, and battery chargers. "There was a day when I just thought, 'Tomorrow, I'm sleeping in my own bed.' I bought a bigger cooler, and that was it" (Langenhennig, 2005).

'Home' is the desired prescription following disasters: Drawings, photographs and sculptures by children recounting the storm experiences and trauma from Hurricane Katrina have been shown at the New Orleans Museum of Art and the New Orleans Jazz and Heritage Festival. They powerfully show that the storm is still continuing for these children and their families, nearly three years later: "The real prescription for these families is to get them back into a normal community," said Dr. Irwin Redlener, the co-founder of the Children's Health Fund. "We're treading water doing these things, when I'd like to take my prescription pad and write, 'Home' " (Dewan, 2007).

FEMA Trailers prompt lifelong ailments: Temporary housing supplied by the Federal Emergency Management Agency (FEMA) has been implicated into producing health ailments in adults and children – some which maybe lifelong, according to a wire service report. FEMA has acknowledged testing for formaldehyde exposure as being five times the normal levels. A young mother housed in one while pregnant now has a 15-month-old girl with severe asthma. The girl must inhale medicine through a breathing device: "If I had known it would get her sick, I wouldn't have stayed in the trailer for so long" (AP, 2008).

Finding affordable housing means renters must buy the appliances: A newspaper recalled the reaction of a couple in Mid-City which searched for months to rent half of a duplex for $950 a month – provided they purchased their own refrigerator, stove and air conditioning units: "Those were considered 'luxury items'" (Saulny, 2006).

Homelessness **Rent hikes since Hurricane Katrina prompt family to live in their business:** A national newspaper reported that a mother and four children are living in the small office of a laundry her family owns in Mid-City. "I can't afford the rent around here – it's gone up almost double," said the mother, whose three bedroom home in Broadmoor had flooded (Saulny, 2006).

The limited return of small landlords, limiting further the availability of rental housing: A newspaper noted that in addition to many homeowners awaiting insurance settlements or governmental assistance, "uninsured, small-scale landlords are also waiting for help, and their languishing properties are contributing to pockets of emptiness in almost every part of town, experts say. A shortage of affordable housing and workers is compounding the problem" (Saulny, 2006).

Housing grants premature expiration sent families back into turmoil: Expecting to have one year's support from FEMA for housing relief after losing their homes during Hurricane Katrina, a national newspaper story reported that the federal agency demanded that those who qualified for long-term assistance reapply or begin paying for their rent and utilities. Quoting one distressed parent, who had enrolled her son in school in a Houston suburb: "It's stressful, but I thought I had it together" (Dewan, 2006).

Many apartment developers after Hurricane Katrina holding tax credits lag in offering supportive housing: A national newspaper spotlighting New Orleans' intense homelessness crisis noted that "many apartment developers who applied for tax credits after Hurricane Katrina were required to set aside 5 percent of their units for supportive housing, but because of high construction costs and other factors, far fewer units than expected are in the pipeline – and without [rent] vouchers, even those units will not be affordable" (Dewan, 2008).

'Road Home' housing program effectively excluded renters, said report: A national newspaper underscored that the housing crisis in New Orleans following Hurricane Katrina was made worse by governmental failure to provide an affordable return for the majority of pre-storm residents. Quoting a local civil rights attorney who filed a federal complaint regarding the state housing program: "The state has misleadingly named its programs as 'The Road Home Housing Programs' despite the fact that the planned expenditures will not provide a realistic road home for most of the people with low and moderate incomes" (Saulny and Rivlin, 2006).

Business

- *Commercial/business stability/diversity*
- *Small business sector*
- *Informal exchange (bartering) networks*

Small Business **Insurance limitations upon small business inhibit recovery:** Many small businesses also discovered the limitations of insurance policies following Hurricane Katrina. One report quoted the owner of a plant store and garden center: "We were under the impression that the insurance company would come to your aid immediately rather than inundate you with paperwork. We paid business interruption insurance for 21 years, but as yet we haven't received a penny. We're disappointed" (Mowbray, 2005).

The ripple effect of business losses due to disasters: In many cases insurance companies requested documentation before it would pay off on claims. This same article reported that adjusters sought information that was lost in the storm. Compounding situations were losses experienced by related firms that usually would provide back-up, including tax preparers and bookkeepers – whose offices were also destroyed (Mowbray, 2005).

Small Business **Collective Vietnamese community action brings back neighborhood businesses key to recovery:** A weekly newspaper noted that "at the entrance to the subdivision, 24 businesses have sprung back to life, including restaurants, grocery stores and even a dentist office." Key to the success of the restoration was "working together, they set about gutting and restoring their homes [and businesses]." Negotiations with utility providers to provide electricity netted "500 signed requests for electrical hookups. By November [2005], Versailles had electrical power and water lines" (Hill, 2006).

Major employer relocates because of the high cost of insurance: A national newspaper reported that a major industrial employer on the Mississippi Gulf Coast is shifting its operations to Tennessee, due to the soaring cost of commercial insurance. The firm, whose headquarters is in New Orleans, having won wide acclaim because it had reopened just ten days after Hurricane Katrina's August 29, 2005 landfall, "says it cannot get enough insurance to cover its plant here, and cannot hire enough skilled workers to replace those who never returned after the storm, mostly because they had nowhere to live" (Eaton, 2007).

Small Business **Skyrocketing homeowners insurance costs impacting business owners:** The escalating cost of homeowners insurance along the Gulf Coast is impacting negatively business owners, who are considering leaving the region two years after Hurricane Katrina because the cost of insuring their own homes is becoming prohibitive, said one newspaper story. The report also underscored that policy holders are tiring in their fight to receive what they perceive as just compensation for losses incurred: "You're so worn down by everything you've been through that you just don't have the fight left in you" (Eaton & Treaster, 2007).

Small Business **Restaurant owners face daunting challenges staying in business:** Celebrated culturally for providing visitors and residents alike the food that New Orleans is acclaimed the world over for, restaurants were amongst the first businesses which reopened following Hurricane Katrina, said a national news story. Nevertheless as businesses they face indomitable odds staying in business. While finding and retaining workers with decent wages remains a challenge, returning owners also grappled with sporadic power outages and even water in natural gas lines, which threatened to damage kitchen equipment. Said one proprietor: "I know people say, 'My God, a year later and you're not any further than this?' They just don't understand. We're all taking a whipping down here" (Severson, 2006).

Small Business **Small business sector IS the economy:** One year following Hurricane Katrina, many small enterprises throughout New Orleans struggle to remain open for business. Many more had yet to reopen, or were forced to relocate, according to an assessment by a national newspaper. A proprietor of New Orleans-themed gift, spice and hot sauce shop at Louis Armstrong International Airport, who had already taken out home loans, maxed-out her credit cards and whose husband staffed the cash register each day after her one employee failed to return after the storm, worried aloud about the future and flavor of the city which these businesses sustain: "What I'm fearing now," she said, "is that we're going to lose more of the mom-and-pop places that made it so special here" (Eaton, 2006).

Small Business **Commercial business diversity at stake:** Employing watery metaphor, this news article underscored that small businesses are the backbone of New Orleans: "Even before the storm, New Orleans's economic ship was powered not by a couple of whales, but by a school of minnows. The city estimates that 95 percent of the 22,000 businesses here before Hurricane Katrina employed fewer than 100 workers (fewer than 25, in most cases). These included not just shops, but also the artists and manufacturers and wholesalers that supplied them, and the accountants and lawyers and cleaning companies that served them" (Eaton, 2006).

Level of flooding determines level of business return, report suggested: The return of stores and shops following Hurricane Katrina largely has been determined by amount of flooding a given neighborhood had endured. This report cited a geographer, who suggested that "each foot of flooding reduced the percentage of businesses that have returned by about 10 points" who then contrasted the return of businesses on relatively unscathed Magazine Street with the much more damaged St. Claude Avenue (Eaton, 2006).

Small Business **New Orleans small business entrepreneurs unite for recovery:** This special report also spotlighted efforts to unite business proprietors to harness grant funds to restart businesses as well as to share in public advocacy for government attention to their plight: "Hundreds of small business owners have formed Second

Wind, an advocacy group modeled on one that grew up in Manhattan after September 11." A specialist involved with both efforts noted however that while the government in New York allocated $500 million in grants for small businesses, "In New Orleans, almost a year later, we can't even get Baton Rouge or Washington to put real grant relief on the table. Since it accounts for more than half the economy, including most of the tourism and almost all the culture, letting the small-business community wither will only hurt long-term recovery" (Eaton, 2006).

Small Business **Reopening of ice cream shop, a sweet return after the storm, feeds the soul as well as the palate:** The reopening of Angelo Brocato's Ice Cream in New Orleans' Mid-City neighborhood was reported in a national newspaper story: "Ice cream's restorative powers are well known. Just ask any 4-year-old. But the question here is, can ice cream help restore an entire city?" Noting that it was one of the first businesses to reopen in the heavily flooded area – and considered not reopening – the grandson of the founder surmised that ice cream wasn't all that people lined up down the street arrived for: "They have a void that everyone is trying to fill. They want that comfort that everything is back to normal, some sense that their lives are back in place. They're not just coming here to shop" (Nossiter, 2006).

Income, Employment, Labor Force

- *Economic activity of population*
- *Personal/household income*
- *Employment/income dispersion/stability*
- *Occupational diversity*
- *Community socioeconomic characteristics*

Disasters' impact upon employment: The losses experienced by businesses extend to their employees, said one newspaper report. A specialty wood-working business was closed after Hurricane Katrina and had to let go its seven employees. Its owner noted: "If we don't get any kind of a loan or anything, I'm not staying in New Orleans" (Mowbray, 2005).

Impact of disasters upon scarce occupations: A newspaper photographer came across an entrepreneur whose occupation was especially scarce in the wake of Hurricane Katrina, a barber. Found under a tent canopy around the corner from his flood-damaged shop, he gave customers hair trims with his equipment powered by a portable generator. The proprietor had "been offering haircuts to anyone who stops by in exchange for 'a tip, food or whatever'" (Zdon, 2005).

Victim of post-Hurricane Katrina city layoffs: A newspaper report told the story of a laid-off supervisor of 911-emergency dispatchers, who found out firsthand about crisis when she could no longer afford to pay her $367 a month insurance premiums, all the medicines she needed to treat her high blood pressure, or the $250 it would cost to see a private doctor. A patient in one of the city's few open emergency rooms, she was told she would need transfusions to treat her anemia – and had to go eighty miles away to Baton Rouge to get treated, as there were no beds available for uninsured patients (Eaton, 2007).

Unveiled comments suggest that getting rid of the poor is an opportunity flooding from Hurricane Katrina afforded: A national newspaper noted U.S. Representative Richard H. Baker, a Republican from Baton Rouge, said just after the hurricane: "We finally cleaned up public housing in New Orleans. We couldn't do it. But God did," (Saulny, 2006).

Returning community beckoned employers seeking workers after storm: A weekly newspaper noted that one benefit of the mass collective return of the Versailles neighborhood in New Orleans East following Hurricane Katrina was “employers from around the city coming to recruit desperately needed service workers” (Hill, 2006).

Mixed report on community socioeconomic statistics after the storm: A news report highlighted the demographic and economic shifts experienced by New Orleans following Hurricane Katrina: “As a city in flux, New Orleans remains statistically murky, but demographers generally agree that the population replenishment after the storm, as measured by things like the amount of mail sent and employment in main economic sectors, has leveled off. While many poorer residents have moved back to the city, the “brain drain” of professionals that the city was experiencing before the storm appears to have accelerated” (Dewan, 2007).

Immigrants challenge substandard wages: A national newspaper reported that a group of hotel workers recruited from outside the U.S. filed suit against their employer, citing lower wages than promised: “The amount of money we’re earning, it’s not enough to get our investment back and send money home – it’s not enough to survive,” said one worker who immigrated on a special work visa from the Dominican Republic (Eaton, 2006).

Local workers charge immigrant labor has undercut wages: While some immigrant rights advocates charge that some employers failed to pay meaningful wages for meaningful work, the same report noted that “local residents have complained they are being undercut for rebuilding jobs.” Said a lawyer representing both, citing the $6 to $7 an hour wages paid to the immigrants: “That is not what you have to pay a desk clerk in your luxury hotel here, and it is not a living wage to live here,” (Eaton, 2006).

Day laborers face hardships amidst plentiful work after storm: A journalist from a national newspaper observed in an op-ed piece that “the money was good after Katrina, in August 2005, and the work pace was frantic. Men were recruited for jobs that were plentiful, though seldom as good as promised. Conditions were dangerous and sickening. A glut of workers soon lowered wages for everyone. Intimidation and abuse were common, often by contractors, sometimes by cops” (Downes, 2007).

Immigrant workers bailed out of jail by survivors’ council repay the favor: “After 17 Latino day laborers were arrested in Gretna, a suburb, in February, they were bailed out of jail. Not by anyone they knew, but by members of the New Orleans Survivor Council, an organization of African-Americans that meets at a church in the Lower Ninth Ward” according to a news report. Organized themselves as Congreso de Jornaleros, or Day Laborers’ Congress, the workers who faced charges of loitering in public repaid the favor by helping rebuild the flooded home of an elderly Survivor Council member (Downes, 2007).

New Orleans musicians return after Hurricane Katrina face challenges: “People don’t think artists as a category of workers,” a cultural advocate noted in a news report about New Orleans’ music scene following Hurricane Katrina. While world-renowned for its music and cuisine, the city’s musicians largely get by hand-to-mouth, with many traditional music venues and bars which supported their mostly meager existence failing to reopen after the storm. The city’s former music industry director said that “figuring how to translate that authenticity to economic development has been the challenge for all these years,” (Park, 2007).

Health and Physical Safety

- *Adequacy of health/medical services*
- *Access to health/medical services*
- *Community health risk factors – environmental, mental health exposure, vulnerable populations*
- *Mortality rates, causes*
- *Health/medical facilities and personnel*

Healthcare Access **Closure of Charity Hospital curtailed access to health and medical services:** "It is my observation that since the closing of Charity Hospital people have been coping with lower standards of health care. People without insurance had little choice but to go to Charity Hospital before Hurricane Katrina, now their choices are even more limited, and sometimes non-existent,"(Craft-Kerney, 2008).

Destruction of community: Most of New Orleans following Hurricane Katrina reflected this returning Broadmoor resident's worst fears: "Everything was dead. I was in the military and the smell reminded me of dead bodies" (Shevory, 2007).

The emotional toll of uncertainty: Families had learned of the deaths of loved ones, yet experienced months of waiting and uncertainty to reclaim their bodies for funerals, said a newspaper report, quoting the daughter of a deceased mother: "It's been a nightmare" (Scott, 2005) .

When delay becomes unconscionable: In an accompanying newspaper editorial decrying the delay of the release of a family's identified loved one's body, it noted that "hundreds of other families are suffering through the same agonizing wait. This is unconscionable. People have endured more than enough indignities since Hurricane Katrina struck. They shouldn't have to wait for months to give their loved ones the memorial they deserve" (Editorial, 2005).

Destruction of community: The return of this neighborhood though was far from certain. Most of New Orleans following Hurricane Katrina reflected returning residents' worst fears: "Everything was dead," said one resident. "I was in the military and the smell reminded me of dead bodies" (Shevory, 2007).

The aftermath of disaster limits return home: Lower Ninth Ward residents were not permitted to enter their neighborhood until early 2006, more than three months following the storm. A newspaper report quoted two officials underscoring safety concerns: "We're still finding remains. It's not free access," said one. A police official then said: "It's an unsafe environment" (Filosa, 2005).

Fire danger of temporary housing following disasters: Addressing interim housing needs with the use of travel trailers presents safety issues. Constructed mostly of metal and tightly configured, fire safety becomes a major concern. One report noted firefighters battling a blaze which engulfed one trailer and damaged two others: "They did a great job of averting disaster. But what's going to happen next time?" Another fire official quoted in the story dubbed the trailers "little matchboxes" and posed what the future might bring: "Winter's coming up, heaters could be lit, gas leaks could occur" (Hurwitz, 2005).

Disaster relief brings on anxiety?: A news report noted that many people who received "excess" government relief and would have to pay it back now endure added anxiety. Describing the climate hurricane victims felt when relief funds were accepted, even if recipients were cautioned in advance of potential overpayments, one legal aid attorney said: "It was in writing, but there were pages of documents that were shoved across the table at them to sign and return. They weren't necessarily reading the fine print. We're dealing with people who were in an extremely emotional state and were just moving waves of paper to make sure they're able to access whatever is available to them" (Heath, 2007).

Healthcare Access **Closed hospitals force patients to travel long distances for healthcare:** A front-page article reported about a 59-year-old heart patient who lost his health insurance after Hurricane Katrina has been forced to shuttle in between Charity Hospital system facilities over sixty miles away because of the continued closure of its flagship Charity Hospital in New Orleans. "Without Chabert [Medical Center in Houma], I would have no care. Without the pharmacy at Earl K. Long (Medical Center in Baton Rouge), I could not afford my prescriptions. I am grateful for all that," he said. "It's just that there is a series of dog and pony shows and hoops and fences you have to go over to get through it" (Moran, 2007).

Healthcare Access **Health conditions worsen for patients who have to travel outside the city for care:** a reporter noted that "a nurse at a neighborhood clinic says that travel can hamstring patients who do not own a car. She had a patient who she suspected was suffering from prostate cancer, and she tried to send him to the Charity Hospital in Houma for further evaluation. He had no car, and even if he did, he could not get an appointment for months" (Moran, 2007).

Healthcare Access **Patients even recommended to go outside the country for care:** The same news report suggested that maybe overseas travel might get the patient the healthcare he needed: "What he did have, however, was a niece in Nicaragua who worked as a doctor." The nurse at the St. Cecilia Clinic in consultation with her colleagues suggested that going there could afford him the support he needed with less difficulty: "I have been a nurse for 30 years," she said. "I never thought I would have seen anything like this" (Moran, 2007).

Healthcare Access **Health conditions worsen in the wake of disaster:** A man who suffered a stroke in February 2007 was treated the day it occurred at University Hospital. "Unfortunately he was not referred to physical therapy to alleviate the effects of the stroke until October 2007 [The hospital did not offer physical therapy services until then] Because of this delay it is unlikely he will ever fully recover from the stroke. He continues to have difficulty speaking and requires a cane to walk," the patient responded (LeBlanc, et al. 2008).

Healthcare Access **Even people with insurance lack hospital options:** A mother whose son suffers from asthma resides in eastern New Orleans. "Whenever he has an attack, she drives past the vacant Methodist Hospital about three miles from her home, to Children's Hospital" more than ten miles away and "about 20 minutes even in mild traffic" reports a newspaper story. "It's 20, 30 minutes, then they might not have a bed, then you have to wait for hours," she said (Reid, 2007).

Healthcare Access **The closed VA Hospital delayed healthcare for local veterans:** "If the bone fusion had disintegrated the summer before Hurricane Katrina," a front page newspaper story said that the Air Force veteran "would have made the short drive from his home in Slidell to the veterans' hospital in downtown New Orleans to have it resealed." Instead he needed surgery after the storm. With the hospital then closed for more than a year, "his case file was shipped to the veterans' hospital in Jackson, Mississippi, where doctors tarried over it for two months before arranging for him to have the surgery – in Houston," (Moran, 2007).

[Healthcare Access] **Patients throughout the Gulf South impacted by closed VA hospital:** The same article disclosed that "while veterans can go to private hospitals if they have a heart attack or other emergency, they have to use veterans hospitals in Houston, Little Rock, Arkansas; Biloxi, Mississippi; or Memphis if they need elected surgery or laboratory work." Convinced that the surgery he needed would have happened quicker had the Veterans Administration Hospital been open in New Orleans, the Air Force veteran endured "every day that passed without the operation was a day he was confined to a wheelchair," (Moran, 2007).

"Don't bring your parents back if they are sick": Another article quoted a former internist there now practicing and residing in a New Orleans suburb: "I've been telling people, don't bring your parents back if they are sick," (Eaton, 2007).

[Healthcare Access] **Closed hospital psychiatric facility leads to death of patient:** Depressed about his brother who suffered from sickle cell anemia, a young man "tried to inhabit his sibling's world and take the mantle of his pain. He could not sleep or eat and began disappearing on rambling walks." Just days later "his family took him to the hospital for a psychiatric evaluation, initiating a tragic chain of events that would end with him becoming the latest patient to suffer or perish because of the dearth of mental health beds in the city, especially for patients without health insurance." The 23-year-old died after jumping from the back of an ambulance that carried him from University Hospital in downtown New Orleans which lacked mental health beds, to go almost fifty miles away to a state psychiatric hospital in Mandeville, according to a front-page newspaper report (Moran, 2007).

Wait times void needed healthcare in the wake of the storm: "The closure of Charity Hospital has also limited the ability of local clinics to offer life and cost-saving preventative care. At Charity Hospital [before Hurricane Katrina], we could refer patients to have a mammogram, a pap smear, or another screening procedure at no charge."… "Even when there are specialty services available through [University Hospital or other Charity system hospitals statewide], like OBG/GYN or orthopedic services, the referral process is lengthy and our patients may, without intervention on our part, wait months for appointments that they need. I have had patients who have had to wait for chemotherapy, and one patient who was told she would have to wait for months for a prenatal check up although she was already six months pregnant," (Berryhill, 2008).

Governmental Organization

- *Organizational structure and functioning of government*
- *Infrastructure of government [water, utilities, streets, public buildings]*
- *Provision of public services – planning, taxation, permitting, public transportation, etc.*

Transportation destruction, restoration: The report underscored the damaging havoc Hurricane Katrina's winds had: "The streetcar's reconquest of St. Charles Avenue after Hurricane Katrina has been fitful. The storm sent the avenue's old oak trees crashing down on the dense network of overhead electric lines that power the cars, destroying nearly 13.5 miles' worth. These had to be painstakingly rebuilt; one section on Carrollton of just over a mile, between St. Charles and Claiborne Avenues, remains out," (Nossiter, 2007).

The length of time to recover critical infrastructure: "Lake Forest Estates did not have power for five months after the storm," a reporter noted. "I remember the day the lights came on, though I was in New York City. My phone did not stop ringing with the kind of calls a person might expect from a third world country: "We got lights! We go electricity!" (Saulny, 2007).

Hurricane Katrina's devastation created millions of tons of debris which needed disposal: One report noted that the storm "created 12 million tons of debris in New Orleans, or about 34 years worth" from normal pre-storm levels. Returning residents months afterwards complained about stinking piles of refuse: "We're trying to do the right thing and move back into the city," said one resident. "But the work is not getting done. Why would you want to live here when it's like this?" (Hamilton, 2005).

Established land use plans and patterns became upended following disasters: Some industries and businesses which provided quick-fix housing for their workers were allowed to develop trailer parks without regulated oversight, sometimes leading to disastrous consequences, a fire chief recalled in a news report about a trailer fire: "There was no provision to provide us with firefighting water," he said, noting that the nearest hydrant was too far away for their hoses to reach (Hurwitz, 2005).

Neighboring communities near disaster zones face infrastructure challenges: Baton Rouge in particular was inundated with tens of thousands of people and their cars, said a university newspaper. A professor of civil engineering observed that "this traffic was predicted to be here 20 years from now, but we have it today," (Burris, 2005).

Delays in infrastructure restoration prompt tensions: One report noted the slowness of recovery from Hurricane Katrina raised public outrage during a special meeting to air resident concerns: "How come we don't have lights? All these billions of dollars and they can't get some lights in New Orleans East?" (Varney, 2005).

The collective psychic welfare of working utility infrastructure following disasters: Public officials echoed the sentiment in another report, suggesting that working streetlights were important in boosting morale of returning residents: "Residents of neighborhoods with no lights at night see nothing to show them they are part of a grand plan for the city's revival," one New Orleans city councilmember said. Underscoring residents' suspicions, said the same official, the story reported: "that situation feeds rumors that the city intends to bulldoze their neighborhoods, no matter how many times officials deny the rumors," (Eggler, 2005).

"You can kill a whole city" without restored utilities: A report linked the return of utilities to the city's very survival. One community activist suggested that "if you don't let people come back, and if you don't give them electricity, and you don't give them water – you can kill a whole city," (Hamilton, 2005).

Mail delivery interrupted following disasters: The age-old expectation that letters and other mail would be regularly delivered became undone following Hurricane Katrina, even months after the storm. One report detailed that since the mail processing plant in downtown New Orleans was out of service, sending a letter from Uptown to the French Quarter would instead make stops in Baton Rouge, Houston, Baton Rouge again and St. Rose before it could reach its original destination up to two weeks later. Expectant receivers mused regarding the whereabouts of their mail: "It's somewhere in the bowels of an Indiana Jones-style warehouse, probably beneath a mountain in Montana," one man half-jokingly said (Hunter, 2005).

Government compounds anxiety following disasters? Thousands of Hurricane Katrina victims have faced government charges of "overpayment" of disaster assistance, creating further anxiety and uncertainty when repayment was demanded. A national daily newspaper quoted a D'Iberville, Mississippi resident's response: "I haven't paid anything back because I don't have it. If I had the money to pay it back, I wouldn't have needed the rental assistance," (Heath, 2007).

Disastrous decision to keep closed Charity Hospital: A New Orleans man endured much upset as his uninsured wife endured an eight-hour transfer from a makeshift medical clinic downtown to a private hospital after her appendix burst. Testifying before a public hearing, he said that "she could have easily died during that period. This incident for [me] brings up a broader question of 'How many people have died and how much suffering has been inflicted on the people because of the closure of Charity?'" (Mozie, 2007).

Sheriff decries official decision to keep Charity Hospital closed: "As Sheriff of Orleans Parish, I have been confronted with the incredible burden of dealing with mental health issues in the criminal and prison systems. While the prison in New Orleans has a facility for mentally ill inmates and can treat inmates who are suffering from mental health issues, before the storm police officers could take people whom they suspected were exhibiting criminal behavior as a result of mental health problems to Charity Hospital. Since the closure of Charity's Crisis Intervention Unit, police officers have limited options as to where they can take people with mental health problems outside of jail," (Gusman, 2008).

Government responsibility following Hurricane Katrina: "It is my opinion that the state is responsible for the health of its people. Because this is not happening, people who once had access to personal care physicians through Charity Hospital are now reduced to emergency room care. As such, many patients are unable to adequately treat and track their illnesses, and often encounter complications," (Craft-Kerney, 2008).

Community Social Services

- *Availability and access to basic range of social services*
- *[family counseling, parenting, family violence, seniors, chemical dependency, children services including child care, disabilities, welfare benefits/job training, foster care, mental health, disabled transportation, etc.]*

The dependency upon public transit by people who cannot drive is acute: A University of New Orleans student, who has spinal bifida, cannot use her legs so she uses a wheelchair. Following the storm however, her very mobility beyond her home is in question: "Post-Katrina, it has been hard, as far as the RTA goes, because they told me they couldn't give me a ride to and from school," she said. "They couldn't guarantee that I would get to school on time. As a result, I have been taking mostly online classes" (Ott, 2006).

Lack of affordable housing and assisted living facilities acute: "There are no nursing homes — none," an elder advocate said, according to a national newspaper report. "There are no plans to rebuild the public housing where many of them lived. And those apartments that are available are priced way, way beyond the means of anyone on a low, fixed income," (Lyman, 2006).

Underscoring the need for crisis counseling: Sitting on a stoop in the Ninth Ward and ignoring a nearby parade protesting the lagging recovery, a truck driver was quoted by a national newspaper about his mental state and the state of New Orleans following Hurricane Katrina: "It's a depression going on. It's not like the '20s and '30s. It's right here," he said, tapping his temple. "Let the world know, the depression is on," (Nossiter, 2006).

Disability assistance not enough to afford high rents: A national newspaper underscored the crisis of homelessness that has inundated New Orleans such that hundreds of people are camping underneath an elevated expressway, "near enough to the French Quarter to regularly encounter tourists." According to the report, 86% were from the New Orleans area, with some receiving monthly disability checks, which are "not nearly enough to cover post-hurricane rents," (Dewan, 2008).

Supportive services in short supply in post-Katrina New Orleans: Facing the crisis of homelessness which continues to escalate, this newspaper report noted that chronically homeless people, as well as those with addictions or mental illness, "permanent housing with supportive services, like counseling, has become a preferred method." Yet the shortage of apartments, affordable or otherwise, prevents even the partial implementation of this promising solution (Dewan, 2008).

Cultural, Historical Landmarks, Aesthetic Support

- *Recreational and cultural opportunities and participation*
- *Diversity of recreational and cultural opportunities*
- *Museum, sports, recreational facilities and personnel*
- *Archaeological/Historical landmark/sites condition, access*
- *Festival infrastructure and voluntary/commercial personnel*
- *Maintenance of valued cultural characteristics*

Disasters uproot burial sites: In the aftermath of Hurricane Katrina, finding the dead and recovering and identifying their bodies commands an emotional toll. This includes people who were already deceased. A report notes the devastation in Buras, in southern Plaquemines Parish: "Sixteen coffins remain unidentified at Our Lady of Good Harbor cemetery. They rest in cement vaults, strapped to the ground so they will not float away again in another storm," (Longman, 2007).

Tradition -- When life ends, the living mourn: An editorial illuminated in one paragraph the end of life and the historical ritual of death: "The rituals of death help us grieve and allow us to start to move on and deal with the heartache of loss. Many of these families are dealing not only with the loss of a loved one but also with the loss of a home and a lifetime of possessions. They need to have an ending to at least one part of this tragedy," (Editorial, 2005).

St. Charles Streetcar is a rolling historical landmark: A national news story underscores the physical and emotional impact storm damage had upon New Orleans' historic transit system in its opening paragraph: "Like the rolling tide to seacoast residents, the low rumbling of the streetcar is a nearly internal sound for citizens here, its absence since Hurricane Katrina a painful reminder of civic ill health," (Nossiter, 2007).

Cultural heritage threatened following disasters: The human diaspora which developed following hurricanes Katrina and Rita brought into question whether significant elements of south Louisiana's diverse culture would return. Amongst the groups most challenged are French Louisianans, according to one report: "That community faces probably the greatest catastrophe in its history," said a state cultural official (Donn, 2005).

Linguistic heritage threatened following disasters: A report underscored the uniqueness of French Louisiana culture that could be lost forever if people uprooted because of Hurricanes Katrina and Rita do not return: "Home is the place where everyone speaks French and practices their culture. And if homes are gone, that's lost," (Donn, 2005).

Cultural memorabilia lost following disasters: People's possessions amount to "cultural keepsakes," emphasized a Cajun historian in a report: "All the memorabilia, the documents, the childhood toys – it's gone. I literally cannot walk into the house," (Donn, 2005).

Community Activities **Festival infrastructure sparks reunions after Hurricane Katrina:** A national news report noted the healing power of the old Louisiana festival tradition: "Jazzfest's essence was in the gathering of a 50-woman choir from the Franklin Avenue Baptist Church, which sustained $9 million in damage and now holds services for parts of its congregation in Houston and Baton Rouge as well as New Orleans. Some choir members had not seen one another since the hurricane. They, and other performers at the festival, kept saying, "It's like a reunion," (Pareles, 2006).

Community Activities **Tourists and locals return for Jazzfest:** Defining the impact of the annual New Orleans Jazz and Heritage Festival, this news report said: "It was a fitting wrap-up for a weekend that found hope, and solace, in the continuity of tradition. Jazzfest, as everyone calls it, is itself a tradition after nearly four decades, and like Mardi Gras, it is not only a tourist magnet but also a defining event for the city. "It's bigger than just the music," said George Wein, the chief executive of Festival Productions and the executive producer of Jazzfest. "This is people's lives," (Pareles, 2006).

Community Activities **Cultural traditions persist in Katrina's wake: "**Even with much of the city's population displaced and scattered, New Orleanians are determined not to let the music and its public celebrations disappear. At Jazzfest, Mardi Gras Indians, who usually take the whole year to hand-sew their elaborate feathered and beaded suits, were resplendent. Social aid and pleasure clubs, the neighborhood associations that sponsor parades and funerals, might not have had their old neighborhoods to return to, but they showed up at Jazzfest to parade in brand-new suits. Gospel choirs exiled from their home churches regrouped to sing about unswerving faith," (Pareles, 2006).

Community Activities **Vietnamese New Year Celebration signaled successful return of community:** The opening paragraph of a weekly events calendar highlighted the fusion of culture and tradition of a neighborhood back home after Hurricane Katrina: "If the Year of the Dog rewards loyalty and vigilance, the Vietnamese community in eastern New Orleans is on its way to a championship year," (Dorrough, 2006).

3. Community Interpersonal Capital

Ideal Interpersonal Conditions

- *Community identification/attachment*
- *Community cohesiveness*
- *Distribution of resources and power*
- *Civil and human rights*
- *Environmental justice*

Diverse history transported: In celebrating the return of nearly six miles of the St. Charles Streetcar line after it was closed because of damage from Hurricane Katrina, a national news report spotlighted the unique community intersection the trolley represents: "The streetcar has represented something else besides the connections through time and space: the city's living room, a privileged spot for tentative social encounters across lines of race, class and nationality, in a place not otherwise given to them," (Nossiter, 2007).

People blocked from returning home do not understand: In an attempt to mediate New Orleans residents' desires to return home in spite of the dangers, this report noted that the city organized sightseeing tours of the devastation. Nevertheless, emotions remained high: "We would like to get out and walk around. We'd like to have more closure than right now," (Filosa, 2005).

Internal displacement of people in disasters: Human rights activists have compared the internal displacement of people from New Orleans following Hurricane Katrina to international situations in wartime, one news report noted: "The clearest articulation of a right to return is in the international arena. The United Nations Guiding Principles on Internationally Displaced Persons hold that people should be allowed "to return voluntarily, in safety and with dignity, to their homes or places of habitual residence," (Tilove, 2005).

Charges of favoritism within communities beset by disasters: Residents expressed sentiments in another newspaper story that certain areas of New Orleans were favored over others. An educator displaced to Baton Rouge from the Lower Ninth Ward exclaimed: "I'm tired of being forced out of my city. I just want to come home," (Filosa, 2005).

Returning residents still feel the loss of displaced friends and neighbors: A national news article quoted a mourner commemorating the second anniversary of Hurricane Katrina: "Most of my good friends are not here any longer. That's one of the things that's wrong. The fabric of this city will never be the same," (Nossiter, 2006).

Community identification by posting their own street signs: A national news article quoted a member of the Claiborne-University Neighborhood Association, which decided to replace missing street signs missing since the Hurricane: "We don't know when we'll have real signs, so people are banding together and taking things into their own hands," (Saulny, 2006).

Community cohesiveness by taking care of absent neighbors': An article noted that people which have returned to New Orleans following Hurricane Katrina to repair their own homes have also planted trees on neutral grounds and cleaned their neighbors' yards: "If you want people to populate the city and help make a new New Orleans, you've got to help yourself," a woman said, recently returned from Atlanta. "If the place looks like Katrina just hit it, who's going to want to come back home?" (Saulny, 2006).

Community cohesiveness through collective action: A New Orleans weekly newspaper spotlighted the early return of Versailles Village in eastern New Orleans, despite suffering flooding and storm damage from Hurricane Katrina. More than one thousand residents of the predominately Vietnamese community returned by late 2005, with a thousand more living elsewhere in metro New Orleans while their homes are repaired, making it the first residential community east of the Industrial Canal to secure restoration of electricity and water service. One man stoically replied to a question of returning despite the looming uncertainties: "Look, we fled Vietnam. We fled New Orleans. Now we're back. We're here to stay," (Hill, 2006).

Vietnamese New Year Celebration proposes new plans for neighborhood: New Orleans' daily newspaper's entertainment guide spotlighted that in addition to food, games, crafts, music and dancing, "architects will unveil their plan to develop and redevelop" the eastern New Orleans neighborhood. The parish priest where the three-day festival was held said that "people from the community who are returning will review the designs and give comments. We are expecting everyone to come back and more," (Dorrough, 2006).

Community attachment renewed by the oldest in the community: One year following Hurricane Katrina New Orleans' daily newspaper highlighted the recovery progress of various neighborhoods. In contrast with many elderly people being unable to return, the report noted that "While many New Orleanians have wrestled with the decision of whether to return and rebuild, there was no hesitation for many of the original residents of Pontchartrain Park, where about a third of all residents are retirement age." The article quoted a returning 74-year-old woman: "The older people all want to come back, but the younger people don't want to come back and deal with the hassle," (Ritea, 2006).

Churches step up to ensure equitable distribution of housing and employment resources following the storm: Recovery of their faith community from the ravages of Hurricane Katrina has been more than just repairing buildings and restoring their church sanctuaries, several New Orleans pastors have come to find, according to a national news report. They have become developers for affordable housing and creators of job-training programs. "I'd rather be doing something else," one pastor said. "But when you hear stories like the Good Samaritan or about how Jesus walks into the temple and overturns the tables of the money-changers, it charges us as a church to make sure justice is done for all people," (Banerjee, 2007).

Interaction Means to Achieve Conditions

- *Community leadership*
- *Political organizations and citizen political involvement*
- *NGO adequacy vis-à-vis community needs*
- *Voluntary associations and membership*
- *Religious organizations*
- *Neighborhood (place based) voluntary organizations*
- *Friendship/family networks*
- *Regional/national linkages*
- *Print and electronic media array, diversity, access*

Informal Networks **First steps towards neighborhood reclamation:** A news report chronicled the response of a New Orleans residential neighborhood that it be turned into a park: "Three days after the commission released its plan, residents of Broadmoor, which is west of downtown, held a protest rally. A meeting was called to work out a plan, and more than 600 people attended, many of them driving from Baton Rouge and Houston. For them, their neighborhood's future could not be left to someone else. This was where they had grown up, married and had children. "We love our neighborhood, and we had to do something," said the president of the Broadmoor Improvement Association," (Shevory, 2007).

Voluntary Associations **Day-to-day recovery for the present and the future:** The Broadmoor resurrection report detailed what residents had to do as a neighborhood while recovering their own homes: "Working out of a doublewide trailer at a local church, residents surveyed Broodmoor and designed a database on the area's 7,000 residents and selected block captains to monitor the area. Meetings were held on the best ways to revitalize the neighborhood, like deterring crime and reopening the local elementary school. At the time, many people were juggling full-time jobs and community work while they renovated their homes," (Shevory, 2007).

Voluntary Associations **Restoration of education and school sports restores community:** "The Hurricanes" defiantly faced the wreckage of their school and community, this report continued: Little has returned to normal in the two and a half years since Katrina destroyed the tiny fishing, oil and citrus villages of Port Sulphur, Buras, Boothville and Venice in lower Plaquemines Parish, where the Mississippi River runs to the Gulf of Mexico. "Football is the only thing that will bring this community together; there's nothing else here," said Corey Buie, an assistant coach and the recreation director of Plaquemines Parish (Longman, 2007).

Community wisdom about the future: "Tomorrow is not guaranteed," [Coach Cyril] Crutchfield told his players. "We don't know what will happen when the Gulf water turns warm and the wind starts to blow." (Longman, 2007)

The pull to return home: One report noted that social service advocates hear of the strong desire for many displaced elderly people to return home, despite the huge obstacles: "I had a woman tell me she had to go back because she wanted to be buried next to her husband," said the advocate. "You hear things like that a lot," (Lyman, 2006).

Catholic Church central to the successful return of neighborhood: An African-American newspaper posed the question to its readers of the resurrection of a Vietnamese neighborhood in New Orleans East, "while adjacent black neighborhoods continue to stagnate in eerie silence." It reported that "a good part of the success of Versailles owes to the Mary Queen of Vietnam Catholic Church. Before Katrina, the church was the center of religious and social life for 4000 Vietnamese who lived in approximately 950 homes located within one mile of the church," (Hill, 2006).

Priests act quickly to reclaim flood ravaged neighborhood: Leaders of Mary Queen of Vietnam Catholic Church acted quickly to bring together parishioners back to the Versailles neighborhood in New Orleans East, reported a weekly newspaper: "Church leaders kept the Diaspora Vietnamese community linked together, with Rev. Vien constantly visiting refugee sites and fellow priests dispatched to Houston and Dallas to work full-time with the displaced community," (Hill, 2006).

Media reports perpetuated "disaster myths": A weekly newspaper report recalled post-Hurricane Katrina media coverage and its continuing impact upon New Orleans recovery from the storm, suggesting that a "Katrina narrative" set in to inform that "people in New Orleans were dangerous." Racial stereotypes fueled the coverage, the report suggested, though in this instance, the Katrina myths crossed racial lines, quoting a national civil rights leader: "This is the first time I know of that black people believed the hysteria," (Reckdahl, 2006).

Reporters swallowed rumors and reported them as truth: Over one month after Hurricane Katrina and the swirling media reports of wanton looting, mayhem and killing in New Orleans following catastrophic flooding of the city, a national newspaper story recalled that "many instances in the lurid libretto of widespread murder, carjacking, rape, and assaults that filled the airwaves and newspapers have yet to be established or proved, as far as anyone can determine. And many of the urban legends that sprang up – the systematic rape of children, the slitting of a 7-year-old's throat – so far seem to be just that," (Carr, 2005).

Project Specific Aspects

- *Internal displacement of residences, businesses and agriculture due to siting footprint*
- *Primary project interest groups/stakeholders*

Challenge to right to return to place of attachment and extra-ordinary effort required to assert that right: A newspaper report opened with the challenge of abandonment faced by a Hurricane Katrina flood ravaged New Orleans neighborhood: "Four months or so after Hurricane Katrina, and just as residents of the Broadmoor neighborhood had begun moving back into their water-logged homes, a rebuilding commission set up by the mayor delivered another shock: If Broadmoor did not bring back half its residents within four months, their homes could be razed and the land turned into parks. So Broadmoor took action," (Shevory, 2007).

Internally displaced vow to return even if unwanted public housing residents: A national newspaper recorded the return of an apartment leaseholder: "They are trying to steal New Orleans from us. Well, I will not be displaced anymore. I'll take my home any way they give it to me. It's been 10 months. They've got to know we're serious. We're going to stand here until they let us in our homes," (Saulny, 2006).

Siting footprint of market-rate housing over public complexes: A national newspaper recorded the expressions of relief of public officials exclaimed when considering the opportunity they suggested Hurricane Katrina gave them to remake public housing: "We don't need to recreate pockets of poverty," the president of the City Council, Oliver M. Thomas Jr., said. "They don't work. We want more mixed-income, working communities. I think that's really the only way," (Saulny, 2006).

Fast re-occupation of neighborhood blocks its displacement: A weekly newspaper summarized how the predominately Vietnamese neighborhood in eastern New Orleans was able to return before it could be declared uninhabitable by city planners: "From the first days of evacuation, the community began planning to return and rebuild Versailles Village. The decision to return together was key in helping overcome homeowners' fears that they might lose their investment if they rebuilt in a neighborhood that later failed to revive. The community was convinced that if they quickly rebuilt and occupied their homes, the city government and utility companies would have to provide services. The plan worked," (Hill, 2006).

'Laissez-faire' redevelopment contradicts calls against rebuilding in vulnerable areas, said newspaper report: A first anniversary report by the city's daily newspaper reviewed the rebuilding of New Orleans' neighborhoods following the devastation of Hurricane Katrina. In particular, it spotlighted 'the jack-o-lantern effect' of returning residences amidst empty lots and abandoned storm-ravaged properties. It also noted the conflicting messages city leaders, particularly the mayor, which the report quoted, gave to returning residents, especially to those residing in the Lower Ninth Ward and New Orleans East, while not specifically prohibiting rebuilding nor identifying specific neighborhoods: "I've been saying this publicly, and people are starting to hear it: low-lying areas of New Orleans east, stay away from. Lower 9th Ward. I said it in Houston; people are starting to hear it. That's what I'm telling people (in the Lower 9). Move closer to the river. That stuff from Claiborne to the lake -- we can't touch that," (Russell, 2006).

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Appendix C: Use of Historical Background in SIA

An example of indicators used by the U.S. Forest Service for historical background (Bright, Cordell, Hoover, and Tarrant 2003) is presented below..

Dimension I: Historical Background	
Concept I: Record of a community's past and present dependence on the natural resource base will reflect important social attitudes and the structures supporting them. Problems and opportunities stem from historical experience.	
Indicator 1: Historical Background	
Description	Communities are born of and evolve from key industries, migrating peoples, social attitudes, and common human behavior.
Related social assessment questions	What are human uses of natural resources
	What conflicts exist among various uses, users, stakeholders, and ecosystem managers?
	What is the nature of relationships between nearby communities, the forest or other ecosystem, and the larger encompassing ecosystem?
	What recent social and economic trends relevant to management of the ecosystem are occurring in the region?
Method of measuring indicator	Analysis of historical and archival records
Indicator 2: Recent or current experience with ecosystem management (EM) issues	
Description	Information about public response(s) to EM policies, practices, and planning is dynamic. It is important to recognize how EM issues have been addressed in the past, what political controversy surrounds those issues, which prominent individuals or major groups seem to influence management (as well as public opinion), what other events in the community are related to EM issues, and what recurrent or unresolved problems must be addressed?
Related social assessment questions	What are human uses of natural resources in the assessment area?
	What conflicts exist among various uses, users, stakeholders, and managers of the ecosystem?
	What is the nature of relationships between nearby communities, the forest or other ecosystem, and the larger encompassing ecosystem?
	What do stakeholders and the public value about the natural environment, its resources, and various uses of those resources?
	What recent social and economic trends relevant to management of the ecosystem are occurring in the region?
Method of measuring indicator	Analysis of historical and archival records and survey data research
Indicator 3: Names and characteristics of influential persons, groups, or families	
Description	Individuals, families, and other important groups influence the evolution and development of a community.
	Who are users of natural resources in the assessment area?

Related social assessment questions	What conflicts exist among various uses, users, stakeholders, and managers of the ecosystem?
Method of measuring indicator	Analysis of historical and archival records and survey data research
Indicator 4: Distinctive characteristics of the community, which are strongly valued locally	
Description	Community characteristics that serve as accepted identifiers of the personality and nature of the community. These characteristics address general values held by the community as a whole and may be manifested in the work and leisure of its residents.
Related social assessment questions	Who are users of natural resources in the assessment area?
	What conflicts exist among various uses, users, stakeholders, and managers of the ecosystem?
	What do stakeholders and the public value about the natural environment, its resources, and various uses of those resources?
Method of measuring indicator	Analysis of historical and archival records and survey data research
Indicator 5: Prominent stakeholder groups with a history in the area	
Description	Prominent groups who have a stake in management of the assessment area's natural resources
Related social assessment questions	What conflicts exist among various uses, users, stakeholders, and managers of the ecosystem?
	What is the nature of relationships between nearby communities, the forest or other ecosystem, and the larger encompassing ecosystem?
Method of measuring indicator	Analysis of historical and archival records and survey data research

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Attachment 3 –
Regional Economic Development Effects
Coastwide Plans

Louisiana Coastal Protection and Restoration

Regional Economic Development (RED) Effects Analysis

Final Array of Alternatives – Coastwide Plans

Source: Regional Economic Model, Inc. (REMI) Version 9.0

Introduction

Each of the seven comprehensive coastwide plans is associated with a unique set of regional economic impacts that takes into account more than the initial, direct loss in key sectors such as employment, output and income. The 70-sector Regional Economic Model, Inc. (REMI) Policy Insight ® input-output model, described in the economics appendix under RED Effects as a multi-regional economic and demographic model of the U.S. economy, was used to specifically analyze consequences for the regional and national economics that incorporate the secondary and induced effects of changes in key variables. In this way, the performance of each of these comprehensive plans can be illustrated in comparison to the expected economic activity that is forecast to occur under a no-action alternative.

Regional Model and Analysis

A custom, dynamic forecasting regional model was constructed by REMI for the state of Louisiana using regions defined as part of the Interagency Performance Evaluation Team regional impacts assessment and an updated 2005 post-Katrina baseline data set. Economic damages only for the "high employment" future development, dispersed land use economic scenario and high seal level rise scenario by planning sub-unit were aggregated as necessary to coincide with the regions predefined within the custom REMI model as a point of reference for relative evaluation of comprehensive plan performance. For the no-action scenario and for each of the seven comprehensive plans, equivalent annual damages, representing the expected loss to residential and non-residential capital stock, agriculture, and all other damage categories, on an annual basis due to storm surge activity, was input for each year in period of analysis. For each comprehensive plan, the results are displayed as the net change from the no-action scenario.

Summary

The following tables provide a concise summary of the relative performance of each of the comprehensive plans, CP-1 through CP-7) when compared to the no-action alternative. Table 1 shows the equivalent annual percentage change in each of nine primary regional economic indicators for the period 2010 through 2050. This means that when compared to the no action alternative, a given comprehensive plan will increase the value of a given indicator by the percent shown each year during the period. In this way the relative performance of the plans can be ranked. In table 2, the absolute magnitude of change between the years 2010 and 2050 is shown as a percentage. This approach gives a more accurate measure of performance for the alternatives collectively when compared to the no-action alternative. Table 3 shows the increase in the selected economic variables for each of the comprehensive plans relative to the “no-action” alternative for the year 2050. The equivalent annual income and output variables are expressed using 2007 price levels.

The period for comparison, 2010-2050, was chosen to conform to the specific projection horizons of the REMI model. The equivalent annual damages estimated by the study team, used as inputs to the REMI model, spans the period 2010 to 2075. However, the base year for the comprehensive plans is 2025, and measures of the plan performance with respect to regional indicator could occur only in the succeeding 25 years, that is, to 2050, the limit of our current REMI projections. In order to ensure comparisons over the longest period possible, it was assumed that each comprehensive plan would be implemented and fully functional by 2010.

Table 1
Louisiana Coastal Protection and Restoration Study
Changes in Regional Economic Variables Compared to "No Action" Alternative
Equivalent Annual Percent Changes for the Period 2010 to 2050
Aggregated for All Planning Units

Regional Economic Variable	Coastwide Plans						
	CP-1	**CP-2**	**CP-3**	**CP-4**	**CP-5**	**CP-6**	**CP-7**
Total Employment	0.59%	1.10%	1.01%	1.03%	1.31%	0.88%	0.83%
Total Gross Regional Product (GRP)	0.76%	1.45%	1.32%	1.32%	1.54%	1.16%	1.09%
Personal Income	0.48%	0.91%	0.82%	0.83%	1.03%	0.71%	0.67%
Real Disposible Personal Income	0.45%	0.86%	0.78%	0.79%	0.98%	0.67%	0.64%
Output	0.82%	1.59%	1.44%	1.43%	1.65%	1.26%	1.19%
Relative Cost of Production	0.02%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%
Average Annual Compensation Rate-Wages & Salary	0.07%	0.14%	0.12%	0.10%	0.09%	0.10%	0.09%
Population	0.35%	0.68%	0.61%	0.62%	0.80%	0.54%	0.51%
Labor Force	0.46%	0.89%	0.79%	0.81%	1.05%	0.71%	0.66%
Rank	**7**	**2**	**4**	**3**	**1**	**5**	**6**

Source: Regional Economic Model, Inc. (REMI) Version 9.0

Table 2
Louisiana Coastal Protection and Restoration Study
Changes in Regional Economic Variables Compared to "No Action" Alternative
Absolute Percent Changes between the Years 2010 to 2050
Aggregated for All Planning Units

Regional Economic Variable	Coastwide Plans						
	CP-1	**CP-2**	**CP-3**	**CP-4**	**CP-5**	**CP-6**	**CP-7**
Total Employment	25.3%	24.6%	24.8%	24.8%	25.1%	24.8%	24.8%
Total Gross Regional Product (GRP)	100.5%	99.4%	99.7%	99.7%	100.1%	99.7%	99.8%
Personal Income	415.0%	414.3%	414.6%	414.6%	415.8%	414.3%	414.4%
Real Disposible Personal Income	83.1%	82.8%	82.9%	82.9%	83.4%	82.8%	82.9%
Output	155.0%	153.2%	153.7%	153.7%	154.2%	153.8%	154.0%
Relative Cost of Production	1.6%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%
Average Annual Compensation Rate-Wages & Salary	290.7%	291.0%	290.8%	290.9%	290.7%	291.0%	290.9%
Population	27.5%	28.0%	27.9%	27.9%	28.2%	27.8%	27.7%
Labor Force	19.6%	20.1%	20.0%	20.0%	20.4%	19.9%	19.8%
Rank	**2**	**7**	**3**	**3**	**1**	**3**	**3**

Source: Regional Economic Model, Inc. (REMI) Version 9.0

Table 3
Louisiana Coastal Protection and Restoration Study
Changes in Regional Economic Variables Compared to "No Action" Alternative
Equivalent Annual Values for the State of Lousiana for the Year 2050
Aggregated for All Planning Units

Regional Economic Variable	**Coastwide Plans**						
	CP-1	**CP-2**	**CP-3**	**CP-4**	**CP-5**	**CP-6**	**CP-7**
Total Employment (Thousands)	19.2	34.4	31.5	31.9	41.3	27.0	25.7
Total Gross Regional Product (Billions, Fixed 2007$)	2.2	4.0	3.7	3.7	4.4	3.2	3.0
Personal Income (Billions, Nominal $)	4.9	8.9	8.1	8.2	10.2	7.0	6.6
Real Disposable Personal Income (Billions, Fixed 2007$)	1.4	2.5	2.3	2.3	2.9	2.0	1.9
Output (Billions, Fixed 2007$)	4.8	8.9	8.1	8.1	9.7	7.1	6.7
Relative Cost of Production	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Annual Compensation Rate (Thousands, Nominal $)	0.2	0.4	0.4	0.3	0.3	0.3	0.3
Population (Thousands)	33.4	60.7	55.3	56.1	70.3	48.3	45.8
Labor Force (Thousands)	20.6	37.4	34.0	34.3	41.4	30.0	28.5
Rank	**7**	**2**	**4**	**3**	**1**	**5**	**6**

Source: Regional Economic Model, Inc. (REMI) Version 9.0