SOUTHWEST COASTAL LOUISIANA
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Reserved

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Recreational Resources

1. RECREATION RESOURCES

Historic and Existing Conditions

Recreational features and opportunities vary throughout the coastal zone, habitat and culture playing significant roles in the diversity of activities. From the games and competitions of Native Americans, to the influence of diverse immigrant cultures, traditional recreation in Louisiana has been a product of its people. Nearly 10,000 years ago, people began living off the ample resources of Louisiana. The means by which Louisiana's early residents lived, hunting and fishing for food, utilizing high ground for camps, and building vessels for transportation, shaped what is now recognized as traditional recreation in southern Louisiana.

State parks *within the Gulf Coast Prairie and Forested Terraced Uplands* physiographic regions include Palmetto Island and Sam Houston Jones parks. There are no Federal National Wildlife Refuges (NWR) or Wildlife Refuges (WR) within the regions. Sixteen boat launches are located within these regions.

Federal NWRs or State WRs within or adjacent to the Gulf Coast Marsh physiographic region include Sabine, Cameron Prairie, and Lacassine NWR and White Lake Wetlands Conservation Area. Public and private boat launches are located throughout the study area.

Recreation areas within or adjacent to the Gulf Coast Marsh physiographic region that provide access to high quality recreational resources include three National Wildlife Refuges, one Wildlife Management Area, one State Wildlife Refuge, and one State Park. See Map N1. From east to west, the region includes the 13,000-acre State Wildlife Refuge, the 71,544-acre White Lake Wetlands Conservation Area, the 76,000-acre Rockefeller WR, the Lacassine National Wildlife Refuge NWR, Cameron Prairie NWR, and the 124,511-acre Sabine NWR. Outside but adjacent to the area is Cypremont State Park, Shell Keys NWR and Marsh Island WR. These areas represent more than 329,000 acres that are visited more than 460,000 times annually. Recreation areas include trails for hiking and biking, five boat ramps (within recreation parks), three visitor centers, picnic shelters, one classroom, and one campground that is rented more than 36,700 times annually. Recreation areas also provide opportunities for hunting, boating, bird watching, fishing, crabbing, crawfishing, education, picnicking, education, camping, and playing.

Access into the WMAs and Refuges is generally by car or boat. Consumptive recreation includes hunting, fishing for freshwater and saltwater species and trapping alligators and nutria. Non-consumptive recreation includes bird watching, sightseeing, boating and environmental education/interpretation. Many of the parks offer hiking trails, camping and picnic shelters.

In addition to the high quality recreational fishing and hunting in the parks in the region, several lakes and inland marshes offer opportunities for hunting and catching both freshwater and saltwater species. Grand, White, Sabine and Calcasieu Lakes, Freshwater Bayou and Vermillion Bay are prime fishing spots for recreational species such as redfish and speckled trout as well as flounder and brown and white shrimp. White Lake is a remote open lake and can only be accessed by the Schooner Bayou Canal, the old Intracoastal Canal north of Pecan Island or via the Superior Canal west of Pecan Island. The Calcasieu Lake area offers 10 of the 35 public or private boat launches in the area.

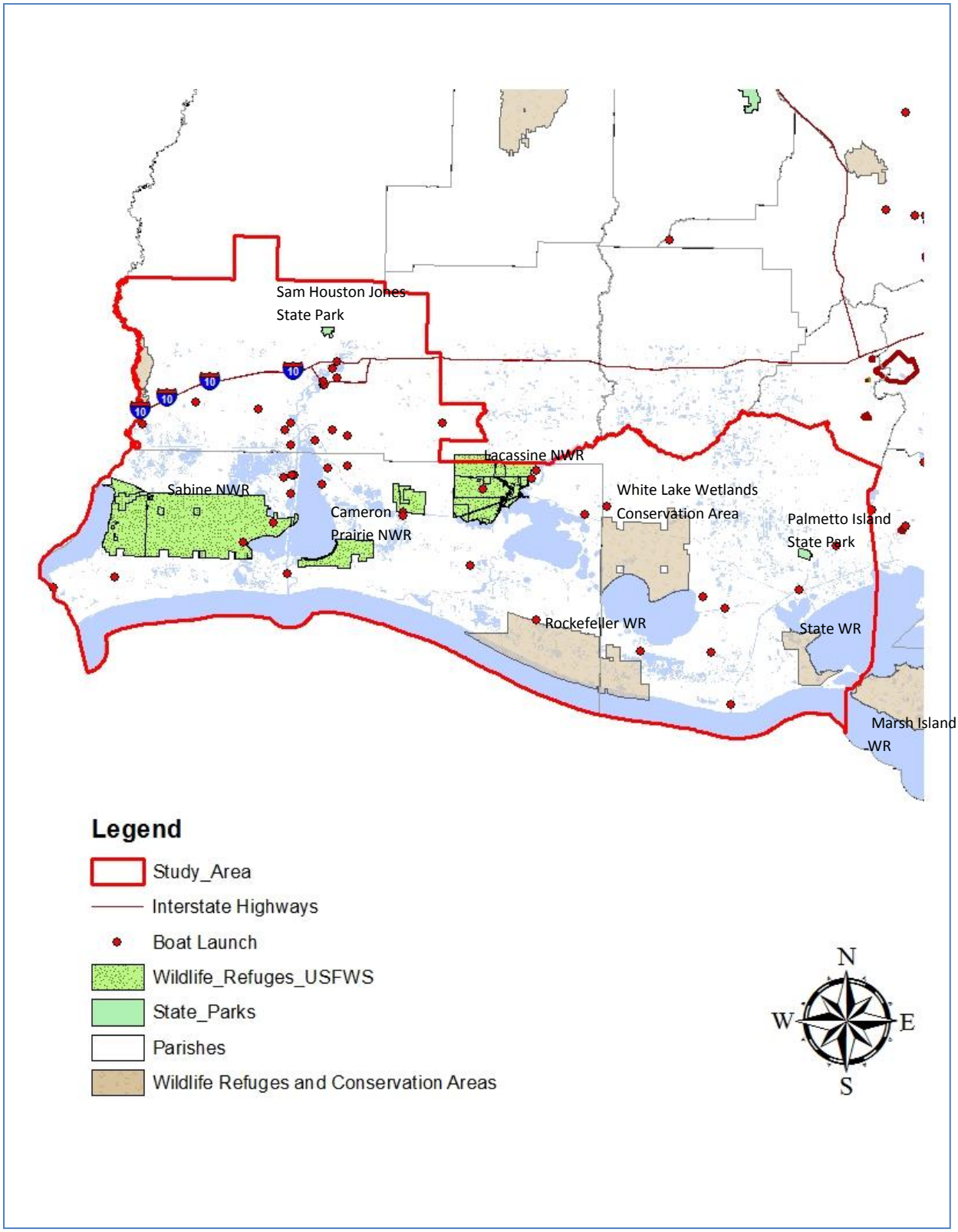
Bird watching is also an important recreational resource in southern Louisiana. A global initiative of BirdLife International, implemented by Audubon and local partners in the United States, the Important Bird Areas Program (IBAs) is an effort to identify and conserve areas that are vital to birds and other biodiversity. In the NER area, Audubon lists the entire Chenier Plain as a globally IBA (source: http://netapp.audubon.org/iba, accessed 25 September 2013). Many of the IBAs recognized are located within state or federally operated areas. Federal parks within the Chenier Plain that are globally IBAs include Lacassine NWR, Cameron Prairie NWR and Sabine NWR. The sanctuary provided at Lacassine Pool, a very popular birding site, is critical to the long-term viability of continental pintail populations and is one of the key pintail wintering areas in the continent, with a wintering pintail population that has reached almost 400,000 (source: http://www.fws.gov/

swlarefugecomplex/lacassine/, accessed 25 September 2013). Also in the area is the Baton Rouge Audubon Society 40-acre Peveto Woods Sanctuary located along the Louisiana coast in Cameron Parish. The Peveto Woods Bird & Butterfly Sanctuary site is the most heavily birded locale in Louisiana and was the first Chenier sanctuary for migratory birds established in Louisiana. Each spring and fall, Peveto Woods hosts most migratory songbirds native to eastern North America (source: http://www.braudubon.org/peveto-woods-sanctuary.php, accessed 25 September 2013). The sanctuary is a favorite birding spot in southwest Louisiana, as well as a location for viewing the many butterfly species that migrate to the region.

The State of Louisiana owns and operates the White Lakes Conservation Area, Rockefeller WR and the State Wildlife Refuge (SWR), all located in the Chenier Plain and all globally IBAs. Rockefeller Wildlife Refuge is one of the most biologically diverse wildlife areas in the nation. Historically, Rockefeller wintered as many as 400,000-plus waterfowl annually, but severe declines in the continental duck population due to poor habitat quality on the breeding grounds have altered Louisiana's wintering population (source: http://www.wlf.louisiana.gov/refuge/ rockefeller-wildlife-refuge, accessed 25 September 2013). The Audubon/Paul J. Rainey Wildlife Sanctuary is located to the west and the Marsh Island Wildlife Refuge to the east of the SWR. The Little Pecan Island Preserve, located between Lacassine and Rockefeller WRs near White Lake is managed by The Nature Conservancy and contains 1,810 acres of gulf coast prairies and marshes in Cameron Parish. Palmetto Island State Park is an IBA.

Designated within the area is the Creole Nature Trail National Scenic Byway, a 105- mile driving and walking tour touching four state and national wildlife refuges and a bird sanctuary. Finally, public and private boat launches are located throughout the entire NER area.

Map N1: National and state parks in the SWC area



Future Without-Project Conditions (No Action Alternative)

Direct, Indirect, and Cumulative Impacts: Recreational resources in the Louisiana coastal zone that will be most affected in the Future Without Action are those related to loss of wetlands/marshes and habitat diversity. Many recreational activities are based on aquatic resources and directly related to the habitat and species in an area.

There would be no direct impacts. Indirectly, the continued loss of wetlands/marshes and habitat diversity affects recreational opportunities. Storm surge and saltwater could have a negative impact on freshwater forests and habitats and could reduce recreational resources (e.g., fishing, hunting, bird watching, and other). In general, further degradation of area marshes will continue and its associated negative impacts on recreation activities will increase.

Recreational infrastructure would remain vulnerable to surges. Another major impact of storm surge is land loss and the possible loss of facilities and infrastructure that support or are supported by recreational activities. Land loss can result in the loss of park land, boat launches, parking areas, access roads, as well as marinas and supply shops. In general, further degradation of area marshes will continue and its associated negative impacts on wildlife activities will increase. Additionally, saltwater intrusion and predicted sea-level rise will continue to cause land loss. As existing freshwater wetland/marsh areas convert to saltwater marsh, then to open water, the recreational opportunities will change accordingly.

HURRICANE STORM DAMAGE RISK REDUCTION NATIONAL ECONOMIC DEVELOMENT (NED) PLAN

Alternative —Nonstructural 0-25-Year Floodplain - Recommended Plan (RP)

Nonstructural measures as part of the RP include elevation of residential structures and flood proofing of non-residential structures. There would be no direct impacts on recreational resources from structure elevation that results in storm surge passing safely below a structure. By elevating residential recreational structures, such as camps, damage from storm surge is less likely to occur. Additionally, elevated structures should create less debris that must be removed following a storm surge event. Elevation requirements may lead to fewer camps and hunting clubs in the region because elevated structures would most likely be more costly to erect. This may negatively affect recreation opportunities because people would have to travel further to access locations for activities such as hunting, fishing, boating, and birding.

A direct impact from flood proofing park buildings is the recreational use may be temporarily unavailable during flood proofing activities. Flood proofing at parks could affect recreational structures at the White Lake Wetlands Conservation Area, the Lacassine, Cameron Prairie, and Sabine National Wildlife Refuges and Sam Houston Jones State Park. Once flood proofing is complete, park structures would reopen more quickly following storm surge events.

See Map N2 for National and State Parks in the study area and NED RP structures.

Cumulative Impacts: Depending on the number of structures affected, recreational resources impacts could include fewer camps and features at parks as cost associated with elevation or flood proofing may result in fewer recreational opportunities, outside of fishing and hunting.

ECOSYSTEM RESTORATION (NER) PLANS

Alternative CM4 — Comprehensive Small Integrated Restoration (RP)

Direct and Indirect Impacts:

Marsh Restoration: Any direct impacts to recreational fishing, hunting and other recreational resources would be temporary and occur during construction activities. However, since there are many other areas for recreational fishing and hunting in the coastal region, impacts are expected to be minimal.

An indirect effect of marsh restoration and nourishment is the potential for limiting access to fishing areas as boaters would have to navigate around newly created land area. Recreationalists may have to circumvent the marsh restoration project area when traveling to a destination due to construction activities limiting or delaying access. It is assumed floating pipelines would convey dredge material from borrow areas to sites being restored. These pipelines may, in some cases, block access to fishing areas and fisherman may have to travel longer distances to arrive at their preferred destination. However, canals that are frequently used by fisherman should not be blocked as the pipeline crossing these locations may be submerged.

Marsh restoration projects proposed for Cameron Prairie NWR East Cove Unit and to a lesser extent in Sabine NWR may improve fishing and hunting opportunities once the projects have a chance to mature into productive fishery and wildlife habitats. See Map N2 for National and State Parks in the study area and NER RP Measures. Marsh restoration measures proposed along Freshwater Bayou should provide additional habitat to birds and other wildlife in the Paul J. Rainey Wildlife Sanctuary. In general, measures that create marsh habitat and improve hydrology of wetlands are more likely to improve recreational fishing opportunities by enhancing the sustainability of productive nursery habitats. Marsh restoration, while improving nursery habitat for juveniles in the interior marshes, could improve recreational fishing opportunities in off-shore waters as adults move to deeper depths. Development of additional marsh habitat is potentially beneficial to bird watching as it would support more birds and increase the diversity of species in the area. Potential negative effects include temporary turbidity associated with construction of marsh projects and excavation of borrow material in the Calcasieu Ship Channel, Calcasieu Lake, Freshwater Bayou, and the Gulf of Mexico.

Shoreline Protection: Any direct impacts to recreational fishing and hunting would be temporary and occur during construction activities. Bank fishing in areas proposed for shoreline protection or spoil bank fortification measures could be affected. Holly Beach shoreline stabilization offshore breakwater along the Gulf of Mexico shoreline from the western jetty of the Calcasieu Ship Channel to just west of the town of Holly Beach may temporarily disrupt recreational use on the beach during construction activities as will the reef breakwater along the Gulf of Mexico shoreline of the Rockefeller Wildlife Management Area and Game Preserve. The breakwaters would help reduce the risk of storm surge and saltwater damage to recreational opportunities within the preserve thereby helping preserve recreational resources of the park.

Indirect impacts of the spoil bank fortification projects for the GIWW and Freshwater Bayou Canal, designed to reduce erosion of canal banks, could help protect recreational resource lands from effects of coastal storm surge and minimize the loss of valuable fishery habitat. Potential effects of shoreline protection measures would include the temporary displacement of fish populations due to increased turbidity both near the shorelines and near borrow areas during project implementation. Spoil bank fortification with rock dikes along the Freshwater Bayou Canal may cause temporary disruption to recreational use in the project vicinity.

Cheniers: Chenier reforestation measures support wildlife and system structure. Restoration of natural ridges would improve bank stabilization and potentially provide additional habitat for deer, small game and birds, which could be beneficial for hunting and bird watching. Restored ridges would also enhance protection available to adjacent swamps and marshes during coastal storms, which could also potentially benefit recreational resources and infrastructure such as boat launches.

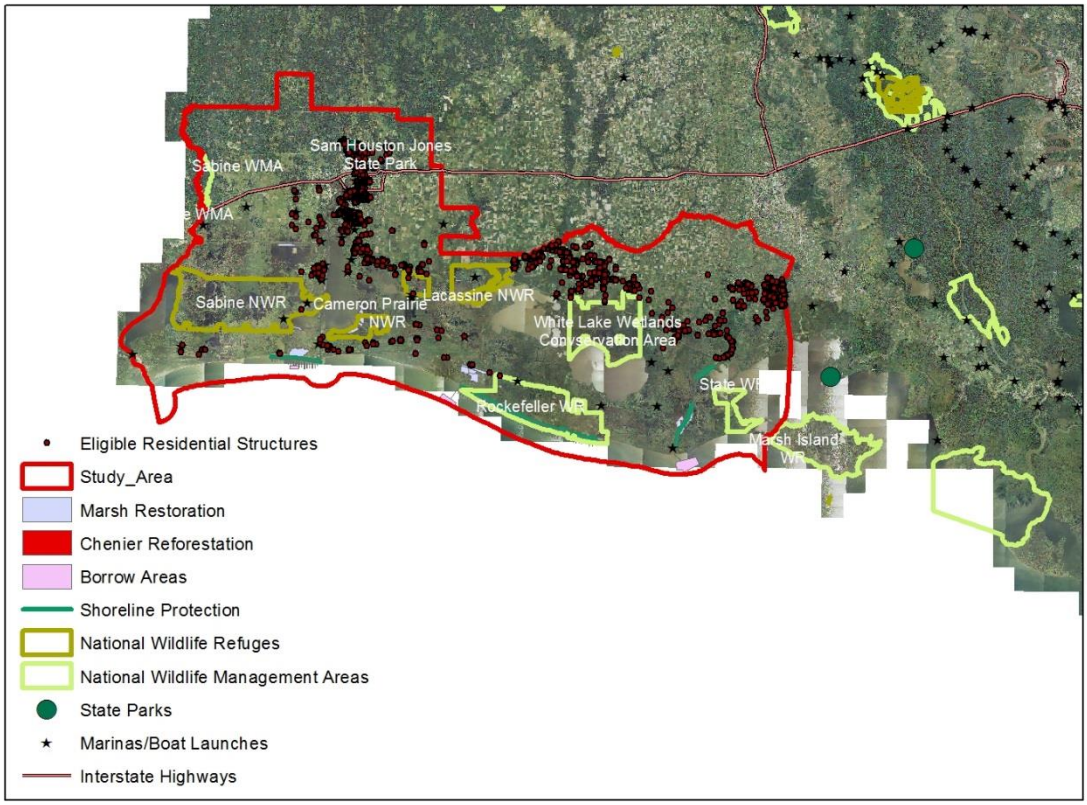
Cumulative Impacts:
The cumulative impacts of other ongoing and planned ecosystem restoration measures are expected to be generally beneficial to recreation as the risk of destruction of recreation resources by storm surge is reduced and habitat areas supporting fish and wildlife resources are enhanced. Temporary negative impacts of restoration activities due to construction activities, increased turbidity and possible boating access issues are mediated by the presence of other productive and popular recreation areas throughout the coastal region of Louisiana. Long-term positive cumulative impacts are expected to occur as restoration enhances the sustainability of valuable nursery habitats.

Alternative M4 Comprehensive Small Integrated Restoration for Mermentau Basin

Direct and indirect impacts to recreational resources from the restoration measures for Alternative M4 would be similar to and less than impacts described for the RP. Additionally, impacts are less than those expected for the RP because Alternative M4 has fewer restoration measures and therefore more minimal direct and indirect impacts to recreational resources.

Cumulative Impacts: Cumulative impacts to recreational resources from Alternative M4 would be similar to impacts described for the RP.

Map N2: National and State Parks in SWCL Area and NED/NER Measures



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Environmental Justice

CONTENTS

1. INTRODUCTION

An environmental justice (EJ) analysis was conducted which focused on the potential for disproportionately high and adverse impacts to minority and low-income populations during the construction and normal operation of the proposed risk-reduction system. The assessment identified the occurrence of minority and low-income populations within the study area. Overall, the assessment used Census Tract and block group level data. Environmental Justice Communities are identified within the study area. This analysis details whether the proposed federal action would disproportionately impact the EJ communities as defined by minority composition and percent of population below the federal poverty level.

A disproportionately high and adverse effect means the impact is appreciably more severe or greater in magnitude on minority or low-income populations than the adverse effect suffered by the non-minority or non-low-income populations after taking offsetting benefits into account.

This appendix will provide information on Census Tract and block group EJ analysis. As the National Economic Development (NED) implementation process is further assessed prior to implementation, additional EJ-related analysis will be performed to ensure adequate consideration of the potential for EJ-related impacts across the study area.

2. METHODOLOGY

Environmental Justice is institutionally significant because of Executive Order 12898 of 1994 (E.O. 12898) and the Department of Defense's Strategy on Environmental Justice of 1995, which direct Federal agencies to identify and address any disproportionately high adverse human health or environmental effects of Federal actions to minority and/or low-income populations. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, some other race, or a combination of two or more races. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.

Low-income populations as of 2010 are those whose income are $22,113 for a family of four and are identified using the Census Bureau's statistical poverty threshold. The Census Bureau defines a "poverty area" as a census tract or block group with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level. This resource is technically significant because the social and economic welfare of minority and low-income populations may be positively or disproportionately impacted by the proposed actions. This resource is publicly significant because of public concerns about the fair and equitable treatment (fair treatment and meaningful involvement) of all people with respect to environmental and human health consequences of Federal laws, regulations, policies, and actions.

The methodology, consistent with E.O. 12898, to accomplish this EJ analysis includes identifying low-income and minority populations within the study area using up-to-date economic statistics, aerial photographs, and U.S. Census Bureau 2007-2011 American Community Survey (ACS) estimates. The newly released ACS estimates provide the latest socioeconomic community characteristic data, including poverty level, released by the U.S. Census Bureau and are based on data collected between January 2007 and December 2011. Race and ethnicity data at the Census block group level was compiled from the 2010 U.S. Census data. The 2010 U.S. Census dataset was chosen because it is more complete and based on actual counts.

All Census Tracts and Census block groups located within the study area are identified as the EJ study area. Calcasieu, Cameron, and Vermilion Parishes are considered the reference communities of comparison.

2.1 Historic and Existing Conditions:

High poverty rates negatively impact the social welfare of residents and undermine the community's ability to provide assistance to residents in times of need. The 2007-2011 ACS data indicate that 17% of households in Calcasieu Parish, 9% in Cameron Parish, and 18% in Vermilion Parish fell below the poverty line. The 2007-2011 ACS data indicate that there are:

- 17 poverty areas and 2 extreme poverty areas (block groups) in Calcasieu Parish
- 0 poverty areas or extreme poverty areas (block groups) in Cameron Parish
- 7 poverty areas and 1 extreme poverty areas (block groups) in Vermilion Parish

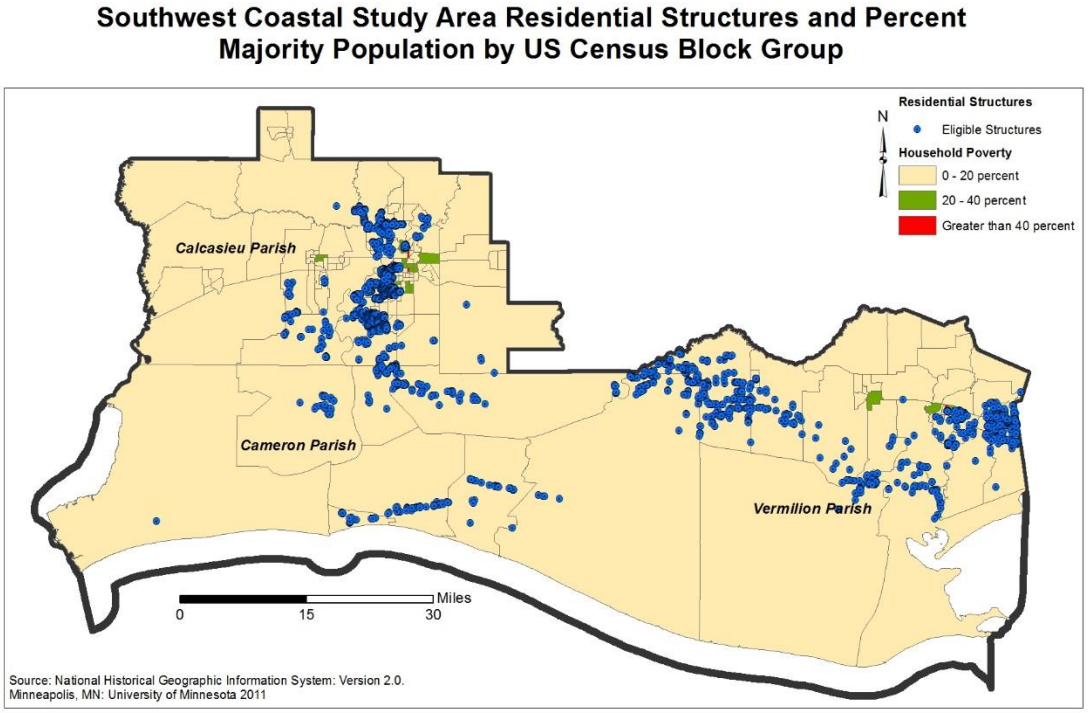

Figure 1: EJ percent below poverty by block group

Race and Ethnicity continue to play an important role in the everyday lives of Americans. Unequal access to social and political resources may affect preparing for and recovering from storm damage and flood events for certain groups. **Table 1** shows the racial characteristics of the three parishes according to the 2010 U.S. Census.

Table 1: Racial characteristics of the three affected parishes

Racial Characteristics							
Parish	White	African American	American Indian/ Alaska Native	Asian	Hawaiian/ Pacific Islander	Total	Percent Minority
Calcasieu	136,514	47,782	898	2,073	93	192,768	29%
Cameron	6,546	119	36	6	0	6,839	4%
Vermilion	46,922	8,286	209	1,160	5	57,999	20%

According to the 2010 U.S. Census data there are 41 block groups in Calcasieu Parish where 50% or more of the population identify themselves as part of a minority group. There are no block groups in Cameron Parish where more than 1% of the population identify themselves as part of a minority group. There are 8 block groups in Vermilion Parish where 50% of the population identify themselves as part of a minority group. See

Figure 2.

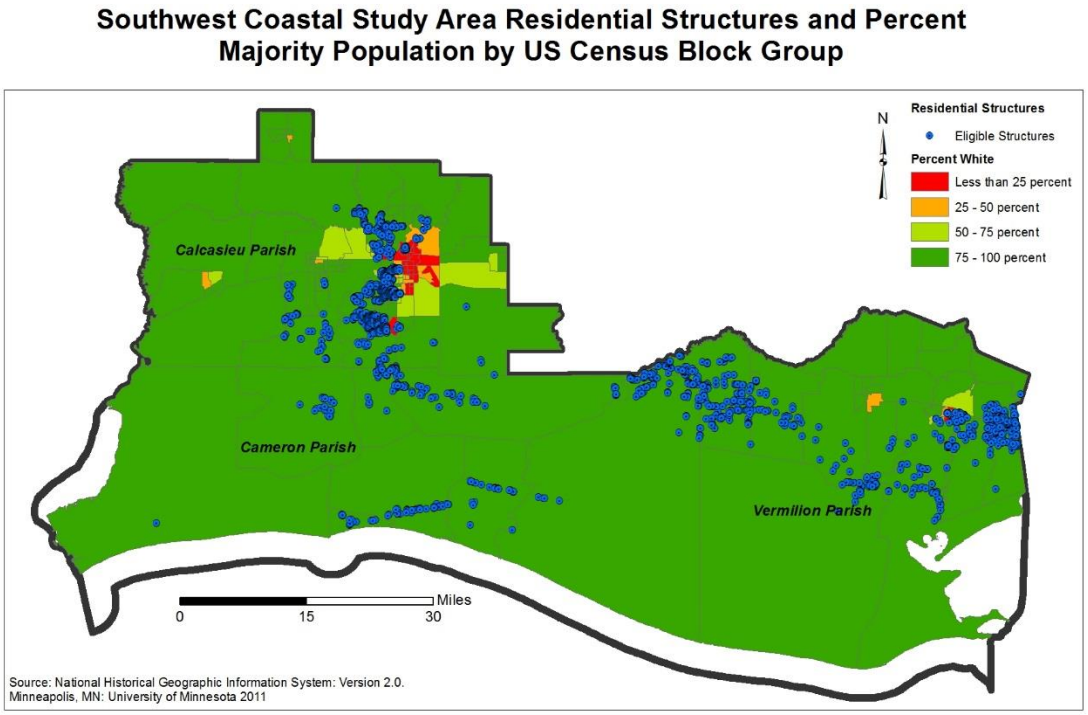

Figure 2- EJ racial majority by block group

2.2 Future Without-Project Conditions (No Action Alternative)

Direct, Indirect, and Cumulative Impacts: The No Action Alternative would not provide hurricane storm damage risk reduction, or reduce flooding induced by storm surge, or provide ecosystem restoration that improves ecosystem sustainability. There would be no direct impact on minority and/or low-income populations under this alternative. Indirect impacts under the No Action Alterative include a higher potential for temporary displacement of minority and/or low-income populations because residents within the study area would remain vulnerable to flooding and may be forced to relocate to areas with risk reduction measures in place. Storm surge increase due to subsidence and sea level rise will exacerbate the vulnerability to flooding across the area. Low-income populations may find it more difficult to bear the cost of evacuation. This alternative would not contribute to any additional EJ issues when combined with other Federal, state, local, and private risk reduction efforts.

3. ENVIRONMENTAL CONSEQUENCES

3.1 Alternative —Nonstructural 0-25-Year Floodplain Recommended Plan (RP)

The EJ assessment of the nonstructural plan to reduce storm surge risk includes all residential structures located in the 0-25 year floodplain. Owners of residential structures in the floodplain can voluntarily take part in the plan to receive financial assistance in raising/elevating their residential structure. Relocations benefits are not available under Public Law 91646 to those receiving nonstructural measures under the Project (except for tenants living in structures at which nonstructural measures would be implemented).

Direct, Indirect, and Cumulative Impacts:

A direct impact to those who benefit from the nonstructural measures includes reduced risk of hurricane storm surge-related damage due to the home being elevated. Direct impacts to owners of eligible structures include having to temporarily relocate during the elevation of the residential structure. Residents would be required to leave their home during the elevation and seek temporary quarters for the period of time necessary to elevate the structure. Temporary relocation benefits would not be made available to these residents (except for tenants living in these structures). Household income could be a factor in the decision to pursue nonstructural measures since temporary relocation costs could potentially be cost prohibitive for lower income residents. A direct impact to those whose homes are not eligible for the nonstructural measures or to those who choose not to pursue the nonstructural measures includes continuing vulnerability to hurricane storm surge related damage. This vulnerability may increase based on the actual rate of relative sea level rise (RSLR).

Indirect impacts to those choosing to forego the nonstructural measures include the potential to experiencing storm surge related damage from a 25-year storm event or possible even a lesser storm. Indirect impacts to those who benefit from the nonstructural measures would include a decrease in risk of damage from 1 percent (and more frequent) exceedance storm events. Population groups residing or working near the construction site (elevating homes) itself may experience direct impacts due to the added traffic congestion and construction noise and dust. Finally, indirect impacts may include effects on residential market value, insurability, potential impacts to community cohesion, and a more sustainable local economy and tax base as more fully detailed in Chapter 3 of the Report.

Positive cumulative impacts to minority and/or low-income populations associated with providing risk reduction are expected to occur as a result of the lower hurricane storm surge–related risk in the area under this alternative. If this alternative encourages regional economic growth, any additional jobs created may benefit minority and/or low-income groups living within the study area.

Identifying EJ Communities:

According to guidance set forth in Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, minority and low-income residential communities must be identified and a determination made if these communities suffer a disproportionate impact. A comparison of minority residents and low-income households in the larger study area and in the impact area helps determine if there is a proportionate or disproportionate distribution of impacts.

EJ Study Area
The EJ study area includes the three-parish area of Calcasieu, Cameron, and Vermillion. The total population of the study area is approximately 256,000 people, an estimated 26% of which are minority. The number of low-income households in the study area is approximately 8,800, an estimated 9% of which are households at or below the poverty threshold. In the event that significant adverse impacts are identified, these two percentages, 26% minority and 9% low-income, provide a baseline against which we would measure impact when determining whether the impacts would be disproportionate. See Table 2.

EJ Impact Area
The EJ impact area is defined as those Census Block Groups within the three-parish study area that contain the 3,445 residential structures within the 0-25-year floodplain that are eligible for the nonstructural plan (Note: there are additional structures located in these Census Block Groups that are not located within the 0-25 year floodplain). Currently, a vast majority of these structures would be able to pursue non-structural measures if their structures meet the eligibility requirements.

There are approximately 105,000 residents in the impact area, as defined by the Census Block Groups; approximately 26% are minority residents. See Table 2. The larger study area also is made up of about 26% minority residents, indicating no potential for a disproportionate impact.

Table 2. Relationship between the Study Area and the Impact Area for EJ Analysis

Criteria	Three Parish Study Area*	Impact Area**	Percent in Study Area	Percent in Impact Area
Total Population	255,634	104,846	100%	41%
White	189,945	87,974	74%	46%
Minority***	65,689	16,872	26%	26%
Total Households	96,259	39,995	100%	42%
Low-Income Households****	8,783	659	9%	7%

*Study Area data is for Calcasieu, Vermillion and Cameron Parishes.
**Impact Area consists of Block Groups within 0-25 year floodplain
***Minority includes non-Hispanic black and other non-white races and Hispanics.
**** Below poverty level
Source: US Census 2010 Data, US Census ACS 2007 - 2011

The following analysis identifies if there is a disproportionate impact on low-income residents from Project implementation.

To determine if there is a disproportionate impact on low-income residents, the eligible structures located in census block groups identified as EJ communities/poverty areas are considered. If an eligible owner of a residential structure in the 0-25-year floodplain is below the poverty level, they are less likely to be able to afford the temporary relocation costs and therefore less likely to benefit from this Project than those above the poverty threshold. Additionally, residents below the poverty level may not have adequate transportation to their jobs if the only affordable temporary relocation option is not near public transit.

There are approximately 660 structures in the 0-25-year floodplain that are located within census block groups that meet the EJ criteria for "poverty areas" or that at least 20% of the households are below the poverty threshold.

About 9% of the households in the study area are low-income (below the poverty threshold). Seven percent of households in the impact area are below the poverty threshold. There is a similar percentage of low income residents in the impact area compared to the study area. The analysis does not show a disproportionate impact to low-income residents in the impact area.

However, this determination is made using Census Block Group (CBG) income data which reveals the percentage of households in the geographic area with incomes below the poverty threshold. The specific households that are below the threshold are unknown. We assume all 660 eligible structures that are located within block groups where at least 20% are below the poverty threshold are in fact low-income. Structures that are located in CBG that are above the poverty threshold but may in fact be occupied by low-income residents are not included in this analysis. Only those eligible structures (660) in CBG with at least 20% of individuals below poverty are included in the EJ analysis. In this case, 7% of all impact area households and 9% of all study area households are at least 20% below the poverty level which are very comparable rates and a proportionate impact.

3.2 Alternative C4+M4 — Comprehensive Small Integrated Restoration – Recommended Plan (RP)

Direct, Indirect, and Cumulative Impacts: Many of the areas in which these activities will occur are sparsely populated or devoid of permanent structures and/or population. Access to some areas due to marsh restoration and nourishment activities may be temporarily interrupted. Impacts due to shoreline protection construction would also be temporary. Temporary impacts from construction activities due to increased turbidity, noise, and access interruption are compensated for by the opportunity for long-term positive cumulative impacts as other restoration programs improve the habitat and sustainability of coastal Louisiana. The long-term benefits of

marsh restoration, shoreline protection, bank stabilization, and chenier reforestation would improve wetland habitat which would subsequently improve leisure and recreation opportunities to all residents of the area. The proposed action would have no disproportionate adverse impacts on minority and low-income populations.

3.3 Alternative M4 — Comprehensive Small Integrated Restoration for Mermentau Basin

Direct, Indirect, and Cumulative Impacts: The direct, indirect, and cumulative impacts would be similar to those described for the RP but smaller given the fewer number of measures in this alternative.

4. MITIGATION FOR ADVERSE IMPACTS

At this time, no EJ issues have been identified and as such, no mitigation measures are necessary.

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Other Social Effects

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5. INTRODUCTION

This appendix presents a socioeconomic evaluation of the alternatives being considered for coastal storm damage risk reduction for the Southwest Coastal Louisiana evaluation area, which includes three parishes in the state of Louisiana. It was prepared in accordance with Engineering Regulation (ER) 1105-2-100, Planning Guidance Notebook, ER 1105-2-101, Planning Guidance, Risk Analysis for Flood Damage Reduction Studies, and Engineering Circular (EC) 1105-2-409.

Given the area's low elevation, flat terrain, and proximity to the Gulf of Mexico, the people, economy, unique environment and cultural heritage of Southwest Louisiana are at risk of storm surge flooding and wave impacts from tropical storms. Land subsidence, combined with rising sea level, is expected to increase the potential for coastal flooding, shoreline erosion, saltwater intrusion, and loss of wetland and Chenier habitats in the future.

Because of that risk, alternatives to provide hurricane storm surge risk reduction have been evaluated for Southwest Louisiana. Opportunities to incorporate non-structural solutions to reduce vulnerability, damages, and economic losses have been studied through the Southwest Coastal Louisiana Feasibility Study conducted by the U.S. Army Corps of Engineers (USACE) New Orleans District (MVN) and Regional Planning and Environmental District South (RPEDS).

1.1 Purpose

The purpose of this appendix is to describe the Other Social Effects (OSE) account of the SWC Project. The OSE account considers the potential social ramifications of Corps actions so that decision makers and stakeholders are able to evaluate the social implications of each alternative and choose an alternative that will be judged as complete, effective, and fair.

1.1.1 Study Area

The area covers over 4,700 square miles in Louisiana's Chenier Plain. It lies in the southwest corner of the state in Calcasieu, Cameron, and Vermilion parishes. The Gulf Intracoastal Waterway (GIWW) dissects the area horizontally, mostly coterminous with the existing coastal zone boundary.

The Gulf of Mexico coastline is another major water resource of the area. The major highways are LA Highway 82 and LA Highway 27. Population centers include many small towns, the largest of which are Lake Charles, Sulphur, Grand Lake, and Abbeville.

Communities located within the study area include the city of Lake Charles, the towns of Sulphur, Vinton, Iowa, and Bell City in Calcasieu Parish, the towns of Cameron, Creole, Grand Chenier, and Grand Lake in Cameron Parish, the city of Abbeville, and the towns of Erath, Delcambre, Kaplan, and Pecan Island in Vermilion Parish. All three parishes have historically suffered extensive hurricane and tropical storm surge damage. The impact of preparing for, mitigating, and recovering from these damages has placed a significant physical and emotional burden on individuals and has been devastating for communities. The goals of the proposed project are to provide storm damage risk reduction to residents within the study area from the damaging effects of storm surges while also protecting and preserving the fragile and rapidly deteriorating coastal wetlands.

1.1.2 Overview of Other Social Effects

The USACE views "social well-being factors as constituents of life that influence personal and group definitions of satisfaction, well-being, and happiness. The distribution of resources; the character and richness of personal and community associations; the social vulnerability and resilience of individuals, groups, and communities; and the ability to participate in systems of governance are all elements that help define well-being and influence to what degree water resources solutions will be judged as complete, effective, acceptable, and fair." (USACE 2009). It is the OSE account that considers these elements and assures that they are properly weighted, balanced, and considered during the planning process under the USACE's Four Accounts Planning Framework.

This appendix follows the guidance set forth by the USACE Institute for Water Resources (IWR) in *Applying Other Social Effects In Alternatives Analysis* (USACE, 2013). The handbook describes the procedures for analyzing and using OSE criteria in the planning process by identifying seven social factors that describe the social fabric of a community. The social factors are based on conventional psychological Human Needs Theory and Abraham Maslow's Hierarchy of Needs. Table 1 lists and describes the social factors. These social factors are covered in the Socioeconomic and Other Social Effects sections of the main report.

Table 1: Social Factors

Social Factor	Description
Health and Safety	Refers to perceptions of personal and group safety and freedom from risks
Economic Vitality	Refers to the personal and group definitions of quality of life, which is influenced by the local economy's ability to provide a good standard of living
Social Connectedness	Refers to a community's social networks within which individuals interact; these networks provide significant meaning and structure to life
Identity	Refers to a community member's sense of self as a member of a group, in that they have a sense of definition and grounding
Social Vulnerability and Resiliency	Refers to the probability of a community being damaged or negatively affected by hazards, and its ability to recover from a traumatic event
Participation	Refers to the ability of community members to interact with others to influence social outcomes
Leisure and Recreation	Refers to the amount of personal leisure time available and whether community members are able to spend it in preferred recreational pursuits

Source: Applying Other Social Effects In Alternatives Analysis (USACE, 2013)

1.1.3 Organization of Appendix

The OSE appendix is organized as follows:

- Section 1 provides an introduction to OSE.
- Section 2 provides a description of the existing socioeconomic characteristics, and the existing and future without-project social factors of the study area.
- Section 3 provides an OSE analysis of the project alternatives.

2. OTHER SOCIAL EFFECTS STUDY AREA CHARACTERISTICS

This section provides a description of the existing and future without-project socioeconomic characteristics and other social factors of the study area.

2.1 Socioeconomic Characteristics of the Study Area

In this section, socioeconomic data for Calcasieu, Cameron, and Vermilion Parishes are presented in order to provide a context from which to evaluate the potential social impacts of the proposed project. A more detailed explanation of socioeconomic characteristics is available in the main report socioeconomic section.

2.1.1 Population and Households

Population increases in the three parish area between 2000 and 2010 are likely the result of population influx under normal growth conditions. The three parish total population in 2012 was 259,918 residents, although there has been a decline of population in Cameron Parish since 2000. Most of the population is located in the metropolitan areas. Major communities include: Lake Charles, the largest urban area in the study, in Calcasieu Parish; Cameron (which serves as the parish seat) in Cameron Parish; and Abbeville in Vermilion Parish.

2.1.2 Employment Opportunities

Leading employment sectors include education, healthcare, petroleum and petrochemical and service industries. Industries providing employment include education, health and social services (20%), manufacturing (15%), arts, entertainment, accommodations and food services (12%), and retail trade (12%).

2.1.3 Social Profile of Communities

This section provides a baseline profile of existing and future without project conditions for the social communities in the study area. Data for the social profile were obtained from a variety of sources including 2010 U.S. Census records, the 2007-2011 U.S. Census Bureau's American Community Survey (ACS) estimates, ESRI data, public meetings, interviews with local representatives, and aerial photography. The baseline characteristics are considered the existing and future-without project conditions.

2.1.4 Health and Safety (Stress, Loss-of-Life, Health Care and Emergency Facilities)

Severe storm surge events threaten the health and safety of residents living within the study area. Loss of life, injury, and post flood health hazards may occur in the event of catastrophic flooding. For example, the study area was severely impacted by Hurricane Rita in 2006 and Hurricane Ike in 2008. The Louisiana Recovery Authority estimated that 120 fatalities occurred associated with Hurricane Rita (one in Louisiana) and $8 billion in damages in Louisiana alone. Hurricane Ike was more costly in terms of lives lost and damages incurred, claiming 195 deaths in four countries and ranking as the third costliest storm in US history according to the National Hurricane Center. When facilities that provide critical care or emergency services are impacted by storm surge events, residents are at an even greater risk for experiencing negative health outcomes. Hurricanes Rita and Ike reduced the accessibility and availability of health facilities and services and required additional first-responder (fire and police) protection. During Rita and Ike, police stations were destroyed by storm surge and/or required to relocate because of flood risk. In addition to the damages of Rita and Ike to hospitals, police stations, and fire stations, many employees providing related services lost their homes reducing the staff needed to operate health and safety services.

The number of medical facilities, police stations, and fire stations located within the study area were obtained using 2010 ESRI data (latest year available).

Medical Care Facilities: There are 8 medical care facilities within Calcasieu Parish, 4 medical care facilities in Cameron Parish, and 6 medical care facilities in Vermilion Parish.

Police Stations: Calcasieu Parish has 8 police stations/sheriff's offices located within the study area, Cameron Parish has 5 police stations/sheriff's offices, and Vermilion Parish has 6 police stations/sheriff's offices, according to ESRI data.

Fire Stations: There are 29 fire stations (parish and volunteer) located within the study area—9 in Calcasieu Parish, 8 in Cameron Parish, and 12 in Vermilion Parish.

2.1.5 Economic Vitality

Growth in employment, business and industrial activity is expected to follow economic trends in the local, regional, and national economies. An additional 11,940 jobs are projected by the year 2038. However, without flood risk management alternatives, the stability of employment, business and industrial activity could be adversely affected.

2.1.6 Social Connectedness

The degree to which communities are able to instill a shared sense of belonging and purpose among residents is in large part determined by the communities' civic infrastructure. The presence of social institutions such as libraries, places of worship, and schools provide residents an opportunity for civic participation and engagement which allows residents to come together and work toward a common goal. The number of libraries and schools located within the study area were obtained using 2010 ESRI data (latest year available).

Civic Infrastructure: According to ESRI data, Calcasieu Parish has 7 libraries and 34 schools. There are 2 libraries and 2 schools located within the study area in Cameron Parish. ESRI data also show that there are 9 libraries and 9 schools located within the study area in Vermilion Parish.

2.1.7 Social Vulnerability/Resiliency

The devastation left behind after Hurricanes Rita and Ike brought attention to the salience of the related concepts of social vulnerability and resiliency when evaluating water resources projects (USACE 2008). Social vulnerability is a characteristic of groups or communities that limits or prevents their ability to withstand adverse impacts from hazards to which they are exposed.

Resiliency, in turn, refers to the ability of groups or communities to cope with and recover from adverse events. The factors that contribute to vulnerability often reduce the ability of groups or communities to recover from a disaster; therefore, more socially vulnerable groups or communities are typically less resilient.

Several factors have been shown to contribute to an area's vulnerability/resiliency, including poverty, racial/ethnic composition, educational attainment, and proportion of the population over the age of 65.

Poverty Rate: High poverty rates negatively impact the social welfare of residents and undermine the community's ability to assist residents in times of need. The 2007-2011 U.S. Census data indicate that 17 percent of the population of Calcasieu, 9 percent of the population in Cameron Parish, and 18 percent of the population in Vermilion Parish fell below the poverty line.

Racial / Ethnic Composition: Race/ethnicity continues to play an important role in the everyday lives of Americans. Unequal access to social resources and language barriers may affect preparing for and recovering from storm surge events for certain groups. In all parishes, according to the 2010 U.S. Census, the majority of the population is white (71% in Calcasieu Parish, 96% in Cameron Parish, and 80% in Vermilion Parish), followed by black (29% in Calcasieu Parish, 4% in Cameron Parish, and 20% in Vermilion Parish).

Social Vulnerability Index: The Hazards and Vulnerability Research Institute at the University of South Carolina created an index that compares the social vulnerability of U.S. counties/parishes to environmental hazards. The variables included in the index are based on previous research which has found that certain characteristics (e.g., poverty, racial/ethnic composition, educational attainment, and proportion over the age of 65) contribute to a community's vulnerability when exposed to hazards. According to the IWR OSE handbook (USACE, 2008), the Social Vulnerability Index (SoVI®)[1] is a valuable tool that can be used to identify areas that are socially vulnerable and whose residents may be less able to withstand adverse impacts from hazards.

The SoVI® was computed as a comparative measure of social vulnerability for all counties/parishes in the U.S., with higher scores indicating more social vulnerability than lower scores. Calcasieu Parish has a SoVI® 2006-10 score[2] of -1.21 (0.28 national percentile), Cameron Parish has a SoVI® 2006-10 score of -3.59 (.08 national percentile), and Vermilion Parish has a SoVI® 2006-10 score of -0.04 (0.49 national percentile). Calcasieu Parish is more socially vulnerable than roughly 72 percent of counties/parishes in the U.S., Cameron Parish is more socially vulnerable than about 92 percent of counties/parishes in the U.S., and Vermilion Parish is more socially vulnerable than roughly 51 percent of counties/parishes in the U.S. In comparison, Orleans Parish—notorious for its enduring levels of high poverty—has a SoVI® 2005-09 score of -0.92 with making it more socially vulnerable than 33 percent of counties/parishes in the nation ranked more socially vulnerable.

Stated another way, Cameron Parish is the most socially vulnerable to coastal storm damage consequences, Calcasieu Parish is the next most socially vulnerable, and Vermilion Parish is the least socially vulnerable and all three Parishes are more socially vulnerable to coastal storm damage consequences than Orleans Parish.

The study area's social vulnerability, however, is expected to increase over time if subsidence and sea level rise continue to occur, and the population in the study area increases as it is projected to do. The absolute number of socially vulnerable people (e.g., low-income, minority, less-educated, and over the age of 65) at risk for storm

[1] More information on the methodology and data used to calculate the SoVI® can be found here: http://webra.cas.sc.edu/hvri/products/sovi.aspx

[2] Data can be found here: http://webra.cas.sc.edu/hvri/products/sovi2010_data.aspx

surge events will increase. This, in turn, may lead to an increased burden placed on local, state, and federal agencies to ensure that these socially vulnerable populations have access to resources before, during, and after these events.

2.1.8 Leisure and Recreation

Having personal leisure time available and having access to recreational areas contributes to residents' quality of life and is therefore an important aspect of well-being. The number of recreational areas within the study area was obtained using 2011 ESRI data (latest year available).

The three parish study area is home to a State Wildlife Refuge, the 71,544-acre White Lake Wetlands Conservation Area, the 76,000-acre Rockefeller Wildlife Refuge (WR), the Lacassine National Wildlife Refuge (NWR), Cameron Prairie NWR, and the 124,511-acre Sabine NWR. State Parks in the study area include Palmetto Island and Sam Houston Jones parks.

Recreational fishing and hunting are very important to the area. In addition to the high quality recreational fishing and hunting in the wildlife refuges and parks in the study area, several lakes and inland marshes offer opportunities for hunting and catching both freshwater and saltwater species. Grand, White, and Calcasieu Lakes and Vermillion Bay are prime fishing spots. The high quality of the recreational fishery, especially an abundance of red fish and trout, has made this an important leisure time activity for residents. Inland saltwater fish species, crabs, and shrimp are also available in the more brackish water. Game species hunted in the area include waterfowl, deer, rabbit, squirrels, rail, gallinule, and snipe.

3. OTHER SOCIAL EFFECTS EVALUATION OF ALTERNATIVES

3.1 Social Implications of the Alternatives

This section provides an OSE analysis of the project alternatives. The evaluation is based on the differential impact that each alternative is expected to have on the socioeconomic characteristics and other social factors of the study area presented in the previous section.

The study area's social vulnerability is expected to increase over time if subsidence and sea level rise continue to occur, and the population in the study area increases as it is projected to do. The absolute number of socially vulnerable people (e.g., low-income, minority, less-educated, and over the age of 65) at risk for storm surge events will increase. This, in turn, may lead to an increased burden placed on local, state, and federal agencies to ensure that the most socially vulnerable populations have access to resources before, during, and after flood events.

Table 2: Other Social Effects (OSE) Account

Social Factor	No Action	Nonstructural	NER
Health and Safety	High level of flood risk in entire region with associated stress and anxiety, risk to regional health care system, and impacts to emergency access during floods. High potential for loss of life during storm events.	Project would reduce risk of hurricane storm surge damage to regional healthcare system and stress in Southwest Louisiana.	Project would contribute to a lower stress level due to improved habitat.
Economic Vitality	Current regional economy is moderate. If a catastrophic flood occurs, economic impacts will be extensive and long-lasting.	Project would benefit the regional economy.	The regional economy will benefit from improved habitat and increased storm surge resiliency.
Social Connectedness	High levels of instrumental social support will continue throughout the region. Population of coastal communities will continue to decline after storm events	Residents would experience social disruption during storm events or flooding, however social	Residents would benefit socially and economically from improved habitat.

	following historic trends, and social connectedness would be reduced.	connectedness would likely improve population retention.	
Social Vulnerability and Resiliency	Region is highly vulnerable to Storm damage, but residents would likely band together during recovery. Resilience of rural communities may be lower due to lack of temporary housing options. Low -income residents are more vulnerable to short-term impacts of flood fighting.	Project would significantly reduce the area's vulnerability to hurricane storm surge damage for those choosing to participate in the Project. . The ability of lower income groups to participate in the Project could be impacted by out of pocket expenses associated with ineligible Project costs including costs associated with temporary relocation during structure elevation, and any additional costs that would be required in order to meet the Project eligibility criteria, (i.e., costs associated with any necessary structural repair or asbestos abatement). (See Appendix L of the Final Report for Project eligibility criteria and a description of eligible and ineligible Project costs.) This could potentially offset, to some degree, the reduction in overall social vulnerability brought about by the Project at least as it relates to lower income communities	Project would increase the area's resiliency to storm surge events.
Leisure and Recreation	Residents of the region are active. Recreational opportunities would continue to be provided in the communities as currently planned	Project measures would help protect existing recreational opportunities.	Project measures would increase long-term recreational opportunities.

4. SUMMARY OF ALTERNATIVE ANALYSIS

4.1 No Action Alternative

Under the No Action Alternative, hurricane storm surge risk reduction and ecosystem restoration would not be implemented. However, the direct, indirect, and cumulative impacts of other existing, authorized, and reasonably foreseeable future action would continue. These would include hurricane storm damage risk reduction (HSDRR) projects and ecosystem restoration projects expected to be completed near and around the project areas. (See Section 1.9 of the Final Report.) The OSE associated with these have been documented in reports referenced in Section 1.9 and would generally include reduce the risk to health and safety factors, provide or benefit local and regional economies, provide for or enhance social connectedness, and protect existing recreational opportunities. Additional OSE information is available in documents referenced in Section 1.9. Information on the Recommended Plan for NED and NER is presented below.

4.2 NED Alternative — Nonstructural 0-25 Year Floodplain Plan (RP)

Direct, Indirect, and Cumulative Impacts: Under this alternative, the study area would experience storm surge risk reduction via nonstructural measures. This alternative would reduce the risks associated with damages to housing units, public facilities, and commercial structures during storm events as well as improve the health and safety of residents living within the study area. The area's social vulnerability would be reduced under this alternative with the possible exception of populations unwilling to participate or unable to participate in the Project due to ineligible Project costs. Reduced social vulnerability leads to the potential for enhanced long-term growth and sustainability. Also, the area would be at a reduced risk of incurring the costs associated with clean-up, debris removal, and building and infrastructure repair as a result of storm surge events.

Plan 8 Alternative – Nonstructural 100-Year Floodplain

The impacts from this alternative are similar to the impacts identified in connection with the Modified Plan 8 Nonstructural 0-25-Year Floodplain Plan (NED RP) alternative but greater in scale because of the larger numbers of structures that would be included in the Project under this alternative as compared to the NED RP, as described above

4.2.1 NER Alternative CM-4 — Comprehensive Small Integrated Restoration (RP)

Direct, Indirect, and Cumulative Impacts: This alternative would reduce the risks associated with habitat damage via saltwater intrusion, shoreline retreat, and loss of geomorphologic infrastructure. The area's social vulnerability would be reduced under this alternative via improved leisure and recreation opportunities, economic vitality, and reduced stress. Thus, the potential for long-term growth and sustainability would be enhanced.

4.2.2 NER Alternative M4 — Mermentau Small Integrated Restoration

Direct, Indirect, and Cumulative Impacts: The direct, indirect, and cumulative impacts would be similar to those described for the CM4 alternative but to a lesser extent due to the smaller size /fewer number of ecosystem restoration features in the MR as compared to the RP.

5. REFERENCES

Hazards and Vulnerability Research Institute. SoVI® 2006-10 Index. http://webra.cas.sc.edu/hvri/products/sovi2010_data.aspx Accessed on 03 Oct 2013.

U.S. Army Corps of Engineers. 2013. Applying Other Social Effects in Alternatives Analysis.

U.S. Army Corps of Engineers. 2008. Handbook on Applying "other Social Effects" Factors in Corps of Engineers Water Resources Planning.

U.S. Bureau of the Census, 2010. U.S. Census of Population and Housing, SF1 and SF3 data tables. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed 16 Sept 2013.

U.S. Bureau of the Census, 2007-2011 American Community Survey. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed 16 Sept 2013.

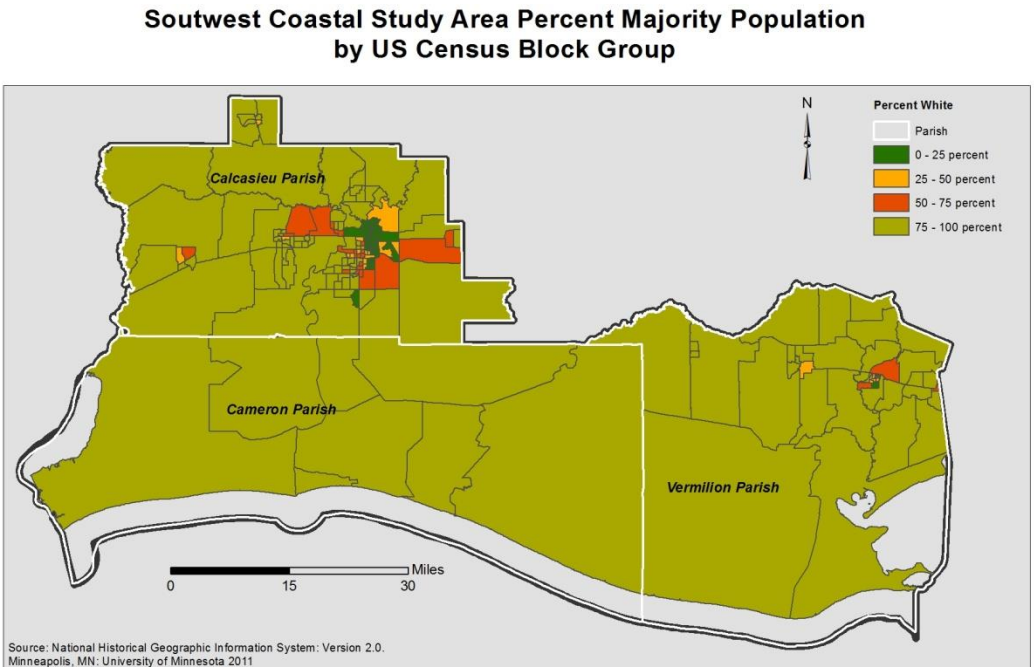

Figure 1. SWC Louisiana Study Area Racial Diversity 2013

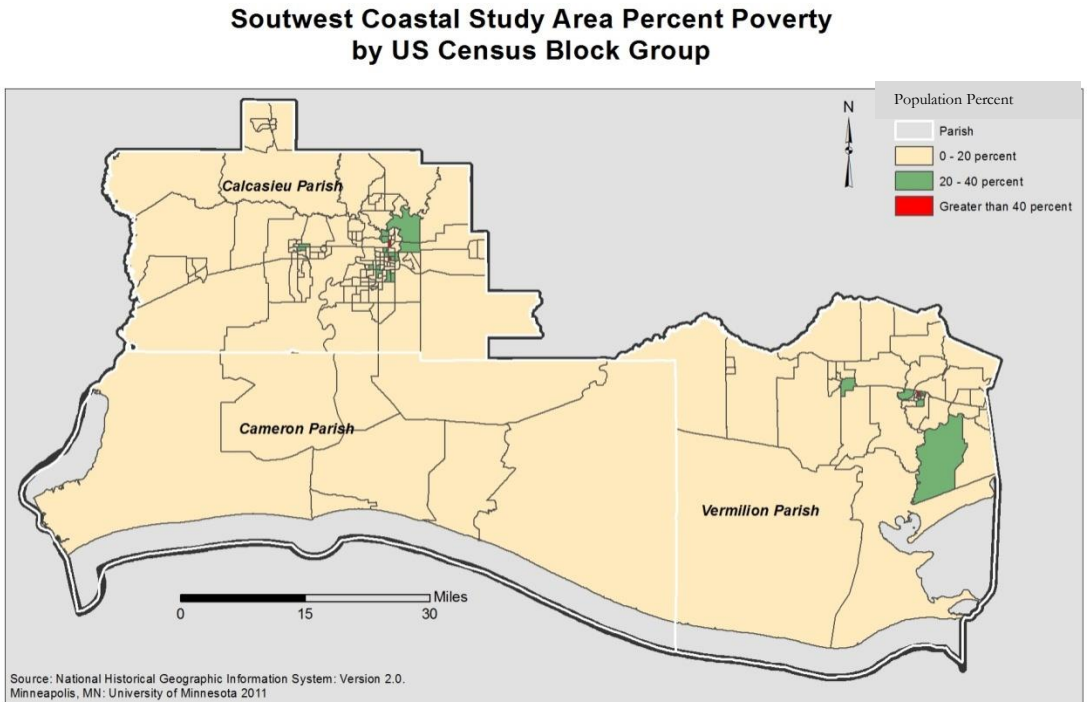

Figure 2. SWC Louisiana Study Area Percent Living Below Poverty 2013

SOUTHWEST COASTAL LOUISIANA
REVISED INTEGRATED DRAFT FEASIBILITY REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX A

Annex Q

Best Management Practices and Avoidance Procedures

MIGRATORY BIRD TREATY ACT and
BALD AND GOLDEN EAGLE PROTECTION ACT
BEST MANAGEMENT PRACTICES

Colonial nesting wading birds (including but not limited to, herons, egrets, and Ibis), seabirds/water-birds (including, but not limited to terns, gulls, Black Skimmers, and Brown Pelicans) and bald eagles are known to roost, forage, and nest in the project area. The birds and their nests are protected by the Migratory Bird Treaty Act (MBTA) and must not be disturbed or destroyed. As such, in areas near known rookeries, nesting prevention measures may be necessary in order to insure the success of the nesting season. These measures would be developed by the U.S. Army Corps of Engineers New Orleans District (CEMVN) in coordination with the U.S. Fish and Wildlife Service (USFWS) and Louisiana Department of Wildlife and Fisheries (LDWF) and would be implemented by a trained biologist. The nesting activity period extends from 15 February through 1 September for colonial nesting wading and seabirds/water birds, and September to May for bald eagles. Therefore, the nesting prevention measures should begin well before February.

CEMVN and USFWS biologists will conduct surveys prior to construction to determine the presence and/or location of any eagle's nests, colonial nesting wading/water birds and/or rookeries and if nesting prevention measures would be necessary. Nest prevention measures shall be intended to deter birds from nesting within applicable the designated buffer zone of construction areas without physically harming birds or disturbing any existing nests. Nest prevention measures may be used in combination and/or adjusted to be most effective. At minimum, nest prevention measures shall include, but not be limited to the following:

- Flagging/Streamers
- Vehicular/Pedestrian Traffic
- Clapping and Yelling
- Horn Blowing

Once work has commenced, the presence of nesting eagles, wading birds and/or seabirds/water-birds within the minimum distances from the work area, as specified in paragraph entitled "No Work Distances", shall be immediately reported to the Environmental Technical Manager, Ms. Tammy Gilmore, of the U.S. Army Corps of Engineers at (504) 862-1002 email address tammy.h.gilmore@usace.army.mil

No Work Distances

No-work distance restrictions are as follows:

o Terns, Gulls, and Black Skimmers -1,300 feet;
o Colonial nesting wading birds -1,000 feet;
o Brown Pelicans -2,000 feet; and,
o Bald Eagles -660 feet.

Coordination by CEMVN personnel with the USFWS may result in a reduction or relaxing of these no-work distances depending on the species of birds found nesting at the work site and specific site conditions.

MANATEE PROTECTION MEASURES COORDINATED WITH USFWS:

All contract personnel associated with the project would be informed of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel would be responsible for observing water-related activities for the presence of manatees. Temporary signs would be posted prior to and during all construction/dredging activities to remind personnel to be observant for manatees during active construction/dredging operations or within vessel movement zones (i.e., the work area), and at least one sign would be placed where it is visible to the vessel operator. Siltation barriers, if used, would be made of material in which manatees could not become entangled and would be properly secured and monitored. If a manatee

is sighted within 100 yards of the active work zone, special operating conditions would be implemented, including: moving equipment would not operate within 50 ft of a manatee; all vessels would operate at no wake/idle speeds within 100 yards of the work area; and siltation barriers, if used, would be re-secured and monitored. Once the manatee has left the 100-yard buffer zone around the work area of its own accord, special operating conditions would no longer be necessary, but careful observations would be resumed. Any manatee sighting would be immediately reported to the USFWS (337/291-3100) and the LDWF, Natural Heritage Program (225/765-2821).

SEA TURTLE PROTECTION MEASURES

1. Hopper dredging is being conducted under the "Gulf of Mexico Regional Biological Opinion" (RBO) which can be viewed at the following link: http://el.erdc.usace.army.mil/seaturtles/refs-bo.cfm.

It should be noted that incidental takes of sea turtle and gulf sturgeon are authorized on a Fiscal Year (FY) (October 1 – September 30) basis to be metered out by the Division Commander, South Atlantic Division, U.S. Army Corps of Engineers for the southeastern United States for Federal, military, and permitted projects. If care is not taken, the take limits could be reached by any of these parties and hopper dredging would cease for the remainder of that FY. The Permittee understands and agrees that, even where it is in full compliance with the terms and conditions of the RBO, incidental take by the Permittee may require suspension of the permit by the Corps of Engineers. The amount of incidental take that will trigger suspension, and the need for any such suspensions, shall be determined at the time in the sole discretion of the Corps of Engineers. The Permittee understands and agrees on behalf of itself, its agents, contractors, and other representatives, that no claim, legal action in equity or for damages, adjustment, or other entitlement against the Corps of Engineers shall arise as a result of such suspension or related action.

2. Prior to the commencement of hopper dredging, and throughout the dredging operations, a Corps of Engineers-approved Inspector shall inspect specific sea turtle protection requirements. The list of inspections the Inspector will perform is identified on a sea turtle inspection checklist entitled "USACE Sea Turtle Inspection Checklist for Hopper Dredges" that can be found at the following link: http://el.erdc.usace.army.mil/seaturtles/index.cfm. All identified deficiencies shall be corrected prior to the commencement of hopper dredging activities. An inspection shall also be performed following each sea turtle incidental take. Results of inspections shall be provided to Mr. Edward Creef (Edward.D.Creef@usace.army.mil) as soon as they are completed.

3. No dredging shall be performed by a hopper dredge without the inclusion of a rigid sea turtle deflector device. The Permittee shall electronically submit drawings showing the proposed device and its attachment to Mr. Edward Creef at Edward.D.Creef@usace.army.mil. Mr. Creef can be contacted by phone at (504) 862-2521. These drawings shall include the approach angle for any and all depths to be dredged during the dredging. A copy of the approved drawings and calculations shall be available on the vessel during the dredging. No dredging work shall be allowed to commence until approval of the turtle deflector device has been granted by the New Orleans District U.S. Army Corps of Engineers. Sample turtle deflector design details may be viewed at the web site indicated in condition number 1.

The leading v-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be installed in the deflector to prevent structural failure of the device. The leading edge of the deflector shall be designed to have a plowing effect of at least 6" depth when the draghead is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to ensure the critical "approach angle" (Information only note: The design "approach angle" or the angle of lower draghead pipe relative to the average sediment plane is very important to the proper operation of the deflector. If the lower draghead pipe angle in actual dredging conditions varies tremendously from the design angle of approach used in the development of the deflector, the 6" plowing effect does not occur. Therefore, every effort should be made to insure this design "approach angle" is maintained with the lower drag pipe.).

If adjustable depth deflectors are installed, they shall be rigidly attached to the draghead using either a hinged aft attachment point or an aft trunnion attachment point in association with an adjustable pin front attachment point or cable front attachment point with a stop set to obtain the 6" plowing effect. This arrangement allows fine-tuning the 6" plowing effect for varying depths. After the deflector is properly adjusted there shall be NO openings between the deflector and draghead that are more than 4" X 4".

4. The Permittee shall install baskets or screening over the hopper inflow(s) with no greater than 4" X 4" openings. The method selected shall depend on the construction of the dredge used and shall be approved by the Corps of Engineers-approved Inspector prior to commencement of dredging. The screening shall provide 100% screening of the hopper inflow(s). The screens and/or baskets shall remain in place throughout the performance of the work. The turtle deflector device and inflow screens shall be maintained in operational condition for the entire dredging operation.

5. When initiating dredging, suction through the dragheads shall be allowed just long enough to prime the pumps, and then the dragheads must be placed firmly on the bottom. When lifting the dragheads from the bottom, suction through the dragheads shall be allowed just long enough to clear the lines, and then must cease. Pumping water through the dragheads shall cease while maneuvering or during travel to / from the disposal area (Information Only Note: optimal suction pipe densities and velocities occur when the deflector is operated properly. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency, which reduces total dredging hours, and potential for "turtle takes". The operation of a draghead with teeth must be monitored for each dredged section to insure that excessive material is not forced into the suction line. When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators should configure and operate their equipment to eliminate all low-level suction velocities. Pipe plugging in the past was easily corrected, when low suction velocities occurred, by raising the draghead off the bottom until the suction velocities increased to an appropriate level. Pipe plugging cannot be corrected by raising the draghead off the bottom. Arrangements of teeth and / or the reconfiguration of teeth should be made during the dredging process to optimize suction velocities.

6. Raising the draghead off the bottom to increase suction velocities is not acceptable. The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure suction velocities do not drop below appropriate levels, production meters shall be monitored throughout the job and adjustments primarily made to the number and opening sizes of water ports. Water port openings on top of the draghead or on raised standpipes above the draghead shall be screened before they are utilized on the dredging project. If a dredge section includes sandy shoals on one end of a tract line and mud sediments on the other end of the tract line, the equipment shall be adjusted to eliminate draghead pick-ups to clear the suction line.

7. During turning operations, the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists. These operational procedures are intended to stress the importance of balancing the suction pipe densities and velocities in order to keep from taking sea turtles.

8. All hopper dredges shall be equipped with the National Dredging Quality Management Program (DQM) system, formerly known as Silent Inspector, for hopper dredge monitoring. The DQM system must have been certified by the Engineer Research and Development Center (ERDC) within the last year. Questions regarding certification should be addressed to the DQM support team at 877-840-8024. The DQM is an automated dredge monitoring system comprised of both hardware and software developed by the U.S. Army Corps of Engineers (Corps). The Corps developed the DQM as a low cost, repeatable, impartial system for automated dredge monitoring. The DQM consists of three major components: The Dredge Specific System (DSS), the Ship Server, and the Shore Server. The DSS collects and displays various dredge sensor data for the dredge crew to monitor dredge progress and quality control. The other major task of the DSS is to send data to the Ship Server. Most dredging contractors already have a computer system and sensors onboard for control or positioning that can be used as the DSS. The dredging contractor supplies and owns the DSS and all associated

sensors. The Ship Server acts as the dredged-based data archive and report creation center by storing the data from the DSS and performing automated review of the data. The Ship Server can produce many different reports including dredge location history, volume history, and an operational status. Additional information about DQM can be found at: http://dqm.usace.army.mil/. The data collected by the DQM system shall, upon request, be made available to the Operations Division Technical Support Branch of the New Orleans District U.S. Army Corps of Engineers.

All hopper dredge(s) shall be equipped with recording devices for each draghead that capture real time draghead elevation, slurry density, and at least two of the following: Pump(s) slurry velocity measured at the output side, pump(s) vacuum, and / or pump(s) RPM. The Permittee shall record continuous real time positioning of the dredge, by plot or electronic means, during the entire dredging cycle including dredging area and disposal area. Dredge location accuracy shall meet the requirements of the latest version of EM 1110-1-1003. A copy of the EM can be downloaded from the following website: http://www.hnd.usace.army.mil/techinfo/engpubs.htm.The recording system shall be capable of capturing data at variable intervals but with a frequency of not less than every 60 seconds. All data shall be time correlated to a 24-hour clock and the recording system shall include a method of daily evaluation of the data collected. This data shall be made available at the request of the New Orleans District U.S. Army Corps of Engineers.

The practice of dropping an empty dredge bucket can be taken as a precaution during construction to avoid impacts to sea turtles. A bucket (or similar equipment) will be dropped into the water and retrieved empty one time. After the bucket has been dropped and retrieved, a one-minute no work period must be observed. During this no work period, personnel would carefully observe the work area in an effort to visually detect listed species. If listed species are sighted, no bucket dredging would be initiated until the listed species have left the work area. If the water turbidity makes such visual sighting impossible, work would proceed after the one-minute no work period has elapsed. If more than fifteen minutes elapses with no work, then the empty bucket drop/retrieval process would be performed again prior to work commencing.

9. **Dredging operations shall cease immediately upon the first incidental take, and thereafter as directed by the Corps, until the District Engineer, or his designee, notifies the Permittee to resume dredging.** The Permittee shall immediately notify Mr. Edward Creef by phone (504-862-2521) and e-mail (Edward.D.Creef@usace.army.mil) that an incidental take has occurred. The Sea Turtle Mortality Report, available on the web site indicated in condition number 1, will be filled out by the National Marine Fisheries (NMFS)-Approved Protected Species Observer immediately (within 6 hours) and sent to Edward Creef electronically at the e-mail address listed above.

10. During dredging operations, NMFS-Approved Protected Species Observers shall be aboard to monitor for the presence of sea turtles, sturgeon, and whales. Observer coverage shall be 100% (24 hr/day) and shall be conducted year round. During transit to and from the disposal area, the Observer shall monitor from the bridge during daylight hours for the presence of endangered species. During dredging operations, while dragheads are submerged, the Observer shall continuously monitor the inflow and / or outflow screening for turtles and / or turtle parts. Upon completion of each load cycle, dragheads should be monitored as the draghead is lifted from the sea surface and is placed on the saddle in order to assure that sea turtles that may be impinged within the draghead are not lost and unaccounted for. Observers shall physically inspect dragheads and inflow and overflow screening / boxes for threatened and endangered species takes.

11. Monitoring Reports: The results of the monitoring shall be recorded on the appropriate observation sheets. There is a sheet for each load, a daily summary sheet, and a weekly summary sheet. In addition, there will be a post dredging summary sheet. Observation sheets will be completed regardless of whether any takes of sturgeon, whales, or sea turtles occur. In the event of any sea turtle or sturgeon takes by the dredge, appropriate incident reporting forms shall be completed. Additionally, all specimens shall be photographed with a digital camera. These photographs shall be attached to the respective reports for documentation. Dredging of subsequent loads shall not commence until all appropriate reports are completed from the previous dredging load to ensure completeness and thoroughness of documentation associated with the incidental take. Reports

shall be submitted to the Corps within 24-hours of the take. Copies of the form shall be legible. Observer forms may be accessed on the web site indicated in condition number 1.

a. NMFS-Approved Protected Species Observers: A list of protected species observer-biologists that have been NMFS-approved to monitor threatened / endangered species takes by hopper dredges can be obtained by contacting NOAA Fisheries Northeast Region, Protected Resources Division. The main contact is Ms, Julie Crocker; she can be reached at Julie.Crocker@noaa.gov or 978-281-9300 ext. 6530. A current list of NMFS-Approved Protected Species Observer companies is provided at the end of this document.

b. The Contractor shall provide a digital camera, with an image resolution capability of at least 300 dpi, in order to photographically report incidental takes, without regard to species, during dredging operations. Immediately following the incidental take of any threatened or endangered species, images shall be provided via e-mail, CD, or DVD to Mr. Edward Creef electronically at Edward.D.Creef@usace.army.mil in a .JPG or .TIF format and shall accompany incidental take forms. The nature of findings shall be fully described in the incidental take forms including references to photographs.

12. Manatee, Sea Turtle, and Whale Sighting Reports.

Any take concerning a manatee, sea turtle, sturgeon, or whale; or sightings of any injured or incapacitated manatees, sea turtles, or whales shall be reported immediately to the Corps Regulatory Section Chief, Martin Mayer electronically at martin.s.mayer@usace.army.mil, and to Mr. Edward Creef electronically at Edward.D.Creef@usace.army.mil.

13. Disposition of Sea Turtles or Turtle Parts

a. Turtle taken by hopper dredge

(1) Dead turtles – upon removal of sea turtle and / or parts from the draghead or screening, Observers shall take photographs as to sufficiently document major characteristics of the turtle or turtle parts including but not limited to dorsal, ventral, anterior, and posterior views. For all photographs taken, a backdrop shall be prepared to document the dredge name, observer company name, contract title, time, date, species, load number, location of dredging, and specific location taken (draghead, screening, etc.). Carcass / turtle parts shall also be scanned for flipper and Passive Integrated Transponder (PIT) tags. Any identified tags shall be recorded on the "Sea Turtle Incidental Take Form" that is included in the "Endangered Species Observer Program Forms" located on the web site indicated in condition number 1. Turtle parts which cannot be positively identified to species on board the dredge or barge(s) shall be preserved by the observer(s) for later identification. A tissue sample shall be collected from any lethally taken sea turtle and submitted under the process stated in the "Protocol for Collecting Tissue Samples from Turtles for Genetic Analysis" on the web site indicated in condition number 1. After all data collection is complete, the sea turtle / parts should be marked (spray paint works well), weighted down and disposed of in direction of the contracting officer.

(2) Live Turtles - Observer(s) shall measure, weigh, scan for PIT tags, tag (Inconel flipper and PIT tags - if PIT tag is not located during scan and only if observer is qualified to tag using PIT tags), and photograph any live turtle(s) incidentally taken by the dredge. Observer(s), or their authorized representative, shall coordinate with the contracting officer's representative and environmental branch staff to transport as soon as possible the live turtle(s) taken by the dredge to an approved rehabilitation facility such as the Aquarium of the Americas in New Orleans, Louisiana.

14. Relocation Trawling of Sea Turtles

Sea turtle relocation trawling efforts to aid in the prevention of sea turtle takes during dredging operations would be performed by the Permittee as deemed necessary. An initial sea turtle relocation trawling effort would be performed 2 to 3 days prior to the start of hopper dredging activities to determine if sea turtles are present at the dredging site. Based on the results of this trawling effort, the Permittee may be required to implement sea turtle relocation trawling either at the start of hopper dredging activities, or following the first sea turtle take by the hopper dredge. Captured sea turtles either would be relocated approximately 5 miles away from the dredging site, or, if injured, transported to the Aquarium of the Americas located in New Orleans, Louisiana. A NMFS-Approved Protected Species Observer shall supervise the relocation trawling efforts. If relocation trawling in Louisiana territorial waters occurs outside of the shrimping season, the approved sea turtle relocation trawling supervisor must possess a Scientific Collecting Permit from the Louisiana Department of Wildlife and Fisheries (point of contact is Ms. Karen Foote at 225-765-2384).

Trawling operations shall be performed in front of the working hopper dredge, with trawlers operating a safe distance from the hopper dredge. Trawling efforts shall be performed with and against the tidal flow at a speed not to exceed 3.5 knots using repetitive trawls in the dredging area with each trawling effort not to exceed 42 minutes duration.

Methods and equipment shall be standardized including data sheets, nets, trawling direction to tide, length of station, length of tow, and number of tows per station. Data on each tow shall be recorded using the Sea Turtle Trawling Report found at the website (http://el.erdc.usace.army.mil/seaturtles/docs/trawlingforms.pdf). The trawler shall be equipped with 60-foot nets constructed from 8-inch mesh (stretch) fitted with mud rollers and flats as specified in the Turtle Trawl Nets Specifications appended to the end of this Section. Paired net tows shall be made for 24 hours per day. The tows shall be performed in shifts, and the trawler shall be available for operation 24 hours a day. Positions at the beginning and end of each tow shall be determined from GPS Positioning equipment.

At least one crewmember who is a NMFS-Approved Protected Species Observer shall be on board the trawler during the trawl. The Observer shall be responsible for handling of captured sea turtles. Each captured turtle shall be identified, scanned for PIT tags, measured, tagged, tissue sampled and released, and data recorded on the Sea Turtle Tagging and Relocation Report, which can be found at the following website: (http://el.erdc.usace.army.mil/seaturtles/docs/taggingforms.pdf). Presence of PIT tags shall be scanned for by using a multi-frequency scanner capable of reading multiple frequencies (including 125-, 128-, 134-, and 400-kHz tags) and reading tags deeply embedded in muscle tissue. Turtle measurements shall be recorded and shall include, at a minimum, weight, straight-line length, straight-line width, and tail length. Turtles shall be tagged with NMFS #681 Inconel tags in each of the front flippers according to NMFS protocol. Aseptic conditions shall be maintained for tags and tag attachment. The Contractor shall be responsible for obtaining any and all permits related to trawling from the appropriate state and Federal agencies. All aspects of the trawling shall be coordinated with Mr. Edward Creef (504-862-2521).

Anyone handling sea turtles infected with fibropapilloma tumors shall either: 1) clean all equipment that comes in contact with the turtle with mild bleach solution between the processing of each turtle, or 2) maintain a separate set of sampling equipment for handling turtles displaying fibropapilloma tumors or lesions.

Water temperature measurements shall be taken at the water surface each day using a laboratory thermometer. Weather conditions shall be recorded from visual observations and instruments on the trawler. Weather conditions, air temperature, wind velocity and direction, sea state-wave height, and precipitation shall be recorded on the Sea Turtle Trawling Report. High and low tides shall be recorded.

a. Repair and Replacement of Damaged Trawl Nets

The Contractor, at the time of mobilization, shall provide trawl nets that meet the requirements specified in the Turtle Trawl Net Specifications at the end of this section. Tools, supplies and materials for repairing nets shall be kept aboard the trawler. In the event of damage to trawl nets, one hour will be allowed to either repair or replace them. The Contractor shall have at least one set of

replacement nets immediately available at all times, to insure that the dredging work is not adversely delayed due to trawler down-time for replacing damaged nets. It is recommended that a second set of replacement nets be available aboard the trawler.

b. Suspension of Dredging and Relocation Trawling
Should there be a tearing of nets, or breakdown of other equipment that would cause the trawler to leave the area where dredging is underway during any period of time where relocation trawling is required, the dredge may continue to operate for up to 48 hours, as long as no turtles are taken. Should there be dangerously high seas that would cause the trawler to leave the dredging area when relocation trawling is required the dredge may continue to operate, as long as no turtles are taken.

c. Turtle Excluder Devices
Approval for trawling for sea turtles without Turtle Excluder Devices (TEDs) must be obtained from NMFS (contact Eric Hawk at 727-551-5773). Any necessary State or Federal clearances for the capture and relocation of sea turtles must also be obtained. Approvals must be submitted to Mr. Edward Creef electronically at Edward.D.Creef@usace.army.mil prior to trawling.

d. Reporting
Immediately after completing each day of relocation trawling, if possible, the Contractor shall notify Mr. Edward Creef by telephone (504-862-2521) or email (Edward.D.Creef@usace.army.mil) conveying the results of the trawl. The results of each trawl shall be recorded on the Sea Turtle Trawling Report. The Sea Turtle Trawling Report also shall be furnished by the Contractor to Mr. Edward Creef within 24 hours after completing the relocation trawl. Following completion of the project, a copy of the Contractor's log regarding sea turtles shall be forwarded to Mr. Edward Creef within 10 working days.

15. Report Submission.

The Contractor shall maintain a log detailing all incidents, including sightings, collisions with, injuries, or killing of manatees, sea turtles, sturgeon, or whales occurring during the contract period. The data shall be recorded on forms provided at the web site indicated in condition number 1. All data in the original form shall be forwarded directly within 10 days of collection to Mr. Edward Creef at the address provided below. Following project completion, a report summarizing the above incidents and sightings shall be submitted to:

USACE - New Orleans District
Operations Division - Technical Support Branch
Attn Edward Creef
P.O. Box 60267
New Orleans, Louisiana, 70160-0267

Partial List of NMFS-Approved Protected Species Observer Companies

Dr. L. M. Ehrhart Dept. of Biological Science University of Central Florida P.O. Box 25000 Orlando, FL 32816 407-823-2970 Fax: 407-283-5769 lehrhart@pegasus.cc.ucf.edu	A.I.S. Inc. (P.O.C. Arv Poshkus) 19 Camden Street P.O. Box 421 Stoughton, MA 02072-0421 800-230-8032 Fax: 781-297-7669 ARVIDAS1@juno.com	Mary Jo Barkaszi ECOES, Inc. 7341 Glenwood Road Cocoa, FL 32927 321-635-8477 Fax: 321-635-8449 maryjo@ecoes.com www.ecoes.com

Jane Provancha Dynamac Corporation DYN-2 Kennedy Space Ctr., FL 32899 321-759-0935 Fax: 321-730-3455 jprovancha@dynamac.com	R. Eric Martin Ecological Associates, Inc. P.O. Box 405 Jensen Beach, FL 34958 772-334-3729 Fax: 772-334-4925 erikmartin@bellsouth.net	Roxanne Carter REMSA, Inc. * 124 W Queens Way Hampton, VA 23669 757-722-0113 ext. 25 Fax: 757-722-0638 roxy@remsameso.com
Christopher Slay, President ***** Coastwise Consulting (Environmental Consultants - Land, Sea, Air) 173 Virginia Avenue Athens, GA 30601 706-543-6859 904-261-8518 Fax/Tel cslay@att.net	Richard Alboth Tiny's Marine Environmental Services 7 Rogers Street Randolph, MA 02368 781-963-6308 Cellular: 321-863-6561 tinysvc@aol.com	Andrea Balla-Holden, Marine & Marine Life Consulting 5988 SE Kelsey Court Port Orchard, WA 98367 360-769-5934: Office 360-769-4195: Fax MarineMarineLife@aol.com
Trish Bargo, ***** East Coast Observers, Inc. P.O. Box 6192 Norfolk, VA 23508 757-227-5779 757-965-6766 Fax 757-880-7636 Cell tbargo@eastcoastobservers.com		Robert K. Metzger ***** Relocation Trawling Biologist 1327 N. Wheaton Dr. St. Charles, MO 63301-0881 636-946-6464 Tel/Fax 314-265-4806: Cell metzgerr@swbell.net

* Contractors that also provide sea turtle trawling and relocation services.

Turtle Trawl Net Specifications

DESIGN: 4 Seam, 4 Legged, 2 Bridal Trawl Net

WEBBING: 4 inch bar, 8 inch stretch
Top – 36 Gauge Twisted Nylon Dipped
Side – 36 Gauge Twisted Nylon Dipped
Bottom – 84 Gauge Braided Nylon Dipped

NET LENGTH: 60 ft from cork line to cod end

BODY TAPER: 2 to 1

WING END HEIGHT: 6 feet

CENTER HEIGHT: Dependent on depth of trawl – 14 to 18 ft

COD END: Length 50 meshes x 4 in equals 16.7 ft
Webbing 2 in bar, 4 in stretch, 84 gauge braid nylon
Dipped, 80 meshes around, 40 rigged meshes with ¼ x 2 in choker rings, 1 each ½ x 4 in at end
Cod End Cover – none
Chaffing Gear – none

HEAD ROPE: 60 ft ½ in combination rope (braid nylon with stainless cable center)

FOOT ROPE: 65 ft ½ in combination rope

LEG LINE: Top – 6 ft, Bottom – 6 ft

FLOATS: Size – Tuna Floats (football style), Diameter – 7in;
Length – 9 in; number 12 each;
Spacing – center of top net 2 in apart

MUD ROLLERS: Size – 5 in Diameter, 5.5 in length
Number – 22 each; spacing – 3 ft attached with 3/8 in
Polypropylene rope (replaced with snap on roller when broken)

TICKLER CHAINS: NONE (Discontinued – but previously used ¼ in x 74 ft galvanized chain)

WEIGHT: 20 ft of ¼ in galvanized chain on each wing, 40 ft per net looped and tied

DOOR SIZE: 7 ft x 40 in (or 8 ft x 40 in); Shoe – 1 in
X 6 in: bridles – 3/8 in high test chain

CABLE LENGTH: (Bridle Length, Total): 7/16 in x 240-300 ft varies with bottom conditions

FLOAT BALL: NONE

LAZY LINES: 1 in nylon

PICKUP LINES: 3/8 in polypropylene

WHIP LINES: 1 in nylon

SEA TURTLE/GULF STURGEON OBSERVER SPECIFICATIONS

As a result of consultation under Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers has agreed to report any sea turtle/gulf sturgeon activity to the National Marine Fisheries Service (NMFS). The points of contact (listed below) should be notified of any sightings, collisions with, injuries or killing of sea turtles/gulf sturgeons by telephone within 12 hours of the action. The notification should include the number and species of turtles (if known) impacted and the time the activity occurred.

New Orleans District, Operations Division,
Marine Management Section, Dredge Wheeler
Ms. Bethany Walker
(504) 862-2699 and fax (504) 862-1912
After hours number: 504-905-4573 (cell)

New Orleans District, Operations Division,
Operations Technical Support Branch,
Mr. Ed Creef
(504) 862-2521 and fax (504) 862-2317
After hours number: 504-818-0034 (home)

Observers will continuously monitor all of the hopper inflow and/or over-flow screens 24 hours per day during dredging mode, to detect turtles/sturgeons or turtle/sturgeon parts. Screen monitoring shall be conducted as required to effectively watch these screens, based on the design, configuration, and position thereof. The observers will be provided access and use of a facsimile and telephone 24 hours per day to insure, in the event of a take, the observers will be able to fulfill the requirements of the paragraph entitled "Sea Turtle/Gulf Sturgeon Reporting".

In addition to monitoring 24 hours per day during dredging mode, the observers will be responsible for assuring that:

1) temperatures in the waterway are taken, in degrees Fahrenheit, at the surface and at the mid-depth from the surface to the water bottom. The readings shall be made each eight hours for the duration of each dredging assignment. The waterway mileage and latitude/longitude shall be recorded corresponding to each temperature reading.

2) during transit of the dredge to/from the disposal site(s), after dredging has ceased, the screen observer shall assure that the hopper screens are cleaned of debris and correctly re-installed on the dredge for return to dredging mode. The observer shall report damage of the screens to the Dredge Wheeler representative immediately upon detection of such damage, and the screens shall be repaired or replaced before dredging is resumed.

3) complete turtle/sturgeon data reporting is made, as required in paragraph entitled "Sea Turtle/Gulf Sturgeon Reporting".

4) positively identified turtle/sturgeon parts are disposed of at the dredge material disposal site(s). Turtle/sturgeon parts which cannot be positively identified on board the dredge shall be color photographed by the observer(s) using instant developing film or a digital camera. The photos shall be attached to respective reports for documentation and later identification. Observer(s) shall measure, weigh, tag, and release any uninjured turtles incidentally taken by the dredge. Turtle/sturgeon handling and tagging methods shall be performed in accordance with NMFS-approved procedures. Injured turtles shall be transported to a rehabilitation facility, the Aquarium of the Americas at New Orleans, Louisiana. Observer(s) or their authorized representative shall provide NMFS-approved containers for turtle/sturgeon transport.

5) Sea Turtle/Gulf Sturgeon Reporting

The observers shall maintain a log detailing all incidents, including sightings, collisions with, injuries, or killing of sea turtles/sturgeons occurring during the contract period. The results of the monitoring shall be recorded on copies of the observation sheets attached, entitled "Endangered Species Observer Program" or similar forms. For each load, screen watch data shall be consolidated on a single sheet prior to beginning a new sheet for the next load. An observation sheet shall be completed for each load whether or not turtles are sighted in the waterway or turtle/sturgeon parts are detected on the screens. Dredging shall not commence until the consolidated report is completed from the previous dredging load. The observer(s) should notify the District points of contact (listed above) of any sightings, collisions with, injuries or killing of sea turtles by telephone and facsimile within 12 hours of the action. The notification should include the number and species of turtles impacted and the time the activity occurred. Upon completion of the dredging project, all consolidated and completed data reports shall be forwarded to the District points of contact (listed above).

The various endangered species observer program data forms are provided below.

ENDANGERED SPECIES OBSERVER PROGRAM

LOAD DATA FORM

USACE DISTRICT: _____

CONTRACT #: _____ **Maintenance____/New Work _____ PROJECT start date** _____

PROJECT NAME: _____ **DREDGE NAME:** _____

DREDGE FIRM: _____

LOAD #: _____ **LOAD start date:** _____ **Times (24hrs): Start** _____ **End** _____

Condition of screening : Port_____ **Starboard** _____ **Overflow** _____

Number of dragheads in use: _____ **Type of dragheads used:** _____**Size of dragheads:** _____

Draghead deflector? YES ____ **NO** ____ **Condition of deflector:** _____

Type of material dredged: _____

Weather conditions: _____

_____

Tidal stage (CIRCLE ONE): Slack Rising High Falling Low Unknown

Beaufort Sea States (Winds/Wave Height) (CIRCLE ONE)

0 = <1 knot/ 0 ft	**3** = 7-10 knot/ 2 ft	**6** = 22-27 knot/10 ft	**9** = 41-47 knot/23 ft	**12** = >63 knot/45
1 = 1- 3 knot/ 0.25 ft	**4** = 11-16 knot/ 4 ft	**7** = 28-33 knot/14 ft	**10** = 48-55 knot/29 ft	
2 = 4- 6 knot/ 0.5 ft	**5** = 17-21 knot/ 6 ft	**8** = 34-40 knot/18 ft	**11** = 56-63 knot/37 ft	

Waves: _____ **ft Wind (speed & direction):** _____

AIR TEMP: _____ **°C/°F** (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))

WATER TEMP: Surface _____ **°C /°F Column (mid-depth)** _____ **°C /°F Bottom** _____ **°C /°F**

SCREEN TYPE

_____	**Inflow screening:**	**None**	**25%**	**50%**	**75%**	**100%**
_____	**Overflow screening:**	**None**	**25%**	**50%**	**75%**	**100%**
_____	**Other screening:**	**None**	**25%**	**50%**	**75%**	**100%**

PORT SCREEN CONTENTS: _____

_____

_____

STARBOARD SCREEN CONTENTS: _____

_____

_____

Estimate number entrained on this load for the following:

Sturgeon (any species) _____

Shark (any species) _____

Horseshoe crab _____

Blue crab _____

TURTLE OR TURTLE PARTS PRESENT THIS LOAD: YES _____ **NO** _____

SPECIES OF TURTLE TAKE: Unknown Loggerhead Green Kemp's ridley Hawksbill Leatherback

Comments: _____

_____

Number observers used/24hrs: _____ **% Monitoring/24 hrs: None 25% 50% 75% 100%**

Observer's name: _____ **Observer firm**_____

Observer signature _____

Endangered Species Observer Program – Daily Report

ENDANGERED SPECIES OBSERVER PROGRAM

DAILY REPORT

USACE DISTRICT: _____

PROJECT NAME: _____ **DREDGE NAME:** _____

Date: _____ **Load #s:** _____ **Areas dredge worked:** _____

Beaufort Sea State: 0 1 2 3 4 5 6 7 8 9 10 11 12

AIR TEMP: _____ °C/° F (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))

WATER TEMP: Surface _____ °C /° F **Column (mid-depth)** _____ °C /° F **Bottom** _____ °C /° F

Condition of deflector:_____ **Condition of screening:** _____

Were there incidents involving endangered or protected species? **YES** ____ **NO** ____

Which species? (complete incident form(s))_____

Comments (type of material, biological specimens, unusual circumstances, etc): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

BRIDGE WATCH SUMMARY

Time	Species	# Sightings/# Animals	Location/Comments
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
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		/	
		/	
		/	
		/	
		/	

Observer name _____

USACE Sea Turtle/Dredging Database – Post Hopper Dredging Project Checklist follows.

USACE Sea Turtle/Dredging Database
Post-Hopper Dredging Project Checklist

(1)_____PROJECT SUMMARY

District name_____ **District POC** _____
Contract # _____ **Maintenance** ___ **New Work**____ **Federal** ____**Regulatory** ____

Project name _____ **Dates of project** _____

Dredge name _____ **Dredge firm** _____ **Dates worked** _____
Dredge name _____ **Dredge firm** _____ **Dates worked** _____
Dredge name _____ **Dredge firm** _____ **Dates worked** _____
Dredge name _____ **Dredge firm** _____ **Dates worked** _____

For total project:
 # days dredged: _____ **# hours dredged:**_____ **# loads dredged:** _____**Total CY dredged**_____

For dredge vessel_____
 # days dredged: _____ **# hours dredged:**_____ **# loads dredged:** _____**Total CY dredged**_____
For dredge vessel_____
 # days dredged: _____ **# hours dredged:**_____ **# loads dredged:** _____**Total CY dredged**_____
For dredge vessel_____
 # days dredged: _____ **# hours dredged:**_____ **# loads dredged:** _____**Total CY dredged**_____
For dredge vessel_____
 # days dredged: _____ **# hours dredged:**_____ **# loads dredged:** _____**Total CY dredged**_____

General project description/Disposal method(s):_____
_____
_____

Type of material dredged: (circle) **silt** **clay** **sand** **mud** **shell** **rock** **other**
Type of draghead(s): _____ **Silent inspector: YES** _____ **NO** _____
Mitigation measures:
Dredging within designated environmental window **YES** _____ **NO** _____ **N/A** _____
Draghead deflectors installed **YES** _____ **NO** _____ **N/A** _____
Relocation trawling conducted **YES** _____ **NO** _____ **N/A** _____
Pre-dredge assessment trawling conducted **YES** _____ **NO** _____ **N/A** _____
Monitoring measures:
Screening type(s) : _____ **% material screened: None 25% 50% 75% 100%**
 # observers/24hrs: _____ **% monitoring/24 hrs: None 25% 50% 75% 100%**

For total project:
 # Incidental sea turtle takes **Loggerhead** _____ **Green** _____ **Kemp's ridley** _____ **Other** _____ **Unknown** _____
 # Incidental sturgeon takes **Shortnose** _____ **Gulf** _____ **Other** _____ **Unknown** _____
Description of other endangered/sensitive species incidents: _____
_____

(2)_____ Dredge summary logs associated with dates of incidental takes

(3)_____ Endangered Species Observer Final Report(s)
(Each incidental take reported should include: Incidental Take Form, Load Data Form, Dredge Load Log, Copies of photos)

(4)_____ Relocation and/or assessment trawling Final Report(s)
(Report should include: total #/species of turtles relocated during project; total #/species of turtles relocated on date of dredging incidental take, total #/species of sturgeon collected.)

(5)_____ Reports/descriptions of other related research/studies being done during/related to project.

Endangered Species Observer Program – Sturgeon Incidental Take Data Form

ENDANGERED SPECIES OBSERVER PROGRAM

STURGEON INCIDENTAL TAKE DATA FORM

USACE DISTRICT: _____
PROJECT NAME: _____ **DREDGE NAME:** _____

DATE: _____ **Time sturgeon take recovered (24hr):** _____ **Sturgeon # for project:** _____

LOAD #: _____ **Times (24hrs): Start** _____ **End** _____ **Load start date** _____

SPECIES OF STURGEON TAKE: Shortnose _____ **Gulf** _____ **Other** _____ **Unknown** _____

Channel location of take: Latitude _____ **Longitude** _____
Other location / Channel description (e.g. buoy markers, landmarks): _____
_____

Location take recovered on dredge: _____

Number of dragheads in use at time of incident: _____ **Draghead deflector? YES** ____ **NO** ____
Condition of deflector: _____ **Condition of screening:** _____

Beaufort Sea State: 0 1 2 3 4 5 6 7 8 9 10 11 12

AIR TEMP: _____ **°C/° F** (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))
WATER TEMP: Surface _____ **°C /° F Column (mid-depth)** _____ **°C /° F Bottom** _____ **°C /° F**

Condition of specimen: _____
_____
_____
0 = Alive; 1 = Fresh dead; 2 = Moderately decomposed; 3 = Severely decomposed; 4 = skeleton/old bone; 5 = undetermined

Measurements/description of specimen: _____
_____
_____

Genetic samples taken: YES ____ **NO** ____ **Photos taken: YES** ____ **NO** ____
Sample frozen/preserved: YES ____ **NO** ____
Final disposition of specimen: _____

Comments: _____
_____
_____
_____

Load data form attached: YES ____**NO** ____ **Dredge load log attached: YES** ____**NO** ____

Observer's name _____

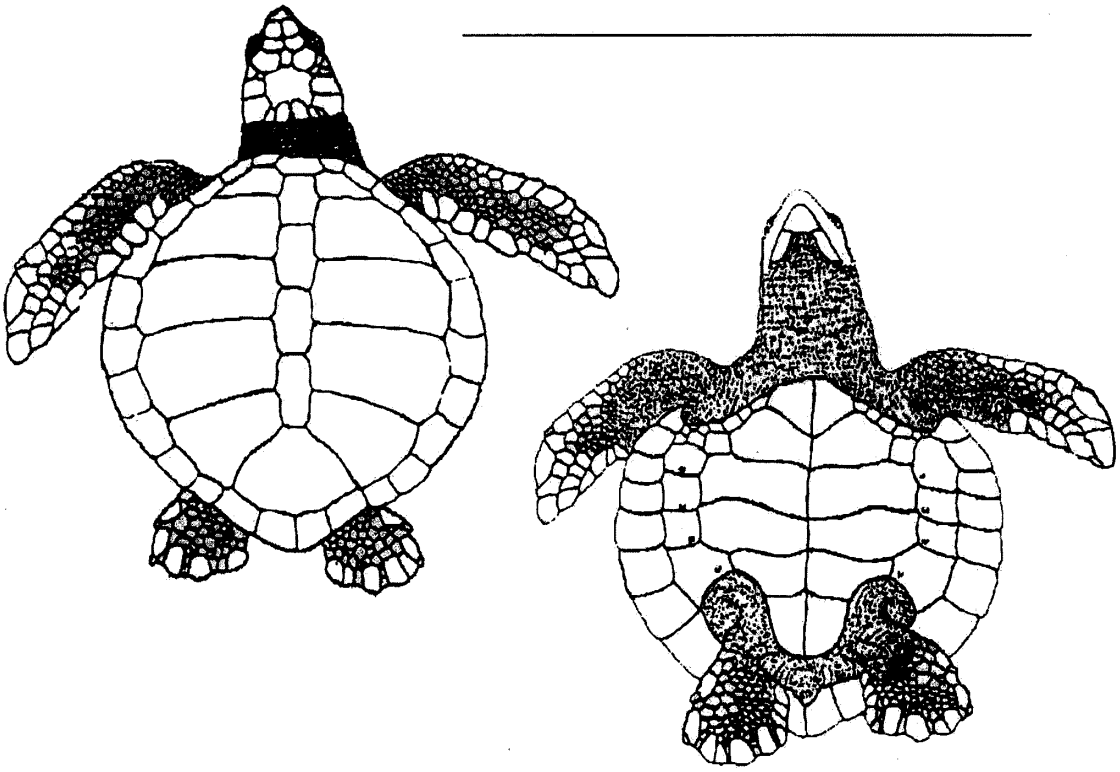
Use diagram below to illustrate specimen/part recovered:

Endangered Species Observer Program Sea Turtle Take Form - Kemp's Ridley follows

Kemp's Ridley (*Lepidochelys kempii*)

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____



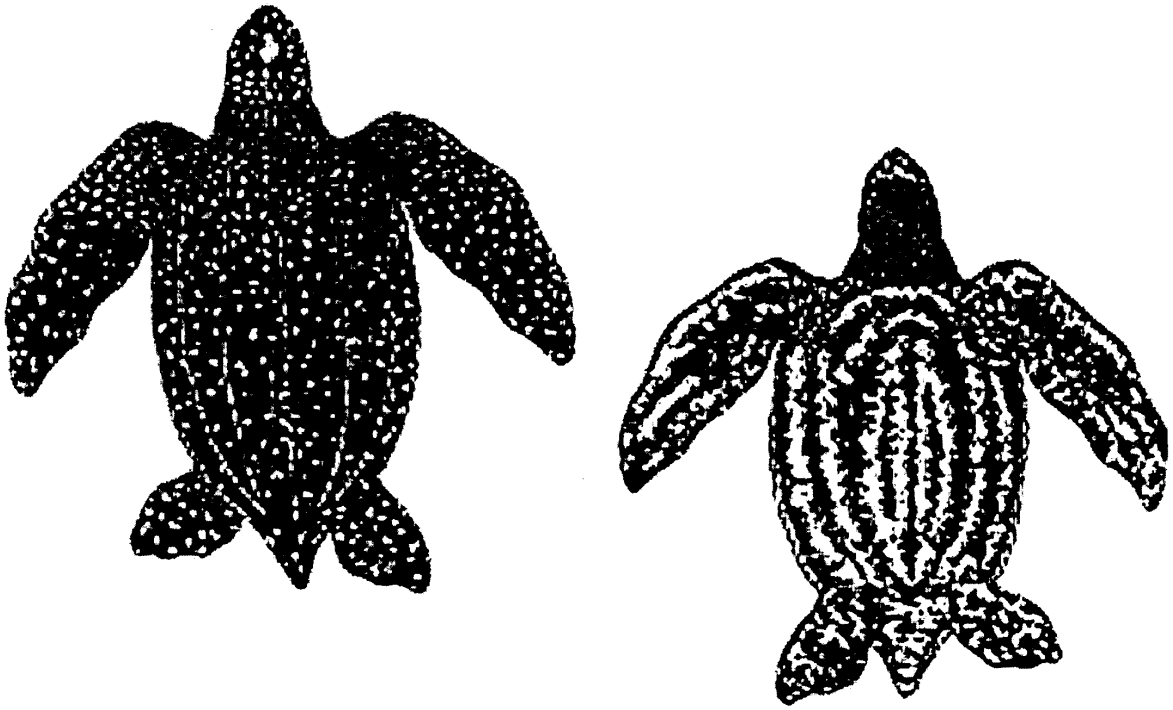
Diagrams by Tom McFarland

Endangered Species Observer Program Sea Turtle Take Form – Leatherback

Leatherback (*Dermochelys coriacea)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____



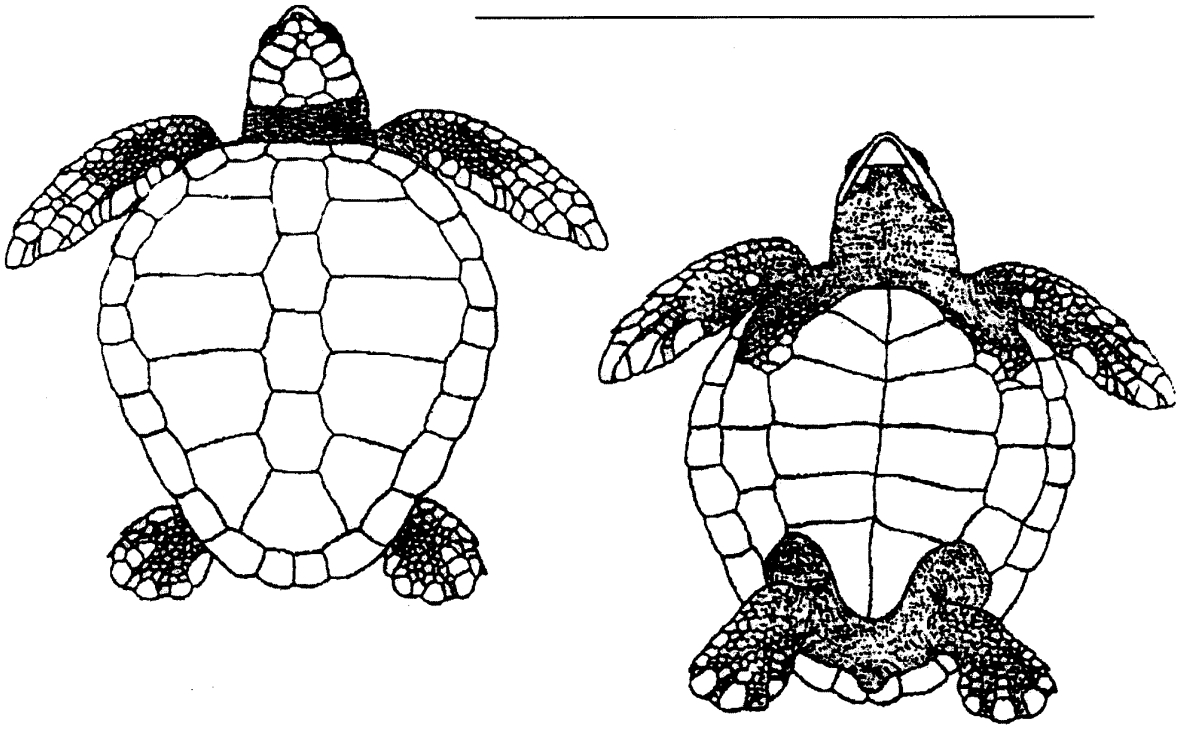
Diagrams by Tom McFarland

Endangered Species Observer Program Sea Turtle Take Form – Loggerhead

Loggerhead (*Caretta caretta)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____



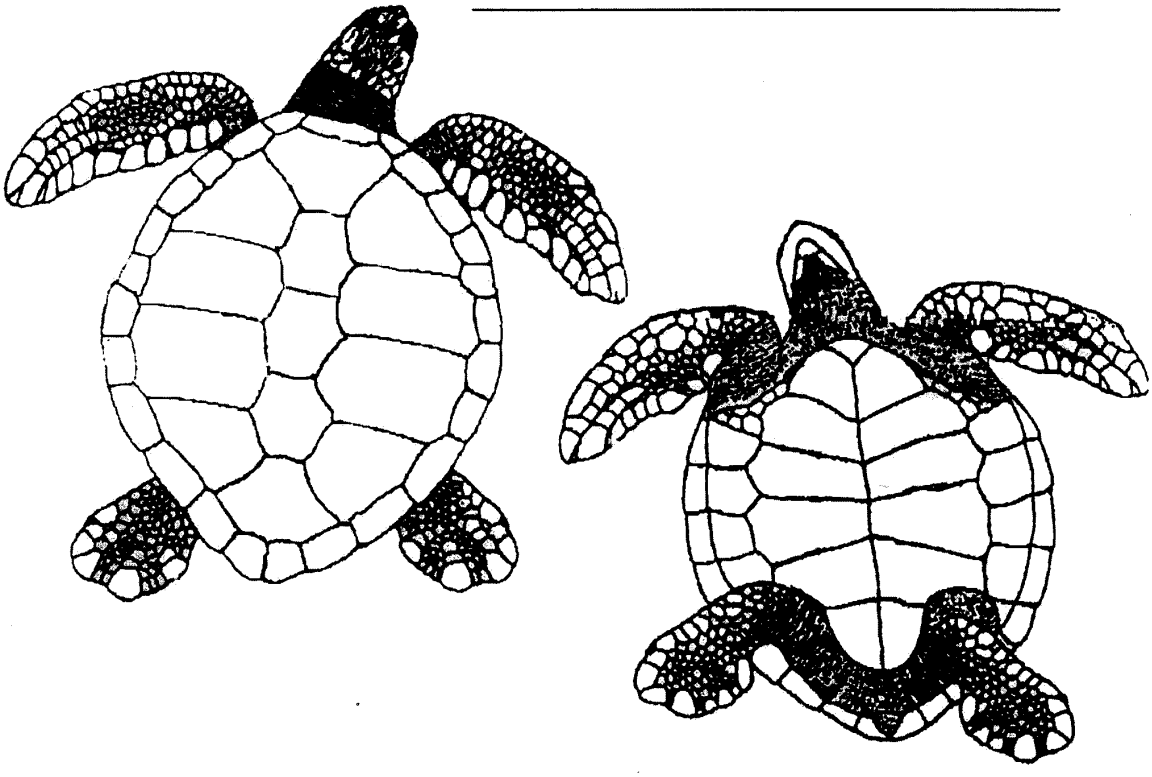
Diagrams by Tom McFarland

Endangered Species Observer Program Sea Turtle Take Form – Green turtle

Green turtle (*Chelonia mydas)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____



Diagrams by Tom McFarland

Endangered Species Protection for Sea Turtles & Gulf Sturgeon

I. Sea Turtle Trawling and Relocation

Sea Turtle Trawling and Relocation, as specified herein, will be at the option and in the discretion of the Government to aid in preventing the taking of sea turtles during dredging operations with the approved turtle deflector in place. Within 72 hours after receiving written directions from the Contracting Officer, the Contractor shall begin trawling for turtles to relocate them from the dredging project area. Relocation trawling shall be performed so as to not interfere with dredging operations in progress.

e. Approved Sea Turtle Trawling and Relocation Supervisor

A NMFS-Approved Protected Species Observer (supervisor) shall conduct sea turtle trawling. A letter of approval from NMFS shall be provided to the Contracting Officer or his/her authorized representative prior to commencement of trawling. If trawling in Louisiana territorial waters outside of the shrimping season, the approved sea turtle trawling and relocation supervisor must also possess a Scientific Collecting Permit from the Louisiana Department of Wildlife and Fisheries (point of contact is Ms. Karen Foote at 225-765-2384).

f. Sea Turtle Trawling Procedures

Any captured sea turtles either shall be transported to the Institute for Marine Mammal Studies located in Gulfport, Mississippi, or released into waters minimally impacted by presence of oil/dispersants (to be determined by the relocation trawling supervisor in coordination with Edward Creef and Dena Dickerson (601-831-0687). Any captured gulf sturgeons shall be released immediately after capture and handling for measurements away from the dredging site in waters minimally impacted by presence of oil/dispersants (to be determined at the time of capture by the trawling supervisor in coordination with Edward Creef and Dena Dickerson). Methods and equipment shall be standardized including data sheets, nets, trawling direction to tide, length of station, length of tow, and number of tows per station. Data on each tow shall be recorded using the Sea Turtle Trawling Report found at the website (http://el.erdc.usace.army.mil/seaturtles/docs/trawlingforms.pdf). The trawler shall be equipped with 60-foot nets constructed from 8-inch mesh (stretch) fitted with mud rollers and flats as specified in the Turtle Trawl Nets Specifications appended to the end of this Section. Paired net tows shall be made for 24 hours per day, as directed by the Contracting Officer or his/her authorized representative. The tows shall be performed in shifts, to be determined by the Contracting Officer or his/her authorized representative, and the trawler shall be available for operation 24 hours a day. Positions at the beginning and end of each tow shall be determined from GPS Positioning equipment. Refer to EM 1110-1-1003 "Navstar global positioning system surveying", paragraph 5.3 and Table 5-1, for acceptable GPS criteria.

g. Trawling Requirements

Trawling operations shall be conducted in the vicinity of dredge operations, but shall maintain a safe distance from that dredge. **NOTE: ALL TRAWLING ACTIVITIES, VESSELS AND EQUIPMENT SHALL COMPLY WITH THE CONTRACTOR'S ACCIDENT PREVENTION PLAN AND THE REQUIREMENTS OF EM 385-1-1, U.S. ARMY CORPS OF ENGINEERS SAFETY AND HEALTH REQUIREMENTS MANUAL**. Trawling shall be conducted with and against the tidal flow at a speed not to exceed 3.5 knots using repetitive trawls in the channel or other work area not to exceed 42-minutes (total time). Trawls shall be made in the center, green, and red sides of the channel such that the total width of the channel bottom is trawled.

h. Sea Turtle/Gulf Sturgeon Handling and Measurements

At least one crewmember who is a NMFS-Approved Protected Species Observer shall be on board the trawler during the trawl. The observer shall be responsible for handling of captured sea turtles and Gulf sturgeons.

Each captured turtle or gulf sturgeon shall be identified, scanned for PIT tags, measured, tagged, tissue sampled and released, and data recorded on the Sea Turtle Tagging and Relocation Report, which can be found at the following website: (http://el.erdc.usace.army.mil/seaturtles/docs/taggingforms.pdf). Presence of PIT tags shall be scanned for by using a multi-frequency scanner capable of reading multiple frequencies (including 125-, 128-, 134-, and 400-kHz tags) and reading tags deeply embedded in muscle tissue. Any captured sea turtles shall be transported to the Institute for Marine Mammal Studies located in Gulfport, Mississippi. Turtle measurements shall be recorded and shall include, at a minimum, weight, straight-line length, straight-line width, and tail length. Gulf sturgeon measurements shall be recorded and shall include, at a minimum, weight, total length, and fork length. Turtles shall be tagged with NMFS #681 Inconel tags in each of the front flippers according to NMFS protocol. Aseptic conditions shall be maintained for tags and tag attachment. The Contractor shall be responsible for obtaining any and all permits related to trawling from the appropriate state and Federal agencies. All aspects of the trawling shall be coordinated with Edward Creef (504-862-2521) and Dena Dickerson (601-831-0687).

i. Handling Fibropapillomatose Turtles

Anyone handling sea turtles infected with fibropapilloma tumors shall either: 1) clean all equipment that comes in contact with the turtle with mild bleach solution between the processing of each turtle, or 2) maintain a separate set of sampling equipment for handling turtles displaying fibropapilloma tumors or lesions.

j. Water Quality and Physical Measurements

Water temperature measurements shall be taken at the water surface each day using a laboratory thermometer. Weather conditions shall be recorded from visual observations and instruments on the trawler. Weather conditions, air temperature, wind velocity and direction, sea state-wave height, and precipitation shall be recorded on the Sea Turtle Trawling Report. High and low tides shall be recorded.

k. Repair and Replacement of Damaged Trawl Nets

The Contractor, at the time of mobilization, shall provide trawl nets that meet the requirements specified in the Turtle Trawl Net Specifications at the end of this section. Tools, supplies and materials for repairing nets shall be kept aboard the trawler. In the event of damage to trawl nets, one hour will be allowed to either repair or replace them. The Contractor shall have at least one set of replacement nets immediately available at all times, to insure that the dredging work is not adversely delayed due to trawler down-time for replacing damaged nets. It is recommended that a second set of replacement nets be available aboard the trawler.

l. Suspension of Dredging and Relocation Trawling

Should there be a tearing of nets, or breakdown of other equipment that would cause the trawler to leave the area where dredging is underway during any period of time where relocation trawling is required, the dredge may continue to operate for up to 48 hours, as long as no turtles are taken, and subject to the discretion of the Contracting Officer. Should there be dangerously high seas that would cause the trawler to leave the dredging area when relocation trawling is required, the dredge may continue to operate, as long as no turtles are taken and subject to the discretion of the Contracting Officer.

m. Turtle Excluder Devices

Approval for trawling for sea turtles without Turtle Excluder Devices (TEDs) must be obtained from NMFS (contact Eric Hawk at 727-551-5773). Any necessary State or Federal clearances for the capture and relocation of sea turtles must also be obtained. Approvals must be submitted to the Contracting Officer or his/her authorized representative prior to trawling.

n. Reporting

Immediately after completing each day of relocation trawling, if possible, the Contractor shall notify Dena Dickerson by telephone conveying the results of the trawl. The results of each trawl shall be recorded on the Sea Turtle Trawling Report. The Sea Turtle Trawling Report also shall be furnished by the Contractor to Mr. Edward Creef, U.S. Army Corps of Engineers, New Orleans District, within 24 hours after completing the relocation trawl (fax number 504-862-2317; email: edward.d.creef.@usace.army.mil). Following completion of the project, a copy of the Contractor's log regarding sea turtles shall be forwarded to Mr. Edward Creef within 10 working days.

Turtle Trawl Net Specifications

DESIGN:	4 Seam, 4 Legged, 2 Bridal Trawl Net
WEBBING:	4 in bar, 8 in stretch Top – 36 Gauge Twisted Nylon Dipped Side – 36 Gauge Twisted Nylon Dipped Bottom – 84 Gauge Braided Nylon Dipped
NET LENGTH:	60 ft from cork line to cod end
BODY TAPER:	2 to 1
WING END HEIGHT:	6 ft
CENTER HEIGHT:	Dependent on depth of trawl – 14 to 18 ft
COD END:	Length 50 meshes x 4 in equals 16.7 ft Webbing 2 in bar, 4 in stretch, 84 gauge braid nylon Dipped, 80 meshes around, 40 rigged meshes with ¼ x 2 in choker rings, 1 each ½ x 4 in at end Cod End Cover – none Chaffing Gear – none
HEAD ROPE:	60 ft ½ in combination rope (braid nylon with stainless cable center)
FOOT ROPE:	65 ft ½ in combination rope
LEG LINE:	Top – 6 ft, Bottom – 6 ft
FLOATS:	Size – Tuna Floats (football style), Diameter – 7 In; Length – 9 in; number 12 each; Spacing – center of top net 2 in apart
MUD ROLLERS:	Size – 5 in Diameter, 5.5 in length Number – 22 each; spacing – 3 ft attached with 3/8 in Polypropylene rope (replaced with snap on roller when broken)
TICKLER CHAINS:	NONE (Discontinued – but previously used ¼ in x 74 ft galvanized chain)
WEIGHT:	20 ft of ¼ in galvanized chain on each wing, 40 ft per net looped and tied
DOOR SIZE:	7 ft x 40 in (or 8 ft x 40 in); Shoe – 1 in X 6 in: bridles – 3/8 in high test chain
CABLE LENGTH:	(Bridle Length, Total): 7/16 in x 240-300 ft varies with bottom conditions
FLOAT BALL:	NONE
LAZY LINES:	1 in nylon
PICKUP LINES:	3/8 in polypropylene
WHIP LINES:	1 in nylon

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5312; FAX (727) 824-5309
http://sero.nmfs.noaa.gov

Measures for Reducing Entrapment Risk to Protected Species

Bottlenose dolphins, sea turtles, and Gulf sturgeon (protected species) are known to inhabit coastal waters of the northern Gulf of Mexico. Bottlenose dolphins are protected under the Marine Mammal Protection Act (MMPA) and sea turtles and Gulf sturgeon are protected under the Endangered Species Act (ESA). Because of the potential for these protected species to become entrapped within coastal waters of construction sites along the northern Gulf coast, projects that enclose shallow open water areas for wetland creation or nourishment will use the following measures to minimize the potential for entrapment:

1. **Pre-construction planning.** During project design, the Federal Action Agency or project proponents must incorporate at least one escape route into the proposed retention structure(s) to allow any protected species to exit the area(s) to be enclosed. Escape routes must lead directly to open water outside the construction site and must have a minimum width of 100 feet. Escape routes should also have a depth as deep as the deepest natural entrance into the enclosure site and must remain open until a thorough survey of the area, conducted immediately prior to complete enclosure, determines no Protected Species are present within the confines of the structure (see item 5 below for details).

2. **Pre-construction compliance meeting.** Prior to construction, the Federal Action Agency, project proponents, the contracting officer representative, and construction personnel should conduct a site visit and meeting to develop a project-specific approach to implementing these preventative measures.

3. **Responsible parties.** The Federal Action Agency will instruct all personnel associated with the project of the potential presence of protected species in the area and the need to prevent entrapment of these animals. All construction personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing protected species. Construction personnel will be held responsible for any protected species harassed or killed as a result of construction activities. All costs associated with monitoring and final clearance surveys are the responsibility of project proponents and must be incorporated in the construction plan.

4. **Monitoring during retention structure construction.** It is the responsibility of construction personnel to monitor the area for protected species during dike or levee construction. If protected species are regularly sighted over a 2 or 3 day period within the enclosure area during retention structure assembly, construction personnel must notify the Federal Action Agency. It is the responsibility of the Federal Action Agency

to then coordinate with the National Marine Fisheries Service (NMFS) Marine Mammal Health and Stranding Response team (1-877-WHALE HELP [1-877-942-5343]) or the appropriate State Coordinator for the Sea Turtle Stranding and Salvage Network (see http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm) to determine what further actions may be required. Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area.

5. **Pre-closure final clearance.** Prior to completing any retention structure by closing the escape route, the Federal Action Agency will insure that the area to be enclosed is observed for protected species. Surveys must be conducted by experienced marine observers during daylight hours beginning the day prior to closure and continuing during closure. This is best accomplished by small vessel or aerial surveys with 2-3 experienced marine observers per vehicle (vessel/helicopter) scanning for protected species. Large areas (e.g. >300 acres) will likely require the use of more than one vessel or aerial survey to insure full coverage of the area. These surveys will occur in a Beaufort sea state (BSS) of 3 feet or less, as protected species are difficult to sight in choppy water. Escape routes may not be closed until the final clearance determines the absence of protected species within the enclosure sight.

6. **Post closure sightings.** If protected species become entrapped in an enclosed area, the Federal Action Agency and NMFS must be immediately notified. If observers note entrapped animals are visually disturbed, stressed, or their health is compromised then the Action Agency may require any pumping activity to cease and the breaching of retention structures so that the animals can either leave on their own or be moved under the direction of NMFS.

    a. In coordination with the local stranding networks and other experts, NMFS will conduct an initial assessment to determine the number of animals, their size, age (in the case of dolphins), body condition, behavior, habitat, environmental parameters, prey availability and overall risk.
    b. If the animal(s) is/are not in imminent danger they will need to be monitored by the Stranding Network for any significant changes in the above variables.
    c. Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area. Coordination by the Federal Action Agency with the NMFS SER Stranding Coordinator may result in authorization for these actions.
    d. NMFS may intervene (catch and release and/or rehabilitate) if the protected species are in a situation that is life threatening and evidence suggests the animal is unlikely to survive in its immediate surroundings.
    e. Surveys will be conducted throughout the area at least twice or more in calm surface conditions (BSS 3 feet or less), with experienced marine observers, to determine whether protected species are no longer present in the area.

Revised: May 22, 2012

While NMFS recommends these best management practices to prevent the future takes of marine mammals by entrapment, use of these measures cannot guarantee a take will not occur. Following these measures does not constitute compliance with the MMPA's Incidental Take requirements and take is not authorized.

SOUTHWEST COASTAL LOUISIANA
REVISED INTEGRATED DRAFT FINAL FEASIBILITY REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

ANNEX R

2050 Coastal Wildlife Tables

Table 7-2. Region 3 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
Status: NH = Not Historically Present; NL = No Longer Present; Lo = Low Numbers; Mo = Moderate Numbers; Hi = High Numbers
Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions
Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna														Furbearer												Game Mammals												Reptiles			
	Type	% of Unit	Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Migrants				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Atchafalaya Basin																																											
Atchafalaya Subdelta	OW	95	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	I	I
	FM	3	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
	BB	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy
West N. Wax Lake	FM	17	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy
	FS	16	Mu	Lo	Sy	Sy	Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	HF	55		NH			Ne	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	11		NH			Ne	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
East N. Wax Lake Wetlands	FS	35	Mu	Lo	Sy	Sy	Ne	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	56		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Wax Lake Wetlands	OW	18	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	FM	38	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
	FS	8	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	I	I
	HF	34		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	I	I
Wax Lk. Outlet Subdelta	OW	97	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	I	I
	FM	2	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
	BB	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy
Teche/Vermilion Basin																																											
Cote Blanche Wetlands	OW	10	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	I
	FM	54	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	I
	FS	15	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	I	I
	HF	17		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	I	I
East Cote Blanche Bay	OW	100	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH				NH		
West Cote Blanche Bay	OW	100	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH				NH		
Marsh Island	OW	20	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Mo	Sy	I

Table 7-2. Region 3 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
Status: NH = Not Historically Present; NL = No Longer Present; Lo = Low Numbers; Mo = Moderate Numbers; Hi = High Numbers
Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions
Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
	BM	70		NH				NH			Mu	Hi	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	SM	10		NH				NH			Mu	Hi	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy
Vermilion Bay Marsh	OW	13		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH			Mu	Lo	Sy	Sy
	FM	5		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	IM	25		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BM	30		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	FS	5		NH			Ne	Lo	Sy	Sy		NH			Mu	Hi	I	Sy		NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	18		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy
Vermilion Bay	OW	99	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH				NH		
Big Woods	FM	8		NH				NH			St	Lo	Sy	Sy	Mu	Mo	I	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Lo	Mo	Sy	Sy
	HF	60		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D		NH		
	AU	25		NH				NH				NH			St	Lo	I	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH		
Rainey Marsh	OW	12	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy
	IM	11		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy
	BM	70		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy

Table 7-2. Region 3 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
Status: NH = Not Historically Present; NL = No Longer Present; Lo = Low Numbers; Mo = Moderate Numbers; Hi = High Numbers
Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions
Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna (cont.)														Furbearers												Game Mammals												Reptiles			
	Type	% of Unit	Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Migrants				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
	BM	70	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	I
	SM	10	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Vermilion Bay Marsh	OW	13	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	I	I
	FM	5	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	I	I
	IM	25	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	I	I
	BM	30	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	I	I
	FS	5	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	I	I
	HF	18		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	I	I
Vermilion Bay	OW	99	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH				NH		
Big Woods	FM	8	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	60		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	25	Mu	Lo	Sy	Sy	Ne	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Rainey Marsh	OW	12	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Hi	I	I
	IM	11	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	I
	BM	70	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	I

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Mermentau Basin																																								
Amoco	OW	14		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Hi	I	I		NH			W	Mo	Sy	Sy
	FM	80		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Hi	I	I	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
Big Marsh	OW	11		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			W	Mo	Sy	Sy
	FM	57		NH			St	Lo	U	U	Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	25		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
Big Burn	OW	18		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	AB	6		NH				NH				NH				NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	FM	67		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
Cameron Prairie	OW	6		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	AB	14		NH				NH				NH				NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	FM	67		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	AU	11		NH				NH				NH			St	Lo	I	Sy	Mu	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Grand Chenier Ridge	OW	11		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	FM	23		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	24		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	BM	5		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	8		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D		NH		
	AU	30		NH				NH				NH			St	Lo	I	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Grand Lake	OW	99		NH				NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH				NH		

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Mermentau Basin																																								
Amoco	OW	14		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Hi	I	I		NH			W	Mo	Sy	Sy
	FM	80		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Hi	I	I	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
Big Marsh	OW	11		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			W	Mo	Sy	Sy
	FM	57		NH			St	Lo	U	U	Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	25		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
Big Burn	OW	18		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	AB	6		NH				NH				NH				NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	FM	67		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
Cameron Prairie	OW	6		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	AB	14		NH				NH				NH				NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	FM	67		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	AU	11		NH				NH				NH			St	Lo	I	Sy	Mu	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Grand Chenier Ridge	OW	11		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	FM	23		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	24		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	BM	5		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	8		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D		NH		
	AU	30		NH				NH				NH			St	Lo	I	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Grand Lake	OW	99		NH				NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH				NH		

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
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Mapping Unit	1988 Habitat		Avifauna																Furbearer												Game										Reptiles			
	Type	% of Unit	Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Mermentau Basin																																											
Amoco	OW	14	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	FM	80	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
Big Marsh	OW	11	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	I
	FM	57	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
	IM	25	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	I
Big Burn	OW	18	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	AB	6	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	FM	67	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
Cameron Prairie	OW	6	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	AB	14	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	FM	67	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	I	Sy
	AU	11	Mu	Mo	Sy	Sy	Ne	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Grand Chenier Ridge	OW	11	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	I	Sy
	FM	23	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	I	Sy
	IM	24	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	I	Sy
	BM	5	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	I	Sy
	HF	8		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	30	Mu	Lo	Sy	Sy	Ne	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Grand Lake	OW	99	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH				NH		

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

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			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Grand/White Lake Land Bridge	OW	35		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			W	Lo	Sy	Sy
	FM	54		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	9		NH				NH				NH				NH				NH				NH				NH				NH			Mu	Hi	Sy	D		NH		
Grand Lake East	OW	14		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			W	Lo	Sy	Sy
	AB	6		NH				NH				NH				NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			Mu	Lo	Sy	Sy
	FM	64		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			Mu	Lo	Sy	Sy
	HF	14		NH				NH				NH				NH				NH				NH				NH				NH			Mu	Hi	Sy	D		NH		
Hog Bayou	OW	34	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			W	Lo	Sy	Sy
	FM	5		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			Mu	Lo	Sy	Sy
	BM	32		NH				NH			Mu	Hi	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			Mu	Lo	Sy	Sy
	SM	25		NH				NH			Mu	Hi	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	D	D	W	Lo	D	D	W	Lo	D	D		NH			Mu	Lo	Sy	Sy
	BB	1		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH				NH				NH		
Lacassine	OW	20		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	AB	20		NH				NH				NH				NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	FM	55		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	HF	5		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D		NH		
Little Prairie	OW	6		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy
	FM	30		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy
	HF	14		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH			W	Mo	Sy	Sy		NH		
	AU	50		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Lo	Sy	Sy

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
Status: NH = Not Historically Present; NL = No Longer Present; Lo = Low Numbers; Mo = Moderate Numbers; Hi = High Numbers
Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions
Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna														Furbeare												Game												Reptiles			
	Type	% of Unit	Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Grand/White Lake Land Bridge	OW	35	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	FM	54	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	D	D		NH			Mu	Lo	D	D	Mu	Mo	I	I
	HF	9		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	D	D		NH			Mu	Lo	D	D	Mu	Lo	Sy	Sy
Grand Lake East	OW	14	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	AB	6	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	FM	64	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	D	D		NH			Mu	Lo	D	D	Mu	Mo	I	Sy
	HF	14		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Hog Bayou	OW	34	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	FM	5	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BM	32	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	SM	25	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BB	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
Lacassine	OW	20	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	AB	20	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	FM	55	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy
	HF	5		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Little Prairie	OW	6	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	FM	30	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	I	Sy
	HF	14		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	50	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.

Status: NH = Not Historically Present; NL = No Longer Present; Lo = Low Numbers; Mo = Moderate Numbers; Hi = High Numbers

Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions

Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Little Pecan	OW	15		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	FM	75		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	D	D	W	Mo	D	D	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	HF	3		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH				NH				NH		
Locust Island	OW	9		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy
	FM	9		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	31		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy
	BM	13		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy
	AU	36		NH				NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Lower Mud Lake	OW	11	W	Lo	I	I		NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D		NH			W	Lo	Sy	Sy
	SM	77		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Lo	D	D	W	Lo	D	D	W	Lo	D	D		NH			Mu	Lo	Sy	Sy
	HF	4		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	BB	2		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH				NH				NH		
Middle Marsh	OW	7		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	FM	10		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	IM	69		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Hi	Sy	Sy	W	Hi	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	AU	10		NH				NH				NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
North White Lake	FM	92		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy
	HF	6		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D		NH		

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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna														Furbear												Game												Reptiles			
			Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
	Type	% of Unit	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Little Pecan	OW	15	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH			Mu	Hi	I	I
	FM	75	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Hi	I	I
	HF	3		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Locust Island	OW	9	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy
	FM	9	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	I	Sy
	IM	31	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	BM	13	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	AU	36	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Lower Mud Lake	OW	11	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Lo	Sy	Sy
	SM	77	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	4		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BB	2		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
Middle Marsh	OW	7	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy
	FM	10	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	I	Sy
	IM	69	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Mo	I	Sy
	AU	10	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
North White Lake	FM	92	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	HF	6		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy

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Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
North Grand Lake	OW	20		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy
	FM	68		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	HF	7		NH				NH				NH				NH				NH			Mu	Lo	Sy	Sy		NH				NH			Mu	Hi	Sy	D		NH		
Oak Grove	IM	73		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	BM	13		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	8		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Rockefeller	OW	23	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy
	FM	15		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	D	D
	IM	14		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	D	D
	BM	30		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Mo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	D	D
	SM	15		NH				NH			Mu	Hi	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Lo	D	D	W	Lo	D	D	W	Mo	Sy	Sy		NH			Mu	Lo	D	D
South Pecan Island	OW	26	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy
	IM	5		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	D	D
	BM	61		NH				NH			Mu	Hi	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Lo	Sy	Sy	Mu	Lo	Sy	D	Mu	Mo	D	D
South White Lake	OW	7		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	D	D	W	Mo	D	D	W	Lo	D	D					W	Mo	Sy	Sy
	FM	70		NH			Ne	Lo	I	I	Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	D	D	W	Mo	D	D	W	Lo	D	D	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	HF	11		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	AU	10		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	Mu	Lo	Sy	Sy
White Lake	OW	99		NH				NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH				NH		

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna														Furbeare												Game												Reptiles			
			Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
	Type	% of Unit	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
North Grand Lake	OW	20	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	FM	68	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy	Mu	Mo	I	Sy
	HF	7		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Oak Grove	IM	73	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	BM	13	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	AU	8	Mu	Lo	Sy	Sy	Ne	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Rockefeller	OW	23		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH			Mu	Hi	I	Sy
	FM	15	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	D		NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy
	IM	14	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	D		NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy
	BM	30	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Mo	Sy	D		NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy
	SM	15	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	D		NH			Mu	Mo	Sy	D	Mu	Lo	Sy	Sy
South Pecan Island	OW	26		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH			Mu	Mo	I	Sy
	IM	5	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
	BM	61	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
South White Lake	OW	7	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	FM	70	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	HF	11	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	10	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
White Lake	OW	99	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH				NH		

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Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Calcasieu/Sabine Basin																																								
Big Lake	OW	24		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	FM	14		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	IM	9		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	BM	18		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	HF	10		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH				NH				NH		
	AU	25		NH				NH			St	Lo	Sy	Sy	St	Mo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH		
Black Bayou	OW	34	W	Lo	I	I		NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			W	Lo	Sy	D
	IM	23		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	BM	34		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	HF	5		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
Black Lake	OW	68		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Lo	I	D	W	Lo	I	D	W	Lo	I	D	W	Lo	I	D	W	Lo	Sy	D
	IM	5		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Lo	I	D	W	Lo	I	D	W	Lo	I	D	W	Lo	I	D	Mu	Lo	Sy	D
	BM	11		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Lo	I	D	W	Lo	I	D	W	Lo	I	D	W	Lo	I	D	Mu	Lo	Sy	D
	AU	10		NH				NH			St	Lo	Sy	Sy	St	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH		
Brown Lake	OW	52		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	FM	7		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	IM	5		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	BM	34		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D

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Mapping Unit	1988 Habitat		Avifauna																Furbear												Game																Reptiles			
			Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
	Type	% of Unit	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Calcasieu/Sabine Basin																																																
Big Lake	OW	24	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Mo	I	Sy
	FM	14	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	IM	9	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	BM	18	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	HF	10		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	25	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Black Bayou	OW	34	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Lo	Sy	Sy
	IM	23	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
	BM	34	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
	HF	5		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
Black Lake	OW	68	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Lo	Sy	Sy
	IM	5	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	BM	11	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	AU	10	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	D		NH			Mu	Mo	Sy	D	Mu	Lo	Sy	Sy
Brown Lake	OW	52	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH			Mu	Lo	Sy	Sy
	FM	7	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
	IM	5	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
	BM	34	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy

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Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Cameron	OW	6		NH				NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH		
	FM	19		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy		NH		
	IM	22		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	BM	14		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	SM	6		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	BB	1		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH				NH				NH		
Calcasieu Lake	OW	94	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH				NH				NH		
Cameron-Creole Watershed	OW	38		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	Sy	W	Hi	I	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy
	IM	26		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BM	35		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Choupique Island	OW	33		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy
	FM	29		NH				NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BM	31		NH				NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	5		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH		
Clear Marais	OW	21		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	I		NH			W	Mo	Sy	Sy
	AB	10		NH				NH				NH				NH				NH			W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	I		NH			Mu	Mo	Sy	Sy
	FM	58		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	I	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	AU	6		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	I	Sy	W	Mo	I	Sy	W	Mo	I	I	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
Gum Cove	FM	21		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy
	AU	77		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	W	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	Sy	Sy

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	Type	% of Unit	Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Cameron	OW	6	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	FM	19	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	IM	22	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	BM	14	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
	SM	6	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	HF	1	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
	BB	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
Calcasieu Lake	OW	94	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH				NH				NH				NH				NH				NH				NH				NH		
Cameron-Creole Watershed	OW	38	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	I	I	Mu	Mo	I	I	Mu	Mo	I	I		NH				NH				NH			Mu	Mo	I	I
	IM	26	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	I	I	Mu	Mo	I	I	Mu	Mo	I	I	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
	BM	35	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	I	I	Mu	Mo	I	I	Mu	Mo	I	I	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
Choupique Island	OW	33	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	FM	29	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BM	31	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	AU	5		NH			Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Clear Marais	OW	21	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	AB	10	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	I
	FM	58	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	I
	AU	6	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Gum Cove	FM	21	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy
	AU	77	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																							
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Hackberry Ridge	OW	12		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	BM	21		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	I	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	HF	9		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH			Mu	Mo	Sy	D		NH		
	AU	53		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy
Hog Island Gully	OW	37		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	BM	22		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	SM	36		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Lo	Sy	D	W	Lo	Sy	D	W	Lo	Sy	D		NH			Mu	Lo	Sy	D
East Johnson's Bayou	OW	7		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			W	Lo	Sy	Sy
	FM	7		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	IM	80		NH				NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
West Johnson's Bayou	OW	13	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	I	D	W	Mo	I	D	W	Mo	I	D		NH			W	Lo	Sy	Sy
	BM	83		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	D	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
Johnson's Bayou Ridge	OW	5	W	Lo	I	I		NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	I	D	W	Mo	I	D	W	Mo	I	D		NH			W	Lo	Sy	Sy
	BM	31		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Hi	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	SM	44		NH				NH			Mu	Mo	Sy	D	Mu	Hi	I	Sy	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Hi	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	HF	3		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH				NH				NH		
	BB	1		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH				NH				NH		
	AU	16		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	I	D	W	Mo	I	D	W	Hi	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
Martin Beach-Ship Can. Shore	OW	9	W	Mo	I	I		NH			Mu	Mo	Sy	Sy		NH				NH			W	Mo	I	D	W	Mo	I	D	W	Lo	I	D		NH			W	Lo	Sy	Sy
	IM	33		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	BM	26		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	SM	7		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	I	D	W	Mo	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	BB	1		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH				NH				NH		
	AU	24		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Lo	I	D	W	Lo	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D

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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna														Furbearer												Game												Reptiles			
			Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
	Type	% of Unit	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Hackberry Ridge	OW	12	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	BM	21	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	HF	9	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH				NH				NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH						
	AU	53	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH		
Hog Island Gully	OW	37	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	BM	22	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	SM	36	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
East Johnson's Bayou	OW	7	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	FM	7	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy
	IM	80	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy
West Johnson's Bayou	OW	13	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	BM	83	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy
Johnson's Bayou Ridge	OW	5	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	BM	31	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	SM	44	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	HF	3		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BB	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	AU	16	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
Martin Beach-Ship Can. Shore	OW	9	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	IM	33	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	BM	26	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	SM	7	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	BB	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	AU	24	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	D		NH			Mu	Mo	Sy	D	Mu	Lo	Sy	Sy

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	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Mud Lake	OW	34	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	I	Sy	W	Mo	I	Sy	W	Lo	I	Sy		NH			W	Lo	Sy	Sy
	BM	62		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	I	Sy	W	Mo	I	Sy	W	Lo	I	Sy	Mu	Lo	Sy	D	W	Lo	Sy	Sy
Perry Ridge	OW	30		NH				NH			Mu	Mo	Sy	D		NH				NH			W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	Sy		NH			W	Lo	Sy	Sy
	FM	30		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	Sy		NH			Mu	Lo	Sy	Sy
	IM	28		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	Sy		NH			Mu	Lo	Sy	Sy
	HF	10		NH			Mu	Lo	Sy	Sy		NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH				NH				NH		
Sabine Pool No. 3	OW	32		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	Sy	W	Hi	I	Sy	W	Hi	I	Sy		NH			W	Lo	Sy	Sy
	AB	7		NH				NH				NH				NH				NH			W	Hi	I	Sy	W	Hi	I	Sy	W	Hi	I	Sy		NH			Mu	Mo	Sy	Sy
	FM	61		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Hi	I	Sy		NH			Mu	Mo	Sy	Sy
Sabine Lake Ridges	OW	5	W	Lo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Hi	I	Sy		NH			W	Mo	Sy	Sy
	FM	5		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Hi	I	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	24		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	D	W	Mo	Sy	D	W	Hi	I	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D
	BM	35		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Mo	Sy	D	W	Mo	Sy	D	W	Hi	I	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D
	SM	11		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	D	W	Lo	Sy	D	W	Lo	Sy	D	W	Mo	I	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D
	HF	1		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	BB	2		NH				NH			Mu	Hi	Sy	Sy	St	Lo	Sy	Sy	Mu	Hi	Sy	Sy		NH				NH				NH				NH				NH		
	AU	17		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Hi	I	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Second Bayou	OW	13		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			W	Lo	Sy	Sy
	IM	72		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	BM	14		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D

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Functions of Particular Interest: Ne = Nesting; St = Stopover Habitat; W = Wintering Area; Mu = Multiple Functions
Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna														Furbeare												Game												Reptiles			
			Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
	Type	% of Unit	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Mud Lake	OW	34	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	BM	62	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	I	Sy
Perry Ridge	OW	30	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	FM	30	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy
	IM	28	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	I	Sy
	HF	10		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Sabine Pool No. 3	OW	32		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH			Mu	Hi	Sy	Sy
	AB	7	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	Sy	Sy
	FM	61	Mu	Hi	Sy	Sy		NH			Mu	Hi	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy
Sabine Lake Ridges	OW	5	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	Sy	Sy
	FM	5	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
	IM	24	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	BM	35	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	SM	11	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	HF	1		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
	BB	2		NH				NH				NH				NH				NH				NH				NH				NH				NH				NH				NH		
	AU	17	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy
Second Bayou	OW	13	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH				NH			Mu	Hi	I	I
	IM	72	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Hi	I	I
	BM	14	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Hi	I	I

Table 7-2. Region 4 wildlife functions, status, trends, and projections.

Habitat Types: OW = Open Water; AB = Aquatic Bed; FM = Fresh Marsh; IM = Intermediate Marsh; BM = Brackish Marsh; SM = Saline Marsh; FS = Fresh Swamp; HF = Hardwood Forest; BB = Barrier Beach; AU = Agriculture/Upland. Habitat types comprising less than 5% of unit are shown only if habitat is particularly rare or important to wildlife.
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Trends (since 1985) / **Projections** (through 2050)**:** Sy = Steady; D = Decrease; I = Increase; U = Unknown

Mapping Unit	1988 Habitat		Avifauna																																					
	Type	% of Unit	Brown Pelican				Bald Eagle				Seabirds				Wading Birds				Shorebirds				Dabbling Ducks				Diving Ducks				Geese				Raptors				Rails, Coots, and Gallinules			
			Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Southeast Sabine	OW	9		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			W	Lo	Sy	Sy
	IM	59		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
	BM	31		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D	Mu	Lo	Sy	D	Mu	Lo	Sy	D
SW Gum Cove	OW	17		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			W	Lo	Sy	D
	FM	41		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	IM	24		NH				NH			Mu	Lo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	BM	8		NH				NH			Mu	Mo	Sy	Sy	Mu	Hi	Sy	Sy	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	HF	6		NH				NH				NH				NH				NH			Ne	Lo	Sy	Sy		NH				NH				NH				NH		
	AU	5		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy
Sweet/Willow Lakes	OW	43		NH				NH			Mu	Lo	Sy	Sy		NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			W	Mo	Sy	Sy
	AB	6		NH				NH				NH				NH				NH			W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
	FM	46		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Lo	Sy	Sy		NH			Mu	Mo	Sy	Sy
West Black Lake	OW	61		NH				NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	FM	20		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	IM	9		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	Sy	W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	AU	6		NH				NH				NH			St	Lo	Sy	Sy	Mu	Mo	Sy	Sy	W	Hi	I	Sy	W	Hi	I	Sy	W	Mo	I	Sy		NH			Mu	Lo	Sy	Sy
West Cove	OW	24	W	Mo	I	I		NH			Mu	Hi	Sy	Sy		NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	AB	7		NH				NH				NH				NH				NH			W	Hi	I	D	W	Hi	I	D	W	Mo	I	D		NH			Mu	Lo	Sy	D
	FM	65		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	Sy	W	Hi	Sy	D	W	Hi	Sy	D	W	Mo	Sy	D		NH			Mu	Lo	Sy	D
Willow Bayou	OW	40	W	Lo	I	I		NH			Mu	Mo	Sy	Sy		NH				NH			W	Hi	D	D	W	Hi	D	D	W	Mo	Sy	D		NH			W	Lo	Sy	D
	IM	8		NH				NH			Mu	Lo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	Sy	W	Hi	D	D	W	Hi	D	D	W	Mo	Sy	D		NH			Mu	Lo	Sy	D
	BM	52		NH				NH			Mu	Mo	Sy	D	Mu	Hi	Sy	D	Mu	Hi	Sy	Sy	W	Hi	D	D	W	Hi	D	D	W	Mo	Sy	D		NH			Mu	Lo	Sy	D

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Mapping Unit	1988 Habitat		Avifauna																Furbear														Game												Reptiles			
			Other Marsh/ OW Residents				Other Wood-land Resid.				Other Marsh/ OW Migrants				Other Wood-land Mig.				Nutria				Muskrat				Mink, Otter, and Raccoon				Rabbits				Squirrels				Deer				American Alligator			
	Type	% of Unit	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.	Func.	Status	Trend	Proj.
Southeast Sabine	OW	9	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy		NH				NH			Mu	Hi	I	Sy
	IM	59	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy
	BM	31	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Mo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy
SW Gum Cove	OW	17	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	Sy	Sy
	FM	41	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	IM	24	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	BM	8	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	Sy	Sy
	HF	6		NH			Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	Sy
	AU	5	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy	W	Mo	Sy	Sy		NH			W	Mo	Sy	Sy	Mu	Lo	Sy	Sy
Sweet/Willow Lakes	OW	43	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	AB	6	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	Sy	Sy
	FM	46	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy
West Black Lake	OW	61	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Lo	Sy	Sy
	FM	20	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	I
	IM	9	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Lo	Sy	I
	AU	6	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy	Mu	Lo	Sy	Sy
West Cove	OW	24	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	AB	7	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Hi	I	Sy
	FM	65	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Hi	I	Sy
Willow Bayou	OW	40	Mu	Mo	Sy	Sy		NH			Mu	Mo	Sy	Sy		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy		NH				NH				NH			Mu	Mo	I	Sy
	IM	8	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy
	BM	52	Mu	Hi	Sy	D		NH			Mu	Hi	Sy	D		NH			Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	Sy	Mu	Lo	Sy	D		NH			Mu	Lo	Sy	D	Mu	Mo	I	Sy

SOUTHWEST COASTAL LOUISIANA
REVISED INTEGRATED DRAFT FEASIBILITY REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

ANNEX S

Floods and Storms of Record

1. FLOODS AND STORMS OF RECORD

FLOODS AND STORMS OF RECORD

There have been several floods caused by runoff from heavy rainfall. Some of the major events that occurred over the last thirty years, including Hurricanes Lili, Rita, and Ike are discussed below.

Hurricane Audrey (June 25 - 29, 1957) ranks as the 7th deadliest hurricane to strike the United States and was the deadliest natural disaster in the history of southwest Louisiana in modern record-keeping with at least 500 deaths (source: http://www.srh.noaa.gov/lch/?n=audrey; accessed January 7, 2016).

Hurricane Lili (September 23 - October 3, 2002) was originally a Category 4 hurricane and first made landfall near Marsh Island in Iberia Parish with maximum sustained winds of 92 mph. Highest recorded rainfall amount was about 9 inches in some parts of Louisiana. The highest storm surge was over 11 feet in St. Mary Parish (source: https://coast.noaa.gov/hes/docs/postStorm/Lili_%20final.pdf; accessed December 15, 2015).

Hurricane Rita (September 24 - 26, 2005) Hurricane Rita, reaching its peak intensity southeast of the mouth of the Mississippi River as a Category 5, first made landfall just west of Johnson's Bayou and east of Sabine Pass at the Texas-Louisiana border as a Category 3 hurricane Sensors recorded storm-surge water levels over 14 ft above NAVD 88 at Constance Beach (LC11), Creole (LA12), and Grand Chenier (LA11), La., about 20 miles, 48 miles, and 54 miles, respectively, east of Sabine Pass, Texas. In general, storm-surge water levels increased eastward from the Sabine River into southwest Louisiana. The magnitude of the storm surge was greatest near the coast and decreased inland through the approximate latitude of I-10, about 35 miles inland from the coast (source: http://pubs.usgs.gov/circ/1306/pdf/c1306_ch7_j.pdf; accessed December 15, 2015).

Hurricane Gustav (August 25 - September 4, 2008) Gustav made landfall near Cocodrie, Louisiana on September 1, 2008 as a strong category 2 (based on 110 mph sustained winds) and continued to move northwest, spreading hurricane force wind gusts across portions of Southeast and South Central Louisiana (http://www.srh.noaa.gov/lix/?n=gustavsummary; accessed January 26, 2016). Due to the storm making landfall east of the study area, storm surge values were only 4-5 feet across St. Mary, Iberia, and Vermilion parishes (http://www.srh.noaa.gov/images/lch/tropical/HPW1-SUN.pdf; accessed January 26, 2016).

Hurricane Ike (September 1-14, 2008) first made landfall near Galveston, Texas on September 13, 2008 as a Category 2 hurricane with maximum sustained winds of 110 mph (http://www.srh.noaa.gov/hgx/?n=projects_ike08; accessed December 15, 2015). Ike was a large hurricane with tropical-storm-force and hurricane-force winds associated at the time of its landfall extending approximately 275 miles and 120 miles from the storm center, respectively. In Louisiana, estimated wind speeds ranged from 80 mph near the Texas-Louisiana border to 50 mph in Vermilion Parish. Storm surge caused flooding in Cameron, Vermilion, and many parishes to the east, with over 9 foot stillwater levels estimated for Lake Charles (http://www.fema.gov/media-library-data/20130726-1648-20490-1790/757_ch1_final.pdf; accessed December 15, 2015).