DRAFT COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL ASSESSMENT

SABINE NATIONAL WILDLIFE REFUGE

Cameron Parish, Louisiana

U.S. Department of the Interior
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Preface

Sabine National Wildlife Refuge is part of the Southwest Louisiana National Wildlife Refuge Complex, which also includes Cameron Prairie and Lacassine national wildlife refuges to the east within Cameron Parish, and Shell Keys National Wildlife Refuge in Iberia Parish. The Complex also has administrative oversight responsibilities for the state-managed Rockefeller Refuge in lower Cameron Parish. Some lands within the Complex, specifically the East Cove Unit of Cameron Prairie National Wildlife Refuge, are also part of the Cameron Creole Watershed Project, a cooperative effort among local, state, and federal agencies and the private sector to restore 64,000 acres of marsh in Cameron Parish.

By September 23, 2005, the U.S. Fish and Wildlife Service planning team that prepared the comprehensive conservation plan for Sabine National Wildlife Refuge had nearly completed a preliminary draft of this document for internal review and revision. Release of the refuge's Draft Comprehensive Conservation Plan and Environmental Assessment for public review and comment would have occurred shortly thereafter.

However, one day later, on September 24, Hurricane Rita—a Category 3 hurricane—roared across southwest Louisiana with winds in excess of 100 knots, leaving a broad swath of destruction in her wake. As a measure of the power of her destructive impact to one key industry alone, Rita demolished 69 offshore oil and gas platforms and four drilling rigs, and extensively damaged another 32 platforms and 10 drilling rigs.

Sabine National Wildlife Refuge bore the brunt of Rita's 15–20 foot storm surge, which deposited many tons of debris onto the refuge. This debris came from the remnants of devastated coastal communities such as Holly Beach, Constance Beach, and Johnson's Bayou, as well as the oil and gas facilities. It contained a chaotic jumble of natural vegetation, construction debris, a myriad of household items, and an unknown amount of hazardous materials.

To assess the extent of the problem, the Service commissioned a survey by Research Planning, Inc., which was completed in January 2006. This study, entitled "Assessment of Hazardous Materials and Debris from Hurricane Rita in the Sabine National Wildlife Refuge," details the stunning dimensions of the refuge's predicament. Approximately 32,000 acres on the refuge have been impacted, including 1,700 acres of debris piles, seven million cubic meters of debris, and nearly 1,400 potential hazmat items positively identified. Estimates range from 115,000 to 350,000 gallons of hazardous liquids and gases.

Initially cleaning up this mess was an enormous challenge, but funding from Congress in June of 2006 allowed the Service to begin cleanup operations.

About $12 million has been allocated to remove surface debris and subsurface tanks and other heavier items that were sinking into the marsh. Personnel from the Service, U.S. Environmental Protection Agency, U.S. Coast Guard, and Tennessee Valley Authority established an Incident Command Team to oversee the cleanup operation. Clean Harbors Environmental Services was contracted to conduct the debris removal using specialized equipment in sensitive wetland areas without road access. Hundreds of hazardous waste items, household goods, and commercial goods have been recovered.

In addition to habitat damage, Sabine's facilities were devastated by Hurricane Rita. Five of eight buildings in the headquarters and visitor center area were immediately condemned and required

demolition. The remaining three buildings need extensive repairs before they can be used. All public use facilities—including bridges, trails, boardwalks, and restrooms—received major damage and will require repairs before they can be reopened. These conditions represent a significant risk to health and human safety, requiring the Service to restrict refuge access to the public.

As this Draft Comprehensive Conservation Plan goes to press, Sabine National Wildlife Refuge continues to be closed to most public use. By removing hazardous debris, the refuge will avoid a significant risk of chemical and physical damage for decades to come.

All of these abrupt and drastic "on the ground" changes forced refuge planners and managers to step back, pause, and reconsider the management direction that Sabine National Wildlife Refuge should take in the coming 15 years. The three management alternatives in the Environmental Assessment, including the proposed alternative selected for the Draft Comprehensive Conservation Plan, were modified, as was the description of the existing refuge environment.

The U.S. Fish and Wildlife Service is committed to restoring the integrity of Sabine's habitat and, when conditions permit, to realizing once more the refuge's potential to provide wholesome wildlife-dependent outdoor activities to the public.

Executive Summary

The U.S. Fish and Wildlife Service (Service) has prepared this Draft Comprehensive Conservation Plan and Environmental Assessment to guide the management of Sabine National Wildlife Refuge, a unit of the Southwest Louisiana National Wildlife Refuge Complex, in Cameron Parish, Louisiana, for the next 15 years, as mandated by the National Wildlife Refuge Improvement Act of 1997.

Before the Service began planning, it conducted biological and public use reviews of the refuge's wildlife and habitat management programs. The biological review team was comprised of biologists from federal and state agencies and nongovernmental organizations that have an interest in the refuge. This diverse team presented the Service with recommendations to manage habitat, wildlife, refuge resources such as oil and gas, cultural resources, refuge administration, and visitor services. Public scoping meetings were then held to solicit public opinion on the issues the plan should address. The input received from the public also was considered during the planning process.

A planning team comprised of Service personnel, state agency representatives, nongovernmental organizations, and others then developed an environmental assessment to formulate a range of alternatives or different approaches to refuge management that the Service could reasonably undertake to achieve the goals and fulfill the purpose of Sabine National Wildlife Refuge. Each alternative consists of different sets of goals, objectives, and strategies for management of the refuge.

Three alternatives emerged for possible management direction and are summarized below.

ALTERNATIVE A: NO ACTION

Alternative A, the "No Action" alternative, is the baseline or status quo of refuge programs and is usually a continuation of current planning unit objectives and management strategies, with no change or changes that would have occurred without the Comprehensive Conservation Plan.

Sabine National Wildlife Refuge, which was severely affected by Hurricane Rita in September of 2005, is currently closed to all activities other than essential operations, hurricane cleanup, and restoration activities. Very limited public use activities are being allowed as areas are cleaned up. Fishing on areas accessible from off-refuge launches is being permitted for the first time since the hurricane.

Under this alternative, nonessential programs, including most maintenance and all public use, would cease at the refuge due to hurricane recovery efforts. However, research monitoring activities and the fire program, including both prescribed fire as well as extinguishing wildfires, would continue. Hazardous debris removal and Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) projects would continue. Oil and gas operations would continue. Law enforcement operations will increase to make sure that the over 300,000 annual visitors who normally use the Refuge comply with the closure. The Sabine Refuge staff would function at an office located off-site. The refuge's cultural resources would continue to be protected.

As hurricane recovery is accomplished, the refuge would essentially be managed as it was prior to the devastation from the historic storm.

ALTERNATIVE B: PROPOSED ACTION

The Service's proposed action, Alternative B, would continue to keep the refuge operational with minimal public use programs functional but at a reduced cost (near term), and increase marsh restoration, enhance fish and wildlife management, and expand public use (long term).

Over the near term, programs would continue throughout the refuge commensurate with the level of hazardous material cleanup and restoration. Over time, public use areas would be reopened as repairs to infrastructure and restoration of habitat occur. Fire and research programs would remain active. Existing oil and gas operations would continue at the normal level but new operations would be closely regulated under Service regulations and other federal law. Staff assigned to the refuge would function out of a hurricane-resistant building to be located at the original headquarters site.

Over the long term, under Alternative B, the Sabine Refuge would increase marsh restoration and enhance wildlife management, stepping up these efforts from current levels. A habitat improvement feasibility study would be performed for Unit 3. The refuge would improve marsh plant communities and shallow water, increase waterfowl food production, and provide habitats and sanctuary needs for migrating, wintering, breeding ducks (mottled ducks) and geese and other birds, fish, and wildlife. It would also protect and/or restore 43,200 acres of intermediate and brackish marsh and continue working toward restoring emergent marsh. The beneficial use of dredge material for marsh restoration would be continued. Sabine would closely monitor oil and gas activities to minimize impacts to wetland habitats and wildlife usage. It would also increase surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species. All new non-refuge mineral owners' requests for petrochemical transmission infrastructure will be prohibited.

Like Alternative A, Alternative B would maintain salinity monitoring throughout the refuge at established discrete salinity stations. Improving water quality would be a major thrust for the refuge. Fire management objectives under Alternative B would be the same as Alternative A: the Sabine Refuge would continue to use fire as a multipurpose management tool for reducing hazardous fuels, promoting habitat diversity, and prescribe burn approximately 20,000 acres per year. Cultural resources would continue to be protected.

The refuge would provide additional opportunities for Friends groups, volunteers, partners and interns to assist the refuge.

Management of the East Cove Unit under Alternative B would be identical to Alternative A. The East Cove Unit would continue to be managed under an interagency management plan. Gates at the water control structures would be operated to restore preferred vegetated plant communities associated with intermediate or possibly slightly brackish environments. Staff would evaluate the use of terraces to improve vegetation of open-water areas. During the life of this plan, an assessment would be conducted to determine the need for sanctuary in the East Cove Unit and minimizing detrimental waterfowl disturbances. The invasion of exotic plant species, with special emphasis on giant salvinia, would be monitored. Public fishing access to East Cove would be improved.

ALTERNATIVE C: HOLD REFUGE IN CUSTODIAL FORM

Under this alternative, the Sabine and Complex staff would hold refuge property in custodial form. Major restoration and recovery efforts from the devastation caused by Hurricane Rita would be curtailed. The fire and research programs would remain active throughout the refuge. Oil and gas operations would continue at the normal level.

No active habitat management would be applied. Instead, the refuge and Complex staff would serve as good caretakers or custodians of the refuge, observing and monitoring the natural forces and ecological succession that would shape its habitats and effectively determine their suitability for wildlife. A "hands off" or passive approach to refuge management in an area that has been so heavily altered by a century of human activity—including grazing; oil and gas exploration and development; pipeline construction; canal, drainage ditch, levee and road building; hunting; introduction of exotic species; and so forth—would not lead to habitat conditions resembling those that would have occurred on the site today if these interventions had never taken place. Some of these interventions produced long-lived or virtually permanent results that cannot be undone simply by ceasing all active management. Resources that are presently used for Sabine would be assigned to higher priorities as determined by the Complex Project Leader and Complex staff to other refuges within the Southwest Louisiana National Wildlife Refuge Complex.

Alternative C would entail the following for habitat at Sabine:

- Units would not be actively managed; human intervention would be minimal.
- Water control structures would not be replaced.
- Plant species composition and vegetation communities would be inventoried to determine the effects of succession.
- Units 1A, 1B, and 3 would change due to succession and loss of open water for waterfowl (would become predominantly emergent vegetation, reducing accessible water habitat).
- No habitat improvement feasibility study would be performed for Unit 3. Levees may fail due to deteriorating physical conditions; however, this may result in some desirable habitat for waterfowl.
- No prescribed fires would be conducted.
- Fire management would be limited to hazardous fuel reduction and suppression of wildfires; prescribed fire would not be used as an agent of disturbance and habitat renewal.

These actions would result in reduced capabilities to reverse progression of succession.

Under Alternative C, no effort would be made to reduce the accumulation of organic materials in impoundments through drawdowns and prescribed fire. There would be no need to replace and upgrade equipment and facilities such as pumps, tractors, and water control structures.

This alternative would result in very little effective high quality waterfowl sanctuary. That is, high ground would succeed to a mix of Chinese tallow, willow, and hackberry, while lower ground would revert to dense stands of maidencane. There would be few open areas.

With regard to public use, each of the six priority public uses would be strongly encouraged but facilities would be limited. However, actual opportunities to enjoy these uses on the refuge would, in all probability, decline. This would happen because of the decreased value of wildlife habitat that would occur due to no active management, and the subsequent decline in wildlife diversity and abundance.

Management of the refuge's cultural resources and the East Cove Unit under Alternative C would be identical to Alternatives A and B.

SELECTION OF PROPOSED ALTERNATIVE

The planning team's proposed action, Alternative B, forms the basis for this Draft Comprehensive Conservation Plan. It is the most reasonable alternative to best achieve the purposes, vision, and goals of Sabine National Wildlife Refuge. Implementation of the plan will also help fulfill the National Wildlife Refuge System mission; maintain and restore the ecological integrity of the refuge; address significant refuge issues and mandates; and would be consistent with principles of sound fish and wildlife management.

Overall, the greatest risk to fish, wildlife, plants, and wildlife habitats in the Chenier Plain of the Gulf Coast Ecosystem—where the Sabine Refuge lies—is from extensive wetland habitat degradation and loss that has occurred over the past century. Louisiana has the highest rate of wetland loss of any state in the nation, estimated at 25–35 square miles a year, accounting for 80 percent of the national total (Esslinger and Wilson 2001). The wetland area in the Chenier Plain declined 16 percent from the mid-1960s to 1990. These habitat losses have led to commensurate impacts on wildlife populations, especially those species dependent on wetlands. Implementing the long-term management goals identified in this Draft Comprehensive Conservation Plan would help achieve wetland preservation and restoration, a most important wildlife conservation priority in the Gulf Coast Ecosystem.

I. Background

UNITED STATES FISH AND WILDLIFE SERVICE

The mission of the Service is working with others to "conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

The United States Fish and Wildlife Service (Service) is the primary federal agency responsible for conserving, protecting, and enhancing the Nation's fish and wildlife resources and their habitats. Responsibilities are shared with other federal, state, tribal, and local entities; however, the Service has specific responsibilities for endangered species, migratory birds, interjurisdictional fish, and certain marine mammals, as well as for lands and waters administered by the Service for the management and protection of these resources. It also operates national fish hatcheries, fishery resource offices and ecological services field stations. The agency enforces federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars from excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

THE NATIONAL WILDLIFE REFUGE SYSTEM

The mission of the National Wildlife Refuge System is "...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The Service manages the 95-million acre National Wildlife Refuge System, which encompasses 545 national wildlife refuges, thousands of small wetlands and other special management areas. The majority of these lands, 77 million acres, are in Alaska, with the remaining acres spread across the other 49 states and several territories. Approximately 82 million acres in the System were reserved from the public domain. The remainder has been acquired through purchase, from other federal agencies, as gifts, or through easement and lease agreements.

NATIONAL WILDLIFE REFUGE SYSTEM IMPROVEMENT ACT OF 1997

An important milestone occurred in 1997 with the passage of the National Wildlife Refuge System Improvement Act, which has been called the "Organic Act" of the Refuge System. The Act established, for the first time, a clear legislative mission of wildlife conservation for the National Wildlife Refuge System.

The Act also recognized the outstanding recreational opportunities on refuges. The Refuge System has long provided some of the nation's best hunting and fishing, and our refuges continue to support these deeply rooted American traditions. The law established compatible wildlife-dependent recreation such as hunting, fishing, wildlife observation, photography, environmental education, and interpretation as priority public uses of the Refuge System.

Among other things, this far-reaching law required comprehensive conservation planning for each refuge, and set standards to assure that all uses of refuges were compatible with their purposes and the System's wildlife conservation mission. It also required the Service to conserve the biological integrity, diversity, and environmental health of refuges, and consider the conservation of the ecosystems of the United States in planning the growth of the Refuge System.

The Service's planning process is premised on strong partnerships with state fish and wildlife agencies. It provides an opportunity to use science in managing refuges, assuring an ecological perspective as to how refuges fit into the greater surrounding landscapes. The planning process also provides citizens with a meaningful role in helping to shape future management of individual refuges and recognizes the important roles they play in the lives of nearby communities.

The National Wildlife Refuge System Improvement Act states that each refuge shall be managed to:

- fulfill the mission of the National Wildlife Refuge System;
- fulfill the individual purpose of each refuge;
- consider the needs of wildlife first;
- fulfill the requirement of developing a comprehensive conservation plan for each unit of the Refuge System;
- maintain the biological integrity, diversity, and environmental health of the Refuge System;
- recognize that wildlife-dependent recreation activities, including hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, are legitimate and priority public uses; and
- retain the authority of refuge managers to determine compatible public uses.

SABINE NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN

This Draft Comprehensive Conservation Plan for Sabine National Wildlife Refuge was prepared as mandated by the Act to guide management actions and direction for the refuge for the next 15 years. Fish and wildlife conservation will receive first priority in refuge management; wildlife-dependent recreation will be allowed and encouraged as long as it is compatible with, and does not detract from, the mission of the refuge or the purposes for which it was established.

PURPOSE AND NEED FOR PLAN

The purpose of the plan is to ensure that each refuge in the System contributes to the System's mission to provide a network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Specifically, the plan is needed to:

- provide a clear statement of refuge management direction;
- provide refuge neighbors, visitors, and government officials with an understanding of the Service's management actions on and around the refuge;
- ensure that the Service's management actions, including its land protection, recreational, and educational programs, are consistent with the mandates of the National Wildlife Refuge System;
- ensure that refuge management is consistent with the purpose for which the refuge was established;

- ensure that refuge management is consistent with federal, state, and local plans and contributes to the mission of the ecosystem it is located in; and
- provide a basis for development of the refuge's budget requests for operations, maintenance, and capital improvement needs.

LEGAL POLICY CONTEXT

COASTAL ZONE MANAGEMENT COMPLIANCE

The Service complies with all federal, state, and regional policies and regulations for projects within the boundaries of its national wildlife refuges. The Louisiana Department of Natural Resources requires coastal zone permits for work which may affect the land use, water use, or natural resources of the coastal zone. The coastal zone boundary is the northern bank of the Gulf Intracoastal Waterway. Although the Service is exempt from coastal zone permits, it is required to be consistent with the Coastal Zone Management Program requirements for work within its boundary that may affect resources south of the boundary, regardless of where the project occurs. A "No Effect Determination" to the coastal zone area is applicable for projects described in this plan that will be completed within the refuge boundary.

NATIONAL WILDLIFE REFUGE SYSTEM LANDS

Administration of national wildlife refuges is guided by the mission and goals of the National Wildlife Refuge System, congressional legislation, presidential executive orders, and international treaties. Policies for management options of refuges are further refined by administrative guidelines established by the Secretary of the Interior and by policy guidelines established by the Director of the Fish and Wildlife Service. Appendix C provides a complete listing of the relevant legal mandates.

Lands within the National Wildlife Refuge System are closed to public use unless specifically and legally opened. All programs and uses must be evaluated based on mandates set forth in the National Wildlife Refuge System Improvement Act. These mandates are to:

- contribute to ecosystem goals, as well as refuge purposes and goals;
- conserve, manage, and restore fish, wildlife, and plant resources and their habitats;
- monitor the trends of fish, wildlife, and plants;
- manage and ensure appropriate visitor uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation), as these uses benefit the conservation of fish and wildlife resources and contribute to the enjoyment of the public; and
- ensure that visitor activities are compatible with refuge purposes.

RELATIONSHIP TO STATE WILDLIFE AGENCY

A provision of the National Wildlife Refuge System Improvement Act of 1997, and subsequent agency policy, is that the Service shall ensure timely and effective cooperation and collaboration with other federal agencies and state fish and wildlife agencies during the course of acquiring and managing refuges. State wildlife management areas and national wildlife refuges provide the foundation for protection of fish and wildlife, and contribute to the overall health and diversity of fish and wildlife species in the State of Louisiana.

The Louisiana Department of Wildlife and Fisheries (LDWF) is a state-partnering agency with the Service, charged with enforcement responsibilities relating to migratory birds and endangered species, as well as managing the State of Louisiana's natural resources and approximately 1.4 million acres of coastal marshes and wildlife management areas. The LDWF coordinates the state wildlife conservation program and provides public recreation opportunities on state wildlife management areas. The LDWF's participation and contribution throughout this comprehensive conservation planning process provides for ongoing opportunities and open dialogue to improve the ecological health and diversity of fish and wildlife. A vital part of the comprehensive conservation planning process is integrating common mission objectives where appropriate.

ECOSYSTEM CONTEXT

OVERVIEW

The Service is increasing its efforts to adopt collaborative resource partnerships with private landowners and local communities as well as state and federal governments within ecosystems to reduce the declining trend of fish and wildlife populations and biological diversity; establish conservation priorities; clarify goals; and solve common threats and problems associated with fish and wildlife resources. The synergy of all federal, state, tribal, and private organizations working together will ensure that the Service not only protects the more important areas, but also reduces redundancy and overlap.

Sabine National Wildlife Refuge is a member and active participant of the Service's Lower Mississippi River Ecosystem (LMRE) Team. This ecosystem (Figure 1) serves as the primary wintering habitat for midcontinental waterfowl populations, as well as breeding and migration habitat for migratory songbirds returning from Central and South America, and numerous resident wildlife species.

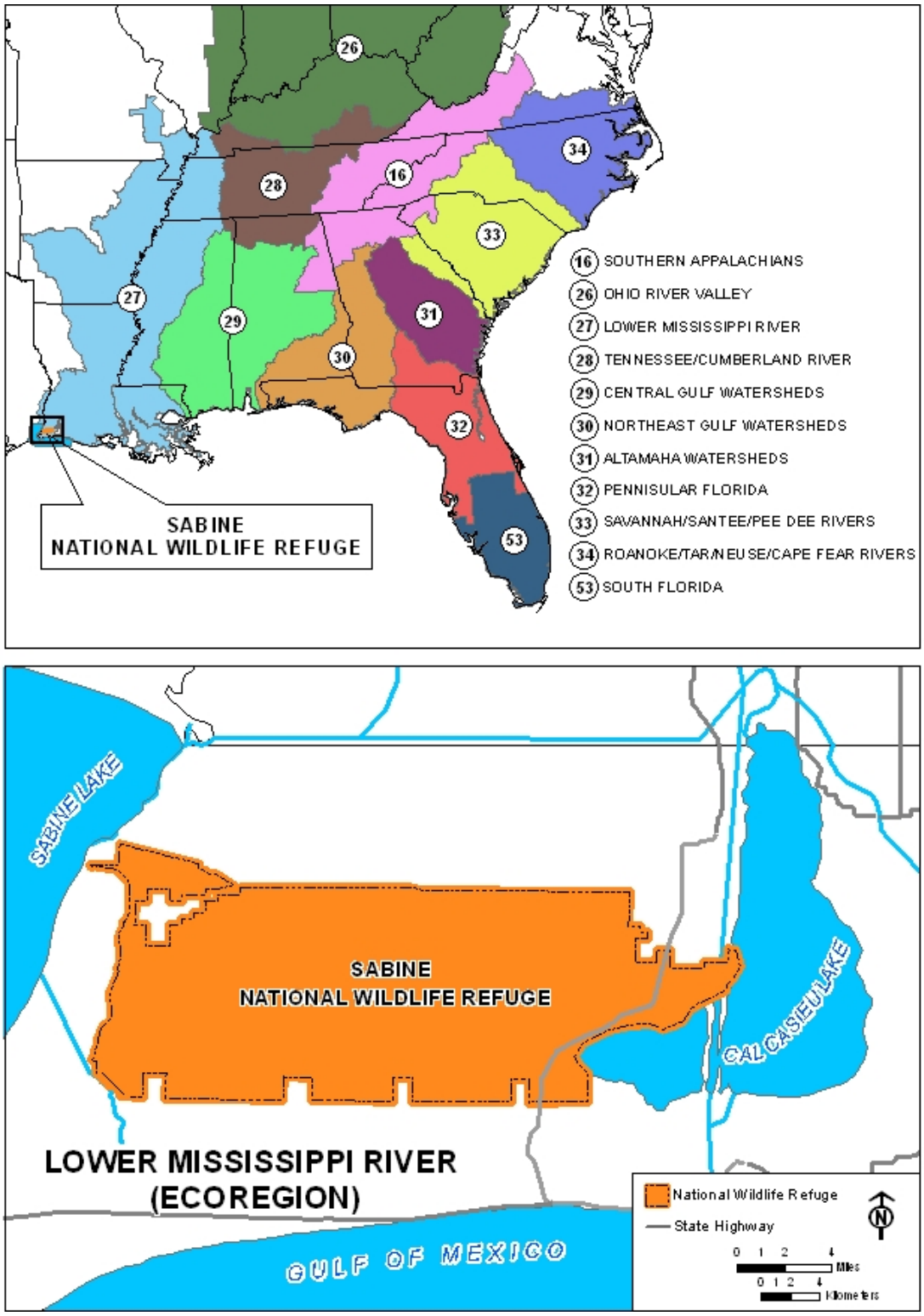
Geographically, the refuge lies on the extreme southwestern boundary of the ecosystem and has few opportunities to contribute to many of the goals and objectives of the LMRE. There are some common targets that are applicable to the refuge and to which they contribute, but the refuge would more appropriately contribute to the objectives of the Service's Texas Gulf Coast Ecosystem (TGCE). The TGCE lies between the Sabine River and the mouth of the Rio Grande and inland to include the historical coastal prairie. It is considered by many to be part of a larger ecological Gulf Coast system that also includes portions of coastal Louisiana and Mexico. The TGCE Team has requested the participation of the Sabine Refuge and other nearby southwest Louisiana refuges in its ecosystem team meetings.

LOWER MISSISSIPPI RIVER ECOSYSTEM PRIORITIES

The priorities identified by the Lower Mississippi River Ecosystem Team, to which the refuge can contribute, include:

- Continue to work with the Louisiana Coastal Wetlands Task Force, private landowners, and other entities to protect and restore coastal wetlands, consistent with the Coast 2050 Plan and associated project planning, evaluation and implementation activities.
- Consider all grant opportunities available to the LMRE Team and partners and work to improve internal coordination of these programs to assure that the contributions to these programs are of maximum benefit to the resource.
- Support environmental education efforts underway by Service offices to enhance and expand knowledge, awareness and appreciation of trust resources.

Figure 1. U.S. Fish and Wildlife Service Region 4 Ecosystems.



- Restore native prairie.
- Control invasive and exotic species.
- Build regional and national support for the Service's Fisheries program.

TEXAS GULF COAST ECOSYSTEM PRIORITIES

The priorities identified by the Texas Gulf Coast Ecosystem Team, to which the refuge can contribute, include:

- Restore, conserve, enhance and maintain approximately 500,000 acres of the historic Gulf Coast prairies in Louisiana, Texas, and Mexico to ensure the continued existence of native flora and fauna.
- Maintain, restore, enhance and create wetlands and associated habitats to achieve a net gain in wetland quality, quantity (based on National Wetland Inventory data), and natural productivity.
- Increase ecological monitoring and research efforts and improve information management capabilities in the Texas Gulf Coast Ecosystem.
- Encourage the Service's Region 4 field stations with similar coastal resource objectives to participate in Ecosystem Team meetings.
- Develop partnerships with other Service regions, Mexico, natural resource agencies, universities, and nongovernmental organizations to plan and implement outreach programs.

ECOLOGICAL THREATS AND PROBLEMS

National wildlife refuges in the Lower Mississippi Valley serve as part of the last safety net to support biological diversity—the greatest challenge facing the Service. According to the LMRE Team, the greatest threats to biological diversity within the Lower Mississippi Valley include:

- The loss of sustainable communities, including the loss of 20 million acres of bottomland hardwood forests.
- The loss of connectivity between bottomland hardwood forest sites, e.g., forest fragmentation.
- The effects of agricultural and timber harvesting practices.
- The simplification of the remaining wildlife habitats within the ecosystem and gene pools.
- The effects of constructing navigation and water diversion projects.
- The cumulative habitat effects of land and water resource development activities.

Specific threats applicable to Sabine National Wildlife Refuge include:

- Colonization of invasive plant and animal species which displace natural vegetation and deteriorate those habitats on which native animal species depend.
- Prolonged flooding within refuge units which interferes with management strategies developed for ideal habitat conditions.
- Problems associated with the adjacent Gulf Intracoastal Waterway, including soil erosion caused by wave action and contamination resulting from barge accidents.
- Problems associated with sea level rise and climate change.

GLOBAL WARMING AND SEA LEVEL RISE

The Service is mandated to address climate change in its management planning by the U.S. Department of the Interior's Secretarial Order 3226, issued on January 19, 2001. This order states

that each bureau and office of the Department will consider and analyze potential climate change impacts when undertaking long-range planning exercises, when setting priorities for scientific research and investigations, when developing multi-year management plans, and/or when making major decisions regarding the potential utilization of resources under the Department's purview.

There is scientific consensus that the earth is warming and that the primary cause of this warming is human-caused increases in greenhouse gas emissions. Since the beginning of the Industrial Revolution, average global temperatures have risen by one degree Fahrenheit, with the most accelerated warming occurring in the past two decades (Schlyer 2006). It is not known what the complexity of effects that global warming will have on habitat and wildlife on national wildlife refuges. Hand-in-hand with global warming is sea level rise.

Coastal Louisiana has lost over 1.2 million acres of land along its coast in the last 100 years and 15,300 acres between 1990 and 2000, mostly due to the conversion of coastal wetlands to open water. Storm damages from the two hurricanes in 2005 contributed even more land loss.

Sabine National Wildlife Refuge has already participated in methods to combat wetland loss and participates in the coastal initiatives outlined below. Specific strategies identified by the refuge to help overcome sea level rise are discussed in Chapter IV, Management Direction.

CONSERVATION PRIORITIES AND INITIATIVES

Conservation priorities for national wildlife refuges in the Lower Mississippi Valley focus on threatened and endangered species, trust species, and species of local concern. The goals and objectives in this Comprehensive Conservation Plan are stepped down from the following plans:

- Partners in Flight Bird Conservation Plan.
- North American Waterfowl Management Plan (Gulf Coast Joint Venture, Chenier Plain Initiative).
- North American Waterbird Conservation Plan.
- United States Shorebird Conservation Plan.
- Coastal Wetlands Planning Protection and Restoration Act.
- Coast 2050 – Towards a Sustainable Coastal Louisiana.
- Louisiana Coastal Area Ecosystem Restoration Plan.
- Fisheries Vision for the Future.
- American Woodcock Management Plan.

PARTNERS IN FLIGHT BIRD CONSERVATION PLAN

The National Fish and Wildlife Foundation led efforts in the 1990s to form the Partners in Flight program to combine resources and knowledge of many people to jointly protect the natural diversity of our continent. Many partners have made the program successful by participating in working groups to develop regional bird conservation plans. Sabine National Wildlife Refuge is located within the Coastal Prairie Physiographic Area 6 Conservation Plan, and can contribute to the plan's actions for marsh restoration projects to benefit migrant landbirds.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

The North American Waterfowl Management Plan was signed by the United States and Canadian governments in 1986 to undertake an intensive effort to protect and restore North America's

waterfowl populations and their habitats. Mexico became a signatory to the plan in 1994. The main premise of the plan is to return waterfowl populations to their 1970s levels by restoring wetlands and associated ecosystems.

GULF COAST JOINT VENTURE (CHENIER PLAIN INITIATIVE)

Regional partnerships or joint ventures composed of individuals, sportsmen's groups, conservation organizations, and local, state, provincial, and federal governments were formed under the North American Waterfowl Management Plan. One such partnership—the Gulf Coast Joint Venture (GCJV)—was established to conserve priority waterfowl habitats along the western United States Gulf Coast, one of the most important waterfowl areas in North America. The Gulf Coast is the terminus of the Central and Mississippi Flyways and provides both wintering and migration habitat for significant numbers of continental goose and duck populations. The Gulf Coast Joint Venture's greatest contribution to the North American Waterfowl Management Plan is to provide wintering grounds for waterfowl. A great diversity of birds, mammals, fish, shellfish, reptiles and amphibians also rely on the wetlands of the Gulf Coast for part of their life cycles.

The GCJV is divided geographically into six initiative areas, one of which is the Chenier Plain Initiative area of southwest Louisiana and southeast Texas. The goal of the Chenier Plain Initiative is to provide wintering and migration habitat for significant numbers of dabbling ducks, diving ducks, and geese (especially the lesser snow goose (*Chen caerulescens*) and greater white-fronted goose (*Anser albifrons*)), as well as year-round habitat for mottled ducks (*Anas fulvigula*).

Sabine National Wildlife Refuge contributes to the objectives of the Chenier Plain Initiative by providing sanctuary needs for migrating, wintering, and breeding ducks (mottled ducks), and geese. This sanctuary is provided by the refuge's management of three impounded freshwater marshes: Units 3, 1A, and 1B. Management Unit 3, at 26,400 acres, is the largest freshwater marsh remaining in southwest Louisiana. Management units 1A and 1B comprise 5,138 acres and 1,800 acres of marsh, respectively. They are heavily used by a variety of wildlife, most notably ducks. Waterfowl foods in Management Unit 3 have been found to be available at densities significantly above the level required for efficient waterfowl use.

The refuge has also contributed to the Chenier Plain Initiative by maintaining unimpounded marsh areas, including 7,231acres of brackish marsh, 84,829 acres of intermediate marsh, and 33,730 acres of fresh marsh.

NORTH AMERICAN WATERBIRD CONSERVATION PLAN

The North American Waterbird Conservation Plan was developed under a partnership called the Waterbird Conservation for the Americas, which is a group of individuals and organizations having interest and responsibility for the conservation of waterbirds and their habitats in the Americas. The Sabine Refuge is located in the Southeast U.S. Regional Waterbird Conservation Planning Area. The refuge can contribute to a key objective of this region, which is to standardize data collection efforts and analysis procedures to allow better tracking of regional movements and the association of these movements with environmental or land use changes.

UNITED STATES SHOREBIRD CONSERVATION PLAN

The United States Shorebird Conservation Plan is a partnership involving organizations throughout the United States committed to the conservation of shorebirds. Sabine National Wildlife Refuge is located within the Lower Mississippi, Western Gulf Coast Shorebird Planning Region. On a regional

scale, the refuge can help ensure that adequate quantity and quality of habitat is identified and maintained to support the different shorebirds that breed in, winter in, and migrate through the area.

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

In 1990, Congress passed the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) that generates $50 to $60 million annually for Louisiana coastal wetland restoration projects via an 85/15 federal-state cost share, and which provided for the development of the 1993 comprehensive Louisiana Coastal Wetlands Restoration Plan. Funding of proposed projects is determined by the Louisiana Coastal Wetlands Conservation and Restoration Task Force, which is composed of five federal agencies and the State of Louisiana. As mandated by CWPPRA, the task force developed a detailed Coastal Wetlands Restoration Plan in 1993 that describes the restoration actions and projects that should be implemented to address Louisiana's coastal land loss crisis. A priority project list is developed and approved by the task force each year, outlining which projects will receive CWPPRA funding.

COAST 2050: TOWARDS A SUSTAINABLE COASTAL LOUISIANA

Coast 2050, funded by CWPPRA, is a comprehensive, ecosystem-based plan developed by private citizens, local, state, and federal agencies, and the scientific community to address coastal wetland loss throughout southern Louisiana. This plan, which is recognized by the State of Louisiana, five federal agencies, and local coastal parish governments, serves as the joint coastal restoration plan for CWPPRA. The overarching goal of the plan is to sustain a coastal ecosystem that supports and protects the environment, economy, and culture of southern Louisiana, and that contributes greatly to the economy and well-being of the nation. The strategic objectives of Coast 2050 are to (1) sustain a coastal ecosystem with the essential functions and values of the natural ecosystem; (2) restore the ecosystem to the highest practicable acreage of productive and diverse wetlands; and (3) accomplish this restoration through an integrated program that has multiple use benefits (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). Sabine National Wildlife Refuge is included in Region 4 of this plan.

LOUISIANA COASTAL AREA ECOSYSTEM RESTORATION PLAN

The Louisiana Coastal Area Ecosystem Restoration Plan (LCA) evolved from the Coast 2050 Plan with the overarching goal of reversing the current trend of degradation of the coastal ecosystem. This plan formed the basis for the Louisiana Coastal Area Ecosystem Restoration Study, designed to identify critical ecological needs, identify restoration efforts, establish restoration priorities, and identify scientific uncertainties to present a strategy for addressing the long-term needs of coastal Louisiana restoration.

Sabine National Wildlife Refuge is located within Sub-province 4 for the LCA. The restoration plans identified in LCA relate directly and indirectly to the refuge through long-term efforts to explore large scale restoration projects that will influence the entire coastal zone of Louisiana.

FISHERIES VISION FOR THE FUTURE

In 2001, the U.S. Fish and Wildlife Service worked with partners to refocus its Fisheries Program and develop a vision. This vision of the Service and its Fisheries Program *"is working with partners to restore and maintain fish and other aquatic resources at self-sustaining levels and to support Federal mitigation programs for the benefit of the American public."* To achieve the vision, the Fisheries program works with its partners to:

- protect the health of aquatic habitats;
- restore fish and other aquatic resources; and
- provide opportunities to enjoy the benefits of healthy aquatic resources.

Together, the group developed a series of goals, objectives, and implementation actions to focus on key needs. Sabine National Wildlife Refuge can contribute to the program's recreational fishing goal to provide quality opportunities for responsible fishing and other related recreational enjoyment of aquatic resources on Service lands.

AMERICAN WOODCOCK MANAGEMENT PLAN

Developed by the U.S. Fish and Wildlife Service in 1990, the American Woodcock Management Plan sets management goals to restore woodcock populations to levels consistent with the demands of consumptive and nonconsumptive users (U.S. Fish and Wildlife Service 1990). Reliable annual population estimates, harvest estimates, and information on recruitment and distribution are essential for comprehensive woodcock management as well as conserving and managing habitat.

II. Refuge Overview

Established in 1937, Sabine National Wildlife Refuge is one of more than 545 refuges within America's National Wildlife Refuge System, the world's largest network of lands set aside specifically for wildlife. The Sabine Refuge is located eight miles south of Hackberry, on State Highway 27 in Cameron Parish, Louisiana (Figures 2 and 3). The refuge occupies the marshes between Calcasieu and Sabine lakes in southwest Louisiana, and contains 125,790 acres, consisting of 40,403 acres of open water and 85,387 acres of marsh grassland. This area contains a diversity of habitat including freshwater impoundments, wooded ridges and levees, canals, ponds, lakes, and bayous. Some of the largest wetland management efforts in Louisiana occur at Sabine. The refuge is managed to provide habitat for migratory waterfowl and other birds and to preserve and enhance coastal marshes for wildlife and fish. Oil companies, however, still own the subsurface rights to the refuge and must be given reasonable access.

The East Cove Unit was established in 1937 as part of Sabine National Wildlife Refuge. This unit, administratively transferred to Cameron Prairie National Wildlife Refuge from Sabine in 1992, consists of 14,927 acres of brackish to intermediate marsh. These marshes are managed as a nursery for brown and white shrimp, blue crab, and many fish species. Located in Cameron Parish in the southwest corner of Louisiana, the East Cove Unit (Figure 4) is bordered on the west by Calcasieu Lake, and on the north, east, and south by privately owned marshes (USFWS 2002a; 2002b; 2001; 1998).

Sabine Refuge provides habitat for many species of wildlife, including ducks, geese, alligators, muskrats, nutria, raptors, wading birds, shorebirds, blue crabs, shrimp, and various fish. The refuge is one of the primary wintering refuges for waterfowl in the Mississippi Flyway. Olivaceous cormorant, snowy egret and common egret rookeries are present on the refuge. In the fall and spring many shorebird species can be found here. Numerous species of neotropical migrant songbirds pass through the refuge on their migration. Many species of fish and shrimp mature and grow in the "nursery" provided by the refuge's intermediate and brackish marshes.

Management of this refuge is not as intensive as that of many smaller refuges. Because of man-made and natural factors, habitat losses have occurred on an estimated 40,000 acres of the refuge. There are currently four Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) projects underway on the refuge, with the goal of restoring its wetlands. These projects include marsh creation, shoreline protection, earthen terracing, and water control structures. These control structures were placed on the refuge to lessen saltwater intrusion and along with improved water management practices are attempting to reverse or slow habitat losses. Sabine was established to protect and provide habitat for migratory waterfowl. Today water level management and prescribed marsh burning still aim at providing quality habitat for waterfowl, but these practices also take other species into account.

Within the East Cove Unit, marshes are being managed to preserve the balance between salt and fresh water and to restore the historic marshes destroyed by saltwater intrusion (USFWS 1998). The Service is also cooperating with other agencies on the East Cove Unit to restore thousands of acres of freshwater marsh habitat by planting bulrush and constructing fences out of Christmas trees.

Figure 2. Location of Sabine Refuge National Wildlife Refuge and the Southwest Louisiana National Wildlife Refuge Complex.

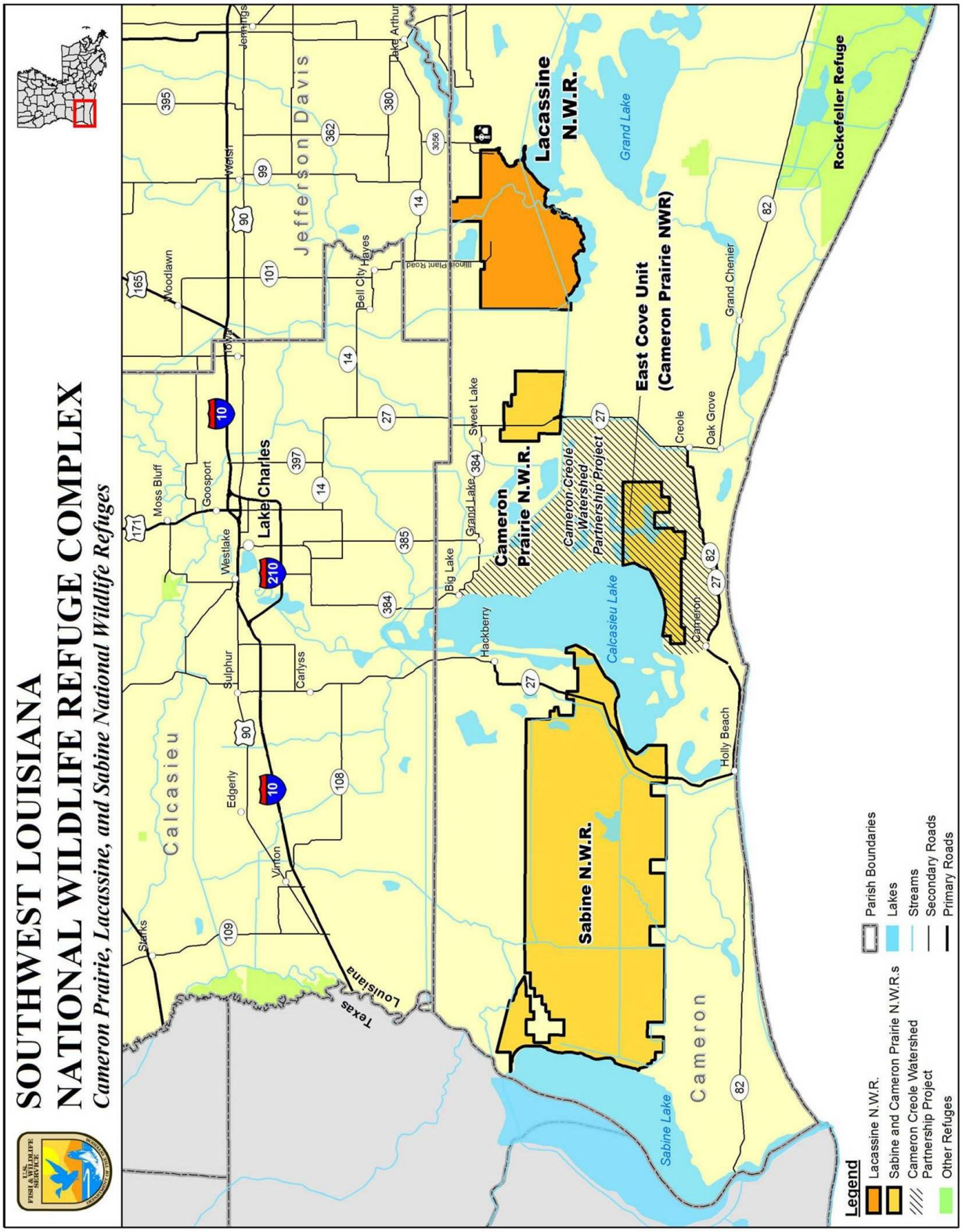


Figure 3. Sabine National Wildlife Refuge excluding the East Cove Unit.

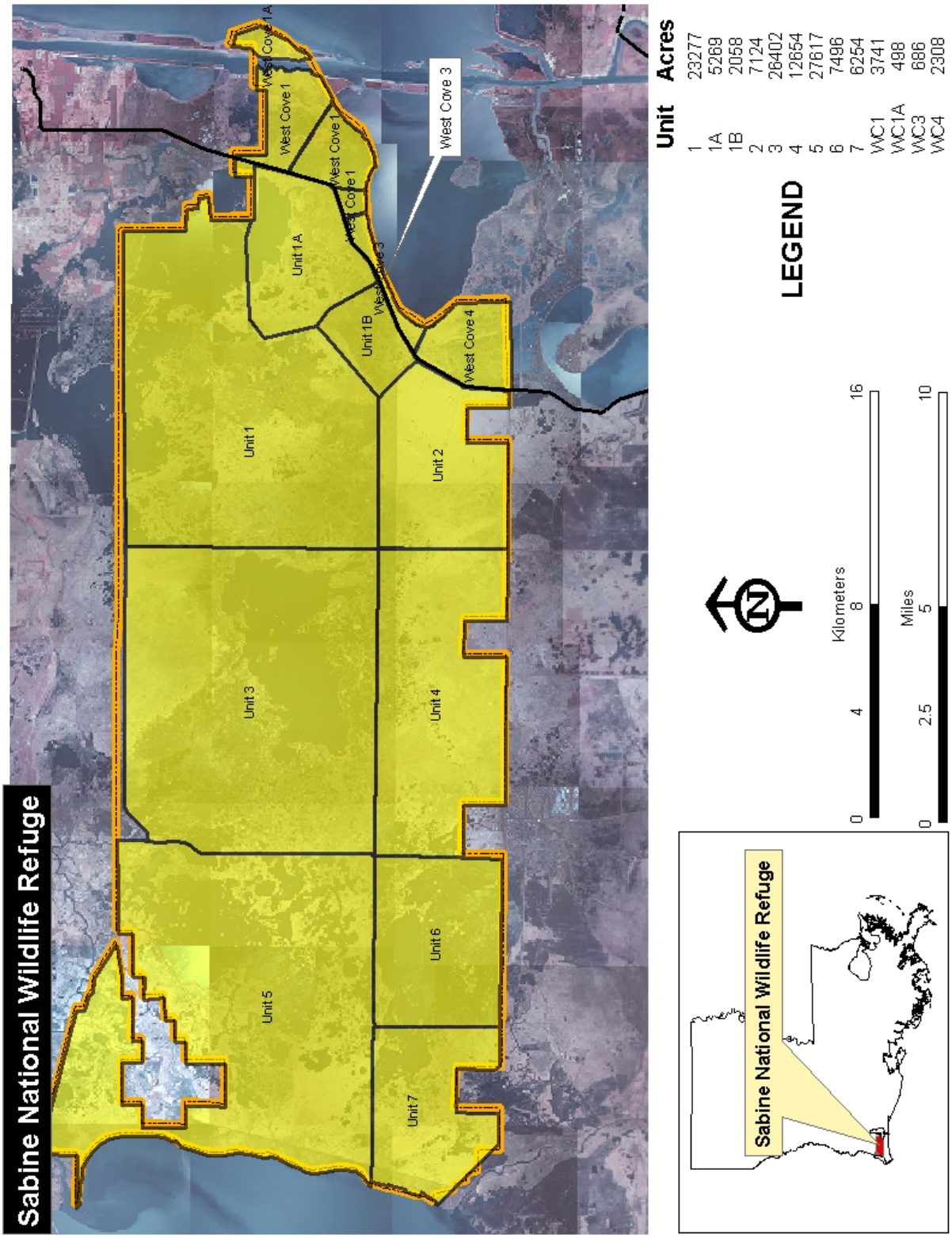
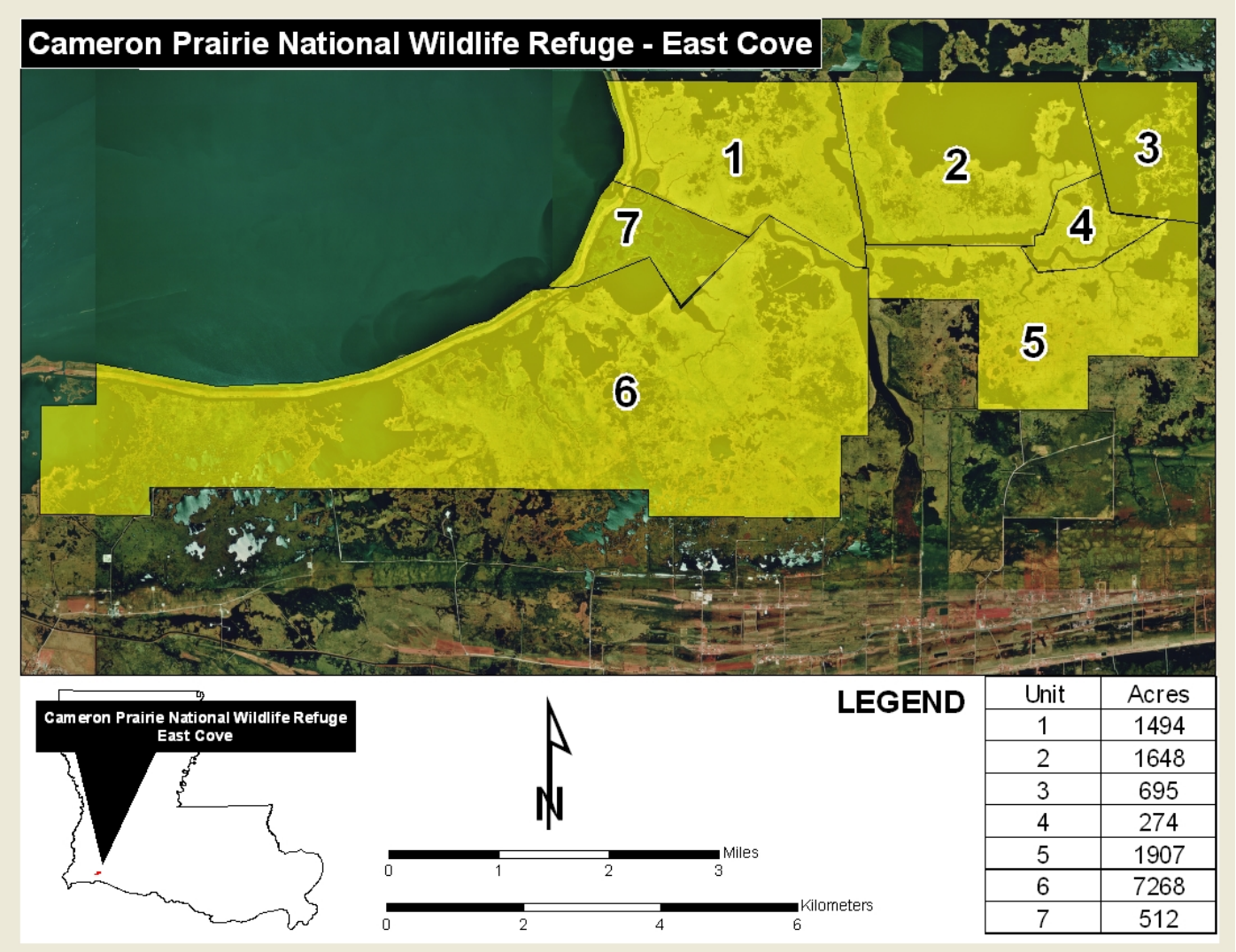


Figure 4. East Cove Unit managed by Cameron Prairie National Wildlife Refuge.



PURPOSE

Executive Order 7764, dated December 6, 1937, stated the official purpose of the refuge: "…as a refuge and breeding ground for migratory birds and other wildlife." A secondary purpose of the refuge is "…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds..." (16 U.S.C. 715d (Migratory Bird Conservation Act)).

Sabine is managed according to goals, objectives, and strategies designed to maintain and restore habitat and manage water levels. Tools used to accomplish the refuge's goals and objectives include operating water control structures and prescribed burning. The primary management goal is to maintain and perpetuate Gulf Coast wetlands for wintering waterfowl from the Mississippi and Central Flyways. The refuge is one of the largest estuarine-dependent marine species nurseries in southwest Louisiana (USFWS 2002c).

The management goals for Sabine National Wildlife Refuge are to:

- maintain and perpetuate refuge wetlands for wintering waterfowl (USFWS 1998);
- provide for the needs of endangered plants and animals;
- allow compatible public uses, such as hunting, fishing, trapping, wildlife observation, and photography; and
- promote research on marsh and aquatic wildlife (USFWS 2002c).

REFUGE ENVIRONMENT AND OTHER RELATED INFORMATION

IMPACT OF HURRICANE RITA

On September 24, 2005, Category 3 Hurricane Rita roared across Southwest Louisiana with winds in excess of 100 knots, leaving a broad swath of destruction in her wake. Sabine National Wildlife Refuge bore the brunt of Rita's 15–20 foot storm surge, which deposited many tons of debris onto the refuge. This debris came from the remnants of devastated coastal communities such as Holly Beach, Constance Beach, and Johnson's Bayou, as well as oil and gas facilities. It contained a chaotic jumble of natural vegetation, construction debris, a myriad of household items, and an unknown amount of hazardous materials.

In addition to habitat damage, the refuge's facilities were devastated by Hurricane Rita. Five of eight buildings in the headquarters and visitor center area were immediately condemned and required demolition. The remaining three buildings need extensive repairs before they can be used. All public use facilities—including bridges, trails, boardwalks, and restrooms—received major damage and will require repairs before they can be reopened. These conditions represent a significant risk to health and human safety, requiring the Service to restrict refuge access to the public.

The Service has published a handout (Figure 5) to answer some of the more common cleanup questions. The text following the hurricane handout contains descriptions of pre-hurricane conditions on Sabine National Wildlife Refuge.

FISH, WILDLIFE, AND PLANT POPULATIONS

Sabine National Wildlife Refuge boasts more than 250 bird species, 132 fish species, 36 reptile and amphibian species, and 28 mammal species. This diversity exists in spite of ongoing habitat changes on the refuge. Plant species composition has changed from an expansive area of emergent marsh dominated by sawgrass (*Cladium jamacense*) to an area largely composed of shallow open water ponds and slowly eroding land dominated by saltmeadow cordgrass (*Spartina patens*); seashore paspalum (*Paspalum vaginatum*); Olney's three-square (*Scirpus olneyi*); and common reed (*Phragmites australis*) present today (Valentine 1979; Chabreck et al. 2001). This has been caused by changes in the salinity regime and water retention time on the refuge. Records indicate that the sawgrass die-off at Sabine occurred after the large tidal surge of Hurricane Audrey in 1957, which was followed by two years of drought. Dumping of oil field production waters (salinities of 200 ppt) (parts per thousand) into the marsh has also been blamed for the die-off. Habitat shift analysis has shown that while the species composition may have changed, there has not been a basin-wide shift to a more saline environment since 1949 (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2002). What has not changed is that waterfowl still flock to the refuge, but they are concentrated in the freshwater impoundments.

Figure 5. Hurricane recovery information for Sabine National Wildlife Refuge.

U.S. Fish & Wildlife Service

Sabine National Wildlife Refuge
Hurricane Rita Clean-up Questions and Answers

Following Hurricanes Katrina and Rita, national wildlife refuges including Sabine, Big Branch Marsh, Bayou Sauvage, and Delta have been grappling with hazardous materials issues. Sabine National Wildlife Refuge, which encompasses more than 125,000 acres of marshland, has the most significant impacts.

What is the problem at Sabine National Wildlife Refuge?

The U.S. Fish and Wildlife Service's Sabine National Wildlife Refuge received the brunt of Hurricane Rita's storm surge, which carried with it tons of debris onto the refuge. The debris came from the remnants of beach communities as well as oil and gas facilities. It contains a mix of natural vegetation, construction debris, household items and an unknown amount of hazardous material. The impact is still being determined, but clean-up will be a huge challenge, with submerged tanks and massive debris fields. A total of 32,000 acres have been impacted. This includes: 1,700 acres of debris piles, seven million cubic meters of debris, and nearly 1,400 potential hazmat items positively identified. Estimates range from 115,000 to 350,000 gallons of hazardous liquids and gases.

What is the Service doing to fix it?

The Service and Department of the Interior are exploring every option to remove hazardous debris, including working with the Federal Emergency Management Agency (FEMA), the Environmental Protection Agency, the Department of Defense and other federal agencies to assist with cleanup. We closed the refuge to the public for safety reasons. We are working with local and state government planning teams to become involved in their broad restoration initiatives. We are also working with the Coastal America Partnership Program (CAP) to see if we can obtain assistance from the Department of Defense.

With the large amounts of dangerous materials in the water and on land, physical safety needs to be addressed immediately. The Service commissioned a detailed study by Research Planning, Inc. in January 2006 entitled "Assessment of Hazardous Materials and Debris from Hurricane Rita in the Sabine National Wildlife Refuge" that provided enhanced detail of the extent of the problem. Additional surveys are needed to identify submerged items. This will help the Service develop a plan for their removal. After the tanks are removed, a long-term monitoring program of any debris piles that remain will be needed.

photo: USFWS

Sabine NWR September 27, 2005

What is it going to cost?

An exact cost has not yet been determined, but the costs for surface clean-up and removing subsurfact tanks and debris could range from $10 million to $50 million at Sabine alone.

How will the Service pay for it?

We anticipate using funds requested by the Administration in a supplemental currently pending before the Congress.

How long will it take?

We do not know.

What is the extent of the damage?

Sabine NWR remains closed to the public and is not expected to reopen soon. Without removing the tanks, the refuge may pose a significant risk of chemical and physical damage for decades. Some short-term damages have been addressed such as visible oil spills. One such spill was intentionally burned on-site to limit impacts to migratory birds.

What was the justification for closing Sabine NWR and how long will it remain closed?

The facilities at Sabine NWR were devastated from Hurricane Rita. Five of eight buildings were immediately condemned and required demolition. The remaining three buildings need extensive repairs before they can be occupied. All public-use facilities received major damage and will require repairs before they can be reopened. The interior marshes of the refuge were inundated with debris, including hazardous/industrial waste, household debris. These conditions represent a significant risk to health and human safety requiring the Service to restrict refuge access to the public.

Areas in coastal southwest Louisiana outside of freshwater impoundment have experienced changes in vegetation (see Figure 6) due to increased salinity and freshwater retention time, according to surveys dating back to 1949 (O'Neil 1949; Chabreck et al. 2001). The increased salinity can be attributed to navigation channels and their maintenance, primarily the Calcasieu Ship Channel into nearby Calcasieu Lake. These channels allow salt water from the Gulf of Mexico into the marsh faster than fresh water can flow into it. Between 1875 and 1910, Calcasieu Lake salinities were low enough for the water to be used to irrigate rice, which cannot tolerate salinities over 0.6 ppt (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2002). Today, the average water salinity of Calcasieu Lake is between 8 and 12 ppt.

The other major factor contributing to shifting vegetation is canals and their associated spoil banks impeding the north-south flow of fresher water over the marsh. Combined with drought conditions, this can cause areas with salinities to more than double in some instances. Three areas of the refuge were impounded to prevent saltwater intrusion and lessen drought-induced salinity shifts in those areas.

The three impounded freshwater marsh management units are dominated by bulltongue (*Sagittaria spp.*), water shield (*Brasenia schreberi*), white water-lily (*Nymphaea odorata*), spikerush (*Eleocharis spp.*), cattails (*Typha spp*.) and bulrushes (*Scirpus spp.*). Open water areas throughout the refuge host a variety of submerged aquatics that assist with marsh stabilization, add to detritus build-up, and provide food for waterfowl. Widgeon grass (*Ruppia maritime*), coontail *(Ceratophyllum demersum*), southern naiad (*Najas quadalupensis*), common bladderwort (*Utricularia vulgaris*), fanwort (*Cabomba caroliniana*), Eurasian milfoil (*Myriophyllum spicatum*) and Ottelia (*Ottelia alismoides*) line the shallow areas along canals and bayous, in addition to occupying large expanses of open water. Over 25 acres in Management Unit 3 are inhabited by wild celery (*Vallisneria americana*), an important food of wintering canvasbacks. Vegetative species that occur on drier upland sites such as ridges and levees include Chinese tallow (*Sapium sebiferum*), groundsel-tree (*Baccharis halimifolia*), live oak (*Quercus virginiana*), rattlebox (*Sesbania drummondii*), black willow (*Salix nigra*), waxmyrtle (*Myrica cerifera*), common elderberry (*Sambucus canadensis*), blackberry (*Rubus spp*.), trumpet vine (*Campsis radicans*), blue vervain (*Verbena hastate*), and goldenrod (*Solidago spp*.) (USFWS 1996).

East Cove Unit Vegetation

As a result of habitat deterioration through erosion and saltwater intrusion, wildlife species and numbers on the East Cove Unit decreased dramatically in the past. The more diverse freshwater and intermediate marshes formerly present on the unit (Figure 7) were converted to brackish and saltwater marshes with monotypic stands of marshhay cordgrass (*Spartina patens*). Implementation of the Cameron Creole Watershed Project has helped to reverse this trend (USFWS 2001).

Threatened and Endangered Species of Management Concern

Species of special management concern, including threatened or endangered, occur infrequently at Sabine. Calcasieu and Sabine lakes provide habitat for two species of sea turtles: the federally endangered Kemp's ridley and the federally threatened loggerhead. The refuge provides access and habitat for these species, and Service personnel have seen Kemp's ridleys on the refuge; staff have also radio-tracked loggerheads on the refuge. As well, the refuge could potentially be used by the threatened bald eagle, which formerly nested in Cameron Parish, and the endangered wood stork.

Figure 6. Vegetation of Sabine National Wildlife Refuge.

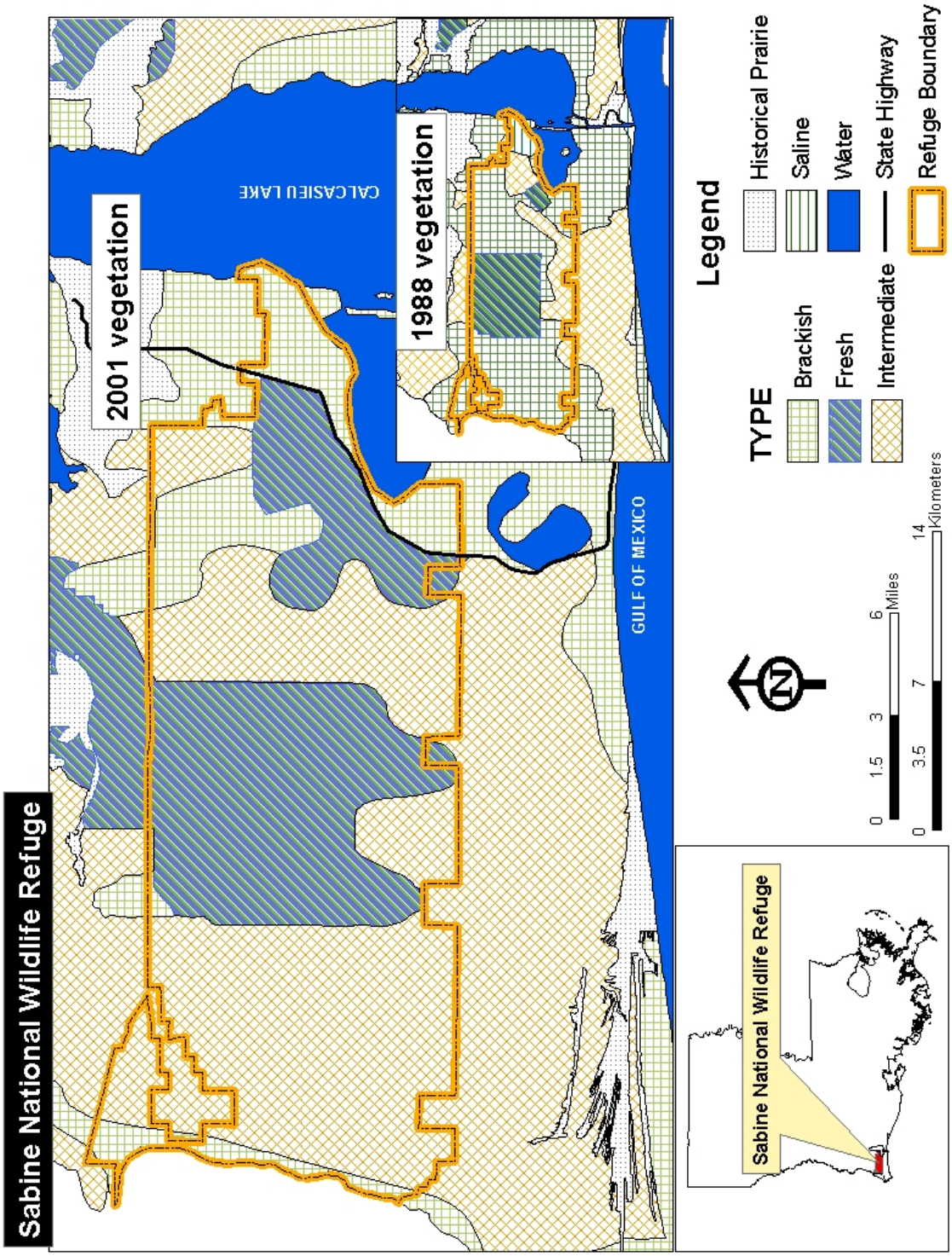
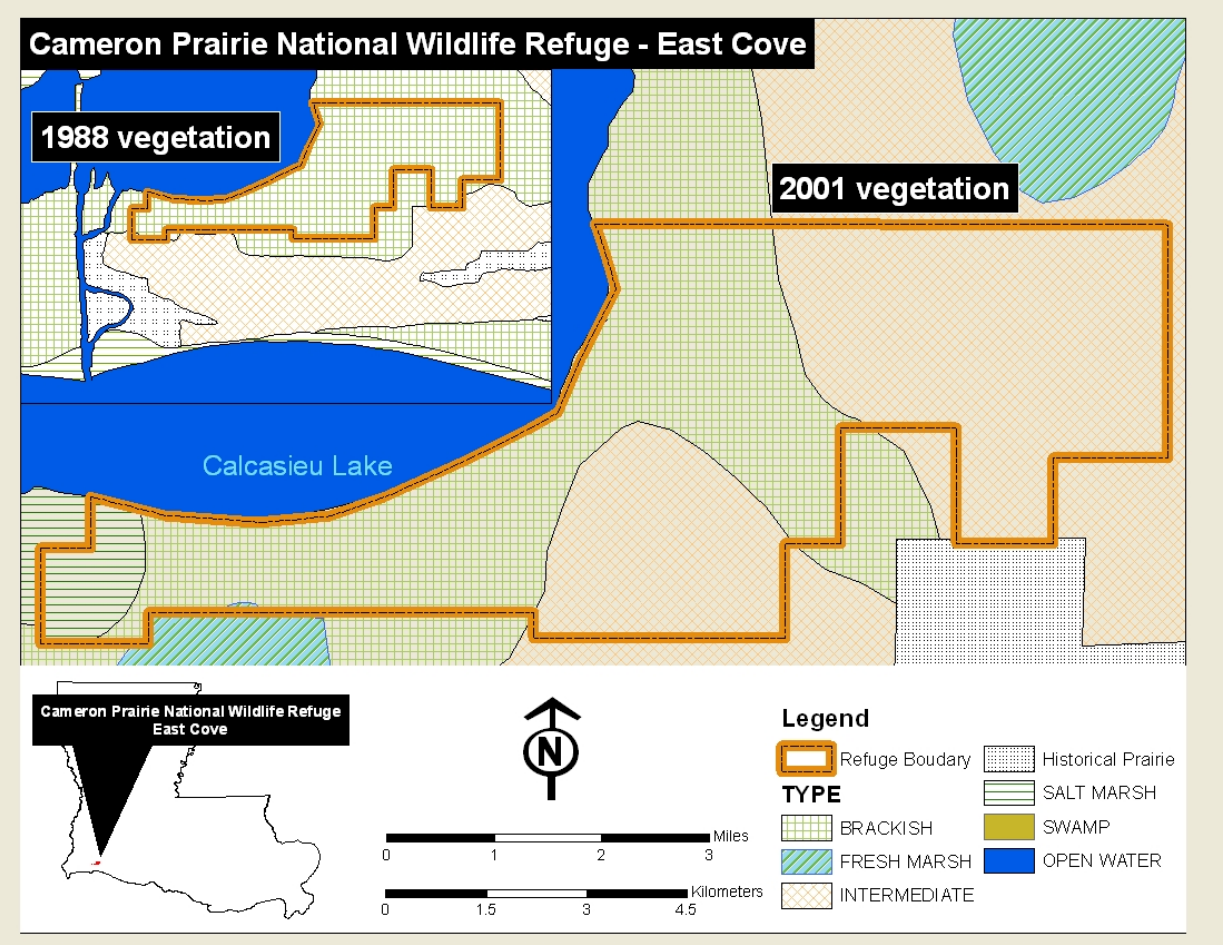


Figure 7. Vegetation of East Cove Unit.



Birds of Conservation Concern 2002 (USFWS 2002d) (*BCC 2002*) is an effort to carry out a mandate (Public Law 100-653, Title VIII) to identify species, subspecies, and populations of all migratory nongame birds that are likely to become candidates for listing under the Endangered Species Act of 1973 (ESA). The report strives to accurately identify migratory and nonmigratory bird species that represent the Service's highest conservation priorities. *BCC 2002* lists birds of conservation concern at three geographic scales—North American Bird Conservation Initiative Bird Conservation Regions, U.S. Fish and Wildlife Service Regions, and National—to maximize the utility of the lists for partners and agencies.

In addition, three national plans were used to place birds on the lists: Partners In Flight, United States Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. Current conservation assessment scores for each species were taken from the three plans which were based on several factors, including population trends, threats, distribution, abundance, and area importance.

While all the bird species included in *BCC 2002* are priorities for conservation action, the lists make no finding with regard to whether they warrant consideration for ESA listing. The Service's goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. Table 1 lists the birds of management concern that are known or expected to occur on the refuge. The refuge's bird checklist is presented in Appendix D.

Table 1. Birds of management concern to the refuge.

Common Name	Bird Conservation Region 37 List	USFWS Region 4 List	National List
American Bittern	X		
Little Blue Heron		X	X
Reddish Egret	X	X	X
White ibis	X		
Northern Harrier	X		X
Peregrine Falcon	X	X	X
Yellow Rail	X	X	X
Black Rail	X	X	X
American Golden-Plover	X		X
Wilson's Plover	X	X	
Upland Sandpiper			X
Whimbrel	X	X	X
Long-billed Curlew	X	X	X
Marbled Godwit	X	X	X
Red Knot	X	X	X
Stilt Sandpiper	X		X
Short-billed Dowitcher	X		X
Buff-breasted Sandpiper	X	X	X
Gull-billed Tern	X	X	X
Common Tern			X
Least Tern	X	X	X
Black Tern	X		
Black Skimmer	X	X	X
Black-billed Cuckoo			X
Burrowing Owl		X	X
Short-eared Owl	X	X	X
Chuck-will's Widow		X	X
Whip-poor-will			X
Red-headed Woodpecker	X	X	X
Olive-sided Flycatcher		X	X
Scissor-tailed Flycatcher			X
Sedge Wren	X		X
Wood Thrush			X
Golden-winged Warbler		X	X
Prairie Warbler		X	X
Cerulean Warbler		X	X
Prothonotary Warbler	X	X	
Worm-eating Warbler		X	X
Louisiana Waterthrush			X
Kentucky Warbler	X		X
Canada Warbler			X
LeConte's Sparrow	X	X	X
Nelson's Sharp-tailed Sparrow		X	X

Waterfowl

Migratory waterfowl use the refuge and are economically important in the area. Mottled ducks, wood ducks, and fulvous whistling-ducks are known to nest and raise young on the refuge. The refuge provides excellent wintering habitat for many other waterfowl species including white-fronted geese, lesser snow geese, and Canada geese. At least 20 duck species including gadwall, green-winged teal, blue-winged teal, American widgeon, mallards, and ring-necked ducks winter on Sabine (USFWS 1996). Aerial waterfowl surveys have recorded over 100,000 ducks on the refuge three out of five winters between the winter of 1994-95 and the winter of 1998-99, and one of those years over 200,000 ducks were counted. Gadwall, green-winged teal, and lesser snow geese frequent the refuge in higher numbers than other waterfowl species. Winter population surveys over the last ten years averaged almost 25,000 gadwall and 10,000 green-wing teal and snow geese, respectively (USFWS 2002c). Table 2 shows the approximate peak wintering waterfowl numbers for Sabine for the years 1990 to 1998. Figure 8 relates the various waterfowl species and their relative numbers using the marshes of Sabine National Wildlife Refuge.

Table 2. Annual peak wintering waterfowl populations on Sabine National Wildlife Refuge.

Year	No. of Waterfowl Observed
1990	138,107
1991	134,909
1992	279,427
1993	204,804
1994	204,881
1995	153,912
1996	72,057
1997	136,977
1998	38,538
Source: USFWS, unpublished data	

East Cove Unit Waterfowl

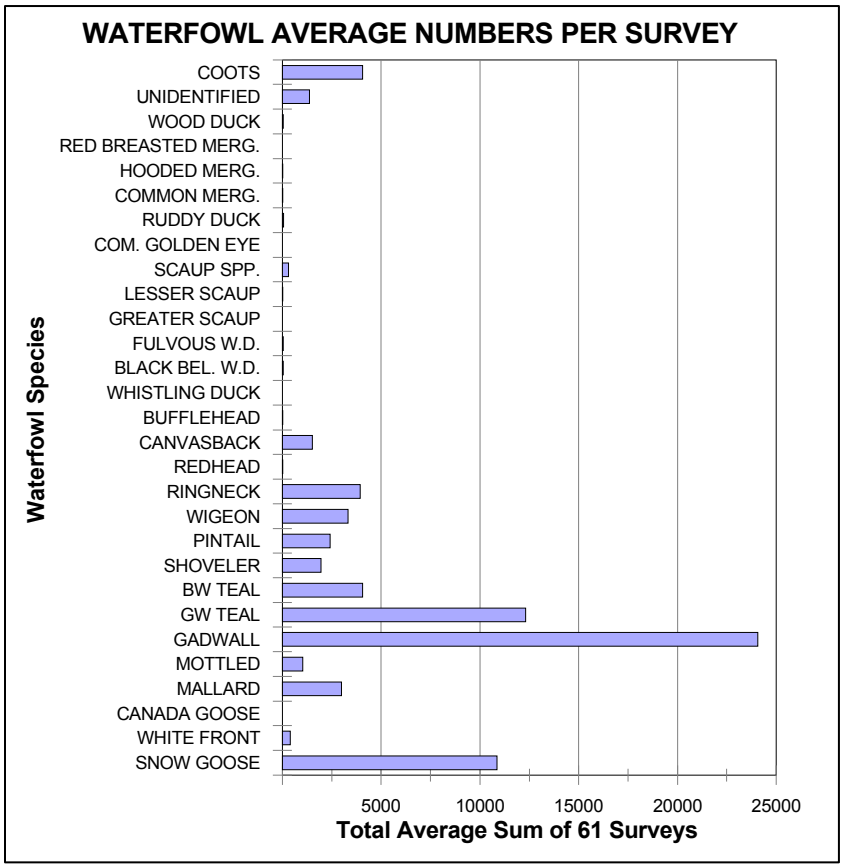
During 2001, six wintering waterfowl surveys were conducted for the Cameron Creole Watershed Project (Figure 8), which includes the East Cove Unit. Waterfowl numbers were below their long-term average, which may be a result of very low aquatic plant production due to extended periods of elevated salinities (USFWS 2002a). Table 3 shows approximate peak wintering waterfowl numbers for the East Cove Unit for the past 13 years.

The gadwall is usually the most frequently encountered duck during surveys on the East Cove Unit; it primarily consumes aquatic vegetation. The low number of waterfowl observed in 2000 and 2001 was due to the absence of aquatic vegetation. Aquatic vegetation within the Cameron Creole Watershed Project area began to disappear after extended periods of drought and high salinities. With the decrease in aquatic vegetation, there is an associated decline in waterfowl numbers. In addition, only one survey was conducted in 2000, compared to 45 between 1988 and 2000. With such sparse and sporadic data, it is hard to make reliable conclusions regarding population shifts, trends, and long-term effects of the Watershed Project on waterfowl populations (USFWS 2001).

Table 3. Annual peak wintering waterfowl populations on the East Cove Unit.

Year	No. of Waterfowl Observed
1988	2,400
1989	6,900
1991	3,400
1992	11,700
1993	9,500
1994	22,100
1995	17,870
1996	13,750
1997	15,729
1998	5,985
1999	72,498
2000	3,060
2001	6,176
Source: USFWS, 2002a	

Figure 8. Waterfowl survey results for Sabine National Wildlife Refuge.



Wading Birds (Water and Marsh Birds)

Many wading bird species are present on the refuge year-round. Winter surveys have revealed that great egrets, white and white-faced ibis, and roseate spoonbills are the most abundant wading birds on the refuge and feed throughout the marshes during the winter months. Species such as white pelicans, tricolored herons, black-crowned night herons, green herons, great blue herons, and snowy egrets are also present in great numbers. Hundreds of cormorants utilize the refuge as well.

Many species of colonial nesting birds such as herons, egrets and cormorants have been observed nesting in trees and shrubs within Management Units 1, 1A, and 3. There are five active rookeries on the refuge (as indicated in a May 10, 2001 survey). Favored nesting areas include islands and abandoned levees. During the 1990s, as many as 5,000 white and white-faced ibis nested in bullwhip marsh on Unit 1B. Breeding bird surveys, conducted by boat from canals, have indicated that common moorhens and least bitterns are the most abundant species of this group during the summer. Numbers of more secretive species such as clapper rails and purple gallinules have not been determined (USFWS 1996).

East Cove Unit Wading Birds

Areas of highest wading bird use on the East Cove Unit include the shallow open ponds at the northeast boundary of the refuge and broken marsh between the Lambert Bayou and No Name Bayou near the Borrow Canal. Peak use of the unit by wading birds occurs with varying water levels (low and high), where fluctuating water levels create new shallow water areas for feeding (USFWS 2001).

Shorebirds, Gulls, Terns, and Allied Species

Over 30 shorebird species utilize habitat on the refuge during their spring and fall migrations. As part of the International Shorebird Survey, a three-year study was conducted at several sites, near Calcasieu Lake, along the eastern portion of the refuge. That survey indicated that dowitcher species were the most abundant, with black-necked stilts second, and small shorebirds including sandpipers and plovers, third in abundance. Other species sighted include American avocets, yellowlegs, willets, dunlins and killdeer. A June survey of black-necked stilt nests indicated that as many as 214 nests occurred in a 384-acre, muskrat eat-out area (USFWS 1996).

East Cove Unit Shorebirds, Gulls, Terns and Allied Species

Shorebird use of the East Cove Unit has traditionally been very low, occurring only during low water levels, drawdown periods, and droughts. Even then, only a few hundred birds use this unit. Commonly observed species of shorebirds, gulls, terns and allied species include Forster's terns, black-necked stilts, laughing gulls, willets, dowitchers, black terns, black-bellied plovers, and dunlins (USFWS 2001).

Raptors

Many species of hawks, owls, and vultures utilize the refuge as a wintering ground. Red-tailed hawks, which are observed throughout the refuge in trees lining canal banks, are the most abundant of the wintering hawks. Year-round residents include barn owls, great horned owls, and black and turkey vultures (USFWS 1996). Black vultures can usually be found roosting in trees and on structures on Club House Island at the intersection of the Beach and Central canals.

East Cove Unit Raptors

Northern harriers are frequently observed flying low over the marsh during fall, winter, and spring. Several types of owls are year-round residents of the unit, including barn owls, great horned owls, barred owls, and screech owls. Potentially suitable habitat for these owls exists along levees and ridges. Barn owls have been recorded nesting in the nest box near the paired ponds for the past several years (USFWS 2001).

Other Migratory Birds

Seventy-five species of migratory songbirds use the refuge levees during their spring migration. Several species of passerines are known to breed/nest on refuge levees during the summer months, including the orchard oriole, yellow-billed cuckoo, eastern kingbird, mourning dove, white-eyed vireo, northern cardinal, and common yellowthroat. Species such as the red-winged blackbird, boat-tailed grackle, eastern meadowlark, marsh wren, and seaside sparrow are known to nest in and among the marsh vegetation (USFWS 1996). Belted kingfishers and eastern kingbirds can be seen perched on trees and power lines above the canals along State Highway 27. Refuge personnel participate in two Christmas bird counts and a breeding bird survey route on the refuge each year.

Mammals

At least 28 species of mammals can be found on the refuge. The most common rodents include muskrat, nutria, marsh rice rat, and hispid cotton rat. The swamp rabbit and eastern cottontail are the only two lagomorphs found on the refuge. Many carnivorous furbearers live on the refuge, including river otter, mink, coyote and bobcat. Armadillo can frequently be seen on the levees. The only ungulate present is the white-tailed deer. Among the bats that have been documented to occur on the refuge are the red bat, Eastern pipistrelle, and Brazilian free-tailed bat (USFWS 1996).

East Cove Unit Mammals

Use of the East Cove Unit by several species of small mammals, including the muskrat and nutria, may be increasing as a result of improved water management, subsequent conversion of areas of brackish marsh to intermediate and freshwater marsh, and increases in the abundance of preferred food sources (USFWS 2001).

Otters are observed throughout the year on the East Cove Unit, with heaviest use seen during winter. In addition, coyotes have been observed both during aerial waterfowl surveys and from boats in the marsh (USFWS 2001).

Virtually the only game mammal found on the East Cove Unit and Cameron Creole Watershed is the white-tailed deer. During high water levels, deer are restricted to the ridges, levees, and areas of higher elevation. During low water levels, deer can venture into the interior of the marsh. Deer are regularly observed at the north end of the watershed along Big Pasture Road near the PPG camp and boat launch, as well as in the marsh west of the Cotton Well Road landing. Although deer are not frequently observed on the lake bank levee, signs of deer use are present (USFWS 2001).

Amphibians and Reptiles

Sabine National Wildlife Refuge harbors at least 35 species of amphibians and reptiles. Species most commonly encountered include: the American alligator, snapping turtle, alligator snapping turtle, red-eared slider, Mississippi green water snake, broad-banded water snake, western ribbon snake,

speckled kingsnake, western cottonmouth, green anole, ground skink, Gulf coast toad, green treefrog, and southern leopard frog (USFWS 1996). Another species of note is the diamondback terrapin, a medium-size turtle that prefers open water in coastal salt marshes and estuaries (USFWS 2002).

Alligator Trapping

The alligator harvest on the refuge occurs during September. Harvest limits and dates are set by the Louisiana Department of Wildlife and Fisheries, and in some instances the regulations on Sabine are more restrictive. Sabine's alligator harvest is a sustained yield harvest, meaning that smaller alligators, which grow into the harvested size class during the year, replace the animals taken each year. The state decides how many alligators will be harvested by considering a number of factors including habitat type, annual productivity, and harvest data from previous years (USFWS 1996).

East Cove Unit Alligator Trapping

Alligator trapping was initiated in the East Cove Unit in 1993. Initially, harvest quotas for this unit were reduced from the state allowed limit to err on the conservative side; however, the numbers gradually increased over the years up to the state limit. Alligator trapping on the East Cove Unit was discontinued in 2001 (USFWS 2002a).

Aquatic Species

Fish associated with the refuge marshes include Gulf menhaden, Atlantic croaker, gobies, pipefish, bay anchovy, inland silverside, western mosquitofish, pinfish, striped and white mullet, silver perch, bay whiff, bayou and rainwater killifish, speckled worm eel, sand sea trout, red drum, crappie, gar, sunfishes, largemouth bass, and catfish. Shellfish associated with these areas include blue and mud crab, and white, grass, and brown shrimp (Bush 2003; USFWS 1996). Many of these fish spend time maturing in these marshes before they return to the ocean. Recreational fishery populations have been greatly reduced over the last decade because of drops in water levels due to management and drought (USFWS 2002). Restocking efforts on the refuge failed and low populations are expected to continue in the future.

East Cove Unit Aquatic Species

The East Cove Unit serves as an important nursery for brown and white shrimp and blue crabs. Fish species present include gar, catfish, bowfin, bluegill, bass, crappie, flounder, and redfish (USFWS 2002b; 2001).

Invasive Plant Species

Several invasive plant species are present on the refuge. The Chinese tallowtree (*Sapium sebiferum*) is the most prevalent. It is found on canal and impoundment spoil banks and may be found on ridges. It is an introduced ornamental that has escaped to become the dominant woody species in Louisiana coastal marshes. Larger tallowtrees can be controlled by herbicide application or cleared, and small plants can be removed by burning woody growth before it reaches maturity.

Salt cedar (*Tamarix gallica*) is found sparsely along canal banks and ridges throughout the refuge. It was introduced from Europe and can be an aggressive invader on dewatered, disturbed wetlands and especially on hydraulically deposited soils. Drought conditions probably contribute to its

establishment and propagation. Methods of control include long-term deep flooding or application of herbicides licensed for aquatic use.

Chinaberry (*Melia azedarach*) is present on canal and spoil banks on the refuge. It was introduced as an ornamental, but has escaped and now can be found on higher elevated areas of the refuge. No methods of control or elimination were found in the literature, but may be similar to tallowtree.

Water hyacinth (*Eichhornia sp*.) was found in old borrow pits used to construct ring levees for oil and gas development in Management Unit 2. This is a South American and African plant introduced as an ornamental that produces quickly and has no natural predator in the United States. Repeated applications of the herbicide 2,4-D is the most practical method of reducing infestations.

Eurasian milfoil (*Myriophyllum spicatum*) is rapidly colonizing areas that have converted from emergent marsh to open water, and was found to be one of the most common species near terraces placed in an open water area in Unit 7. Though Eurasian milfoil is not native and is of less value to wildlife than other aquatic species, its presence is desired over the absence of vegetation in recently disturbed open water areas. The species is native to Eurasia and Africa and is believed to have arrived in North America during the late 19th century, possibly from shipping ballast. Methods of control include application of 2,4-D or biocontrol by introducing American Weevil.

Invasive Plant Species on the East Cove Unit

Salinity levels in the East Cove Unit usually control most noxious plants. One noxious plant species of concern—giant salvinia—was recently identified in Cameron Parish. This is a very aggressive, floating, aquatic plant that grows so thick on the water's surface that it completely shades out submerged aquatic vegetation (USFWS 2001). The plant can tolerate a salinity of 8 ppt or greater, which falls within the salinity ranges of the East Cove Unit (USFWS 2002a).

Invasive Animal Species

The most common invasive animal on the refuge is the nutria. This rodent was first trapped on the refuge in the winter of 1941–42, and at the time refuge personnel wished they had more of them to control vegetation. However, numbers increased dramatically in 1954 and are now a problem in some years. The nutria has displaced the native muskrat in many of Louisiana's coastal marshes and they can cause harm to fragile marshes when they occur in high densities. When warranted, harvest is used to control the population.

Feral hogs are common on the refuge and can be detrimental to nesting bird success. The hogs degrade habitat and can contribute to land loss by damaging healthy plants that hold the soils in many areas together. No harvest of feral hogs is conducted on the refuge at this time.

Another invasive animal species of concern potentially found on the refuge is the zebra mussel, which has caused great problems wherever it has become established in North America. Refuge personnel annually monitor canals throughout the refuge for this highly invasive mussel, but none have been found to date.

Habitats

The refuge is managed to balance the needs of reducing stress to wetland plants caused by waterlogging and saltwater intrusion while providing sufficient access to interior marshes for estuarine species.

Freshwater Impoundments. Three rain-fed freshwater impoundments created in 1951 and 1959 provide habitat for numerous species of waterfowl, wading birds, shorebirds, mammals, reptiles, and fish. Management Unit 3, which encompasses 26,400 acres, is the largest freshwater marsh remaining in southwest Louisiana. Management units 1A and 1B comprise 5,138 acres and 1,800 acres of marsh, respectively, and are highly utilized by a variety of wildlife, most notably ducks. Waterfowl foods in Management Unit 3 have been found to be available at densities significantly above the level required for efficient waterfowl use (Winslow 2003). The target water management level is 1.8 feet to enhance the growth and survival of desirable plant communities for waterfowl (USFWS 1996). Water depths can be reduced, but only rainfall can increase water levels in these impoundments.

Coastal Marsh. The refuge contains 91,173 acres of fresh, intermediate, and brackish marshes interspersed with low prairie ridges, man-made levees, meandering bayous, and canals. Traditionally, the area fluctuates from being a predominantly fresh marsh to a predominantly brackish marsh and reverts back from brackish to fresh, dependent upon weather cycles and precipitation.

Prescribed fire is one of the primary habitat management tools used on the refuge. Between 1984 and 2006, 85 prescribed fires were conducted restarting plant succession on over 241,304 acres on the refuge. These fires increase plant productivity and reduce the dangers of uncontrolled fires that may threaten people or property.

From fiscal years 2003 to 2006, over 80 wildfires burned 50,279 acres. Wildfires on the refuge are primarily caused by lightning strikes and seismic surveying activity.

Restoration and Mitigation Sites. Marsh re-creation using dredge material from channel dredging and linear terrace construction is currently being employed on the refuge. The basic principle behind both practices is to re-create habitat lost when areas convert from emergent marsh to open water.

Dredge Material. The Calcasieu Ship Channel that borders Sabine Refuge to the east is dredged on a two-year cycle to allow for large ship passage to the Port of Lake Charles. Sabine was chosen for a demonstration site to use dredged material to re-create marsh that had been lost. This use of dredge material will, ideally, allow managers to not only restore these marshes, but to connect the restored sites with the greater landscape, restoring hydrology, and improve habitat quality and diversity. To address concerns about dredge material contaminants, the U.S. Army Corps of Engineers (ACE) analyzes soil samples along the channel used for beneficial use. Thus far, four sites on the refuge have received dredge material for marsh re-creation efforts. Since 1975, 1,400 acres of marsh have been restored on Sabine using dredge-fill (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2002).

Research has found that elevation of these constructed wetlands has more impact than the age of the restoration on achieving “natural” soil processes (Edwards and Proffitt 2002); however, decomposition rates on the sites do appear comparable to natural areas (Mills and Edwards 2003). The belowground biomass on restored sites is significantly lower than natural sites (Ford et al. 2003). There appears to be some difference between small mammal use rates of restored sites as compared to natural sites, though this may be due to elevation difference (Mills et al. 2003). Many of these studies are ongoing. Studies are being conducted to assess patterns of vegetation (breeding system, colonization, cover, dominance, genetic diversity, growth, and succession); levels of metal contaminants in the sediment and biota; and use of the habitat by small mammals. Further studies of selected faunal use, dominant plant productivity, and elevation over time are currently being conducted. Analysis of the sites that experienced the brown marsh phenomenon is also underway.

Earthen Terraces. In 1990, “checker board” terraces were constructed in ponds along Calcasieu Lake in the West Cove Unit. These were followed in 2001 by the construction of 18,000 linear feet of planted, earthen terraces in Units 6 and 7 to mitigate for impacts due to oil and gas activities. The ACE and the Louisiana Department of Natural Resources (LDNR) require compensatory mitigation for acreage loss due to dredge and fill activities in wetlands. Terraces are discontinuous low ridges constructed with bottom sediments excavated from adjacent pond bottoms. They are designed to reduce wind related wave intensity, slow water movement allowing fine sediments to settle within the area, provide favorable conditions for submerged aquatic vegetation (SAV) establishment, and increase abundance and habitat of fish and other aquatic species.

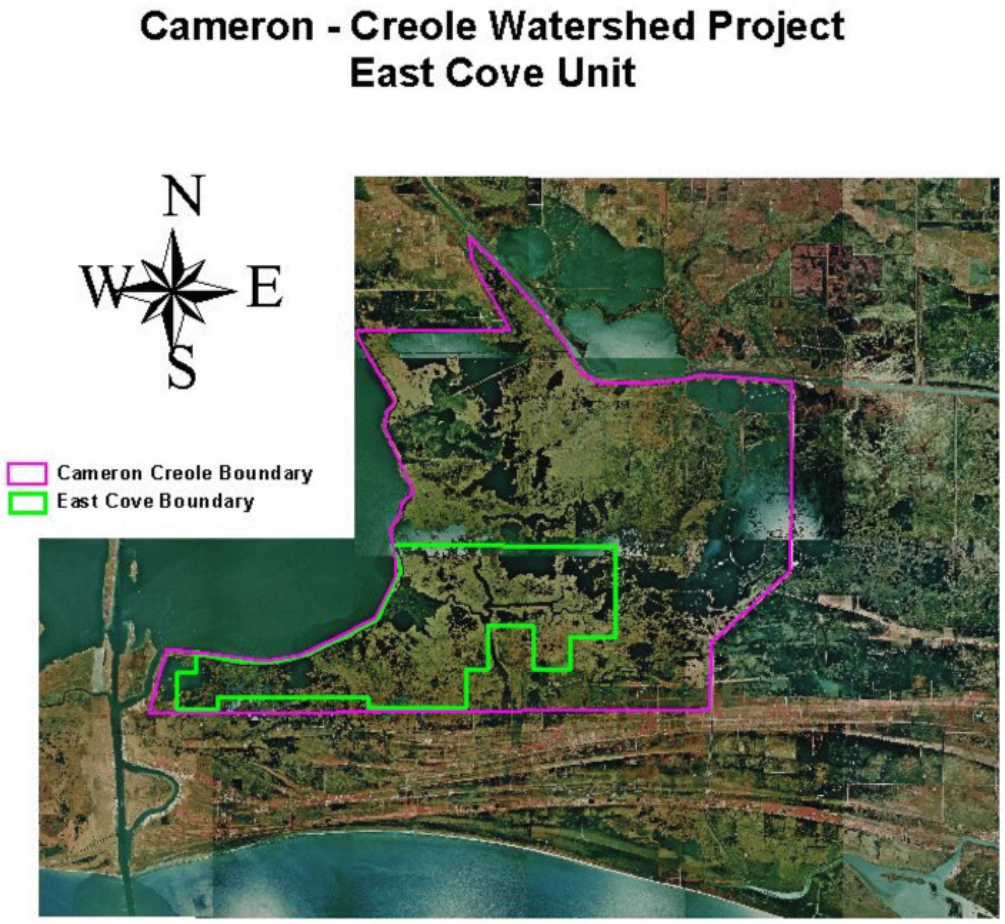
Ideal sites for terrace construction are areas where water bodies join or are threatening to join with another water body. No significant benefit to SAV has been found in two studies conducted on terraces at the refuge (Steyer 1993; Caldwell 2003), but research on other terrace configurations is ongoing. An unexpected secondary benefit is they have provided nesting habitat for seabirds such as least terns, forester’s terns, and black skimmers. Another secondary benefit is that terraces contribute to increased fish habitat quality as compared to sparsely vegetated open ponds (Bush 2003). Terrace construction for 2002 exceeded 40,000 linear feet in Unit 6. Terrace construction is also proposed for areas of Unit 5 as part of the CWPPRA East Sabine Lake Hydrologic Restoration (CS-32) project.

East Cove Unit Coastal Marsh. The East Cove Unit consists of 14,927 acres of brackish and salt marsh that is closely managed to preserve a balance between salt and fresh water. The salinity of the water is constantly monitored and water levels managed to restore and maintain the historic marshes destroyed by saltwater intrusion. The East Cove Unit is part of the Cameron Creole Watershed Project (Figure 9), a cooperative effort among local, state, and federal agencies and the private sector to restore 64,000 acres of marsh in Cameron Parish (USFWS 1998). Water control on the East Cove Unit and Cameron Creole Watershed is accomplished with the operation of five water control structures located along Calcasieu Lake’s eastern shore (USFWS 2002a). The refuge manager of Cameron Prairie National Wildlife Refuge manages the Cameron Creole Watershed Project under a cooperative agreement among sponsors.

The Service does not currently conduct vegetation surveys or monitoring of the East Cove Unit. However, the Natural Resources Conservation Service (NRCS) conducts vegetation monitoring as part of the Cameron Creole Watershed Project, every five years since 1983. According to these surveys, the major vegetation components of the East Cove Unit are marshhay cordgrass (*Spartina patens*) and oystergrass or smooth cordgrass (*S. alterniflora*) (USFWS 2002a).

Additional information on East Cove vegetation can be found in the Cameron Creole Watershed 1993 Vegetative Monitoring Report, published by the NRCS in 1997.

Figure 9. Cameron Creole Watershed Project including East Cove Unit.



Wetlands

In the late 1990s and early 2000s, freshwater submerged aquatic plants increased and expanded their ranges on the Cameron Creole Watershed due to improved water management. Dominant submergent vegetation in fresh to intermediate marshes consists of coontail (*Ceratophyllum demersum*), water hyacinth (*Eichhornia crassipes*), wild celery (*Vallisneria americana*), Eurasian watermilfoil (*Myriophyllum spicatum*), southern niad (*Najas quadalupensis*), and several pondweed species (*Potamogeton spp*.). In the past several years, submergents continued to spread further east and south in the watershed, into larger bodies of water from Broussard Lake to East Prong and from Bayou Bois Connine to North Prong. In brackish areas, large mats of widgeon grass (*Ruppia maritime*) continued to colonize, forming thick mats in open water areas from Lambert Bayou south to NoName Bayou. However, as a result of extreme rain deficits in 1999 and 2000, high salinity levels contributed to the overall decline and/or disappearance of aquatic vegetation (USFWS 2001).

Water level and salinity management on the East Cove Unit are based on the 1987 Resource Management Plan for Cameron Creole Watershed, established by the Cameron Creole Advisory Committee. During the year, salinities are recorded bi-weekly at 28 stations throughout the marsh, and are averaged to compare seasonal fluctuations from year to year. Water salinities within the Cameron Creole Watershed are directly but inversely correlated to seasonal rainfall—as rainfall decreases, salinity levels increase (USFWS 2001).

EDUCATION AND VISITOR SERVICES

The Sabine Refuge is one of the premier attractions of the Creole Nature Trail All American Road (a National Scenic Byway), and attracts 300,000 visitors annually (Figure 10). These visitors represent diverse groups with a variety of interests, including wildlife viewing, fishing, shrimping, crabbing, and hunting. The refuge's visitor facilities (pre-hurricane) are shown in Figure 11. (Note: the refuge facilities were destroyed or heavily damaged by Hurricane Rita in September of 2005 and have not been replaced at the time this Comprehensive Conservation Plan was printed.)

Figure 10. Annual visitation for Sabine National Wildlife Refuge.

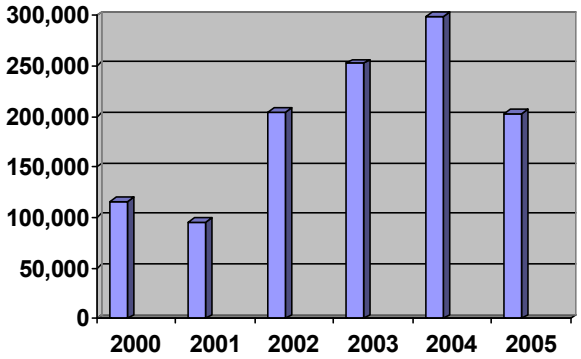
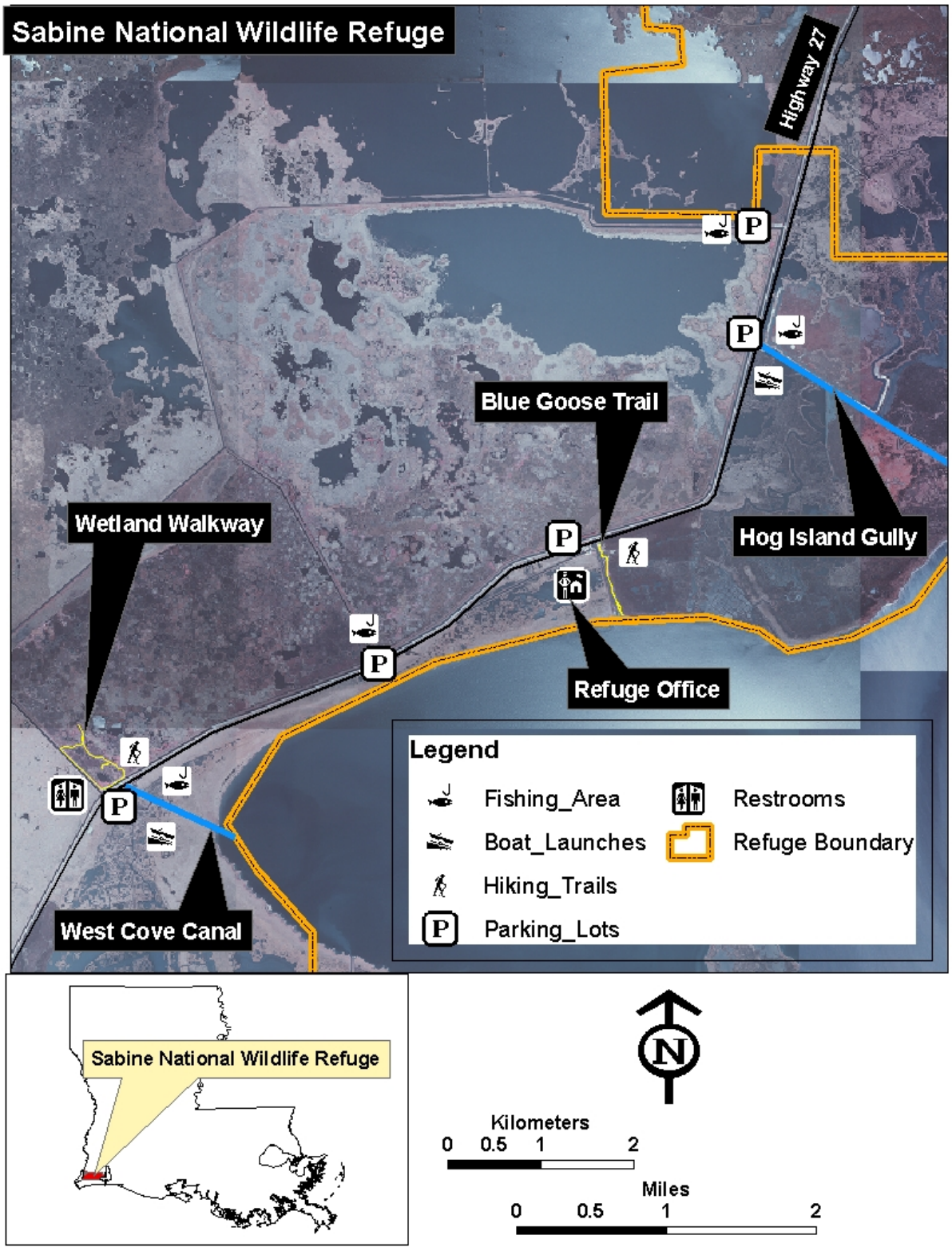


Figure 11. Visitor facilities at Sabine National Wildlife Refuge.



Hunting and Trapping

Hunting of waterfowl and trapping of alligators, nutria, and muskrats is permitted on the refuge. Hunting and trapping of other wildlife species is not permitted on the refuge. During the 1993–1994 through the 2004–2005 waterfowl hunting seasons, an average of 3,166 hunters per year used the refuge.

Waterfowl. Hunting of ducks, geese, and coots has been allowed in designated areas of the refuge on Wednesdays, Saturdays, and Sundays during the state waterfowl seasons set by the Louisiana Department of Wildlife and Fisheries. This Comprehensive Conservation Plan recommends changing the weekly hunting schedule to allow hunting on days that are coordinated with Lacassine National Wildlife Refuge's hunting days. All hunters are required to have a refuge-issued permit.

Alligator. The alligator season generally occurs during September after alligator hatching occurs but prior to winter hibernation. The season is set by LDWF and may vary slightly depending on the duration of the nesting season. The refuge harvest follows state regulations, but may be more restrictive under certain conditions.

Refuge hunters must have at least two years of hunting experience and have the necessary equipment. A special use permit from the refuge is required. Alligators are processed at a check station prior to leaving the refuge or being sold. Data collected from each alligator include tag number, sex, weight, and length and girth measurements.

Alligators can be taken by fishing or shooting during daylight hours, between sunrise and sunset. The primary method for harvesting alligators on the refuge is by setting a line with a baited hook along bayous, canals or open lakes.

Nutria and Muskrat. Local trappers who operate under federal trapping permits conduct the harvest. The trapping season is established by LDWF. Trapping proceeds are shared between the Service and the trapper, with the permittee retaining a certain percentage of the harvest. The refuge manager designates the number of helpers and harvest quota, and may suspend trapping operations any time there is a need to protect waterfowl concentrations, when conditions prevent successful catches, or when trappers do not conform to the terms of the agreement. No trapping has occurred on the refuge since the winter of 1997–98 because nutria and muskrat populations have been low enough to not warrant a harvest.

Fishing and Boating

Fishing is permitted on designated waterways at Sabine. Between calendar years 2000–2005, an average of 107,030 people fished on the refuge annually. Fishing with rod and reel, pole and line, or jug and line is permitted. The use or possession of other types of fishing gear is prohibited on the refuge. Bank fishing along Highway 27 is permitted year-round. A special permit is required from the refuge for cast netting for shrimp.

Fishing and public access is permitted from March 15 through October 15 on designated waterways and on Management Unit 3 (motors up to 40 horsepower). Management Units 1A and 1B are open from March 15 to October 15 to nonmotorized boats only. Aside from Management Unit 3, trolling motors only are allowed in refuge marshes. The saltwater boat launch at West Cove is open year-round for fishing access into Calcasieu Lake. The West Cove Canal is closed to fishing from October 16 through March 14, and is used for boat passage only during this time.

East Cove Unit Fishing and Boating

The East Cove Unit is open for public use (Figure 12), including fishing year-round, except during the state's waterfowl hunting season and when the Grand Bayou Boat Bay is closed. Public use of the unit is restricted to boats only; no walking, wading, or climbing in or on the marsh, levees, or structures to fish, cast net, or crab is allowed (USFWS 2002b). An estimated 10 to 12 boats use the East Cove Unit daily when the boat bay is open.

Wildlife Observation and Photography

Sabine National Wildlife Refuge has two nature-viewing trails and two roadside "scenic overlook" viewing areas. From 2000–2005, 85,734 visitors walked the Wetland Walkway and the Blue Goose Trail annually. The refuge has also established several nonmotorized boating areas that allow the public to view and photograph wildlife in areas undisturbed by motorized traffic.

Scenic Overlooks. In cooperation with the Creole Nature Trail Scenic Byway, the refuge built two roadside "scenic overlooks" beside State Highway 27. These areas allow visitors on the refuge to stop and observe coastal marsh habitats and the wildlife inhabiting them without having to leave their vehicles.

Trails. There are two wildlife observation trails on the refuge, one in a freshwater impoundment and another in coastal brackish/saline marsh.

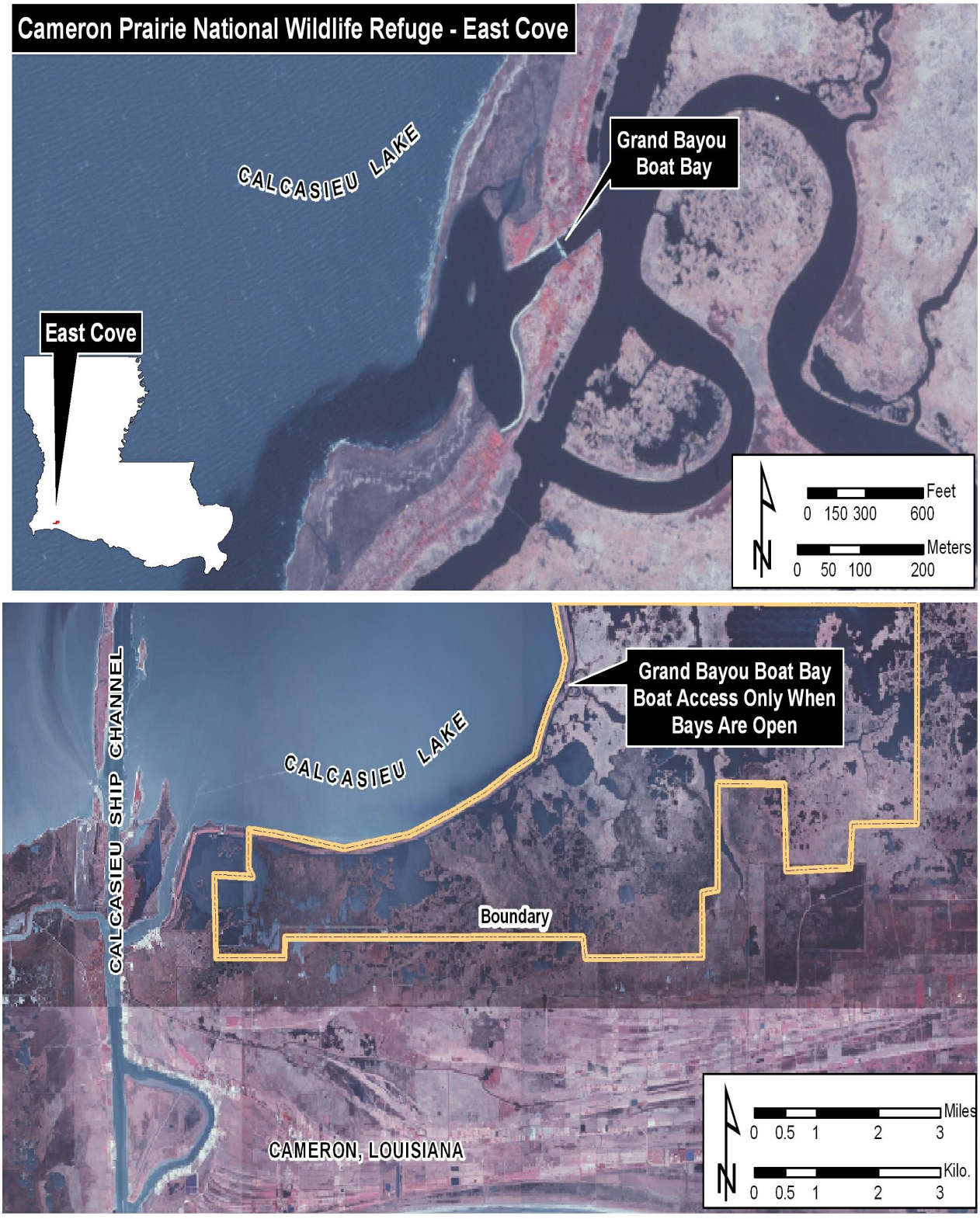
The Wetland Walkway, a one and one-half mile trail and boardwalk located approximately four miles south of the refuge headquarters with parking and facilities near State Highway 27, provides opportunities for wildlife observation and photography. There is a boardwalk over the impounded freshwater marsh of Unit 1B and wildlife can frequently be seen crossing the trail. The trail also features a raised observation tower that allow for spectacular views especially at sundown when the western sky frames acres of grassy marsh. Visitors can see wading birds, waterfowl, alligator, rabbits, armadillos, muskrat, nutria, nesting birds, butterflies, and migrant songbirds during various times of the year from the trail. The trail is open year-round from dawn until dusk.

The Blue Goose Trail is located on State Highway 27 just north of the refuge headquarters and features parking and a wildlife observation platform. Wading birds, shorebirds, waterfowl, diamond-backed terrapins, and many other brackish/saline marsh and shoreline species may be seen along the trail. The trail is open year-round from dawn until dusk.

Environmental Education and Interpretation

On-site and off-site education and interpretation to visitors and the community-at-large are presented by the Complex staff. Complex staff and volunteers taught 501 students on and off-site, and an additional 467 were taught by teachers or scout groups while on the refuge in Fiscal Year 2003. Off-site education services were provided to 1,568 people at community seminars, festivals, and other public exhibitions. The public receives education through media events such as press releases and radio/television events.

Figure 12. Visitor facilities at the East Cove Unit.



REFUGE ADMINISTRATION

REFUGE STAFF

Sabine National Wildlife Refuge is part of the Southwest Louisiana National Wildlife Refuge Complex, which also includes the Cameron Prairie, Lacassine, and Shell Keys national wildlife refuges. The Sabine staff consists of four permanent employees, with occasional interns, volunteer workers, and term appointments supervised by the Refuge Manager. Positions include one Project Leader, one maintenance worker, one carpenter, and one refuge officer. Complex employees also perform many duties associated with management of Sabine. A Complex Project Leader stationed at the Complex headquarters at Cameron Prairie National Wildlife Refuge supervises the Sabine Refuge Manager.

COORDINATION/COOPERATIVE PROGRAMS

The refuge staff coordinates and cooperates extensively with state agencies, tribes, landowners, the public, conservation groups, oil and gas companies, and local agencies and organizations. Sabine is a component of several important regional or ecosystem planning and management efforts, and works with all levels of government and nongovernmental organizations and private citizens to accomplish goals and objectives specific to those efforts.

Since the East Cove Unit is part of the Cameron Creole Watershed Project, refuge and Complex staff work closely with several state and local government agencies, including the Louisiana Department of Wildlife and Fisheries, Louisiana Department of Natural Resources, Louisiana Agriculture Extension Service, and Cameron Parish Police Jury (USFWS 2002a). The Service and Miami Corporation have been part of a cooperative agreement since 1990 to jointly manage lands within the watershed project for the preservation and restoration of coastal wetlands and for the benefit of waterfowl and other biological resources. Miami Corporation agreed to provide 1.5 employees and the Service agreed to provide three employees for the management and operation of the Cameron Creole Watershed Project as part of the agreement. However, when administration and management of the East Cove Unit was transferred from Sabine to Cameron Prairie, a new cooperative agreement was developed, resulting in the Service providing two full-time employees and the Miami Corporation providing up to one employee on an as-needed basis (USFWS 2001).

In addition, since 75 percent of the watershed is private land with multiple landowners, an advisory committee was established prior to construction of the water control mechanisms in the watershed. This committee developed a management plan that was acceptable to all affected parties, and included the plan in the U.S. Army Corps of Engineers permit for the Cameron Creole Watershed Project. The Service adheres to the plan during day-to-day operations (USFWS 2002a).

FACILITIES AND EQUIPMENT

The refuge's heavy equipment is shown in Table 4.

Table 4. List of heavy equipment at Sabine National Wildlife Refuge.

Tractor, John Deere
Tractor, Kubota

ROADS

Oil and gas companies maintain all roads on the refuge, except State Highway 27, which is maintained by the Louisiana Department of Transportation and Development; it is the only road on the refuge open to public traffic. In the near future, Vastar Road will become the Service's responsibility. The well that Vastar Road services will be removed from the refuge in 2007.

Visitor parking on the refuge is provided at eight locations along State Highway 27. Parking lots are provided at the refuge headquarters; the Wetland Walkway; the Blue Goose Trail; the Northline Recreation Area (at the intersection of the Northline Canal and Roadside Canal); the Hog Island Gully Recreation Area; the 1A/1B Recreation Area, an overlook area on State Highway 27; and the West Cove area.

RESEARCH NATURAL AREAS

Research Natural Areas are designated by federal land management agencies to preserve plant and animal communities in a natural state for research purposes. They protect vanishing native habitats that exhibit outstanding ecological value by preventing unnatural encroachments and activities that might modify ecological processes. The Sabine Refuge encourages research and many research projects have and are currently being conducted on the refuge, but no specific research nature areas have been designated on the refuge.

WILDERNESS REVIEW

As part of the comprehensive conservation planning process, the lands within Sabine National Wildlife Refuge were reviewed for their suitability in meeting the criteria for wilderness, as defined by the Wilderness Act of 1964. Wilderness is "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain" (The Wilderness Act, September 3, 1964; (16 U.S.C. 1121 (note), 1131-1136)).

No lands on the refuge were found suitable for designation as wilderness. Although the refuge contains contiguous roadless lands that are at least 5,000 acres in size (one of the criteria for wilderness designation), these lands and waters have been substantially altered by humans, particularly through agriculture, water manipulation, levee and canal construction, pipeline laying, oil and gas development, and seismic exploration. As a result of both extensive modification of natural habitats and ongoing manipulation of natural processes, adopting a "hands-off" approach to management at the refuge would not facilitate the restoration of a pristine or pre-settlement condition, which is the goal of wilderness designation. These past and present human activities do not make the refuge's lands practicable or suitable as wilderness. Therefore, the suitability of refuge lands for wilderness designation is not further analyzed in this plan.

ARCHEOLOGICAL AND HISTORICAL RESOURCES

Sabine National Wildlife Refuge contains several archeological sites with artifacts from the Atakapa people, who inhabited much of southwest Louisiana and southeast Texas before European colonization in the mid-1700s. Known sites can be found in almost all of the units of the refuge, though details are known for few of the sites. State regulations prohibit the disclosure of the contents of most of these sites, and several sites have only been identified from aerial photographs. Most of the known site locations on the refuge were identified by a cultural resource survey (Thomas et al. 1978). There are no programs allowing the public access to these sites, and there is little for the public to view on these sites due to the high subsidence and burial rates found in coastal Louisiana.

Most sites abandoned before 800 A.D. are buried. Cultural sites have been damaged inadvertently due to canal construction and maintenance, mostly before the refuge was acquired.

Three archeological sites on the refuge were discussed in Thomas et al. (1978); these are located at the "Club House" at the intersection of the Central and Beach canals, and two oyster shell concentrations observed in the East Cove Unit. The cultural significance of these sites is unknown, but a cursory survey was conducted on the "Club House" site. The survey indicated that the material at the "Club House" was probably transported from nearby Shell Hill in order to raise the elevation of the "Club House." The materials from this site are still of concern, but may not have originated on the site.

An Atakapa site, which may have served as a seasonal settlement, has been found near the refuge at the Hackberry Salt Dome. The Atakapa, named by the early French explorers for the Choctaw Indian word for "man-eater," are believed to be one of the most technologically primitive Native American cultural groups in North America. The culture did not feature hierarchical leadership or an organized religious structure, though shamans were prominent members of the community. Most of their technological development centered on subsistence hunting, and their reputation as cannibals kept the group isolated from the Europeans until the mid-1700s.

The Atakapa probably subsisted by hunting, foraging, and fishing, and common foods were probably deer, raccoon, muskrat, turtle, alligator, and various fish and shellfish. Shell mounds are believed to have been a prominent feature in coastal Atakapa settlements. The Atakapa were semi-nomadic and probably only spent the spring and summer subsisting in small family groups on coastal lands, such as those currently occupied by the Sabine Refuge; the fall and winter were spent in larger settlements further inland.

The area was a "no-man's land" between Spanish Mexico and French (later American) Louisiana frequented only by trappers and outlaws until the early 1800s. European settlement of southwest Louisiana during the late 1700s consisted mostly of isolated communities of Acadian, French, and Spanish settlers. After Louisiana was purchased by the United States in 1803, new Scottish-Irish settlers began to settle the area, but it was not until the railroads connected the area with the outside world after the Civil War that major settlements, most notably the City of Lake Charles, were founded.

The area now occupied by the Sabine Refuge was relatively undisturbed until oil was discovered in the region in the 1920s. The fur industry became a secondary source of income for the Texas Company, an oil company that owned much of the area currently occupied by the refuge. Declines in muskrat populations during the late 1920s and early 1930s led to the Texas Company (now ChevronTexaco) selling surface rights to the federal government for the purpose of establishing the wildlife refuge. The company retains the subsurface rights to this day.

It is more than likely that many undiscovered archeological sites exist at Sabine. These sites may never be discovered due to the difficult survey conditions imposed by the marsh environment. The refuge at present does not have a Cultural Resources Management Plan. This plan, when completed, will specify the measures that need to be taken on the refuge to identify, protect, and interpret the area's archeological and historical sites.

SOCIOECONOMIC PROFILE

Sabine National Wildlife Refuge is located in 1,313 square-mile Cameron Parish, Louisiana, one of the largest parishes (i.e., county equivalents) in the state. Cameron Parish is situated in the extreme southwestern corner of Louisiana, abutting the Gulf of Mexico to the south and Texas to the west. In

2003, the population of the parish was estimated at 9,708, a slight decline (3%) from the 2000 Census (U.S. Census Bureau 2004). The median household income of the parish in 1999 was $34,232, compared to $32,566 for Louisiana as a whole. The same relative prosperity is reflected in a poverty rate below the state average. Approximately 12% of Cameron Parish residents lived below the poverty line in 1999, compared to almost 20% for all of Louisiana. Educational attainment is below the state average, however, with only 8% of the population aged 25 or higher having a Bachelor's degree or higher, as opposed to the statewide average of 19%.

In 2003 transportation and warehousing was the largest of 20 major economic and employment sectors in the parish (STATS Indiana 2004). The U.S. Census Bureau classified occupations in Cameron Parish are shown in Table 5.

In terms of employment by industrial sector, the primary industries lumped as "agriculture, forestry, fishing and hunting, and mining" predominate in Cameron Parish, as shown in Table 6.

In terms of its racial and ethnic breakdown, as reported in the 2000 Census, Cameron Parish is 92.5% white, non-Hispanic; 3.9% black or African American; 0.4% American Indian; 0.4% Asian; and 2.2% Hispanic or of Latino origin (U.S. Census Bureau 2004). (These percentages do not add up precisely to 100% because of the difference between designated races—white, black, Native American, and Asian—and ethnicities, which are Latino and non-Latino.) In addition, 1.6% in the Census reported some other race or two or more races. Overall, the population of Cameron Parish has a greater percentage of non-Hispanic whites (92.5%) than the state as a whole (62.5%). That is, it is less diverse and has fewer minorities.

Table 5. Cameron Parish - Occupations of employed civilian population 16 years and older (2000).

Cameron Parish - Occupations of employed civilian population 16 years and older (2000)		
Occupation	Number	Percent
Management, professional, and related occupations	772	18.5
Service occupations	718	17.2
Sales and office occupations	954	22.8
Farming, fishing and forestry occupations	199	4.8
Construction, extraction and maintenance occupations	594	14.2
Production, transportation, and material moving	947	22.6
***Source*:** U.S. Census Bureau, Census 2000, Summary File 3, Profile of Selected Economic Characteristics		

Table 6. Cameron Parish - Employment of civilian population 16 years and older by industry (2000).

Cameron Parish – Employment of civilian population 16 years and older by industry (2000)		
Industry	**Number**	**Percent**
Agriculture, forestry, fishing and hunting, and mining	696	16.6
Construction	470	11.2
Manufacturing	295	7.1
Wholesale trade	143	3.4
Retail trade	426	10.2
Transportation and warehousing, and utilities	396	9.5
Information	52	1.2
Finance, insurance, real estate, and rental and leasing	155	3.7
Professional, scientific, management, administrative, and waste management services	206	4.9
Educational, health and social services	677	16.2
Arts, entertainment, recreation, accommodation and food services	269	6.4
Other services (except public administration)	213	5.1
Public administration	186	4.4
Source: U.S. Census Bureau, Census 2000, Summary File 3, Profile of Selected Economic Characteristics		

LAND PROTECTION AND CONSERVATION

In keeping with the purpose for its creation, management efforts at Sabine National Wildlife Refuge are oriented toward the improvement of habitats under its jurisdiction for the benefit of waterfowl and other migratory birds, wading and shorebirds, threatened and endangered species, and all other native wildlife. The refuge is managed for these goals through prescribed fire, water control structures, and marsh restoration projects that protect adjacent areas from erosion and return the area to a more “natural” hydrology.

EAST COVE UNIT

The East Cove Unit has witnessed high rates of marsh loss over the years, much of it attributed to saltwater intrusion from the Calcasieu Ship Channel and oil and gas exploration. Widespread seismic surveying activities on this unit have altered marsh hydrology and increased wetland erosion. The Cameron Creole Watershed Project was instituted in 1989 to reduce saltwater intrusion on more than 64,000 acres of refuge and adjacent privately owned marsh. A 19-mile protective levee and five water control structures were constructed along the eastern shore of Calcasieu Lake to facilitate water level and salinity management within the marsh.

Currently with the Cameron Creole Watershed Project and other partners, the Service is carrying out a large marsh restoration endeavor, the Cameron Creole/East Cove Unit Marsh Terrace Project. This project features the construction of a lattice of terraces 48,000 feet in total length throughout open water areas of the East Cove Unit (areas that were formerly fresh marsh and have since been converted to open water). The terraces are being constructed in rows running east/west, and are spaced approximately 500 feet apart. The purpose of these terraces is to reduce the fetch of open water, and thus wave action, which in turn will reduce turbidity and allow for the re-establishment of aquatic vegetation. Emergent marsh vegetation will be planted along the edges of the terraces to establish marsh edges and stabilize the terraces.

REFUGE-RELATED PROBLEMS

INTRODUCTION

Marsh loss is the most ominous problem faced by land managers in coastal Louisiana, and the Sabine Refuge is no different. The Service has to stem the tide of marsh loss at Sabine or there may not be a wildlife refuge for future generations to enjoy. Of all the problems faced by the refuge, this is the most expensive to solve; it cannot be done without cooperation from adjacent land owners, state and federal agencies, the academic community, and ultimately the public, which has to fund these measures.

OIL AND GAS ACTIVITIES

General Information

The Fish and Wildlife Service does not hold mineral rights on the majority of the refuge. Subsurface mineral rights were retained by The Texas Company (now the ChevronTexaco U.S.A. Production Company) in 1937 when Sabine National Wildlife Refuge was acquired. The acquisition deed stipulated that oil and gas operations were not to interfere with the refuge purpose, but ultimately stated that the refuge could not prevent the subsurface owner from exercising their rights to access and develop their minerals. A mutually agreed upon special use permit is issued for all oil and gas operations to communicate refuge expectations and environmental concerns to all operating companies. In accordance with current Fish and Wildlife Service policy which is derived from a July 17, 1986, Department of the Interior Solicitors Office Opinion and Louisiana State mineral rights law, the owners of subsurface oil and gas mineral rights must be granted a reasonable and necessary means of extraction and production.

In more explicit terms, the Solicitor's opinion states:

The United States has a number of rights as a surface owner of refuge lands in Louisiana:

1. It may request the mineral owner to alter its proposed operation to accommodate existing and planned uses of the refuge, provided that the burden on the mineral owner is not unreasonable.

2. It may insist that the mineral owner use only the minimum amount of land that is required in order to carry out its operations.

3. The necessary operations that are performed on the refuge must be carried out in a manner which is least injurious to refuge resources.

4. Upon conclusion of each separable phase of operation the mineral owner must restore the surface to its original condition, insofar as is practicable. This will include filling pits no longer required, leveling land, cleaning up spilled oil and salt water, reseeding, and repair or replacement of damaged improvements.

5. Access roads damaged by the mineral operator must be put in a condition for use by the United States, although they need not be completely regraded if damage is recurring and unavoidable.

The United States may not:

1. Charge a mineral operator for excavation of dirt on the lease where the dirt is required in order to carry out the operation.

2. Charge for destruction of timber unless such right was reserved by the United States “grantor”.

3. Interfere with the reasonable and necessary operations of the mineral owner.

Historical Perspectives: Exploration and Production

A total of 107 wells have been drilled on Sabine National Wildlife Refuge since its establishment. The refuge currently has 49 plugged and abandoned wells. There are four production facilities, of which only three are active. Over 100 acres are occupied for oil and gas production and support activities.

Exxon-Mobil has recently completed a three-dimensional (3D) seismic survey of 10,560 acres. Hunt Oil Company completed a 14,000-acre 3D seismic program in 2001. In 1998, the Sabine Refuge had over 90,000 acres covered under a 3D seismic program. Thousands more acres have been surveyed using various techniques on the surface to determine subsurface geological features since about 1945, including gravity meter surveys, seismography, and 2D seismic surveys.

Current Activities: Exploration

ChevronTexaco currently has five companies with leased blocks that occupy portions of the refuge, including: Ballard Exploration Company, Inc., Legacy Resources Company, Goodrich Petroleum Company, Inc., Petrohawk Resources, Inc., and partner company Kaiser-Francis Oil Company-Samuel Gary, Jr. & Associates. There are 32 producing oil and gas wells, and exploration planning for the next five years has included discussions for at least 10 to 12 new wells. In 2006, one well was drilled and at least two wells worked over.

Current Activities: Production

ChevronTexaco has begun major cleanup and proper abandonment activities for the East Mud Lake Field which began producing in the early 1950s, but has not produced in over three years.

Negotiating the cleanup of the East Mud Lake Field with Texaco Exploration & Production Inc., which became ChevronTexaco in October 2001, has been a major project for the last five years. The company has been very receptive and began cleanup immediately after taking over.

In addition, ChevronTexaco and Goodrich Petroleum Company have updated their 20-year-old facilities at the Second Bayou Field to provide more environmentally friendly operations. Modern technology will benefit the refuge, as well as the oil companies.

Mitigation

Eighteen thousand linear feet of planted, earthen terraces were constructed in Units 6 and 7 to mitigate for impacts due to oil and gas activities in 2001. The U.S. Army Corps of Engineers and the Louisiana Department of Natural Resources require compensatory mitigation for acreage loss due to dredge and fill activities in wetlands. Earthen terraces are designed to be a successful mitigation technique to attenuate waves, reduce marsh erosion, and increase marsh/water interface for use by all estuarine dependant species. Other possible benefits of earthen terraces that are currently being researched are increased water clarity that may promote the establishment of submerged aquatic vegetation. An unexpected secondary benefit is that they have provided nesting habitat for seabirds such as least terns, forester's terns, and black skimmers. Terrace construction for 2004 allowed the total linear feet in Unit 6 to exceed 60,000 linear feet.

Contamination Issues

Historically, wells were drilled using open, earthen pits for mud circulation and storage during drilling operations. The drilling mud was oil based and the cuttings that were removed from down hole have been known to contain heavy metals, naturally occurring radioactive material (NORM), and other forms of contamination. These open earthen pits were left in the late 1980s but remain on the refuge. Information exists on the locations of these pits and plans for testing are being considered to try and detect if any leaching or other residual impacts have occurred. ChevronTexaco is currently closing old open pits in East Mud Lake Field, ensuring that they comply with Louisiana State Order 298. Plans are to continue to close all remaining pits on the refuge.

Transmission Pipeline Rights-of-Way

Rights-of-way were issued (or were inherited) for transmission lines that traverse the refuge for the purpose of transporting oil, natural gas, synthetic liquid or gaseous fuels, or any refined petroleum based product. Transmission lines are usually large in diameter and transport product to or from large processing plants. These pipelines do not service mineral production from subsurface minerals, but require a corridor of refuge land for transportation. In contrast, flowlines are usually the smallest in diameter and transport raw product from individual wells, from subsurface mineral production, through the production separation process. Gathering lines, similar to flowlines, usually "gather" the production from multiple wells and transport it to production facilities. Rights-of-way are not issued for flowlines and gathering lines.

Presently, there are nine transmission pipelines (built between 1942 and 1983) that move product from the south to the north of the refuge. These lines do not service producing wells on the refuge. The refuge has more than 40 active flowlines that transport product from private mineral owned wells to their production facilities, with numerous left buried in place from past production activities. Transmission lines traverse approximately 101 miles of the refuge, while flow lines cover approximately 50 miles.

Existing oil and gas transmission lines and their associated rights-of-way on the southwest Louisiana national wildlife refuges that have been in place for decades have become manageable over the years. Their long-term effects on the environment, which have been identified as creating pathways for saltwater intrusion into freshwater marshes, are being indirectly addressed through numerous wetlands management programs and laws such as the Louisiana Coastal Act, the Coastal Louisiana Wetlands Planning Protection and Restoration Act, the North American Wetlands Conservation Act, and many local government and private watershed initiatives such as the Cameron Creole Watershed Management Plan. These laws and initiatives have led to the development of significant wetlands restoration projects which have mitigated the effects of some negative impacts associated with oil and gas transmission lines and associated right-of-ways.

Future Management

Existing oil and gas transmission lines on approved U.S. Fish and Wildlife Service right-of-ways currently within a national wildlife refuge will be managed as per U.S. Fish and Wildlife Service Policy 603 FW 2 in general, and explicitly under section 2.11D, which states:

Existing rights-of-way: We will not make a compatibility determination and will deny any request for maintenance of an existing right-of-way that will affect a unit of the National Wildlife Refuge System unless (1) the design adopts appropriate measures to avoid resource impacts and includes provisions to ensure no net loss of habitat quantity and quality; (2) restored or replacement areas identified in the design are afforded permanent protection as part of the national wildlife refuge or wetland management district affected by the maintenance; and (3) all restoration work is completed by the applicant prior to any title transfer or recording of the easement, if applicable. Maintenance of an existing right-of way includes minor expansion or minor realignment to meet safety standards. Examples of minor expansion or minor realignment include: expand the width of a road shoulder to reduce the angle of the slope; expand the area for viewing on-coming traffic at an intersection; and realigning a curved section of a road to reduce the amount of curve in a road.

New construction for oil and gas transmission line right-of-ways will not be permitted because they can significantly contribute to further land loss on coastal Louisiana national wildlife refuges. Canals built for the construction and repair of oil and gas transmission lines allow saltwater to penetrate further inland, particularly during droughts and storms, which can have severe effects on wetlands (Wang 1987). This is evident for the oil and gas transmission line right-of-ways which were established in accordance with the Federal Department of Transportation and Louisiana Department of Transportation regulations already established on Sabine National Wildlife Refuge. Oil and gas transmission lines constructed since the 1940s are still readily apparent. Compaction and displacement of hydric soils during oil and gas transmission line repair and/or construction reduces water exchange and can result in increased waterlogging and plant mortality (Swenson and Turner 1987). Excavation necessary for oil and gas transmission line construction causes significant hydrological changes. Exposing hydric soil to oxygen changes the natural ecological processes, including chemical transformations, sediment transport, vegetation health, and migration of organisms. Furthermore, by altering salinity gradients and patterns of water flow, the natural process by which coastal marshes are replenished and protected cannot occur (U.S. Army Corps of Engineers 2004).

Restoration of Coastal Marsh

Restoration of coastal marsh is a priority on national wildlife refuges in the Louisiana coastal zone. Approximately $10 million has been spent on the Southwest Louisiana National Wildlife Refuge Complex trying to restore marsh. Extensive changes and alterations due to new pipeline rights-of-

way could negatively affect restoration project predictability and life span. The stability created through these restoration projects could be jeopardized when major hydrologic changes occur due to new pipeline construction. Therefore, managing existing pipelines and rights-of-way in accordance with current Service policy, and state and federal law is permissible under current conditions. Any expansion beyond the current conditions would be an inappropriate use in conflict with the purposes for which the refuge was established, considering the current status of Louisiana's coastal wetlands and the Fish and Wildlife Service's role in managing and protecting this state's coastal resources.

WILDFIRES

Lightning strikes and seismic survey activity are the primary causes of wildfires on the refuge. In recent years drought or dry conditions have disrupted the normally scheduled prescribed burning regime. The Southwest Louisiana Refuges fire team has to spend more time fighting unwanted wildland fires on the refuge and is frequently called upon to fight wildfires in other states. The application of prescribed fire has decreased due to the fire team's increased workload and unsuitable dry weather conditions.

UNAUTHORIZED PUBLIC USE

Of less ominous concern for the refuge is a problem with duck hunters trying to camp on the property the night before a hunt. Sabine has not determined camping to be compatible with its purpose and it has the potential to cause damage to refuge property. To reduce this problem, gates are installed on parking lots and law enforcement officers are warning hunters not to camp on the refuge.

WATER LEVEL MANAGEMENT

Sportsmen have complained of low fish populations in the impoundments. At one time there were larger fish and higher populations in the impoundments, but droughts in the mid-1990s caused water levels to drop and much of that fish population died. Restocking of fish failed in the late-1990s, and the impoundments are now managed at lower water levels for the benefit of wildlife. The reduction of freshwater fishing opportunities in the impoundments is regrettable, but many other freshwater fishing opportunities are available on refuge canals, as well as saltwater fishing opportunities elsewhere on the refuge.

CONSERVATION PRIORITIES

During the week of March 25–29, 2002, the U.S. Fish and Wildlife Service conducted a formal biological review for the Southwest Louisiana National Wildlife Refuge Complex, comprised at the time of Sabine and Cameron Prairie national wildlife refuges (Lacassine National Wildlife Refuge has since been added). A diverse team of Service, university, state, and nongovernmental personnel participated. The review was held as part of pre-planning efforts for preparation of each refuge's comprehensive conservation plan and to determine how the refuges could contribute to numerous system-wide and landscape conservation needs. A formal report was not prepared by the Biological Review Team; rather, the refuge management personnel compiled the report from the many contributors. In a few cases, some recommendations were revised based on refuge personnel's knowledge and experience in managing the refuge; justification of obstacles to implementation of proposed recommendations is discussed within the goals, objectives, and strategies.

The biological review participants identified and prioritized the top five critical biological needs of Sabine National Wildlife Refuge as follows:

1. Maintain and restore marshes.

2. Monitor, inventory, and evaluate marsh restoration.

3. Conduct an elevation study in the impoundments (use best available equipment; more training for staff involved in study).

4. Monitor, control, and when possible, eradicate invasive species to maintain the biological integrity of the refuge. (Remove tallow trees and attempt to restore native rest species including fruit and berry trees. Develop plan to remove hogs.)

5. Continue oversight of oil/gas activities.

III. Plan Development

PUBLIC INVOLVEMENT AND THE PLANNING PROCESS

The process for developing this plan first began in March of 2002 with a biological review conducted by representatives of the Service and conservation partners from McNeese State University in nearby Lake Charles; the Louisiana Department of Wildlife and Fisheries; and the Gulf Coast Joint Venture Office of the North American Waterfowl Management Plan. More than 25 biologists spent a week conducting a critical review of the refuge's existing biological programs and developing a set of recommendations for future desired conditions. In addition, a comprehensive public use review was held in June of 2002 with ten reviewers representing the Service, the Creole Nature Trail, and Louisiana Department of Wildlife and Fisheries. The recommendations of both the biological review and public use review teams helped determine the proposed alternatives, goals, objectives, and strategies found in this document.

A series of public scoping meetings were held to obtain input from the general public. The meetings were held in various communities in Cameron Parish in 2002 as follows: October 1, Carlyss; October 8, Grand Lake; October 10, Cameron; October 16, Hackberry; and October 17, Johnson Bayou. A total of approximately 25 people attended these meetings. On January 16 and February 4, 2003, public open house meetings were held in Lake Charles with a total of 33 people attending. Comment forms were placed in the refuge visitor center and invitations to comment or provide input were issued at various special events. A variety of issues emerged from these meetings and were considered and evaluated during the preparation of this Comprehensive Conservation Plan.

ISSUES AND CONCERNS

PUBLIC COMMENTS

The issues and concerns raised by attendees at the public scoping meetings and open houses are summarized below. The issues include written comments received from eight citizens.

- All visitors, including bird watchers, should be required to pay and have a permit ($5.00 fee). We can all pitch in to keep the usage of the lands in good shape.
- Consider having some type of rotation on the hunting units, be it annually or half the season in these units, and the other half in different units.
- Have a limit on how many shotgun shells can be brought in to hunt with for waterfowl hunting. Start out with a limit of 25 shells per person to see if this brings down the amount of unnecessary shooting. If need be, reduce this limit by say 10 shells.
- Implement a limited deer hunting season for bow hunters on the duck split or before duck season. Manage the deer herd (by allowing the hunt) on a short-time basis (not a month like Cameron Prairie and Lacassine.)
- Allow duck hunting on other days of the week than currently allowed such as Monday, Tuesday, and Wednesday.
- I am in favor of having a minimum and a maximum size limit of bass. Reduce the limit to 5 bass.
- Open the refuge to hunting every day during the September teal season. It was at one time but was discontinued.
- Allow waterfowl hunting on Tuesday, Thursday, Saturday, and Sunday during the regular season to accommodate shift workers who work weekends.

- I appreciate all the hard work by your department and the improvements made at Sabine the last few years. This is the best hunting spot for waterfowl I've ever seen.
- Stock native bass to survive drought conditions and in open marsh.
- Have a small limit like 5 fish to allow for trophy fish.
- Trails need to be dug deeper to help drought conditions.
- You need to look at the boat bay situation at East Cove.
- I have hunted and fished Sabine for 39 years. These are the best years we have ever experienced. It is difficult to find any method of improvement. We now have a relationship with the agents and management that was nonexistent in the past. Keep up the great work.
- Furbearer populations in coastal marshes are cyclic in numbers and during peak levels can produce disastrous effects on plant communities. Does this planning process include a historical review of management practices to control furbearer populations and proposals for future control methods for these species?
- Are the priorities for all management operations given equal values or do certain "IN" activities (such as hunting, fishing, and other public use activities) have priority over other management activities?
- Public use of the refuge has become a giant which can easily get out of hand if the public does not respect what the refuge is and what it stands for in the community. All usages of the refuge are privileges provided to the public, they are not rights. The public are guests to do activities which are not possible without paying on other lands. The refuge provides this without much cost to them. However, these activities need to be monitored, not on a casual basis, but by an active and observant staff.
- The loss in recent years of enough full-time staff with enforcement authority is a major problem which needs to be addressed in planning for the refuge and its future operations. I respect the efforts and activities of present enforcement officers on all refuges but too few cannot do a proper job of protecting a refuge. (The whole enforcement system on refuges needs a major overhaul.)
- Regarding fire management: will the burn plan include an analysis of all requirements of wildlife in the proposed burn area in relation to the time of burning? Does the fire crew and refuge biologist do an immediate post-burn survey over the unit to accurately assess the effects of the fire on wildlife? Do burn plans include a pre-fire assessment of the effects of fire (time, direction, ignition rate, and method) on the wildlife and plants in the unit (should these be included in the objectives of the burn)?
- Grazing as a management tool has fallen into disregard at the refuge during recent years. This usage has a long history in coastal wetlands and when properly used has provided more benefits than losses. Cattle grazing and increased goose usage are closely related in coastal marshes. Does the planning process include proper documentation and evaluation of this practice and its use on the refuge?

BIOLOGICAL AND PUBLIC USE REVIEW COMMENTS

The comments and recommendations of the biological and public use review participants are summarized below.

Habitat and Wildlife

- Restore marshes to freshwater/intermediate type marsh to help achieve coastal restoration statewide objectives.
- Maintain and operate water control structures to limit saltwater intrusion.
- Determine structure needs on the western boundary of the refuge.

- Monitor water quality and salinity.
- Research use of dredge spoil for marsh creation.
- Monitor, inventory, and evaluate marsh restoration
- Manage Impoundments 1A, 1B, and Unit 3 for a more intensive focus on waterfowl and water birds using drawdowns, pumping, early successional vegetation management, and production of valuable submerged aquatic vegetation.
- Utilize drawdowns, prescribed fire, pumping, etc. to promote desirable aquatics and preferred water levels.
- Experiment with terraces in Unit 3. If feasible, drawdown during droughts or at least every four years.
- Provide more intensive and systematic monitoring, recording, inventory, and evaluation of management treatments and wildlife uses to improve adaptive management procedures.
- Employ a biologist to focus on marsh and impoundment management and avian use inventories.
- Develop a high definition vegetation map of the refuge.
- Allocate resources annually for wildlife monitoring, inventory, evaluations, and data recording and archiving.
- Conduct an elevation study in the impoundments (use best available equipment; more training for those involved in study).
- Monitor, control, and when possible, eradicate invasive species to maintain the biological integrity of the refuge (remove tallow trees and attempt to restore native forest species – fruit/berry).
- Develop plan to remove noxious plants and animals.
- Continue oversight of oil/gas activities to include monitoring and inspecting, contaminant sampling, limiting of sites and operational periods to minimize impacts on wildlife, and require mitigation for impacts.

Public Use

- Increase the staff by adding a full-time law enforcement officer, an education specialist, and a volunteer coordinator to improve visitor services.
- Expand and remodel the visitor center to increase space for interpretive exhibits, accommodate large groups such as school or tour buses, and to improve contact with visitors.
- Develop a strong volunteer program to functionally increase staff size and provide support to programs and projects.
- Develop the Friends Group.
- Develop a Visitor Services Plan with recommendations for the safety of visitors.

IV. Management Direction

INTRODUCTION

On national wildlife refuges, the Service manages fish and wildlife habitats by taking into account the needs of all resources in decision-making. First and foremost, however, fish and wildlife conservation assumes priority in refuge management. The National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997, clearly establishes that wildlife conservation for the benefit of present and future generations of Americans is the singular National Wildlife Refuge System mission. *House Report 105-106* accompanying the National Wildlife Refuge System Improvement Act of 1997 states "…the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first."

However, the National Wildlife Refuge System Improvement Act of 1997 also recognizes that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, when determined to be compatible, are legitimate and appropriate public uses of the Refuge System and that these compatible wildlife-dependent recreational uses are the priority general public uses of the Refuge System.

Another requirement of the National Wildlife Refuge System Improvement Act of 1997 is for the Service to maintain the ecological health, diversity, and integrity of refuges. National wildlife refuges in the Chenier Plain of the Gulf Coast include both brackish and freshwater marshes, in addition to coastal prairies, agricultural areas and some woodlands and swamps. Valuable coastal marshes in the region have declined tremendously in quantity and quality over the past century, due to both human and natural causes. To offset these historic and continuing habitat losses within the broader coastal ecosystem, Sabine National Wildlife Refuge and other public lands provide a biological "safety-net" for migratory waterfowl and nongame birds, threatened and endangered species, and resident species.

VISION

Sabine National Wildlife Refuge will maintain, restore, and enhance its unique coastal wetland habitats to provide favorable conditions for improving species diversity and richness of migratory birds and native terrestrial and aquatic species. In cooperation with partners, the refuge will also conserve healthy and viable wildlife and fish populations, thereby contributing to the purpose for which it was established and to the mission of the National Wildlife Refuge System.

Complex staff will manage petroleum infrastructure and activities on the refuge to protect wildlife habitat and water resources, wintering migratory birds, nesting birds, and fisheries. Further, Sabine will provide opportunities for safe, quality, compatible, wildlife-dependent public use and recreation—including environmental education, interpretation, wildlife observation, photography, hunting, and fishing. These activities will promote understanding and appreciation of the U.S. Fish and Wildlife Service and its mission to conserve our Nation's wildlife heritage among refuge visitors and the public at large. Finally, Sabine National Wildlife Refuge will continue to protect its cultural resources in accordance with federal and state historic preservation legislation and regulations.

GOALS, OBJECTIVES, AND STRATEGIES

The goals, objectives, and strategies addressed below are the Service's response to the issues, concerns, and needs expressed by the planning team, Complex and refuge staff, and the public. These goals, objectives, and strategies reflect the Service's commitment to achieve the mandates of the National Wildlife Refuge System Improvement Act of 1997; the mission of the National Wildlife Refuge System; the North American Waterfowl Management Plan and other special purpose management plans; and the purpose and vision for Sabine National Wildlife Refuge. The Service intends to accomplish these goals, objectives, and strategies over the next 15 years.

GOAL A – HABITAT: Maintain, restore, and enhance unique coastal wetland habitats on the refuge to provide favorable conditions to improve species diversity and richness of migratory birds and native terrestrial and aquatic species.

Objective A-1. Hurricane Recovery – Within reason, all accessible, unburied debris deposited by Hurricane Rita, including hazardous materials as well as nonhazardous refuse, rubbish, and wreckage, will be removed from the refuge within five years of comprehensive conservation plan (CCP) approval.

Strategies

(a) – Concentrate initial cleanup efforts on removal of tanks, barrels, drums, and other containers likely to hold hazardous materials and toxic chemicals.

(b) – Utilizing GIS and GPS tools, as well as aerial photography and surveys, conduct mapping and monitoring of cleanup and maintain records and archives, documenting changing extent of debris fields over time, and to measure degree or success of cleanup effort.

(c) – Consult or partner with agencies such as Environmental Protection Agency and Tennessee Valley Authority that have experience in hazardous waste cleanup.

(d) – Emphasize removal of debris from channels or other areas that currently negatively affect desired water movement.

(e) – Continue to monitor and survey specifically for hazardous waste or petrochemical spills and seepage that could damage habitat and wildlife.

(f) – Within two years of CCP approval, conduct a hydrological and feasibility study to evaluate how the plug of hurricane-deposited debris, uprooted vegetation and sediments has affected marsh drainage patterns and determine what should, or can, be done about it.

(g) – Repair 7 miles of damaged levees and 10 miles of damaged canals.

Objective A-2. Impounded Marsh – Once Hurricane Rita recovery operations are complete, focus on improving marsh plant communities and shallow water, increasing waterfowl food production, and providing habitat and sanctuary needs for migrating, wintering, breeding ducks (mottled ducks) and geese of the Chenier Plain system of southwest Louisiana.

Discussion: For more than 40 years, Sabine's three freshwater impoundments—Units 1A, 1B, and 3—have provided habitat for many species of waterfowl, wading birds, shorebirds, and other vertebrates, including mammals, amphibians, reptiles and fish. Management Unit 3 (26,400 acres) is

the largest freshwater marsh remaining in southwest Louisiana. Management units 1A and 1B (5,138 acres and 1,800 acres, respectively) are heavily used by wildlife, especially ducks. Waterfowl foods in Unit 3 occur at densities significantly above the level required for efficient waterfowl use. The target water management level is 1.8 ft to enhance the growth and survival of desirable plant communities for waterfowl. Water depths can be reduced, but only rainfall can increase water levels in these impoundments.

A hydrology feasibility study will need to be conducted to determine what course of action needs to be taken to ensure that Unit 3 is being managed in concert with the remainder of the watershed.

Strategies

(a) – Conduct a hydrology feasibility study to determine how best to manage Unit 3 post-Hurricane Rita. Use engineering studies and recommendations from experts to determine the best course of action for this unit.

(b) – Apply drawdown procedures to Units (impoundments) 1A and 1B. Drawdowns should occur on two to five-year rotations for Units 1A and 1B and to alternate manipulations between units. Drawdown timing should also coincide with drought conditions to improve success.

(c) – Replace 5 water control structures at Units 1A, 1B, and 3.

(d) – Monitoring and evaluation of plant response to management practices should be conducted.

(e) – As other habitats are restored, evaluate need for impoundments and whether or not they still serve an important function on the refuge.

(f) – Use prescribed fire, wildland fire, and salt water as agents of disturbance.

(g) – Manage water levels for optimal utilization for fish and wildlife with primary management actions oriented for the primary purpose for which the refuge was established (migratory birds). An adaptive management strategy will be applied to achieve this end.

(h) – Within five years of CCP approval, write an adaptive water management plan.

(i) – Protect all marshes from excessive saltwater intrusion and fragmentation.

(j) - Monitor and inventory any changes attributed to sea level rise.

Objective A-3. Unimpounded Marsh – Once Hurricane Rita recovery operations are complete, focus on protecting and/or restoring 43,200 acres of intermediate and brackish marsh and continue working toward restoring the emergent marsh and functional value of Unit 3.

Discussion: Sabine contains 91,173 acres of fresh, intermediate, and brackish marshes. These unimpounded coastal marsh habitats are actively managed and restored on the refuge through salinity control, prescribed fire, and construction of terraces. Management of salinities by means of monitoring and use of water control structures is critical to maintaining these marsh habitats. Another important tool is prescribed fire, which is used to periodically rejuvenate unimpounded marsh by restarting plant succession and increasing plant productivity. In addition, in recent years, in cooperation with the Corps of Engineers, the refuge has been actively restoring and re-creating coastal marsh by using approved dredge material from channel dredging to construct linear terraces.

These terraces block wave action that for decades has stirred up sediments, increased turbidity and eroded marsh vegetation. When marsh plants are either planted on or colonize the terraces, coastal marsh restoration is on its way.

Strategies

(a) – Repair as necessary and operate the three Calcasieu/Sabine-23 water control structures (Hog Island Gully, West Cove Canal, and Headquarters Canal) in accordance with the Coastal Wetlands Planning Protection Restoration Act to improve marsh conditions.

(b) – Monitor salinity and vegetative cover throughout the refuge to document changes over the long term that may be occurring on the refuge and develop projects to achieve any preferred conditions or prevent undesirable conditions.

(c) – Continue to plan and implement broad marsh management activities (e.g. construction and operation of water control structures) to maintain or lower salinity in accordance with the Coastal Wetlands Planning Protection Restoration Act and Calcasieu/ Sabine-23 project to improve marsh conditions.

(d) – Continue to support the modeling of potential impacts of future off-site ship channel modifications, oil/gas canals, and loss of freshwater from the Sabine River on the Sabine Lake side of the refuge.

(e) – After multi-agency recommendations are finalized, support placement of structures that will minimize encroachment of saltwater type conditions.

(f) – Continue to construct terraces using dredge material beneficially to convert large open water areas to areas that are productive for submerged aquatic vegetation. Conduct study of hurricane damage to terraces by 2008.

(g) – With partners, use funds from various sources to establish terraces to improve vegetation/water interface.

(h) – Continue innovations with designs of terraces to determine most successful configuration. Keep well-documented records of all phases of construction and beyond. With partners, encourage research and monitoring of success and designs should be continued and/or initiated.

(i) – Monitor the impacts on floral and fauna changes that occur in the impacted areas and assess if any of these changes are attributed to sea level rise.

(j) – With partners, construct and operate a wetland management and restoration research facility.

(k) – Add one permanent, full-time wetland restoration ecologist.

(l) – Use GIS, GPS, and aerial photography/mapping tools to inventory and document changes in marsh communities post-hurricane, specifically acreages of brackish marsh, intermediate marsh, and fresh marsh habitats.

Objective A-4. Water Quality and Quantity Monitoring – Once Hurricane Rita recovery operations are complete, maintain salinity monitoring throughout the refuge at the established discrete salinity

stations (nine locations). Develop new water quality monitoring program within five years of CCP approval. Working through regional solicitor's office, clarify water rights for Complex.

Discussion: Monitoring salinity is crucial to controlling it on the refuge and ensuring that intermediate and brackish marsh are provided the water quality conditions they need to survive and thrive. Throughout southwestern Louisiana, increasing salinity levels from navigation channels and oil/gas development have been a serious problem for freshwater and brackish wetlands. For Sabine, the Calcasieu Ship Channel leading from the Gulf of Mexico into nearby Calcasieu Lake has exposed unimpounded marshes to potentially detrimental salinity levels that must be regulated with water control structures.

Strategies

(a) – When applicable, use state-of-the-art data gathering stations that automatically record salinity, water quality parameters yet to be defined, water levels, and temperature.

(b) – Provide resources to allow for analytical testing of water samples.

(c) – Keep records archived to show trends over time. Update annual records in tabular form to show salinity levels by year.

(d) – Add one permanent, full-time biological technician to monitor water quality and work with appropriate individuals to quantify water rights.

Objective A-5. Fire Management – Use fire as a multipurpose management tool to reduce hazardous fuels and promote habitat diversity as defined in the National Fire Plan. Utilize prescribed fire on approximately 20,000 acres per year.

Discussion: Lightning strikes and seismic survey activity are the main causes of unwanted wildland fires on the refuge. The recent drought has forced the Southwest Louisiana Refuges fire team to spend more time fighting unwanted wildland fires on the refuge and in other states. Thus, there have been fewer prescribed fires at Sabine because of the fire team's increased workload and unsuitable dry weather conditions.

Prescribed fire is one of the principal habitat management tools at Sabine. Between 1984 and 2006, 85 prescribed fires were conducted on 241,304 acres. Eight prescribed fires were conducted in fiscal year 2006. These fires boost plant productivity and reduce the risk of uncontrolled wildfires that could threaten people and property. In fiscal year 2006—a wet one—636 acres burned on the refuge due to wildfire. In 2005, a drier year, 20,229 acres were burned by wildfire.

Strategies

(a) – Update burn plans and Fire Management Plan to include organic matter consumption burns (ground fires in drier conditions) and to meet waterfowl habitat management needs throughout the refuge.

(b) – Update Fire Management Plan within two years of CCP approval to include wildland fire use fires. Updated Fire Management Plan will also reflect post-Rita habitat and facilities conditions.

(c) – Burn management units in different years to lessen impacts on insects and birds.

(d) – Reduce hazardous fuels, and the potential for uncontrollable wildfires using prescribed fire, mechanical or chemical treatments to protect life, property, industrial oil and gas infrastructure and natural resources on the refuge.

(e) – Complex and refuge staff associated with petrochemical spill sites to be burned will be trained within one year of CCP approval.

(f) – Prescribed fires used to treat hazardous material spills will be addressed in the station's Fire Management Plan to minimize damage to the environment.

(g) – Place higher priority on mosaic burns to help decrease impacts to secretive marsh birds.

(h) – Implement the Southwest Louisiana National Wildlife Refuge Complex Fire Monitoring Plan.

(i) – Work with the National Interagency Fire Center, Regional Fire Management staff, area partners and agencies to achieve permission to conduct prescribed fires during National adverse fire conditions.

(j) – Hire six additional fire staff and support equipment and provide office space and bunkhouse space.

(k) – Hire a permanent full-time fire ecologist for the Complex.

Objective A-6. Restoration – Once Hurricane Rita recovery operations are complete, resume beneficial use of dredge material for marsh restoration by restoring 1,500 to 2,500 acres of marsh.

Discussion: In 1990, "checker board" terraces were constructed in ponds along Calcasieu Lake in the West Cove Unit. The terraces, discontinuous low ridges constructed with bottom sediments excavated from adjacent pond bottoms, are designed to reduce wind-related wave intensity, slow water movement allowing fine sediments to settle within the area, provide favorable conditions for submerged aquatic vegetation (SAV) establishment, and increase abundance and habitat of fish and other aquatic species.

Ideal sites for terrace construction are areas where water bodies join or are threatening to merge with another water body. While studies of the benefits of terraces to SAV have been inconclusive to date, unexpected secondary benefits have been documented, including nesting habitat for water-related birds such as least terns, forester's terns, and black skimmers, and improved fish habitat quality.

Strategies

(a) – Require the Army Corps of Engineers to provide only dredge materials that do not exceed contaminant specifications, in accordance with their special use permit.

(b) – Continue water quality sampling and long-term research on development of plant and animal communities at restoration sites.

(c) – Actively participate in short-term and long-term plans of the Army Corps of Engineers for the Calcasieu Ship Channel.

Objective A-7. Habitat Monitoring – Once Hurricane Rita recovery operations are complete, improve and increase capability of refuge to conduct inventories, monitoring, and data analysis of habitat changes in the aftermath of the hurricane, as well as in response to management procedures.

Strategies

(a) – Hire one GS-12/13 biologist with marsh management and avian training backgrounds to focus more on wetland habitat activities and wildlife responses. GIS training and experience will be required of this position.

(b) – Establish habitat sampling procedures to track annual and long-term habitat changes as effects of Hurricane Rita recede over time and in response to refuge programs.

(c) – Utilize aerial and satellite imagery of sufficient fine-scale to type map the refuge—preferably on an acre-by-acre scale of accuracy or better.

(d) – Ensure water gauges at select areas (especially impoundments) are able to record water levels associated with each management strategy.

(e) – Develop proposed projects to use oil and gas mitigation funds to help track response of habitats to restoration and habitat management treatments in Unit 6 (aerial, satellite, and digitizing of images over time).

(f) – Especially within impoundments (Units 1A, 1B, and 3), establish sampling schemes (transects, sampling points, etc.) to be able to monitor and record current plant conditions (to help direct management actions) and to archive the plant community response to hurricane recovery and management treatments. In a standard formal procedure, record management treatments (draw down, water levels, mechanical activities, time-of-year, climatic conditions) in such a manner that they can be repeated and analyzed and evaluated in a more biologically sound/scientific way. Confer with the Service's Wildlife Habitat and Management Office in Jackson, Mississippi, for potential sampling technique and data recording sheets.

(g) – More intensive monitoring of management actions (e.g. controlled and wild fire, drawdowns) in Units 1A, 1B, and 3, particularly in the fresh and intermediate marsh areas, is needed.

(h) – Map refuge habitat types at frequent intervals (e.g. every 5–10 years) with aerial photography.

(i) – Document vegetative response to management actions with early fall vegetative transects or visual mapping.

(j) – Maintain records of all management actions (e.g., burning, structure operation, or structure/levee repairs).

(k) – Encourage partners to conduct research and monitoring on changes attributed to global warming and sea level rise.

GOAL B – FISH AND WILDLIFE MANAGEMENT: Maintain healthy and viable wildlife and fish populations on the refuge to contribute to the purpose for which it was established and to the mission of the National Wildlife Refuge System.

Objective B-1. Migratory Waterfowl – Once Hurricane Rita recovery operations are complete, provide 125,790 acres of diverse marsh and open water habitats for migrating and wintering waterfowl to contribute significantly to the population and habitat objectives addressed in the Gulf Coast Joint Venture Chenier Plain Initiative. Population objectives of the plan include 4.5 million ducks and 500,000 geese with foraging habitat provided in the coastal marshes.

Discussion: Sabine National Wildlife Refuge was established in the 1930s to protect wintering populations of migratory waterfowl and their habitat, and more than 60 years later that remains the refuge's primary focus. At least 20 species of ducks—including gadwall, green-winged teal, blue-winged teal, American wigeon, mallards, and ring-necked ducks—winter at Sabine. In recent years, aerial surveys have recorded more than 100,000 ducks on the refuge, and once over 200,000. Gadwall, green-winged teal and lesser snow geese are the most abundant waterfowl species on the refuge, averaging almost 25,000 gadwall and 10,000 green-winged teal and snow geese, respectively, over the last decade.

Strategies

(a) – Aggressively use fire to create a mosaic of vegetative habitats throughout the refuge.

(b) – Provide one to two grit sites for geese, using high quality grit. Provide sanctuary around these sites.

(c) – Develop a partnership between the refuge and the research community to promote monitoring and research to determine the most effective methods for waterfowl management.

(d) – Record all management actions and implement adaptive management strategies to evaluate food production and wildlife response, and modify management actions to improve wildlife habitat.

(e) – Conduct waterfowl surveys on a unit-specific and species-specific basis from September through February.

(f) – Continue waterfowl surveys to include the entire Southwest Louisiana National Wildlife Refuge Complex to determine and record trends in waterfowl distribution.

Objective B-2. Mottled Ducks – Once Hurricane Rita recovery operations are complete, with partners, support mottled duck banding activities and provide preferred mottled duck breeding and nesting habitat.

Discussion: The mottled duck is a dabbler native to the American South and a close relative of the mallard duck. This year-round resident nests in coastal marshes and lagoons along the Gulf Coast. Its diet consists mostly of aquatic invertebrates with lesser quantities of seeds, green plant matter and fish. The Louisiana Chenier Plain population estimate is about 170,000 birds, making this region one of the most important in the world for this species. Mottled ducks must meet all their life cycle requirements from their year-round home of Gulf Coast marshes and associated agricultural habitats. These habitat requirements vary seasonally. As such, special consideration is warranted to ensure that the unique needs of this species are met.

Mottled ducks have a long potential nesting period, from February through mid-July, and as a result frequent renesting attempts are common. Typical mottled duck nesting habitats are cordgrass ridges and other elevated sites within coastal marsh complexes, and cattle pasture and rice production zone

of the former coastal prairie. Mottled ducks frequently select nest sites with some overhead cover, but typically abandon sites once they are overgrown with baccharis, willow, or Chinese tallow.

Strategies

(a) – With partners, conduct a research study to survey the ridge areas of the refuge to determine if preferred nesting sites exist and if they do, document nesting success. Such information is needed before modification of brushy/scrub vegetation, as these plant communities may be key to nesting.

(b) – Conduct nocturnal surveys to determine mottled duck brood success.

(c) – Partner with universities and Louisiana Department of Wildlife and Fisheries to obtain a literature search of upland/wetland habitat nesting/brood conditions preferred by nesting mottled ducks.

(d) – Determine need for some predator control (furbearer and reptiles) in key areas where mottled duck nests are abundant, but nest success is less than 15 percent.

(e) – Continue banding efforts on the refuge.

Objective B-3. Shorebirds – Once Hurricane Rita recovery operations are complete, resume providing shorebird habitat, contributing to the goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan.

Discussion: The northern Gulf coast provides critical habitat for both migrating and wintering shorebirds. Mudflat habitat provided through moist-soil management is particularly valuable. Southbound migration starts in early July, peaks August through September, and usually ends by mid-October. Hydrologic modification and traditional lack of rainfall in late summer and fall in the Coastal Prairie physiographic area leads to a severe shorebird habitat shortage. If adequate flood water is impounded until fall migration begins in July, some of the best shorebird habitat along coastal Louisiana may be provided.

Over 30 shorebird species utilize Sabine during their migration in the spring and fall. Dowitcher species are the most abundant, with black-necked stilts next, and small shorebirds including sandpipers and plovers, third in abundance. Other species include the American avocet, yellowlegs, willet, dunlin and killdeer.

Strategies

(a) – Increase late summer/fall foraging habitat for shorebirds consistent with the goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan.

(b) – Continue an International Shorebird Survey along levees bordering impoundments to track occurrence, relative abundance, and response to management regimes.

(c) – Coordinate data transfer to the Joint Venture Office in Vicksburg.

Objective B-4. Colonial Waterbirds – Once Hurricane Rita recovery operations are complete, identify and protect nesting colonies of colonial waterbirds from disturbance.

Discussion: Many species of colonial waterbirds are present at Sabine year-round. Great egrets,

white and white-faced ibis, and roseate spoonbills are the most abundant wading birds on the refuge and feed throughout the marshes during the winter months. Herons, egrets, cormorants, and other species nest in trees and shrubs within Management Units 1, 1A, and 3. There are five active rookeries on the refuge. Favored nesting areas include islands and abandoned levees. During the 1990s as many as 5,000 white and white-faced ibis nested in bullwhip marsh on Unit 1B.

Strategies

(a) – Survey monthly between March and June to determine the location and species composition of each rookery and determine potential disturbance factors and minimize problems as much as possible.

(b) – Annually determine locations of nesting colonies and as best as possible estimate the number of pairs for each species present at each colony. Additional monitoring may not be necessary unless a specific need is identified to address other management activities.

Objective B-5. Marsh Birds – Once Hurricane Rita recovery operations are complete, resume maintaining 125,790 acres of diverse marsh plant communities to support marsh birds.

Discussion: The term marsh bird, as used in the North American Waterbird Conservation Plan (NAWCP), includes a variety of species from several different families of birds, such as rails, grebes, bitterns, rails, coots, and gallinules. The Sabine Refuge provides excellent foraging and nesting habitat for a variety of marsh bird species. High-conservation priority marsh bird species known or expected from Sabine include black rail, American bittern, king rail, yellow rail, sandhill crane, least bittern, and purple gallinule. Purple gallinules, common moorhens, and least bitterns breed on the refuge.

Prescribed fire is a frequently used management tool in marsh ecosystems. The effects of prescribed fire on nesting and wintering marsh birds needs further study. The effects of certain other wildlife management measures on marsh birds, such as the timing and extent of water drawdowns or input, also deserve further investigation.

Strategies

(a) – Determine marsh bird use of refuge habitats, with special emphasis on black and yellow rails and least bitterns.

(b) – Establish sampling locations in areas most likely to support marsh habitats for summer, migration (spring and fall), and winter secretive marsh bird counts focusing on black rail, king rail, least bittern, and American bitterns.

Objective B-6. Nongame Migratory and Resident Landbirds — Once Hurricane Rita recovery operations are complete, the refuge will continue and enhance its role in the conservation of nongame birds in the Southeast United States, and will focus on surveying, inventorying, and monitoring of all groups, and will contribute to the goals of the Gulf Coast Joint Venture, Partners in Flight and other plans.

Discussion: Concerns about unfavorable population trends for neotropical migratory land birds led to the formation of Partners in Flight (PIF), a nongovernmental agency dedicated to arresting those declines. Though the initial focus of PIF was on long-distance neotropical migrants, the group's emphasis has expanded to encompass nearly all species of resident and migratory land birds. Land

birds as defined by PIF include passerine birds (songbirds), woodpeckers, raptors, cuckoos, and other bird species besides waterfowl, waterbirds, and shorebirds.

Seventy-five species of migratory songbirds use Sabine's levees during spring migration. In addition, several species of passerines breed and nest on levees during the summer months. Belted kingfishers and eastern kingbirds perch on trees and power lines next to State Highway 27. The refuge hosts two Christmas bird counts and conducts a breeding bird survey route each year.

Strategies

(a) – Remove exotic invasive species such as tallow and chinaberry trees from levees. Maintain shrubs that support fleshy-fruit and cover for transient landbirds.

(b) – Maintain existing acres of open grassy-herbaceous dominated ground conditions through the next 15 years to support priority grassland bird species.

(c) – Determine the location of any existing coastal prairie sites and promote the maintenance and development of grassy-herbaceous ground cover.

(d) – Survey/inventory/monitor grassland bird populations using area searches, transects and develop protocols (project prairie bird) focusing on wintering species.

Objective B-7. Alligators – Once Hurricane Rita recovery operations are complete, in coordination with Louisiana Department of Wildlife and Fisheries, monitor alligator numbers, establish a desirable alligator density objective, and set annual harvest quotas.

Discussion: American alligators are opportunistic carnivores and a top predator on the refuge. Smaller alligators (less than five feet long) primarily feed on crustaceans, fish, and insects. Larger alligators primarily feed on mammals (nutria and muskrat), birds, fish, reptiles, and crustaceans. The refuge's annual alligator harvest takes place in September. Harvest limits and dates are set by the Louisiana Department of Wildlife and Fisheries by considering a number of factors, including habitat type, annual productivity, and harvest data from previous years; in some instances the regulations on Sabine are more restrictive. Sabine's alligator harvest is a sustained yield harvest, meaning that smaller alligators which grow into the harvested size class during the year replace the animals taken each year.

Strategies

(a) – Work with the Louisiana Department of Wildlife and Fisheries utilizing their annual harvest recommendation (standard and bonus tags) and customized harvest strategies to achieve and maintain target density levels.

(b) – Continue to partner with the Louisiana Department of Wildlife and Fisheries to conduct intensive aerial alligator nest surveys and furnish a survey report to the Refuge Manager.

(c) – Refuge personnel will monitor the annual harvest of alligators, collecting all data necessary to make sound biological decisions and adjust harvest strategies accordingly.

(d) – Continue prohibition of alligator egg collection.

(e) – Establish a positive impact on the refuge's relationship with the local public and governing body. The cultural heritage of alligator harvesting in the local community will be maintained.

Objective B-8. Impoundment Fisheries – In cooperation with partners, once Hurricane Rita recovery operations are complete, or within 5 years of CCP approval, manage habitat consistent with the purpose of the refuge; also resume monitoring and seeking ways to improve water quality and fishery resources.

Discussion: Impoundments on the refuge are popular with anglers. In cooperation with the Louisiana Department of Wildlife and Fisheries, the refuge actively manages sport fisheries in its impoundments (Units 1A, 1B, and 3). Management tools include stocking, electroshocking surveys, and creel surveys. Sport fish in these impoundments include largemouth bass, bluegill, redear and warmouth sunfish, black crappie, and channel catfish.

Strategies

(a) – Construct terraces in areas of high turbidity to reduce wave action.

(b) – Develop a project to dredge and maintain canals.

(c) – Maintain impoundment levees and water control structures to prevent breaching and pool drainage, as long as it coincides with overall habitat management plans.

(d) – Develop and implement plan to inspect levee integrity.

(e) – Maintain water in the pools (especially Unit 3) as deep as possible for as long as possible to create a more stable environment that is conducive to fish production.

(f) – Establish water management plan that meshes needs of fish with other pool wildlife.

(g) – Continue to coordinate with federal and state hatcheries when fish stocking is necessary from droughts and saltwater intrusion.

(h) – Sample fish stocks through electrofishing when possible since this activity is dependent upon water level and boat access.

(i) – Conduct creel surveys and collect harvest data.

(j) – Continue to calculate Proportional Stock Density (PSD), an index of population structure, using data from Strategy (i).

(l) – Continue to establish length or slot limits on largemouth bass if PSD calculations indicate need.

Objective B-9. Undesirable Animals – Once Hurricane Rita recovery operations are complete, the refuge will intensively control certain wildlife populations as needed to achieve habitat and population objectives.

Discussion: The two most undesirable animals at Sabine are nutria and feral swine. Nutria are the most common invasive animal on the refuge. This rodent, introduced from South America, was first trapped on the refuge in 1941–42. Numbers increased dramatically in 1954 and are now a problem in some years. The nutria has displaced the native muskrat in many of Louisiana's coastal marshes

and, at high densities, nutria can harm fragile marshes. When warranted, harvest is used to control the population.

Feral hogs are common at Sabine and can be detrimental to nesting bird success. These hogs degrade habitat and can contribute to land loss by damaging healthy plants that hold the soils in many areas together. At present, no harvest of feral hogs is conducted on the refuge.

Strategies

(a) – Follow Animal Control Plan.

(b) – Continue to maintain trapping as a permitted activity to benefit native habitats, wildlife, and to provide for the safety of visitors.

(c) – Continue removal of nuisance animals such as nutria or feral hogs to improve biological conditions. This will be allowed dependent upon the refuge's capability to manage such activities.

(d) – Explore the feasibility of providing a feral hog hunting program.

Objective B-10. Diamond-backed Terrapins – Once Hurricane Rita recovery operations are complete, resume protection of diamond-backed terrapin populations on Sabine National Wildlife Refuge.

Discussion: The diamond-backed terrapin is a medium-sized turtle (4–9 inches long) whose preferred habitats include coastal marshes, sheltered coves, tidal channels fringed by cordgrass, and lagoons behind barrier beaches. It has an unusually sculptured shell that is greenish or yellowish on the bottom, plates that bear deep growth rings, black prominent eyes and light-colored jaws. Females are twice as large as males and mature more slowly. In the southern reaches of their range, like the Gulf Coast, they nest in April or May.

Strategies

(a) – Protect nesting habitat along Calcasieu Lake from disturbance.

(b) – Continue to enforce the existing ban on commercial crabbing and crab pot use to protect terrapins from drowning in traps, especially at the mouths of rivers, bayous, and creeks.

Objective B-11. Wildlife Inventory, Census, And Survey – Once Hurricane Rita recovery operations are complete, improve and increase capability of refuge to conduct inventorying, monitoring, and data analysis of management procedures and subsequent wildlife responses to water and plant management regimes.

(a) – Inventory and monitor wildlife responses and uses of refuge habitats with biologically sound, repeatable methods that provide results capable of enabling better adaptive management feedback and tracking of objective(s) management.

(b) – Within three years of completing Hurricane Rita recovery operations, update the current Inventory and Monitoring Plan to follow in collecting and archiving data used to benefit the long-term management of the refuge habitats and fish and wildlife resources.

(c) – Aerial waterfowl inventories should continue to be conducted, by unit, at least every month from September through February or March. At a base minimum, aerially inventory the refuge during the official mid-winter survey period.

(d) – Strive to coordinate waterfowl surveys with any existing state surveys.

(e) – Strive to take advantage of helicopter contracts under the fire management program to conduct waterfowl surveys using Refuge Operation funding.

(f) – Explore opportunities to utilize a pilot/biologist to cover most of the aerial work for all refuges in Louisiana or at least coastal Louisiana.

(g) – Continue to conduct nongame bird inventories annually using standard procedures.

(h) – Continue to survey herpetological species and provide data to state and other programs (e.g. Louisiana Amphibian Monitoring Program, etc.).

(i) – Use more scientific, consistent and repeatable procedures to inventory wildlife responses (sampling schemes, etc.).

(j) – Archive data in a standardized format. In all inventory/monitoring/evaluation procedures, maintain accurate records of methods, timing, conditions, etc. and place pertinent procedures and results in the annual narrative, so work can be repeated in a more scientific and standardized manner.

(k) – Operation funds should be dedicated to performing basic inventories/monitoring needed.

(l) – Pursue use of oil and gas mitigation funds to help aerially inventory wildlife responses to mitigation activities such as marsh restoration treatments.

GOAL C – OIL AND GAS INFRASTRUCTURE AND ACTIVITIES: Manage petroleum infrastructure and activities to protect habitat, wintering migratory birds and nesting birds.

Objective C-1. Protection and Management – Increase protection and management of petroleum activities to minimize impacts to migratory birds, fish, and other wildlife and their habitats.

Discussion: Sabine National Wildlife Refuge has never owned subsurface mineral rights and has learned to coexist with oil and gas exploration and extraction since its very inception. While activities and infrastructure associated with oil/gas development do have a variety of adverse impacts on refuge habitat and wildlife, these impacts can be substantially mitigated through proactive planning, cooperation with oil/gas companies, and remediation. Oil and gas exploration companies now use seismic surveys to detect petroleum resources. These surveys can temporarily disrupt habitat and disturb wildlife. Production wells may cause localized contamination and ring levees and roads displace habitat and can serve as avenues for the spread of nonnative vegetation like Chinese tallow. Future management for existing oil and gas transmission lines and operations will be managed per Fish and Wildlife Service Policy. (Reference Fish and Wildlife Manual FWS 603, Section 2.11 D and Chapter II of this Comprehensive Conservation Plan, Refuge-related Problems, Oil and Gas).

Oil and gas policy is described in Chapter II.

Strategies

(a) – When possible, use pre-existing sites for proposed exploration wells and storage facilities.

(b) – Require all spills of any quantity to be reported to the refuge so proper and prompt cleanup can be assured.

(c) – By 2015, update the Oil and Gas Management Plan.

(d) – Ensure all future management for existing oil and gas transmission lines and operations are managed per Fish and Wildlife Service Policy. (Reference Fish and Wildlife Manual: FWS 603, Section 2.11 D and Chapter II of this Comprehensive Conservation Plan, Refuge-related Problems, Oil and Gas.) All new non-refuge mineral owners requests for petrochemical transmission infrastructure will be prohibited.

(e) – Continue to implement policy of no drilling or other major oil and gas activities between October 16 to March 14 to avoid disturbance of wintering migratory birds.

(f) – Maintain existing petrochemical infrastructure in accordance with state and federal laws. Prohibit all new non-refuge mineral owners' requests for petrochemical transmission infrastructure.

(g) – Staff associated with oil and gas spill sites will be trained to facilitate remediation within one year.

(h) – Add one term employee to assist current oil and gas specialist with oil/gas management throughout the Complex.

(i) – Continue to implement current Fish and Wildlife Service and Complex policy on denying new non-refuge mineral owners requests for oil and gas transmission lines,

Objective C-2. Reclamation – Increase surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species.

Discussion: As the surface owner, Sabine Refuge has the right to require any old, out-of-use equipment and wells that are not in production to be removed so that sites can be returned to wildlife habitat.

Ring levees built around wells have typically been left behind by oil companies when extraction ceases and the well is abandoned. The ring levees then become nuisances because they displace native habitat and are reservoirs of nonnative and invasive species like Chinese tallow.

Strategies

(a) – Obtain at least a one-to-one (1:1) acreage ratio to mitigate oil and gas activities with emphasis on marsh protection and restoration.

(b) – Continue to require prompt site remediation and restoration on oil or gas activity sites.

(c) – Continue to require cleanup of old sites.

(d) – Identify wells that need to be plugged and abandoned, remnant equipment that needs to be removed and possible contaminant issues and communicate these needs to the responsible oil and gas company.

(e) – Continue to add to the database that tracks well status and pipeline locations, along with current ownership.

GOAL D – PUBLIC USE MANAGEMENT: Provide opportunities for safe, quality, compatible, wildlife-dependent public use and recreation—including environmental education, interpretation, wildlife observation, photography, hunting, and fishing—which will promote understanding and appreciation of the United States Fish and Wildlife Service and its mission.

Objective D-1. Visitor Services – Within three (3) years of finishing Hurricane Rita cleanup operations, complete steps to enhance the refuge's infrastructure and operations to provide for quality, wildlife-dependent public use.

Discussion: Sabine National Wildlife Refuge is one of the premier attractions along the Creole Nature Trail (designated an All American Road), receiving about 300,000 visitors a year. These diverse visitors engage in various forms of wildlife-dependent recreation, including wildlife viewing, fishing, shrimping, crabbing, and hunting. In addition, each year hundreds of young pupils from area schools visit the refuge.

Strategies

(a) – Within 8 years of concluding hurricane cleanup at Sabine Refuge, develop an up-to-date step-down Visitor Services Management Plan for the Southwest Louisiana National Wildlife Refuge Complex that includes recommendations for wildlife-dependent recreation. The Visitor Services Plan will encompass environmental education, interpretation, wildlife observation and photography and outreach.

(b) – Through partnerships, continue to improve ability to obtain accurate visitor counts and projected visitation, applying statistical methods.

(c) – Improve quality and quantity of information about the refuge.

(d) – Revise and update a step-down Law Enforcement Plan for the Complex by 2008.

(e) – Work with state to standardize all highway signs regarding appearance and information; use Sabine National Wildlife Refuge on all signs.

(f) – Keep public use areas clean and well mowed.

(g) – Hire one permanent full-time law enforcement officer.

(h) – Hire a permanent, full-time Park Ranger (Public Use) for visitor services (environmental education, interpretation, etc.) to work under the direction and guidance of the Complex Outreach Coordinator.

(i) – Replace hurricane-damaged restrooms at the Wetland Walkway and add restrooms to the North-line, Hog Island Gully, and West Cove public use areas.

(j) – Repair or replace hurricane-damaged boardwalks, hard surface trails, observation towers, signs, and interpretive materials associated with these structures.

(k) – Repair 4 acres of public use parking lots and resurface 2 acres of parking areas. Replace Hog Island Gully parking lot.

(l) – Replace 5 public use bridges.

(m) – Replace all entrance signs at Headquarters Area and public use sites.

Objective D-2. Hunting Opportunities – Once Hurricane Rita recovery operations are complete, improve hunting opportunities that are compatible with the purpose of the refuge.

Discussion: Hunting of waterfowl is permitted in designated areas at Sabine. During the 1993–1994 through 2004–2005 waterfowl seasons, the refuge attracted an average of 3,166 hunters annually. In recent years, hunting of ducks, geese, and coots has been allowed on Wednesdays, Saturdays, and Sundays during the state waterfowl seasons set by the Louisiana Department of Wildlife and Fisheries. This CCP recommends adding one day (Tuesday) to the weekly hunting schedule, in coordination with Lacassine Refuge, the other refuge in the Southwest Louisiana Refuge Complex that permits waterfowl hunting. All hunters would be required to have a refuge-issued permit.

Strategies

(a) – Provide up to 50,000 acres or 40% of the refuge for waterfowl hunting.

(b) – Increase waterfowl hunting opportunities from three days per week to four days per week.

(c) – Continue providing sanctuary with minimal human disturbance three days per week.

(d) – Continue restrictions on motors and sizes, utilizing only trolling motors and push poles in marsh, and prohibiting the use of permanent blinds.

(e) – Initiate permit drawings if conditions require them.

(f) – Continue youth waterfowl hunting days as set by Louisiana Department of Wildlife and Fisheries.

(g) – Continue to monitor potential for hunting of deer and feral hogs. If it is determined that a viable hunting program for either of these species can be established, then the refuge will be opened to big game hunting after updating the Refuge Hunt Plan and appropriate notification is published in the Code of Federal Regulations, Title 50.

(h) – Monitor potential for feral hog hunting. If it is determined that a viable hunting program for this species can be established, then the refuge will be opened to this hunt after updating the Refuge Hunt Plan and appropriate notification is published in the Code of Federal Regulations, Title 50.

(i) – Monitor potential for deer hunting. If it is determined that a viable hunting program for this species can be established, then the refuge will be opened to this hunt after updating the Refuge Hunt Plan and appropriate notification is published in the Code of Federal Regulations, Title 50.

(j) – Update the Hunt Plan, complying with current Service policy, by FY 2008.

Objective D-3. Fishing Opportunities – Once Hurricane Rita recovery operations are complete, provide increased fishing opportunities for families to experience compatible wildlife-dependent recreation.

Discussion: Fishing is permitted on designated waterways at Sabine. Fishing with rod and reel, pole and line or jug and line is permitted; use or possession of other gear is prohibited. Bank fishing at recreation areas along State Highway 27 is permitted year-round, but on the rest of the refuge, fishing and public access is permitted from March 15 through October 15. Units 1A and 1B are open to nonmotorized boats only. Aside from Management Unit 3, trolling motors only are allowed in refuge marshes.

Strategies

(a) – Increase public access through improvements to the canal system when compatible with the purpose of the refuge.

(b) – Continue to allow fishing from March 15th to October 15th each year.

(c) – Upgrade existing boat roller/sling systems and establish new one(s) at water control structures.

(d) – Improve parking/launching facility at Unit 1A utilizing partnerships for obtaining funding to provide additional fishing opportunities.

(e) – With partners, strive to keep fishing areas clean through a combination of education (signage) and litter pickup.

(f) – Assess the feasibility of allowing commercial guiding on the refuge. If guiding is allowed, it would be under the auspices of the Recreation Fee Demonstration Program.

(g) – Assess the feasibility of enrolling in the Recreation Fee Demo program which allows fees to be charged for facility use. The proceeds from this program are allocated to improve visitor facilities.

(h) – With partners or other Complex refuges, sponsor a youth fishing activity during National Fishing Week.

(i) – Repair or replace all hurricane-damaged recreational boat docks, fishing piers, boat ramps and parking areas at North-line, Hog Island Gully, and West Cove public use areas.

Objective D-4. Wildlife Observation and Photography – Once Hurricane Rita recovery operations are complete, enhance existing opportunities for wildlife observation and wildlife photography by upgrading facilities throughout the refuge over the life of the plan.

Discussion: Sabine has two wildlife observation trails (the Wetland Walkway Trail and the Blue Goose Trail) and two roadside “scenic overlook” viewing areas. Between 2000–2005, 85,734 visitors walked these trails annually. The refuge has also established several nonmotorized boating areas that allow the public to view and photograph wildlife in areas undisturbed by motorized traffic. In cooperation with the Creole Nature Trail, the refuge built two roadside “scenic overlooks” beside State

Highway 27. These areas allow visitors to the refuge to stop and observe coastal marsh habitats and the wildlife inhabiting them without having to leave their vehicles.

Strategies

(a) – Initial focus of efforts should be on repair and/or replacement of facilities damaged during Hurricane Rita, e.g. trails, boardwalks, restroom facilities, observation platforms, and parking lots.

(b) – Partner with others to promote wildlife observation opportunities.

(c) – Work with partners to sponsor refuge photo contest.

(d) – Work with local photographer to generate list of quality photo spots.

(e) – Allow commercial guiding for ecotourism, including birding and other nonconsumptive wildlife and recreational activities. Each guide would be covered by a special use permit.

Objective D-5: Environmental Education and Interpretation – Once Hurricane Rita recovery efforts are complete, coordinate with and complement other refuges within the Complex to implement environmental education and interpretation.

Strategies

(a) – With partners such as the Creole Nature Trail Board of Directors and Complex Friends Group, find a volunteer cadre to manage the environmental education program within the Complex for a variety of audiences.

(b) – With partners, develop kits and material for environmental education, conduct teacher training, and provide kits/materials to the teachers on a check-out basis.

(c) – Use interns and Student Temporary Employment Program hires to develop and conduct environmental education programs.

(d) – As the outdoor interpretive program is enhanced, the following themes/topics should be considered:

- the purpose/importance of this refuge for migratory waterfowl
- management of wetlands
- invasive species management
- national wildlife refuges in Louisiana
- impacts of hurricanes on wildlife habitat
- oil and gas infrastructure activities
- research activities and results
- wetland restoration projects and success stories
- effects of global warming and sea level rise and the importance of the refuge to restore wetlands to help combat coastal land loss

Objective D-6. Friends, Volunteers, Partners, Interns – Once Hurricane Rita recovery operations are complete, provide additional opportunities for Friends, volunteers, partners and interns to assist the refuge.

Strategies

(a) – Nurture and strengthen the Southwest Louisiana National Wildlife Refuge Complex Friends Group.

(b) – Continue to cooperate closely with all partners and volunteers; work closely with them to help manage a volunteer program.

(c) – Identify projects that can be done by Friends and volunteers; develop specific job descriptions and timelines.

(d) – Promote the need for Friends and volunteers through local media.

(e) – Provide 5 recreational vehicle spaces with utility hookups for volunteer, intern, and other partner housing.

GOAL E – CULTURAL RESOURCES: Protect refuge cultural resources in accordance with federal and state historic preservation legislation and regulations.

Discussion: With the enactment of the Antiquities Act of 1906, the federal government recognized the importance of cultural resources to the national identity and sought to protect archaeological sites and historic structures on those lands owned, managed, or controlled by the United States.

The body of historic preservation laws has grown dramatically since 1906. Several themes recur in the laws and the promulgating regulations. They include: (1) each agency is to systematically inventory the "historic properties" on their holdings and to scientifically assess each property's eligibility for the National Register of Historic Places; (2) federal agencies are to consider the impacts to cultural resources during the agencies' management activities and seek to avoid or mitigate adverse impacts; (3) the protection of cultural resources from looting and vandalism is to be accomplished through a mix of informed management, law enforcement efforts, and public education; and (4) the increasing role of consultation with groups, such Native American tribes and African American communities, to address how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups.

The objectives and strategies below outline the Service's attempt to achieve its mandated historic preservation responsibilities in a way consistent with the agency's and the refuge's mission.

Objective E-1. Survey – Within three (3) years of completing Hurricane Rita recovery operations, assess the feasibility of conducting a refuge-wide archaeological survey.

Strategies

(a) – Contact the State Historic Preservation Officer to determine if any known archaeology sites exist within the vicinity of the refuge.

(b) – Determine the cost of conducting the survey and seek resources to accomplish the work.

(c) – Consult the Regional Preservation Officer for guidance.

Objective E-2. Education – Within five (5) years of completing Hurricane Rita recovery operations, develop and implement an educational program that will provide an understanding and appreciation of the refuge's ecology and the human influence on the region's ecosystems.

Strategy

(a) – Work with local ethnic groups (Native American, African American, Creole, Cajun, etc.) to develop an education program regarding their cultural heritage and history.

Objective E-3. Cultural Resources Management Plan – Within 5 years of completing Hurricane Rita recovery operations, develop a step-down Cultural Resources Management Plan.

Strategy

(a) – Consult the Regional Historic Preservation Officer for guidance.

GOAL F – EAST COVE UNIT: Utilize water control structures to restore the area to a healthy marsh with good vegetation cover important to certain fin and shellfish species and dabbling waterfowl groups.

Objective F-1. Intermediate Marsh Restoration – Operate gates to restore preferred vegetated plant communities associated with intermediate or possibly slightly brackish environs. Evaluate use of terraces to improve vegetation of open-water areas.

Discussion: The East Cove Unit contains almost 15,000 acres of brackish and salt marsh that is closely managed by water control structures to preserve a balance between salt and fresh water. Salinity is continuously monitored and water levels managed to restore and maintain the historic marshes destroyed by saltwater intrusion. The East Cove Unit is part of the Cameron Creole Watershed Project, a cooperative effort among local, state, and federal agencies and the private sector to restore 64,000 acres of marsh in Cameron Parish. Water level and salinity management on the East Cove Unit are based on the 1987 Resource Management Plan for Cameron Creole Watershed, established by the Cameron Creole Advisory Committee. Annually, salinities are recorded biweekly at 28 stations throughout the marsh, and are averaged to compare seasonal fluctuations from year to year. Water salinities within the Cameron Creole Watershed are directly but inversely correlated to seasonal rainfall—as rainfall decreases, salinity levels increase.

Strategies

a) – Manage East Cove Unit in accordance with Cameron Creole Watershed Management Plan adopted in 1987.

(b) – During periods of very high salinity in the Calcasieu Lake area, keep gates closed-or in an almost closed condition.

(c) – Monitor effectiveness of terraces and record/report results.

(d) – Work with state and national marine fisheries agencies to be sensitive to the needs of marine fin fish/shellfish, but not to the detriment of restoring sites as outlined in the 2050 Coastal Restoration Plan.

(e) – Add two permanent full-time employees for main Sabine unit and East Cove unit.

Objective F-2. Sanctuary – Continue to monitor and evaluate the need for sanctuary in the East Cove area and minimize detrimental waterfowl disturbances.

Discussion: No hunting for waterfowl or other game is permitted in the East Cove Unit at the present time. However, the unit is open for other public uses, including fishing, year-round, except during the state's waterfowl hunting season and when the Grand Bayou Boat Bay is closed to provide some sanctuary in the area. Public use of the unit is restricted to boats only; no walking, wading, or climbing in or on the marsh, levees, or structures to fish, cast net, or crab is allowed.

Strategies

(a) – Limit use of motorized boats in the area (time/space).

(b) – Continue with the present policy of no hunting at the site, but reevaluate the possibility of limited waterfowl hunting within the life of the plan.

Objective F-3. Invasive Plant Species – Monitor the East Cove Unit for invasion of exotic plant species with special emphasis on giant salvinia.

Discussion: Giant salvinia, a native of Brazil, was first discovered growing in the wild in North America only about five years ago; this invasive exotic has already infested a number of southern states. It can spread swiftly to cover the surface of lakes and streams, forming floating mats that shade out and displace important native plants by reducing the oxygen content and degrading the water quality for fish and other aquatic organisms. It has almost no value as a waterfowl food or fish habitat and can outcompete native plants that do provide food and aquatic habitat.

Strategies

(a) – Conduct 2–3 annual boat surveys in cooperation with state and/or United States Department of Agriculture agencies to search for problem plant species.

(b) – Take immediate action to control *Salvinia molesta* via using "Reward" (diquat). Another option is to increase the salinity to < 7 parts per thousand to help control salinity.

Objective F-4. Fishing Access – Improve public fishing access to the East Cove Unit within the life of the plan.

Discussion: Public fishing access to the East Cove Unit is by boat. This access is difficult because of surrounding private lands and the presence of water control structures along Calcasieu Lake.

Strategies

(a) – Find cooperative landowner to allow access.

(b) – Install small boat lift into the unit via Calcasieu Lake (similar to lifts on Unit 3 on Sabine).

(c) – Allow commercial guiding for fishing in this unit. All use would be under special use permits and would be highly regulated.

(d) – Allow commercial guiding for ecotourism in this unit.

GOAL G – REFUGE COMPLEX OPERATIONS: Concurrently with Hurricane Rita recovery operations, develop and maintain the Southwest Louisiana National Wildlife Refuge Complex Headquarters to (1) support, direct, and manage the needs, resources, and staff of Cameron Prairie, Lacassine, Sabine, and Shell Keys national wildlife refuges; (2) coordinate their relationship with each other; (3) manage the role of the Service as a partner in the multiagency Cameron Creole Watershed Project; and (4) interact with the state-managed Rockefeller Refuge.

Objective G-1: Complex Support – The Southwest Louisiana National Wildlife Refuge Complex will encourage and support each refuge's major focus (environmental education, interpretation, and research) and the relationship of these programs to wildlife and habitat management objectives and strategies.

Strategies

(a) – Resources needed to attain success in achieving the objective will be allocated to address the highest priority needs of the Complex.

(b) – Complex staff will support individual refuge needs and will provide expertise and assistance as needed to each refuge's staff.

V. Plan Implementation

INTRODUCTION

The following projects reflect the basic needs of the refuge as identified during the development of this Comprehensive Conservation Plan and will help fulfill the refuge's important role in providing habitat for waterfowl in Southwest Louisiana, supporting both the mission of the refuge and the Service.

Implementation of these projects will contribute to various plans and initiatives discussed earlier in Chapter I of this document. First and foremost, the refuge will concentrate on recovery, cleanup, and restoration of habitat, bridges, roads, canals, and other infrastructure damaged from the forces of wind and tidal surge from the September 2005 hurricane.

PROPOSED PROJECTS

Listed below are the proposed project summaries and their associated costs for fish and wildlife population management, habitat management, resource protection, visitor services, and refuge administration over the next 15 years. This proposed project list reflects the priority needs identified by the public, planning team, and refuge staff based upon available information. These projects were generated for the purpose of achieving the refuge's objectives and strategies. The primary linkages of these projects to those planning elements are identified in each summary.

PROJECT 1: HURRICANE RECOVERY

Overview

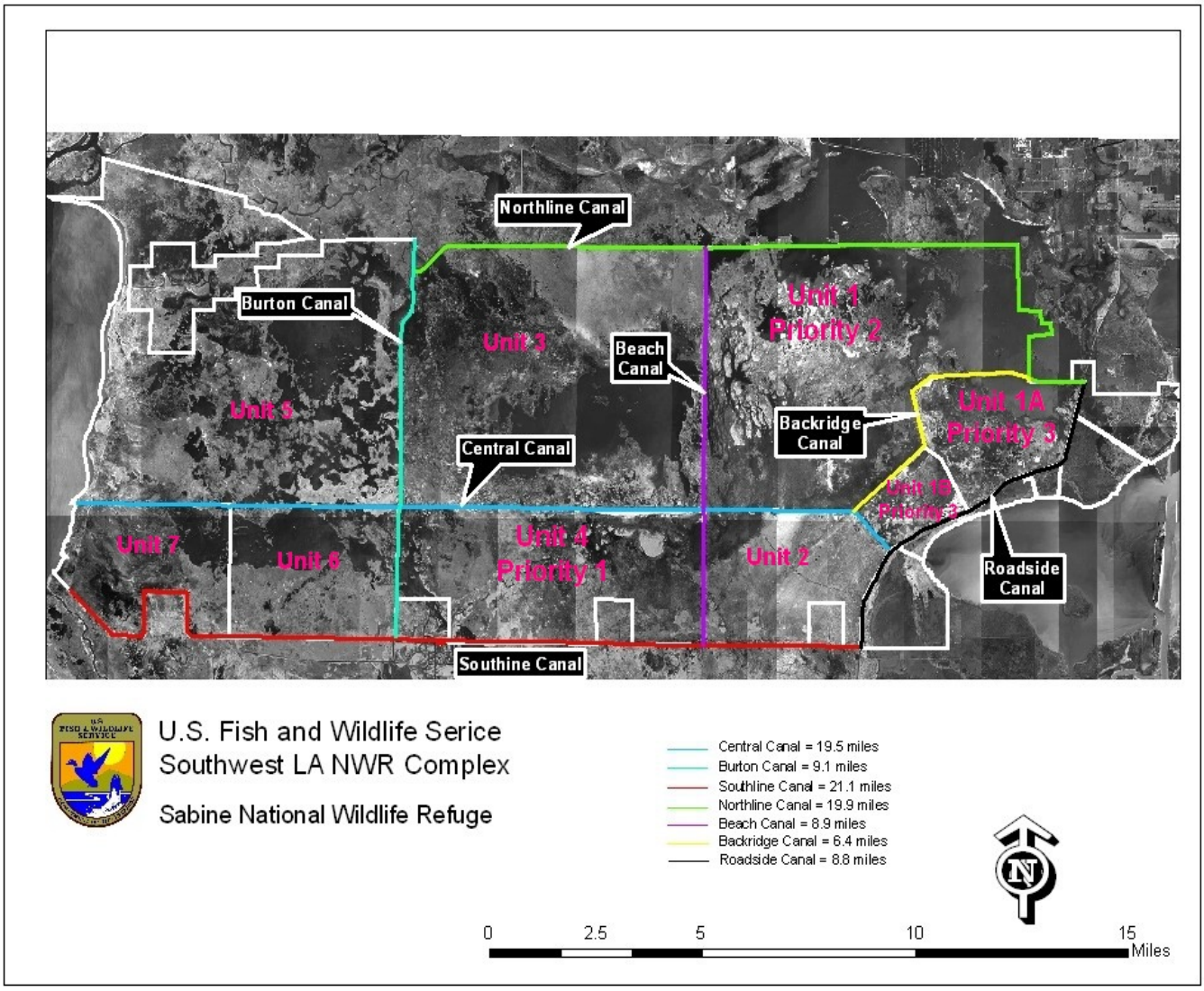
Hurricane Rita came ashore in southwestern Louisiana on September 24, 2005, with the storm's eye passing near the community of Johnson Bayou (directly south of Sabine National Wildlife Refuge) in Cameron Parish, Louisiana. A Category 3 hurricane at landfall, Rita caused widespread damage to the surrounding areas with winds in excess of 100 mph and a storm surge topping 15 to 20 feet. The coastal communities of Holly Beach, Johnson's Bayou, and Cameron received catastrophic damage. Oil drilling rigs and platforms located just offshore in the Gulf of Mexico also received heavy damage.

Large parcels of the U.S. Fish and Wildlife Service's property were impacted by the winds and tidal surge associated with Hurricane Rita. Hazardous materials from communities and commercial activities were carried by the wind and flood waters into the refuge, along with household materials, lumber, and displaced vegetation. These included large tanks, totes, drums, and other smaller containers which comprise a potential threat to the marsh environment and the flora and fauna of the refuge.

In January of 2006, the Service commissioned a study by Research Planning Inc. (RPI) of Columbia, South Carolina, to compile various existing spatial data sources in an attempt to calculate the number and types of debris deposited into the refuge during Hurricane Rita. A subset of the resulting database was then field-verified by helicopter overflight and limited ground reconnaissance. From these efforts, a correction factor was calculated and applied to the entire data set yielding an extrapolated estimate of the debris left in Sabine. The RPI report indicates there are almost 4,000 items visible in the refuge. However, local Service field personnel indicate that this number may be slightly high because of subsequent sinking and breakdown of debris piles.

On May 16, 2006, Tennessee Valley Authority (TVA) personnel attended an initial site meeting with the Service to discuss the objectives for hazardous material (HAZMAT) removal operations at Sabine and nearby Cameron Prairie National Wildlife Refuge. During this meeting, the Service identified four distinct priority areas (Figure 13) for removal operations. These areas were chosen based on debris density estimates within existing refuge management units. Sabine was identified as the highest priority refuge with the heaviest distribution of hazardous materials resulting from Hurricane Rita's storm surge. Of the seven Sabine management units, Units 1, 1A, 1B, and 4 were identified as having the highest priority. Debris fields located south of Central Canal in management Unit 4 were identified as the primary priority area. The second priority area is the hazardous material containers diffused throughout refuge management Unit 1; the third priority area is refuge management Units 1A and 1B in Sabine.

Figure 13. Prioritized hazardous material work units.



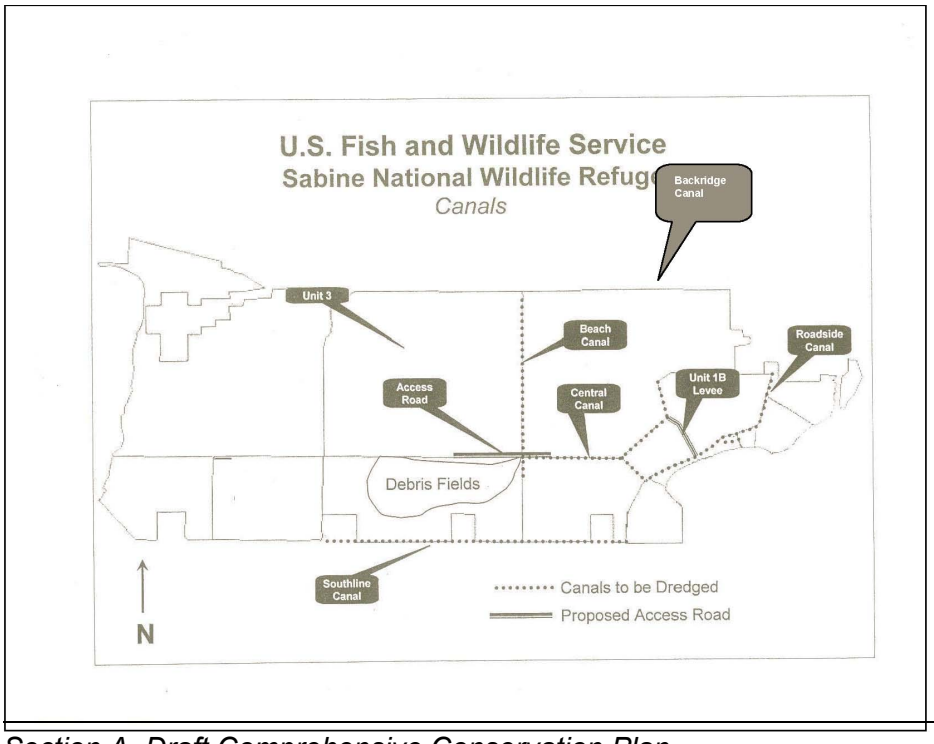
Hazardous Material Recovery

Sabine National Wildlife Refuge Unit 4: Priority 1 and Support of Dredging Operations

At the refuge, removal of hazardous materials from large accumulation areas (debris fields) in Unit 4 was identified by the Service as the top priority. The best access and route for transporting hazardous materials (HAZMAT) from the Unit 4 debris fields to the transfer site appears to be via canals (see Figure 13), specifically Central Canal. A transfer site will be established on the south bank of Central Canal to the west of Backridge Bridge. Backridge Bridge crosses Central Canal near the location where Central Canal and Back Ridge Canal converge. The contractor shall complete temporary improvements to this site to create a safe and stable platform for equipment that will be used to transfer HAZMAT from the canal transport vehicles to trucks. HAZMAT shall be transported to this transfer site using boats and barges from various refuge units via Central Canal. At the transfer site, HAZMAT shall be transferred from the boats and barges to vehicles and transported to the designated collection site. Scheduled canal maintenance should increase the depth of Central Canal and sections of adjoining canals from 3 to 4 feet. These canal repairs will make using boats with outboard motors and barges possible and aid HAZMAT recovery operations. Prior to canal maintenance operations, the contractor shall be responsible for the removal all visible hazardous material within or immediately adjacent to canal sections scheduled for repairs. The contractor shall provide support throughout dredging operations and shall be responsible for the spill response and recovery of HAZMAT encountered during dredging operations. Following canal maintenance, tracked amphibious marsh equipment should be able to access Unit 4 debris fields via Vastar Road and Central Canal.

The highest priority debris fields in Unit 4 extend westward from the eastern boundary of Unit 4 and along Central Canal to approximately the midpoint of the unit. Other large debris accumulations are located in Unit 4 to the south of the Central Canal debris line. An additional, less consolidated debris line was indicated in the RPI report, extending from the Central Canal to the Southline Canal, but little debris was observed in this area during overflights in mid-May 2006.

Figure 14. Canals scheduled for dredging.



Sabine National Wildlife Refuge Unit 1: Priority 2

Unit 1, the second priority, is located north of Central Canal and to the east of Beach Canal. A combination of Central Canal and Beach Canal should provide access to Unit 1. Unit 1 debris is not consolidated in heavy debris fields, as is the case in Unit 4. Instead, debris and hazardous materials are scattered over most of the unit within numerous small collection points, often separated by water. Hazardous material removal from Unit 1 will require considerable preplanning to determine which areas have a significant amount of HAZMAT to justify the impact of heavy equipment to the marsh areas identified as response areas by the Service. These areas will be entered into the GIS database and plotted in ArcMap or equivalent GIS software.

Sabine National Wildlife Refuge Units 1A and 1B: Priority 3

Units 1A and 1B are the third priority recovery areas as designated by the Service. These units are north of Central Canal and to the east of Back Ridge Canal. The heaviest HAZMAT accumulations appear to be along the east side of the Back Ridge Canal and to the south of the canal after it makes a 90º bend to the east. Back Ridge Canal is scheduled for maintenance and clearing from Central Canal to the ninety degree bend to the east in Back Ridge Canal. The use of Back Ridge and Central canals should provide access to the heaviest accumulations of HAZMAT located in Units 1A and 1B.

Repair of Bridges

There are three bridges within the Sabine Refuge on or near State Highway 27—Vastar Bridge, Backridge Bridge, and Northline Bridge—that were damaged during the hurricane. All three were inspected and found in need of repairs in order to bring them back up to their normal posted load ratings. Anticipated repairs at this time include the following:

Vastar Bridge

As stated in the October 2005 bridge inspection report, in order to repair the bridge to its original posted load limit of 16 tons, several repairs are needed. The repairs include replacing steel girders in the middle span; removing and replacing the entire deck with full-width running planks and timber curbs; excavating along wingwalls, abutments, and embankments at the approaches, and installing geotextile fabric; replacing the excavated material, compacting in layers; and adding stone and/or riprap and gravel as needed along the wingwalls and approaches. The entrance gate to Vastar Road will also be replaced, as well as required signs.

Backridge Bridge

According to the October 2005 bridge report, repairs required to reestablish the 16-ton restricted load limit of Backridge Bridge include removing grass and debris from the approaches and debris from the channel around the bridge; excavating along the wingwalls, abutments, and embankments at the approaches; replacing missing planks from the northeast and northwest wingwalls; installing a layer of geotextile fabric at the soil interface along the wingwalls, abutments, and approaches; replacing excavated material, compacting in layers; and adding stone and/or riprap and gravel as necessary along the wingwalls, abutments, and approaches. In addition, installing runner planks the full width of the deck; replacing a rotted pile cap; and installing required signs are needed.

Northline Bridge

The Northline Bridge will be repaired to a usable structure with a restricted load limit of 18 tons. Such repairs include removing debris from bridge deck; replacing the backwall planking at the west abutment; installing geotextile fabric on the inside face of abutments and wingwalls; removing existing embankment material along both approaches, installing geotextile fabric, and replacing embankment material; installing runner planks full width on bridge deck; installing bridge and approach rails; and installing object markers and required signs.

Both the Vastar and Backridge bridges will be used during the cleanup of hazardous material debris which accumulated within the refuge marshes and canals during Hurricane Rita; however, a protective mat will be placed onto of each bridge before use. Hazardous/nonhazardous material cleanup activities will be completed prior to initiating any bridge repairs. At such time, both Vastar and Backridge bridges will be reinspected prior to conducting said repairs to ensure that additional repairs are not required.

Headquarters Fueling Facility Repairs

Three above-ground fuel oil storage tanks (ASTs)—two 1000-gallon ASTs and one 500-gallon AST—located at the Sabine National Wildlife Refuge Headquarters were destroyed by the hurricane. The original concrete pads and protective bollards remain intact. Thus, repairs to the fueling facility entail purchasing and placing new ASTs back in the original locations. The two larger tanks, designed to store gasoline and diesel fuel, will be located along the north bank of the west-east canal towards the rear of the headquarter facility grounds, while the smaller tank, designed to store diesel fuel for operating boats, will be installed adjacent to the facility boat house.

Each tank will be designed with a double interior; a compact, tank-mounted, 115-VAC pump with 12-foot hose and auto shutoff nozzle; an 8-inch, direct-reading fuel level, clock-type gauge; a 2-inch through tank leak detection tube; a built-in, 7-gallon overfill containment; an automatic shutoff valve at the fill port; and vents and signage.

Canal Cleaning

Almost 35 miles of refuge canals (see Figure 14) require cleaning of both hazardous/nonhazardous material debris and vegetation. Most or all of Central, Beach, and Backridge canals will be cleaned of the hazardous materials by a contractor under the guidance of EPA.

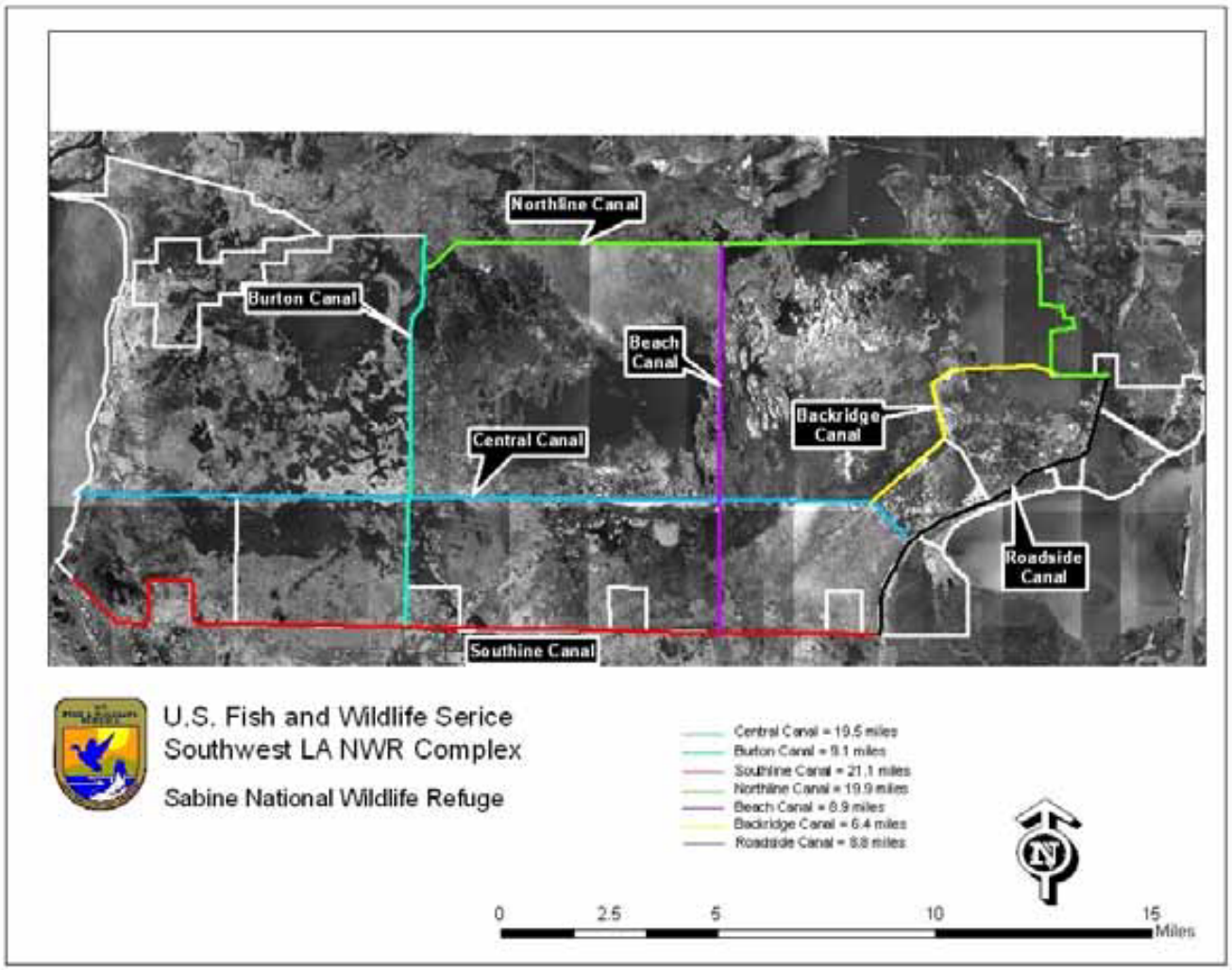
Approximately 20 miles of the Roadside and Southline canals, 8.6 and 11.4 miles, respectively, also require cleaning, primarily of vegetation.

With respect to the Roadside and Southline canals, grass buckets will be used to minimize the removal of silt/sediment. Vegetation and clinging silt/sediment, if any, removed will be placed along the bank of the canals as far inland as a swamp buggy excavator boom will reach. Any hazardous material encountered will be removed and addressed accordingly by the hazardous material debris cleanup personnel under the coordination of EPA and the Service.

Road Repairs

Vastar Road, approximately 2.9 miles in total length, needs to be regraveled and leveled. This road connects Vastar Bridge and Backridge Bridge and then continues west past Backridge Bridge along the north side of Central Canal.

Figure 15. Canal cleaning.



Parking Lot Repairs

Eight parking lots, varying in size, require repair. Some lots require the placement of a layer of geotextile fabric covered with gravel, while others require resealing and restriping. The parking lots that need to be repaired are as follows:

- Unit 1A/1B parking lot
- Northline parking lot
- Hog Island South parking lot
- Blue Goose parking lot
- West Cove parking lots (south and north sides)
- Nature Trail parking lot
- Headquarters parking lot

Repairs to Water Control Structure, Observation Deck, Pier, and Several Boat Ramps

In addition to the above repairs, various other repairs are required as well. At Unit 1B, there is a concrete bridge/water control structure in need of repair. The top of the structure will be repaired by widening the existing concrete bridge/water control structure by adding a suitable wooden deck which will allow refuge vehicles and tractors/mowers a sufficient width by which to comfortably drive across, yet still allow refuge personnel continual access to the structure stop-logs from the bridge deck. The Blue Goose Observation Tower needs a new wheelchair-accessible ramp constructed leading from the parking lot up to the tower. The entire ramp was lost during the hurricane. In the same area, an associated walking trail needs repair. A new 3,000-foot asphalt walking trail will be constructed to replace the existing trail.

At the Northline Bridge, there is an associated wooden pier and boat ramp. Both require repair due to hurricane impacts. With respect to the pier, repairs include the removal of the existing 350 foot by 6-foot-wide wooden fishing pier; and the construction of a new wheelchair-accessible wooden pier of the same size with deck planks installed perpendicular to the pier length. Similarly, with respect to the boat ramp, a new ramp will be installed along the north end of the pier.

And lastly, at the Hog Island Gully South area, two boat ramps need attention. One will be replaced altogether with a new one of similar size and style, including a new gate. The second ramp simply needs to be cleared of excess mud created during the hurricane.

Miscellaneous

The hurricane damaged or destroyed numerous refuge vehicles, boats, trailers, fire equipment, furniture and other items. The costs to replace or repair these items are shown in Table 7.

Nonhurricane-related Projects

Routine restoration and other projects will be completed as hurricane recovery is complete. It is unknown how long it will take to restore the refuge to pre-storm condition. All nonhurricane-related projects are identified in the goals, objectives, and strategies found in this document. The costs to complete some identified projects are not available at this time; however, a number of exceptions are listed in Table 7 below.

Table 7. Costs to repair, recover, and replace real and personal property damaged from Hurricane Rita.

Huuicane Supplemental Appropriation	Projects Associated with Recovery from Hurricane Rita	Estimated Costs (One Time)
X	HAZMAT/Debris removal	$16,061,000
X	Tasks 0 – 15 (Need to describe tasks)	6,233,000
X	Repair/reopen 18 miles of canals	3,600,000
X	Repair three water control structures	1,000,000
X	Replaced destroyed maintenance shop	750,000
X	Replace destroyed headquarters office	3,500,000

Huuicane Supplemental Appropriation	Projects Associated with Recovery from Hurricane Rita	Estimated Costs (One Time)
X	Replaced fueling facilities, above ground fuel storage tanks	160,000
X	Replace maintenance area water lines	100,000
X	Replace maintenance area electrical lines	250,000
X	Repair rear access road to pole shed	22,000
X	Repair maintenance parking areas	100,000
X	Repair office grounds and landscaping	200,000
X	Replace damaged office equipment/furniture/supplies	100,000
X	Replace headquarters sewerage treatment unit	50,000
X	Replace headquarters telephone system and lines	100,000
X	Repair and rehabilitate Blue Goose nature trail/design and build visitor contact station	400,000
X	Repair damage to concrete nature trail and boardwalk (partnership with tourism bureau)	500,000
X	Replace security gates	20,000
X	Survey/replace/repair refuge posting	600,000
X	Replace ATV's	15,000
X	Replace vehicle (truck)	35,000
X	Replace vehicle (SUV)	25,000
X	Replace and repair multiple damaged boats and trailers	35,000
X	Repair/replace damaged fire equipment	300,000
Total		**$34,156,000.00**

PROJECT 2: COSTS TO CONTROL UNDESIRABLE PLANTS AND ANIMALS

Undesirable plant and animal species pose problems at Sabine, as they do at many national wildlife refuges. Invasive species are plants and animals that cause severe changes and degradation when introduced into native habitats. Invasive plants cause billions of dollars of damage to our natural and managed ecosystems and agricultural lands. Invasive plant species include Chinese tallow tree, water hyacinth, hydrilla, common salvinia, phragmites, and alligator weed. Invasive plants will be controlled by prescribed burning, herbicides, flooding, and by mechanical means.

Exotic species are nonnative organisms that can invade native habitat. These species reduce biological diversity because they outcompete native species for limited resources. The Chinese tallow tree (*Sapium sebiferum*) constitutes the greatest threat to the refuge in terms of exotic species.

Other undesirable species that are becoming concerns are roseau cane (*Phragmites* sp.), salt cedar (*Tamarix gallica*) and alligatorweed (*Alternanthera philoxeroides*).

Currently, the animal that is causing the most concern is the feral hog. The hogs adversely impact habitat and they prey on ground nesting birds. Nutria and muskrat have caused serious habitat damage. Nutria damage levees by burrowing; they also consume newly-planted trees and other vegetation. Trapping and shooting will be used to control nutria.

The public should be made aware of refuge concerns with undesirable plants and animals and instructed with ways to minimize or eliminate the spread of undesired species. Refuge personnel should also be trained in identifying undesired species. The costs to control undesirable plants and animals are shown in Table 8.

Table 8. Costs to control undesirable plants and animals.

Project Type and Number	Projects	Estimated Costs (One Time)
RONS 97705	Control invasive species	$67,500
RONS 00021	Control Nutria and Feral Hog Populations	$51,000
Total		**$118,500.00**

PROJECT 3: INVENTORY/MONITOR WILDLIFE POPULATIONS AND RESPONSES TO MANAGEMENT ACTIONS

Adaptive management is dependent on having current information on the resource being managed prior to the time management decisions are made. Inventories, surveys and censuses are methods of providing information on wildlife population trends and health of wildlife resources. Monitoring of habitat also provides managers with information needed to manage wildlife. Performing this basic wildlife management function should be a high priority for the refuge. The refuge will work with universities, the U.S. Geological Survey, and other agencies and partners to establish effective monitoring techniques and statistical analysis of data for decision-making purposes.

The refuge's biological program needs trained technicians to conduct each of the required activities discussed above. The program should include at minimum one biologist and two biotechnicians. Monitoring protocols and procedures should exist for all biological activities and should be based on scientifically designed methods involving standardized collection procedures.

The first priority of the biological program should be to identify those resources requiring monitoring. Monitoring those resources should direct future management actions (i.e., water drawdowns, fire, water levels, timing of mechanical treatments, etc.) in such a way that the methods are repeatable and suitable for proper evaluation. Computer resources should include field computers, GIS database, and statistical software.

The refuge should consider habitat and population monitoring and evaluation a priority factor in assessing how it is meeting its mission. Staff should develop protocols for sampling habitat and incorporate them into the refuge's objectives and goals. When budget and staffing allow, the refuge should conduct inventories, surveys, and population assessments of fish, amphibians, reptiles, birds and mammals. National protocols should analyze ecosystem-wide trends.

The costs for this project are shown in Table 9.

Table 9. Costs to inventory and monitor wildlife populations and responses to adaptive management techniques.

Projects	Estimated Costs (One Time)
Supplies, water level monitoring equipment, vehicle fuel	$21,000
Waterfowl (Flights, fuel, supplies)	$5,000
Colonial Nesting Birds (Misc., fuel)	$1,000
Grassland birds (Fuel, equipment)	$2,000
Marsh birds (misc. supplies, fuel)	$2,000
Develop Oil & Gas Monitoring Program	$134,000
Expand Refuge Biological Monitoring Programs	$ 75,000
Enhance Refuge Management Capabilities Using GIS	$ 30,000
Total	**$270,000.00**

PROJECT 4: PARTNERSHIPS, VOLUNTEERS, FRIENDS AND INTERNS

The refuge utilizes the services of volunteers, student interns, partners, and members of the Friends of Southwest Louisiana National Wildlife Refuges and Wetlands. These groups and others assist the refuge staff in activities such as management and biological monitoring; studies and research; facility maintenance; and conducting education and outreach programs for schools, civic groups, libraries, and other entities requesting presentations about fish and wildlife (refuge) issues. Partnership opportunities are large but the volunteer base has been limited. The refuge must find ways to improve and increase awareness of these important needs, locate appropriate outlets to advertise opportunities for short-term employment, student projects, scout projects, and better advocate the quantity and types of volunteer activities that are available. In addition, the refuge must maintain and enhance capabilities to house and attract outside assistance.

Many outside organizations and agencies have promoted and supported activities and programs at the refuge. The refuge must continue to foster healthy partnerships with nonprofit organizations, universities and schools, parish officials, other elected officials, and civic groups to expand upon to partnerships. The cost to promote these partnership opportunities is shown in Table 10.

Table 10. Cost to promote partnerships.

Projects	Estimated Costs (One Time)
Promote partnerships	$5,000
Total	**$5,000.00**

FUNDING AND PERSONNEL

Approved staffing at Sabine National Wildlife Refuge consists of four full-time positions as shown in Table 8. In early 2004, Sabine, Lacassine, Cameron Prairie, and Shell Keys merged into a Complex

under the supervision of a GS-14 Complex Leader stationed at Cameron Prairie National Wildlife Refuge, Complex Headquarters.

Additional staffing will be necessary for the refuge to implement the goals, objectives, and strategies identified in this Comprehensive Conservation Plan. Table 11 identifies the costs of existing and proposed staffing. Figure 16 provides an organization chart of current and proposed staffing for Sabine National Wildlife Refuge.

Table 11. Cost of existing and proposed positions.

Existing Positions	Annual Costs – Existing Positions
Refuge Manager, GS 13	$136,000.00
Maintenance Worker, WG 8	$65,000.00
Carpenter, WG-8	$65,000.00
Park Ranger (LE), GS 9	$68,000.00
Sub-total – Salary for Existing Positions	$334,000.00
Proposed Positions	**Annual Costs – Proposed Positions**
Biologist, GS – 11/12	$89,000.00
Biological Technician, GS 5/7	$51,000.00
Biological Technician (East Cove), GS 5/7	$52,000.00
Biological Technician (East Cove), GS 5/7	$52,000.00
Park Ranger (Law Enforcement), GS 9	$68,000.00
Park Ranger (Public Use), GS 7/9	$55,000.00
Fire Ecologist, (Complex) GS-11	$72,000.00
Oil and Gas Specialist, (Complex) GS 11	$72,000.00
Facility Manager, (Complex) GS-9	$68,000.00
Sub-total for proposed positions	$579,000.00
Total (Existing and Proposed)	**$913,000.00**

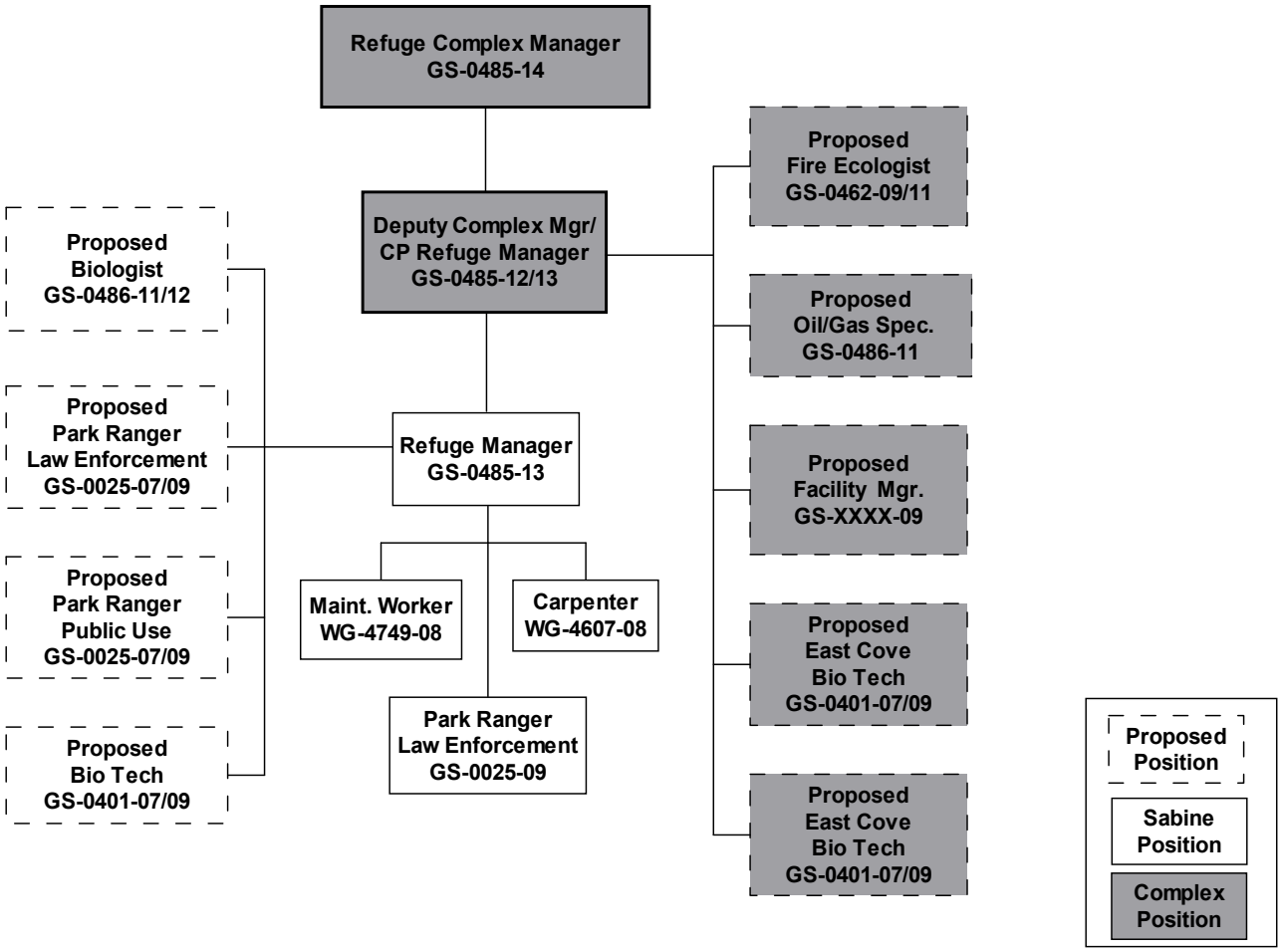
SUMMARY TABLE OF COSTS FOR 2007–2022

Implementation of the projects identified in the proposed alternative would be achieved when possible. Table 12 summarizes the costs for projects proposed to be completed from 2007–2022.

Table 12. Summary of costs for projects proposed to be completed from 2007–2022.

Project Title	One-time Costs
Hurricane Recovery Projects	$34,156,000
Construct Visitor Contact Station	$400,000
Control Invasive Species	$150,000
Monitor Wildlife Populations and Responses to Adaptive Management	$270,000
Promote Partnerships	$5,000
Existing Staff Costs – 4 FTE's (Based on FY07 salary costs)	$334,000
Proposed Staff Costs – 9 FTE's (based on FY07 salary costs)	$579,000
Base Operations - Varies	
Total	**$35,894,000.00**

Figure 16. Organization chart for Sabine National Wildlife Refuge with current and proposed positions.



STEP-DOWN MANAGEMENT PLANS

A comprehensive conservation plan is a strategic plan that guides the future direction of the refuge. A step-down management plan provides specific guidance on activities, such as habitat, fire, and visitor services management. These step-down plans (Table 13) are also developed in accordance with the National Environmental Policy Act, which requires the identification and evaluation of alternatives and public review and involvement prior to their implementation.

Table 13. Sabine National Wildlife Refuge step-down management plans related to the goals and objectives of the Comprehensive Conservation Plan.

Plan Name	Fiscal Year Proposed Completion/Revision Date
Fire Management/Fire Effects Monitoring	2010 (1998)
Volunteers, Friends, and Partnerships	2010
Population Management	2015
Law Enforcement	2006
Visitor Services	2010
Sport Fishing	2015
Sport Hunting	2008
Habitat/Water Management Plan	2010
Exotic Species (Animal Control)	2010 (1997)
Pesticide Use and Disposal	2010
Alligator & Furbearer Harvest Plan	2010
Fisheries Resources	2015
Cultural Resources	2019
Oil and Gas Management	2015 (1985)
Wildlife Inventory	2015 (1993)

PARTNERSHIP/VOLUNTEER OPPORTUNITIES

Sabine National Wildlife Refuge has historically partnered with many others to improve management of the refuge. It is anticipated that these partnerships will continue and opportunities to develop additional partnerships will be pursued. Partnerships are very important to the refuge to achieve its goals, objectives, and strategies, leverage funds, minimize costs, and bridge relationships with others.

Presently, the refuge has cooperated with the Louisiana Department of Fisheries and Wildlife; Louisiana Department of Natural Resources; Louisiana Department of Transportation and Development; U.S. Army Corps of Engineers; U.S. Geological Survey Wetlands Research Center; National Resources Conservation Service; National Oceanic and Atmospheric Administration; North American Wetlands Conservation Council; City of Lake Charles; Lake Charles Visitors and Convention Bureau; Cameron Parish Police Jury; Creole Nature Trail; McNeese State University; Louisiana State University; Ducks Unlimited; Coastal Prairie Conservancy; and Texas Parks and Wildlife.

Other opportunities to support environmental education, public awareness, and outreach; development of a formal volunteer program; and helping to establish a Friends group will be a high priority for the refuge.

MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is a flexible approach to long-term management of biotic resources that is directed over time by the results of ongoing monitoring activities and other information. More specifically, adaptive management is a process by which projects are implemented within a framework of scientifically driven experiments to test the predictions and assumptions outlined within a plan.

To apply adaptive management, specific survey, inventory, and monitoring protocols will be adopted for the refuge. The habitat management strategies will be systematically evaluated to determine management effects on wildlife populations. This information will be used to refine approaches and determine how effectively the objectives are being accomplished. Evaluations will include ecosystem team and other appropriate partner participation. If monitoring and evaluation indicate undesirable effects for target and nontarget species and/or communities, then alterations to the management projects will be made. Subsequently, the refuge's Comprehensive Conservation Plan will be revised. Specific monitoring and evaluation activities will be described in the step-down management plans.

PLAN REVIEW AND REVISION

This Comprehensive Conservation Plan will be reviewed annually in development of the refuge's annual work plans and budget. It will also be reviewed to determine the need for revision. A revision will occur if and when conditions change or significant information becomes available, such as a change in ecological conditions or a major refuge expansion. The final plan will be augmented by detailed step-down management plans to address the completion of specific strategies in support of the refuge's goals and objectives. Revisions to the Comprehensive Conservation Plan and the step-down management plans will be subject to public review and NEPA compliance.

SECTION B. ENVIRONMENTAL ASSESSMENT

Chapter I. Background

This Environmental Assessment (EA) for Sabine National Wildlife Refuge has been prepared in compliance with the National Environmental Policy Act. It discusses the purpose and need for the Comprehensive Conservation Plan (CCP) for the refuge, which is located in Cameron Parish, Louisiana, and provides an analysis of the environmental impacts that could be expected from each of the management proposals outlined in the plan. This analysis assists the Fish and Wildlife Service in determining if it will need to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) for the refuge's proposed CCP.

The U.S. Fish and Wildlife Service (Service) is the Nation's primary conservation agency concerned with the protection and long-term management of wildlife resources. The Service administers the National Wildlife Refuge System, a system of more than 540 national wildlife Refuges embracing over 93 million acres, much of which is primarily managed for the enhancement of migratory bird populations and federally listed threatened and endangered fish, wildlife, and plants. Of particular concern in the Lower Mississippi Valley Ecosystem and the adjacent Texas Gulf Coast Ecosystem is the plight of migratory bird populations—migratory waterfowl and shorebirds as well as neotropical migrant songbirds—and the loss of coastal marshland from both natural and human causes. As a result, the Service is emphasizing the maintenance and restoration of coastal wetlands and healthy bird populations in the proposed management plan for Sabine National Wildlife Refuge.

PURPOSE AND NEED FOR ACTION

The purpose of the CCP and EA is to establish and implement management direction for Sabine National Wildlife Refuge for the next 15 years.

The EA is needed to set forth and evaluate a range of reasonable management alternatives for the refuge. Each alternative was generated with the potential to be fully developed into a final CCP and to describe the predicted biological, physical, social, and economic impacts of implementing each alternative. The Fish and Wildlife Service will select an alternative to be fully developed for this refuge.

The Service identified issues, concerns, and needs through discussions with the public, agency managers, conservation partners, and others. In particular, the Service's planning team identified a range of alternatives, evaluated the possible consequences of implementing each, and selected Alternative B as the proposed management action. In the opinion of the Service and the planning team, Alternative B is the best approach to guide the refuge's future direction.

There is no current plan that identifies priorities and ensures consistent and integrated management of the refuge, thus necessitating the need for this plan. The National Wildlife Refuge System Improvement Act of 1997 requires that all national wildlife refuges have a comprehensive conservation plan in place within 15 years (by 2012).

DECISIONS TO BE MADE

Based on the assessment described in this document, the Fish and Wildlife Service will select an alternative to implement the Final Comprehensive Conservation Plan for Sabine National Wildlife Refuge. A FONSI is a statement explaining why the selected alternative will not have a significant

effect on the quality of the human environment. This determination is based on an evaluation of the Service and Refuge System mission, the purpose(s) for which the refuge was established, and other legal mandates. Assuming no significant impact is found, implementation of the plan will begin and the plan will be monitored annually and revised when necessary.

PLANNING STUDY AREA

Presidential Executive Order 7764 on December 6, 1937 established Sabine National Wildlife Refuge. The official purpose of its establishment was "…*as a refuge and breeding ground for migratory birds and other wildlife."* A secondary purpose of the refuge is "…*for use as an inviolate sanctuary, or for any other management purpose, for migratory birds...*" (16 U.S.C. 715d (Migratory Bird Conservation Act)).

Sabine Refuge is located eight miles south of Hackberry, on State Highway 27 in Cameron Parish, Louisiana. The refuge occupies the marshes between Calcasieu and Sabine lakes in southwest Louisiana, and contains 125,790 acres, consisting of 40,403 acres of open water and 85,387 acres of marsh grassland. This area contains a diversity of habitat including freshwater impoundments, wooded ridges and levees, canals, ponds, lakes, and bayous. Some of the largest wetland management efforts in Louisiana occur at Sabine. The refuge is managed to provide habitat for migratory waterfowl and other birds and to preserve and enhance coastal marshes for wildlife and fish. Oil companies, however, still own the subsurface rights to the refuge and must be provided reasonable access to subterranean mineral resources like oil and natural gas.

The East Cove Unit was established in 1937 as part of Sabine National Wildlife Refuge. This unit, administratively transferred to Cameron Prairie National Wildlife Refuge from Sabine in 1992, consists of 14,927 acres of brackish to intermediate marsh. These marshes are managed as a nursery for brown and white shrimp, blue crab, and many fish species. Also located in Cameron Parish, the East Cove Unit is bordered on the west by Calcasieu Lake, and on the north, east, and south by privately owned marshes.

Sabine Refuge is part of the Southwest Louisiana Refuge Complex, which also includes the Cameron Prairie, Lacassine and Shell Keys national wildlife refuges. While the refuges within the complex share certain staff and coordinate on a good deal of planning and management activities, this EA, and the CCP it covers, focuses only on Sabine Refuge, including the East Cove Unit.

PLANNING PROCESS AND ISSUE IDENTIFICATION

A mailing list of organizations and individuals was compiled to ensure that the refuge was contacting a wide array of "stakeholders"—including interested people, users like hunters, bird watchers, and anglers, and agencies representing tribes, the State of Louisiana, and local jurisdictions. A series of open houses and public scoping meetings was held in early 2003 at various convenient locations in several communities throughout the area. These scoping meetings covered comprehensive conservation planning occurring simultaneously at Cameron Prairie, Sabine and Lacassine national wildlife refuges, and the attendees were invited to register their comments, input, observations and preferences on any or all of the three refuges.

Announcements giving the location, date, and time for the first scoping meeting appeared in local newspapers and were furnished to local residents. Input obtained from the scoping meeting and discussions held with state and local officials, civic groups, and conservation organizations were used to develop the draft plan.

Beginning with the preparation of the draft plan, the planning team developed a list of issues and concerns likely to be associated with the management of the refuge. These issues and concerns were expanded to include those ideas generated by citizens from the local community. Refuge staff contacted local civic groups, as well as federal, tribal, state, and local agency representatives to gather additional issues and concerns and to respond to preliminary alternatives developed by the planning team in 2003–2004.

Together with refuge goals, key issues, and a range of management options, a basis was formed for the development and comparison of the management alternatives described in this document. Comments received from the internal agency review, open house, and other responses from the public will be forthcoming following review of this Draft CCP and EA and will assist the Service in refining the range of alternatives described in this section, especially the proposed alternative that constitutes the Draft CCP. Several significant key issues or problems formed the basis for the development and comparison of the different alternatives described in Chapter III.

Chapter II. Affected Environment

For a description of the affected environment, see Section A, Chapter II, Refuge Overview.

Chapter III. Description of Alternatives

FORMULATION OF ALTERNATIVES

After conducting internal and external scoping, the planning team developed five broad goals for Sabine National Wildlife Refuge and one for the East Cove Unit in particular. The pursuit of these goals would help the refuge realize its purposes and vision. The following goals apply to each of the alternatives described below:

Goal A – Habitat: Maintain, restore, and enhance unique coastal wetland habitats on the refuge to provide favorable conditions to improve species diversity and richness of migratory birds and native terrestrial and aquatic species.

Goal B – Fish and Wildlife Management: Maintain healthy and viable wildlife and fish populations on the refuge to contribute to the purpose for which it was established and to the mission of the National Wildlife Refuge System.

Goal C – Oil and Gas Infrastructure and Activities: Manage petroleum infrastructure and activities to protect habitat, wintering migratory birds and nesting birds.

Goal D – Public Use Management: Provide opportunities for safe, quality, compatible, wildlife-dependent public use and recreation — including environmental education, interpretation, wildlife observation, photography, hunting, and fishing — which will promote understanding and appreciation of the United States Fish and Wildlife Service and its mission.

Goal E – Cultural Resources: Protect refuge cultural resources in accordance with federal and state historic preservation legislation and regulations.

Goal F – East Cove Unit: Utilize water control structures to restore the area to an intermediate-type marsh with good vegetation cover important to certain fin and shellfish species and dabbling waterfowl groups. Improve public fishing access.

Goal G – Refuge Complex Operations: Concurrently with Hurricane Rita recovery operations, develop and maintain the Southwest Louisiana National Wildlife Refuge Complex Headquarters to (1) support, direct, and manage the needs, resources, and staff of Cameron Prairie, Lacassine, Sabine, and Shell Keys national wildlife refuges; (2) coordinate their relationship with each other; (3) manage the role of the Service as a partner in the multiagency Cameron Creole Watershed Project; and (4) interact with the state-managed Rockefeller Refuge.

Alternatives are different approaches or combinations of management objectives and strategies designed to achieve the refuge purpose, vision, and the goals identified in the Comprehensive Conservation Plan; the priorities and goals of the Lower Mississippi Valley Ecosystem Team; the goals of the National Wildlife Refuge System; and the mission of the U.S. Fish and Wildlife Service. Alternatives are formulated to address the significant issues, concerns, and problems identified by the Service and the public during public scoping.

The three alternatives identified and evaluated represent different approaches to provide permanent protection and restoration of fish, wildlife, plants, habitats, and other resources at Sabine National Wildlife Refuge.

The planning team assessed biological conditions and analyzed external relationships affecting the refuge. This information contributed to the development of goals and objectives and, in turn, the formulation of alternatives. As a result, each alternative presents different sets of objectives and strategies for reaching long-term goals. Each alternative was evaluated based on how much progress it will make and how it will address core habitat issues, problems, and wildlife threats.

Problems and threats—which can also be expressed as issues, concerns and opportunities—provide important perspective and guidance in developing alternatives. Trends in habitat and wildlife uses were evaluated, as was the capability of refuge habitat to support these uses.

Overall, the greatest risk to fish, wildlife, plants, and wildlife habitats in the Chenier Plain of the Gulf Coast Ecosystem is from extensive wetland habitat degradation and loss that has occurred over the past century. Louisiana has the highest rate of wetland loss of any state in the nation, estimated at 25–35 square miles a year, accounting for 80 percent of the national total (Esslinger and Wilson 2001). The wetland area in the Chenier Plain declined 16 percent from the mid-1960s to 1990. These habitat losses have led to commensurate impacts on wildlife populations, especially of those species dependent on wetlands. As a result, the Service has identified wetland preservation and restoration as the most important wildlife conservation priority in the Gulf Coast Ecosystem.

DESCRIPTION OF ALTERNATIVES

Serving as a basis for each alternative, sets of objectives were developed by the planning team that lead to the fulfillment of the refuge purpose and the National Wildlife Refuge System mission. Objectives are desired conditions or outcomes that are grouped into sets and for this planning effort, consolidated into three alternatives. These alternatives, overall, represent a range of different management treatments, approaches, or priorities for managing the refuge over a 15-year time frame. The three preliminary alternatives are summarized below. Following the summary descriptions is a table that depicts the objectives formulated for each alternative.

ALTERNATIVE A: NO ACTION
Continue Current Management

NOTE: *Until Hurricane Rita struck Southwest Louisiana on September 23, 2005, drastically altering conditions on the refuge, the text below had been drafted to serve as the description of the No Action or Current Management Direction Alternative. It is included here to provide historical documentation of the refuge's baseline condition prior to Hurricane Rita.*

Under the No Action Alternative, management of Sabine National Wildlife Refuge would not deviate from current management. The size of the refuge would remain at 125,790 acres, including 40,403 acres of open water and 85,387 acres of marsh grassland. Sabine would strive to maintain a diverse array of habitats, including freshwater impoundments, wooded ridges and levees, canals, ponds, lakes, and bayous. Alternative A would maintain existing marsh management at the refuge. Existing conditions include 7,231acres of brackish marsh, 84,829 acres of intermediate marsh, and 33,730 acres of fresh marsh.

Some of the largest wetland management efforts in Louisiana have occurred in recent years at Sabine. Under Alternative A, ongoing restoration efforts would continue with opportunistic funding resources. The beneficial use of dredge material for marsh restoration would continue.

Under this alternative, Sabine would continue providing 125,790 acres of diverse marsh and open water habitat sanctuary for migrating and wintering waterfowl. This would help meet sanctuary needs

for migrating, wintering, and breeding ducks (mottled ducks) and geese of the Chenier Plain system of southwest Louisiana, thereby contributing to the targets of the Chenier Plain Initiative. The refuge would continue to monitor salinity regularly at established stations but would not investigate water rights. Sabine would keep on using fire as a multipurpose management tool to reduce hazardous fuels and promote habitat diversity as defined in the National Fire Plan; the refuge would aim to utilize prescribed fire on approximately 20,000 acres per year.

The refuge's fishery resources would be managed as they are at present under Alternative A. In cooperation with partners, Sabine would periodically sample and maintain fish population data via netting and angler surveys, using proportional stock density as an index of sport fish population structure.

To conserve and manage wildlife, the Sabine Refuge would continue to:

- support mottled duck banding activities and provide preferred mottled duck breeding and nesting habitat;
- provide shorebird habitat, thereby contributing to the goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan;
- protect known nesting colonies of colonial waterbirds from disturbance;
- maintain 125,790 acres of diverse marsh plant communities to support marsh birds;
- play an important role in the conservation of nongame birds in the southeastern United States, focusing on the survey, inventory, and monitoring of all groups; in so doing, it would contribute to the goals of the Gulf Coast Joint Venture, Partners in Flight, and other plans;
- monitor alligator populations and follow state recommendations on annual harvest quotas;
- minimally control certain wildlife populations as needed to achieve habitat and population objectives; and
- protect diamond-backed terrapin populations on the refuge.

Under Alternative A, Sabine would closely monitor oil and gas activities to minimize impacts to wetland habitats and wildlife usage. It would also maintain current levels of surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species.

The refuge would continue to provide for visitation, public use and wildlife-oriented activities by:

- furnishing waterfowl hunting opportunities that are compatible with the purpose of the refuge;
- offering quality fishing experiences for anglers and reviewing the refuge fishing program on an annual basis to monitor its success;
- maintaining existing opportunities for wildlife observation and wildlife photography by maintaining facilities over the life of the plan;
- retaining current environmental education and interpretive programs and exhibits; and
- continuing current opportunities for Friends groups, volunteers, partners and interns to assist the refuge and extend the reach of refuge staff.

Under Alternative A, the Sabine Refuge would advance efforts to inventory, protect, and interpret its cultural resources. During the life of the plan, the staff would assess the feasibility of conducting a refuge-wide archaeological survey. The refuge would also develop and implement an educational program that will provide an understanding and appreciation of the refuge's ecology and human influence on the region's ecosystems. Sabine would aim to develop a step-down Cultural Resources Management Plan through the life of the plan.

Under Alternative A, the East Cove Unit would continue to be managed by Cameron Prairie National Wildlife Refuge. Gates at the water control structures would be operated to restore preferred vegetated plant communities associated with intermediate or possibly slightly brackish environs. Staff would evaluate the use of terraces to improve vegetation of open-water areas. An assessment would be conducted to determine the need for sanctuary in the East Cove Unit to minimize detrimental waterfowl disturbances. The invasion of exotic plant species, with special emphasis on giant salvinia, would be monitored. Public fishing access to East Cove would be improved during the life of the plan.

ALTERNATIVE B: PROPOSED ACTION
Keep Refuge Functional in the Near Term and Enhance Management over the Long Term (Proposed Alternative)

Over the near term, under this proposed alternative, refuge programs would continue throughout the refuge commensurate with the level of hazardous material cleanup and restoration over time. Areas west of State Highway 27 (except the area immediately adjacent to the highway) would remain closed in the near term due to hazardous waste and debris fields that clog waterways. However, over time, areas would be reopened as repairs to infrastructure and restoration of habitat occur. Simultaneously, a hydrological and feasibility study would be conducted to evaluate how the plug of hurricane-deposited debris, uprooted vegetation and sediments has affected marsh drainage patterns and the challenges and opportunities presented by this changed environment. East of Highway 27, all public use facilities along Highway 27 would be repaired. The fire and research programs would remain active throughout the refuge. Oil and gas operations would also continue at the normal level. A modestly constructed hurricane-resistant building would be located at the original headquarters site.

Over the long term, under Alternative B, Sabine National Wildlife Refuge would increase marsh restoration and enhance wildlife management, stepping up these efforts from current levels. The refuge would improve marsh plant communities and shallow water, increase waterfowl food production, and provide habitats and sanctuary needs for migrating, wintering, breeding ducks (mottled ducks) and geese of the Chenier Plain system of southwest Louisiana. It would also protect and/or restore 43,200 acres of intermediate and brackish marsh and continue working toward restoring the emergent marsh and functional value of Unit 3 through the life of the plan. A feasibility study of restoring Unit 3 to tidal influence would be carried out. The beneficial use of dredge material for marsh restoration and the construction of terraces would be continued by restoring 1,500 acres of marsh in Unit 1.

This alternative would provide 125,790 acres of diverse marsh and open water habitats for migrating and wintering waterfowl, which would contribute significantly to the population and habitat objectives addressed in the Gulf Coast Joint Venture Chenier Plain Initiative. Population objectives of the plan include 4.5 million ducks and 500,000 geese with foraging habitat provided in the coastal marshes.

Like Alternative A, Alternative B would maintain salinity monitoring throughout the refuge at the established discrete salinity stations. However, in contrast to Alternative A, under this alternative Sabine would also develop a new water quality monitoring program within five years of CCP approval. Working through the Service's regional solicitor's office, the refuge would quantify or clarify water rights for the Complex.

Fire management objectives under Alternative B would be the same as Alternative A: Sabine would continue to use fire as a multipurpose management tool for reducing hazardous fuels and promoting

habitat diversity. The refuge would aim to utilize prescribed fire on approximately 20,000 acres per year.

In cooperation with partners, habitat would be managed consistent with the refuge purpose, a monitoring program would be in effect, and ways to improve water quality and fishery resources would be sought.

To conserve and manage wildlife, the Sabine Refuge would:

- support mottled duck banding activities and provide preferred mottled duck breeding and nesting habitat;
- provide shorebird habitat, thereby contributing to the goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan;
- protect nesting colonies of colonial waterbirds from disturbance;
- maintain 125,790 acres of diverse marsh plant communities to support marsh birds;
- play an important role in the conservation of nongame birds in the southeastern United States, focusing on the survey, inventory, and monitoring of all groups; in so doing, it would contribute to the goals of the Gulf Coast Joint Venture, Partners in Flight, and other plans;
- coordinate with the Louisiana Department of Wildlife and Fisheries to monitor alligator numbers and establish a desirable alligator density objective for the refuge and work with the state in setting annual harvest quotas;
- intensively control certain wildlife populations as needed to achieve habitat and population objectives; and
- protect diamond-backed terrapin populations on the refuge.

Under Alternative B, Sabine would closely monitor oil and gas activities to minimize impacts to wetland habitats and wildlife usage. It would also increase surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species. All new non-refuge mineral owners' requests for petrochemical transmission infrastructure would be prohibited.

By 2008, staff would complete steps to enhance the refuge's infrastructure and operations to provide for quality, wildlife-dependent public use. There would be **i**mproved waterfowl hunting opportunities that are compatible with the purpose of the refuge. The refuge would also provide increased hunting and fishing opportunities for families to experience compatible wildlife-dependent recreation.

The Sabine Refuge staff would also:

- enhance existing opportunities for wildlife observation and wildlife photography by upgrading facilities throughout the refuge over the life of the plan;
- provide improved environmental education and interpretive programs that complement the programs of other refuges within the Southwest Louisiana National Wildlife Refuge Complex; and
- provide additional opportunities for Friends groups, volunteers, partners and interns to assist the refuge.

Management of cultural resources and the East Cove Unit under Alternative B would be identical to Alternative A. That is, under Alternative B, the East Cove Unit would continue to be managed by Cameron Prairie National Wildlife Refuge. Gates at the water control structures would be operated to restore preferred vegetated plant communities associated with intermediate or possibly slightly brackish environs. Staff would evaluate the use of terraces to improve vegetation of open-water

areas. An assessment would be conducted to determine the need for sanctuary in the East Cove Unit to minimize detrimental waterfowl disturbances. The invasion of exotic plant species, with special emphasis on giant salvinia, would be monitored. Public fishing access to East Cove would be improved during the life of the plan.

ALTERNATIVE C: HOLD REFUGE IN CUSTODIAL FORM

Under this alternative, Sabine and Complex staff would hold refuge property in a custodial capacity. Major restoration and recovery efforts from devastation caused by Hurricane Rita would be curtailed. The fire and research programs would remain active throughout the refuge. Oil and gas operations would continue at the normal level.

No active habitat management would be undertaken. Instead, refuge and Complex staff would serve as good caretakers or custodians of the refuge, observing and monitoring the natural forces and ecological succession that would shape its habitats and effectively determine their suitability for wildlife. A "hands off" or passive approach to refuge management in an area that has been so heavily altered by a century of human activity—including grazing; oil and gas exploration and development; pipeline construction; canal, drainage ditch, levee and road building; hunting; introduction of exotic species; and so forth—would not lead to habitat conditions resembling those that would have occurred on the site today if these interventions had never taken place. Some of these interventions produced long-lived or virtually permanent results that cannot be undone simply by ceasing all active management. Resources that are presently used for Sabine would be assigned to higher priorities determined by the Complex Project Leader and Complex staff to other refuges within the Southwest Louisiana National Wildlife Refuge Complex.

Alternative C would entail the following for habitat at Sabine:

- Units would not be actively managed; human intervention would be minimal.
- Water control structures would not be replaced.
- No new terraces would be constructed and existing terraces would be abandoned to natural forces.
- Plant species composition and vegetation communities would be inventoried to determine the effects of succession.
- Units 1A, 1B, and 3 would change due to succession and loss of open water for waterfowl (i.e., they would become predominantly emergent vegetation, reducing accessible open water habitat).
- No habitat improvement feasibility study would be performed for Unit 3. Levees may fail due to deteriorating physical conditions; however, this may result in some desirable habitat for waterfowl.
- No prescribed fire would be conducted.
- Efforts at managing or controlling all invasive species, both native and nonnative, would cease.
- Fire management would be limited to hazardous fuel reduction and suppression of wildfires; prescribed fire would not be used as an agent of disturbance and habitat renewal.
- Maintenance of canals would cease.

These actions would result in reduced capabilities to reverse the progression of succession. Under Alternative C, no effort would be made to reduce the accumulation of organic materials in impoundments through drawdowns and prescribed fire. There would be no need to replace and upgrade equipment and facilities such as pumps, tractors, and water control structures.

This alternative would result in very little effective high quality waterfowl sanctuary. That is, high ground would succeed to a mix of Chinese tallow, willow, and hackberry, while the lower ground would revert to dense stands of maidencane. There would be few open areas.

With regard to public use, each of the six priority public uses would be strongly encouraged but facilities would be limited. However, actual opportunities to enjoy these public uses on the refuge would in all probability decline. This would happen because of the decreased value of wildlife habitat that would occur because of no active management and the subsequent decline in wildlife diversity and abundance.

Management of the refuge's cultural resources and the East Cove Unit under Alternative C would be identical to Alternative B.

COMPARISON OF ALTERNATIVES

All three alternatives outlined above would pursue the refuge purpose, mission, vision and management goals. However, each alternative represents a different approach to doing so; while there are certainly overlaps between the three, each alternative has its own emphases and priorities, as well as tradeoffs, toward land management, conservation, and public use.

Each of the three alternatives would be broadly consistent with the following: Partners in Flight Plan; North American Waterfowl Management Plan; Lower Mississippi Valley Joint Venture; Chenier Plain Initiative of the Gulf Coast Joint Venture; Endangered Species Act; National Wildlife Refuge System Improvement Act; Migratory Bird Conservation Act; and the mission and goals of the National Wildlife Refuge System. Alternative B would more closely approach the intent of these plans and statutes, but it would also cost more to implement than Alternatives A and C. Alternatives A and C would not be inconsistent with the National Wildlife Refuge System Improvement Act of 1997 and other Service policies. However, by curtailing Hurricane Rita recovery efforts and eliminating most proactive habitat management and maintenance, Alternative C would entail long-term adverse impacts on habitat, wildlife populations, and public use.

Table 14 identifies and compares the various management actions as a means of responding to the issues raised by Service managers and the public. These management actions were summarized into the three alternatives described above to accomplish the Refuge System mission, the authorized purpose of the refuge, and to address significant threats, problems, and issues raised by public agencies and private citizens.

Table 14. Comparison of objectives by management alternative.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Goal A – Habitat Management: Maintain, restore, and enhance unique coastal wetland habitats on the refuge to provide favorable conditions to improve species diversity and richness of migratory birds and native terrestrial and aquatic species.		
Objective A-1. Hurricane Rita Cleanup And Rehabilitation		
As funded, removal of hazardous debris deposited by Hurricane Rita would continue.	All accessible, unburied debris deposited by Hurricane Rita, including hazardous materials as well as nonhazardous refuse, rubbish, and wreckage, will be removed from the refuge within 5 years of CCP approval.	Same as Alternative A
Objective A-2. Impounded Marsh		
Provide sanctuary needs for migrating, wintering, breeding ducks (mottled ducks) and geese of the Chenier Plain system of southwest Louisiana, thereby contributing to the targets of the Chenier Plain Initiative.	Once Hurricane Rita recovery operations are complete, focus on improving marsh plant communities and shallow water, increasing waterfowl food production, providing habitats and sanctuary and needs for migrating, wintering, breeding ducks (mottled ducks) and geese of the Chenier Plain system of southwest LA.	While providing sanctuary for waterfowl, cease all maintenance of levees and all habitat management, manipulation and intervention within impounded marshes, allowing ecological succession to occur unimpeded.
Objective A-3. Unimpounded Marsh		
Maintain existing marsh management; pre-hurricane conditions include 7,231acres of brackish marsh, 84,829 acres of intermediate marsh, and 33,730 acres of fresh marsh. Ongoing restoration efforts will continue with opportunistic resources.	Once Hurricane Rita recovery operations are complete, focus on protecting and restoring 43,200 acres of intermediate and brackish marsh and continue working toward restoring the emergent marsh and functional value of Unit 3 during the life of the plan.	Cease active habitat management and restoration within unimpounded marshes, allowing marsh processes and ecological succession to occur unimpeded.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective A-4. Water Quality and Quantity Monitoring		
Monitor salinity regularly at nine established stations; do not investigate water rights. Replace damaged, destroyed, or missing stations as soon as feasible.	Once Hurricane Rita recovery operations are complete, maintain salinity monitoring throughout the refuge at the established discrete salinity stations (nine locations). Develop new water quality monitoring program within five years of CCP approval. Working through regional solicitor's office, quantify water rights for the Complex.	Same as Alternative A
Objective A-5. Fire Management		
Use fire as a multipurpose management tool to reduce hazardous fuels and promote habitat diversity as defined in the National Fire Plan. Utilize prescribed fire on about 20,000 acres/year.	Use fire as a multipurpose management tool to reduce hazardous fuels and promote habitat diversity as defined in the National Fire Plan. Utilize prescribed fire on about 20,000 acres/year.	Suppress all wildfires and use prescribed fire only to control hazardous fuel accumulation, not for habitat management.
Objective A-6. Restoration		
Once recovery from Hurricane Rita is complete, resume beneficial use of dredge material for marsh restoration.	Once Hurricane Rita recovery operations are complete, resume beneficial use of dredge material for marsh restoration by restoring 1,500 acres of marsh in Unit 1.	Discontinue all beneficial use of dredge material for marsh restoration and allow natural processes alone to shape marshes on the refuge.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective A-7. Habitat Monitoring		
Continue to conduct habitat inventories, monitoring, and data analysis of management procedures and subsequent wildlife responses to water and plant management regimes, especially in the wake of Hurricane Rita.	Once Hurricane Rita recovery operations are complete, improve and increase capability of refuge to conduct inventories, monitoring, and data analysis of habitat changes in the aftermath of the hurricane, as well as in response to management procedures.	Concurrent with Hurricane Rita cleanup and recovery, improve and increase capability of refuge to conduct inventories, monitoring, and data analysis of habitat changes in the aftermath of the hurricane, as well as in response to management procedures.
Goal B – Fish and Wildlife Management: Maintain healthy and viable wildlife and fish populations on the refuge to contribute to the purpose for which it was established and to the mission of the National Wildlife Refuge System.		
Objective B-1. Migratory Waterfowl		
There would be no active management of migratory waterfowl.	Once Hurricane Rita recovery operations are complete, provide 125,790 acres of diverse marsh and open water habitats for migrating and wintering waterfowl to contribute significantly to the population and habitat objectives addressed in the Gulf Coast Joint Venture Chenier Plain Initiative. Population objectives of the Plan include 4.5 million ducks and 500,000 geese with foraging habitat provided in the coastal marshes.	Same as Alternative A.
Objective B-2. Mottled Ducks		
There would be no active management of mottled ducks.	Once Hurricane Rita recovery operations are complete, with partners, support mottled duck banding activities and provide preferred mottled duck breeding and nesting habitat.	Same as Alternative A.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective B-3. Shorebirds		
There would be no active management for shorebirds.	Once Hurricane Rita recovery operations are complete, resume providing shorebird habitat, contributing to the goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan.	Same as Alternative A.
Objective B-4. Colonial Waterbirds		
There would be no active management for colonial waterbirds.	Once Hurricane Rita recovery operations are complete, identify and protect nesting colonies of colonial waterbirds from disturbance.	Same as Alternative A.
Objective B-5. Marsh Birds		
There would be no active management for marsh birds.	Once Hurricane Rita recovery operations are complete, resume maintaining 125,790 acres of diverse marsh plant communities to support marsh birds.	Same as Alternative A.
Objective B-6. Nongame Migratory and Resident Landbirds		
There would be no active management for nongame migratory and resident landbirds.	Once Hurricane Rita recovery operations are complete, the refuge will continue and enhance its role in the conservation of nongame birds in the southeast United States, and will focus on surveying, inventorying, and monitoring of all groups, and will contribute to the goals of the Gulf Coast Joint Venture, Partners in Flight and other plans.	Same as Alternative A.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective B-7. Alligators		
There would be no active management or harvest of alligators on the refuge, however, population surveys and monitoring would continue as it was prior to Hurricane Rita.	Once Hurricane Rita recovery operations are complete, in coordination with Louisiana Department of Wildlife and Fisheries, monitor alligator numbers, establish a desirable alligator density objective, and set annual harvest quotas.	Same as Alternative A.
Objective B-8. Impoundment Fisheries		
There would be no active management of impoundment fisheries.	In cooperation with partners, once Hurricane Rita recovery operations are complete, or within 5 years of CCP approval, resume habitat management consistent with the purpose of the refuge; also resume monitoring and seeking ways to improve water quality and fishery resources.	Same as Alternative A.
Objective B-9. Undesirable Animals		
There would be no active management or control of undesirable animals on the refuge.	Once Hurricane Rita recovery operations are complete, the refuge will intensively control certain wildlife populations as needed to achieve habitat and population objectives.	Same as Alternative A.
Objective B-10. Diamond-Backed Terrapins		
There would be no active management or control of undesirable animals.	Once Hurricane Rita recovery operations are complete, resume protection of diamond-backed terrapin populations.	Same as Alternative A.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective B-11. Wildlife Inventory, Census, And Survey		
Maintain current capability of refuge to conduct inventory, monitoring, and data analysis of management procedures and subsequent wildlife responses to water and plant management regimes.	Once Hurricane Rita recovery operations are complete, improve and increase capability of refuge to conduct inventory, monitoring, and data analysis of management procedures and subsequent wildlife responses to water and plant management regimes.	Same as Alternative A.
Goal C – Oil and Gas Infrastructure and Activities: Manage petroleum infrastructure and activities to protect habitat, wintering migratory birds and nesting birds.		
Objective C-1. Protection And Management		
Closely monitor oil and gas activities to minimize impacts to wetland habitats and wildlife usage.	Closely monitor oil and gas activities to minimize impacts to wetland habitats and wildlife usage and are managed per Fish and Wildlife Service Policy. (Reference Fish and Wildlife Manual: FWS 603, Section 2.11 D and Chapter II of this Comprehensive Conservation Plan, Refuge-related Problems, Oil and Gas. All new non-refuge mineral owners' requests for petrochemical transmission infrastructure will be prohibited per above policy.	Same as Alternative A.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective C-2. Reclamation		
Maintain current levels of surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species.	Increase surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species.	Same as Alternative A.
Goal D – Public Use Management: Provide opportunities for safe, quality, compatible, wildlife-dependent public use and recreation — including environmental education, interpretation, wildlife observation, photography, hunting, and fishing — which will promote understanding and appreciation of the United States Fish and Wildlife Service and its mission.		
Objective D-1. Visitor Services		
Sabine Refuge would remain closed to all visitation and public use indefinitely.	Within 2 years of finishing Hurricane Rita cleanup operations, complete steps to enhance the refuge's infrastructure and operations to provide for quality, wildlife-dependent public use.	Within 2 years of finishing downsized Hurricane Rita cleanup operations, restore most public recreational uses to their former locations on the refuge.
Objective D-2. Hunting Opportunities		
Sabine Refuge would remain closed to hunting indefinitely.	Once Hurricane Rita recovery operations are complete, improve hunting opportunities, compatible with the purpose of the refuge.	Once downsized Hurricane Rita recovery operations are complete, begin to restore waterfowl hunting opportunities.
Objective D-3. Fishing Opportunities		
Sabine Refuge would remain closed to fishing indefinitely.	Once Hurricane Rita recovery operations are complete, provide increased fishing opportunities for families to experience compatible wildlife-dependent recreation.	Once downsized Hurricane Rita recovery operations are complete, reopen selected areas on the refuge to fishing.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Objective D-4. Wildlife Observation and Photography		
Sabine Refuge would remain closed to wildlife observation and photography activities indefinitely.	Once Hurricane Rita recovery operations are complete, enhance existing opportunities for wildlife observation and wildlife photography by upgrading facilities.	Once downsized Hurricane Rita recovery operations are complete, reopen selected areas to wildlife observation and wildlife photography.
Objective D-5. Environmental Education and Interpretation		
Continue to conduct off-site environmental education but no on-site environmental education or interpretation would be carried out.	Once Hurricane Rita recovery efforts are complete, coordinate with and complement other refuges within the Complex to implement environmental education and interpretation programs.	Same as Alternative B.
Objective D-6. Friends, Volunteers, Partners, Interns		
Continue opportunities for Friends, volunteers, partners and interns to assist with off-site environmental education.	Once Hurricane Rita recovery operations are complete, provide additional opportunities for Friends, volunteers, partners and interns to assist with refuge programs.	Once downsized Hurricane Rita recovery operations are complete, continue to provide opportunities for Friends, volunteers, partners and interns to assist with off-site and limited on-site environmental education.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Goal E – Cultural Resources: Protect refuge cultural resources in accordance with Federal and state historic preservation legislation and regulations.		
Objective E-1. Survey		
No cultural resources survey would be conducted at Sabine Refuge.	Within 3 years of completing hurricane recovery operations, assess the feasibility of conducting a refuge-wide archaeological survey.	Same as Alternative B.
Objective E-2. Education		
Develop and implement an educational program off-site that will provide an understanding and appreciation of the refuge's ecology and the human influence on the region's ecosystems.	Within 3 years of completing Hurricane Rita recovery operations, develop and implement an educational program that will provide an understanding and appreciation of the refuge's ecology and the human influence on the region's ecosystems.	Same as Alternative B.
Objective E-3. Cultural Resources Management Plan		
No Cultural Resources Management Plan would be developed.	Within 5 years of completing Hurricane Rita recovery operations, develop a step-down Cultural Resources Management Plan.	Same as Alternative B.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
GOAL F – East Cove Unit: Utilize water control structures to restore the area to an intermediate-type marsh with good vegetation cover important to certain fin and shellfish species and dabbling waterfowl groups. Improve public fishing access.		
Objective F-1. Intermediate Marsh Restoration		
Operate gates to restore preferred vegetated plant communities associated with intermediate/slightly brackish marsh. Assess use of terraces to improve vegetation of open-water areas.	Same as Alternative A.	Same as Alternative A.
Objective F-2. Sanctuary		
Determine the need for sanctuary in the East Cove area and minimize detrimental waterfowl disturbances.	Same as Alternative A.	Same as Alternative A.
Objective F-3. Invasive Plant Species		
Monitor the East Cove Unit for invasion of exotic plant species with special emphasis on giant salvinia.	Same as Alternative A.	Same as Alternative A.
Objective F-4. Fishing Access		
Improve public fishing access to East Cove by FY 2010 or sooner.	Same as Alternative A.	Same as Alternative A.

Alternative A: No Action (Current Management Direction)	Alternative B: Keep Refuge Functional (Near Term) and Enhanced Management (Long Term) – Proposed Alternative	Alternative C: Hold Refuge in Custodial Form
Goal G – Refuge Complex Operations: Concurrently with Hurricane Rita recovery operations, develop and maintain the Southwest Louisiana National Wildlife Refuge Complex Headquarters to (1) support, direct, and manage the needs, resources, and staff of Cameron Prairie, Lacassine, Sabine, and Shell Keys national wildlife refuges, (2) coordinate their relationship with each other, (3) manage the role of the Service as a partner in the multiagency Cameron Creole Watershed Project, and (4) interact with the state-managed Rockefeller Refuge.		
Objective G-1 –Complex Support		
The Southwest Louisiana National Wildlife Refuge Complex will encourage and support each refuge's major focus (environmental education, interpretation, and research) and the relationship of these programs to wildlife and habitat management objectives and strategies.	Same as Alternative A.	Same as Alternative A.

Chapter IV. Environmental Consequences

OVERVIEW

Outlined below are the predicted impacts that could result from the implementation of the proposed actions described in Alternatives A, B, and C. Each alternative portrays the expected outcomes for fish and wildlife through the year 2020, varying in magnitude with the intensity of management.

When this Environmental Assessment was originally prepared prior to Hurricane Rita, Alternative A was described as "essentially the 'business as usual' approach to refuge management." However, in post-Rita circumstances, "business as usual" takes on a new meaning and is perhaps inappropriate as a shorthand description of Alternative A, the No Action or Current Management Direction alternative. Now, the essence of Alternative A is continuing indefinitely with the status quo, which means no public use, no active wildlife or habitat management other than the wildland fire management program, and no restoration of staff and visitor facilities that were damaged or destroyed during the hurricane. However, industrial oil and gas operations would continue at the normal (pre-hurricane) level. Adverse impacts from pursuing Alternative A's management approach would likely occur on habitat and wildlife populations and would certainly occur on public use, which would continue to be prohibited.

The East Cove Unit was not damaged nearly as badly by Hurricane Rita as the main portion of the refuge. Under Alternative A, the marsh habitat of the East Cove Unit would probably continue to be enhanced as recent restoration projects mature and invasive plant infestations are gradually curbed. Waterfowl sanctuary would continue and fishing access may improve on the East Cove Unit.

Actions and impacts under Alternative B can be subdivided into the near term and long term. Over the near term, under this alternative, refuge programs would continue throughout the refuge commensurate with the level of hazardous material cleanup and restoration over time. Areas west of State Highway 27 (except the area immediately adjacent to the highway) would remain closed in the near term due to hazardous waste and debris fields that clog waterways. However, over time, these areas would be reopened as repairs to infrastructure and restoration of habitat occur. Simultaneously, a hydrological and feasibility study would be conducted to evaluate how the plug of hurricane-deposited debris, uprooted vegetation, and sediments has affected marsh drainage patterns and the challenges and opportunities presented by this changed environment. East of Highway 27, all public use facilities along Highway 27 would be repaired as soon as funding permits. The fire and research programs would remain active throughout the refuge, as would oil and gas operations. There would be one or more visitor contact stations, but no visitor center, with visitors being referred to the Cameron Prairie Refuge's visitor center for interpretive exhibits, education, and information.

In the near term, Alternative B would not vary substantially from Alternative A at first, because they are both beginning from the same starting point—a refuge badly damaged by Hurricane Rita and closed to all public entry and use. However, actions and impacts of Alternative B would begin to diverge from those of Alternative A even in the near term, especially with regard to public use. Whereas under Alternative A, the entire refuge would remain closed to all public use throughout the 15-year planning horizon, under Alternative B, the refuge would gradually be opened to public use as cleanup and remediation of hazardous waste occurred and public safety could be guaranteed. This reopening would occur first east of State Highway 27 and then, as circumstances permit, extend to areas west of State Highway 27. With respect to habitat and wildlife populations, the more active

measures proposed under Alternative B would tend to yield benefits that would not accrue under Alternative A.

Over the long term, proposed management actions described in Alternative B, the proposed alternative would in general intensify and expand active management of the two main refuge habitats, the impounded and unimpounded marsh. On impounded marshes (Units 1A, 1B, and 3), if this alternative were successfully implemented, it would improve both emergent marsh and shallow water habitat, thereby increasing waterfowl food production and providing needed habitat and sanctuary for wintering and resident ducks and geese. On the other hand, if the results of a hydrological and habitat study proposed by Alternative B indicated that opening impounded marsh units to tidal influence would likely improve habitat conditions and lead to a more self-sustaining, brackish marsh, then this alternative could well move in that direction.

Also over the long term, vigorous restoration efforts using dredge material on degraded unimpounded marshes would continue and expand, providing additional area (up to 43,200 acres) of improved unimpounded marsh quality on the refuge. This is turn would likely result in an increase in fish, shellfish, waterfowl, wading bird and shorebird populations in those unimpounded marshes that are restored. Impacts from oil and gas exploration and development would be held to an acceptable level from a combination of cooperative planning with the industry, monitoring, mitigation, and reclamation. However, all new non-refuge mineral owners requests for petrochemical transmission infrastructure will be prohibited in accordance with Service policy to avoid habitat destruction, saltwater intrusion, and other diverse effects from off-refuge lines traversing the refuge. Prescribed fire would continue to be a tool for rejuvenating both upland and wetland habitats. There should be a small increase in fall foraging habitat for shorebirds, and an expected increase in seasonal shorebird populations. Public use opportunities—including hunting, fishing, wildlife observation and photography, and environmental education and interpretation—would generally be greater under Alternative B than with Alternative A. Waterfowl hunting, for example, would expand both in time and space: from three to four days of the week open during the season, and from 34% to 40% (50,000 acres) of the refuge open to hunters. Fishing access would also increase. Any cultural resources impacts are expected to be minimal to negligible; cultural resources management on the refuge would improve.

Under Alternative B, as with Alternative A, the marsh habitat of the East Cove Unit would probably continue to be enhanced as recent restoration projects mature and invasive plant infestations are gradually curbed. Waterfowl sanctuary would continue and fishing access may improve.

Alternative C differs sharply from both Alternative A and Alternative B in that, with few exceptions (such as the East Cove Unit), habitat and wildlife would essentially cease to be actively managed. Limited marsh cleanup of Hurricane Rita's damages and debris would continue, as would oil and gas operations, wildfire suppression, and fuel reduction. However, salinity levels would not be managed and preventive maintenance and repair of dikes and levees would cease. They would be abandoned to erosion and eventual breaching. Freshwater impoundments on the refuge would likely revert to brackish or salt water conditions in the relatively near future. In addition, all marsh restoration—such as by the construction of terraces—would be halted.

Public use of the Sabine Refuge would resume as soon as cleanup operations have ceased. Most visitor facilities would be restored to pre-Rita conditions. However, it is likely that the quality of wildlife-viewing opportunities, fishing, and hunting would decline due to the cessation of active habitat and wildlife management. Wildlife habitats are expected to degrade somewhat.

The thrust of Alternative C is passive management. Refuge staff would focus their efforts on monitoring ecological changes and wildlife responses to uninterrupted habitat succession and natural disturbances.

EFFECTS COMMON TO ALL ALTERNATIVES

This section assesses the environmental impacts of implementing the CCP on the biological, physical, social, economic, cultural, and historic resources of the refuge. Some of the predicted impacts are common to all alternatives. A brief discussion of these impacts is outlined in the following paragraphs.

FISH, WILDLIFE, AND HABITAT

Each alternative would protect habitat for wildlife, including migratory and resident birds, mammals, reptiles, amphibians, fish, and invertebrates. The refuge hosts few federally listed species. None are known to be residential, but several species are suspected of occurring at Sabine or have actually been observed occasionally on the refuge; among them are the threatened bald eagle, endangered wood stork, and two sea turtles: the threatened loggerhead and endangered Kemp's ridley. None of the alternatives are likely to have adverse effects on these species.

Alternative A would provide for a moderate amount of habitat management at current levels—all from wildland fire management and prescribed burning—while Alternative B would intensify and expand this management throughout the refuge. While Alternative C would not conduct any active habitat management, it would nonetheless preserve habitat from development other than oil and gas operations. Thus, each of the alternatives would foster habitat for fish and wildlife (although the types of fish and wildlife favored by likely habitat changes would differ somewhat).

The hurricane-affected habitats that are already present on Sabine National Wildlife Refuge would continue under each alternative, but to differing degrees. The large tidal surge of Hurricane Rita engulfed the refuge with huge volumes of salt water. This in turn killed salt-intolerant, freshwater marsh plants over vast areas of the refuge and left behind a residue of salt that may affect habitat development and succession for years to come. While this ecological perturbation was certainly a shock to the ecosystem, it was not entirely negative. Invasive plants that infested the refuge before the hurricane were set back as well, and this effect is also likely to endure for some time.

Each of the alternatives would continue to provide sanctuary from hunting for wintering migratory waterfowl throughout the refuge for at least several days a week. In addition, each would maintain some habitat for shorebirds, wading birds, marsh birds, raptors, neotropical migrants, white-tailed deer, swamp rabbits, nonnative nutria, as well as alligators and other reptiles and amphibians. Finfish and shellfish species that are now present are likely to continue to occur under each alternative, including Gulf menhaden, Atlantic croaker, gobies, pipefish, bay anchovy, inland silverside, western mosquitofish, pinfish, striped and white mullet, silver perch, bay whiff, bayou and rainwater killifish, speckled worm eel, sand sea trout, red drum, crappie, gar, sunfishes, largemouth bass, catfish, blue and mud crab, and white, grass, and brown shrimp.

None of the alternatives would directly impact the soils, water quality, air quality, noise levels, or surrounding land uses. Limited oil and gas exploration and production would continue on the refuge (because subsurface rights are not owned by the refuge), with some potential for localized water contamination by petrochemicals around well sites as well as problems with invasive species encroachment and the need for habitat restoration on ring levees.

Cleanup, remediation, recovery, and restoration would proceed under each alternative, although these efforts would be stopped sooner under Alternative C. Removal of hazardous wastes, large construction debris, and hurricane-generated rubbish would occur equally under each alternative.

The East Cove Unit would be managed identically under all three alternatives, so that there would be no differences between alternatives with regard to impacts on fish, wildlife and habitat. The objectives associated with each alternative—particularly those associated with restoration efforts and invasive species control—should lead to higher-quality, more productive habitat, with commensurately greater fish and wildlife populations.

PUBLIC USE

Each of the three alternatives would allow motorists to drive across the refuge on State Highway 27 and observe wildlife and habitat from the road. Beyond that, only Alternatives B and C would permit visitors to leave their cars and State Highway 27 to actually enter the refuge on foot or by boat.

Each of the alternatives would offer environmental education opportunities, but those of Alternative A would take place entirely off-refuge, in places such as the Cameron Prairie National Wildlife Refuge visitor center, school classrooms, and other venues.

CULTURAL RESOURCES

Each of the alternatives would protect the refuge's cultural resources in accordance with federal and state historic preservation legislation and regulations. A step-down Cultural Resources Management Plan would be prepared under each alternative and the feasibility of conducting an extensive archaeological resources survey would be determined. In addition, the refuge would work with local stakeholders, such as American Indian tribes, Cajun, Creole and African American groups to develop an education program regarding their cultural heritage and history.

Each alternative affords land protection and low levels of development, thereby resulting in little direct adverse effects on the cultural and historic environment. In most cases, any management actions that would involve substantial excavation—such as to construct new levees, canals, or roads—would require review by the Regional Archaeologist and consultation with the Louisiana State Historic Preservation Office (SHPO), as mandated by Section 106 of the National Historic Preservation Act (NHPA). Determining whether a particular action within an alternative has the potential to affect cultural resources is an ongoing process that would occur with the planning stages of every project. The Service's management of land with known or potential archaeological or historical sites provides two major types of protection for these resources—protection from damage by federal activity and protection from vandalism or theft. The NHPA requires that any actions by a federal agency which may impact archaeological or historical resources be reviewed by the SHPO and that the identified impact be avoided or mitigated. The Service's policy is to preserve these resources in the public trust, avoiding impact whenever possible.

OIL AND GAS ACTIVITY

The three alternatives offer the exact same amount of protection for existing and future oil and gas activities on Sabine National Wildlife Refuge. The refuge would be protected in the same manner by each alternative from any harmful effects caused by existing oil and gas activity in accordance with U.S. Fish and Wildlife Service Policy 603 FW 2 in general, and explicitly under section 2.11D and state and federal laws. Likewise, each alternative would treat requests in the same way for new oil and gas activity as an inappropriate use considering the current status of Louisiana's coastal

wetlands and the Fish and Wildlife Service's role in managing and protecting this state's coastal resource.

EFFECTS FROM IMPLEMENTING ALTERNATIVE A: NO ACTION (CURRENT MANAGEMENT DIRECTION)

The No Action Alternative is included in the Environmental Assessment to provide a basis for comparison with the two action alternatives. Implementing Alternative A would likely be only partially successful at meeting the primary purpose of Sabine National Wildlife Refuge. Alternative A would not fully achieve all long-range goals over the 15-year life of this CCP. The No Action Alternative would maintain the status quo, that is, current, post-Hurricane Rita management direction. It assumes that current conservation management and land protection programs and activities by the Service, state and local agencies, and private organizations would continue to follow trends of the recent past over the next 15 years, the planning horizon for this CCP and EA.

FISH, WILDLIFE, AND HABITAT

As mentioned above, the tidal surge associated with Hurricane Rita inundated the entire refuge with salt water. This negatively affected or killed much of the freshwater, nonsalt-tolerant plants across much of the refuge, over tens of thousands of acres. During a site visit by airboat in February 2006, most of the marsh habitat looked brown and gray, dominated by silt-covered, dead vegetation that would have normally appeared much greener at this time of year. In addition, portions of the refuge that had been closed, heavily vegetated marsh were now open water, and other areas of hemi-marsh that had a higher percentage of open water versus emergent vegetation were covered with rotting, displaced plant matter. The direct and indirect effects of the hurricane on the refuge's wildlife populations are unknown, but certainly some species of vertebrates would have experienced high mortality and/or movement, both into and out of the refuge.

Long-term study and habitat monitoring will be necessary to determine the various effects of Hurricane Rita on the habitats at Sabine. Assuming that pre-existing, broad habitat types will reassert themselves over time as the refuge recovers on its own, then under Alternative A, the pre-hurricane acreages and proportions (percentages) of the respective habitat types at Sabine would generally remain the same for the duration of the 15-year planning horizon. With possible exceptions for a variety of reasons, most wildlife populations that were reduced (or increased) by the hurricane would be expected return to their pre-hurricane levels. However, habitat quality—as gauged by its value to waterfowl and most other wildlife—might decline somewhat over the coming years, especially in the impounded marsh units. This would result from the diminution of open water as these impoundments continue to gradually fill in with emergent vegetation and become shallower as dead organic matter accumulated on the bottom.

The inevitable fate of these impoundments, like virtually all ponds and lakes, is not to endure as permanent features of the landscape. While Hurricane Rita killed certain invasive plant infestations and opened up areas of certain impoundments, over time, without active management intervention on a periodic basis to disrupt and reverse natural succession and filling in, this process will certainly resume. Under the No Action Alternative, these interventions, in the form of some dewatering, drawdown, and prescribed fire, would probably not occur with the intensity and regularity needed to consume organic matter and abate the long-term loss of open water. Habitat for waterfowl, wading birds, marsh birds, alligators, and fish will shrink, and eventually disappear altogether, as the impoundments are converted to wet meadow habitat over time. Dense emergent vegetation may provide cover and nest sites for some waterfowl and marsh species, but it does not supply the quantity or quality of food that the shallow open water areas it displaces.

Unimpounded marsh under this alternative is likely to remain the same both in terms of quantity and quality; there may be some improvement in quality as habitats at marsh restoration projects completed over the last decade continue to develop. Waterbird, fish and aquatic invertebrate numbers at these sites would be expected to increase over time. In other areas of unimpounded marsh, there may be some further degradation of habitat from undue wave action and turbidity.

Alternative A would promote the cleanup of hazardous wastes on the refuge and the remediation of contaminated sites. However, there may well be sporadic, long-term problems with hazardous wastes that had sunk out of sight prior to their cleanup and removal seeping back into the marsh as their containers invariably disintegrate over time.

PUBLIC USE

Sabine National Wildlife Refuge is currently closed to all public use and would remain so indefinitely under the No Action Alternative. Hunting, fishing, wildlife observation, wildlife photography, interpretation and environmental education would all continue to be prohibited on the refuge. This is a major adverse impact of Alternative A, because the Sabine Refuge was visited and enjoyed by more than 300,000 visitors annually before Hurricane Rita.

This cessation of outdoor recreation by both resident and nonresident refuge visitors would eliminate the spending and income associated with it, adding incrementally to the devastating economic impacts Hurricane Rita imposed on Cameron Parish. Prior to Rita, the number of tourists visiting Cameron Parish was expected to grow in the coming years, taking advantage of such opportunities as the newly established, 180-mile Creole Nature Trail National Scenic Byway, the proximity of the coast, two other national wildlife refuges in the Southwest Louisiana Refuge Complex (Cameron Prairie and Lacassine), wildlife management areas, and other cultural opportunities. Over time, the number of these tourists visiting Sabine Refuge in particular would probably have increased, as long as it maintained its reputation as a site with outstanding opportunities to observe and appreciate wildlife.

As Cameron Parish and southwest Louisiana recover from the hurricane, the number of potential visitors to the refuge is likely to gradually return to pre-hurricane levels, though it may take some years. Maintaining the current closure of the refuge to public use indefinitely would represent a substantial loss of potential revenue for the area.

EFFECTS FROM IMPLEMENTING ALTERNATIVE B: THE PROPOSED ACTION

Of the three alternatives evaluated in this EA, implementing Alternative B is considered to be the most effective and realistic management approach for pursuing the purpose of Sabine National Wildlife Refuge. Once hurricane cleanup operations have finished, Alternative B would aim to improve management of the refuge in all program areas by restoring wildlife habitats, particularly marsh and shallow water habitat, and expanding public use.

Under Alternative B, the refuge would redouble recent efforts to extend the useful life of its three impoundments as wintering waterfowl sanctuaries and wetland wildlife habitat through adaptive management and increased research and experimentation. For example, the use and evaluation of drawdowns and prescribed fire as tools in freshwater marsh management would be intensified. Part of the adaptive management approach embodied in Alternative B calls for a study of reconnecting the impoundments, particularly Unit 3, to tidal circulation by opening one or more gaps or gates in the levees surrounding the unit. Pending the outcome of this study, which would examine how salinities

and wildlife/waterfowl habitats would likely change in Unit 3, as well as whether tidal currents would help slow or prevent filling in of the unit, refuge managers may decide to pursue this option.

Alternative B would also pursue additional opportunities to reduce wind and wave erosion to unimpounded refuge marshes caused by several different natural and human forces, among them wind/wave action, commercial navigation, and oil and gas industry exploration, extraction, and transport activities.

In terms of public use, starting from a baseline of complete closure to the public, Alternative B would eventually aim to increase quality hunting and fishing experiences as well as expand on wildlife observation and photography and environmental education and interpretation programs.

As in the case of both other alternatives, the pursuit of these objectives is contingent upon first cleaning up and rehabilitating those sections of the refuge impacted by Hurricane Rita.

FISH, WILDLIFE, AND HABITAT

As discussed under Alternative A, Hurricane Rita represented a perturbation or disturbance of enormous magnitude to Sabine Refuge habitats and wildlife—unprecedented in recent decades. In the months following Rita, refuge managers, along with other federal and state agencies, focused exclusively on addressing the urgent issues of human health and safety, search and rescue, providing shelter to displaced and dispossessed persons, and identifying and remediating immediate threats of contamination to the refuge. Since the Sabine Refuge's headquarters complex was badly damaged by the hurricane and had to be mostly demolished, the refuge staff relocated to the headquarters of the Southwest Louisiana National Wildlife Refuge Complex at Cameron Prairie to the east. The Cameron Prairie Refuge headquarters and visitor center served as the command center for hurricane recovery operations in Cameron Parish.

Given these extenuating circumstances, the refuge staff has not yet had time to thoroughly assess the changes wrought by Rita on Sabine's wildlife and habitat. What is known is that the hurricane's powerful tidal surge, in addition to transporting and depositing many tons of manmade debris onto the refuge, also detached, transported, and deposited large quantities of marsh vegetation. Piles of dead and decaying vegetation are visible on the refuge; areas of dense marsh vegetation have been converted at least temporarily into open water; and channels have been plugged or partially filled with plant matter and construction debris. In addition, the salt water of the tidal surge stressed or killed freshwater marsh plants over vast areas of the refuge. In short, it is too early to tell if the relative percentages of marsh habitats at Sabine before the hurricane—7,231 acres of brackish marsh, 84,829 acres of intermediate marsh, and 33,730 acres of fresh marsh—have been permanently affected by Rita.

Once hurricane recovery operations have ceased and natural renewal of the refuge is well underway, Alternative B would pursue a number of wildlife and habitat objectives. In general, habitats and the fish and wildlife populations they support on the refuge should benefit moderately from Alternative B.

On the refuge's impounded marshes (Units 1A, 1B, and 3), the proposed strategies should gradually improve existing marsh plant communities and shallow water habitat. These strategies include periodic drawdowns on regular rotations, extensive use of prescribed fire to consume accumulating organic matter and set back succession, and possible additional use of salt water as a disturbance agent. Approximately once every two to five years, portions or all of the impoundments would be dewatered and burned under Alternative B, in order to reduce the accretion of organic matter that is gradually filling in the impoundments. This could have an adverse, but temporary, effect on habitat in

the impoundment (or a portion thereof) undergoing the treatment, to the temporary detriment of bird, fish, and alligator populations found there. Such impacts would be dispersed and minimized if only one impoundment or a portion of impoundment at a time were subjected to these treatments. However, even naturally-occurring droughts can produce marked adverse effects on the wildlife habitat value of the impounded marsh areas, especially since their only source of water is rainfall.

Over time, regular application of these tools, in conjunction with optimal management of water levels in the impoundments, should increase waterfowl food production and furnish habitats and sanctuary needs for migrating, wintering, and breeding ducks (particularly the mottled duck) and geese of the Chenier Plain system of southwest Louisiana. The impoundments' overall value to waterfowl, other waterbirds, and aquatic species like fish and the alligator would also be improved and extended under this alternative.

Also under Alternative B, a hydrological and habitat study of reconnecting Unit 3 to tidal flows would be conducted. If this study's finding indicated that such a reconnection could have beneficial, long-term effects on the habitat of Unit 3, Sabine managers may decide to open this large unit to tidal influence, changing it from fresh to intermediate marsh.

Over the long term, Alternative B proposes to protect and/or restore an additional 43,200 acres of intermediate and brackish unimpounded marsh and continue working toward restoring the emergent marsh and functional value of Unit 3 through the year 2015. The use of proven techniques like terracing should improve water quality and habitat for waterfowl, wading birds, marsh birds, fish and invertebrates in Units 2, 5, 5, 6 and 7, thereby increasing populations of all of these taxa.

Vegetation communities on levees would be improved by controlling invasive weeds and planting trees and shrubs, where appropriate, that have higher wildlife food value, particularly for neotropical migrants. Deer may also benefit from these proposed habitat changes and enhancements, particularly because of increased food production on levees, croplands, and moist soil units.

The adverse impacts of petrochemical development (exploration, drilling, extraction, and transport) should be ameliorated somewhat under Alternative B, which proposes increased efforts at protection, remediation of contamination and reclamation of former extraction sites.

Both invasive plants and undesirable animals are to be subjected to greater control in this alternative, which if fully and successfully implemented, would yield benefits both for habitat integrity and native wildlife.

This alternative proposes to increase late summer and fall foraging habitat for shorebirds, which would probably assist broader regional goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan. In general, other wildlife—including other breeding birds, mammals, amphibians, and reptiles—while not specifically targeted by managers, would probably see incidental benefits from most of the proposed habitat management. Of course, whether a given species benefits or not from the proposed changes in management and predicted changes in habitat would depend on its particular ecological niche and habitat needs.

PUBLIC USE

As in the case of the No Action Alternative, implementation of Alternative B would start from a situation of complete closure of the refuge to all public use. However, whereas Alternative A would maintain this closure indefinitely, Alternative B would gradually open the refuge to the public in

phases, as given units or areas were certified as cleaned up of hazardous debris and toxic waste, and thus presented minimal or no risk to the public.

Over the long term, in addition to restoring all pre-existing facilities and recreation sites, Alternative B fully intends to support and expand public use opportunities, including more facilities, greater staff and volunteer support, and expanded options for wildlife-dependent outdoor recreation and enjoyment. This commitment, coupled with probable increases in populations and visibility of wintering migratory waterfowl, shorebirds, wading birds, marsh birds, and raptors, would furnish greater opportunities for public use and enjoyment of the refuge. Overall, Alternative B would likely be better for public use than Alternative A.

Alternative B does share one feature with Alternative A: neither would rebuild and reopen a visitor center on the refuge itself. While the lack of a visitor center located at Sabine is a moderate disadvantage or setback for the public, it is not uncommon among national wildlife refuges generally not to have dedicated visitor centers. Instead, the Sabine Refuge would have one or more self-serve "visitor contact stations" for visitors to find maps, brochures, hunting/fishing regulations, and other information about the refuge and its resources.

Waterfowl hunting would eventually expand from 27% to 40% of the refuge. Additional fishing facilities would be provided, and the feasibility of commercial guiding for fishing would be assessed under the auspices of the Recreation Fee Demonstration Program. Were commercial guiding to be allowed, it could expand fishing opportunities for visitors, especially more affluent nonresidents unfamiliar with the area and those with less sport fishing experience and knowledge. Direct adverse impacts from controlled guiding on the fishery resource are not anticipated, but unless managed properly, there could be an unhealthy perception of competition or rivalry between commercial guides and their clients and the general recreational fishing public. Any such conflicts could be minimized by limiting the amount of commercial guiding.

Other public use and educational opportunities would also expand under Alternative B, if fully implemented. With the participation of volunteers and partners, wildlife observation and photography would increase. In addition, this alternative would allow for commercial guiding (e.g. nature and bird watching walks, guided boat, canoe or kayak tours, etc.), which would be generally beneficial because it has the potential of extending appreciation of the refuge and knowledge of wildlife to a broader segment of the public. No substantial conflicts are expected to arise between guided groups and the general public and should be readily resolvable if they do. Both onsite and offsite environmental education and onsite interpretation could increase under this alternative, utilizing volunteers and partners, and making use of such tools as educational kits and materials, teachers' workshops, and lesson plans.

Any increase in visitation to the refuge would result in a corresponding increase in the value of the refuge to the local economy, as visitor spending rises. As infrastructure, employment, and the local economy in general all recover from the effects of Hurricane Rita, increased visitation to Sabine National Wildlife Refuge as part of the Creole Nature Trail All American Road would contribute to the area's socioeconomic recovery.

EFFECTS FROM IMPLEMENTING ALTERNATIVE C: HOLD REFUGE IN CUSTODIAL FORM

Under Alternative C, the refuge would maintain its current size of 125,790 acres, and its current habitat mix: 40,403 acres of open water and 85,387 acres of marsh grassland, assuming this mix has not been fundamentally altered by Hurricane Rita. Alternative C differs sharply from Alternatives A and B because it would halt virtually all active habitat and wildlife management.

FISH, WILDLIFE, AND HABITAT

Under Alternative C, there are two main possible scenarios that could occur at the Sabine Refuge's impounded marshes. In the first scenario, the main consequence would stem from the absence of drawdowns and in the second scenario, from the inevitable degradation of unmaintained levees.

In the first scenario, no drawdowns would be conducted on the three impounded marshes (Units 1A, 1B, and 3). In addition, no prescribed fires would be set to attempt to consume organic matter accumulating on the bottom of each impoundment. Thus, as they continue to fill in, the impoundments would likely continue to see declines in the matrix of hemi-marsh and open water and that characterize them at present. Emergent plants would continue to spread across shallower waters, eventually encompassing most or all of the impoundments and virtually eliminating open water. The value of the impoundments to waterfowl and wading birds would probably diminish. In view of the primary purpose of the refuge being to provide wintering habitat for migratory birds, particularly waterfowl, this would be a serious or significant detrimental impact.

Conversion of the major part of the refuge's impounded wetland habitat to closed marsh filled with emergent plants like maidencane, California bulrush and cattail would also have adverse effects on other wildlife, including mammals, amphibians, reptiles, and other birds. The problem with these plants is not that they have no value for wildlife—each offers some value—but that the dense structure of the stands that would develop, to the exclusion of open water or submerged plants or mudflats, sharply reduces the quality of habitat for almost all species and groups.

In the second scenario, no maintenance and upkeep of dikes and levees would lead to these structures' inevitable decay over time, allowing eventually for the penetration of salt or brackish water into the freshwater marshes. It is unclear at present whether the ecological changes wrought by such a hydrological reconnection with tidal flows would be beneficial or adverse but changes in plant community and wildlife use would certainly occur. Initially, mortality of freshwater plants would likely ensue, followed by the gradual displacement of salt-intolerant species by salt-tolerant ones.

Under Alternative C, no new terraces would be constructed in open water areas and existing terraces would not be added to or maintained. Consequently, wave action would probably continue to erode the marshes at the edge of open water areas, in addition to continuing to exacerbate turbidity and the damage it causes to aquatic plant and animal life.

Under this alternative, those upland sites along dikes and levees that now support trees would become even more dominated by Chinese tallow and other invasive, weedy species, to the detriment of these habitats and the neotropical birds that use them during spring and fall migration.

Clogging of channels with emergent vegetation would also reduce fish habitat.

In conclusion, of the three alternatives, Alternative C would have the greatest adverse impact on the habitats that contribute to the refuge's purpose. It would almost certainly lead to further declines in populations of waterfowl, wading birds, shorebirds, and neotropical birds. Its effects on populations of other species groups—mammals, amphibians, reptiles, and fish—would be mixed, but mostly negative.

PUBLIC USE

Like Alternative B, Alternative C intends to support public use opportunities once marsh cleanup and remediation have finished. Nevertheless, the Sabine Refuge could well see a decline in the quality of the visitor experience and a drop-off in public use. Once again, this is because the very wildlife that attracts the public to the refuge for observation, photography or hunting, would probably be less abundant and less visible due to the predicted habitat changes described above. This is particularly true of waterfowl, wading birds and shorebirds, which are not only visible, but often spectacular as well. Not only are smaller numbers of ducks and geese likely to winter at Sabine, as their sources of food diminish, but fewer would be visible to the viewing public in the denser vegetation. Thus, as the opportunity to see wildlife declines, eventually the refuge may draw fewer visitors. Deer hunting may not be adversely affected, however, if the deer herd adapts to the predicted habitat changes.

Sport fishing, which takes place mostly in Sabine's canals, may still occur under this alternative, and would be supported in principle. However, the quality of the fishing experience is expected to deteriorate even more so than in the case of Alternative A, as the canals in which fish live are progressively more choked with emergent vegetation and the shrinking volume and area of water reduce the number of fish that can survive.

Environmental education, both onsite and offsite, could still function effectively, although it may be less interesting to students with fewer large birds or flocks to observe at the refuge. Interpretation—which would focus on describing and explaining the habitat changes underway—would still be effective, although once again, less frequently utilized if overall visitation were to decline from reduced opportunities to view wildlife. These two priority public uses would have to change from their focus on waterfowl and other visible birds to a broader ecological focus that examines "the changing land" due to ecological succession and other natural processes.

If visitation to the refuge under this alternative never attains its pre-Rita levels, which seems probable, given decreasing wildlife numbers and opportunities for viewing, this outcome would lead to a decline in the modest economic value of the refuge to the surrounding community. While the number of tourists motoring past the refuge along the newly established, 180-mile Creole Nature Trail National Scenic Byway is likely to increase, over time the number of these auto tourists visiting the refuge would probably decline if it were to develop a reputation for not offering outstanding opportunities to see and appreciate wildlife.

CUMULATIVE IMPACTS ANALYSIS

Cumulative impacts refer to effects that result from the incremental impact of action(s) when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time. This section analyzes and discusses the cumulative impacts of the hunting program of each alternative on a variety of resources at Sabine National Wildlife Refuge.

ANTICIPATED IMPACTS ON WILDLIFE SPECIES

Migratory Birds

The U.S. Fish and Wildlife Service annually prescribes frameworks, or outer limits, for dates and times when hunting may occur and the number of birds that may be taken and possessed. These frameworks are necessary to allow state selections of season and limits for recreation and sustenance; aid federal, state, and tribal governments in the management of migratory game birds;

and permit harvests at levels compatible with population status and habitat conditions. Because the Migratory Bird Treaty Act stipulates that all hunting seasons for migratory game birds are closed unless specifically opened by the Secretary of the Interior, the Service annually promulgates regulations (50 CFR Part 20) establishing the frameworks from which states may select season dates, bag limits, shooting hours, and other options for the each migratory bird hunting season. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them. Thus, in effect, federal annual regulations both allow and limit the hunting of migratory birds.

Migratory game birds are those bird species so designated in conventions between the United States and several foreign nations for the protection and management of these birds. Under the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Secretary of the Interior is authorized to determine when "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any ... bird, or any part, nest, or egg" of migratory game birds can take place, and to adopt regulations for this purpose. These regulations are written after giving due regard to "the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, and are updated annually" (16 U.S.C. 704(a)). This responsibility has been delegated to the U.S. Fish and Wildlife Service as the lead federal agency for managing and conserving migratory birds in the United States. Acknowledging regional differences in hunting conditions, the Service has administratively divided the nation into four flyways for the primary purpose of managing migratory game birds. Each flyway (Atlantic, Mississippi, Central, and Pacific) has a Flyway Council, a formal organization generally composed of one member from each State and Province in that Flyway. Sabine National Wildlife Refuge is within the Mississippi Flyway.

The process for adopting migratory game bird hunting regulations, located in 50 CFR Part 20, is constrained by three primary factors. Legal and administrative considerations dictate how long the rule making process will last. Most importantly, however, the biological cycle of migratory game birds controls the timing of data-gathering activities and thus the dates on which these results are available for consideration and deliberation. The process of adopting migratory game bird hunting regulations includes two separate regulations-development schedules, based on "early" and "late" hunting season regulations. Early hunting seasons pertain to all migratory game bird species in Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands; migratory game birds other than waterfowl (e.g. dove, woodcock, etc.); and special early waterfowl seasons, such as teal or resident Canada geese. Early hunting seasons generally begin prior to October 1. Late hunting seasons generally start on or after October 1 and include most waterfowl seasons not already established. There are basically no differences in the processes for establishing either early or late hunting seasons. For each cycle, Service biologists and others gather, analyze, and interpret biological survey data and provide this information to all those involved in the process through a series of published status reports and presentations to Flyway Councils and other interested parties (USFWS 2006). Under the proposed action, Sabine estimates a maximum additional 8,200 ducks, 50 snow geese, and 10 white-fronted geese would be harvested each year. This harvest impact is minimal and represents less than 1 percent of Louisiana's four-year average harvest of 921,990 ducks, 60,830 snow geese, and 72,611 white-fronted geese (USFWS 2005).

Because the Service is required to take abundance of migratory birds and other factors into consideration, the Service undertakes a number of surveys throughout the year in conjunction with the Canadian Wildlife Service, state and provincial wildlife management agencies, and others. To determine the appropriate frameworks for each species, the Service considers factors such as population size and trend, geographical distribution, annual breeding effort, the condition of breeding and wintering habitat, the number of hunters, and the anticipated harvest. After frameworks are established for season lengths, bag limits, and areas for migratory game bird hunting, migratory game

bird management becomes a cooperative effort of state and federal governments. After Service establishment of final frameworks for hunting seasons, the states may select season dates, bag limits, and other regulatory options for the hunting seasons. States may always be more conservative in their selections than the federal frameworks but never more liberal. Season dates and bag limits for national wildlife refuges open to hunting are never longer or larger than the state regulations. In fact, based upon the findings of an environmental assessment developed when a national wildlife refuge opens a new hunting activity, season dates and bag limits may be more restrictive than the state allows. At Sabine National Wildlife Refuge, season length is the same as the state allows. However, the refuge has imposed restrictions on the number of days of the week that hunting is allowed at Sabine and the hours of the day the hunting is permitted. For example, legal shooting hours end at noon on Sabine, whereas throughout the state these restrictions do not apply.

National Environmental Policy Act (NEPA) considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, ‘‘Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FSES 88– 14),’’ filed with the Environmental Protection Agency on June 9, 1988. The Service published a Notice of Availability in the *Federal Register* on June 16, 1988 (53 FR 22582), and its Record of Decision on August 18, 1988 (53 FR 31341). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate environmental assessment, “Duck Hunting Regulations for 2006-07,” and an August 24, 2006, Finding of No Significant Impact. Further, in a notice published in the September 8, 2005, *Federal Register* (70 FR 53376), the Service announced its intent to develop a new supplemental EIS for the migratory bird hunting program. Public scoping meetings were held in the spring of 2006, as announced in a March 9, 2006, *Federal Register* notice (71 FR 12216). More information may be obtained from: Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Department of the Interior, MS MBSP-4107-ARLSQ, 1849 C Street, Washington, DC 20240.

Although woodcock are showing declines in numbers on their breeding grounds, habitat loss is considered to be the culprit, not hunting. This assertion was tested in a study conducted by the U.S. Geological Survey’s Patuxent Wildlife Research Center in 2005 (McAuley et al. 2005). Results showed no significant differences in woodcock survival between hunted and nonhunted areas. Furthermore, the authors concluded that hunting was not having a considerable impact on woodcock numbers in the Northeast (McAuley et al. 2005).

An estimated 24,000 woodcock were harvested in the 2005–06 season in the state of Louisiana. Louisiana’s harvest of 24,000 woodcock represented 0.5% of the estimated 4.6 million North American woodcock population. Woodcock are not abundant at Sabine because the refuge does not possess large areas of their preferred habitat. Consequently, there is no current or planned hunting for woodcock on the refuge.

Resident Big Game

Deer. Deer hunting does not have regional population impacts due to the restricted home ranges of white-tailed deer. The average home range of a male deer in Mississippi is 1,511 ± 571 S.D. hectares or about six square miles (Mott et al. 1985). Therefore, only local impacts would occur from the proposed rifle, muzzle-loader, and bow hunts for deer under Alternatives B and C. The Louisiana Department of Wildlife and Fisheries estimates that 209,200 deer were harvested throughout the state in 2005/06. The average annual statewide harvest since 1995 is 234,000 deer. Sabine Refuge estimates a maximum of approximately 20 deer would be harvested under the proposed action, representing only 0.01% of the long-term average state harvest. Therefore, addition of deer hunting on refuge lands should not have negative cumulative impacts on the area and state’s deer herd.

Feral Hogs. Feral hogs are an extremely invasive, nonnative species and are not considered a game species by the State of Louisiana. They are common on the Sabine Refuge and can be detrimental to nesting bird success. Feral hogs degrade habitat and can contribute to land loss by damaging healthy plants that hold together the soils in many areas. No harvest of feral hogs is conducted on the refuge at this time and none is proposed under the CCP.

Resident Small Game

Small game includes mammals and birds such as squirrel, rabbit, raccoon, opossum, quail and dove. There is currently no open season for any small game on the refuge and none is planned under this CCP.

Nongame Wildlife

Nongame or nonhunted wildlife would include nonhunted migratory birds such as songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, shrews, and bats; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, frogs and toads; and invertebrates such as butterflies, moths, other insects and spiders. Except for migratory birds and some species of migratory bats, butterflies and moths, these species have very limited home ranges and hunting could not affect their populations regionally; thus, only local effects will be discussed.

Disturbance to nonhunted migratory birds could have regional, local, and flyway effects. Regional and flyway effects would not be applicable to species that do not migrate such as most woodpeckers, and some songbirds including cardinals, titmice, wrens, chickadees, etc. The cumulative effects of disturbance to nonhunted migratory birds under the proposed action are expected to be negligible for the following reasons. Hunting season would not coincide with the nesting season. Long-term future impacts that could occur if reproduction was reduced by hunting are not relevant for this reason. Disturbance to the daily wintering activities of birds, such as feeding and resting, might occur. Disturbance to birds by hunters would probably be commensurate with that caused by nonconsumptive users. The cumulative effects of disturbance to nonhunted migratory birds under the proposed action are expected to be negligible for the above reasons.

With regard to other wildlife, disturbance would be unlikely for the following reasons. Small mammals, including bats, are inactive during the winter when hunting season occurs. These species are also nocturnal. Both of these qualities make hunter interactions with small mammals very rare. Hibernation or torpor by cold-blood reptiles and amphibians also limits their activity during the hunting season when temperatures are low. Hunters would rarely encounter reptiles and amphibians during most of the hunting season. Encounters with reptiles and amphibians in the early fall are few and should not have cumulative negative effects on reptile and amphibian populations. Invertebrates are also not active during cold weather and would have few interactions with hunters during the hunting season. The refuge has estimated current hunter density on peak days to be no more than one hunter per 160 acres. During the vast majority of the hunting season, hunter density is much lower (1 hunter/1,000 acres). Refuge regulations further mitigate possible disturbance by hunters to nonhunted wildlife. Vehicles are restricted to roads and the harassment or taking of any wildlife other than the game species legal for the season is not permitted.

Although ingestion of lead shot by nonhunted wildlife could be a cumulative impact, it is not relevant to Sabine because the use of lead shot would not be permitted on the refuge for any type of hunting.

Some species of bats, butterflies and moths are migratory. The cumulative effects to these species at the "flyway" level should be negligible. These species are in torpor or have completely passed through Louisiana by the peak hunting season in November–January. Some hunting occurs during September and October when these species are migrating; however, hunter interaction would be commensurate with that of nonconsumptive users.

Threatened and Endangered Species

Federally threatened or endangered species occur infrequently at Sabine National Wildlife Refuge. Calcasieu and Sabine lakes provide habitat for two species of sea turtles: the federal endangered Kemp's ridley and the federal threatened loggerhead. The refuge provides access and habitat for these species, and Service personnel have seen Kemp's ridleys on the refuge; the staff has also radio-tracked loggerheads on the refuge. The refuge could potentially be used by the threatened bald eagle and the endangered wood stork.

An Intra-Service Section 7 evaluation under the Endangered Species Act is included in Appendix H. It concludes that the proposed action would have no effect on the threatened and endangered species mentioned above. These species occur infrequently on the refuge, hunters are unlikely to encounter them, and hunters are unlikely to mistake bald eagles or wood storks for geese and ducks. The cumulative impact on the listed species would be nil to negligible.

ANTICIPATED IMPACTS ON REFUGE PROGRAMS, FACILITIES, CULTURAL RESOURCES, ENVIRONMENTAL JUSTICE, ENVIRONMENTAL RESOURCES, AND SURROUNDING COMMUNITIES

Wildlife-dependent Recreation

As noted in the CCP and EA, at present the Sabine Refuge is closed to public use as a result of the damage to facilities and habitat inflicted by Hurricane Rita in 2005. Under two of the three alternatives, public use would be reinstated commensurate with cleanup of the refuge and reduction of risks and threats to acceptable levels. As public use levels expand across time, unanticipated conflicts between user groups may occur. The refuge's visitor use programs would be adjusted as needed to eliminate or minimize each problem and provide quality wildlife-dependent recreational opportunities. Experience on many national wildlife refuges has proven that time and space zoning (e.g., establishment of separate use areas, use periods, and restrictions on the number of users) is an effective tool in eliminating conflicts between user groups.

The level of recreation use and ground-based disturbance from nonhunting visitors would be largely concentrated on the eastern side of the refuge at trails and the refuge's contact station and maintenance areas. Hunting would be more widely dispersed throughout the refuge, and this separation by space alone would reduce the potential for interaction and conflict. Fishing is also widely dispersed throughout the refuge and the East Cove Unit, though on the main portion of the refuge the fishing and hunting seasons do not overlap. The East Cove Unit has traditionally been closed to fishing during the waterfowl season, and this closure would continue once these activities would resume.

Overall, the cumulative impact of hunting on other wildlife-dependent recreation at Sabine would be negligible to minor.

Refuge Facilities

The Service defines facilities as: “Real property that serves a particular function(s) such as buildings, roads, utilities, water control structures, raceways, etc.” The facilities most utilized by hunters are roads, parking lots, trails, and boat launching ramps. Maintenance or improvement of existing facilities (i.e., parking areas, roads, trails, and boat ramps) would cause minimal short-term impacts to localized soils and waters and may cause some wildlife disturbances and damage to vegetation. The facility maintenance and improvement activities described are periodically conducted to accommodate daily refuge management operations and general public uses such as wildlife observation and photography. These activities would be conducted at times (seasonal and/or daily) to cause the least amount of disturbance to wildlife. Siltation barriers will be used to minimize soil erosion, and all disturbed sites will be restored to as natural a condition as possible. During times when roads are impassible due to flood events or other natural causes, those roads, parking lots, trails and boat ramps impacted by the event would be closed to vehicular use.

Overall, the cumulative impact of hunting on the Sabine Refuge’s facilities would be negligible.

Cultural Resources

Hunting, regardless of method or species targeted, is a consumptive activity that does not pose any threat to historic properties on or near the refuge. In fact, hunting meets only one of the two criteria used to identify an “undertaking” that triggers a federal agency’s need to comply with Section 106 of the National Historic Preservation Act. These criteria, which are delineated in 36 CFR Part 800, state:

1. an undertaking is any project, activity, or program that can alter the character or use of an archaeological or historic site located within the “area of potential effect;” and
2. the project, activity, or program must also be either funded, sponsored, performed, licensed, or have received assistance from the agency.

Consultation with the pertinent State Historic Preservation Office and federally recognized tribes are, therefore, not required.

Environmental Justice

Executive Order 12898, "Federal Actions to address Environmental Justice in Minority Populations and Low-income Populations," was signed by President Bill Clinton on February 11, 1994, to focus federal attention on the environmental and human health conditions of minority and low-income populations to achieve environmental protection of all communities. In part, the order is intended to promote nondiscrimination in federal programs substantially affecting human health and the environment and to provide minority and low-income communities access to public information and participation in matters relating to human health or the environment.

There are low-income and minority populations in the area but there is no evidence of adverse disproportionate environmental justice issues associated with the refuge’s existing hunting program or proposed expansion. Any affected populations would generally be affected in the same ways as the regional population as a whole.

Environmental Resources

The refuge expects no appreciable adverse impacts of the proposed action on the Sabine Refuge

environment, which consists of soils, vegetation, air quality, water quality and solitude. Some disturbance to surface soils and vegetation would occur in areas selected for hunting; however, the impacts would be minimal. Hunting would be expected to benefit vegetation, since it is used to maintain many resident wildlife populations, particularly deer, in balance with the habitat's carrying capacity. When and where necessary, the refuge would also control access or close areas to minimize habitat degradation.

The refuge expects impacts to air and water quality to be minimal and only due to refuge visitors' automobile and outboard motor emissions. The effect of these refuge-related activities, as well as other management activities, on overall air and water quality in the region are anticipated to be negligible, compared to the contributions of industrial centers, power plants, and non-refuge vehicle traffic in this portion of Cameron Parish. Existing state water quality criteria and use classifications are adequate to achieve desired on-refuge conditions; thus, implementation of the proposed action would not impact adjacent landowners or users beyond the constraints already implemented under existing state standards and laws.

Impacts associated with solitude are expected to be minimal given time and space zone management techniques, such as seasonal access and area closures, used to avoid conflicts among user groups.

Surrounding Communities

The refuge would work closely with state, federal, and private partners to minimize adverse cumulative impacts to adjacent lands and its associated natural resources; however, no cumulative impacts are anticipated. The newly opened hunt(s) would result in a net gain of public hunting opportunities, which are expected to positively impact the general public, nearby residents, and refuge visitors. Residents in the area and neighboring communities are likely to view the expanded hunting opportunities favorably. The refuge expects increased visitation and tourism to bring additional revenues to local communities, but this increase in spending is likely to be very small in comparison with the size of the local economy.

Appendix A. Glossary

Adaptive Management	A process in which projects are implemented within a framework of scientifically driven experiments to test predictions and assumptions outlined within the comprehensive conservation plan. The analysis of the outcome of project implementation helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.
Alternative	Alternatives are different means of accomplishing refuge purposes, goals and objectives, and contributing to the National Wildlife Refuge System. A reasonable way to fix the identified problem or satisfy the stated need.
Approved Acquisition Boundary	A project boundary which the Director of the Fish and Wildlife Service approves upon completion of a detailed planning and environmental compliance process.
Bayou	A minor river or secondary watercourse, usually sluggish or back flooding water flow.
Beneficial Dredge	Also known as beneficial use of dredge material. Material dredged (removed) from waterways used in a positive manner. (See Pumped and Excavated Dredge)
Biological Diversity	The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. The National Wildlife Refuge System focus is on indigenous species, biotic communities and ecological processes.
Brackish Marsh	An area of soft, wet, low-lying land characterized by grassy-vegetation and water containing some salt, but less than seawater.
Categorical Exclusion	A category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a Federal agency pursuant to the National Environmental Policy Act.

CFR	Code of Federal Regulations.
Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA)	Passed in 1990, by Congress, this act funds wetland enhancement projects to preserve and restore Louisiana's coastal landscape. The act is also known as the "Breaux Act".
Colonial Waterbirds	Waterbird families generally containing seabirds, coastal waterbirds, and wading birds that congregate at breeding sites in numbers ranging from many to hundreds of thousands of birds.
Compatibility Determination	A required determination for wildlife-dependent recreational uses or any other public uses of a refuge.
Compatible Use	A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Refuge Manager, will not materially interfere with, or detract from, the fulfillment of the mission or the purposes of the refuge. A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.
Comprehensive Conservation Plan (CCP)	A document that describes the desired future conditions of the refuge; provides long-range guidance and management direction for the Refuge Manager to accomplish the purposes, goals and objectives of the refuge; and contributes to the mission of the National Wildlife Refuge System, and to meet relevant mandates.
Cooperative Agreement	A simple habitat protection action in which no property rights are acquired. An agreement is usually long-term and can be modified by either party. Lands under a cooperative agreement do not necessarily become part of the National Wildlife Refuge System.
CRMP	Cultural Resources Management Plan
Cultural Resources	The remains of sites, structures, or objects used by people of the past.
Duck Season Split	A planned interruption during the 60-day hunting season to extend the season to allow hunting when waterfowl are still abundant.

Early Successional Wetland	Wetlands managed for the production of annual plants that produce both vegetation and seeds for use by geese, ducks and other wetland bird species. (See also Moist Soil Management)
Ecological Succession	The orderly progression of an area through time in the absence of disturbance from one vegetative community to another.
Ecosystem	A dynamic and interrelating complex of plant and animal communities and their associated nonliving environment.
Ecosystem Management	Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.
Ecotone	A transitional zone between two communities containing the characteristic species of each.
Ecotourism	Visits to an area that maintains and preserves natural resources as a basis for promoting its economic growth and development.
Emergent Marsh	Wetlands dominated by erect, rooted, herbaceous plants.
Endangered Species	A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.
Environmental Assessment	A concise document prepared in compliance with the National Environmental Policy Act that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact.
Environmental Education	A process of building knowledge in students through hands-on activities that promotes discovery and fact-finding. It involves the integration of environmental concepts and concerns into structured educational activities.
ESA	Endangered Species Act

Excavated Dredge	Removal of material from a waterway bottom using excavating equipment. The dredged material is usually high in clay content and can be used for the creation of levees or earthen terraces. See beneficial dredge.
Fauna	All the vertebrate or invertebrate animals of an area.
Federal Trust Species	All species where the Federal Government has primary jurisdiction including federally threatened or endangered species, migratory birds, anadromous fish, and certain marine mammals.
Fee-Title	The acquisition of most or all of the rights to a tract of land. There is a total transfer of property rights with the formal conveyance of a title. While a fee title acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (the ability to continue using the land for a specified time period, or the reminder of the owner's life).
Finding of No Significant Impact	A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, which briefly presents why a Federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared.
Fire Regime	The characteristic frequency, intensity, and spatial distribution of natural fires within a given ecoregion or habitat.
Geographic Information System (GIS)	A computer system capable of storing and manipulating spatial data.
GCJV	Gulf Coast Joint Venture
Goal	Descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but does not define measurable units.
Grassland birds	These birds use prairie habitat to meet their biological needs. This group of birds includes over 300 species and over 75 % of the breeding bird species of the U.S.
GIW	Gulf Intracoastal Waterway

Hemi-marsh	Areas of mixed open water and emergent vegetation at a ratio of one part open water to one part vegetation preferred by many species of wildlife. Interspersed areas of dense emergent vegetation provide nesting areas and cover for many species.
Herbaceous Wetland	Annually or seasonally inundated with vegetation consisting primarily of grasses, sedges, rushes, and cattail.
Habitat	The place where an organism lives. The existing environmental conditions required by an organism for survival and reproduction.
Impoundment	A body of water, such as a pool, confined by a levee or other barrier, which is used to maintain a freshwater marsh area. Rainfall is usually the only means of providing water into the area.
Indicator Species	A species of plant or animals that is assumed to be sensitive to habitat changes and represents the needs of a larger group of species.
In-Holding	Privately owned land inside the boundary of a national wildlife refuge.
Intermediate marsh	This marsh type is found on the sea-ward of freshwater areas. Intermediate marsh is characterized by a diversity of species, many of which can be found in both freshwater and brackish marshes. Plants found in these marshes can tolerate slightly salty water. Intermediate marshes are also important for waterfowl, wading birds, furbearers and provide nursery habitat for brown shrimp, blue crab, and a variety of other commercially and recreationally valuable fishery resources.
Interpretation	A teaching technique that combines factual with stimulating explanatory information.
Invasive species	An alien species whose establishment does, or is likely to, cause economic or environmental harm.
Inventory	Accepted biological methods to determine the presence, relative abundance, and distribution of species.
Issue	Any unsettled matter that requires a management decision.
Kiosk	A small structure with one or more open sides that is used to display or provide information.

LCA	Louisiana Coastal Area Ecosystem Restoration Plan
LDWF	Louisiana Department of Wildlife and Fisheries
LMRE	Lower Mississippi River Ecosystem
Maintenance Management System (MMS)	The Maintenance Management System is a national database and management tool used for planning and budgeting unfunded maintenance, improvements, repairs, replacement, and construction projects required for on-going support of resource management.
Migratory	The seasonal movement from one area to another and back.
Moist Soil Unit Management	Refers to the way water is used to create a desired plant community habitat. This habitat is manually disturbed using mechanical equipment, tractors and disk. Following this disturbance, native plant seeds already existing within the soil are allowed to germinate and then the soil is flooded to a shallow depth. Once plants reach maturity, fields are again disturbed to create a 50:50 ratio of open water to standing vegetation. (See early successional wetland)
Monitoring	The process of collecting information to track changes of selected parameters over time.
National Environmental Policy Act	Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate this Act with other planning requirements, and prepare appropriate policy documents to facilitate better environmental decision-making.
National Wildlife Refuge (NWR)	A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System.
National Wildlife Refuge System	Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction, all lands, waters, and interests therein administered by the Secretary as wildlife refuges, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas.
Native Species	Species that normally live and thrive in a particular ecosystem.

Neotropical Migratory Bird	A bird species that breeds north of the United States and Mexican border and winters primarily south of that border, which includes Mexico, West Indies, Central America and part of South America.
Natural Levee	Natural embankment created by soil deposited as a stream overtops its banks. Located adjacent to a stream, a natural levee is often the highest ground in a bottomland or swamp type area.
Nongame migratory landbirds	Commonly known as Neartic-Neotropical Migratory Birds, these birds breed in temperate latitudes but winter in tropical latitudes.
NORM	Naturally Occurring Radioactive Material
NWR	National Wildlife Refuge
Objective	An objective is a concise quantitative (where possible) target statement of what will be achieved. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific.
Parish	An administrative district in Louisiana, corresponding to a county in other states.
Planning Area	A planning area may include lands outside existing refuge planning unit boundaries that are being studied for inclusion in the unit and partnership planning efforts. It may also include watersheds or ecosystems that affect the planning area.
Planning Team	A planning team prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of the a planning team leader; refuge manager and staff biologists; staff specialists or other representatives of Service programs, ecosystems or regional offices; and state partnering wildlife agencies as appropriate.
Prescribed Burn	Fire**{** XE "Fire" **}** intentionally ignited by refuge fire personnel for natural resource management under strict guidelines to meet specific objectives.

Pumped Dredge	As shipping channels need to be maintained for depth to allow for passage of large vessels, it is necessary to remove accumulated material from the bottom. A suction dredge brings the fine organic material to the surface where a pump system mixes the material with water and creates a slurry. This slurry can be used in coastal restoration projects to replace material lost in open-water marsh areas. See beneficial dredge.
Refuge Boundary	Lands acquired by the Fish and Wildlife Service within the current approved acquisition boundary.
Refuge Complex	Four national wildlife refuges which include Cameron Prairie, Lacassine, Sabine and Shell Keys were administratively combined into the Southwest Louisiana National Wildlife Refuge Complex. Complexing allows for better management oversight.
Refuge Operating Needs System (RONS)	This is a national database which contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans and meet goals, objectives, and legal mandates.
Refuge Purposes	The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge sub-unit.
SAMMS	Service Asset Maintenance Management System
Seismic survey	A means of gathering subsurface geological information through the generation and receipt of impulses from an artificially generated shockwave (usually a dynamite charge) which predicts oil and gas deposits for further exploration.
Source	A habitat in which local reproductive success exceeds local mortality for a given species.
Source Population	A population in a high-quality habitat in which birth rate greatly exceeds death rate and the excess individuals leave as migrants.
Step-Down Management Plans	Step-down management plans provide the details necessary to implement management strategies and projects identified in the comprehensive conservation plan.

Strategy	A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives.
Survey	A general term for any type of inventory or monitoring procedure.
Threatened Species	Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.
TGCE	Texas Gulf Coast Ecosystem
Undesirable Species	A plant or animal species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. These species can be native or nonnative.
Water Buffalo	The use of mechanized farm equipment in combination with land rolling equipment to improve seed-soil contact, as well as to pulverize soil aggregates and leave a smooth surface.
Wildlife-Dependent Recreation	A use of a refuge involving hunting, fishing, wildlife observation, wildlife photography and environmental education and interpretation. The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the system.
Wildland Fire	A fire that is caused naturally (lighting strike) or by a human cause that is unwanted.

Appendix B. References and Literature Cited

American Bird Conservancy. 2000. Partners in Flight, Conservation of the Land Birds of the United States.

Brown, S., C. Hickey, B. Harrington and R. Gills, eds. 2001. *The U.S. Shorebird Conservation Plan.* Second edition. Manomet Center for Conservation Sciences, Manomet, MA.

Bruno, Nicholas A., Richard W. Gregory and Harold L. Schramm, Jr. 1990. Nest sites used by radio-tagged largemouth bass in Orange Lake, Florida. *North American Journal of Fisheries Management* 10: 80-84.

Chenier Plain Initiative Team. 1990. Chenier Plain Initiative, Texas and Louisiana Gulf Coast Joint Venture, North American Waterfowl Management Plan.

Couser, D. 2002. Atakapa Indians. Handbook of Texas Online. Accessed at: http://www.tsha.utexas.edu/handbook/online/articles/view/AA/bma48.html.

Esslinger, C.G. and B.C. Wilson. 2001. North American Waterfowl Management Plan, Gulf Coast Joint Venture: Chenier Plain Initiative. North American Waterfowl Management Plan, Albuquerque, N.M. 28 pp + appendix.

Feldman, L.H. 1998. The Last Days of British Saint Augustine, 1784–1785. A Spanish Census of the English Colony of East Florida.

Gulf Coast Prairie Working Group, Mississippi Alluvial Valley/West Gulf Coastal Plain Working Groups. 2000. U.S. Shorebird Conservation Plan, Lower Mississippi/Western Gulf Coast Shorebird Planning Region.

Hebert, T. 2003. "The First Acadians in New Acadia, 1764–1784." History of the Cajuns: Cajuns in the 18th Century. Acadian-Cajun Genealogy and History. Accessed at: http://www.acadian-cajun.com/hiscaj2b.htm.

Kushlan, J.A.; M.J. Steinkamp; K.C. Parsons; J. Capp; M.A. Cruz; M. Coulter; I. Davidson; L. Dickson; N. Edelson; R. Elliot; R.M. Erwin; S. Hatch; S. Kress; R. Milko; S. Miller; K. Mills; R. Paul; R. Phillips; J.E. Saliva; B. Sydeman; J. Trapp; J. Wheeler; and K. Wohl. 2002. Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan, Version I. Waterbird Conservation for the Americas, Washington, DC.

Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority. 1998. *Coast 2050: Toward a Sustainable Coastal Louisiana.* Louisiana Department of Natural Resources. Baton Rouge, LA. 161 pp.

Martin, Alex C., Ray C. Erickson and John H. Steenis. 1957. Improving duck marshes by weed control. Circular 19 (revised). Washington, DC: U.S. Department of the Interior, Bureau of Sport Fisheries and Wildlife. 60 pp.

North American Waterfowl Management Plan. 1991. Louisiana Waterfowl Action Plan: A Strategy for Implementing the North American Waterfowl Management Plan in Louisiana.

Royal Café. No date. The distinction between Cajun and Creole. Accessed at: http://www.royalcafe.com/cc.html.

Schlyer, Krista. 2006. *Refuges at Risk: The Threat of Global Warming.* Washington, DC: Defenders of Wildlife. 20 pp.

(STATS Indiana, 2004) Indiana Department of Commerce. 2004. USA Counties in Profile. Accessed at: http://www.stats.indiana.edu/uspr/a/usprofiles/22/us_over_sub_pr22023.html.

Swenson, E.M. and R.E. Turner. 1987. Spoil banks: Effects on a coastal marsh on coastal marsh water-level regime. *Estuarine, Coastal and Shelf Science* 24: 599-609.

U.S. Army Corps of Engineers. 2004. Louisiana Coastal Area, Louisiana – Ecosystem Restoration Study – July 2004. Draft Report.

(USCB, 2004) U.S. Census Bureau. 2004. Louisiana QuickFacts: Cameron Parish. Accessed at: http://quickfacts.census.gov/qfd/states/22/22023.html.

U.S. Fish and Wildlife Service. 2003. Cameron Prairie Refuge – Wildlife and Habitat (Biological Review). Draft Final Report.

U.S. Fish and Wildlife Service. 2002a. Cameron Prairie National Wildlife Refuge, Biological Review Notebook.

U.S. Fish and Wildlife Service. 2002b. Cameron Prairie National Wildlife Refuge, Annual Narrative, Calendar Year 2002.

U.S. Fish and Wildlife Service. 2002c. Southwest Louisiana Refuges Complex, Visitor Services Review, June 17–20, 2002.

U.S. Fish and Wildlife Service. 2002d. *Birds of Conservation Concern 2002.* Division of Migratory Bird Management, Arlington, Virginia. 99 pp.

U.S. Fish and Wildlife Service. 2001. Cameron Prairie National Wildlife Refuge, Annual Narrative, Calendar Year 2001.

U.S. Fish and Wildlife Service. 2000. Cameron Prairie National Wildlife Refuge, Annual Narrative, Calendar Year 2000.

U.S. Fish and Wildlife Service. 1998. Cameron Prairie National Wildlife Refuge. Brochure. February, 1998.

U.S. Fish and Wildlife Service. 1998. Expanding the Vision, 1998 Update, North American Waterfowl Management Plan.

U.S. Fish and Wildlife Service. 1993. Refuges 2003, Draft Environmental Impact Statement, A Plan for the Future of the National Wildlife Refuge System.

U.S. Fish and Wildlife Service. No date. Bayou Cocodrie Draft Comprehensive Conservation Plan and Environmental Assessment.

U.S. NABCI Committee. 2000. The North American Bird Conservation Initiative in the United States: A Vision of American Bird Conservation.

Vogl, Richard J. 1973. Effects of fire on the plants and animals of a Florida wetland. *American Midland Naturalist* 89: 334-347.

Wang, J.D. 1987. Hurricane effects on surface Gulf Stream currents. *Ocean Engineering* 14(3): 165-180.

Wilson, B.C. and C.G. Esslinger. 2002. North American Waterfowl Management Plan, Gulf Coast Joint Venture: Texas Mid-Coast Initiative. North American Waterfowl management Plan, Albuquerque, NM. 28 pp + appendix.

Appendix C. Legal Mandates

This comprehensive conservation plan and environmental assessment has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA). The NEPA requires federal agencies to consider all environmental factors related to their proposed actions. The environmental assessment discloses and explains both favorable and unfavorable consequences of a particular action that is being contemplated by a federal agency. This includes effects on the natural, economic, social, and cultural resources of the area.

The Service will comply with the following laws and regulations prior to, during, and following implementation of the comprehensive conservation plan.

National Wildlife Refuge System Authorities:

Emergency Wetlands Resources Act (1986): The purpose of the act is "To promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes. This Act authorized the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The act also requires the Secretary of the Interior to establish a National Wetlands Priority Conservation Plan, requires the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund an amount equal to import duties on arms and ammunition.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended: Public Law 93-205, approved December 28,1973, repealed the Endangered Species Conservation Act of December 5,1969 (P.L. 91-135, 83 Stat. 275). The 1969 act amended the Endangered Species Preservation Act of October 15,1966 (P.L. 89669, 80 Stat. 926): The 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through federal action and by encouraging the establishment of state programs. The act authorizes the determination and listing of species as threatened and endangered; prohibits unauthorized taking, possession, sale, and transport of endangered species; provides authority to acquire land for the conservation of listed species, using land and water conservation funds; authorizes establishment of cooperative agreements and grants-in-aid to states that establish and maintain active and adequate programs for threatened and endangered wildlife and plants; authorizes the assessment of civil and criminal penalties for violating the act or regulations; and authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction of anyone violating the act and any regulation issued there under.

Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the system.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Fish and Wildlife Coordination Act (1958): Allows the Fish and Wildlife Service to enter into agreement with private landowners for wildlife management purposes.

Fish and Wildlife Improvement Act of 1978: This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the

National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary of the Interior to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.

Land and Water Conservation Fund Act of 1948: This act provides funding through receipts from the sale of surplus federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources of land acquisition under several authorities. Appropriations from the fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various federal agencies, including the Fish and Wildlife Service.

Migratory Bird Hunting and Conservation Stamp Act (16 U.S.C. 718-718j, 48 Stat. 452), as amended: The "Duck Stamp Act," of March 16,1934, requires each waterfowl hunter, 16 years of age or older, to possess a valid federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a federal responsibility. This act enables the setting of seasons, and other regulations including the closing of areas, federal or nonfederal, to the hunting of migratory birds.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gift of areas approved by the Migratory Bird Conservation Commission.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary of the Interior to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the refuge system; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography and environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of the Interior for managing and protecting the system; and requires a comprehensive conservation plan for each refuge by the year 2012. This act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Wildlife Refuge System Improvement Act of 1997: Public Law 105-57, amended the National Wildlife Refuge System Act of 1966 (16 U.S.C. 668dd-ee): Provided guidance for management and public use of the Refuge System. The act mandates that the Refuge System be consistently directed and managed as a national system of lands and waters devoted to wildlife conservation and management. The act establishes priorities for recreational uses of the Refuge System. Six wildlife-dependent uses are specifically named in the act: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. These activities are to be promoted on the Refuge System, while all nonwildlife-dependent uses are subject to compatibility determinations. A compatible use is one which, in the sound professional judgment of the refuge manager, will not materially interfere with, or detract from, fulfillment of the National Wildlife Refuge System mission or refuge purpose(s). As stated in the act, "The mission of the system is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of

the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." The act also requires development of a comprehensive conservation plan for each refuge and that management be consistent with the plan. When writing a plan for expanded or new refuges, and when making management decisions, the act requires effective coordination with other federal agencies, state fish and wildlife or conservation agencies, and refuge neighbors. A refuge must also provide opportunities for public involvement when making a compatibility determination.

North American Wetlands Conservation Act (103 Stat. 1968; 16 U.S.C. 44O1~4412) Public Law 101-233, enacted December 13, 1989: Provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on Wetlands between Canada, the United States and Mexico. The act converts the Pittman-Robertson account into a trust fund, with the interest available without appropriation through the year 2006, to carry out the programs authorized by the act, along with an authorization for annual appropriation of $15 million plus an amount equal to the fines and forfeitures collected under the Migratory Bird Treaty Act. Available funds may be expended, upon approval of the Migratory Bird Conservation Commission, for payment of not to exceed 50 percent of the United States' share of the cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands). At least 50 percent and no more than 70 percent of the funds received are to go to Canada and Mexico each year.

Refuge Recreation Act of 1952: This act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area's primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the use Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus federal land, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

Refuge Revenue Sharing Act (16 U.S.C. 715s) Section 401 of the Act of June 15,1935, (49 Stat. 383): Provided for payments to counties in lieu of taxes, using revenues derived from the sale of products from refuges. Public Law 88-523, approved August 30,1964, (78 Stat. 701) made major revisions by requiring that all revenues received from refuge products, such as animals, timber and minerals, or from leases or other privileges, be deposited in a special Treasury account and net receipts distributed to counties for public schools and roads. Public Law 93-509, approved December 3, 1974, (88 Stat. 1603) required that moneys remaining in the fund after payments be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act. Public Law 95-469, approved October 17, 1978, (92 Stat. 1319) expanded the revenue sharing system to include National Fish Hatcheries and Service research stations. It also included in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as follows: on acquired land, the greatest amount calculated on the basis of 75 cents per acre, three-fourths of one percent of the appraised value, or 25 percent of the net receipts produced from the land; and on land withdrawn from the public domain, 25 percent of net receipts and basic payments under Public Law 94-565 (31 U.S.C. 1601-1607, 90 Stat. 2662). This amendment also authorized appropriations to make up any difference between the amount in the fund and the amount scheduled for payment in any year. The stipulation that payments be used for schools and roads was removed, but counties were required to pass payments along to other

units of local government within the county which suffer losses in revenues due to the establishment of Service areas.

Wilderness Act of 1954: Public Law 88-577, approved September 3,1964, directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems for inclusion in the National Wilderness Preservation System.

U.S. Fish and Wildlife Service Manual:

Fish and Wildlife Service Manual: 612 FW 2, Oil and Gas ; FWM#: 107 (new), Series: Natural and Cultural Resources Management, Part 612: Minerals Management. This chapter provides standard policy guidance and background information on management of oil and gas activities on Service lands and provides the basic information regarding the statutes, regulations, and procedures relating to all oil and gas activities conducted on Service lands. The policy of the Service is governed by authorities for leasing oil and gas on Federal lands as found in the Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended; for public domain lands, the Mineral Leasing Act of February 25, 1920, as amended; and in Alaska, Section 1008 of the Alaska National Interest Lands Conservation Act (16 U.S.C. 3148). Leasing is at the discretion of the Secretary of the Interior who has delegated the Bureau of Land Management authority to administer the laws, but has by regulation restricted oil and gas leasing on lands of the National Wildlife Refuge System to those involving drainage (43 CFR 3101.5-1 and 3100.2). In conformance with the policy set forth in 50 CFR 27 (National Wildlife Refuge System), 50 CFR 60.3 (Patuxent Wildlife Research Center), and 50 CFR 70.4 (National Fish Hatcheries), the Service usually recommends against leasing when the Bureau of Land Management asks for comments. In the case of nonfederally owned oil and gas rights, it is the policy of the Service to protect project resources to the maximum extent possible without infringing upon the rights of subsurface owners.

Historic Preservation Mandates:

Antiquities Act (16 USC 431 - 433): The Act of June 8, 1906, (34 Stat. 225): Authorizes the President of the United States to designate as National Monuments objects or areas of historic or scientific interests on lands owned or controlled by the United States. The act required that a permit be obtained for examination of ruins, excavation of archaeological sites and the gathering of objects of antiquity on lands under the jurisdiction of the Secretaries of Interior, Agriculture, and Army, and provided penalties for violations.

Archaeological and Historic Preservation Act (16 U.S.C. 469-469c): Public Law 86-523, approved June 27, 1960, (74 Stat. 220), and amended by Public Law 93-291, approved May 24, 1974, (88 Stat. 174): Directed federal agencies to notify the Secretary of the Interior whenever a federal, federally assisted, or licensed or permitted project may cause loss or destruction of significant scientific, prehistoric or archaeological data. The act authorized use of appropriated, donated, or transferred funds for the recovery, protection, and preservation of such data.

Archaeological Resources Protection Act (16 U.S.C. 470aa - 47011): Public Law 96-95, approved October 31, 1979, (93 Stat. 721) largely supplanted the resource protection provisions of the Antiquities Act for archaeological items. This act established detailed requirements for issuance of permits for any excavation for or removal of archaeological resources from federal and Indian lands. It also established civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from federal and Indian lands in

violation of any provision of federal law; and for interstate and foreign commerce in such resources acquired, transported or received in violation of any state or local law.

Executive Order 13007, Indian Sacred Sites (1996): Directs Federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461-462, 464467): The Act of August 21,1935, (49 Stat. 666) popularly known as the Historic Sites Act, as amended by Public Law 89-249, approved October 9,1965, (79 Stat. 971), declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January 1989, thirty-one national wildlife refuges contained such sites.

National Historic Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n) Public Law 89-665, approved October 15,1966, (80 Stat. 915) and repeatedly amended: Provided for preservation of significant historical features (buildings, objects and sites) through a grant-in-aid program to the states. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468468d).

The act established an Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94 422, approved September 28,1976 (90 Stat. 1319). That act also created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed in, or eligible for listing in, the National Register of Historic Places. As of January 1989, ninety-one such sites on national wildlife refuges are listed in this Register.

Public Law 100-588, approved November 3, 1988, (102 Stat. 2983): Lowered the threshold value of artifacts triggering the felony provisions of the act from $5,000 to $500, made attempting to commit an action prohibited by the act a violation, and required the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the nation.

National Environmental Policy Act of 1969:

National Environmental Policy Act of 1959 (P.L. 91-190,42 U.S.C. 4321-4347, January 1, 1970, 83 Stat. 852) as amended by Public Law 94-52, July 3, 1975, 89 Stat. 258, and Public Law 94-83, August 9,1975, 89 Stat. 424). Title I of the 1969 National Environmental Policy Act: Requires that all federal agencies prepare detailed environmental impact statements for “every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment.” The 1969 statute stipulated the factors to be considered in environmental impact statements, and required that federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unquantified environmental values are given appropriate consideration, along with economic and technical considerations.

Other Relevant Legal Mandates:

Americans With Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Clean Water Act (1977): Requires consultation with the U.S. Army Corps of Engineers for major wetland modifications.

Environmental Education Act of 1990(20 USC 5501-5510; 104 Stat. 3325): Public Law 101-619, signed November 16, 1990: Established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a Federal environmental education program. Responsibilities of the office include developing and supporting programs to improve understanding of the natural and developed environment, and the relationships between humans and their environment; supporting the dissemination of educational materials; developing and supporting training programs and environmental education seminars; managing a federal grant program; and administering an environmental internship and fellowship program. The office is required to develop and support environmental programs in consultation with other federal natural resource management agencies, including the Fish and Wildlife Service.

Executive Order 11988, Floodplain Management: The purpose of this Executive Order, signed May 24, 1977, is to prevent federal agencies from contributing to the "adverse impacts associated with occupancy and modification of floodplains" and the "direct or indirect support of flood plain development." In the course of fulfilling their respective authorities, federal agencies "shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains."

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species; and an interdisciplinary approach with the cooperation of other federal and state agencies.

National and Community Service Act of 1960 (42 U.S.C. 12401:104 Stat. 3127), Public Law 101-610, signed November 16, 1990: Authorizes several programs to engage citizens of the United States in full or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Several provisions are of particular interest to the Fish and Wildlife Service.

Rehabilitation Act (1973): Requires that programmatic and physical accessibility be made available in any facility funded by the Federal Government, ensuring that anyone can participate in any program.

Appendix D. Refuge Biota

Species previously identified as occurring on Sabine National Wildlife Refuge are listed below:

Common Name	Scientific Name
BIRDS	
Loons	
Common Loon	*Gavia immer*
Grebes	
Pied-billed Grebe	*Podilymbus podiceps*
Horned Grebe	*Podiceps auritus*
Eared Grebe	*Podiceps nigricollis*
Pelicans and their Allies	
American White Pelican	*Pelecanus erythrorhynchos*
Double –crested Cormorant	*Phalacrocorax auritus*
Neotropic Cormorant	*Phalacrocorax brasilianus*
Anhinga	*Anhinga anhinga*
Magnificent Frigatebird	*Fregata magnificens*
Herons, Egrets, and Allies	
American Bittern	*Botaurus lentiginosus*
Least Bittern	*Ixobrychus exilis*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Snowy Egret	*Egretta thula*
Little Blue Heron	*Egretta caerulea*
Tricolored Heron	*Egretta tricolor*
Reddish Egret	*Egretta rufescens*
Cattle Egret	*Bubulcus ibis*
Green-backed Heron	*Butorides virescens*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Yellow-crowned Night-Heron	*Nyctanassa violacea*
Ibis, Spoonbill, and Stork	
Glossy Ibis	*Plegadis falcinellus*
White Ibis	*Eudocimus albus*
White-faced Ibis	*Plegadis chihi*
Roseate Spoonbill	*Platalea ajaja*
Wood Stork	*Mycteria Americana*
Sandhill Crane	*Grus canadensis*
Waterfowl	
Fulvous Whistling Duck	*Dendrocygna bicolor*
Black-bellied Whistling Duck	*Dendrocygna autumnalis*
Greater White-fronted Goose	*Anser albifrons*
Snow Goose	*Chen caerulescens*
Ross's Goose	*Chen rossii*
Canada Goose	*Branta canadensis*

Wood Duck	*Aix sponsa*
Green-winged Teal	*Anas crecca*
American Black Duck	*Anas rubripes*
Mottled Duck	*Anas fulvigula*
Mallard	*Anas platyrhynvchos*
Northern Pintail	*Anas acuta*
Blue-winged Teal	*Anas discors*
Cinnamon Teal	*Anas cyanoptera*
Northern Shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
American Wigeon	*Anas americana*
Canvasback	*Aytha valisineria*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Lesser Scaup	*Aythya affinis*
Common Goldeneye	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Hooded Merganser	*Lophodytes cucullatus*
Common Merganser	*Mergus merganser*
Red-breasted Merganser	*Mergus serrator*
Ruddy Duck	*Oxyura jamaicensis*

Vultures, Hawks, and Allies

Black Vulture	*Coragyps atratus*
Turkey Vulture	*Catheartes aura*
Osprey	*Pandion haliaetus*
Bald Eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Acciptier striatus*
Cooper's Hawk	*Acciptier cooperii*
Red-shouldered Hawk	*Buteo lineatus*
Broad-winged Hawk	*Buteo platypterus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Peregrine Falcon	*Falco peregrinus*
Northern Caracara	*Caracara cheriway*

Gallinaceous Birds (Quail, Turkey, and Allies)

Northern Bobwhite Quail	*Colinus virginianus*

Rails, Gallinules, Coots, and Cranes

Yellow Rail	*Coturnicops noveboracensis*
Black Rail	*Laterallus jamaicensis*
Clapper Rail	*Rallus longirostris*
King Rail	*Rallus elegans*
Virginia Rail	*Rallus limicola*
Sora Rail	*Porzana carolina*
Purple Gallinule	*Porphyrio martinica*
Common Moorhen	*Gallinula chloropus*
American Coot	*Fulica americana*

Shorebirds

Black-bellied Plover	*Pluvialis squatarola*
American Golden-Plover	*Pluvialis dominica*

Wilson's Plover	*Charadrius wilsonia*
Semipalmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferous*
Black-necked Stilt	*Himantopus mexicanus*
American Avocet	*Recurvirostra americana*
Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Spotted Sandpiper	*Actitis macularia*
Upland Sandpiper	*Bartramia longicauda*
Buff-breasted Sandpiper	*Tryngites subruficollis*
Whimbrel	*Numenius phaeopus*
Long-billed Curlew	*Numenius americanus*
Marbled Godwit	*Limosa fedoa*
Ruddy Turnstone	*Arenaria interpres*
Red Knot	*Calidris canutus*
Sanderling	*Calidris alba*
Semipalmated Sandpiper	*Calidris pusilla*
Western Sandpiper	*Calidris mauri*
Least Sandpiper	*Calidris minutilla*
White-rumped Sandpiper	*Calidris fusciollis*
Pectoral Sandpiper	*Calidris melanotos*
Dunlin	*Calidris alpina*
Stilt Sandpiper	*Calidris himantopus*
Short-billed Dowitcher	*Limnodromus griseus*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Common Snipe	*Gallinago gallinago*
American Woodcock	*Scolopax minor*
Laughing Gull	*Larus atricilla*
Franklin's Gull	*Larus pipixcan*
Bonaparte's Gull	*Larus philadelphia*
Ring-billed Gull	*Larus delawarensis*
Herring Gull	*Larus argentatus*
Gull-billed Tern	*Sterna nilotica*
Caspian Tern	*Sterna caspia*
Royal Tern	*Sterna maxima*
Common Tern	*Sterna hirundo*
Forster's Tern	*Sterna forsteri*
Least Tern	*Sterna antillarum*
Black Tern	*Childonias niger*
Black Skimmer	*Rynchops niger*

Pigeons and Doves

Mourning Dove	*Zenaida macroura*

Cuckoos

Black-billed Cuckoo	*Coccyzus erythropthalmus*
Yellow-billed Cuckoo	*Coccyzus americanus*

Owls

Barn Owl	Tyto alba
Eastern Screech Owl	Otus asio
Great Horned Owl	Bubo virginianus
Burrowing Owl	Athene cunicularia
Short-eared Owl	Asio flammeus

Nightjars	
Common Nighthawk	Chordeiles minor
Chuck-will's widow	Caprimulgus
Swifts and Hummingbirds	
Chimney Swift	Chaetura pelagica
Ruby-throated Hummingbird	Archilochus colubris
Kingfishers	
Belted Kingfisher	Megaceryle alcyon
Woodpeckers	
Red-headed Woodpecker	Melanerpes erythrocephalus
Yellow-bellied Sapsucker	Sphyrapicus varius
Downy Woodpecker	Picoides pubescents
Northern Flicker	Colaptes auratus
Flycatchers	
Olive-sided Flycatcher	Nuttallornis borealis
Eastern Wood-Pewee	Contopus virens
Yellow-bellied Flycatcher	Empidonax flaviventris
Acadian Flycatcher	Empidonax virescens
Eastern Phoebe	Sayornis phoebe
Vermillion Flycatcher	Pyrocephalus rubinus
Great Crested Flycatcher	Myiarchus crinitus
Western Kingbird	Tyrannus verticalis
Eastern Kingbird	Tyrannus tyrannus
Scissor-tailed Flycatcher	Tyrannus forficatus
Martins and Swallows	
Purple Martin	Progne subis
Tree Swallow	Iridoproche bicolor
Northern Rough-winged Swallow	Stelgidopteryx
Cliff Swallow	Hirundo pyrrhonota
Barn Swallow	Hirundo rustica
Jays and Crows	
Blue Jay	Cyanocitta cristata
Fish Crow	Coruus ossifragus
Nuthatchers	
Red-breasted Nuthatch	Sitta Canadensis
Creepers	
Brown Creeper	Certhia familiaris
Wrens	
Carolina Wren	Thryothorus ludovicianus
Winter Wren	Troglodytes troglodytes
Sedge Wren	Cistothorus platensis
Marsh Wren	Cistothorus palustris
Kinglets and Gnatcatchers	
Golden-crowned Kinglet	Regulus satrapa
Ruby-crowned Kinglet	Regulus calendula

Blue-gray Gnatcatcher	Polloptila caerulea
Bluebirds, Thrushes and Robins	
Eastern Bluebird	Sialia sialis
Veery	Catharus fuscescens
Gray-cheeked Thrush	Catharus minimus
Swainson's Thrush	Catharus ustulatus
Hermit Thrush	Catharus guttatus
Wood Thrush	Hylocicla mustelina
American Robin	Turdus migratorius
Thrashers	
Gray Catbird	Dumetella carolinensis
Brown Thrasher	Toxostoma rufum
Pitpits	
American Pitpit	Anthus spinoletta
Waxwings	
Cedar Waxwing	Bomycilla cedrorum
Starling	
European Starling	Sturnus vulgaris
Shrike	
Loggerhead Shrike	Lanius ludovicianus
Vireos	
White-eyed Vireo	Vireo griseus
Solitary Vireo	Vireo solitarius
Yellow-throated Vireo	Vireo flavifrons
Warbling Vireo	Vireo gilvus
Re-eyed Vireo	Vireo olivaceous
Warblers	
Blue-winged Warbler	Vermivora pinus
Golden-winged Warbler	Vermivora chrysoptera
Tennessee Warbler	Vermivora peregrina
Orange-crowned Warbler	Vermivora celata
Nashville Warbler	Vermivora ruficapilla
Yellow Warbler	Dendroica petechia
Chestnut-sided Warbler	Dendroica pensylvaniea
Magnolia Warbler	Dendroica magnolia
Cape May Warbler	Dendroica tigrina
Black-throated Blue Warbler	Dendroica caerulescens
Yellow-rumped Warbler	Dendroica coronata
Black-throated Green Warbler	Dendroica virens
Blackburnian Warbler	Dendroica fusca
Yellow-throated Warbler	Dendroica palmarum
Prairie Warbler	Dendroica discolor
Palm Warbler	Dendroica palmarum
Bay-breasted Warbler	Dendroica castanea
Blackpole Warbler	Dendroica striata
Cerulean Warbler	Dendroica cerulea
Black and White Warbler	Mniotilta aria

American Redstart	*Setophaga ruticilla*
Prothonotary Warbler	*Protonotaria citrea*
Worm-eating Warbler	*Helmitheros vermivorus*
Ovenbird	*Seiurus aurocapillus*
Northern Waterthrush	*Seiurus noveboracensis*
Louisiana Warerthrush	*Seiurus motacilla*
Kentucky Warbler	*Oporornis formosus*
Mourning Warbler	*Oporonis philadelphia*
Hooded Warbler	Wilsonia citrina
Canada Warbler	Wilsonia Canadensis
Yellow-breasted Chat	Icteria virens

Tanagers

Summer Tanager	Piranga rubra
Scarlet Tanager	Piranga olivacea
Western Tanger	Piranga ludoviciana

New World Finches

Northern Cardinal	Cardinalis cardinalis
Rose-breasted Grosbeak	Pheucticus ludovicianus
Blue Grosbeak	Guiraca caerulea
Indigo Bunting	Passerina cyanea
Painted Bunting	Passerina ciris
Dickcissel	Spiza americana

Sparrows

Rufous-sided Towhee	Pipilo erythrophthalmus
Field Sparrow	Spizella pusilla
Vesper Sparrow	Pooecetes gramineus
Lark Sparrow	Chondestes grammacus
Savannah Sparrow	Passerella iliaca
LeConte's Sparrow	Ammospiza leconteii
Nelson's Sharp-tailed Sparrow	Ammodramus Nelsoni
Seaside Sparrow	Ammodramus maritimus
Fox Sparrow	Passerella iliaca
Song Sparrow	Melospiza melodia
Lincoln's Sparrow	Melospiza lincolnii
Swamp Sparrow	Melospiza Georgiana
White-throated Sparrow	Zonotrichia albicollis
White-crowned Sparrow	Zonatrichia leucophrys
Dark-eyed Junco	Junco hyemalis

Blackbirds, Grackles, Cowbirds and Orioles

Red-winged Blackbird	*Agelais phoeniceus*
Eastern Meadowlark	*Sturnella magna*
Western Meadowlark	*Sturnella neglecta*
Yellow-headed Blackbird	*Xanthocephalus*
Rusty Blackbird	*Euphagus carolinus*
Boat-tailed Grackle	*Quiscalus major*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Orchard Oriole	*Icterus spurious*
Northern Oriole	*Icterus galula*

Old World Finches

Purple Finch	*Carpodacus purpureus*
American Goldfinch	*Carduelis tristis*

Weaver Finches

House Sparrow	*Passer domesticus*

MAMMALS

Marsupials

Virginia Opossum	*Didelphis marsupialis*

Edentates

Nine-banded armadillo	*Dasypus novemcinctus*

Insectivores

Least Shrew	*Cryptotis parva*

Bats

Red Bat	*Lasiurus borealis*
Seminole Bat	*Lasiurus seminolus*
Yellow Bat	*Lasiurus ega*
Eastern Pipstrelle	*Pipistrellus subflavus*
Evening Bat	*Nycticeius humeralis*
Brazilian Free-tailed Bat	

Carnivores

Coyote	*Canis latrans*
Gray Fox	*Urocyon cinereoargenteus*
Red Fox	*Vulpes vulpes*
Raccoon	*Procyon lotor*
Mink	*Mustela vison*
Striped Skunk	*Mephitis mephitis*
Spotted Skunk	*Spilogale putorius*
River Otter	*Lutra canadensis*
Bobcat	*Lynx rufus*

Ungulates

White-tailed Deer	*Odocoileus virginianus*

Rodents

Marsh Rice Rat	*Orysomys palustris*
Fulvous Harvest Mouse	*Reithrodontomys fulvescens*
Hispid Cotton Rat	*Sigmodon hispidus*
Muskrat	*Ondatra zibethicus*
House Mouse	*Mus musculus*
Black Rat	
Norway Rat	*Rattus norvegicus*
Nutria	*Myocastor coypus*
Fox Squirrel	*Sciurus niger*

Lagomorphs

Swamp Rabbit	*Sylvilagus aquaticus*
Eastern Cottontail	*Sylvilagus floridanus*

REPTILES AND AMPHIBIANS

Alligator

American Alligator	*Alligator mississippiensis*

Lizards

Green Anole	*Anolis carolinensis*
Broadhead Skink	*Eumeces laticeps*
Ground Skink	*Scinella lateralis*
Five-lined Skink	*Eumeces fasciatus*
Slender Glass Lizard	*Ophisaurus attenuatus*

Turtles

Snapping Turtle	*Chelydra serpentina*
Alligator Snapping Turtle	*Macroclemys temminckii*
Mississippi Mud Turtle	*Kinosternon subrubrum hippocrepis*
Common Slider	*Trachemys scripta*
Spiny Softshell Turtle	*Apalone spinifera*
Chicken Turtle	*Deirochelys reticularia*
Eastern Box Turtle	*Terrapene carolina carolina*
Stinkpot Turtle	*Sternotherus odoratus*
Mississippi Diamond Back Turtle	*Malaclemys terrapin pileata*
Gulf Coast Box Turtle	*Terrapene carolina major*
Kemp's Ridley Sea Turtle	

Snakes

Southern Water Snake	*Nerodia fasciata*
Mississippi Green Water Snake	*Nerodia cyclopion*
Diamondback Water Snake	*Nerodia rhombifer*
Brown Snake	*Storeria dekayi*
Western Ribbon Snake	*Thamnophis proximus proximus*
Rainbow Snake	*Farancia erytrogramma*
Glossy Crayfish Snake	*Regina rigida*
Eastern Hognose Snake	*Heterodon platirhinos*
Mud Snake	*Farancia abacura*
Racer	*Coluber constrictor*
Rat Snake	*Drymobius elaphe*
Common Kingsnake	*Lampropeltis getula*
Southern Copperhead	*Agkinstodon contortrix contortrix*
Cottonmouth	*Agkinstodon piscivorus*
Pigmy Rattlesnake	*Sistrurus miliarius*
Yellow-bellied Water Snake	*Nerodia erythrogaster flavigaster*
Rough Green Snake	*Opheodrys aestivus*
Graham's Crayfish Snake	*Regina grahamii*

Salamanders

Three-toed Amphiuma	*Amphiuma tridactylum*

Frogs and Toads

Gulf Coast Toad	*Bufo valliceps valliceps*
Northern Cricket Frog	*Acris crepitans crepitans*
Green Treefrog	*Hyla cinera*
Eastern Narrow-mouthed Toad	*Gastrophryne carolinensis*
Bullfrog	*Rana catesbeiana*
Pig Frog	*Rana grylio*

Green Frog	Rana clamitans melanota
Southern Leopard Frog	*Rana utricularia*
Squirrel Tree Frog	*Hyla squirella*
Woodhouse Toad	Bufo woodhousii woodhousii

MARINE INVERTEBRATES

Jellyfish

Portuguese Man-of-War	*Physlia physalis*
Sea Nettle	*Chrysaora quinquecirrha*
Cabbagehead Jellyfish	*Stomolophus meleagris*
Phosphorus Jellyfish	*Mnemiopsis mccradyi*

Marine Round Worms

Blood Worm	*Glycera americana*
Periscope Tube Worm	*Oiopatra cuprea*
Oyster Blister Worm	*Polydora websteri*

Snails

Marsh Periwinkle	*Littorina irrorata*
Common Mud Snail	*Nassarius vibex*
White Slipper Shell	
Atlantic Slipper Shell	
Common Marsh Snail	
Southern Oyster Drill	*Thais haemostoma*

Clams and Oysters

Ribbed Mussel	*Geukensea demissa*
Hooked Mussel	*Ishadium recuryum*
Eastern Oyster	*Crasssostrea virginica*
Road Shell Clam	*Rangia cuneata*
Small Macoma	*Macoma mitchelli*
Constricted Macoma	*Macoma constricta*
Southern Quahog	*Mercenaria campechiensis*

Squids

Squids	*Loligo pealei*

Barnicles

Acorn Barnicle	*Chelonbia spp.*

Crabs and Shrimp

Speckled Crab	*Arenaeus cribrarius*
Blue Crab	*Callinectes spp.*
Flat Mud Crab	*Eurypanaoplus depressus*
Stone Crab	*Menippe mercenaria*
Common Mud Crab	*Panopeus harrisii*
Harris Mud Crab	*Rithropanopeus harrisii*
Red-jointed Fiddler Crab	Uca minax
Sand Fiddler	Uca picgillator
Mud Fiddler	Uca pugnax
Uca Rapax	
Uca Spinicarpa	
Wharf Crab	Sesarma cinereum
Purple Marsh Crab	Sesarma reticulatum

Shore Crab	*Pachygrapsus gracilis*
Pachygrapus Transversus	
Petrolisthes Armatus	
Porcellana Sigsbeiana	
Mussel Crab	*Pinotheres maculatus*
Oyster Crab	*Pinnotheres ostreum*
Spider Crab	*Libinia dubia*
Striped Hermit Crab	*Clibanarius vittatus*
Isocheles Wurdemanni	
Long-armed Hermit Crab	Pagurus longicarpus
White River Crayfish	Procambarus acutus
Red Swamp Crayfish	Procambarus clarkii
Flat-browed Mud Shrimp	Upogebia affinis
Brown Shrimp	Penaeus aztecus
White Shrimp	Penaeus setiferus
Pink Shrimp	Penaeus duorarum
Sea Bob	Xiphopeneus kroyeri
Solenocerianae spp.	
Acetes americanus	
Freshwater Shrimp	Macrobrachium spp.
Grass Shrimp	Palaemonetes spp.
Big-clawed Snapping Shrimp	Alpheus heterochaelils
Mantis Shrimp	Squilla empusa

Isopods and Amphipods

Wood-boring Isopod	Limnoria tripunctata
Rock Louse	Ligia exotica
Bopyrissa Wolffi	
Smooth-backed	Sphaerona quadridentatum
Fish Louse	Cymothous spp.
Wharf Roach	Ligia spp.
Beach Flea	Orchestia grillus
Gammarus Mucronatus	
Marsh Hopper	Talorchestia spp.

FISH

Stingrays

Atlantic Stingray

Gars

Spotted Gar	Lepisosteus oculatus
Longnose Gar	Lepisosteus osseus
Alligator Gar	Lepisosteus spatula

Bowfins

Bowfin	Amia calva

Tarpons

Ladyfish	Elops saurus

Freshwater Eels

American Eel	Anguilla rostrata

Snake Eels	
Speckled Worm Eel	Myrophis punctatus
Shrimp Eel	Ophichthus gomesi
Herrings	
Skipjack Herring	Alosa chrysochloris
Gulf Menhaden	Brevoortia patronus
Gizzard Shad	Dorosoma cepedianum
Threadfin Shad	Dorosoma petenense
Scaled Sardine	Harengula pensacolae
Atlantic Thread Herring	Opisthonema oglinum
Anchovies	
Striped Anchovy	Anchoa hepsetus
Bay Anchovy	Anchoa mitchilli
Lizardfishes	
Largescale Lizardfish	Saurida brasilinsis
Inshore Lizardfish	Synodus foetens
Carps	
Common Carp	Cyprinus carpio
Golden Shiner	Notemigonus crysoleucas
Suckers	
Bigmouth Buffalo	Ictiobus cyprinellus
Freshwater Catfishes	
Blue Catfish	Ictalurus furcatus
Black Bullhead	Ictalurus melas
Yellow Bullhead	Ictalurus natalis
Channel Catfish	Ictalurus punctatus
Sea Catfishes	
Hardhead Catfish	Arius felis
Gaffsopsail Catfish	Bagre marinus
Pirate Perches	
Pirate Perch	Aphredoderus sayanus
Toadfishes	
Gulf Toadfish	Opsanus beta
Atlantic Midshipman	Porichthys porosissimus
Clingfishes	
Skilletfish	Gobiesox strumosus
Codfishes	
Southern Hake	Urophycis floridana
Cusk-eels and Brotecelas	
Bearded Brotula	Brotula barbata
Bank Cusk-eel	Ophidion holbrooke

Needlefishes	
Atlantic Needlefish	Strogylura marina
Killifishes	
Diamond Killifish	Adinia xenica
Sheepshead Minnow	Cyprinodon variegatus
Golden Topminnow	Fundulus chrysotus
Gulf Killifish	Fundulus grandis
Saltmarsh Killifish	Fundulus jenkinsi
Starhead Killifish	Fundulus blairae
Bayou Killifish	Fundulus pulvereus
Longnose Killifish	Fundulus similis
Rainwater Killifish	Lucania parva
Livebearers	
Mosquitofish	Gambusia affinis
Least Killifish	Heterandria formosa
Sailfin Molly	Poecilia latipinna
Silversides	
Brook Silversides	Labidesthes sicculus
Rough Silversides	Membras martinica
Inland Silversides	Menidia beryllina
Pipefishes and Seahorses	
Dusky Pipefish	Syngnathus flordae
Chain Pipefish	Syngnathus louisianae
Gulf Pipefish	Syngnathus scovelli
Lined Seahorse	Hippocampus erectus
Temperate Bass	
Striped Bass	Morone saxatilis
White Bass	Morone chrysops
Yellow Bass	Morone mississippienis
Sunfishes	
Flier	Centrarchus macropterus
Banded Pygmy Sunfish	Elassoma zonatum
Warmouth	Lepomis gulosus
Bluegill	Lepomis macrochirus
Redear Sunfish	Lepomis punctatus
Bantam Sunfish	Lepomis symmetricus
Green Sunfish	
Largemouth Bass	Micropterus salmoides
White Crappie	Pomoxis annularis
Black Crappie	Pomoxis nigromaculatus
Bluefishes	
Bluefish	Pomatomus saltatrix
Cobias	
Cobia	Rachycentron canadrum
Jacks and Pompanos	
Crevalle Jack	Caranx hippos

Atlantic Bumper	Chloroscombrus chrysurus
Bluntnose Jack	Hemicaranx amblyrhychus
Leather Jack	Oligoplites saurus
Atlantic Moonfish	Selene setapinnis
Lookdown	Selene vomer
Florida Pompano	Trachinotus carolinus
Bigeye Scad	Selar crumenophthalmus
Snappers	
Gray Snapper	Lutianus griseus
Tripletails	
Tripletail	
Mojarras	
Spotfin Mojarra	Eucinostomus argenteus
Mottled Mojarra	Eucinostomus lefroyi
Grunts	
Pigfish	Orthopristis chrysoptera
Porgies	
Sheepshead	Archosargus probatocephalus
Pinfish	Lagondon rhomboides
Drums	
Freshwater Drum	Aplodinotus grunniens
Silver Perch	Bairdiella chrysoura
Sand Seatrout	Cynoscion arenarius
Spotted Seatrout	Cynoscion nebulosus
Silver Seatrout	Cynoscion nothus
Banded Drum	Larimus fasciatus
Spot	Leiostomus xanthurus
Southern Kingfish	Menticirrhus americanus
Atlantic Croaker	Micropogonias undulatus
Black Drum	Pogonias cromis
Red Drum	Sciaenops ocellatus
Star Drum	Stellifer lanceoatus
Spadefish	
Atlantic Spadefish	Chaetodipterus faber
Mullets	
Striped Mullet	Mugil cephalus
White Mullet	Mugil curema
Barracudes	
Cuaguanche	Sphuraena guachancho
Threadfins	
Atlantic Threadfin	Polydactylus octonemus
Stargazers	
Southern Stargazer	Astroscopus y-graecum

Combtooth Blennies	
Striped Blenny	Chasmodes boquianus
Freckled Blenny	Hypsoblennius ionthas
Sleepers	
Fat Sleeper	Dormitator maculatus
Emerald Sleeper	Erotelis smaragdus
Spinycheek Sleeper	Eleotris pisonis
Gobies	
Lyre Goby	Evorthodus lyricus
Violet Goby	Gobioides broussoneti
Darter Goby	Gobionellys boleosoma
Sharptail Goby	Gobionellus hastatus
Freshwater Goby	Gobionellus shufeldti
Naked Goby	Gobiosoma bosci
Code Goby	Gobiosoma robustum
Clown Goby	Microbius gulosus
Green Goby	Microbius thalassinus
Wormfishes	
Pink Wormfish	Microgobius longipinnis
Cutlassfishes	
Atlantic Cutlassfish	Trichiurus lepturus
Mackerals and Tunas	
Spanish Mackeral	Scomberomorus maculatus
Butterfishes	
Harvestfish	Peprilus alepidotus
Gulf Butterfish	Peprilus burti
Searobins	
Bighead Searobin	Prionotus tribulus
Lefteye Flounder	
Ocellated Flounder	Ancyclopsetta quadrocellata
Bay Whif	Citharichthys spilopterus
Fringe Flounder	Etropus crossotus
Gulf Flounder	Paralichthys albigutta
Southern Flounder	Paralichthys lethostigma
Soles	
Lined Sole	Achirus lineatus
Hogchoker	Trincetes maculatus
Tonguefishes	
Blackcheek Tonguefish	Symphurus plagiusa
Leatherjackets	
Pygmy Filefishfer	Monacanthus setifer
Puffers	
Southern Puffer	Sphoeroides nephelus

Least Puffer	Sphoeroides parvus

PLANTS

Salt (Saline) Marsh 10.0 ppt and above

Annual Glasswort	*Salicornia bigelovii*
Black Needlerush	*Juncus roemerianus*
Marsh Elder	*Iva frutescens*
Smooth Cordgrass	*Spartina alterniflora*

Brackish Marsh 3.5 to 10.0 ppt

Baccharis	*Baccharis halimifolia*
Black Needlerush	*Juncus roemerianus*
Cattail	*Typa spp.*
Coastal Water-Hyssop	*Bacopa monnieri*
Coffeeweed	*Sesbania macrocarpa*
Dog Fennel	*Eupatorium capillifolium*
Dwarf Spikerush	*Eleocharis parvula*
Eurasian Watermilfoil	*Myriophyllum spicatum*
Flatsedges	*Cyperus spp*.
Hogcane	*Spartina cynosuroides*
Marsh Elder	*Iva frutescens*
Marshhay Cordgrass	*Spartina patens*
Narrow-leaf Groundsel Bush	*Baccharis angustifolia*
Olney's Three-Square	Scirpus americanus
Pennywort	*Hydrocotyle spp*.
Roseau Cane	*Phragmites australis*
Salt Grass	*Distichlis spicata*
Saltmarsh Bulrush	*Scirpus robustus*
Saltmarsh Mallow	*Kosteletzkya virginica*
Saltmarsh Morning Glory	*Ipomoea sagittata*
Seashore Paspalum	*Paspalum vaginatum*
Smooth Cordgrass	*Spartina alterniflora*
Three-cornered Grass	*Scirpus olneyi*
Sprangletop	*Leptochloa fascicularis*
Wigeongrass	*Ruppia maritima*

Intermediate Marsh 0.5 to 3.5 ppt

Alligator Weed	*Alternanthera philoxeroides*
Baccharis	*Baccharis halimifolia*
Banana Water Lily	*Nymphaea mexicana*
Barnyard Grass	*Echinochloa crusgalli*
Black Needlerush	*Juncus roemerianus*
Bulltongue	*Sagittaria lancifolia*
Bullwhip	*Scirpus californicus*
Cattail	*Typa spp.*
Coastal Water-Hyssop	*Bacopa monnieri*
Coffeeweed	*Sesbania macrocarpa*
Coontail	*Ceratophyllum demersum*
Dog Fennel	*Eupatorium*
Dwarf Spikerush	*Eleocharis parvula*
Eurasian Watermilfoil	*Myriophyllum spicatum*
Fall Panicum	*Panicum dichotomiflorum*
Flatsedges	*Carex spp.*
Frogbit	*Limnobium spongia*

Frogfruit	*Phyla nodiflora*
Hogcane	*Spartina cynosuroides*
Marshhay Cordgrass	*Spartina patens*
Pennywort	*Hydrocotyle spp.*
Pigweed	*Chenopodium album*
Roseau Cane	*Phragmites australis*
Sago Pondweed	*Potamogeton pectinatus*
Saltmarsh Bulrush	*Scirpus robustus*
Saltmarsh Mallow	*Kosteletzkya virginica*
Saltmarsh Morning Glory	*Ipomoea sagittata*
Sawgrass	*Cladium jamaicense*
Seashore Pasalum	*Paspalum vaginatum*
Softstem Bullrush	*Scirpus validus*
Southern Naiad	*Najas quadalupensis*
Sprangletop	*Leptochloa fascicularis*
Spikerushes	*Eleocharis spp.*
Thin-leaf Pondweed	*Potamogeton pusillus*
Three-cornered Grass	*Scirpus olneyi*
Walteri Millet	*Echinochloa walteri*
Wax-Myrtle	*Myrica cerifera*
Widgeon Grass	*Ruppia maritima*

Freshwater Marsh 0.0 to 0.5 ppt

Alligator Weed	*Alternanthera philoxeroides*
American Lotus	*Nelumbo lutea*
Baccharis	*Baccharis halimifolia*
Baldcypress	*Taxodium distichum*
Banana Water Lily	*Nymphaea mexicana*
Barnyard Grass	*Echinochloa crusgalli*
Black Needlerush	*Juncus roemerianus*
Black Willow	Salix nigra
Beggar'sTick	*Bidens laevis*
Blue Water Lily	*Nymphaea elegans*
Brazilian Verbena	*Verbena brasiliensis*
Brownseed Paspalum	*Paspalum plicatulum*
Bulltongue	*Sagittaria lancifolia*
Bullwhip	*Scirpus californicus*
Bushy Bluestem	*Andropogon glomeratus*
Buttonbush	*Cephalanthus occidentalis*
Cattail	*Typa spp.*
Chinese Tallow	*Sapium sebiferum*
Coastal Water-Hyssop	*Bacopa monnieri*
Coffeeweed	*Sesbania macrocarpa*
Common Bladderwort	*Utricularia vulgaris*
Coontail	*Ceratophyllum demersum*
Curly-leaf Dock	*Rumex crispus*
Duckweed	*Lemna minor*
Dog Fennel	*Eupatorium capillifolium*
Dwarf Spikerush	*Eleocharis parvula*
Eurasian Watermilfoil	*Myriophyllum spicatum*
Fall Panicum	*Panicum dichotomiflorum*
False Garlic	*Nothoscordum bivalve*
Fanwort	*Cabomba caroliniana*
Flatsedges	*Cyperus spp.*
Floating Water Primrose	*Ludwigia peploides*
Frogbit	*Limnobium spongia*

Frogfruit	*Phyla nodiflora*
Giant Cutgrass	*Zizaniopsis miliacea*
Giant Ragweed	*Ambrosia trifida*
Horned Beakrush	*Rhynchospora corniculata*
Hydrilla	*Hydrilla verticillata*
Iris	*Iris virginica*
Jungle Rice	*Echinochloa colonum*
Maidencane	*Panicum hemitomon*
Marshhay Cordgrass	*Spartina patens*
Mosquito-Fern	*Azolla caroliniana*
Muskgrass	*Chara spp*.
Parrot Feather	*Myriophyllum* aquaticum
Pennywort	*Hydrocotyle spp.*
Pickerelweed	*Pontederia cordata*
Rattlebox	*Sesbania drummondii*
Roseau cane	*Phragmites australis*
Sago Pondweed	*Potamogeton pectinatus*
Saltmarsh Mallow	*Kosteletzkya virginica*
Saltmarsh Morning Glory	*Ipomoea sagittata*
Sawgrass	*Cladium jamaicense*
Seashore Paspalum	*Paspalum vaginatum*
Smartweed	*Polygonum spp*.
Softstem Bullrush	*Scirpus validus*
Southern Naiad	*Najas quadalupensis*
Southern Swamp Lily	*Crinum americanum*
Spadderdock	*Nuphar luteum*
Spikerushes	*Elecocharis spp.*
Sprangletop	*Leptochloa fascicularis*
Squarestem Spikerush	*Eleocharis quadrangulata*
Sumpweed	*Iva annua*
Thalia	*Thalia dealbata*
Thin-leaf Pondweed	*Potamogeton pusillus*
Three-cornered Grass	*Scirpus olneyi*
Toothache Tree	*Zanthoxylum calva-herculis*
Vasey Grass	*Paspalum urvillei*
Walteri Millet	*Echinochloa walteri*
Water Hyacinth	*Eichornia crassipes*
Water Lettuce	*Pistia stratiotes*
Water Pepper	*Polygomum hydropiperoides*
Water Shield	*Brasenia schreberi*
Wax-Myrtle	*Myrica cerifera*
White-topped Sedge	*Rhynchospora colorata*
White Water Lily	*Nymphaea odorata*
Wigeongrass	*Ruppia maritima*
Bird's Eye Bush	*Ochna serrulata*
Chocolate Weed	*Melochia corchorifolia*
Grasslike Fimbry	*Fimbristylis miliacea*
Red Rice	*Oryza functata*

Appendix E. Scoping

A series of scoping meetings and focus groups were held to obtain input from the general public on the comprehensive conservation plans for each refuge in the Southwest Louisiana National Wildlife Refuge Complex, including Lacassine. Meetings were held in various communities in Cameron Parish in 2002 as follows: October 1, Carlyss; October 8, Grand Lake; October 10, Cameron; October 16, Hackberry; and October 17, Johnson Bayou.

Approximately 25 people in total attended these meetings. On January 16, and February 4, 2003, public open house meetings were held in Lake Charles with a total of 33 people attending. Comment forms were placed in the Refuge Visitor Center and invitations to comment or provide input were issued at various special events. Various issues emerged from these meetings and were considered during the preparation of the plan.

An intensive effort to bring together people who were interested in fishing issues at the refuge resulted in over 40 members of the public attending a Fishing Focus Group meeting in Lake Charles on September 4, 2003. Participants were given an overview of the refuge and the planning process and then randomly assigned to smaller groups to discuss issues. Each group brainstormed, identified and prioritized issues, and a representative of each group presented their results to the entire audience. The format of the meeting facilitated an open discussion among user groups with conflicting interests and among the public and Service staff.

Over 50 people attended a meeting on May 18, 2005, at the Lake Charles Civic Center to discuss future management of the Lacassine Pool**{** XE "Lacassine Pool" **}**. Continued interest in the Lacassine Pool and associated issues with fishing prompted the Service to hold the meeting. Various management alternatives were presented and participants were invited to review and select their preferred solution. The majority of the participants chose the Service's proposed action plan which is being written into the Draft CCP and EA.

News releases were sent to local media to inform the public about opportunities to comment and are shown below. Meetings scheduled for October 4, 5, and 6, 2002, were cancelled by notifying the media by telephone due to local communities evacuating during the landfall of Hurricane Lily. These meetings were rescheduled (see News Release #2). A worksheet, comment form, and brochure were also made available and are shown below.

News Release # 1
9/23/02

Southwest Louisiana Refuge Complex Hosts Open House
Public Invited to Help Develop Management Plan

The U.S. Fish and Wildlife Service will hold six public open house sessions for the Southwest Louisiana Refuge Complex in early October to gather input to help prepare a new comprehensive conservation management plan (CCP). The Refuge Complex is comprised of Sabine and Cameron Prairie National Wildlife Refuges which are two of more than 500 refuges nationwide within the National Wildlife Refuge System. The System is dedicated entirely to the conservation of wildlife and their habitats.

The public is invited to the open houses to be held at various locations: **October 1, Carlyss Lions Club; October 3, Community Center, Hackberry; October 4, Community Center, Johnson Bayou; October 5, Civic Center, Lake Charles; October 8, Fireman Center, Grand Lake; and October 9, Police Jury Annex, Cameron**. Hours for all meetings with the exception of Lake Charles will be from 1:00 - 8:00 pm; Lake Charles's meeting will be from 9:00 am - 4:00 pm. (See Table at end of article). Those attending may come at any time during the open house to view maps and other displays, consider refuge purpose and mission statements, visit one-on-one with Service representatives, and give their personal suggestions for future management of the refuge. The input received will be used to evaluate the refuge's effectiveness toward meeting its obligations to the public and the Nation's natural resources, and to plan for future refuge programs and operations. Comments may also be made at the two Refuge Visitor Centers, by email, fax, or through the mail. According to Project Leader Chris Pease, "we need the public's input and the best way to use it is to receive it in writing."

The Service is updating management plans for all lands in the National Wildlife Refuge System. The planning effort is part of the Fish and Wildlife Improvement Act of 1997 which requires national wildlife refuges to reassess their capabilities to protect fish, wildlife, and plant resources and their habitats while also providing compatible wildlife-dependent public uses. The Refuge Complex is in the initial stages of preparing its comprehensive conservation plan that will guide refuge activities and operations for the next 15 years. The new plan will likely include most of the current refuge programs, but unlike previous plans, there will be extensive effort to obtain ideas and concerns from the public, refuge users, neighbors, and partner agencies. Other opportunities for open house meetings for Lacassine National Wildlife Refuge and the other two refuges will be announced at a later date.

Sabine National Wildlife Refuge in Cameron Parish was established in 1937 by Executive Order for the protection of wintering waterfowl. The Refuge protects vast areas of coastal marshland which help support significant wildlife and fisheries resources. These resources are important to SW Louisiana—both biologically and economically. Cameron Prairie National Wildlife Refuge, also located in Cameron Parish, was established to provide for nesting, migrating, and wintering birds and their critical habitat. It was the first refuge established under the North American Waterfowl Management Plan in 1988 with funding provided by the sale of Duck Stamps. The refuge's marshes annually attract a diverse array of migratory birds and other wildlife. After the open house meetings, a draft plan will be written and presented to the public. During the CCP process, a planning team will develop goals, objectives, and strategies to define management actions. The team will develop a reasonable range of alternatives to determine a proposed management action. All alternatives will be reviewed to assess the environmental effects of each one. During the public's review, comments may

be made regarding the Service's proposed alternative. After considering comments, the Service will amend the plan if necessary and then will prepare and adopt a final plan.

For further information regarding the meetings, contact Natural Resource Planner Judy McClendon at Southwest Louisiana Refuges Complex, 1428 SH 27, Bell City, LA 70630. Phone: 337-598-2216, Fax: 337-598-2492, or email judy_mcclendon@fws.gov

The U.S. Fish and Wildlife Service is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System comprised of more than 500 national wildlife refuges, thousands of small wetlands, and other special management areas. It also operates 66 national fish hatcheries, 64 fish and wildlife management assistance offices and 78 ecological services field stations.

U.S. Fish and Wildlife Service Public Scoping Meetings Schedule
(For information the day of meetings, call 337-526-3667)

Thursday, October 3

Hackberry
Community Center
986 Main Street
Hackberry
1:00 pm to 8:00 pm

Friday, October 4

Recreation Center
Hwy 82
Johnson Bayou
1:00 pm to 8:00 pm

Saturday, October 5

Civic Center
900 Lakeshore Drive
Lake Charles
9:00 am - 4:00 pm

Tuesday, October 8

Fireman Center
957A Hwy 384
Grand Lake
1:00 pm - 8:00 pm

Thursday, October 10

Police Jury Annex
110 Smith Circle
Cameron
1:00 pm - 8:00 pm

U.S. Fish and Wildlife Service
Southwest Louisiana Refuges
Contact Information

Project Leader
Sabine NWR
3000 Holly Beach Highway
Hackberry LA 70645
Phone: 337-762-3816
Fax: 337-762-3780
email: chris_pease@fws.gov

Refuge Manager
Cameron Prairie NWR
1428 SH 27
Bell City, LA 70630
Phone: 337-598-2216
FAX: 337-598-2492
email: glenn_harris@fws.gov

Project Leader
Lacassine National Wildlife Refuge
209 Nature Road
Lake Arthur LA 70549
Phone: 337-774-5923
Fax: 337-774-9913
email: bryan_winton@fws.gov

Natural Resource Planner
Southwest Louisiana Refuges Complex
1428 SH 27
Bell City, LA 70630
Phone: 337-598-2216
Fax: 337-598-2492
email: judy_mcclendon@fws.gov

News Release #2
Electronically mailed to all media on October 7, 2002.

Due to all the Hurricane Hoopla, we would like to remind the public about their opportunities to make comments/suggestions regarding their local National Wildlife Refuges at this week's open house meetings. Thank You for your assistance.

NEWS RELEASE
SW LA REFUGE COMPLEX

Cameron Prairie NWR
1428 Hwy. 27
Bell City LA 70630
Phone: 337-598-2216
Fax: 337-598-2492

Sabine NWR
3000 Holly Beach Hwy
Hackberry LA 70645
Phone: 337-762-3816
Fax: 337-762-3780

For Immediate Release 10/07/2002
Contact: Diane Borden-Billiot, 337-762-3816

Southwest Louisiana Refuge Complex Open House Reminder
Public Invited to Help Develop Management Plan

The U.S. Fish and Wildlife Service will be holding two public open house sessions for the Southwest Louisiana Refuge Complex this week to gather input to help prepare a new comprehensive conservation management plan (CCP). The Refuge Complex is comprised of Sabine and Cameron Prairie National Wildlife Refuges which are two of more than 500 refuges nationwide within the National Wildlife Refuge System. The System is dedicated entirely to the conservation of wildlife and their habitats.

The public is invited to the open houses to be held : **October 8, Fireman Center, Grand Lake; and October 9, Police Jury Annex, Cameron**. Hours for the meetings will be from 1:00 - 8:00 pm. Those attending may come at any time during the open house to view maps and other displays, consider refuge purpose and mission statements, visit one-on-one with Service representatives, and give their personal suggestions for future management of the refuge. The input received will be used to evaluate the refuge's effectiveness toward meeting its obligations to the public and the Nation's natural resources, and to plan for future refuge programs and operations. Comments may also be made at the two Refuge Visitor Centers, by email, fax, or through the mail. According to Project Leader Chris Pease, "we need the public's input and the best way to use it is to receive it in writing."

The Service is updating management plans for all lands in the National Wildlife Refuge System. The planning effort is part of the Fish and Wildlife Improvement Act of 1997 which requires national wildlife refuges to reassess their capabilities to protect fish, wildlife, and plant resources and their habitats while also providing compatible wildlife-dependent public uses. The Refuge Complex is in the initial stages of preparing its comprehensive conservation plan that will guide refuge activities and operations for the next 15 years. The new plan will likely include most of the current refuge programs, but unlike previous plans, there will be extensive effort to obtain ideas and concerns from the public, refuge users, neighbors, and partner agencies. Open house meeting opportunities for Lacassine NWR in Lake Arthur, LA will be announced at a later date.

Sabine National Wildlife Refuge in Cameron Parish was established in 1937 by Executive Order for the protection of wintering waterfowl. The Refuge protects vast areas of coastal marshland which help support significant wildlife and fisheries resources. These resources are important to SW Louisiana - both biologically and economically. *Cameron Prairie National Wildlife Refuge*, also located in Cameron Parish, was established to provide for nesting, migrating, and wintering birds and their critical habitat. It was the first refuge established under the North American Waterfowl Management Plan in 1988 with funding provided by the sale of Duck Stamps. The refuge's marshes annually attract a diverse array of migratory birds and other wildlife.

After the open house meetings, a draft plan will be written and presented to the public. During the CCP process, a planning team will develop goals, objectives, and strategies to define management actions. The team will develop a reasonable range of alternatives to determine a proposed management action. All alternatives will be reviewed to assess the environmental effects of each one. During the public's review, comments may be made regarding the Service's proposed alternative. After considering comments, the Service will amend the plan if necessary and then will prepare and adopt a final plan.

For further information regarding the meetings, contact Natural Resource Planner Judy McClendon at Southwest Louisiana Refuges Complex, 1428 SH 27, Bell City, LA 70630. Phone: 337-598-2216, Fax: 337-598-2492, or email judy_mcclendon@fws.gov

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News Release #3
Issued to media via e-mail on January 7, 2003

National Wildlife Refuges in southwest Louisiana managed by the U.S. Fish and Wildlife Service are participating in a Comprehensive Conservation Plan (CCP) process and invites the public to participate. The CCP is developed with partners such as state wildlife agencies, elected officials, nongovernmental conservation agencies, and interested public.

Refuges in Cameron Parish undergoing the process include Sabine, Cameron Prairie, and Lacassine National Wildlife Refuges. These Refuges are three of more than 535 nationwide within the National Wildlife Refuge System which is dedicated entirely to the conservation of wildlife and their habitats.

One of the first steps in the CCP process is to solicit public input regarding management of the refuges. An open house meeting will be held on January 16, 2003, at the Best Suites Inn, 401 Lakeshore Drive, in Lake Charles to give people an opportunity to discuss or comment on management issues. The public may drop by anytime between 2:00 pm and 7:00 pm to view displays, pick up information, or talk with Refuge personnel. Formal presentations will be given at 2:30, 4:30, and 6:30 p.m. A question and answer session will follow each formal presentation.

In 1997, Congress passed the National Wildlife Refuge System Improvement Act which set the stage for ensuring that wildlife refuges continue to be managed for the benefit of both wildlife and the American people. The Act articulates a clear conservation mission for fish, wildlife, and plant conservation and also mandates that CCPs be prepared for every national wildlife refuge.

The plans will specify management direction for the refuges for the next 15 years while ensuring that each refuge's uses are compatible with its mission and purpose for being established. The CCP process will encourage greater involvement by partners and neighbors in wildlife refuge management decision-making and public use programs. Anyone who is interested in the future of the Refuges is invited to participate.

For further information on the meeting, please call Natural Resource Planner Judy McClendon at 337-598-2216 or 337-526-3667.

Public Scoping Meetings:

Thursday, October 3	**Tuesday, October 8**
Hackberry Community Center 986 Main Street Hackberry 1:00 pm to 8:00 pm	Fireman Center 957A Hwy 384 Grand Lake 1:00 pm - 8:00 pm
Friday, October 4	**Thurs., October 10**
Recreation Center Hwy 82 Johnson Bayou 1:00 pm to 8:00 pm	Police Jury Annex 110 Smith Circle Cameron 1:00 pm - 8:00 pm
Saturday, October 5	
Civic Center 900 Lakeshore Drive Lake Charles 9:00 am - 4:00 pm	

For information the day of meetings, call 337-526-3667.

Sabine National Wildlife Refuge

Sabine National Wildlife Refuge, in Cameron Parish was established in 1937 for the protection of wintering waterfowl. The Refuge protects vast areas of coastal marshland which help support significant wildlife and fisheries resources. These resources are important to SW Louisiana - both biologically and economically.

Executive Order 7764, dated Dec. 6, 1937, states the official purpose of the refuge is, ". . . .as a refuge and breeding ground for migratory birds and other wildlife." A secondary purpose of the refuge is ". . . . for use as an inviolate sanctuary, or for any other management purpose, for migratory birds. 16 U.S.C. 715d - Migratory Bird Conservation Act.

Sabine is the largest Service refuge in Louisiana with 124,511 acres; 84,667 acres of grassland/herbaceous marsh and 39,844 acres of open water.

Sabine is managed with goals, objectives, and strategies designed to restore habitat, manage water levels, conduct surveys, censuses, investigations, and studies. Some tools used to accomplish goals and objectives include prescribed burning, mowing, haying, and grazing.

Public use opportunities include fishing, crabbing, shrimping, hunting, nature trails, environmental education, and wildlife observation and photography.

Cameron Prairie National Wildlife Refuge

Cameron Prairie National Wildlife Refuge is located approximately 25 miles southeast of Lake Charles, in Cameron Parish. It was established to provide for nesting, migrating, and wintering birds and their critical habitat. It was the first refuge established under the North American Waterfowl Management Plan. The Refuge was purchased on December 29, 1988 with $5.1 million dollars provided by the Migratory Bird Stamp Act (Duck Stamp Fund).

The primary purpose for establishment of this refuge was "... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds" (16 U.S.C., 715d. Migratory Bird Conservation Act).

The refuge contains 9,621 acres that include fresh marsh, coastal prairie, and old rice fields (currently moist soil units). It provides excellent habitat for migratory waterfowl, shorebirds, and neotropical migrants, as well as habitat for local species such as white-tailed deer, small game, furbearers, American alligators, and other wildlife species.

Cameron Prairie National Wildlife Refuge is managed to provide natural foods for wintering waterfowl and other water birds. This is done by using moist soil management techniques to grow natural plants and by constructing levees and water control structures to provide water for wildfowl usage.

The refuge lends itself to high quality public use activities such as wildlife observation, bird watching, and photography. Additional recreational activities on the refuge include an archery white-tailed deer hunt, waterfowl youth-only hunt, rabbit hunt, snipe hunt, dove hunt, fresh water fishing, and an auto tour route.

U.S. Fish and Wildlife Service

Southwest Louisiana Refuges Complex

Comprehensive Conservation Planning

CELEBRATING A CENTURY of CONSERVATION

Who are we:

The Southwest Louisiana Refuges Complex is comprised of Sabine and Cameron Prairie National Wildlife Refuges, both managed by the U.S. Fish and Wildlife Service. These Refuges are two of more than 535 nationwide within the National Wildlife Refuge System which is dedicated entirely to the conservation of wildlife and their habitats.

What are we doing:

The Complex is beginning a planning process which will result in a **Comprehensive Conservation Plan** (CCP) to specify management direction for the refuges for the next 15 years

The plan must ensure that each refuge's uses are compatible with its mission and purpose for being established. It will encourage greater involvement by partners and neighbors in wildlife refuge management decision-making and public use programs.

Refuges are managed based on biology with the underlying theme that wildlife and their habitats come first. Wildlife-dependent public uses are allowed if compatible with the purpose of the Refuge. If conflict occurs, it shall be resolved so that management still protects the original purpose of the Refuge.

Refuge System Mission:
"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Under the CCP process we will consider how the refuges contribute to the overall Refuge System mission and still accomplish the original purpose for refuge establishment.

Why are we doing this:

In 1997, Congress passed the National Wildlife Refuge System Improvement Act which set the stage for ensuring that wildlife refuges continue to be managed for the benefit of both wildlife and the American people.

Two important components of the Act which articulates a clear conservation mission for fish, wildlife, and plant conservation are:

1) Designated priority wildlife-dependent public uses as hunting and fishing; wildlife observation and photography; and interpretation and environmental education when they are compatible with the refuge's purpose and the mission of the System

2) Mandated comprehensive conservation plans (CCP) for every national wildlife refuge which are for a 15-year period and must be completed by 2012.

How will we conduct the process:

During the CCP process, a planning team will develop goals, objectives, and strategies to define management actions. The team will develop a reasonable range of alternatives to determine a proposed management action. All alternatives will be reviewed to assess the environmental effects of each one.

One of the first steps in the process is to solicit public input regarding management of the refuges. After notifying the public about opportunities to comment, we will hold scoping meetings to receive the comments. We will discuss and scope issues with participants. Scoping is defined as a process to determine what the significant issues will be during the planning process.

Who will help us:

The CCP is developed with our partners such as state wildlife agencies, elected officials, non-governmental conservation agencies, and the general public.

After the scoping meetings, a draft plan will be written and presented to the public. During the public's review, comments may be made regarding the Service's preferred alternative. After considering comments, the Service will amend the plan if necessary and then will prepare and adopt a final plan.

Remember, we need your input and the best way to use it is to receive it in writing.

How to Get Involved:

For further information, contact the following:

Project Leader
Sabine NWR
3000 Holly Beach Highway
Hackberry LA 70645
Phone: 337-762-3816
Fax: 337-762-3780
chris_pease@fws.gov

Refuge Manager
Cameron Prairie NWR
1428 Highway 27
Bell City, LA 70630
Phone: 337-598-2216
FAX: 337-598-2492
email: glenn_harris@fws.gov

Natural Resource Planner
Southwest Louisiana Refuges Complex
1428 Highway 27
Bell City, LA 70630
Phone: 337-598-2216
Fax: 337-598-2492
email: judy_mcclendon@fws.gov

Comment Sheet
Comprehensive Conservation Planning
Cameron Prairie, Sabine, & Lacassine National Wildlife Refuges

Please use the space below to comment on the proposal, then complete the name and address form and turn it in at the Open House or mail to: Natural Resource Planner, U.S. Fish and Wildlife Service, 1428 Hwy 27, Bell City, LA 70630.

PLEASE PRINT

Dear Planner:

Regarding comprehensive conservation planning for Cameron Parish Refuges, **(indicate which refuge you are commenting on)** _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Continue on additional pages if necessary)

Name: _____
Address: _____
City: _____ **State:** _____ **Zip:** _____

Telephone: **DATE:** **PLEASE PRINT**

SPECIAL HURRICANE DAMAGE MEETING

On March 9, 2006, the Service held a meeting at the Lake Charles Civic Center to discuss the devastation caused by Hurricane Rita in September of 2005 and its impacts on the refuges within the Southwest Louisiana National Wildlife Refuge Complex. In part, a presentation given by the Sabine Refuge Manager to over 100 people in attendance explained what the damages were, how the Service would address them, and when the public could use refuge facilities. The announcement that Sabine was closed until further notice was disappointing to many in attendance and subsequently the Project Leader received many calls to discuss the closure. Eventually the public understood the reasoning behind the closure decision.

Appendix F. Appropriate Use Determinations

SABINE NATIONAL WILDLIFE REFUGE APPROPRIATE USE DETERMINATIONS

An appropriate use determination is the initial decision process a refuge manager follows when first considering whether or not to allow a proposed use on a refuge. The refuge manager must find a use is appropriate before undertaking a compatibility review of the use. This process clarifies and expands on the compatibility determination process, by describing when refuge managers should deny a proposed use without determining compatibility. If we find a proposed use is not appropriate, we will not allow the use and will not prepare a compatibility determination.

Except for the uses noted below, the refuge manager must decide if a new or existing use is an appropriate refuge use. If an existing use is not appropriate, the refuge manager will eliminate or modify the use as expeditiously as practicable. If a new use is not appropriate, the refuge manager will deny the use without determining compatibility. Uses that have been administratively determined to be appropriate are:

- Six wildlife-dependent recreational uses – As defined by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act), the six wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) are determined to be appropriate. However, the refuge manager must still determine if these uses are compatible.

- Take of fish and wildlife under State regulations – States have regulations concerning take of wildlife that includes hunting, fishing, and trapping. We consider take of wildlife under such regulations appropriate. However, the refuge manager must determine if the activity is compatible before allowing it on a refuge.

Statutory Authorities for this policy:

National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Administration Act). This law provides the authority for establishing policies and regulations governing refuge uses, including the authority to prohibit certain harmful activities. The Administration Act does not authorize any particular use, but rather authorizes the Secretary of the Interior to allow uses only when they are compatible and "under such regulations as he may prescribe." This law specifically identifies certain public uses that, when compatible, are legitimate and appropriate uses within the Refuge System. The law states ". . . it is the policy of the United States that . . .compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System . . .compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management; and . . . when the Secretary determines that a proposed wildlife-dependent recreational use is a compatible use within a refuge, that activity should be facilitated . . . the Secretary shall . . . ensure that priority general public uses of the System receive enhanced consideration over other general public uses in planning and management within the System . . . ." The law also states "in administering the System, the Secretary is authorized to take the following actions: . . . issue regulations to carry out this Act." This policy implements the standards set in the Administration Act by providing enhanced consideration of priority general public uses and ensuring other public uses do not interfere with our ability to provide quality, wildlife-dependent recreational uses.

Refuge Recreation Act of 1962, 16 U.S.C. 460k (Recreation Act). This law authorizes the Secretary of the Interior to ". . . administer such areas [of the System] or parts thereof for public recreation when in his judgment public recreation can be an appropriate incidental or secondary use." While the Recreation Act authorizes us to allow public recreation in areas of the Refuge System when the use is an "appropriate incidental or secondary use," the Improvement Act provides the Refuge System mission and includes specific directives and a clear hierarchy of public uses on the Refuge System.

Other Statutes that Establish Refuges, including the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) (16 U.S.C. 410hh - 410hh-5, 460 mm - 460mm-4, 539-539e, and 3101 - 3233; 43 U.S.C. 1631 et seq.).

Executive Orders. We must comply with Executive Order (E.O.) 11644 when allowing use of off-highway vehicles on refuges. This order requires that we: designate areas as open or closed to off-highway vehicles in order to protect refuge resources, promote safety, and minimize conflict among the various refuge users; monitor the effects of these uses once they are allowed; and amend or rescind any area designation as necessary based on the information gathered. Furthermore, E.O. 11989 requires us to close areas to off highway vehicles when we determine that the use causes or will cause considerable adverse effects on the soil, vegetation, wildlife, habitat, or cultural or historic resources. Statutes, such as ANILCA, take precedence over executive orders.

Definitions:

Appropriate Use
A proposed or existing use on a refuge that meets at least one of the following four conditions.

1. The use is a wildlife-dependent recreational use as identified in the Improvement Act.
2. The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Improvement Act was signed into law.
3. The use involves the take of fish and wildlife under state regulations.
4. The use has been found to be appropriate as specified in section 1.11.

Native American. American Indians in the conterminous United States and Alaska Natives (including Aleuts, Eskimos, and Indians) who are members of federally recognized tribes.

Priority General Public Use. A compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

Quality. The criteria used to determine a quality recreational experience include:

- Promotes safety of participants, other visitors, and facilities.
- Promotes compliance with applicable laws and regulations and responsible behavior.
- Minimizes or eliminates conflicts with fish and wildlife population or habitat goals or objectives in a plan approved after 1997.
- Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation.
- Minimizes conflicts with neighboring landowners.
- Promotes accessibility and availability to a broad spectrum of the American people.
- Promotes resource stewardship and conservation.

- Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and protecting these resources.
- Provides reliable/reasonable opportunities to experience wildlife.
- Uses facilities that are accessible and blend into the natural setting.
- Uses visitor satisfaction to help define and evaluate programs.

Wildlife-Dependent Recreational Use. As defined by the Improvement Act, a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

DRAFT FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: **Sabine National Wildlife Refuge**

Use: **Recreational Sportfishing Tournaments**

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	x	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	x	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	x	
(d) Is the use consistent with public safety?	x	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	x	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	x	
(g) Is the use manageable within available budget and staff?	x	
(h) Will this be manageable in the future within existing resources?	x	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	x	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _x_** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X__**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

DRAFT FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: **Sabine National Wildlife Refuge**

Use: **Research and Monitoring**

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _x_** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate___X__**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

DRAFT FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: **Sabine National Wildlife Refuge**

Use: **Commercial Video and Photography**

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _x_** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate___X__**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

DRAFT FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: **Sabine National Wildlife Refuge**

Use: **Commercially Guided Wildlife Viewing, Photography, Environmental Education, and Interpretation**

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	x	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _X__** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X__**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

DRAFT FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: **Sabine National Wildlife Refuge**

Use: **Beneficial Use of Dredge Material**

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _x_** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate___X__**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____

A compatibility determination is required before the use may be allowed.

EAST COVE UNIT OF CAMERON PRAIRIE NATIONAL WILDLIFE REFUGE APPROPRIATE USE DETERMINATION

DRAFT FINDING OF APPROPRIATENESS OF A REFUGE USE

Refuge Name: **Cameron Prairie National Wildlife Refuge, East Cove Unit**

Use: **Commercially Guided Fishing**

This form is not required for wildlife-dependent recreational uses, take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision Criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D, 603 FW 1, for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will **generally** not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. **Yes _x_** **No ___**

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate___X__**

Refuge Manager:_____ Date:_____

If found to be **Not Appropriate**, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found **Not Appropriate** outside the CCP process, the refuge supervisor must sign concurrence.
If found to be **Appropriate**, the refuge supervisor must sign concurrence.

Refuge Supervisor:_____ Date:_____
A compatibility determination is required before the use may be allowed.

Appendix G. Compatibility Determinations

Introduction

The following proposed compatibility determinations describe various uses that are outlined in Alternative B, the proposed alternative for Sabine National Wildlife Refuge, and serve to determine if these uses are compatible with wildlife purposes.

Refuge Uses: The following Compatibility Determinations apply to (1) Recreational Freshwater Sportfishing; (2) Recreational Sportfishing Tournaments; (3); Recreational Hunting; (4) Environmental Education and Interpretation; (5) Wildlife Observation and Photography; (6) Research and Monitoring; (7) Commercial Alligator Harvest; (8) Commercial Video and Photography; (9) Commercially Guided Wildlife Viewing, Photography, Environmental Education, and Interpretation; (10) Beneficial Use of Dredge Material; and (11) Commercially Guided Fishing (only on the East Cove Unit of Cameron Prairie National Wildlife Refuge).

Refuge Name: Sabine National Wildlife Refuge

Date Established: December 6, 1937

Establishing and Acquisition Authorities: Executive Order 7764, Migratory Bird Conservation Act

Refuge Purpose(s):

… as a refuge and breeding ground for migratory birds and other wildlife ... (Executive Order 7764, dated Dec. 6, 1937)

... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds. (16 U.S.C. Sec. 715d [Migratory Bird Conservation Act])

Mission of the National Wildlife Refuge System:

The mission of the National Wildlife Refuge System is "... to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Archaeological Resources Protection Act of 1979
Bald and Golden Eagle Protection Act (16 U.S. C. 668-668d; 54 Stat. 250)
Criminal Code provisions of 1940 (18 U.S.C. 41)
Department of Interior, U.S. Fish & Wildlife Service, Code of Federal Regulations, Title 50, Subchapter C; Title 43, 3101.3-3)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.; 87 Stat. 884)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
Fish and Wildlife Service (Refuge) Manual
Land and Water Conservation Fund Act of 1965
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755

Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718-718h; 48 Stat. 451)
National Environmental Policy Act of 1969 (42 U.S.C. 4321, et seq.; 83 Stat. 852)
National Historic Preservation Act of 1966 (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 as amended (16 U.S.C. 668dd-668ee; 80 Stat. 927)
National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-570)
Native American Graves Protection and Repatriation Act of 1990
Refuge Recreation Act of 1962 (16 U.S. C. 460k-460k-4; 76 Stat. 653)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
Wilderness Act of 1964 (16 U.S. C. 1131; 78 Stat. 890)
Laws and Regulations of the State of Louisiana relating to hunting
Additional refuge-specific regulations as published

SABINE NATIONAL WILDLIFE REFUGE COMPATIBILITY DETERMINATIONS

Compatibility determinations for each use listed were considered separately. Within this plan, the preceding sections from “Refuge Uses” through “Other Applicable Laws” are only shown once; however, they are part of each descriptive use and become part of that compatibility determination if approved.

Description of Use: *Recreational Sport Fishing*

Recreational sport fishing has been traditionally allowed and is permitted on designated waterways at Sabine. Approximately 110,000 people fish on Sabine each year.

Fishing with rod and reel, pole and line or jug and line is permitted. The use or possession of other types of fishing gear is prohibited on the refuge. Bank fishing along Highway 27 is permitted year-round. A special permit is required from the refuge for cast netting for shrimp.

Units 1A and 1B are open from March 15 to October 15 to nonmotorized boats only. Aside from Management Unit 3, trolling motors only are allowed in refuge marshes. The saltwater boat launch at West Cove is open year-round for fishing access into Calcasieu Lake. West Cove Canal is closed to fishing from October 16 through March 14, and is only used for boat passage only during this time.

East Cove Unit: The East Cove Unit is open for public use, including fishing, year-round, except during the state’s waterfowl hunting season and when the Grand Bayou Boat Bay is closed. Public use of the unit is restricted to boats only; no walking, wading, or climbing in or on the marsh, levees, or structures to fish, cast net, or crab is allowed. An estimated 10 to 12 boats use the East Cove Unit daily when the boat bay is open.

Availability of Resources: No changes to the refuge’s fishing program are required with the implementation of the proposed alternative.

Sport fishing represents about 50% of the consumptive users on the refuge (~300,000 visitors annually). A portion of the refuge budget is spent annually managing for the benefit of freshwater

fisheries, conducting law enforcement patrols inside and outside the pool, and ensuring refuge visitors are in accordance with boater safety, and following other refuge regulations.

Anticipated Impacts of Use: Fishing is not expected to have substantial, long-term adverse impacts on other wildlife resources at Sabine Refuge, including wildlife habitat or fish and wildlife populations. Also, fishing is not expected to indirectly or cumulatively impact refuge resources adversely. As a consumptive use, fishing would have some minimal and short-term direct, localized impacts on refuge resources, including populations of target sport fish.

Fishing in itself does not impact the refuge. Sport fishing is a wholesome, enjoyable, and wildlife-dependent public use opportunity that the refuge plans to continue to promote. Freshwater Sport Fishing is a sedentary activity (in part) and participation in this activity generally results in litter on the refuge (fishing line, food, bait containers, soda/beer cans, and other "trash"). The refuge is required to retrieve trash numerous times per year in order to keep the refuge looking presentable. Trash is detrimental to the aesthetics of the refuge and can impact the digestive tract of birds, turtles, fish, alligators, and other resident and migratory wildlife. The refuge would strive to reduce this problem by working with partners to pick up litter and educate anglers not to litter in the first place.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Fishing will only be allowed March 15 – October 15, the lowest migratory bird usage period, and only during daylight hours. Only trolling motors would be permitted on boats. Only fishing with rod and reel, pole and line or jug and line will be allowed; no other methods will be permitted. Current and anticipated future levels of fishing pressure are considered to be compatible with the purposes for which the refuge was established.

The East Cove Unit will remain open for fishing year-round, except during the State's waterfowl hunting season and when the Grand Bayou Boat Bay is closed. Public use of the unit will continue to be restricted to boats only; no walking, wading, or climbing in or on the marsh, levees, or structures to fish, cast net, or crab will be allowed.

Justification: According to the National Wildlife Refuge System Improvement Act of 1997, fishing is a priority public use activity that should be encouraged and expanded where possible. It is through compatible public uses such as this that the public becomes aware of, appreciates, and provides support for national wildlife refuges.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: _____

Description of Use: *Recreational Sport Fishing Tournaments*

Tournament sport fishing with pole and line has occurred on refuge waters for an unknown amount of time and has been handled since 1993 subject to special use permit conditions specific to each tournament. Most tournaments are catch and release, with the largest fish kept for weighing. Fish that the angler wants to keep for the weighing are kept in a live well and culled as larger fish are caught.

Through the years, the Sabine Refuge staff has identified three classes of fishing tournaments that occur on the refuge: (1) multiple water tournaments; (2) off-site tournaments which focus on taking fish from the refuge; and (3) on-site tournaments. Descriptions of these tournaments are as follows:

Multiple Water Tournaments: These tournaments are usually sponsored by large organizations. All of the organizational, administrative, and judging activities occur off the refuge, usually in a centrally located municipality. These tournaments are highly publicized and have a large number of participants. Some participants may be professional anglers. The fishing activity occurs over a large geographical area such as southwest Louisiana, or a specific watershed which may include national wildlife refuges. Numerous species of fish may be targeted, or it could be a species-specific tournament. Refuges are not singled out by the tournament operators. Prizes are both monetary and material and can be of substantial value. Participants involved in the tournament may or may not choose to fish on a refuge. Local examples of these tournaments are the STAR (multiple species tournament) and National Red Fish Tournament. Because these tournaments do not target refuge water but a large geographical area and have a time-honored tradition of managing the tournament as described above, the refuge will not regulate this form of fishing tournament.

Off-site Tournaments that Target Taking Fish from the Refuge: These tournaments tend to fall in a gray area in that one is not always sure if the tournament is occurring, and the participants are indistinguishable from other individuals fishing on the refuge. The host of the tournament may be a declared nonprofit organization, a local entrepreneur, or an unaffiliated individual. Locally, these are often referred to as “dog fights,” ”rodeos,” and “derbies.” Often times these events are advertised locally within a very small geographical area. Advertisement is by word of mouth, posters in store windows, or in lesser known publications. Prizes are usually monetary. The target area for these tournaments is very explicit, such as the Lacassine Refuge Pool where many bass have been taken that were of record size. The target species is Florida largemouth bass. The organizational, administrative, and judging activities occur off the refuge. When possible, the refuge will work with the sponsors of such tournaments to advise them that the activity they are conducting requires a special use permit from the refuge.

On-site Tournaments: These tournaments may have the same characteristics as the tournaments identified above, except the organizational, administrative, judging, and fishing activities occur on the refuge. These tournaments will be managed through a recreational special use permitting program.

Availability of Resources: Tournament fishing represents a small portion of all recreational users on the refuge. Management activities associated with tournaments includes law enforcement patrols that ensure tournament participants are in compliance with state and federal boater safety regulations and are following permit and other refuge-specific regulations; administrative personnel are involved managing the permitting process; biologists are needed to plan and conduct habitat management, monitoring and fish stocking; and maintenance personnel are needed to conduct litter control, boat ramp, sign and road and other maintenance. Currently, resources are available to manage a limited duration tournament program.

Anticipated Impacts of the Use: Certain segments of the fishing community find fishing tournaments disruptive on the refuge and have complained about tournament participants dominating the waterways, roads and parking areas, creating safety problems; and in some cases, exhibiting poor ethical boating and fishing behavior. Some anglers complain about finding dead fish at the weigh-in location. Other segments of the fishing community enjoy the competition and camaraderie of fishing tournaments and claim to encourage good fisheries management.

To address the various concerns among anglers, limited duration tournaments will need to be authorized in a manner that would have minimal impacts on recreational fishing enthusiasts that are not involved in the tournaments and other natural resources.

The practice of holding fish in live wells and culling smaller fish in exchange for holding larger fish for tournament purposes has caused concern among some anglers and federal and state biologists. The major concern is the spreading of largemouth bass virus. Research indicates that live-release angling tournaments cause a significant physiological disturbance in largemouth bass, specifically with plasma cortisol, glucose concentrations, and plasma osmolarity in largemouth bass sampled five minutes following weighing (Suski et al. 2003). Tournament-caught fish are often kept in live wells for several hours, and if bigger fish are caught, the smaller fish that are stressed from being in the live wells are released.

Live-release angling tournaments can expose largemouth bass to periods of hypoxia (Furimski et al. 2003). Also, it has been shown that temperature is an important determinant in host survival to largemouth bass virus (Grant et al. 2003).

Roads and travel corridors to boat launching sites on the refuge can be injurious or fatal to wildlife. Vehicle incidents involving wildlife such as reptiles, amphibians and some migratory and resident mammals and birds have been observed on the roadways to and from boat launching sites. This situation can be partially corrected by enforcing speed limits on the refuge and making the public aware of wildlife crossing the roads.

The tournament participants' boats and trailers could accidentally release invasive aquatic plant species into the Lacassine Pool and certain species such as *Salvinia molesta* could be extremely detrimental if introduced. Signs are currently posted at all boat launching sites, making anglers and boat owners aware of the problem; these signs provide recommendations on how to address the matter.

During tournaments, overzealous anglers could cause disturbance to nesting resident and migratory birds in the Lacassine Pool. Time and space zoning will be needed to address this impact.

Some tournaments, if managed proactively, can be a benefit to biologists if staff or volunteers are made available to properly handle the fish and collect valuable data such as weight, length, age, and when appropriate, take body samples for genetic identification purposes.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Limited duration off-site largemouth bass tournaments which focus on taking fish from the refuge, and on-site largemouth bass tournament fishing will be allowed in refuge waters from March 15–September 30 on specific dates by special use permit only and will not exceed over three tournaments per month. This is the time of year with the lowest migratory bird use on the refuge. Tournament slot dates will be identified in early February and a competitive process will be used to allocate slot dates.

The program will be managed as a Recreation Fee Program where a portion of the funds generated from the competitive allocation process will be used to maintain the public use facilities on the refuge. The zoning of tournament activities may be used to protect nesting water birds and to alleviate congestion

Tournament sponsors will be required to conduct their tournaments as follows:

- All bass captured will be retained and removed from the refuge at the end of the tournament. All anglers will be discouraged from holding fish in live wells and culling fish for size to aid in controlling the spread of largemouth bass virus.

- Law enforcement patrols to enforce special use permit and refuge fishing regulations will be a high priority need.

- Tournament sponsor(s) will be required to exhibit proof of insurance for potential damages to facilities or habitat as a result of tournament activities.

Justification: Sport fishing tournaments, as regulated by special use permit, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose(s) of Sabine National Wildlife Refuge.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

References:

Furimsky, M, S.J. Cooke, C.D. Suski, Y. Wang and B.L. Tufts. 2003. Respiratory and circulatory responses to hypoxia in largemouth bass and smallmouth bass: implications for "live release" angling tournaments. *American Fisheries Society Transactions* 132(6):1065-1075. ISSN: 0002-8487. Allen Press.

Grant, E.C., D.P. Philipp, K.R. Inendino and T.L. Goldberg. 2003. Effects of temperature on the susceptibility of largemouth bass to largemouth bass virus. *Journal of Aquatic Animal Health* 15(3):215-220. ISSN: 0899-7659. Allen Press.

Suski, C.D., S.S. Killen, M.B. Morrissey, S.G. Lund and B.L. Tufts. 2003. Physiological changes in largemouth bass caused by live-releasing angling tournaments in southeastern Ontario. *North American Journal of Fisheries Management* 23(3):779-786. ISSN: 0275-5947. Allen Press.

Description of Use: *Recreational Hunting*

Hunting of waterfowl is permitted on the refuge. Hunting of other wildlife species is not permitted.

In recent years, hunting of ducks, geese, and coots has been allowed in designated areas of the refuge on Wednesdays, Saturdays, and Sundays during the state waterfowl seasons set by the Louisiana Department of Wildlife and Fisheries. All hunters are required to have a refuge-issued permit.

Availability of Resources: There are adequate resources to ensure and administer the use at its current level of participation.

Anticipated Impacts of Use: The incidental taking of other wildlife species, either illegally or unintentionally, may occur with any consumptive use program. At current and anticipated public use levels for this program, this incidental take would be very small and would not directly or cumulatively impact population levels on the refuge or in the surrounding area. Currently the refuge does not have any threatened or endangered species restrictions, so concerns about incidental take of protected species are minimal. Implementation of a highly effective law enforcement program and continued development of special regulations for this use would eliminate most incidental take problems.

Hunter access to the hunt areas is by boat, walking or bicycling, with the exception of all-terrain vehicle use by disabled hunters, so impacts such as trampling, crushing/grinding vegetation and noise disturbance should be minimal.

Hunting is not expected to indirectly or cumulatively impact refuge resources negatively. As a consumptive use, hunting would have some minimal and short-term direct impacts on refuge resources. Waterfowl and alligator numbers would be temporarily reduced as animals are harvested, but this population decline would be reversed by recruitment during the following reproductive season.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Hunting will be permitted only for waterfowl and alligators. With regard to waterfowl hunting, permits will be required and a post-hunt information card must be submitted following each hunt.

The following stipulations will also ensure compatibility of the waterfowl hunt:

(a) – Waterfowl hunting will be limited to no more than 50,000 acres or 40% of the refuge.

(b) – During the state season, waterfowl hunting will be open until noon four days per week. (This represents an increase of one day per week from the current level of hunting opportunities.)

(c) – Sabine will continue providing sanctuary with minimal human disturbance for three days per week.

(d) – The refuge will continue restrictions on motors and sizes, permitting the use of only trolling motors and push poles in marsh.

(e) – The use of permanent blinds will be prohibited.

(f) – Sabine will initiate permit drawings if or when conditions require (e.g. too many hunters or two few birds).

(g) – The refuge will continue youth waterfowl hunting days as set by Louisiana Department of Wildlife and Fisheries.

Current and future levels of hunter participation are considered to be compatible with the purpose for which the refuge was established. The refuge will continue to monitor the potential for limited bow hunting of deer and feral hogs.

Justification: According to the National Wildlife Refuge System Improvement Act of 1997, hunting is a priority public use activity that should be encouraged and expanded where possible. It is through compatible public uses such as this that the public becomes aware of, appreciates, and provides support for national wildlife refuges.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__**X**__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: _____

Description of Use: *Environmental Education and Interpretation*

Sabine National Wildlife Refuge and the Southwest Louisiana National Wildlife Refuge Complex staff provide on-site and off-site education and interpretation to visitors and the community-at-large. About 70,000 members of the public use interpretive and educational services on the refuge.

Off-site education services have been provided to people at community seminars, festivals, and other public exhibitions. Refuge and Complex staff also educate the public through media events. The refuge submits about 25 press releases and participates in about 15 radio or television events annually.

Availability of Resources: At the current participation level for this use funding is adequate.

Anticipated Impacts of Use: The incidental disturbance of wildlife species, either illegally or unintentionally, may occur with any public use program. Environmental education and interpretation may result in some additional wildlife disturbance. Habitat destruction (mostly trampling) by approved or unapproved activity may also occur. Interpretive trails, boardwalks, kiosks, scenic overlooks, and observation platforms are designed and placed to minimize disturbance potential. Nonetheless, occasionally conflicts do occur between users and wildlife; for example, alligators that appear to be aggressive and nesting adjacent to interpretive trails used by pedestrians have had to be destroyed or removed as a safety precaution. Effective education and law enforcement programs should minimize this kind of conflict and impact.

Environmental education and interpretation are not expected to indirectly or cumulatively impact refuge resources negatively, even though there may be some minimal and direct short-term disturbance or trampling.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: N/A

Justification: According to the National Wildlife Refuge System Improvement Act of 1997, environmental education and interpretation are priority public use activities that should be encouraged and expanded where possible. It is through compatible public uses such as this that the public becomes aware of, appreciates, and provides support for national wildlife refuges.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: _____

Description of Use: *Wildlife Observation and Photography*

Sabine National Wildlife Refuge has two nature-viewing trails and two roadside "scenic overlook" viewing areas. The Marsh Trail, a one and one-half mile trail and boardwalk located approximately four miles south of the refuge headquarters with parking and facilities near the State Highway 27, provides opportunities for wildlife observation and photography. During 2000–2005, 83,734 visitors per year walked the Wetland Walkway and Blue Goose trails. The Blue Goose Trail is located beside State Highway 27 at the refuge headquarters and features parking and a wildlife observation platform. Wading birds, shorebirds, waterfowl, diamond-backed terrapins, and many other brackish/saline marsh and shoreline species may be seen along the trail. The trail is open year-round from dawn until dusk.

The refuge has also established several nonmotorized boating areas that allow the public to view and photograph wildlife in areas undisturbed by motorized traffic.

In cooperation with the Creole Nature Trail All American Road Board of Directors, the refuge built two roadside "scenic overlooks" beside State Highway 27. These areas allow visitors to the refuge to stop and observe coastal marsh habitats and the wildlife inhabiting them without having to leave their vehicles.

Availability of Resources: There are adequate resources to ensure compatibility and to administer the use at current levels.

Anticipated Impacts of Use: Wildlife observation and photography could result in some disturbance to wildlife, especially along the two nature-viewing trails. There would be an occasional need to remove or destroy potentially dangerous animals like alligators. Some minimal trampling of vegetation and littering may also occur. Trails, boardwalks, scenic overlooks, and observation platforms would be managed to minimize disturbance potential.

Wildlife observation and photography are not expected to indirectly or cumulatively impact refuge resources negatively, even though there may be some minimal conflicts and direct short-term disturbance of wildlife or trampling of vegetation and habitat. Overall, these uses would not cause significant disturbance

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Public access for wildlife viewing and photography would be allowed in designated areas only by automobile, boat, bicycle, or on foot. An increase in education and law enforcement patrols would minimize illegal or undesirable activity. Wildlife observation and photography would be monitored to document any negative impacts. If any negative impacts are found, corrective action would be taken to reduce or eliminate negative impacts to wildlife. Public access to many of the key observation and photography areas may be closed during extremely wet periods for road protection and visitor safety.

Wildlife viewing areas would be managed to minimize disturbance impacts to wildlife and all refuge resources while providing a good opportunity to view wildlife in their natural environments.

Mode of access incidental to this use will be allowed by vehicle or bicycle on roads open to the public.

Justification: According to the National Wildlife Refuge System Improvement Act of 1997, wildlife observation and photography are priority public use activities that should be encouraged and expanded where possible. It is through compatible public uses such as this that the public becomes aware of and provides support for national wildlife refuges.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement
__X__ Environmental Assessment and Finding of No Significant Impact
_____ Environmental Impact Statement and Record of Decision

Mandatory 15-year Re-evaluation Date: _____

Description of Use: *Research and Monitoring*

Research and monitoring are used to collect information for the purpose of better understanding ecosystem functions and responses to management actions to more effectively manage habitats. This activity would allow university students and professors, nongovernmental and governmental researchers to conduct both short- and long-term research projects. Results of this research allow managers to assess the success of management activities and develop a “Best Management Practice” (BMP) on a refuge-specific basis. All research requests are judged on individual project merit and applicability to refuge programs.

Availability of Resources: Adequate refuge personnel and other resources are available to monitor responses and/or fund research at present levels. Refuge will also focus on encouraging research conducted by other organizations on refuge lands through expanded partnerships.

Anticipated Impacts of Use: There could be some negative impacts from scientific research on the refuge. Impacts such as trampling vegetation, all-terrain vehicle use, and temporary disturbance to wildlife would occur. A small number of individual plants or animals may be collected for further study. These collections would not likely adversely affect refuge plant and animal populations. Removal of plant and animal material from the refuge, as well as the potential to accidentally

introduce exotic plants and animals, must be carefully monitored and controlled. Some other impacts from research include (1) noise disturbance from helicopter, airplane, airboat, truck, or car which may temporarily disturb and/or displace wildlife; (2) physical presence of people or equipment which may temporarily disturb and/or displace wildlife; (3) ground disturbance from walking on site or the use of equipment; and (4) water disturbance by stirring sediments and causing temporary turbidity from equipment or walking. Despite these impacts, the knowledge gained from carefully considered and properly executed scientifically defensible research would provide information and justification to improve management techniques and better meet the needs of trust resource species.

Research activities on the refuge are not expected to indirectly or cumulatively impact refuge resources negatively, even though some minimal short-term and direct impacts may occur.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: All researchers would be required to obtain and possess a refuge special use permit. Individual requests to use specialized equipment, all-terrain vehicles, etc. would be evaluated on a project-by-project basis and specified on each permit. Researchers would periodically be evaluated for compliance with requirements. Periodic progress reports would be required and final copies of all reports and publications would be provided to the refuge. The refuge would not directly supply personnel or equipment unless arrangements were made prior to issuance of the special use permit. The refuge manager would reserve the right to delegate a staff member to accompany permittee(s) at any time. All plants or animals sampled, collected, or released would be done in a scientifically accepted manner, such as those specified by scientific societies. Examples of these societies include the Society for the Study of Amphibians and Reptiles, the American Society of Mammologists, the American Ornithological Society, the Ichthyologists League, the Entomological Society of America, and the Botanical Society of America. Incidental take and inadvertent trampling are expected to be minimal and will be addressed with each permit request.

Given compliance with the restrictions set in each special use permit, research conducted on the refuge is considered to be compatible with the purpose for which the refuge was established.

Justification: Sound research and monitoring programs provide a better understanding of species, habitats, and the environmental communities present on the refuge. Implementation of the proposed alternative would require additional monitoring and/or research to evaluate and reevaluate the management programs used on the refuge. The benefits, however, would greatly outweigh any short-term disturbance or loss of individual plants or animals that may occur.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

Description of Use: *Commercial Alligator Harvest*

Since the reestablishment of alligator harvests in Louisiana following 1983, the Sabine Refuge has cooperated with the Louisiana Department of Wildlife and Fisheries in the commercial harvest of alligators. The attachment, entitled "Justification for the Commercial Harvest of Alligators," describes alligator ecology and harvest history for this species in southwest Louisiana and on the refuges on the Southwest Louisiana National Wildlife Refuge Complex. The attachment also discusses refuge objectives and goals as they relate to the management of alligators.

Availability of Resources: Adequate refuge personnel and other resources are available to manage alligator harvest activities at present levels.

Anticipated Impacts of Use: Commercial harvest of alligators could result in some disturbance to wildlife adjacent to the hunted areas, especially those areas associated with canals. Some minimal trampling of vegetation may also occur near harvest sites. However, it is anticipated that this disturbance would be minimal. Hunt areas are designed and placed to minimize disturbance potential.

Alligator harvests are not expected to indirectly or cumulatively impact refuge resources negatively, even though there may be some minimal and direct short-term disturbance or trampling.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Commercial harvest of alligators would be allowed in designated areas only. Activities would be monitored to document any negative impacts to alligator populations and other wildlife. If negative impacts are found, corrective action would be taken to reduce or eliminate these impacts. Access to key hunt areas may be closed during adverse weather conditions for protection of infrastructure (roads, levees, etc.) and hunter safety.

To minimize impacts on refuge lands and resources, law enforcement patrols, in conjunction with a mandatory check system for biological information, will be routinely conducted in an effort to maximize compliance with policies, rules and regulations. The following stipulations apply to special use permits issued for the commercial harvest of alligators:

- Quotas will be assigned yearly. Permittee must take all alligators harvested until his/her quota is filled, beginning with the day after Labor Day and extending continuously for a total of a 10-day period.
- The Refuge Manager has the authority to cancel this permit and/or reduce quotas based on alligator population data and refuge management objectives. Special conditions and quotas will be issued prior to the season. Violation of any federal, state, or refuge regulation, or special condition will result in immediate cancellation of the permit and all alligators will be seized.
- Permittee will furnish all needed equipment, including licenses and tags, which must be ready prior to the season. Permittee may not use refuge equipment.
- Permittee will be allowed to use mudboats, go-devils, and motors over 25 horsepower during the hunting season, and while scouting and baiting hooks, unless otherwise authorized. No airboats will be allowed. Any other form of transportation will require prior refuge approval. General access to harvest units will be as defined by the Refuge Manager.
- Each alligator set must be made clearly visible by marking each alligator set pole with orange surveyors' flagging 12 to 15 inches long. Make sure all sets are well flagged to ensure daily checking and removal of sets. Permittee will provide the refuge with a map of sets when requested by refuge officials.
- No alcohol possession while on the refuge.
- Boats operated on the refuge before sunrise and after sunset must be operated with running lights.
- Permittee must personally hunt the unit each morning, and arrive on the refuge one hour before sunrise to begin harvesting alligators at official sunrise. The permittee must check all refuge lines before hunting in other areas. No nighttime hunting is permitted. Permittee's assistants must have a state helper's license if they shoot. In the event of illness or injury, a designated assistant may hunt the unit for the permittee with prior approval. If permittee decides not to hunt, he or she must notify the Refuge Manager no later than one week before the start of the season. When this occurs, an alternate hunter will be given the opportunity to assume the permit for the remainder of the permit (3 years maximum). The permittee will be eligible for subsequent permit drawings under these circumstances.
- Permittee may take alligators by using set pole, line and baited hooks only. Wildlife is not permitted to be used as bait. Firearms (minimum caliber of .22 magnum) may only be used to kill hooked alligators. If shotguns are used, only nontoxic shot will be permitted. All weapons must be unloaded and encased while in refuge parking areas, boat launches, or en route to and from designated harvest areas. Caution must be used when using firearms because of the presence of fishermen and other individuals on the refuge during the season. Permittees are responsible for human safety near their sets and are encouraged to ask the Refuge

Manager for guidance. No sets will be allowed in areas that jeopardize the health of other refuge users. Sets placed near areas of public use (i.e., active boat travel ways, roadside canals, and boat launches) need to be placed in such a way so not to jeopardize human safety or alternative sites should be used.

- All hooked alligators will be killed immediately. Each alligator must be tagged immediately after being killed. No high grading will be permitted. If a hooked alligator has been chewed or partially eaten by another alligator, it will be tagged regardless. No cuts will be allowed behind the head or at the base of the tail. Under no circumstances will permittee transport an untagged alligator.
- Each permittee is responsible for collecting information on each alligator caught. Data sheets will be provided on which each permittee must record the state tag number he or she placed on the alligator along with the length, tail girth, sex, the numbers from any metal tags found in the feet of each animal, location of missing scutes, and comments on the general condition of the animal (missing legs, scars, missing tails, etc.). Your completed alligator data sheets will be provided daily to the refuge where you are hunting. Each alligator will be identified by its state tag number.
- If permittee uses all tags and has extra alligators on lines, he or she is responsible for notifying the Refuge Law Enforcement Officer or Refuge Manager. Permittees who still need alligators will be notified by the Refuge Law Enforcement Officer or Refuge Manager and will take other permittees' alligators as instructed. If the quota is filled on a weekend, notification can be on the next business day. A sale manifest must be provided to the refuge office within three days.
- Permittee will remove all alligator sets and markers within 24 hours of either the close of the season or after their assigned quota is reached, whichever comes first.
- Permittee will remove all personal equipment such as boats, trailers, or other gear from the refuge within 24 hours of the end of the season or after their assigned quota is reached, whichever comes first. Permittees are allowed to leave a maximum of two boats and/or equipment on the refuge while harvesting, although the refuge is not responsible for theft, damage, loss, etc.
- Meat and all other merchantable parts of the alligators will be disposed of according to state regulations.
- Permittee may sell either whole alligators or alligator hides and meat.
- When whole alligators and hides are sold, the permittee must sell for no less than the minimum market price. Alligator hides must be sold to the highest bidder. Financial irresponsibility is justification for grounds in revoking this permit. Selling below the current market value constitutes a waste of natural resources. Permittee is responsible for all alligators taken and for paying the U.S. Fish and Wildlife Service 40% of the gross value at time of sale. When an alligator(s) and/or its hide(s) are destroyed, ruined, or determined as missing, or no payment is received from the buyer, insufficient checks are issued by the buyers, or any other similar circumstances, the Bill for Collection will be based on 40% of the expected gross sales price per foot during that particular alligator season.
- If the Service does not receive payment for any hide(s) and/or alligator(s), the permittee will be in violation of the special use permit (SUP) and will be subject to civil prosecution as well as termination of the SUP.
- Permittee is responsible for carrying a flexible tape measure to ensure all bonus tags are on alligators less than six feet and proper biological measurements are taken. All unused Louisiana sale tags will be turned over to the refuge.

Given the limited access and timing restrictions, commercial harvest of alligators is viewed as compatible with the purpose for which the refuge was established.

Justification: Following the enactment of the National Wildlife Refuge Improvement Act of 1997, many refuge operation policies and uses have been reviewed. One such activity currently being reviewed for the Southwest Louisiana National Wildlife Refuge Complex, consisting of Sabine, Cameron Prairie, Lacassine, and Shell Keys national wildlife refuges, is the commercial alligator harvest.

Current policies preclude commercial operations on refuges other than for biological reasons. The following report was written to assess biological reasons for continuing the current alligator harvest or to identify required changes to the current alligator harvest strategy.

Ecology

Alligators are opportunistic feeders (McIlhenny 1935). McIlhenny (1935) stated that at sometime in an alligator's life it will eat every living thing coming in range of its jaws. Many authors agree that a relationship exists between alligator size and the type of food eaten (Giles and Childs 1949; Valentine et al. 1972; McNease and Joanen 1977; Wolfe et al. 1987). Studies have indicated that alligators less than 1.5 m (4.9') in length feed primarily on crustaceans, fishes, and insects (Giles and Childs 1949; Fogarty and Albury 1968; Valentine et al. 1972; McNease and Joanen 1977; Wolfe et al. 1987; Elsey et al. 1992), while larger alligators eat primarily mammals, fishes, crustaceans and birds (Valentine et al. 1972; McNease and Joanen 1977; Wolfe et al. 1987; Shoop and Ruckdeschel 1990; Borden-Billiot, unpub. data).

McNease and Joanen (1977) reported that alligator diets are mainly determined by availability and vulnerability of the prey species. If these factors are equal for prey species in an area, then selecting the largest food available should maximize feeding efficiency (Wolfe et al. 1987). Nutria *(Myocaster coypus)* and muskrats *(Ondatra zibethica)* fulfill theses criteria for much of the alligator's range. Because of the high reproductive rate of both prey species (Perry 1982; Willner 1982), it is unlikely that alligator predation has a long-term effect on their populations (Wolfe et al. 1987). It is likely that substantial numbers of muskrats and nutria are taken in areas where they coexist with alligators (Wolfe et al. 1987).

Food habit studies that considered prey volume rated birds among the major food items for alligators (McIlhenny 1935; Valentine et al. 1972). Birds taken by alligators have been predominantly common resident water birds including: gallinules and rails (Gruiformes) (Borden-Billiot unpub. data), herons, egrets, and bitterns (Ciconiformes), and mottled ducks *(Anas fulvigula)* (Giles and Childs 1949; Valentine et al. 1972; Elsey et al. 2004). The alligator may be the single most efficient predator of adult mottled ducks and ducklings (Stutzenbaker 1984; Elsey et al. 2004) and is one of the most common predators of Rallidae species and their nests (Griej 1994; Reid et al. 1994). Migratory waterfowl generally do not arrive on the Complex until cooler temperatures exist. This cooler weather leads to winter dormancy and reduced feeding activity by alligators (Neill 1971; Delany 1986).

Amphibians are rarely reported as alligator foods, but reptiles, especially turtles and snakes are frequently eaten (Wolfe et al. 1987; Gibbons 1990). It has been suggested that prey items which are resistant to digestion such as mammals, birds, and crustaceans may tend to be over-represented while rapidly digested prey species such as amphibians and fish may be under- represented in food studies (Delany and Abercrombie 1986).

Alligators are cannibalistic (Giles and Childs 1949; Valentine et al. 1972; Nichols et al. 1976; Taylor 1980; Delany and Abercrombie 1986; Rootes and Chabreck 1993). The most recent evaluation of cannibalism was conducted on Lacassine National Wildlife Refuge, where Rootes and Chabreck

(1993) discovered that this behavior is an important population regulating mechanism. It was estimated that cannibalism accounted for 50.2% of total hatchling mortality and 63.7% of total mortality in alligators 11 months and older (Rootes and Chabreck 1993). Mortality due to cannibalism may be distributed proportionately among all cohorts in the 0.4-2.1 m (1.2-6.9‘) total length (TL) size classes (Rootes and Chabreck 1993). Males and females were eaten in the same proportions as they occurred in the population (Rootes and Chabreck 1993).

History of Louisiana Alligator Harvest

Numerous accounts of alligator hunting dating as far back as 1718 can be found in Joanen and McNease (1987). McIlhenny (1935) estimated that 3 to 3 ½ million alligators were harvested in Louisiana from 1880 to 1933. Sabine National Wildlife Refuge harvested about 1,000 alligators per year from 1946 to 1951 (SNWR-ANR 1946-1951). The alligator population showed signs of decline during the early 1950s. With the larger alligators becoming difficult to harvest following population declines, tanners established new markets for smaller sized skins.

Exploitation of the alligator continued in Louisiana until 1962 when the State of Louisiana prohibited the taking of alligators. Since then, Louisiana has made a concentrated effort to scientifically manage this valuable resource. Alligator numbers today are estimated to be near those which existed at the turn of the century (Joanen and McNease 1987).

After 15 years of research, extensive law enforcement efforts and the enactment of effective state and federal laws governing the taking, possession and transportation of alligators and their products, Louisiana’s first scientifically managed alligator harvest was initiated in 1972 with the purpose of providing a sustainable yield of alligators in to the future. Lacassine National Wildlife Refuge’s first alligator harvest since 1951 was held in 1983.

Annual harvest of the alligator is based upon population estimates derived from aerial nest censuses conducted each year. Aerial surveys of the coastal marsh zone have been conducted annually since 1970. Coastal alligator habitat is subdivided into three major subdivisions according to origin: the Chenier Plain, Sub-Delta and Active Delta Zones. Each subdivision is further divided based on vegetation and salinities. Over the years approximately 4% of the annual population estimate has been allotted for harvest.

The overall alligator population increased dramatically (10.1% annually) in the Chenier Plain (southwestern Louisiana) zone between 1970 and 1983. Alligator densities of the Chenier Plain were estimated at 1 alligator per 5.4 acres (Joanen and McNease, 1987). Privately-owned property, 90% of which was hunted, showed an increase of 11.0%, whereas refuges and wildlife management areas, where only limited hunting occurred, had an increase of 9.7% over the same fourteen-year period (Joanen and McNease, 1987).

There were 100,712 alligators harvested throughout Louisiana between 1972 and 1983. Harvest strategies are geared to harvest primarily males and immature animals of both sexes. Telemetry studies (Joanen and McNease 1970, 1972; McNease and Joanen 1974) suggest that a September hunt, restricted to daytime hunting and open water areas will result in a harvest that protects reproductive female alligators.

Refuge Alligator Harvest Goals

The goal of the refuge alligator harvest is to maintain a viable alligator population while limiting the alligators’ influence on other species and/or user groups on the refuge. Actual alligator population

goals have not been formally established at any of the refuges within the Complex. According to the Sabine National Wildlife Refuge Master Plan (1963) and the Sabine National Wildlife Refuge Hunt Plan (1980), the recommended population range for the refuge was 5,000–7,000 alligators. When the plans were written there were an estimated 9,000 alligators on the refuge. Current population estimates for Sabine National Wildlife Refuge range from 22,000–39,775. Alligator populations statewide and on the refuges have increased dramatically over the past 40 years. It is apparent that alligator population goals need to be established or updated for each of the three refuges.

Available population estimates for the Chenier Plain could be used as a reference to set goals. The alligator population increased at a dramatic rate (10% per year) between 1970 and 1983. The Louisiana Department of Wildlife and Fisheries estimated an average of one alligator per 5.4 acres from 1970 through 1983. The table below uses this alligator density estimate to calculate a possible population goal for each of the refuges.

Louisiana Department of Wildlife and Fisheries Alligator Density Estimate (1970–1983) used to calculate refuge population goals

Refuge	Acres	Ratio of alligators to acres	Calculated Population Goal
Cameron Prairie	9,621	1:5.4	1,782
Sabine, East Cove Unit	14,927	1:5.4	2,764
Sabine	125,790	1:5.4	23,294
Lacassine	27,035	1:5.4	5,006

The 1970–1983 average population numbers were 60% greater than 1972 populations when the State set its first alligator harvest season. The population numbers at that time were considered sufficient to allow alligators to recover from catastrophic events.

Based on the annual estimated number of nesting females on each refuge, the Louisiana Department of Wildlife and Fisheries estimated that the 2004 alligator population for each of the refuges was:

Refuge	Number of alligators
Cameron Prairie	12,735
Sabine, East Cove Unit	8,440
Sabine	86,464
Lacassine	23,905

These numbers are far above the calculated population goals for the refuges and with state take being limited to less then 5% of the estimated number of alligators, there appears to be little chance for overharvest and decreased opportunities for public viewing of alligators. Since the establishment of the sustainable alligator harvest program (1972), the Louisiana Department of Wildlife and Fisheries has concluded that the alligator population has generally continued to increase (LDWF 1999). Nest count trends continue increasing with each year, which in turn may indicate a growing population.

The Louisiana Department of Wildlife and Fisheries, in cooperation with the Complex, conducts intense surveys of federal refuges as part of their regular state-wide surveys. This ecosystem-wide approach has built working relations among the agencies, and accomplishes the refuge objectives. These coordinated surveys provide the refuges the opportunity to determine if the refuge alligator population trends coincide with state population trends. If discrepancies are discovered in population trends, harvest modifications could be implemented.

Biological Implications of Alligator Harvest

If alligator harvest is reduced or removed from refuges, alligator populations may continue to increase to a point that may negatively impacted both their populations and populations of other fish and wildlife. As populations increase, growth rates decline affecting survivorship. Rootes (1989) indicated that growth rates in young alligators can greatly affect survivorship. Survivorship in sub-adult alligators has been shown to be a function of size, with survivorship increasing as size increases (Nichols et al. 1976). Jacobsen and Kushlan (1989) suggest that if an alligator grows slower, it will take longer to reach sexual maturity and increase its susceptibility to predation, disease and cannibalism. A study of growth levels in juvenile alligators at different stocking densities indicated that all alligators continued to grow during the experiment, but alligators maintained at lowest stocking density were significantly heavier and grew significantly faster than alligators at the highest stocking density (Elsey et al. 1990). These results indicate that crowding of juvenile alligators inhibits maximum growth rates. Studies of other crocodilian species have also shown this reduction in growth in overcrowding situations. In a study on growth of *C. johnstoni* in a controlled environmental chamber, Webb et al. (1983) noted that density was an important determinant of mortality and food conversion rates, with animals at the lowest density showing the highest food conversion rate.

Several studies on levels of reproduction hormones due to acute stress have also been conducted. Over population or crowding has been shown to cause stress. Elsey et al. (1990) reported that elevated levels of plasma corticosterone levels in alligators maintained at high stocking densities had a direct correlation with lower nesting success. Elsey et al. (1991) indicated that females had elevated levels of hormones (plasma estradiol-ß & corticosterone) due to stress. Elsey et al. (1990a) showed lower levels of testosterone in male alligators when subjected to acute stress. Lower levels of testosterone in males would also have a negative correlation with reproduction.

Continued harvest of alligators on refuges may be compensatory to natural losses and can ensure wise use and management of a renewable natural resource. Harvest may also reduce predation impacts on native and migratory animals. By maintaining or reducing the alligator population, biological diversity could be maintained or improved by reducing predation and the public's opportunity to see a greater diversity of species may increase as a result.

Public Safety Issues

Increased alligator numbers in conjunction with increasing public use on the Complex will most likely only increase the number of negative human/alligator encounters. This could lead to increased alligator attacks on humans. Few attacks and no deaths from alligators have been reported in Louisiana. However, Florida reported that since 1970, 177 unprovoked alligator attacks have been documented, of which 99 have been severe and 9 have been fatal (Florida Fish and Wildlife Conservation Commission 2000). Due to these encounters, Florida implemented a nuisance alligator control plan in 1978, but the frequency of attacks has remained stable. Louisiana currently does not have the human population densities of Florida; however, this could change in the future. The nuisance program in Florida has shown some benefits, but attacks continue to occur. By implementing a scientifically managed population-wide alligator harvest, human/alligator encounters may be controlled. Current and future harvest efforts should be in areas most accessible to the visiting public. Alligators also attack and eat domestic livestock and pets, and create traffic hazards when crossing roads. Vehicular and boat collisions with alligators on Sabine National Wildlife Refuge have decreased during the eight years of intensive harvest (Borden-Billiot, pers. comm.).

Social-economic importance to Southwestern Louisiana

Alligators have been harvested in Louisiana commercially since the early 1800s (Joanen and McNease 1987). During the late 1800s through the early 1950s, alligator harvest was uncontrolled for years, and was conducted virtually year-round and advocated by the general public throughout southwestern Louisiana. By the 1950s alligator harvesting had become a tradition in the local culture and heritage of southwestern Louisiana. Following the closure of the season in 1962, illegal harvest of alligators continued as the hides could be readily sold on the black market for great profits. However, with the implementation of a regulated alligator harvest program, illegal harvest has been reduced substantially. Alligators have proven to be a valuable renewable resource.

While the alligator harvest is conducted for commercial gain, many hunters view the hunt as a recreational and social event each year. Many of the local hunters have limited access for hunting alligators and the national wildlife refuge lands provide an unique opportunity for the general public. Dollars derived from the sale of alligator hides is secondary to the actual harvest experience and subsequent use of meat from the animal. A strictly recreational harvest could be used to harvest alligators but would be administratively and logistically difficult to conduct at current management removal rates. The state alligator harvest program was established as a commercial harvest and does not allow for recreational take of alligators.

The economic importance of the alligator in Louisiana cannot be overlooked. The annual sale of wild alligator hides harvested in Louisiana is in excess of $3 million dollars and has accounted for sales as high as $10 million plus. Cameron Parish is the largest (acreage) parish in Louisiana and it contains vast amounts of wetland habitat for which the annual alligator harvest is a very important contributor to the local economy. The 40-percent proceeds collected from each hunter annually by the local federal refuges has also contributed to the Refuge Revenue Sharing Act fund. This fund is distributed to local counties or parishes in lieu of property taxes.

Harvest of alligators on the federal refuges is well supported in the community and viewed as very beneficial to the public. Reduction or removal of the alligator harvest on the refuges could create public animosity towards the refuges. The three refuges are also some of the only areas within Cameron Parish and southwest Louisiana in which alligator tags are allotted by public lottery rather than by landowner designation.

Conclusion

In our opinion, alligator harvest on the Southwest Louisiana National Wildlife Refuge Complex should continue at or above the state-recommended tag allotment rates, unless refuge specific surveys warrant a deviation below state allotment rates. The benefits of harvesting alligators as a management tool are to: maintain and increase public safety; continuation of a viable alligator population; continuation of biological data collection and monitoring; continue to afford public viewing opportunities; reduce adverse overpopulation effects (cannibalism, reduced reproduction rates, etc.); and reduce inter-specific predation, and foster favorable local public and governmental relations.

Literature Cited/Consulted

Borden-Billiot, D.L. 2000. Personal communication. Sabine National Wildlife Refuge, Hackberry, Louisiana.

Delany, M.F. 1986. Bird bands recovered from American alligator stomachs in Florida. *North American Bird Bander* 11:92-94.

____, and C.L. Abercrombie. 1986. American alligator food habits in north central Florida. *Journal of Wildlife Management* 50(2):348-353.

Elsey, R.M., T. Joanen, L. McNease and V. Lance. 1990a. Stress and plasma corti-costerone levels in the American alligator - relationships with stocking density and nesting success. *Comparative Biochemistry and Physiology* 95(1):55-63.

____, T. Joanen, L. McNease and V. Lance. 1990b. Growth rate and plasma corti-costerone levels in juvenile alligators maintained at different stocking densities. *The Journal of Experimental Zoology* 255:30-36.

____, T. Joanen, L. McNease and N. Kinler. 1992a. Growth rates and body condition factors of *Alligator mississippiensis* in coastal Louisiana wetlands: a comparison of wild and farm-released juveniles. *Comparative Biochemistry and Physiology* 103(4):667-672.

____, V.A. Lance, J. Joanen and L. McNease. 1991. Acute stress suppresses plasma estradiol levels in female alligators (*Alligator mississippiensis*). *Comparative Biochemistry and Physiology* Vol. 100A(3):649-651.

____, L. McNease, T. Joanen and N. Kinler. 1992b. Food habits of native wild and farm-released juvenile alligator. *Proceedings of Annual Conference of Southeastern Association of Fish and Wildlife Agencies* 46:57-66.

____, P.L. Trosclair and J.T. Linscombe. 2004. The American alligator as a predator of mottled ducks. *Southeastern Naturalist* 3: 381-390.

Fogarty, M.J. and J.D. Albury. 1968. Late summer foods of young alligators in Florida. *Proceedings of Annual Conference of Southeastern Association of Game and Fish Commissions* 21:220-222.

Gibbons, J.W. 1990. *Life History and Ecology of the Slider Turtle.* Smithsonian Institution Press, Washington, D.C. 368 pp.

Giles, L. and V.L. Childs. 1949. Alligator management on the Sabine National Wildlife Refuge. *Journal of Wildlife Management* 13(1):16-28.

Gosselink, J. G., C. L. Cordes and J. W. Parsons. 1979. *An Ecological Characterization Study of the Chenier Plain Coastal Ecosystem of Louisiana and Texas.* U.S. Fish and Wildlife Service, FWS/OBS–78/9. Washington, D.C. 302 pp.

Greij, E.D. 1994. Common moorhen. Pages 145-157 in Tacha, T.C. and C.E. Braun, eds., *Migratory Shore and Upland Game Bird Management in North America.* Allen Press, Lawrence, KS. 223 pp.

Jacobsen T. and Kushlan. 1989. Growth dynamics in the American alligator (*Alligator mississippiensis*). *Journal of Zoology* 219:309-328.

Joanen, T. and L. McNease. 1970. A telemetric study of nesting female alligators on Rockefeller Refuge, Louisiana. *Proceedings of Annual Conference of Southeastern Association of Game and Fish Commissions* 24:175-193.

____. 1972. A telemetric study of adult male alligators on Rockefeller Refuge, Louisiana. *Proceedings of Annual Conference of Southeastern Association of Game and Fish Commissions* 26:252-275.

____. 1987b. The management of alligators in Louisiana, USA. In Webb, G.J.W., S.C. Manolis and P.J. Whitehead, eds., *Wildlife Management: Crocodiles and Alligators.* Surrey Beatty and Sons Pty. Ltd, Australia. pp. 33-42.

____. 1987. Alligator farming research in Louisiana, USA. Pages 329-340 in G. W. Webb, S.C. Manolis, and P.J. Whitehead, eds*., Wildlife Management: Crocodiles and Alligators.* Surrey Beatty and Sons, Chipping Norton, WSW.

Lance, V.A. and R.M. Elsey. 1986. Stress-induced suppression of testosterone secretion in male alligators. *Journal of Experimental Zoology* 239:241-246.

Louisiana Department of Wildlife and Fisheries. 1999. Louisiana alligator management program. Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA. 15 pp.

McIlhenny, E.A. 1935. *The Alligator's Life History.* The Cristopher Publishing House, Boston. 1976 Reprint, SSAR. 117 pp.

McNease, L., and T. Joanen. 1974. A study of immature alligators on Rockefeller Refuge, Louisiana. *Proceedings of 28th Annual Conference of Southeastern Association of Game and Fish Commissions* 28:482-500.

____, and T. Joanen. 1977. Alligator diets in relation to marsh salinity. *Proceedings of Annual Conference of Southeastern Association of Fish and Wildlife Agencies* 31:36-40.

Nichols, J.D., L. Viehman, R.H. Chabreck, and B. Fenderson. 1976. Simulation of commercially harvested alligator population in Louisiana. Louisiana State University, Bulletin No. 691. 59 pp.

Nichols, W.L., L. Viehman, R.H. Chabreck and B. Fenderson. 1976. Simulation of a commercially harvested alligator population in Louisiana. Louisiana Agricultural Experimental Station Bulletin 691, Baton Rouge, LA.

Perry, H.R., Jr. 1982. Muskrats. In Chapman, J.A., and G.A. Feldhamer, eds., *Wild Mammals of North America.* Johns Hopkins, Baltimore and London. pp 282-325.

Reid, F.A., M. Meanly, L.H. Fredrickson. 1994. King Rail. pp. 181-191 in Tacha, T.C., and C.E. Braun, eds., *Migratory Shore and Upland Game Bird Management in North America.* Allen Press, Lawrence, KS. 223 pp.

Rootes, W.L. 1989. Behavior of the American alligator in a Louisiana freshwater marsh. Ph.D. Dissertation, Louisiana State University, Baton Rouge, LA.

____, and R.H. Chabreck. 1993. Cannibalism in the American alligator. *Herpetological* 49(1):99-107.

Sabine National Wildlife Refuge. 1946–1951. Annual Narrative Reports. Sabine National Wildlife Refuge, USFWS, DOI.

____. 1963. Master Plan. Sabine National Wildlife Refuge, USFWS, DOI. 99 pp.

Shoop, C.R. and C.A. Ruckdeschel. 1990. Alligators as predators on terrestrial mammals. *American Midland Naturalist* 124:407-412.

Stutzenbaker, C.D. 1988. The mottled duck, its life history, ecology and management. Texas Parks and Wildlife Department, Austin, TX. pp. 209.

Taylor, D., T. Joanen, and L. McNease. 1980. An alligator population model and associated minimum population estimate for nonmarsh alligator habitat in Louisiana. Louisiana Department of Wildlife and Fisheries, Monroe, LA. 15 pp.

Valentine, J.M., Jr., J.R. Walther, K.M. McCartney, and L.M. Ivy. 1972. Alligator diets on the Sabine National Wildlife Refuge, Louisiana. *Journal of Wildlife Management* 36(3):809-815.

Webb, G.J.W., R. Buckworth and S.C. Manolis. 1983. *Crocodylus johnstoni* in a controlled-environment chamber: a raising trial. *Australian Wildlife Research* 10:421-432.

Willner, G.R. 1982. Nutria. In Chapman, J.A., and G.A. Feldhamer, eds., *Wild Mammals of North America.* Johns Hopkins, Baltimore and London. pp. 1059-1076.

Wolfe, J.L., D.K. Bradshaw, and R.H. Chabreck. 1987. Alligator feeding habits: new data and a review. *Northeast Gulf Science* 9(1):1-8.

Woodward, A.R. and B.L. Cook. 2000. Nuisance-alligator (*Alligator mississippiensis*) control in Florida, U.S.A. Florida Fish and Wildlife Conservation Commission, Gainesville, FL. 12 pp.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

Description of Use: *Commercial Video and Photography*

Over the past several years, the Sabine Refuge has been contacted as to the possibility of producing commercial audio-visual productions such as video and still pictures. The refuge provides an ideal setting for filmmakers. Refuge locations are adjacent to the Creole Nature Trail, an All American Road and destination for many resident and nonresident visitors. As southwest Louisiana and the Creole Nature Trail as well as Service programs for visitors are promoted, commercial filming on the area is expected to increase.

Availability of Resources: Adequate refuge personnel and base operational funds are available to manage this activity at the present level.

Anticipated Impacts of Use: Commercially produced video and photography could result in some disturbance to wildlife. Some minimal trampling of vegetation may also occur. However, it is anticipated that this disturbance would be minimal.

Commercially produced video and photography activities are not expected to indirectly or cumulatively impact refuge resources negatively, even though there may be some minimal and direct short-term disturbance or trampling.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

__**X**__ Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Access for commercially produced video and photography activities would be allowed in designated areas only. Activities would be monitored to document any negative impacts to wildlife; if negative impacts are found, corrective action would be taken to reduce or eliminate these impacts. Access to key observation and photography areas may be closed during adverse weather conditions for protection of infrastructure (roads, levees, etc.) and visitor safety.

Public Law 106-206 [114 Stat. 314; *cod*. 16 U.S.C. 460*l*-6d.], signed by the President on May 26, 2000, directed the Secretary of the Interior to require a permit and establish a reasonable fee for commercial filming activities on federal lands administered by the Secretary. This law further stated that for still photography neither a permit nor a fee is assessed if the activities take place on lands where members of the public are generally allowed. The Secretary may require a permit and fee if photographic activities take place at locations where the general public is not allowed or where additional administrative costs are likely. The Secretary shall not permit any filming, still photography, or other related activity if the Secretary determines (1) there is a likelihood of resource damage; (2) there would be an unreasonable disruption of the public's use and enjoyment of the site; or (3) that the activity poses health or safety risks to the public.

Further guidance is found in the Code of Federal Regulations, Title 43, Volume 1, revised October 1, 2004, which regulates the making of pictures, television productions, or sound tracks on certain areas under the jurisdiction of the Department of the Interior. It states that:

1. Permits are required of any party except amateur photographers or bona fide newsreel and news television photographers and soundmen. All other parties must obtain written permission from local officials having administrative responsibility for the area involved.

2. However, the Secretary has determined that no fee will be charged for the making of such motion pictures, television productions or sound tracks on areas administered by the U.S. Fish and Wildlife Service.

3. A bond shall be furnished, or deposit made in cash or by certified check, in an amount to be set by the official in charge of the area to insure full compliance with all conditions prescribed in a permit. Such bond may be refunded to the applicant if all permit requirements are met and no costs to the Government are incurred.

4. Permission to make a motion picture, television production or sound track will be granted by the head of the Service or his/her authorized representative in his/her discretion and on acceptance by the applicant of conditions set forth in a permit. Applicants must describe the area where filming is requested and the scope of the filming or production or recording. Dependent upon weather conditions, applicants will state when filming or other production will begin and end.

Other stipulations include:

1. Utmost care will exercised to see that no natural features are injured, and after completion of the work, the area will, as required by the official in charge, either be cleaned up and restored to its prior condition or left, after cleanup, in a condition satisfactory to the official in charge.

2. Credit will be given to the Department of the Interior and the Service through the use of an appropriate title or announcement, unless there is issued by the official in charge of the area a

written statement that no such courtesy credit is desired. A copy of the final product will be proved pro bono to the refuge staff.

3. Pictures will be taken of wildlife only when such wildlife will be shown in its natural state or under approved management conditions if such wildlife is confined.

4. Any special instructions received from the official in charge of the area will be complied with.

5. Any additional information relating to the privilege applied for by the applicant will be furnished upon request of the official in charge.

6. Other stipulations may be warranted depending upon the proposed location and season of the year the activity is conducted.

Further guidance on this activity is found in the Service's Refuge Manual [8 RM 16, dated March 12, 1982].

The following stipulations apply to special use permits issued for commercially produced video and photography activities. To minimize impacts on refuge lands and resources, the Refuge Manager will ensure that filmmakers comply with policies, rules and regulations and will monitor and assess all activities of filmmakers.

- Failure to abide by any part of a special use permit: violation of any refuge related provision in Titles 43 or 50, Code of Federal Regulations; or any pertinent state regulation (e.g., fish or game violation) will be considered grounds for immediate revocation of the permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit.

- The permittee is responsible for ensuring that all employees, party members and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

- This permit may be canceled or revised at any time by the Refuge Manager for noncompliance or in case of emergency (e.g. public safety, unusual resource problems). The permittee and permittee's clients do not have exclusive use of this site(s) or lands covered by the permit.

- Prior to beginning any activities allowed by this permit, the permittees shall provide the refuge with (1) a copy of current business license; and (2) proof of comprehensive general liability insurance.

- Prior to conducting commercial filming activities, the permittee shall provide the Refuge Manager with the name and method of contact for the field party chief or supervisor.

- A valid copy of this special-use permit, signed by the Refuge Manager or designee, must be in the party leader's possession at all times while exercising the privileges of the permit.

- Endorsement of this permit signifies the permittee's understanding and concurrence with all the conditions set forth in the General Conditions found on the reverse side of the permit and the above Special Conditions.

Under the stipulations described above, commercially produced filmmaking, production or sound track recording is viewed as compatible with the purpose for which the refuge was established.

Justification: Allowing commercially guided wildlife viewing, photography, environmental education, and interpretation is an economic use that must contribute to the achievement of the refuge purpose or the mission of the refuge. Individuals or companies serving as guides for these types of uses would lead groups of people that may not normally visit the refuge such as the elderly, handicapped, or urban youth groups. The services provided by commercial guides would be beneficial to extend public appreciation and understanding of wildlife, natural habitats and the mission of the national wildlife refuge system.

Commercial guiding would be incidental to four (wildlife observation, photography, environmental education, and interpretation) of the six priority public uses on national wildlife refuges. Conditions imposed in the special-use permits of guides would ensure that these wildlife dependent activities occur without adverse effects to refuge resources, or other visitors. Permitted guides facilitate public use and enjoyment of these activities while protecting refuge resources.

Commercial photography would be regulated and monitored with special use permits. The refuge will ensure this activity has a primary focus on education and information on refuge purposes and/or the system mission.

Conditions imposed in the special use permits of filmmakers ensure that these wildlife-dependent activities can occur without adverse effects to refuge resources, or other visitors.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__**X**__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

Description of Use: *Commercially Guided Wildlife Viewing, Photography, Environmental Education, and Interpretation*

Over the past several years, the refuge has been contacted as to the possibility of guide/outfitter wildlife viewing opportunities. Presently there are no known guide operations utilizing the refuge. Several wildlife viewing opportunities exist on the refuge, including two trails, two scenic overlooks, and nonmotorized boating areas. The nature trails and scenic overlooks are located along or near the Creole Nature Trail (State Highway 27), an All American Road and destination for many resident and nonresident visitors. As southwest Louisiana and the Creole Nature Trail are promoted, visitor use of the refuge is expected to increase. With the number of visitors increasing, a shift in types of

recreation use and users may occur. It is anticipated that wildlife viewing on the Sabine Refuge will increase as a proportion of total recreation use days.

Availability of Resources: Adequate refuge personnel and base operational funds are available to manage wildlife-dependent recreational activities at present levels.

Anticipated Impacts of Use: Commercially guided wildlife viewing, photography, environmental education, and interpretation could result in some minor incremental increase in disturbance to wildlife adjacent to the Wetland Walkway and Blue Goose Trail. However, in the context of tens of thousands of visitors to these trails annually, this incremental impact is expected to be negligible to minor at most.

Some minimal trampling of vegetation and littering may also occur, but is unlikely, since ecologically-aware, permitted or trained guides would exercise greater control over their clients than most general trail users would be expected to exercise over themselves. Any additional disturbance would be minimal, as 51,000 pedestrians annually are estimated to utilize the Wetland Walkway Trail alone, and commercial guiding should only increase these numbers slightly. Boardwalks, trails, scenic overlooks, observation platforms and nonmotorized boating areas would be managed to minimize disturbance potential.

Wildlife viewing and photography are not expected to indirectly or cumulatively impact refuge resources negatively, even though there may be some minimal and direct short-term disturbance or trampling.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Access for commercially guided wildlife viewing, photography, environmental education, and interpretation would be allowed in designated areas only and regulated by special use permit. Activities would be monitored to document any negative impacts to wildlife; if negative impacts are found, corrective action would be taken to reduce or eliminate these impacts. Access to key observation and photography areas may be closed during adverse weather conditions for protection of infrastructure (boardwalks, trails, roads, levees, etc.) and visitor safety.

The following stipulations apply to special use permits issued for wildlife-dependent recreation (wildlife viewing, photography, environmental education and interpretation). To minimize impacts on refuge lands and resources, law enforcement patrols will routinely be conducted in an effort to

maximize compliance with policies, rules and regulations. This will ensure that activities will be monitored and assessed.

- Failure to abide by any part of this special use permit: violation of any refuge-related provision in Titles 43 or 50, Code of Federal Regulations; or any pertinent state regulation (e.g., fish or game violation) will be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit.

- The permitee is responsible for ensuring that all employees, party members and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

- This permit may be canceled or revised at any time by the refuge manager for noncompliance or in case of emergency (e.g. public safety, unusual resource problems).

- The permittee and permittee's clients do not have exclusive use of this site(s) or lands covered by the permit.

- Prior to beginning any activities allowed by this permit, the permittee shall provide the refuge with (1) a copy of current business license; and (2) proof of comprehensive general liability insurance.

- The permittee is responsible for accurate record keeping and shall provide the refuge manager with a comprehensive summary of location, numbers of clients, and number of client days by January 15 each year. The permittee shall provide the refuge manager with this information on the form provided with the special-use permit. An annual nonrefundable administrative fee of $150 will be assessed prior to issuing this permit. Failure to submit required reports could result in the issuance of citations and revocation of the permit.

- Prior to conducting guiding operations, the permittee shall provide the refuge manager with the name and method of contact for the field party chief or supervisor.

- A valid copy of this special use permit, signed by the refuge manager or designee, must be in the party leader's possession at all times while exercising the privileges of the permit.

- Endorsement of this permit signifies the permittee's understanding and concurrence with all the conditions set forth in the General Conditions found on the reverse side of the permit and the above Special Conditions.

Given limited access, commercially guided wildlife viewing, photography, environmental education, and interpretation is viewed as compatible with the purpose for which the refuge was established.

Justification: The National Wildlife Refuge System Administration Act (as amended by the Refuge Improvement Act of 1997) identifies compatible wildlife observation, photography, environmental education, and interpretation as four of six priority public uses on national wildlife refuges. The law states that, when managed in accordance with principles of sound fish and wildlife management, administration of these uses has been and is expected to continue to be generally compatible and that priority public uses should receive enhanced consideration over other general public uses in refuge planning and management.

Conditions imposed in the special use permits of guides ensure that these wildlife dependent activities can occur without adverse effects to refuge resources, or other visitors. Permitted guides facilitate public use and enjoyment of these activities while protecting refuge resources.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

Description of Use: *Beneficial Use of Dredge Material*

Use of dredge materials from adjacent navigation channels and drainage systems would be utilized on wetland impoundments for levee rehabilitation to improve management of wetlands vital in achieving the refuges purpose. As defined in the Coast 2050 Plan (Louisiana Department of Natural Resources 1988), beneficial use is any use which would protect, enhance, or provide a platform for the restoration of vegetated wetlands. The Fish and Wildlife Service further defines this definition to two forms of beneficial use: (1) the creation of marsh or wetland habitat and (2) the rehabilitation of existing levees. The proposed activity would allow managers the opportunity to improve and/or create wetlands on national wildlife refuges through the use/recycling of maintenance dredge materials.

Availability of Resources: The U.S. Army Corps of Engineers' Mississippi Valley Division, New Orleans District, has the largest annual channel operations and maintenance program in the United States, with an annual average of 70 million cubic yards of material dredged. At this time, approximately 14.5 million cubic yards of this material is used beneficially in the surrounding environment with funding from either the O&M program or the Continuing Authorities Program defined by the WRDA 1992 Section 204 for beneficial use of dredged material (U.S. Army Corps of Engineers 2004). Beneficial use of dredged material has been identified within the Louisiana Coastal Wetlands Restoration Plan, Mermentau Basin (Louisiana Coastal Wetlands Conservation and Restoration Task Force 1993); the Coast 2050 plan (Louisiana Department of Natural Resources 1988); and the Louisiana Coastal Area Ecosystem Restoration Study (U.S. Army Corps of Engineers 2004) as an important wetland restoration method. Within the Louisiana Coastal Area, it is recommended that Congress authorize $100,000,000 over the initial ten years of the program towards beneficial use of dredge material projects. It is expected to contribute to the creation of approximately 21,000 acres of wetlands.

Beneficial use of dredge materials on the Southwest Louisiana National Wildlife Refuge Complex, Sabine National Wildlife Refuge would be allowed in conjunction with an authorized and/or permitted activity from an off-refuge site. Funding will be the responsibility of the authorized and/or permitted

agency. Due to infrequency of dredging activities, no additional staff is required; however, dedication of current staff time will be required during dredging operations to monitor and ensure special use permit compliance.

Anticipated Impacts of Use: Use of beneficial dredge material will improve wetlands management through improved habitat for waterfowl and other migratory birds. Utilization of dredge materials will aid the refuge in reaching its goals and/or objectives as defined in its Comprehensive Conservation Plan and accomplishing identified long-term habitat improvement projects.

Beneficial dredge material placement activities on the refuge are not expected to indirectly or cumulatively impact refuge resources negatively. However, some minimal short-term and direct impacts may occur. These impacts would include displacement of wildlife, disturbance of vegetation and possible impact water quality. No long-term impacts are expected.

A "No Effect Determination" on federally listed threatened or endangered species or designated critical habitat impacts was made. No federally listed threatened or endangered species or critical habitat occurs on the refuge as described in the Endangered Species Act of 1973 (16 U.S.C. 1532-1544, 87 Stat. 884). An assessment and subsequent determination was made that proposed use would not affect mandated under Section 106 of the National Historical Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n). The management decision to allow this use is an action categorically excluded as defined in 516 DM 2, Appendix 1, 1.7.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: All beneficial use of dredge material operations will require the requesting parties to obtain and possess a refuge special use permit. Individual requests will be evaluated on a project by project basis and specified on each permit. Beneficial placement of dredge materials must contribute to the purpose, goals, objectives and management operations of the refuge.

Given compliance with the restrictions set in each special use permit, beneficial use of dredge material conducted on the refuge is considered to be compatible with the purpose for which the refuge was established. At a minimum, special conditions will contain:

1. All state, local and federal permitting requirements will be met by permittee.
2. All applicable federal and state regulations apply.

3. A standard soil contaminants test will be conducted at no cost to the Government.
4. Initial spoil height will be elevations established by refuge manager.
5. If spoil is placed on a levee, levee will be contoured and smoothed to refuge manager specifications. If levee does not meet refuge manager specifications, the contractor must return after spoil has dried to level with dozer or tractor (disked).
6. All vehicles, boats and equipment to be used will be in a safe and working condition. All vehicles and boats will meet or exceed federal and state requirements.

Justification: The rate of coastal land loss in Louisiana is estimated to be between 25 and 35 acres per year. This loss represents 80% of the coastal wetland loss in the entire continental United States (Louisiana Department of Natural Resources 1988). Much of this land loss has occurred on national wildlife refuges. One activity that is often associated with the Louisiana Department of Natural Resources coastal zone consistency program is the beneficial use of material dredged to maintain navigation channels. Sediment represents one of the most important resources for building wetlands. Dredging activities in Louisiana, including maintenance of federal navigation channels and permitted activities in Louisiana's coastal zone, account for the removal and redeposition of 90 to 120 million cubic yards of sediment annually (Louisiana Department of Natural Resources 1988). Through its legislature, Louisiana has stated its policy with respect to beneficial use of dredged material resources in R.S.49:214.32(F):

> "the Secretary (of DNR) shall insure that whenever a proposed use or activity requires that dredging or disposal of five hundred thousand cubic yards or more of any water bottom or wetland within the coastal zone, the dredged material shall be used for the beneficial purposes of wetland protection, creation, enhancement or combinations thereof…"

Beneficial use of dredge material will support the purpose for which the refuge was established by improving wetlands habitat, and increasing the refuges value as a sanctuary and wintering habitat for migratory birds. The action supports refuge management activities as identified in the Comprehensive Conservation Plan and long-term maintenance projects. As dredge material will be placed on existing land, the refuge's fish, wildlife, plants and their habitats will not be adversely impacted.

Literature Citations

Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority. 1988. *Coast 2050: Toward a Sustainable Coastal Louisiana.* Louisiana Department of Natural Resources. Baton Rouge, LA. 161p

U.S. Army Corps of Engineers. 2004. Louisiana Coastal Area, Louisiana – Ecosystem Restoration Study – July 2004. Draft Report.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

__X__ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

_____ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

EAST COVE UNIT COMPATIBILITY DETERMINATION

The following proposed compatibility determination for commercially guided fishing is applicable only to the East Cove Unit of Cameron Prairie National Wildlife Refuge.

Refuge Name: Cameron Prairie National Wildlife, Southwest Louisiana National Wildlife Refuge Complex.

Date Established: December 29, 1988

Establishing and Acquisition Authorities: Migratory Bird Conservation Act; Migratory Bird Hunting and Conservation Act

Refuge Purpose(s):

... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds. (16 U.S.C. Sec. 715d [Migratory Bird Conservation Act])

Mission of the National Wildlife Refuge System:

The mission of the National Wildlife Refuge System is "...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Other Applicable Laws, Regulations, and Policies:

Antiquities Act of 1906 (34 Stat. 225)
Archaeological Resources Protection Act of 1979
Bald and Golden Eagle Protection Act (16 U.S. C. 668-668d; 54 Stat. 250)
Criminal Code provisions of 1940 (18 U.S.C. 41)
Department of Interior, U.S. Fish & Wildlife Service, Code of Federal Regulations, Title 50, Subchapter C; Title 43, 3101.3-3)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.; 87 Stat. 884)
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119)
Fish and Wildlife Service (Refuge) Manual
Land and Water Conservation Fund Act of 1965
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718-718h; 48 Stat. 451)
The National Environmental Policy Act of 1969 (42 U.S.C. 4321, et seq.; 83 Stat. 852)
National Historic Preservation Act of 1966 (16 U.S.C. 470, et seq.; 80 Stat. 915)
National Wildlife Refuge System Administration Act of 1966 as amended (16 U.S.C. 668dd-668ee; 80 Stat. 927)
National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-570)
Native American Graves Protection and Repatriation Act of 1990
Refuge Recreation Act of 1962 (16 U.S. C. 460k-460k-4; 76 Stat. 653)
Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
Use of Off-road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)

Wilderness Act of 1964 (16 U.S. C. 1131; 78 Stat. 890)
Laws and regulations of the State of Louisiana relating to hunting
Additional refuge-specific regulations as published

Description of Use: *Commercially Guided Fishing (East Cove Unit of Cameron Prairie National Wildlife Refuge)*

Over the past several years, the Service has been contacted as to the possibility of allowing commercially guided fishing opportunities on the East Cove Unit of Cameron Prairie National Wildlife Refuge. (Editor's Note: The East Cove Unit was originally established as part of Sabine National Wildlife Refuge but management oversight was administratively transferred to Cameron Prairie National Wildlife Refuge in recent years. Officials in the Service's Southeast Regional Office required the East Cove Unit to be discussed in the Sabine National Wildlife Refuge's Comprehensive Conservation Plan since its legal description was attached to Sabine's establishment. Thus, this Compatibility Determination for commercially guided fishing is limited to the East Cove Unit.)

Presently there are no authorized fishing guide operations on refuges comprising the Southwest Louisiana National Wildlife Refuge Complex. Commercial guiding for anglers is suspected to be an existing activity on the East Cove Unit, but it has not been regulated or administered.

Numerous public fishing opportunities exist on this unit. Fishing guides operate on adjacent Calcasieu Lake, but during times of turbulent water activity, guides would like to use the calmer waters of the East Cove Unit to provide their services to customers whose fishing opportunity would have been cancelled because of the weather. With the number of visitors to southwest Louisiana increasing, a shift in types of recreation use and users may occur. It is anticipated that opportunities to fish using commercial guides will increase as a proportion of total recreation use days.

The Service would authorize commercial fishing guide operations on the East Cove Unit and regulate such use through the implementation of a fishing guide management program, including issuance of special use permits with conditions. This activity provides recreational opportunity for anglers who desire a successful, quality experience, but who may lack the necessary equipment, skills or knowledge to fish within the East Cove Unit. Guiding operations will generally be allowed on the 14,927 acres comprising the East Cove Unit when the area is open to public fishing in accordance with the respective state fishing seasons.

Target fish species for guided anglers include most game fish. Redfish, flounder, and spotted sea trout are the most frequently pursued species. However, given the nature of fishing methods often employed, the potential exists to catch other fish species.

Other species that may be affected by guided fishing activities include many of the species that use the aquatic and flood plain habitat on the unit. Large concentrations of waterfowl such as gadwall and green-winged teal rest and feed on the refuge each fall. Other waterfowl species include mottled duck, mallard, and pintail. Additional species of interest include the roseate spoonbill, king rail, and brown pelican.

Guided fishing operations typically involve transport of clients by power boats from public boat landings to various fishing locations. Depending on the target fish species, guides/clients will then anchor, drift, troll, or fish areas with the aid of electric motors while seeking the intended fish species. Fishing gear varies greatly depending on species, but typically involves the use of artificial lures or bait. Depending on species, clients generally keep a portion of their catch or may practice catch-and-release.

The total number of fishing guides/clients in the area is not known. The State of Louisiana issues permits or licenses for fishing guides so an estimate could be obtained on specific locations of guides. A first step in establishing a commercial fishing guiding program on the East Cove Unit will be to identify existing guides through a review of public records and outreach through news releases and special meetings.

Based on apparent existing client demand for guide services, a significant number of the fishing public is willing to pay for the expertise and local knowledge provided by guides.

The East Cove Unit provides one of the better fishing locations within the area with good populations of catchable fish. Currently fishing activities account for over 1,500 visits to the East Cove Unit. It is expected that the number of fishing guides and the public's use of this service will continue to increase.

Administration of commercial fishing guide activities will be conducted in accordance with commercial guide use stipulations developed to ensure consistency; provide a safe, quality experience; protect resources; and to ensure compliance with pertinent Refuge System regulations and policies. The guide use stipulations will address all aspects of the guided fishing program including the number of permits to be issued, guide qualifications, permit cost, and selection methods. These stipulations are considered draft and will be fine-tuned during coordination meetings with the guides and Louisiana Department of Wildlife and Fisheries personnel.

Availability of Resources: At present levels, adequate resources are available to manage commercial fishing guide recreational activities.

Implementation of a commercial guiding program for fishing will increase overall costs of operations, including but not limited to development and review of policy and procedure, yearly administration of permits (inquiries, screening and selecting applicants, issuing permits), and enforcement of permit conditions. Existing staff is adequate if shifts in priorities and assignments are made to accommodate a modest guiding program. However, the size and scope of the guiding program, and the number of permits that will be available, may have to be limited in balance with permit fees received. Existing facilities (launch ramps) and other infrastructure are currently sufficient to accommodate this use.

Anticipated Impacts of Use: Allowing commercial guiding for sport fishing could result in increased public use of the East Cove Unit. Cumulative impacts of this increased use have correlating effects on wildlife, habitat, and the fisheries resource. This includes more disturbance to wildlife, vegetation trampling, potential introduction and spread of exotic aquatic and terrestrial plants, potential transmission of diseases, problems associated with disposal of human waste, and deposition of lead sinkers and fishing line. These impacts, however, apply to all angling activity, both commercial and noncommercial. Special conditions of the special use permits are designed to minimize these impacts. In addition, limiting numbers of commercial guides will also minimize these impacts.

Because of the oversight of this activity by the Service, the comprehensive state and federal regulations already in place, and combined law enforcement efforts of state and refuge personnel, existing and projected levels of guide services should have minimal impacts on fish and wildlife populations or habitat. Some disturbance of fish and wildlife will occur, but should not affect populations on the refuge overall. It is anticipated that this disturbance would not be measurably greater than disturbance from general fishing.

The primary concern regarding commercial guided fishing activities is the potential for conflict between guided activities and other refuge users, particularly unguided anglers. Based on experiences on this refuge and on other national wildlife refuges, a continuation of unregulated or inadequately regulated commercial guiding operations can increase user conflicts. An important part of this issue is public

perception that fishing guides and clients have an advantage of equipment and technique and are taking fish that would otherwise be caught by regular anglers. Guides, since they are running a business, may also be viewed as more aggressive compared to unguided anglers. To some degree, permitting commercial guiding on the East Cove Unit may negatively impact the Service's relationship with the local community. However, regulating the numbers of outfitters and guides helps mitigate these impacts somewhat. Service oversight of fishing guides should actually help ease any tension between guides and other users since it will help ensure properly licensed and qualified guides. Time and space restrictions would be implemented as needed. Oversight will also provide more data on fishing pressure and harvest levels related to guided fishing which can be shared with the public and help lessen some negative perceptions.

Visitors fishing at the East Cove Unit are restricted to their boats. However, the possibility that some customers or guides leave their boats could occur. Some minimal trampling of vegetation and littering could then occur, but is unlikely, since ecologically-aware, permitted or trained guides would exercise greater control over their clients than most general users would be expected to exercise over themselves.

Guide operations may increase use of some Service facilities, but if regulated, this increase would not be significant compared to overall use.

Commercial guiding for fishing is compatible when conducted within guidelines stipulated in special use permits. It is expected that commercially guided fishing could result in some minor incremental increase in disturbance to wildlife and aquatic species in the East Cove Unit. These impacts are expected to be negligible to minor.

Fishing through the use of commercial guides is not expected to indirectly or cumulatively impact Service resources negatively, even though there may be some minimal and direct short-term disturbance.

Public Review and Comment: This compatibility determination is being made available for public review and comment in conjunction with the public comment period for the Sabine National Wildlife Refuge Draft Comprehensive Conservation Plan (CCP). Comments from the public review of this compatibility determination are invited and are due by the deadline stated on the cover of the CCP.

Methods being used to solicit public review and comment include posted notices at refuge headquarters and area locations; copies of the draft comprehensive conservation plan distributed to adjacent landowners, the public, and local, state, and federal agencies; public meetings; news releases to area newspapers; and local radio announcements.

Determination (check one below):

_____ Use is Not Compatible

X Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Access for commercially guided fishing would be allowed in designated areas of the East Cove Unit only and regulated by special use permit. Activities would be monitored to document any negative impacts to wildlife; if negative impacts are found, corrective action would be taken to reduce or eliminate these impacts. Access to the East Cove Unit may be closed under guidelines of the interagency cooperative management plan, during adverse conditions, or when salinity levels mandate the closing of the weir or gate that provides access.

The Refuge Manager will establish the maximum number of guides that will operate in the East Cove Unit.

Qualified individuals may apply for available Guide Areas. If the maximum number of guides exceeds the recommended allowance for that Use Area, guides will be selected by random drawing for a special use permit valid for up to one year.

Permit fees (a nonrefundable administrative fee) will be determined for part-time guides and for full-time guides. These fees will be established as the initial program fees until the number of participants and earned revenues can be determined.

"Qualified" is defined as:

1. Licensed as a commercial guide by the state in which they operate, as applicable.

2. Possess a current vessel operator license issued by the U.S. Coast Guard. Minimum license shall be Operator Uninspected Passenger Vessel (OUPV). The license shall be valid for the area of operations and type(s) of vessel operated.

3. Possess a current CPR and First Aid training certificate issued by a recognized national organization.

4. Provide proof of insurance as established by the refuge, including minimum coverage for general liability and comprehensive for all operations.

5. Otherwise required by state law.

Permittees may be assisted by any number of individuals. Assistants must be named/authorized on the permit issued and possess the applicable state and Coast Guard licenses for duties conducted.

The permittee is responsible for accurate record-keeping and shall provide to the refuge the following information by February 15 of each year:

- Fee schedule for the year (charge per angler).
- Number of guided fishing trips performed on the East Cove Unit.
- Number of individuals guided.
- Date of each guided trip.
- Location of each trip, or general area of fishing activity.
- Number of each species harvested.
- Individual names and description of duties for all additional staff who assist with a fishing trip on the East Cove Unit.

All vessels and vehicles used in guide operations shall be marked with a guide identifier as required by the Service.

The special use permit and the privileges granted herein may be revoked by the issuing Refuge Manager at any time for failure to comply with the permit conditions or other federal or state law.

Permittee must comply with all other conditions of the special use permit. The following stipulations apply to all special use permits issued for wildlife-dependent recreation. To minimize impacts on refuge lands and resources, law enforcement patrols will routinely be conducted in an effort to maximize

compliance with policies, rules and regulations. This will ensure that activities will be monitored and assessed.

- Failure to abide by any part of this special use permit: violation of any refuge related provision in Titles 43 or 50, Code of Federal Regulations; or any pertinent state regulation (e.g., fish or game violation) will be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit.

- The permitee is responsible for ensuring that all employees, party members and any other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

- This permit may be canceled or revised at any time by the refuge manager for noncompliance or in case of emergency (e.g. public safety, unusual resource problems).

- The permittee and permittee's clients do not have exclusive use of this site(s) or lands covered by the permit.

- Prior to beginning any activities allowed by this permit, the permittee shall provide the refuge with (1) a copy of current business license; and (2) proof of comprehensive general liability insurance.

- The permittee is responsible for accurate record keeping and shall provide the refuge manager with a comprehensive summary of location, numbers of clients, and number of client days by January 15 each year. The permittee shall provide the refuge manager with this information on the form provided with the special-use permit. An annual nonrefundable administrative fee will be assessed prior to issuing this permit. Failure to submit required reports could result in the issuance of citations and revocation of the permit.

- Prior to conducting guiding operations, the permittee shall provide the Refuge Manager with the name and method of contact for the field party chief or supervisor.

- A valid copy of this special use permit, signed by the Refuge Manager or designee, must be in the party leader's possession at all times while exercising the privileges of the permit.

- Endorsement of this permit signifies the permittee's understanding and concurrence with all the conditions set forth in the General Conditions found on the reverse side of the permit and the above Special Conditions.

Given limited access, commercially guided fishing is viewed as compatible with the purpose for which the refuge was established.

Justification: The National Wildlife Refuge System Administration Act (as amended by the Refuge Improvement Act of 1997) identifies fishing as one of six priority public uses on national wildlife refuges. The law states that, when managed in accordance with principles of sound fish and wildlife management, administration of these uses has been and is expected to continue to be generally compatible and that priority public uses should receive enhanced consideration over other general public uses in refuge planning and management.

Conditions imposed in the special use permits of guides ensure that these wildlife-dependent activities can occur without adverse effects to refuge resources, or other visitors. Permitted guides facilitate public use and enjoyment of these activities while protecting refuge resources.

Allowing guided fishing on the East Cove Unit will not materially interfere with the purposes of the refuge or the mission of the Refuge System because:

1. Existing federal and state agency oversight and regulation of affected species and habitat is sufficient to ensure healthy populations. Disturbance to fish and wildlife will be local, short-term, and not adversely impact overall populations.

2. There are adequate state and federal enforcement officials to enforce state and federal regulations.

3. Qualifying standards for fishing guides will help ensure that anglers are guided by competent individuals.

4. Restricting the number of guides and managing how guided activities are conducted will reduce adverse habitat effects, conflicts between competing guide services, and conflicts between guided operations and other refuge users.

5. Designated areas of operation (Guide Use Areas), operating requirements, and other regulation of guided fishing will minimize conflicts with other refuge users.

6. Administrative (application) and special use permit fees will help offset costs to administer and provide oversight to this use.

7. Regulating and limiting the number of sport fishing guides as stated in the refuge commercial guide program stipulations will provide a safe, quality experience to individuals who fish on the refuge. It will also increase opportunities for those who wish to fish on the refuge, but may lack the required equipment, knowledge or expertise. By regulating commercial guides, the refuge will also better manage fish resources and reduce conflict between refuge visitors.

8. Permitting regulated commercial guiding for fishing on the refuge may increase public awareness of the refuge and the Refuge System, helping to build support for the Service's mission. However, this is highly dependent on an individual guide's efforts in educating their clients.

NEPA Compliance for Refuge Use Decision: *Place an X in appropriate space.*

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

Mandatory 10-year Re-evaluation Date: _____

Approval of Compatibility Determinations

The signature of approval is for all compatibility determinations considered within the Comprehensive Conservation Plan for Sabine National Wildlife Refuge. If one of the descriptive uses is considered for compatibility outside of the Comprehensive Conservation Plan, the approval signature becomes part of that determination.

Refuge Manager: _____
(Signature/Date)

Regional Compatibility Coordinator: _____
(Signature/Date)

Refuge Supervisor: _____
(Signature/Date)

Regional Chief, National Wildlife Refuge System, Southeast Region: _____
(Signature/Date)

Appendix H. Intra-Service Section 7 Biological Evaluation

REGION 4
INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Southwest Louisiana National Wildlife Refuge Complex, Sabine National Wildlife Refuge, Donald J. Voros, Project Leader

Telephone Number: 337/598-2216 **E-Mail:** don_voros@fws.gov

Date: January 11, 2007

PROJECT NAME (Grant Title/Number):

I. Service Program:
___ Ecological Services
___ Federal Aid
___ Clean Vessel Act
___ Coastal Wetlands
___ Endangered Species Section 6
___ Partners for Fish and Wildlife
___ Sport Fish Restoration
___ Wildlife Restoration
___ Fisheries
_X_ Refuges/Wildlife

II. State/Agency: Louisiana / U.S. Fish and Wildlife Service

III. Station Name: Southwest Louisiana Refuge Complex, Sabine National Wildlife Refuge

IV. Description of Proposed Action (attach additional pages as needed):

The proposed action would result in the implementation of a comprehensive conservation plan (CCP) for Sabine National Wildlife Refuge, a 125,790-acre refuge in Cameron Parish. Approval and subsequent implementation of the CCP will direct management actions on the refuge for the next 15 years.

The proposed alternative identified for the CCP is to continue to keep refuge operational and public use programs functional but at a reduced cost (near term), and increase marsh restoration, enhance fish and wildlife management, and expand public use (long term).

This alternative supports the purpose for which the refuge was established. The plan identifies 6 broad goals for habitat, fish and wildlife management, oil and gas infrastructure and associated activities, visitor services, cultural resources, East Cove management, and refuge and Complex administration and operations. Detailed strategies are also outlined. Goals and objectives were developed to support regional and national plans and initiatives and will be implemented in partnership with others such as the Louisiana Department of Wildlife and Fisheries. (See attached Comprehensive Conservation Plan and Environmental Assessment for Sabine National Wildlife Refuge.)

Over the near term, under this alternative, refuge programs would continue throughout the refuge commensurate with the level of hazardous material cleanup and restoration over time. Areas west of State Highway 27 (except the area immediately adjacent to the highway) would remain closed in the near term due to hazardous waste and debris fields that clog waterways. However, over time, areas would be reopened as repairs to infrastructure and restoration of habitat occur. Simultaneously, a hydrological and feasibility study would be conducted to evaluate how the plug of hurricane-deposited debris, uprooted vegetation and sediments has affected marsh drainage patterns and the challenges and opportunities presented by this changed environment. East of Highway 27, all public use facilities along Highway 27 would be repaired using TEA Emergency Road Funds. The fire and research programs would remain active throughout the refuge. Oil and gas operations would also continue at the normal level. Staff assigned to Sabine would function out of a modestly constructed hurricane-resistant building to be located at the original headquarters site. Refuge staff actually assigned to the new building at the site of the former Headquarters would be smaller than pre-Rita. Repairs will be made to other infrastructure over time.

Over the long term, under Alternative B, the Sabine Refuge would increase marsh restoration and enhance wildlife management, stepping up these efforts from current levels. The refuge would improve marsh plant communities and shallow water, increase waterfowl food production, and provide habitats and sanctuary needs for migrating, wintering, breeding ducks (mottled ducks) and geese of the Chenier Plain system of southwest Louisiana. It would also protect and/or restore 43,200 acres of intermediate and brackish marsh and continue working toward restoring the emergent marsh and functional value of Unit 3 through the year 2015. A feasibility study of restoring Unit 3 to tidal influence would be carried out. The beneficial use of dredge material for marsh restoration would be continued by restoring 1,500 acres of marsh in Unit 1.

This alternative would provide 125,790 acres of diverse marsh and open water habitats for migrating and wintering waterfowl, which would contribute significantly to the population and habitat objectives addressed in the Gulf Coast Joint Venture Chenier Plain Initiative. Population objectives of the plan include 4.5 million ducks and 500,000 geese with foraging habitat provided in the coastal marshes.

Alternative B would maintain salinity monitoring throughout the refuge at the established discrete salinity stations (nine locations) and Sabine would also develop a new water quality monitoring program within five years of CCP approval. Working through the Service's regional solicitor's office, the refuge would quantify or clarify water rights for the Complex.

Sabine would continue to use fire as a multipurpose management tool for reducing hazardous fuels and promoting habitat diversity. The refuge would aim to utilize prescribed fire on approximately 20,000 acres per year.

In cooperation with partners, habitat would be managed consistent with the refuge purpose; a monitoring program would be in place, and ways to improve water quality and fishery resources would be sought.

To conserve and manage wildlife, Sabine National Wildlife Refuge would:

- support mottled duck banding activities and provide preferred mottled duck breeding and nesting habitat;
- provide shorebird habitat, thereby contributing to the goals of the Lower Mississippi Valley/Western Gulf Coast Shorebird Plan;
- protect nesting colonies of colonial waterbirds from disturbance;
- maintain 125,790 acres of diverse marsh plant communities to support marsh birds;
- play an important role in the conservation of nongame birds in the southeastern United States, focusing on the survey, inventory, and monitoring of all groups; in so doing, it would contribute to the goals of the Gulf Coast Joint Venture, Partners in Flight, and other plans;
- coordinate with the Louisiana Department of Wildlife and Fisheries to monitor alligator numbers and establish a desirable alligator density objective for the refuge and work with the state in setting annual harvest quotas;
- intensively control certain wildlife populations as needed to achieve habitat and population objectives; and
- protect diamond-backed terrapin populations on Sabine National Wildlife Refuge.

Sabine would closely monitor oil and gas activities to minimize impacts to wetland habitats and wildlife usage. It would also increase surface reclamation at former petroleum extraction sites to improve habitat for wintering migratory birds and other species. New construction for oil and gas transmission line right-of-ways will not be permitted because they can significantly contribute to further land loss on coastal Louisiana national wildlife refuges.

By 2008, staff would complete steps to enhance the refuge's infrastructure and operations to provide for quality, wildlife-dependent public use. There would be improved waterfowl hunting opportunities that are compatible with the purpose of the refuge. The refuge would also provide increased hunting and fishing opportunities for families to experience compatible wildlife-dependent recreation.

Sabine would also:

- enhance existing opportunities for wildlife observation and wildlife photography by upgrading facilities throughout the refuge over the life of the plan;
- provide improved environmental education and interpretive programs that complement other refuge programs within the Complex; and
- provide additional opportunities for Friends, volunteers, partners and interns to assist the refuge and extend the reach of refuge staff.

Management of cultural resources would continue to be protected. The East Cove Unit would continue to be managed in cooperation with Cameron Prairie Refuge as it has been in recent years under the Cameron Creole Watershed Cooperative Agreement. Gates at the water control structures would be operated to restore preferred vegetated plant communities associated with intermediate or possibly slightly brackish environs. Staff would evaluate the use of terraces to improve vegetation of open-water areas. Through the life of the plan, an assessment would be conducted to determine the need for sanctuary in the East Cove Unit and minimizing detrimental waterfowl disturbances. The invasion of exotic plant species, with special emphasis on giant salvinia, would be monitored. Public fishing access to East Cove would be improved.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map:

B. Complete the following table:

SPECIES/CRITICAL HABITAT	STATUS
Bald Eagle	T
Kemp's ridley sea turtle	E
American Alligator	T (State)
Loggerhead turtle	T
Wood Stork	E

[1]STATUS: E = endangered, T = threatened, PE = proposed endangered, PT = proposed threatened, CH = critical habitat, PCH = proposed critical habitat, C = candidate species

Identify listed, proposed and candidate species as well as designated and proposed critical habitat within the action area and their status. The action area includes the immediate area where the proposed action will occur, as well as any other areas where direct or indirect impacts of the action may be expected. For example, effects of an action in the headwaters of a stream may affect endangered fish that occur 20 miles downstream. A compilation of species or critical habitats that possibly occur in the action area may be generated by the Project Leader, or it may be requested from the appropriate Ecological Services Office.

Note: All experimental populations of listed species are treated as threatened species. However, for the purposes of intra-Service section 7 consultation, they are treated as species *proposed* for listing if they occur off National Wildlife Refuge System or National Park System lands and they are classed as "nonessential" experimental populations.

List all listed, proposed or candidate species and designated or proposed critical habitat that may occur within the action area. This informs the reviewer what species have been considered.

VI. Location (attach map):

A. Ecoregion Number and Name: Lower Mississippi, 27

B. County and State: Cameron Parish, Louisiana

C. Section, township, and range (or latitude and longitude): Townships 12 and 13 South and Ranges 4, 5, and 6 West, Louisiana Meridian.

D. Distance (miles) and direction to nearest town: Sabine Refuge is 9 miles south of Hackberry, LA.

E. Species/habitat occurrence: Depict species' locations and their habitat on a project area map.

VII. Determination of Effects:

A. Explanation of effects of the action on species and critical habitats in item V. B (attach additional pages as needed):

Discuss either the effects of the action on each listed, proposed, or candidate species and critical habitat in the action area, or why those species or critical habitats will not be affected. For species or critical habitats affected by the proposed action, provide the following information:

Impacts of the proposed action on species and/or critical habitat, including direct, indirect, interdependent, interrelated, and cumulative impacts. (Quantification of effects – acres of habitat, miles of habitat, number of individuals, etc.

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Bald Eagle	NA
American Alligator	NA
Kemp's ridley sea turtle	NE
Loggerhead turtle	NE
Wood Stork	NE

B. Explanation of actions to be implemented to reduce adverse effects:

Management actions initiated under the Comprehensive Conservation Plan may result in beneficial effects to bald eagle, American alligator, Kemp's ridley sea turtle, loggerhead turtle, and wood stork. Efforts to improve habitat management programs as described in the CCP may potentially improve conditions for these species.

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Bald Eagle	Protect any nesting sites that occur
American Alligator	Conduct harvest according to state regulations
Kemp's ridley sea turtle	Provide access and habitat
Loggerhead turtle	Provide access and habitat
Wood Stork	Protect any nesting sites that occur

VIII. Effect Determination and Response Requested:

SPECIES/ CRITICAL HABITAT	DETERMINATION[1]			RESPONSE1 REQUESTED
	NE	NA	AA	
Bald Eagle				NE
American Alligator				NE
Kemp's ridley sea turtle				NE
Loggerhead turtle				NE
Wood Stork				NE

[1]*DETERMINATION/ RESPONSE REQUESTED:*

NE = no effect. This determination is appropriate when the proposed action will not directly, indirectly, or cumulatively impact, either positively or negatively, any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.

NA = not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a "Concurrence".

AA = likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response requested for proposed and candidate species is "Conference".

Enter the Species, the Determination, and the Response Requested.

No effect/no adverse modification.
All identified. No effect – request concurrence.

May Affect, but is not likely to adversely affect species/adversely modify critical habitat.

May affect, and is likely to adversely affect species/adversely modify critical habitat.

Is likely to jeopardize proposed species/adversely modify proposed critical habitat.

Is likely to jeopardize candidate species.

_____ _____
Signature (originating station) Date

Complex Refuge Manager
Title

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence _____ Nonconcurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

_____ _____
Signature Date

_____ _____
Title Office

Appendix I. Budget Requests

The following lists were developed over time and represent the budget needs and identified projects prior to Hurricane Rita's devastation in September of 2005. Subsequent to the massive destruction resulting from the hurricane, the Service received special appropriations to repair and replace damaged infrastructure, habitat, and equipment. This funding and its associated projects are identified in Chapter V of the Comprehensive Conservation Plan. Some projects identified below may be accomplished through the use of this special appropriation.

SERVICE ASSET MAINTENANCE MANAGEMENT SYSTEM (SAMMS)

SAMMS Work Order Num	Sabine	Project Title	Cost Est (1000's)	Project Type
93102425	93076	Rehabilitate post boundary signs	$136K	Deferred Maintenance
2120496	2007	Rehabilitate Oil House To Include Pole Shed Structures	$46K	Deferred Maintenance
1102444	1002	Replace fishing wharves	$28K	Deferred Maintenance
2119940	2006	Remove pilings and bulkhead material from canal openings	$42K	Deferred Maintenance
2119521	2001	Replace roofing shingle at north shop, N.T. restroom and oil house	$31K	Deferred Maintenance
4135014	4001	Rehabilitate Nature Trail Observation Tower	$90K	Deferred Maintenance
1113605	1047	Rehabilitate 5 Stoplog Watercontrol Structures	$30K	Deferred Maintenance
102426	10	Rehabilitate Marsh levee	$79K	Deferred Maintenance
4135282	4005	Remove Silt from Boathouse and Headquarters Canal	$75K	Deferred Maintenance
4136514	4413	Repair Bridge 43630-00169	$44K	Deferred Maintenance
4136515	4414	Repair Multiple Bridges	$59K	Deferred Maintenance
2119950	2005	Replace 2001 Ford Truck, Fire Engine, Type 6, BME 115, 4X4 Cab & XLT chassis,	$65K	Heavy Equipment
99110621	99005	Construct a Bunkhouse at the Refuge Headquarters	$432K	Large Construction
4135234	4004	Replace Failing Unit 1B Water Control Structure	$2453K	Large Construction
110622	16	Construct a building for Refuge Fire Program	$503K	Small Construction
3124930	3006	Replace Dormer Windows/Roof of Headquarters Building	$73K	Small Construction
1110108	1009	Construct addition to headquarters building	$379K	Small Construction

123344	6	Replace Boat Access in Management Unit 3	$94K	Small Construction
1123342	01NNN	Construct Fishing Wharves on Sabine NWR	$136K	Small Construction
3124915	3005	Replace Helicopter Base	$84K	Small Construction
97123346	97703	Construct wave break terrances	$188K	Small Construction
1112948	1028	Replace 1994 Chevy Diesel Pickup	$26K	Small Equipment
1113377	1042	Replace 1995 Ford Explorer	$0K	Small Equipment
1112942	1026	Replace 1995 Ford 4 X 4 Pickup	$26K	Small Equipment
1112958	1031	Replace 2001 Chevy 4 X 4 Pickup	$26K	Small Equipment
1113026	1036	Replace Ford Model 1100 Tractor	$57K	Small Equipment
1112954	1030	Replace 1998 Ford Explorer	$26K	Small Equipment
1112935	1025	Replace 1992 Chevy 4 X 4 Crew Cab Pickup	$0K	Small Equipment
1113366	1040	Replace 15' Fire Boat	$16K	Small Equipment
1112973	1032	Replace 1994 Chevrolet 4X4 Fire Engine	$74K	Small Equipment
1113018	1035	Replace 1995 62 Yazoo Lawn Mower	$16K	Small Equipment
1112952	1029	Replace 1999 Ford Expedition	$26K	Small Equipment
98102424	98008	Replace lawn mower tractor	$22K	Small Equipment
98102422	98005	Replace PolarKab Boat	$27K	Small Equipment
2119949	2004	Replace 2002 GM 4X4 Crew Cab Dually Pickup	$30K	Small Equipment
2119958	2003	Replace 2002 4X4 Ext. Cab GM Pickup	$26K	Small Equipment
4135140	4002	Replace 2002 Ford F250 4X4 Crew Cab Pickup	$26K	Small Equipment
4135144	4003	Replace 2003 Ford F150 XL Pickup Truck	$26K	Small Equipment
1133091	1010A	PE Northline Bridge (Rte 901)	$52K	TEA21
1102450	1010B	CN/CE Northline Bridge (Rte 901)	$173K	TEA21
97102431	97001B	CN/CE Northline parking lot (901)	$63K	TEA21
97133354	97001A	PE Northline parking lot (901)	$52K	TEA21
96102432	97001	Repair and Redesign 1A/1B Parking Area	$59K	TEA21
4136209	97001	Replace Hog Island Gully parking lot & access road	$75K	TEA21
4136212	97001	Repair West Cove recreational parking area	$180K	TEA21

Appendix J. List of Preparers

PLANNING TEAM

Judy McClendon, Natural Resource Planner, U.S. Fish and Wildlife Service, Augusta, Arkansas - Planning Team Leader, Co-writer and Editor

Leon Kolankiewicz, Environmental Consultant, Mangi Environmental Group, McLean, Virginia - Co-writer and Editor

Donald J. Voros, Project Leader, U.S. Fish and Wildlife Service, Southwest Louisiana National Wildlife Refuge Complex, Bell City, Louisiana – Writer and Editor, Provided overall guidance and oversight

Glenn Harris, Refuge Manager/Deputy Project Leader, U.S. Fish and Wildlife Service, Cameron Prairie National Wildlife Refuge, Bell City, Louisiana – Writer and Editor, Provided overall guidance and oversight

Terry Delaine, Refuge Manager, U.S. Fish and Wildlife Service, Sabine National Wildlife Refuge, Hackberry, Louisiana – Provided overall development, guidance, and oversight**.**

Michael Hoff, Refuge Operations Specialist, U.S. Fish and Wildlife Service, Cameron Prairie National Wildlife Refuge, Bell City, Louisiana – Writer, Developed project descriptions and RONS and MMS Sections

Steve Reagan, Wildlife Biologist, U.S. Fish and Wildlife Service , St. Charles, Arkansas – Writer, Provided input and oversight on Biological Sections

Diane Borden-Billiot, Outreach Coordinator, U.S. Fish and Wildlife Service, Southwest Louisiana Refuges Complex, Hackberry, Louisiana - Editor and provided guidance and oversight on Visitor Services

Dawn McMillin, Former Biological Science Technician, U.S. Fish and Wildlife Service, Sabine National Wildlife Refuge, Hackberry, Louisiana – Assisted in typing, proofreading, and plan development; maintained databases; provided biota lists

Roy Walter, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Sabine National Wildlife Refuge, Hackberry, Louisiana – Provided maps and editing

Robert Greco, GIS Specialist, U.S. Fish and Wildlife Service, Lafayette, Louisiana – Provided GIS assistance

Richard Kanaski, Regional Archaeologist, U.S. Fish and Wildlife Service, Savannah, Georgia – Provided writing and guidance on cultural resources

CONTRIBUTORS

Pre-planning for this CCP began in early 2002 when Biological and Public Use Reviews of Cameron Prairie National Wildlife Refuge were held. Experts and specialists submitted recommendations for future management. These recommendations were used extensively during the development of this Plan. Contributors include:

Frank Bowers, Chief (Retired), Office of Migratory Birds, U.S. Fish and Wildlife Service, Atlanta, GA

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David Chisolm, Fire Management Officer, U.S. Fish and Wildlife Service, Hackberry, LA

Mark Ford, Professor, McNeese State University, Lake Charles, LA

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