U.S. Fish & Wildlife Service

DRAFT LAND PROTECTION PLAN AND ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED ESTABLISHMENT OF EVERGLADES TO GULF CONSERVATION AREA

Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Lee, Manatee, Okeechobee, Polk, Sarasota Counties, Florida

Southeast Region

Table Of Contents

LIST OF FIGURES

LIST OF TABLES

Everglades to Gulf Conservation Area

Draft Land Protection Plan

U.S. Department of the Interior
Fish and Wildlife Service
Southeast Region
September 2023

DRAFT LAND PROTECTION PLAN

I. INTRODUCTION AND PURPOSE

Southwest Florida fosters a unique set of natural communities and species with notable threats from rapid human population growth and climate change. However, this region also harbors a large and largely intact rural landscape essential to the Florida panther and a host of other Federal and State listed species. It plays a vital role in the ecological integrity of both the Everglades and Charlotte Harbor watersheds. Important opportunities still exist to protect large working landscapes and functional ecological connections between conservation areas to address many of the region's biodiversity and water resource conservation goals.

The U.S. Fish and Wildlife Service (Service), Southeast Region, proposes to conserve, protect and manage one of the most important regional conservation landscapes in the United States through the establishment of the Proposed Everglades to Gulf Conservation Area (Conservation Area) which would be located within the Study Area used for the Southwest Florida Landscape Conservation Design (LCD; Morris et.al 2022) (Appendix E). The LCD Study Area incorporates almost 7 million acres of land and water from the western Everglades north to include the Caloosahatchee watershed to the headwaters of the Peace River, west to incorporate the Myakka River watershed, and east to the Lake Wales Ridge, Fisheating Creek watershed and the northwestern half of Lake Okeechobee (Figure 1).

The Study Area represents the current breeding range and best potential population expansion areas for the Florida panther and habitat for other listed and focal species, unique natural communities, the heart of Florida's unique prairie ranching landscape, Everglades watersheds, and the entire Peace River and Myakka river watersheds, which are essential for the health of Charlotte Harbor, a National Estuary and epicenter of natural resource based tourism and economic activity in southwest Florida. The Study Area is also an essential keystone for the Florida Wildlife Corridor, which is delineated by the State of Florida as one of the top three priorities within the Florida Ecological Greenways Network (FEGN). The Florida Wildlife Corridor has recently become a statewide conservation priority for the Florida Legislature and Governor, who have expressed their commitment to its protection through a significant increase in conservation protection land funding for the Florida Forever and Rural and Family Lands Protection programs. This Study Area represents an unprecedented landscape-scale conservation opportunity with great potential for both large scale conservation funding and cooperative opportunities between federal, State, regional, and local partners. In fact, Florida's ecological and economic future is dependent on conservation success in this region.

Working with the key partners, as well as with other State and local governments, Tribal Nations, businesses, non-governmental organizations, and the public, the Service examined the needs for wildlife habitat protection within the biologically important Everglades, Caloosahatchee, Fisheating Creek, Peace River and Myakka River watersheds (Figure 1). During the planning process, this Study Area was further refined to encompass a smaller, approximately 4-million-acre area referred to as the Everglades to Gulf Conservation Area which would be equivalent to the acquisition boundary. The proposed Conservation Area spans twelve counties and encompasses the Greater Everglades, the northern margin of Lake Okeechobee and the watersheds of the Caloosahatchee River, Fisheating Creek, Peace River, and Myakka River. Within the proposed Conservation Area, the Service proposes to acquire less-than-fee-title in the Conservation Area. In addition, the Service

would also pursue fee-title interest in up to 10% of the proposed Conservation Area to support the shared goals of conservation efforts in this important landscape. It is crucial to note the Service's policy is to work with willing sellers to acquire less-than-fee-title or fee-title interest in property.

One of the objectives of establishing a Conservation Area is to contribute to a more connected and functional conservation landscape that would provide effective habitat connections between existing and future conservation areas. Identification of land parcels within the draft Land Protection Plan (LPP) does not preclude the acquisition of those parcels by other agencies, organizations, or individuals.

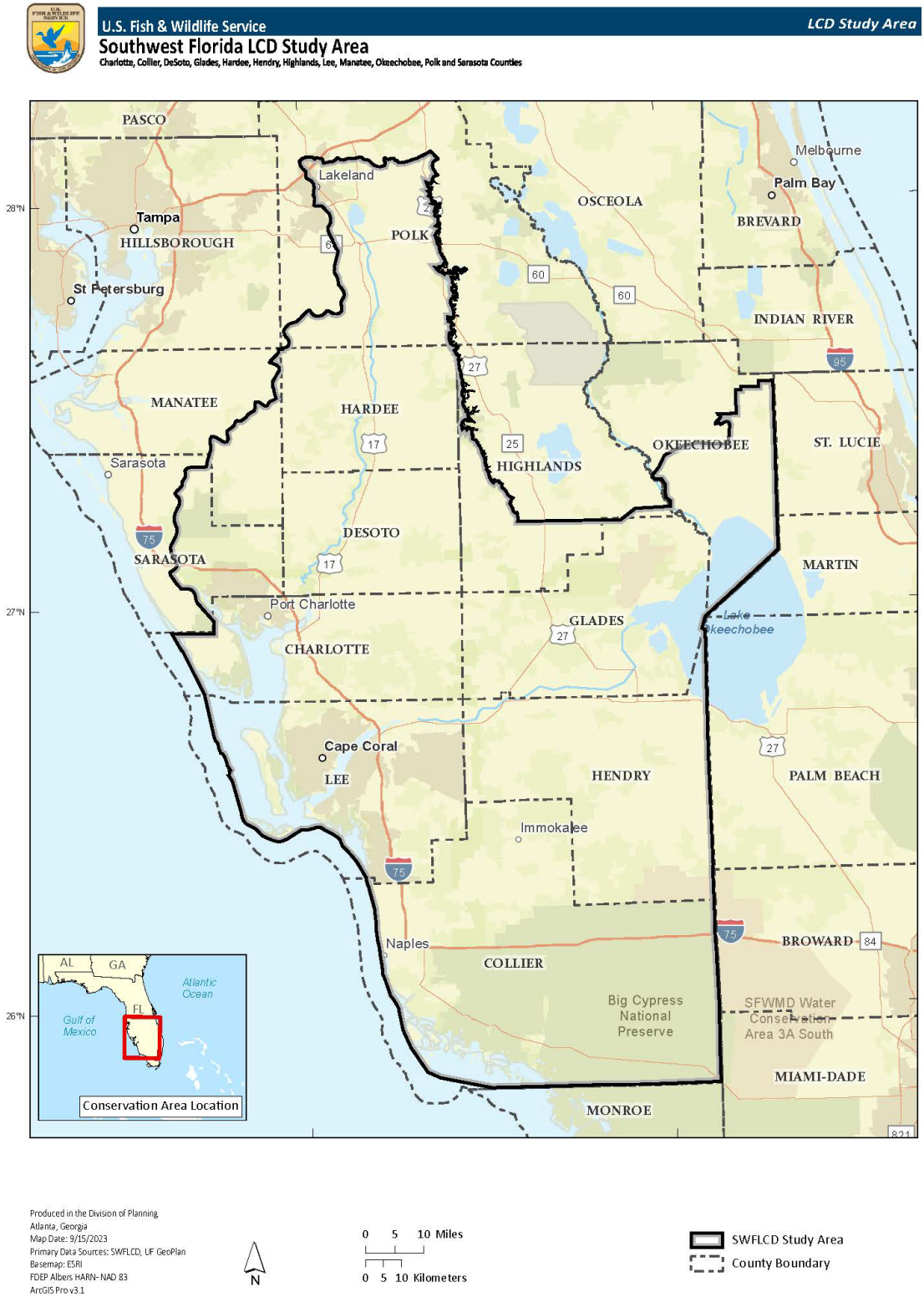


Figure 1. Outline of the LCD Study Area

PROJECT DESCRIPTION

The generalized Study Area for the proposed Conservation Area is located within portions of the Greater Everglades, Caloosahatchee River, Fisheating Creek, Peace River, and Myakka River Watersheds. The proposed Conservation Area would protect a combination of wetland and upland habitats supporting migratory birds, federal and State listed species, and regionally important wildlife and plant communities within a 4-million-acre portion of the 7-million-acre Study Area. Within this region, undeveloped lands and surface waters provide a host of wildlife-dependent recreational opportunities such as hunting, fishing, and wildlife-watching amid an increasingly urbanized landscape.

Recognizing the generations of responsible stewardship within this working rural landscape, the Conservation Area proposes to work with willing landowners to secure a legacy of conservation lands for future generations to enjoy. The proposed Conservation Area would aim to address threats from habitat fragmentation and urban development, altered ecological processes, and impacts from global climate change.

This Draft LPP identifies the proposed authorization and establishment of the Everglades to Gulf Conservation Area, as outlined in the Service's Proposed Action (Alternative B) in the Draft Environmental Assessment (Draft EA). The purposes of the Draft LPP are to:

- announce the Service's intent to establish the proposed Everglades to Gulf Conservation Area;
- provide landowners and the public with an outline of Service policies, priorities, and protection methods for property in the project area;
- assist landowners in determining whether their properties are located within the proposed Conservation Area; and
- inform landowners about the Service's long-standing policy of acquiring land only from willing sellers.

Conservation Area/Acquisition Boundary	A specified area within which the Service would work with partners and willing landowners to achieve conservation goals and within which the Service would have authority to work with willing landowners to acquire fee-title and less-than-fee-title interest or enter into management agreements. Alternative B, the proposed alternative, identifies an approximately 4-million-acre proposed Conservation Area. The Service would be authorized to acquire up to 10% of the proposed Conservation Area in fee-title. In addition, the Service would seek opportunities on less-than-fee-title acquisitions within the proposed Conservation Area.
Study Area	A generalized area of interest evaluated in the LCD (2022) within which the Service assessed opportunities for conservation measures and analyzed threats to fish and wildlife resources. The Study Area for this project totals approximately 7 million acres of the Greater Everglades, Caloosahatchee River,

	Fisheating Creek, Peace River, and Myakka River Watersheds. The designation of a Study Area does not convey authority to establish rules and regulations throughout the 7-million-acre area.
Areas Not Considered	During the planning process, certain areas were removed from consideration for less-than-fee-title and fee-title acquisition. These included lands owned by Tribal Nations, incorporated lands, developed areas and areas determined not to meet the Service's criteria for additional conservation.

The LPP presents the methods that the Service, conservation partners, and interested landowners could use to accomplish wildlife and habitat goals and objectives for the proposed Conservation Area.

The scope of the Draft EA and Draft LPP is limited to the proposed acquisition of lands, in less-than-fee-title and fee-title, within the proposed Conservation Area. The Draft EA and Draft LPP are not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A conceptual management plan and interim compatibility determinations (Appendix B) would guide management and public use on fee-title lands acquired within the proposed Conservation Area and where appropriate, less-than-fee lands (i.e., conservation easements) until a comprehensive conservation plan and compatibility determinations are developed.

The following definitions aid in outlining the Proposed Action:

The specific action identified in this LPP would be to establish the Everglades to Gulf Conservation Area which would include less-than-fee-title and fee-title acquisition. The proposed Conservation Area would provide the Service with the opportunity to engage with partners and local landowners on conservation activities such as acquiring conservation easements and fee-title lands, wetland restoration management actions, recreational opportunities, and provide cultural, traditional, and medicinal use opportunities.

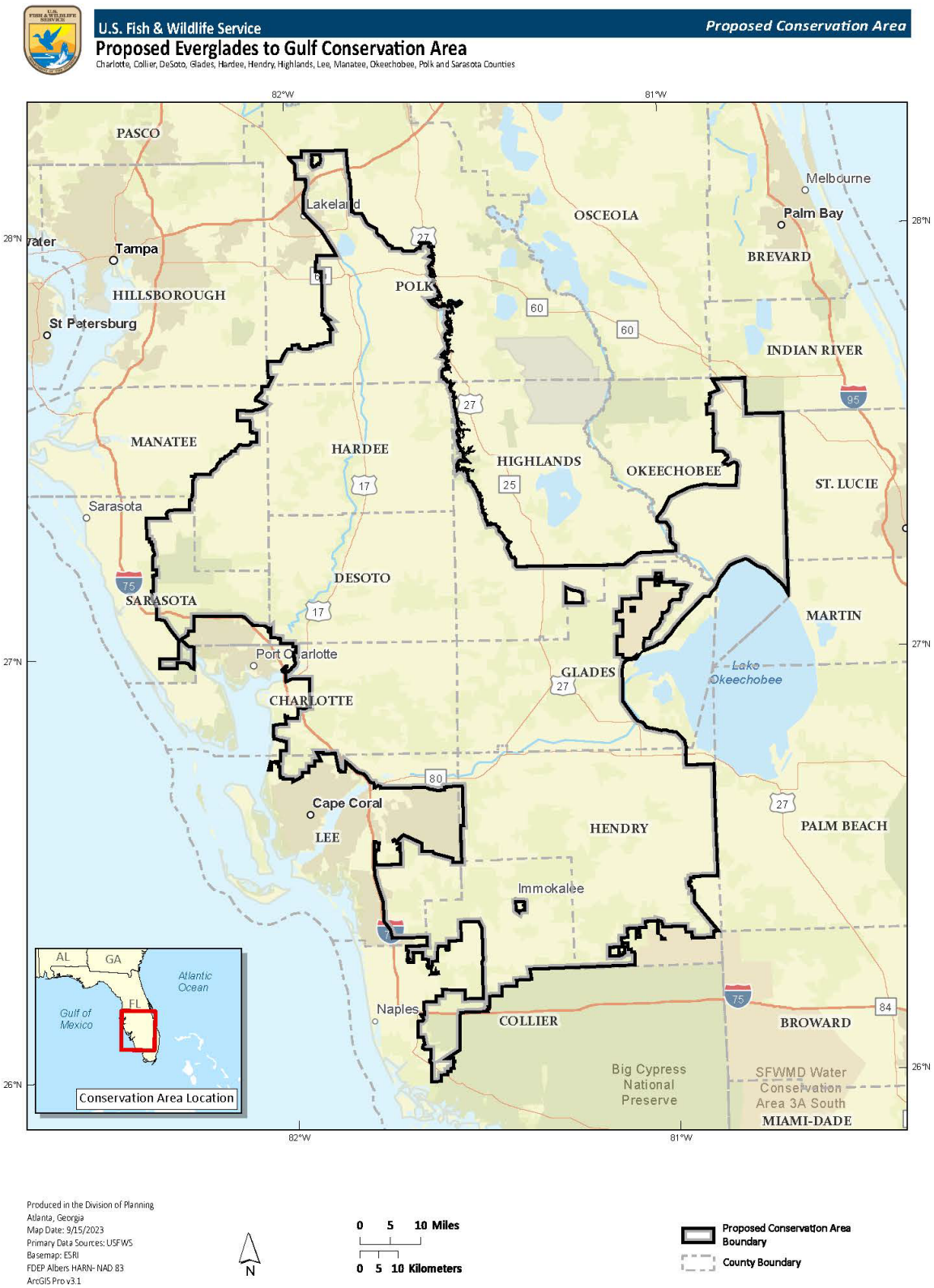


Figure 2. Proposed Everglades to Gulf Conservation Area

THE MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM (REFUGE SYSTEM)

"... 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" (National Wildlife Refuge System Improvement Act of 1997).

REFUGE UNIT PURPOSE(S), VISION, AND GOALS

Emphasizing migratory birds, listed species, and wetlands, while protecting the important fish and wildlife resources of this landscape, the listed purposes have been developed for the establishment of the proposed Conservation Area.

> "... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)
>
> "…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)
>
> "…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)
>
> "…to conserve and protect migratory birds..., including species that are listed...as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)
>
> "…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)
>
> "…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

The vision for Everglades to Gulf Conservation Area is:

Together with our partners, we will preserve wildlife corridors containing a mosaic of natural communities and working lands with rich cultural history and traditions for the benefit of all people. All species and habitats will be protected and contain the resiliency to facilitate adaption due to the impacts of climate change and development. Additionally, protection and management actions within the landscape will improve water quality, water storage, provide wildlife dependent recreational opportunity, and support Florida's family farms and ranches.

Conservation Area Goals and Objectives

Four overarching goals were developed for the proposed Conservation Area. The goals are intentionally broad, descriptive statements of the desired future conditions. They embrace the proposed purposes and vision statement. The goals address a functional conservation landscape; habitat for fish and wildlife; water quality, quantity, and storage; opportunities for Tribal Nations; and wildlife-dependent recreation, as listed.

1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Conservation Area would aid in the maintenance and recovery of Florida panther populations and protect many rare and endemic species, including over 100 Federally and State-listed Threatened and Endangered species, such as the Florida scrub-jay, Audubon's crested caracara, wood stork, Florida bonneted bat, Everglade snail kite, Eastern indigo snake and sand skink, thereby protecting natural communities found only in south Florida and species adapted to Florida's unique subtropical environment. In addition, the Service would conserve important rural landscape mosaics, including ranchlands, to combat habitat fragmentation and protect wildlife corridors essential to many species' viability and adaptation responses to climate change. Important wildlife corridors essential for listed species viability and adaptation opportunities in response to climate change would be provided. The proposed Conservation Area would also provide opportunities to restore important wetlands, provide water storage, and improve water quality for the Greater Everglades, Myakka River, Peace River, Fisheating Creek, and Caloosahatchee River watersheds, and coastal estuaries including Charlotte Harbor.

2. Provide Science-Driven Landscape-Level Conservation. The proposed Conservation Area would contribute to protection of a functional conservation landscape composed of a mosaic of natural communities and ranchlands that would prevent further habitat fragmentation, provide functional habitat for wide-ranging listed species, and facilitate watershed and prescribed fire management. The proposed Conservation Area would allow the Service to protect and restore water resources within multiple watersheds to improve water quality and quantity; maintain and enhance ecological integrity, recreation, and the economy; and improve and secure water supplies, benefiting humans and wildlife. The landscape-scale ecological priorities within the proposed Conservation Area are identified with the best available ecological and spatial data based on conservation science, landscape ecology, tribal indigenous knowledge, and spatial analysis.

3. Conserve Important Lands and Waters for the Benefit of All People. Visitors to the proposed Conservation Area fee-title lands would enjoy opportunities for compatible wildlife-dependent recreation which may include hunting, fishing, wildlife observation, photography, environmental education, and interpretation, while increasing knowledge of and support for conservation. Fee-title lands could also provide cultural, traditional, and medicinal use opportunities. Willing landowners could protect their private land through conservation easements and stewardship programs while providing important ecosystem services for all people. The Everglades and southwest Florida watersheds require protection of remaining functional wetlands and floodplains, and

restoration of hydrology to avoid further impairment and improve water quality and supply including Charlotte Harbor, an essential economic engine for south and southwest Florida.

4. Promote Conservation Partnerships Working with Adaptive and Flexible Tools and Strategies. Collaboration in science, education, research, and land acquisition (including conservation easements) would facilitate the development of new partnerships and strengthen existing partnerships with natural resource organizations, private landowners, government agencies, Tribal Nations, and local decision-makers. The partnerships would help inform land management decisions and encourage continued responsible stewardship of natural and rural landscapes essential for listed species protection, associated natural resources, while facilitating resiliency and adaptation to climate change.

Objectives associated with the proposed Conservation Area would:

- Assist with the restoration of the Everglades.
- Enhance the viability and recovery of the Florida Panther and over 100 other threatened and endangered species and 17 At-risk species.
- Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy especially the Caloosahatchee River watershed, Fisheating Creek watershed, the Peace River watershed, the Myakka River watershed, Okaloacoochee Slough, Corkscrew Swamp, and Charlotte Harbor.
- Maintain unique natural communities and species adapted to the unique subtropical environment.
- Conserve habitat diversity and complexity.
- Improve and increase resiliency.
- Facilitate protection of a regional scale wildlife corridor through the protection of a functional landscape mosaic of natural communities and ranchlands.
- Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species.
- Complement other conservation initiatives.
- Foster existing partnerships and seek new partnerships.
- Conserve cultural sites and landscapes.
- Provide cultural, traditional, and medicinal use opportunities on fee-title lands.
- Provide wildlife dependent recreational opportunities on fee-title lands.

II. RESOURCES

RESOURCES TO BE PROTECTED

For a complete description of resources (physical, biological, socioeconomics, cultural) to be protected, see Chapter II. Affected Environment of the Environmental Assessment (Appendix A) for the proposed Everglades to Gulf Conservation Area.

Habitat and Wildlife Resources

Table 1. Focal Natural Communities (Protected and Unprotected). Source: Morris et al. (2022); Florida Fish and Wildlife Conservation Commission and Florida Natural Areas Inventory (2022)

Proposed CA Map Unit	SWFLCD Focal Natural Community	Protected (acres)	Unprotected (acres)	Total
Dry Prairie	Dry Prairie	48,952	30,014	78,966
Freshwater Forested Wetland	Bay Wetland	2,133	5,327	7,460
Freshwater Forested Wetland	Cypress/Pine/Cabbage Palm	2,629	20,905	23,534
Freshwater Forested Wetland	Freshwater Hardwood Wetland	23,869	144,417	168,286
Freshwater Forested Wetland	Hydric Hammock	2,945	4,550	7,495
Upland Hardwood/Hammock	Upland Hammock	13,878	53,882	66,075
Upland Hardwood/Hammock	Upland Hardwoods	53	1,632	1,685
High Pine and Scrub	Sandhill	625	12	637
High Pine and Scrub	Scrub	3,028	12,859	15,887
Pine Flatwoods	Hydric Flatwoods	43,569	32,765	76,334
Pine Flatwoods	Mesic Flatwoods	134,401	168,710	321,111
Pine Flatwoods	Scrubby Flatwoods	5,773	9,792	15,565
Wet Prairie and Freshwater Marsh	Freshwater Marsh	48,080	200,021	248,101
Wet Prairie and Freshwater Marsh	Wet Prairie	19,262	52,296	71,559

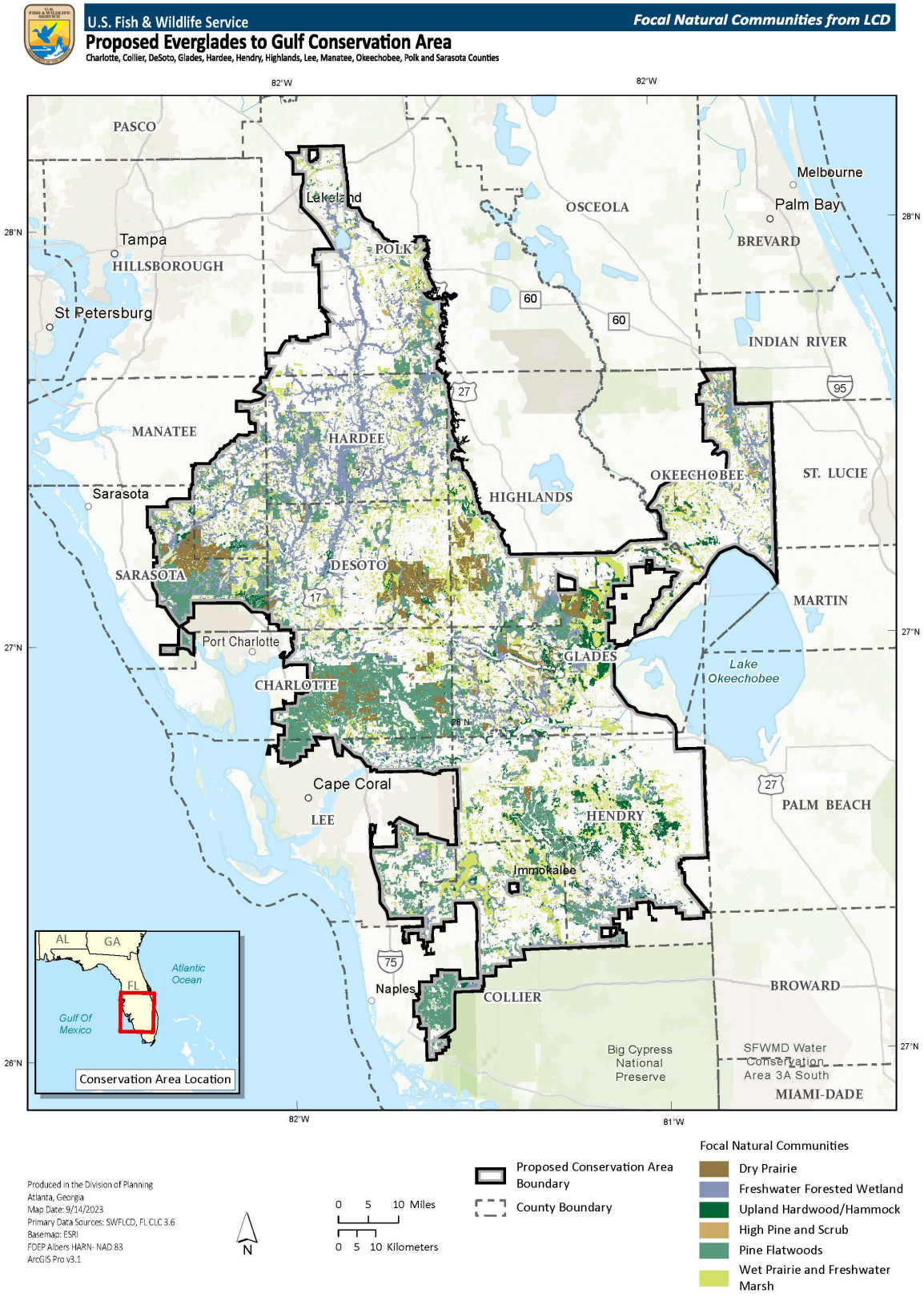


Figure 3. Focal Natural Communities.

Wildlife

The variety of habitats found in the proposed Conservation Areas supporting a range of wildlife, including various amphibians and reptiles that tend to stay in localized areas to wide-ranging species such as Florida black bear. (Chapter II in the Draft EA contains more detailed information about the wildlife of this area.) Numerous bird species, both resident and migratory, utilize project area habitats for foraging, loafing, and breeding. Common mammal species include white-tailed deer, black bear, raccoon, opossum, various rodents, and bats. The proposed Conservation Area hosts 18 Birds of Conservation Concern and its waters provide habitat for at least 70 fish species, most of which are found across peninsular Florida. Additionally, more than 500 amphibian, reptile, bird, and mammal species have been identified within the proposed Conservation Area.

Threatened and Endangered Species

As is further detailed in the Affected Environment chapter of the Draft EA, the proposed Conservation Area would provide habitat for many federal and State listed species. In addition, the Draft EA discusses habitat needs of several listed species and factors contributing to population declines. Listed species include most major taxonomic groups. There are over 100 Federally or State listed or candidate plant and animal species in the proposed Conservation Area. A more comprehensive list of federal, federal at-risk, State, and conservation birds of concern species found throughout the 12 counties encompassing the proposed Conservation Area can be found in the Draft EA (Appendix A).

THREATS TO THE RESOURCES

A variety of factors have been implicated in the decline of habitats and wildlife species in the proposed Conservation Area. In additional to habitat loss, the alternation of the area's hydrology and decline in water quality are of concern. Most of the threats summarized below are likely to adversely affect habitats with negative consequences to a range of species.

Waterflow and Water Quality

The estuaries of Southwest Florida in the Caloosahatchee and Greater Everglades watersheds are impacted by poor water quality due to excess nutrients, as well as the quantity and timing of water delivery from Lake Okeechobee. Increased water storage and treatment in the Greater Everglades ecosystem is needed to achieve the goals of Everglades restoration. Protection and restoration of the Fisheating Creek watershed is essential for restoration of Lake Okeechobee and all downstream ecosystems.

The Peace and Myakka River watersheds are crucial to a healthy Charlotte Harbor Estuary (an estuary of National Significance) and Gulf of Mexico. The watersheds are increasingly impacted by development, intensive agriculture, and phosphate mining, but there are also important opportunities to protect remaining natural uplands, wetlands, and ranchlands that all contribute to water resource protection. Protection of lands within the Peace River watershed would help protect critical water resources and its significance to water resources becomes even more important given future mining impacts to the river and Charlotte Harbor.

Climate change

Greenhouse gas emissions caused by human activities have caused the Earth to warm, with the global surface temperature increasing faster since 1970 than in any other 50-year period over at least the last 2000 years (Intergovernmental Panel on Climate Change [IPCC] 2023). From 2011–2020, the global temperature was 1.1°C higher than from 1850–1900. Larger increases have occurred over land (1.59°C) than over the ocean (0.88°C) (IPCC 2023). The primary sources of greenhouse gas emissions include unsustainable energy use, land use and land-use change, and consumption-based lifestyles (IPCC 2023).

Increasing temperatures have contributed to glacial melting and the thermal expansion of ocean water, resulting in sea level rise. Historically, the average rate of global sea level rise was 1.3 mm per year between 1901 and 1971, increasing to 1.9 mm per year between 1971 and 2006, and further increasing to 3.7 mm per year between 2006 and 2018 (IPCC 2023). Human influence is certain to be the main driver of these increases since at least 1971 (IPCC 2023). Florida is extremely vulnerable to the effects of sea-level rise due to a combination of low land elevations, a high-water table, peninsular geography of being surrounded by ocean on three sides, susceptibility to tropical cyclones, and a large and growing human population that is mostly concentrated along the coasts (Noss et al. 2014). Sea-level rise and increased intensity of storm surges in Florida are leading to the erosion and saltwater inundation of beaches and barrier islands, greater property damages, saltwater intrusion into drinking water supplies, and adverse impacts on coastal ecosystems and species (Noss 2011). The National Oceanic and Atmospheric Administration (NOAA) estimates that by 2060, sea level off the coasts of Naples and Fort Myers will rise by 1.4 ft under their intermediate scenario and 1.9 ft under their intermediate-high scenario (NOAA 2023). Scientists are confident sea levels will continue to rise during the coming decades, likely worsening these impacts.

Human-induced climate change has caused substantial damage to Earth's terrestrial and aquatic ecosystems. Mass wildlife mortality events have been recorded worldwide on land and in the ocean, while ecosystems have experienced increasingly irreversible changes. Florida's species are vulnerable to these climate change impacts, out of 1,200 species tracked by the Florida Natural Areas Inventory, housed within the Florida Resources and Environmental Analysis Center at Florida State University, 25% are likely to lose at least half of their current habitat due to sea level rise alone (Stys et al. 2017). Florida's wildlife populations and ecosystems are likely to experience many challenges related to climate change, including but not limited to the inability of species to migrate inland due to human modification of the landscape Noss et al. (2014); negative impacts from phenological changes, such as mistimed migrations (Robinson et al. 2009); changes in the population dynamics of species with temperature-dependent sex determination (Laloë et al. 2016); disruption of synchronized co-evolutionary relationships, like that between plants and their pollinators; enhanced fitness and range shifts of invasive species (Rahel et al. 2008, Bellard et al. 2013); vegetation root zone saltwater intrusion (Miller et al. 2022); and habitat migration and alteration (Pearlstine et al. 2010, Koch et al. 2015, Nungesser et al. 2015). The negative impacts on Florida's wildlife and habitats associated with climate change are expected to increase as warming continues.

Global warming is also leading to changes in Florida's precipitation patterns (Miller et al. 2022). Annual precipitation has increased by 5% since 1900 in southwest Florida (U.S. Global Change Research Program 2018). Since the 1970's, heavy downpours have increased in frequency and intensity by 27% and are increasing flooding along barrier islands, coastal beaches, and in low-lying areas. Model simulations predict changes in seasonal precipitation for southwest Florida with increases in dry season rainfall up to 20% and decreases in wet season rainfall up to 30% (NOAA 2017). A decrease in wet season rainfall will lead to lower water levels and increased droughts during a time that plants are water-dependent for growing and flowering and wetland bird species are foraging. The change in timing of rainfall will stress ecosystems and cause changes in vegetation types. An increase in dry season rainfall will increase water levels and hydroperiods during the important time of year when many birds are preparing to breed and nest, migratory birds are stopping over to forage, alligators are preparing nesting holes, and plants are becoming more dormant (Miller et al. 2022).

The impacts associated with climate change are not restricted to wildlife and ecosystems. Because humans are intimately intertwined with the environment, climate change also affects humans and human systems. Changes in freshwater availability and the productivity of agriculture, livestock, and fisheries have been observed,

resulting in food and water insecurity (IPCC 2023). Climate change has also caused adverse impacts on human health and well-being related to infectious diseases (Lafferty 2009), heat stress, respiratory illnesses (Barnes et al. 2013), cardiovascular issues (De Blois et al. 2015, Giorgini et al. 2017), malnutrition (Lieber et al. 2022), mental health (Berry et al. 2010, Cianconi et al. 2020), and displacement (Warner et al. 2009). In addition, economic damages from climate change have been detected (Stanton and Ackerman 2007, Hsiang et al. 2017, Auffhammer 2018) in climate-exposed sectors, such as realty, agriculture, forestry, fishery, energy, and tourism (IPCC 2023). Further, urban infrastructure, including transportation, water, sanitation, and energy systems, has been compromised by climate-related events (IPCC 2023). These documented impacts are concentrated amongst economically and socially marginalized urban residents and are driven by changes in multiple physical climate conditions, which are increasingly attributed to human influence (IPCC 2023).

Development

Development Southwest Florida is growing rapidly, experiencing extreme human population growth, fast-paced and largescale habitat loss due to new development, and rapidly expanding coastal development. Coastal development is spreading further inland and threatening important habitats, watersheds, and a sustainable rural landscape (Volk et al. 2017). Though the growth rate fluctuates, Florida's population increased by approximately 2.7 million people between 2010 and 2020 (U.S. Census Bureau n.d.). Over 25% and 15% of central (Figure 4) and south (Figure 5) Florida's land was developed as of 2010 (Carr and Zwick 2016). By 2070, the percentage of developed land within central and south Florida is expected to increase to 48.2% (Figure 4) and 30.4% (Figure 5), respectively (Carr and Zwick 2016). Further, the population of the 12 counties within the proposed boundary is expected to grow by over 1.1 million people by 2050 (Rayer and Wang 2022), contributing to the projected urbanization of 280,400 acres or 7% of the proposed Conservation Area (Southeast Conservation Adaptation Strategy 2022). This population growth, coupled with tourism, has exacerbated the conversion of natural and semi-natural lands to urban land uses and expanded the loss of biodiversity and ecosystem services (Volk et al. 2017).

In addition to development, the agricultural industry has also transformed Florida's natural landscapes. As of 2010, 40.3% of central Florida and 29.9% of south Florida is used for agricultural purposes, including croplands and livestock (Carr and Zwick 2016). Ranching is currently a predominant use in south-central and southwest Florida, though these ranches also have significant value for prairie, wetland, and wide-ranging wildlife species and have an important role in water storage and conservation. These ranches are threatened by conversion to development, though in some cases also from agricultural intensification. Currently, the State is on track to decrease the percentage of land used for agriculture from 40.3% to 28.9% in central Florida (Figure 4) and 29.9% to 21.5% in south Florida (Figure 5) by 2070, with some of the agricultural acreage being lost to development (Carr and Zwick 2016).

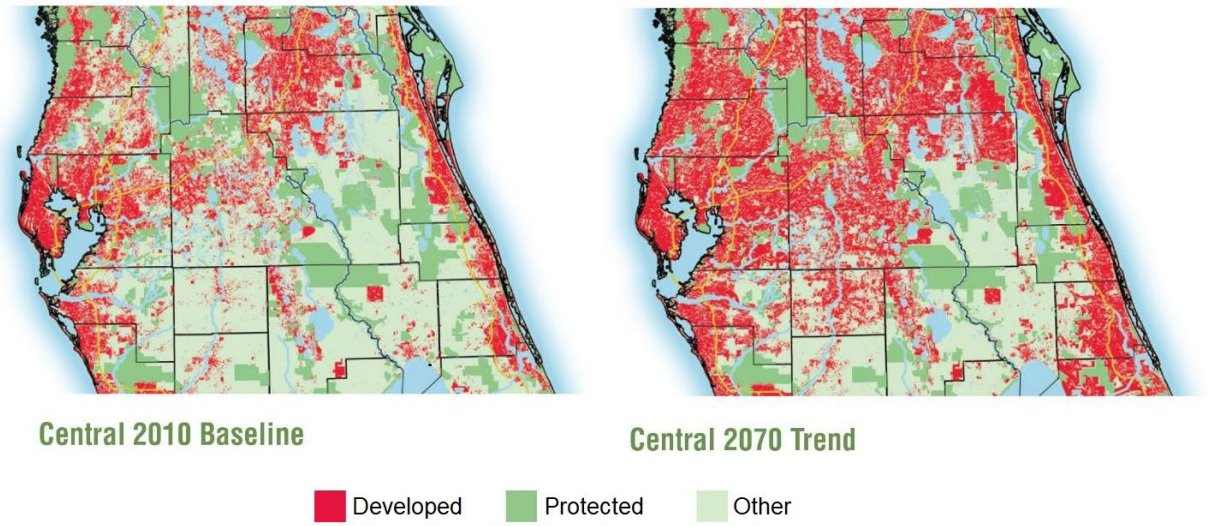


Figure 4.Projected 2070 development trends in central Florida. Image source: Carr and Zwick (2016).

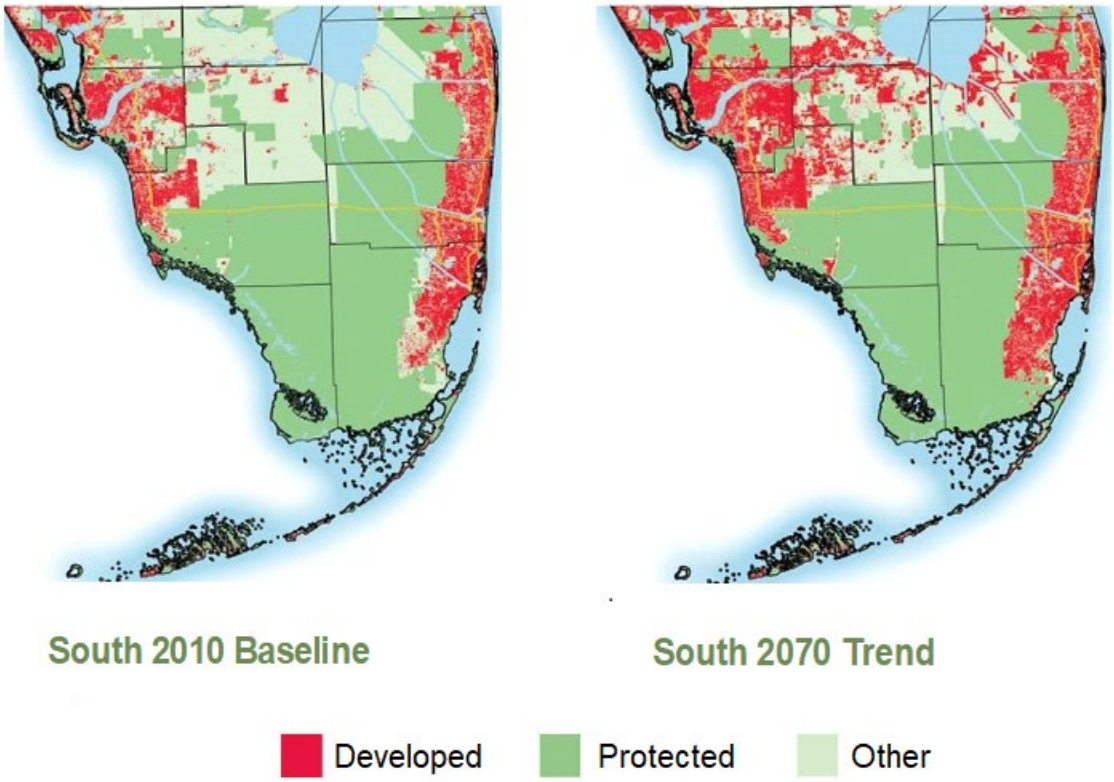


Figure 5. Projected 2070 development trends in south Florida. Image source: Carr and Zwick (2016)*.

*Americans with Disabilities Act (ADA) Compliance Disclaimer: The U.S. Fish and Wildlife Service is committed to ensuring its electronic documents are accessible to all users. There may be some third-party images and maps within this document that are not ADA compliant at this time. Please contact southeast_fws_planning@fws.gov for further assistance.

Invasive Exotic Species
The threats discussed above all contribute to the proliferation of invasive exotic species in south Florida. The climate is conducive to the establishment and expansion of many species from around the globe. Often these species outcompete endemic species that become stressed due to changes in water flow and availability, climate change, and slower rates of development that allow invasive species to become dominant. In addition, invasive, exotic species change habitat for native wildlife species. The habitat changes may result in loss of food resources and loss of cover that adds another source of stress on these species.

Treatment of invasive, exotic species is costly and time-consuming. Typical treatment methods include prescribed fire, chemical treatment, and manual removal. The ability to use these treatments on a large scale is important to have a significant impact on the presence of these species. Development and dense populations make some treatments more difficult to implement.

RELATIONSHIP OF PROJECT TO LANDSCAPE CONSERVATION GOALS AND OBJECTIVES

The proposed Conservation Area would contribute to many landscape conservation goals and objectives, as well as partner efforts, including international, national, and regional conservation plans and initiatives. These include but are not limited to plans and initiatives listed below.

International:

North American Bird Conservation Initiative (NABCI 2022)
The North American Bird Conservation Initiative and its partners work to advance national and international priorities in bird conservation. Most of the work is accomplished through its subcommittees, which focus on crucial bird conservation needs. The United States North American Bird Conservation Initiative Committee recognizes seven formal subcommittees: Communications, Human Dimensions, International, Monitoring, Legislative and Policy, Private and Working Lands, and State of the Birds. The State of the Birds report uses the latest bird monitoring and scientific data to assess the status and health of all U.S. bird species and promote birds as indicators of overall environmental health and human well-being.

North American Waterfowl Management Plan (NAWMP 2018)
The goals of NAWMP revision are: 1) Abundant and resilient waterfowl populations to support hunting and other uses without imperiling habitat; 2) Wetlands and related habitats sufficient to sustain waterfowl populations at desired levels, while providing places to recreate and ecological services that benefit society; and 3) Growing numbers of waterfowl hunters, other conservationists and citizens who enjoy and actively support waterfowl and wetlands conservation. The 2018 Plan update added eight recommendations:

1. Focus conservation actions on waterfowl habitat and population management objectives and incorporate social science into planning and program delivery.
2. Help people understand the opportunities for conservation and outdoor recreation resulting from NAWMP and how society benefits from waterfowl habitat.
3. Compel people to take action to conserve waterfowl habitat.
4. Identify key geographic areas where the best opportunities exist to meet the needs of waterfowl and people.
5. Establish a process to review and update Plan objectives every 10 years and provide guidance on implementation.

6. Share knowledge from all work to integrate and balance the needs of habitat, waterfowl, and people.
7. Bolster training programs for future waterfowl management professionals.
8. Replace the Interim Integration Committee (IIC) with a new system of liaisons between the Plan Committee and the working groups and appoint ex-officio members from the working groups to the Plan Committee.

The proposed Conservation Area directly supports the goals and recommendations of the NAWMP through wetland conservation, outdoor recreation, and strategic land conservation.

North American Waterbird Conservation Plan (Kushlan et al. 2002)
Waterbird Conservation for the Americas, a partnership of organizations and individuals, developed the North American Waterbird Conservation Plan in 2002 to conserve and manage 210 species of seabirds, waterbirds, marshbirds, and wading birds in North America, Central America and the Caribbean. Colonial nesters represent 80% of the species covered by the Plan of those species, one-third are considered to be at serious risk of population declines. Contaminants, destruction of inland and coastal wetlands, hydrologic change, and habitat loss are some of the primary threats to waterbirds identified in the Plan. Conservation of waterbirds through landscape-level protection is directly supported by the proposed Conservation Area.

Partners in Flight North American Landbird Bird Conservation Plan (Rosenberg et al. 2016)
The mission of Partners in Flight is: "Keeping common birds common and helping species at risk through voluntary partnerships." Partners in Flight is a network of more than 150 organizations engaged in land management, monitoring, education, outreach, policy, science, and research with a goal of stopping or reversing population declines before species need to be listed as threatened or endangered. Partners in Flight strategic goals include:

- Maintain healthy bird populations, in natural numbers, in healthy habitats and ecosystems.
- Keep species from becoming threatened or endangered through proactive measures and science-based planning.
- Promote full life-cycle conservation of migratory birds throughout the Western Hemisphere.
- Promote the value of birds as indicators of environmental health and human quality of life.

Recommendations in the Partners in Flight North American Landbird Conservation Plan include providing funding for existing and new protected areas, create corridors of high-quality habitat, protect vital surface water sources, and reduce habitat loss and degradation. The proposed Conservation Area supports these and many other recommendations and goals of the Partners in Flight North American Landbird Conservation Plan.

National:

Natural Resources Conservation Service
The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps Tribal Nations, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect, and enhance enrolled wetlands. NRCS easement programs are very popular in Florida and well-funded. The Wetland Reserve Easement (WRE) Program under the NRCS ACEP is an easement program that purchases conservation easements on degraded or former wetlands in need of restoration. NRCS prioritizes wetlands that have been converted into other agricultural uses. NRCS

prioritizes applications based on the easement's potential for protecting and enhancing habitat for migratory birds and other wildlife. WRE's are more restrictive than other easements. NRCS has the right to restrict grazing rights for restoration purposes. NRCS has not done this and have indicated it is highly unlikely they ever will, as cattle are an important management tool in Florida. A reduced rate grazing option is also potentially available. WRE's tend to have a higher dollar value than other easements, due to their restrictive nature. The Agricultural Land Easement (ALE) Program is a partnership program and is geared for working landscapes. NRCS provides financial assistance to eligible partners for purchasing ALE's that protect the agricultural use and conservation values of eligible land. Eligible partners include Tribal Nations, state and local governments and non-governmental organizations that have farmland or grassland protection programs. The ALE program will provide up to 50% match for working agricultural lands and 75% where there are grasslands of special significance. NRCS does not purchase these easements, rather they contribute to the partner that is acquiring the easement. The State of Florida's Rural and Family Lands Protection Program (RFLPP) has been successfully partnering with the NRCS ALE program for several years, as have some local governments and land trusts.

U.S. Shorebird Conservation Plan (Brown et al. 2001)

In 2000, partners from state and federal agencies and non-governmental organizations across the country pooled their resources and expertise to develop a conservation strategy for migratory shorebirds. The U.S. Shorebird Conservation Partnership (USSCP) provides a scientific framework to determine species, sites, and habitats that most urgently need conservation action. The main goals of the plan are to ensure that adequate quantity and quality of shorebird habitat is maintained at the local level and to maintain or restore shorebird populations at the continental and hemispheric levels.

Shorebird related activities are coordinated through the Migratory Bird Program, which support the USSCP coordinator. In addition to administering and facilitating USSCP activities, the national coordinator assists the U.S. Fish & Wildlife Service regions with the development and implementation of shorebird monitoring efforts, works with the National Wildlife Refuge System on habitat protection and inventory and monitoring, coordinates with the Service's international programs on shorebird conservation, and collaborates with Endangered Species program on listed and candidate shorebird species.

Partners for Fish and Wildlife

The Partners for Fish and Wildlife Program of the U.S. Fish and Wildlife Service consults with landowners to help them conserve and improve wildlife habitat. Landowner conservation is important because nearly 70 percent of land in the United States is privately owned. Public and private landowners are critical partners in ensuring the health and sustainability of America's fish, wildlife and plant species.

Projects are voluntary and customized to meet landowners' needs. Participating landowners continue to own and manage their land while they improve conditions for wildlife. Many Partners for Fish and Wildlife projects take place on working landscapes such as forests, farms and ranches. Partners for Fish and Wildlife focus efforts on areas of conservation concern, such upland forests, wetlands, native prairies, marshes, rivers and streams. Partners for Fish and Wildlife design projects to benefit federal trust species including migratory birds, endangered, threatened and at-risk species.

Forest Stewardship Program

The Forest Stewardship Program (FSP) of the U.S. Forest Service works in partnership with state forestry agencies, cooperative extension, and conservation districts to connect private landowners with the information and tools they need to manage their forests and woodlands. Actively managed forests provide timber, fuel wood,

wildlife habitat, watershed protection, recreational opportunities, and many other benefits. They also benefit adjacent National Forest System lands by creating healthier, more resilient landscapes overall.

The Forest Stewardship Program provides resources for landowners and practitioners to promote healthy, productive forests and woodlands. The proposed Conservation Area complements the goals of the Forest Stewardship Program through conservation of the watersheds, working lands, forests, woodlands, and wildlife habitat in central and southwest Florida.

America's Great Outdoors Initiative (Presidential Memorandum 2010)
The America's Great Outdoors Initiative was enacted in 2010 to promote and support innovative community-level efforts to conserve outdoor spaces and reconnect Americans to the outdoors. The memorandum called on the Secretary of the Interior, the Secretary of Agriculture, the Administrator of the Environmental Protection Agency, and the Chair of the Council on Environmental Quality to lead the initiative in coordination with the Department of Defense, Commerce, Housing and Urban Development, Health and Human Services, Labor, Transportation, Education, and the Office of Management and Budget to develop a 21st-century conservation agenda that builds on successes in communities across the country, and starts a national dialogue about enjoying America's great outdoors.

Resilient Lands and Waters Initiative (2016)
This initiative identifies landscape conservation priorities to build resilience. In collaboration with states, Tribes, and other partners, federal agencies designated seven Resilient Lands and Waters Partnerships nationwide during the spring and summer of 2015. One such partnership was Southwest Florida, which aims to determine where to focus various voluntary and non-regulatory conservation incentives. The strong partnerships would provide the needed interagency coordination and landowner and stakeholder involvement to apply incentives to meet the conservation targets for this region and provide resilience against future threats.

The Great American Outdoors Act (Presidential Memorandum 2020)
This landmark conservation law, enacted in 2020, authorizes the use of up to $1.9 billion a year in energy development revenues for five years for needed maintenance to critical facilities and infrastructure in our wildlife refuges, national parks, forests, recreation areas and American Indian schools. The law also authorizes the use of $900 million in royalties from offshore oil and natural gas drilling sites to permanently fund the Land and Water Conservation Fund to invest in conservation and recreation opportunities across the country. The U.S. Fish and Wildlife Service infrastructure portfolio drives local economic activity and supports every recreation and conservation activity that occurs on Service lands. Infrastructure is always degrading: As one structural problem is fixed, others develop. Service structures are particularly vulnerable to deterioration because of remote field locations and the increasingly destructive effects of climate change.

America the Beautiful Initiative-Executive Order 140008-Tackling the Climate Crisis at Home and Abroad (Conserving and Restoring America the Beautiful 2021)
The Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, through the Administrator of the National Oceanic and Atmospheric Administration, and the Chair of the Council on Environmental Quality shall, as appropriate, solicit input from state, local, Tribal Nations, and territorial officials, agricultural and forest landowners, fishermen, and other key stakeholders in identifying strategies that would encourage broad participation in the goal of conserving 30% of our lands and waters by 2030. America the Beautiful is a decade-long challenge to pursue a locally led and voluntary, nationwide effort to conserve, connect, and restore the lands, waters, and wildlife upon which we all depend. The key principles that are guiding the conservation efforts include:

- Pursuing a collaborative and inclusive approach to conservation;
- Conserving America's lands and waters for the benefit of all people;
- Supporting locally led and locally designed conservation efforts;
- Honoring Tribal sovereignty and supporting the priorities of Tribal Nations;
- Pursuing conservation and restoration approaches that create jobs and support healthy communities;
- Honoring private property rights and supporting the voluntary stewardship efforts of private landowners;
- Using science as a guide; and
- Building on existing tools and strategies with an emphasis on flexibility and adaptive approaches.

The proposed Conservation Area planning process engaged in manner of the key principles identified in the America the Beautiful initiative. If established, the proposed Conservation Area would contribute to conserving 30% of lands and waters for the benefit of all people by 2030.

Strategic Plan for Responding to Accelerating Climate Change (USFWS 2010)
This plan's purposes are to (1) explain our strategies for achieving the mission of the U.S. Fish and Wildlife Service, "to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people," in the face of accelerating climate change and (2) provide direction for our agency and its employees, defining our role within the context of the Department of the Interior and the larger conservation community. In this plan, the U.S. Fish and Wildlife Service expresses its commitment to the agency's mission and the strategic goals and objectives that must be accomplished to sustain fish and wildlife nationally and internationally. The proposed Conservation Area supports this initiative by providing wildlife corridors essential for species viability and adaptation opportunities in response to climate change.

Regional:

Southeast Conservation Adaptation Strategy (2022)
The Southeast Conservation Adaptation Strategy is a shared, long-term vision for lands and waters that sustain fish and wildlife populations and improve human quality of life across the southeastern United States and the Caribbean. It provides a regional focus for investments across organizations, disciplines, and partnerships on shared and proactive goals. The Southeast Conservation Adaptation Strategy aims to identify and support the steps necessary to regionally plan, implement, and evaluate actions that sustain habitat, mitigate threats, and adapt to desired conditions. As a result, it unifies the delivery of conservation activities and supports innovation that can be applied across the region.

Southeast Conservation Blueprint (2022)
The Blueprint is a living, spatial plan identifying priority areas for a connected network of lands and waters across the Southeast and Caribbean. The Blueprint identifies priority areas based on natural and cultural resource indicators representing terrestrial, freshwater, and marine ecosystems. Across most of the region, a connectivity analysis identifies corridors that link coastal and inland areas and span climate gradients. Because the Blueprint is a living plan, it evolves, driven by improvements to the underlying science, our growing understanding of on-the-ground conditions, and input from new partners.

The Nature Conservancy's Resilient Lands Analysis (Anderson et al. 2016)
The Nature Conservancy's Resilient Sites for Terrestrial Conservation project identifies the areas estimated to be the most climate resilient for each of 62 characteristic environments in Eastern North America. This new version, released in October 2016, builds on and replaces two previously released studies for the Northeast and

Southeast regions. The study developed new methods for mapping species-relevant microclimates and highly connected lands to identify where species are most likely to persist. A committee of 58 scientists from around the region reviewed and guided the project.

The Coastal & Heartland National Estuary Partnership formerly Charlotte Harbor National Estuary Program (CHNEP)

The CHNEP was established on July 6, 1995, following a nomination submitted by the Governor Chiles of Florida to the US Environmental Protection Agency. CHNEP provides cutting edge scientific research and restoration, environmental education and public outreach, as well as support and convene partners and interested parties throughout Estuary watershed to protect and restore water and other exceptional natural resources. CHNEP works with interested parties to prevent as well as to address existing water quality degradation by conducting water quality and sediment monitoring and engaging in numerous projects to address harmful algae blooms and nutrient pollution. CHNEP also collaborates with others on variety of initiatives including: The South Lee County Watershed Initiative, Charlotte Harbor Flatwoods Initiative, and LeHigh Headwaters Initiative which focuses on the restoration of the headwaters of the Caloosahatchee River. Additionally, CHNEP facilitated development of the Habitat Restoration Needs (HRN) Plan which serves as a guide for habitat management, connectivity preservation and conservation, sustainability, restoration, and resiliency throughout the CHNEP area. The Habitat Resiliency to Climate Change Project (HRCC) undertaken by CHNEP takes a closure look at the impacts the watershed may experience due to most recent climate change and sea level rise predictions. The proposed Conservation Area would build upon the existing partnership efforts in improving and protecting water quality and quantity and restoration and protection of natural resources withing the Charlotte Harbor watershed.

Avon Park Air Force Range Joint Land Use Study (Tetra Tech, Inc. et al. 2010)

The Joint Land Use Study (JLUS) is a collaboration with local cities and counties that includes portions of Polk, Osceola, Highlands, and Okeechobee Counties. The JLUS program encourages cooperative land use planning between military installations and the adjacent communities so future community growth and development are compatible with the training and operational missions of the installation. The JLUS is studying the planned land uses in the area that surround the range, and the military training needs of the armed forces, to determine their compatibility. It is designed to protect public health, safety, and welfare, while safeguarding the ability of the military services and homeland security agencies to provide needed training. A common recommendation for all counties and cities from this study includes developing policies to protect critical areas supporting military readiness and/or environmental conservation, including partnering opportunities with the U.S. Air Force, The Nature Conservancy, Florida Forever, Florida Defense Alliance, South Florida Water Management District, Florida Department of Environmental Protection, and federal agencies to purchase conservation lands. As part of this program, potential funding sources should be identified and alternative mechanisms to fee-title purchase explored, such as restrictive use easements, aviation easements, land exchanges, and transfer of development rights.

The United States Department of Defense Readiness and Environmental Protection Integration Program is available source to achieve these efforts. The Avon Park Air Force Range Environmental Protection Integration Program benefits interested parties and industries important to the Florida economy, such as agriculture, recreation, and ecotourism. Protected lands and water resources and wetlands include lands of Everglades and the entire Florida water supply. The proposed Conservation Area would provide the framework to work cooperatively with the Department of Defense to purchase conservation easements for the protection of ecological priorities while maintaining military readiness.

Comprehensive Everglades Restoration Plan (CERP)
The CERP was authorized by Congress in 2000 as a plan to restore, preserve, and protect the south Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection. At a cost of more than $10.5 billion and with a 35 plus year timeline, this is the largest hydrologic restoration project ever undertaken in the United States. The effort is implemented by a federal-state partnership to restore, protect, and preserve the region's water resources by addressing the quantity, quality, timing, and distribution of water. Results of the proposed Conservation Area would improve water quality, quantity, timing, and distribution which would enhance efforts of the CERP.

Southwest Florida Comprehensive Watershed Plan (U.S. Army Corps of Engineers (USACE) and SWFCWP 2015)
The Southwest Florida Comprehensive Watershed Plan, a CERP-related initiative with goals of improving inland and estuarine habitats, natural water regimes, and wildlife populations would be furthered by the proposal. The Southwest Florida Comprehensive Watershed Plan evolved out of the Southwest Florida Feasibility Study (SWFFS), which was initiated in 2001 to identify environmental problems and opportunities in Southwest Florida and develop a comprehensive watershed management plan for the region outside of the CERP geographic area. SWFFS was converted into SWFCWP to better address problems, needs, and opportunities within a regional watershed context and to recommend site-specific project implementation studies. The SWFCWP identifies plans that could be implemented by partners. The proposed Conservation Area can assist in partnerships with others to protect and restore lands and waters of Southwest Florida watersheds. /)

South Florida Ecosystem Restoration Land Acquisition Strategy (South Florida Restoration Task Force 2010)
The proposal would be within the boundaries of the South Florida Ecosystem Restoration Land Acquisition Strategy (LAS) (South Florida Restoration Task Force 2010) developed to describe the land acquisition needed for ecosystem restoration projects that are either federally funded or jointly funded by federal and non-federal agencies, and with its appendices, provide a broad picture of all land acquisition initiatives that contribute to restoration. The LAS addresses land acquisition needed to achieve the three strategic goals for South Florida Ecosystem restoration as adopted by the Task Force, as listed.

- Goal 1: Develop the best possible strategies to protect water quality and quantity in the system.
- Goal 2: Restore, conserve, and protect habitats and species.
- Goal 3: Foster compatibility of the built and natural systems.

The LAS provides an update on how these restoration goals will be accomplished through the use of land acquisition strategies designed to ensure that only those private property rights necessary to accomplish the restoration goals are acquired from willing sellers at fair market value. It also measures and reports the acquisition of identified lands. The LAS presents an overall land acquisition picture for those responsible for South Florida Ecosystem restoration activities and funding. It also provides cooperating agencies with a perspective on how their current and potential land acquisition projects relate and contribute to the vision of the CERP Task Force.

Kissimmee River Restoration Project
In 1992, the U.S. Congress authorized the Water Resources Development Act to implement the Kissimmee River Restoration project, a cost-shared partnership between SFWMD and the USACE. This project was completed in 2020. The Kissimmee River Restoration Project is targeted to restored over 40 square miles of the river/floodplain ecosystem, including 44 miles of meandering river channel and nearly 20,000 acres of wetlands (https://www.saj.usace.army.mil/Missions/Environmental/Ecosystem-Restoration/Kissimmee-River-

Restoration/). The proposed Conservation Area would enhance the efforts completed by this project to protect portions of the Kissimmee River Watershed.

South Florida Multi-Species Recovery Plan (USFWS 1999)
The 1999 South Florida Multi-Species Recovery Plan is one of the first recovery strategies specifically designed to meet the needs of multiple species that do not occupy similar habitats. The Plan contains ecosystem restoration initiative strategies to recover 68 federally listed threatened and endangered species, and to restore and maintain the biodiversity of native plants and animals in South Florida. The proposed Conservation Area plays a role in the recovery many of the species listed in the Multi-species Recovery Plan, including Audubon's Crested Caracara (*Polyborus plancus audubonii*), Florida ziziphus (*Ziziphus celata*), Pygmy fringe-tree (*Chionanthus pygmaeus*), Garrett's mint (*Dicerandra christmanii*), Scrub mint (*Dicerandra frutescens*), Florida perforate cladonia (*Cladonia perforata*), Pigeon wings (*Clitoria fragrans*), Short-leaved rosemary (*Conradina brevifolia*), Highlands scrub hypericum (*Hypericum cumulicola*), Lewton's polygala (*Polygala smallii*), ireweed *(Polygonella basiramia*), Carter's mustard (*Warea carteri*), Florida golden aster (*Chrysopsis floridana*), Snakeroot (*Eryngium cuneifolium*), Florida scrub-jay (*Aphelocoma coerulescens*), Wood stork (*Mycteria americana*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), American Crocodile (*Crocodylus acutus*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Piping plover (*Charadrius melodus*), red-cockaded woodpecker (*Picoides borealis*), sand skink (*Neoseps reynoldsi*), Florida Panther (*Puma concolor coryi*), Eastern indigo snake (*Drymarchon couperi*), and bluetail mole skink (*Eumeces egregious lividus*).

State:

Imperiled Species Management Plan (FWC 2016)
The Imperiled Species Management Plan (ISMP) was approved by FWC in November 2016, with rule changes in effect as of January 2017, including changes in listing status for 23 species. The goal of Florida's ISMP is "With broad public and partner support, conserve or improve the status of threatened species to effectively reduce the risk of extinction." The ISMP represents a significant and successful collaborative effort between FWC staff, partners, and external stakeholders. This innovative, integrated plan is designed to conserve 60 fish and wildlife species over the next 10 years. The proposed Conservation Area contains several of the ISMP species including: Big Cypress fox squirrel (*Sciurus niger avicennia*), Southern fox squirrel (*Sciurus niger niger*), Everglades Mink (*Neovison vison evergladensis*), Florida mouse (*Podomys floridanus*), Homosassa shrew (*Sorex longirostris*), Sherman's short-tailed shrew (*Blarina carolinensis shermani*), American Oystercatcher (*Haematopus palliates*), Black Skimmer (*Rynchops niger*), Brown Pelican (*Pelecanus occidentalis*), Florida burrowing owl (*Athene cunicularia*), Florida sandhill crane (*Grus canadensis*), Least Tern (*Sternula antillarum*), Limpkin (*Aramus guarauna*), Little blue heron (*Egretta caerulea*), Reddish egret (*Egretta rufescens*), Roseate spoonbill (*Platalea ajaja*), Snowy egret (*Egretta thula*), Snowy plover (*Charadrius nivosus*), American kestrel (*Falco sparverius paulus*), Tricolored heron (*Egretta tricolor*), White ibis (*Eudocimus albus*), Florida pine snake (*Pituophis melanoleucus mugitus*), Short-tailed snake (*Lampropeltis extenuate*), Gopher frog (*Lithobates capito*) and Florida tree snail (*Liguus fasciatus*). Conservation efforts made within the proposed Conservation Area would benefit efforts to protect species and habitats identified by ISMP.

State Wildlife Action Plan (FWC 2019)
Florida's State Wildlife Action Plan (SWAP), completed in 2019, is a comprehensive, statewide plan for conserving Florida's wildlife and natural areas for future generations. SWAP highlights Florida's native wildlife and habitats in need, explains the reasons for their conservation need, and outlines specific conservation actions to protect them. SWAP identifies 974 animals and the actions needed to conserve them. It sets goals and measurable objectives for implementing the SWAP. SWAP categorizes the State into freshwater, saltwater, and

land systems consisting of forty-five habitat categories. SWAP's goals direct the use of FWC resources, including State Wildlife Grants, and provide opportunities for partners to coordinate on conservation priorities. The implementation goals and objectives, achieved through five State Wildlife Grant funding cycles, includes: research and monitoring; marine and estuarine enhancement; terrestrial habitat integrity; and aquatic habitat resiliency. The SWAP takes an ecosystem-based approach to benefit more species and habitats including Species of Greatest Conservation Need which are State and Federally listed species and declining common species. The SWAP integrates climate-change through the plan and represents the impacts of climate change on all conservation efforts. SWAP also develops a framework for conserving species that live or use urban areas or working lands. FWC's on the ground implementation of SWAP occurs through the development of partnerships with scientists, businesses, landowners and volunteers that possess the necessary expertise to address implementation goals and objectives. The ultimate goal is for Florida's broader conservation community to share ownership of the SWAP, by implementing SWAP conservation actions and pooling financial resources to leverage cooperative conservation efforts. The proposed Conservation Area would complement SWAP by leveraging opportunities through partnerships, protecting natural resources and habitats, and enhance efforts on working lands and conserving the species that live or use these lands.

Critical Lands and Waters Identification Project (Oetting et al. 2016)

The Critical Lands and Waters Identification Project (CLIP) is the Florida Century Commission's flagship project led by Thomas Hoctor, Ph.D., of the GeoPlan Center at the University of Florida and Jonathan Oetting of Florida Natural Areas Inventory (FNAI) at Florida State University. CLIP uses science and the best available statewide spatial data to depict Florida's critical environmental resources in a database that can be used as a decision-support tool for collaborative statewide and regional conservation and land use planning to envision and ensure the sustainability of Florida's green infrastructure and vital ecosystem services (Century Commission for a Sustainable Florida 2010). The use of CLIP data was instrumental in the initial development of this proposal. CLIP science recommendations would be vetted with rural landowners, State agencies, regional planning councils, and other stakeholders through the Cooperative Conservation Blueprint Initiative, led by FWC in partnership with the Century Commission and the Cooperative Conservation Blueprint steering committee. The goal is to develop a strategic plan for land and water conservation in Florida, using a new and broader range of conservation incentives with a shared view of the priorities.

Florida's Cooperative Conservation Blueprint (FWC 2006)

The Cooperative Conservation Blueprint (Blueprint) is a multi-partner strategic conservation process initiated in 2006 by the FWC as part of implementing Florida's State Wildlife Action Plan. The process has brought together landowners, businesses, governmental and conservation organizations to collectively build broad agreement on both voluntary and non-regulatory conservation incentives along with a comprehensive vision of wildlife habitat and connectivity priorities to which existing and new incentive ideas can be applied. The goal is to conserve wildlife and maintain a sustainable economy and a wide range of agriculture and nature-based opportunities, as well as provide clean air and water for the benefit of all Floridians.

The Blueprint builds on the Critical Land and Waters Identification Project (CLIP). The CLIP is a fully integrated set of GIS data layers of priority statewide conservation areas, working landscapes and development areas. The CLIP uses science and the best statewide spatial data to identify Florida's critical environmental resources in a database that can be used as a decision-support tool for collaborative statewide and regional conservation and land-use planning. The Cooperative Conservation Blueprint is about creating a bold vision for our State's future, 25-50 years from today. It is a collaborative effort that integrates environmental, social, and economic considerations to enhance the quality of life for future generations of Floridians.

The Blueprint Regional Pilot was instituted in 2010 to 2014 to focus application of incentives-based conservation landscape planning in south central and southwest Florida. The homogeneity of the landscape, high level of on-going conservation activities in the region and large tracts of open and working lands made this geographic area particularly useful for on the ground application of the Blueprint process. The Pilot was organized into two main initiatives that included a southwest Florida area corridor mapping effort and a northern Everglades focus on incentive development. Priority conservation areas throughout the region were identified using extensive ecological research and stakeholder involvement. The second initiative involved identification of existing incentives and investigation into new incentives and alternative funding strategies with the potential to protect priority lands. The proposed Conservation Area would build on the ecological priorities and interested party involvement identified by FWC.

Florida Wildlife Corridor

In 2021, Governor Ron DeSantis and the Florida Legislature created the Florida Wildlife Corridor Act which directed the Florida Department of Environmental Protection to encourage and promote investments in areas that protect and enhance the Florida Wildlife Corridor. The Act specifically stated that the Florida Wildlife Corridor is an existing physical, geographically defined area comprised of over 18 million acres, of which 10 million acres are protected conservation lands. Additionally, in 2021, the Florida legislature dedicated $300 million to support the effort in addition to the $100 million allocated to Florida Forever Program. The funding is to be used for the acquisition of Florida Wildlife Corridor lands in fee simple or conservation easements.

The Florida Wildlife Corridor refers to the conserved lands and opportunity areas defined as Priority 1, 2 and 3 of the Florida Ecological Greenways Network (FEGN). The FEGN is a statewide database that identifies and prioritizes a functionally connected statewide ecological network of public and private conservation lands. It is the primary data layer used to inform the Florida Forever, Rural and Family Lands Protection Program and other state, federal, and regional land acquisition programs regarding the most important ecological corridors and intact landscapes across the State for protection of Florida's native wildlife, ecosystem services, and ecological resiliency. The Florida Ecological Greenways Network Florida Forever Projects identify "opportunity areas," which are lands and waters within the wildlife corridor that are not conserved lands, and green spaces within the corridor which lack conservation status and/or are contiguous or between conserved lands.

There are 1.46 million acres within the Florida Wildlife Corridor opportunity area that are a high priority for conservation through the State's Florida Forever program. Utilizing the most current scientific analysis of Florida's natural resources, DEP's Division of State Lands triages properties in the same manner as Florida Forever potential acquisitions. Priority is given to lands that preserve, protect, or enhance wildlife habitats and corridors and linkages to agricultural and rural lands. The Florida Wildlife Corridor is envisioned as an added layer to enhance the Florida Forever program. Its purpose is to build upon the network of public and private lands for safe passage and dispersal routes to maintain healthy populations of plants and animals.

The establishment of the proposed Conservation Area can enhance the effort of the State of Florida and provide the opportunity to leverage funds. The priority ecological areas of the Florida Wildlife Corridor greatly overlap with the identified priorities of the proposed Conservation Area which can assist in creating a contiguous permanently protected corridor for wildlife.

Rural and Family Lands Protection Program

The Rural and Family Lands Protection Program (RFLPP) was created in 2001 by the passage of the Rural and Family Lands Protection Act. The RFLPP is an agricultural easement program led by the Florida Department of Agriculture and Consumer Services (FDACS). The Program recognizes that working agricultural lands are

essential to Florida's economic future and are increasingly threatened by urban development. The Program is designed to protect important agricultural lands through the acquisition of permanent land conservation easements. The Program is designed to protect valuable agricultural lands, create easement documents that provide for sustainable agricultural practices and reasonable protection of the environment without interfering with agricultural operations in a way that could put the continued economic viability of these operations at risk. The purpose of the program is to protect working landscapes, and easements are not restrictive. The program is very popular among landowners who would like to continue their agricultural operations. Projects are ranked based on the quality of their agricultural operations. To date, nearly 69,000 acres of working lands have successfully been protected through acquired conservation easements. Some of the proposed Conservation Area fee-title and conservation easement lands may also be identified for acquisition by RFLPP. The Service and our State partners in FDACS will work collaboratively to identify parcels for acquisition and we may partner to leverage funding to protect parcels identified with ecological importance. (Sources: LCD and https://www.fdacs.gov)

Florida Forever Program

The Florida Forever Program, created by the Florida Legislature in July 2001, follows in the footsteps of earlier successful land acquisition programs in the State of Florida by continuing to focus land acquisition efforts in several resource categories including natural communities, forest resources, plants, fish and wildlife, freshwater supplies, coastal resources, geologic features, historical resources, and outdoor recreational resources. Lands have been proposed for acquisition in the FFP because of outstanding natural resources, opportunity for natural resources-based recreation, or historic and archaeological resources. Since the inception of the FFP, the State has purchased more than 902,011 acres of land with approximately $3.3 billion.

Some of the proposed Conservation Area fee-title and conservation easement lands are likely also identified for acquisition by Florida Forever. The Service and Florida Forever would work collaboratively to identify parcels for acquisition and assess how we may partner to leverage funding to protect parcels identified with ecological importance. (https://floridadep.gov/floridaforever)

Florida Forest Legacy Program

The Forest Legacy Program (FLP) aims to protect and conserve forests that are threatened by conversion to non-forest uses. The program is led by the Florida Forest Service and the U.S. Forest Service makes the final selections and distributes the funds. The Florida Forest Service places an emphasis on purchasing conservation easements, although past projects to date have been fee simple. Funding for the Forest Legacy Program are annual appropriations from the Land and Water Conservation Fund (LWCF) and more recently the Inflation Reduction Act (IRA). The Florida program focuses on conservation easements to ensure that forests in Florida remain economically viable. The program can partner with other state and county government entities to leverage funding. Established objectives of the Program in Southwest-Central Florida include: maintain healthy flow of clean water vital to local citizens and the Everglades Natural Communities, flora, and fauna; conserve critical fish and wildlife habitat including threatened and endangered species such as Florida Panther, black bear, and whooping crane; and focus on areas where implementation of FLP could contribute to local or regional land use planning efforts, the reduction of urban sprawl, and protection of the forest resources. Important core criteria include: protection of scenic viewsheds; protection of fish and wildlife habitat; protection of threatened and endangered species habitat; protection of contiguous riparian areas, sensitive watersheds, lakefront, or buffering public drinking supply; support local resource-based economy; provide recreational opportunities, and protection of significant cultural resources.

Some of the proposed Conservation Area fee-title and conservation easement lands are likely also identified for acquisition by FLP. The Service and our state partners in FDACS will work collaboratively to identify parcels for acquisition and how we may partner to leverage funding to protect parcels identified with ecological importance to both agencies. (Sources: LCD, https://ccmedia.fdacs.gov and https://www.fs.usda.gov/managing-land/private-land/forest-legacy/program)

Southwest Florida Water Management District

The Southwest Florida Water Management District (SWFWMD) mission is to protect water resources, minimize flood risks, and ensure the public's water needs are met. The SWFWMD is a science-based organization responsible for managing and protecting water resources in west-central Florida. The SWFWMD's job is to ensure there are adequate water supplies to meet the needs of current and future users while protecting and restoring water and related natural resources. The SWFWMD encompasses all or part of 16 counties, from Levy County in the north to Charlotte County in the south. It extends from the Gulf of Mexico east to the highlands of central Florida. The SWFWMD contains 97 local governments spread over approximately 10,000 square miles, with an estimated 5.4 million permanent residents in 2020. This figure does not include seasonal residents and tourists. For planning purposes, the SWFWMD is divided into four regions: Northern, Tampa Bay, Heartland and Southern. The SWFWMD identifies four goals including: ensuring adequate supply of water while protecting and maintaining water resources and related natural systems; protecting and improving water quality to sustain the water resources, environment, economy, and quality of life; preserving, protecting, and restoring natural systems in support of natural hydrologic and ecological functions; and minimizing flood damage to protect people, property, infrastructure, and investment. The Strategic Plan (2023-2027) provides a road map for how the SWFWMD will meet the water resources challenges of west-central Florida by identifying what needs to be accomplished, how the job will be done, and how success will be measured. In addition to identifying the SWFWMD's programs, the Plan targets specific priorities in each of the four planning regions. The Plan is used to prioritize project funding requests and to provide guidance to funding partners. The proposed Conservation Area includes Heartland and Southern regions. Implementation of the proposed Conservation Area would assist with protecting water resources in west-central Florida and protecting natural resources.

South Florida Water Management District

The South Florida Water Management District (SFWMD) mission is to safeguard and restore South Florida's water resources and ecosystems, protect our communities from flooding, and meet the region's water needs while connecting with the public and stakeholders. The SFWMD is a regional governmental agency that manages the water resources in the southern half of the State of Florida, covering 16 counties from Orlando to the Florida Keys and serving a population of 9 million residents. It is the oldest and largest of the State's five water management districts. Created in 1949, the agency is responsible for managing and protecting water resources of South Florida by balancing and improving flood control, water supply, water quality and natural systems. A key initiative is restoration of the Everglades – the largest environmental restoration project in the nation's history. The SFWMD is also working to improve the Kissimmee River and its floodplain, Lake Okeechobee and South Florida's coastal estuaries The strategic plan (2023-2028) provides the SFWMD and the public it serves with the blueprint for successfully meeting the water resource management regional priorities for a five-year period and beyond. It acts to focus the agency's efforts on its core mission functions of flood control, water supply, natural systems/water quality to put these commitments and strategies into action to help make a difference in South Florida's future. The proposed Conservation Area would assist with the Plan's mission to advance ecosystem restoration by protecting and restoring ecological priority lands and waters and improve flood protection and water supply by contributing to water storage and improving water quality within the footprint of the SFWMD.

Northern Everglades and Estuaries Protection Program (NEEPP)
In 2016, the Florida legislature passed the Northern Everglades and Estuaries Protection Program (NEEPP), to protect and restore surface water resources and achieve and maintain compliance with water quality standards in the Northern Everglades through a phased, comprehensive, and innovative protection program that includes a long-term solution based upon the State's total maximum daily loads (TMDLs). NEEP requires watershed protection programs to improve the quality, quantity, timing, and distribution of water in the Northern Everglades ecosystem. The programs are watershed specific and comprised of research and monitoring, development and implementation of best management practices, refinement of existing regulations and structural and non-structural projects. The programs are driven by Basin Management Action Plans and supported by the Watershed Protection Plan developed by the SFWMD, FLDEP, and FDACS programs to control nutrient sources at the local, subregional, and regional levels. NEEPP focuses on the Lake Okeechobee Watershed and Caloosahatchee River Watershed which are contained in the proposed Conservation Area. The proposed Conservation Area would benefit NEEPP by assisting with improving water quality, quantity, timing, and distribution of Caloosahatchee River and portions of the Lake Okeechobee watersheds.

Charlotte Harbor Surface Water Improvement & Management Plan (Garcia et al. 2020)
In 1987 the Florida Legislature created the Surface Water Improvement and Management (SWIM) Act to protect, restore, and maintain Florida's highly threatened surface water bodies. Under this act, the State's five water management districts identified a list of priority water bodies within their authority and implemented Surface Water Improvement and Management Plans to improve and/or protect them. In 1993, the Governing Board of the SWFWMD adopted the first Charlotte Harbor SWIM Plan. The original plan outlined issues and management actions associated with the three focus areas of water quality, hydrology, and natural systems (habitat).

In 2020, the SWFWMD completed its latest update of the Charlotte Harbor SWIM Plan. The SWFWMD will continue to their natural systems protection and restoration focus on coastal, upland and both freshwater and saltwater wetland habitats. These habitats include mangroves, salt marshes, oyster beds, mesic flatwoods, and upland pine communities. Coastal upland and wetland restoration will continue to be important in Charlotte Harbor and Lemon Bay. However, given the large size of the watersheds, the significance of healthy riverine corridors to protecting water quality, and the importance of hydrologic restoration, effort will also focus on the watershed as well as the shoreline and immediately adjacent lands. These efforts will include evaluating differences between various 46 upland forest management techniques, including their ability to enhance rainfall infiltration into the surficial aquifer, increase wet-weather storage, and increase baseflow, which could lead to improved water quality and more natural timing and volumes of inflows to coastal areas. For natural systems restoration, the SWIM Plan recognizes the Natural System restoration and protection goals and targets from the CHNEP's Habitat Restoration Needs Update Project (ESA et al. 2019). Project types, locations and acreages documented in the Habitat Restoration Needs Update will be used within the boundaries of the SWFWMD to guide ecosystem restoration programs and projects.

The proposed Conservation Area will build upon the efforts of the SWIM Plan by protecting water quality, quantity, and storage and assist with improving flows to coastal areas by protecting and restoring natural resources within the watersheds flowing into Charlotte Harbor.

County:

Heartland 2060 Building a Resilient Region Plan (Heartland 2060 2020)
Florida's "Heartland" encompasses seven counties in Central Florida, including Polk, Hardee, Highlands, DeSoto, Okeechobee, Glades, and Hendry. The Central Florida Regional Planning Council began a visioning

effort for this region in 2007 entitled Heartland 2060, and developed a broad resiliency plan, "Building a Resilient Region," for Heartland 2060 in 2014. Four task force teams were established for Heartland 2060 strategic planning: Education, Workforce and Economic Development; Environmental and Natural Resources; Transportation and Land Use; and Community Resources. The current and future status of these sectors were assessed and are described in the resiliency plan. The possible impact of future inland migration from coastal communities in Florida as a result of sea-level rise (SLR) was an issue explored in the Heartland 2060 project. Although the Florida Heartland does not have any coastal counties, the potential exists for these inland counties to experience in-migration and resettlement of displaced coastal populations. The potential future displaced population that might migrate to the Heartland was estimated assuming a three-foot rise in sea level by the year 2060. The Central Florida Regional Planning Council is developing a Strategic Action Plan - a regional blueprint to guide growth and development in the Heartland over the next 50 years. Priorities are to be established for protecting and enhancing conservation areas, natural resources, recreational areas, and open spaces; enhancing regional education and healthcare opportunities; guiding transportation and infrastructure investment and planning future land use; and building healthy communities through economic development. The vision enables growth while preserving natural areas and protecting wildlife and agricultural production, supporting healthy communities, large and small, and ensures a vibrant economic and social opportunities. The Heartland 2060 Five Year Strategic Action Plan is web-based on www.heartland2060.com. Information from partners' contributions is available upon this platform to track alignment with the goals of Heartland 2060. Using the results of the planning effort, the proposed Conservation Area can assist in the identification of priority lands and leverage preservation and protection of conservation areas with interested partners throughout the seven counties.

Highlands County Comprehensive Plan (Central Florida Regional Planning Council 2014)

Highlands County is a major contributor of natural area acquisition and protection in Highlands County, primarily through the vision and implementation of the Highlands County Comprehensive Plan. The Highlands County Comprehensive Plan identifies acquisition of natural resources including scrub and sandhill habitats (xeric habitats); endemic populations of threatened or endangered species, including species of special concern; wetlands and cutthroat seeps, and un-canalized freshwater estuaries feeding the lakes; important aquifer recharge functions; and unique scenic or natural resources through the plan's Natural Resources Element utilizing the Conservation Trust Fund account. Acquisition can be in the form of fee purchase, easements, donations, and other less-than-fee-title mechanisms of natural resources listed above for the enhancement, required maintenance, and/or management of publicly owned conservation-valued lands, as determined by the Highlands County Board of County Commissioners (Board). The Conservation Trust Fund is funded through voluntary contributions, mitigation or impact fees, matching grants, and referendum while other sources of funding as recommended by the Highlands County Natural Resources Advisory Commission (NRAC) are considered by the Board. NRAC was established in 1991 by the Board whose members include 11 full-time residents of Highlands County, including environmental, developmental, agricultural, professional, and at-large representatives, who function as an advisory body to the Board on matters of natural resource protection, environmental clearance, and the stewardship of conservation efforts by, in, and for Highlands County. The proposed Conservation Area can leverage opportunities with these ongoing efforts for natural resource protection.

Conservation Collier

Conservation Collier is Collier County's environmentally sensitive land acquisition and management program. The mission of Conservation Collier is to acquire, preserve, restore, and maintain vital and significant threatened natural lands, forest, upland and wetland communities located in Collier County, for the benefit of present and future generations. Since 2003, the Conservation Collier Program has been acquiring properties of high natural

resource value throughout Collier County from willing sellers. Properties acquired met specific criteria including rare habitat, aquifer recharge, flood control, water quality protection, and listed species habitat. At the program's inception, the Collier County Board of County Commissioners (Board) appointed a Land Acquisition Advisory Committee (Committee) to consider and make recommendations on offered properties. The Committee's recommendations have resulted in Board approval for and acquisition of 4,714 acres in 22 project locations throughout Collier County. The proposed Conservation Area can complement these efforts by leveraging acquisition opportunities to ensure contiguous protection of lands and waters.

Collier County Comprehensive Watershed Improvement Plan (2016)

Collier County encompasses over 2,300 sq miles and is located in southwestern Florida. Approximately 70 percent of Collier County (ca. 1,400 sq miles) has been altered by human modifications of the local hydrology. Prior to human alterations, rainfall either infiltrated into the surficial aquifer or flowed through extensive wetland features into the coastal waters of Collier County. Most of these hydrologic alterations were due to coastal development in Collier County since the early 1950s, as dredge-and-fill became the established method to meet the growing post-World War II demand for waterfront housing. The canals served to create waterfront property, increasing access for boating, and provided fill material needed for the creation of buildable lots. In addition to shoreline modifications, extensive canal construction for urban and agricultural drainage has changed the timing and quantity of freshwater inflows to coastal waters. These changes have dramatically affected water quality and quantity of many of Collier County's estuaries. For example, the construction of the Golden Gate Canal (GGC) network increased the size of the Naples Bay watershed and freshwater flows to Naples Bay, as lands that originally drained southward into the Rookery Bay watershed were redirected. Consequently, the Rookery Bay watershed is now much smaller and, combined with alterations in drainage pathways and changes in wet and dry season storage capacities, receives less freshwater inflow than it did historically. These altered freshwater inflow patterns have been identified as the most important threat to the natural biodiversity of Rookery Bay.

Modifications to drainage patterns have resulted in significant impacts throughout the watersheds in Collier County. Changes in the timing and amount of freshwater inflows into coastal waters, drainage alterations, and urbanization have also lowered groundwater levels, degraded or eliminated wetlands, altered wildlife distribution patterns or reduced populations, and increased the delivery of nutrients and other pollutants to coastal waters. This Plan was developed to address these conditions. The proposed Conservation Area can complement the efforts identified in this Plan that are being made to restore the watersheds of Collier County especially the Naples Bay watershed.

Collier County Rural Lands Stewardship Area

The Collier County Rural Lands Stewardship Area (RLSA) includes important environmental and agricultural assets, most of which are on privately held land. In 2002, the RLSA Overlay was adopted to create a land-use plan to protect agricultural areas, natural habitats, wetlands and flow ways while directing growth away from these areas. The RLSA program was established under the Future Land Use Element (FLUE) of the Growth Management Plan (GMP). Its objective is the creation of an incentive-based land use overlay system based on the principles of rural land stewardship found in Florida Statutes, Section 163.3177(11), including environmental preservation, agricultural preservation and smart growth development.

Through the RLSA program, Stewardship Sending Areas (SSAs) can be approved for preservation purposes, creating credits to entitle Stewardship Receiving Areas (SRAs), typically towns, villages, hamlets and compact rural developments (CRDs). The credit system is designed to incentivize preservation of the most import environmental lands, including large, connected wetland systems and significant habitat for listed species, by

awarding higher credit values for high value preservation areas. The proposed Conservation Area can utilize the information contained in RLSA to identify high value land and through acquisition ensure preservation and protection.

Conservation Charlotte

Since 1988 Charlotte County Parks and Natural Resources has managed environmental parks and preserves. On November 7, 2006, Charlotte County citizens voted to tax themselves for the purchase of environmentally sensitive lands. They approved a referendum authorizing the County to issue up to $77 million in bonds to purchase environmentally sensitive lands. The bonds are paid for by a .20 mil ad valorem tax, equal to about 20 cents on every $1,000 of tax assessed land value. The tax is levied annually for 20 years until 2027. All funds raised by these bonds are used to buy and manage environmental lands and open space. Charlotte County provides over 4,100 acres of preserves and environmental parks that focus on sensitive environmental habitats that are important to the community and are the guiding influence for management limited public use (preserves) and lands with less intensive management and the opportunity for more public use and amenities and multi-use trails (environmental parks). Charlotte County's Conservation Charlotte acknowledges that protecting environmentally sensitive lands balances the impacts of future growth while buffering sensitive areas from encroachment. Environmentally sensitive lands perform free services for people of Charlotte County including: flood control, filtering water resources, recharging aquifers, cleaning air, and providing open spaces and recreational opportunities. Without protecting environmental lands these services cost much more. Preserving special places allows the community to avoid future infrastructure costs and helps to keep Charlotte County unique and beautiful. Preservation efforts help protect Charlotte Harbor from storm surge. The Harbor is a vital component the local economy. The proposed Conservation Area is focusing on restoration and protection of watersheds that feed into the Charlotte Harbor. Acquisition of lands for permanent protection will contribute to the County's efforts of Conservation Charlotte.

Lee County Conservation 20/20 Program

Conservation 20/20 is Lee County's environmentally sensitive land acquisition and management program, through which there are 31,000 acres of conservation land protected in Lee County. The program was established in 1996 through voter referendum and reaffirmed at the ballot box in 2016, receiving 84 percent majority support from Lee County voters. Conservation 20/20 manages 52 preserves spread throughout Lee County. Properties that can be used for wildlife habitat, passive public recreation, open space conservation, surface water management, water quality and water recharge and supply, and flood control. Conservation 20/20 preserves include habitat critical to support the populations of several endangered and threatened animal species, including the Florida scrub-jay, gopher tortoise, Florida panther, West Indian manatee, and eastern indigo snake. Conservation areas are important for many reasons, including water supply and quality, flood prevention, habitat for wildlife, and green space for nature-based recreation and enjoyment. For preserves in Lee County, the focus is to restore and maintain these lands in their natural state, while enhancing hydrologic features and protecting water resources. Additionally, several rare plant species are found at these preserves, including the Florida butterfly orchid, Catesby's lily, and golden leather fern. Conservation 20/20 Preserves provide a variety of recreation opportunities, including hiking, kayaking and canoeing, horseback riding, fishing, and scenic observation areas to view wildlife. The proposed Conservation Area shares similar goals and objectives and efforts to protect water and natural resources will complement the Lee County Program.

Manatee County Environmental Lands Program

The Environmental Lands Program (ELP) is focused on the conservation of Manatee County's environmental heritage to benefit current and future generations. The Environmental Land Management and Acquisition Committee advises the Board of County Commissioners (BCC) on environmental land acquisition, management,

and recreational programming. The BCC decides which properties can be purchased. Only properties whose owners want to have their land considered for purchase are considered. A grassroots effort, led by individuals and organizations throughout the region, resulted in a successful 2020 Referendum to finance the acquisition, improvement, and management of conservation lands. The Conservation and Parks Projects Referendum calls for a 0.15 mill ad valorem tax and up to $50,000,000 in general obligation bonds. Partnerships with many other organizations result in additional funds and resources that support the success of the program. Manatee County has12-publically-accessible preserves and more than 30,000 acres established through a combination of land donations, land purchases, grants from other organizations, and partnerships with Land Trusts. Habitat restoration, ongoing resource management, and providing access for hiking, biking, running, swimming, paddling, horseback riding, fishing, hunting, camping, and picnics are rewarding challenges for Manatee County staff. Many recreational and outdoor education opportunities are provided. Four main criteria were established in the ELMAC Ordinance in 2003 and are fundamental to conservation and preservation programs throughout the Country. Ecological quality relates to the quality of species or habitat, degree of alteration or degradation, level of restoration required. Rarity of species or habitat includes uniqueness, number of threatened, endangered or species of special concern supported. The importance to water resources focuses on the protection of or degradation to portable water supply or aquatic environment. Connectivity includes proximity to existing conservation lands or planned corridor, size of connection. The proposed Conservation Area can help achieve the natural resource value criteria of the ELP including ecological quality, rarity of species or habitat, importance to water resources, and connectivity.

Polk County Environmental Lands Program

Polk County is a major contributor of natural area protection, acquiring more than 12,000 acres of diverse lands in the county through the Polk County Environmental Lands Program (Program). The Program accepts site nominations and then gathers pertinent information for each nomination. The Program acquires, preserves, protects, manages and restores endangered and environmentally sensitive lands, water resources, and important wildlife habitats. Acquired properties are used for passive outdoor recreational purposes provided that such uses will not disturb or degrade the environmental quality for which the site was acquired. The Environmental Lands Criteria are used by the County's Technical Advisory Group and Conservation Land Acquisition Selection Advisory Committee (CLASAC) to rank sites and recommendations for or against acquisition of sites are forwarded to the Board of County Commissioners (BoCC) for consideration and approval. Costs for acquisition are shared with partners whenever possible. Once acquired, interim management begins and may include site security, debris removal, exotic species removal, and creation of visitor service amenities. A final management plan for each site is finalized and adopted by the BoCC based on evaluations of nature-based recreation opportunities and resource inventories to ensure compatibility with the site, and through input received via public review, CLASAC, and Polk County staff. Acquisition, management, and restoration of environmentally sensitive lands, water resources, and important wildlife habitat in Polk County are funded through a 1994 bond referendum utilizing ad valorem taxes (0.2 million) administered over a 20-year life span. The proposed Conservation Area could provide opportunities to create contiguous conservation protection to ensure vitality of sensitive lands.

Sarasota County - Environmentally Sensitive Lands Protection Program and Neighborhood Parklands Acquisition Program

The Environmentally Sensitive Lands Protection Program (ESLPP) was created to protect lands through fee-title and less-than-fee simple acquisition methods with willing sellers. The ESLPP was initially funded by a 0.25 mill ad valorem tax passed by referendum in March 1999. After protecting over 14,500 acres within the first six years, the program was approaching the original $53 million bond limit set by the referendum. To maintain flexible

program funding, the Board of County Commissioners (BCC) authorized a referendum in November 2005. Sarasota County citizens approved a referendum with an 80% majority. Its passage extended and expanded the program to collect up to 0.25 mil of ad valorem through 2029, to include the purchase of Neighborhood Parklands Acquisition Program (NPP) and to authorize new related debt not to exceed $250 million. To date, ESLPP has identified and established 32 diverse and environmentally sensitive areas/regions throughout the county for possible acquisition while protection over 40,000 acres of land through land purchases and conservation easements. ESLPP has purchased and/or protected 78 properties with ESLPP funds. NPP has acquired 24 properties totaling 115 acres throughout the county, including within municipalities. Environmental land protection can be done by purchasing and then owning land or negotiating and purchasing a perpetual conservation easement over land from a private landowner. The conservation easement allows the private landowner to retain ownership of the land but limit the current and future uses of the land. A conservation easement essentially removes all development rights from a property. The remaining allowable uses available to the landowner are low impact agriculture like cow-calf operations, outdoor nature-based recreation such as fishing, hunting, hiking and camping, and minimal structures such as a single-family home and barn. By removing development rights from a property, the Program is ensuring that native habitat remains intact, native wildlife and vegetation can thrive, natural resources and waterways stay protected, and wildlife corridors and greenspace are established and maintained. Any fee-title or less-than-fee-title acquisition efforts within the proposed Conservation Area could complement the connectedness of landscape, water quality, and natural habitat objectives of the ESLPP.

PARTNERSHIP EFFORTS/RELATED RESOURCES

Partnerships are integral to the conservation of this landscape. The southwest Florida region has a long history of agency and stakeholder conservation partnerships. FWC's Cooperative Conservation Blueprint regional pilot project (FWC Blueprint) completed in southwest Florida provided a starting point for a discussion regarding future efforts to effect protection of conservation priorities through voluntary conservation land protection and incentives programs. This effort took place between 2007 and 2014. Significant work on conservation incentives has been accomplished. The FWC Blueprint provides a building block to work from, as more detailed planning efforts are initiated. Additional work by the Peninsular Florida Landscape Conservation Cooperative provided successful models for establishing a framework for agency partnerships, and land protection efforts in the Everglades Headwaters NWR and CA have demonstrated the success of such partnerships. These models will serve as templates as conservation planning and implementation within the proposed Everglades to Gulf Conservation Area. Building solid relationships with landowners is a critical first step. Leveraging existing conservation programs can advance conservation on a landscape-scale. The protection and conservation of wildlife habitats and working landscapes is an issue of concern in the region. During the public scoping and conversations with landowners and other conservation partners for this proposal, the Service recognized that all interested parties would have an enhanced ability to protect and manage wildlife and habitats in the proposed Conservation Area. Partners often assist with activities including environmental education and interpretive programs, land acquisition, public relations, habitat evaluations, species inventories, nest site and wildlife monitoring, and habitat restoration. For that reason, the Service recognizes the need to collaborate with other conservation organizations in the region to achieve objectives of the LLP.

The Service would work to combine conservation efforts with many partners, including partners yet to be identified. Several federal and state agencies serve as key partners in this landscape, including Natural Resource Conservation Service (NRCS); Avon Park Air Force Range, U.S. Air Force; Florida Fish and Wildlife Conservation Commission (FWC); Florida Department of Agriculture and Consumer Services (FDACS); Florida Forest Service (formerly Florida Division of Forestry); Florida Department of Environmental Protection (FDEP); Florida Division of State Lands; South Florida Water Management District (SFWMD); and Southwest Florida

Water Management District (SWFLMD) County governments within the footprint and non-governmental organizations are also extremely active within the proposed Conservation Area.

Figure 6 depicts current conservation lands and waters within the proposed Conservation Area. Many of our partners already own or have future plans to protect lands in the proposed Conservation Area through conservation or agricultural easements. Still others have completed on-the-ground habitat restoration projects throughout the proposed Conservation Area. These partners use their individual mission statements to focus protection and restoration efforts. Taken together, those mission statements cover the protection of state and federal threatened and endangered species, rare habitats, prairie and flatwoods habitats, ranchlands, and recreational areas that have been identified through the scoping process as being important to the long-term ecological health, economy, and way of life of the region.

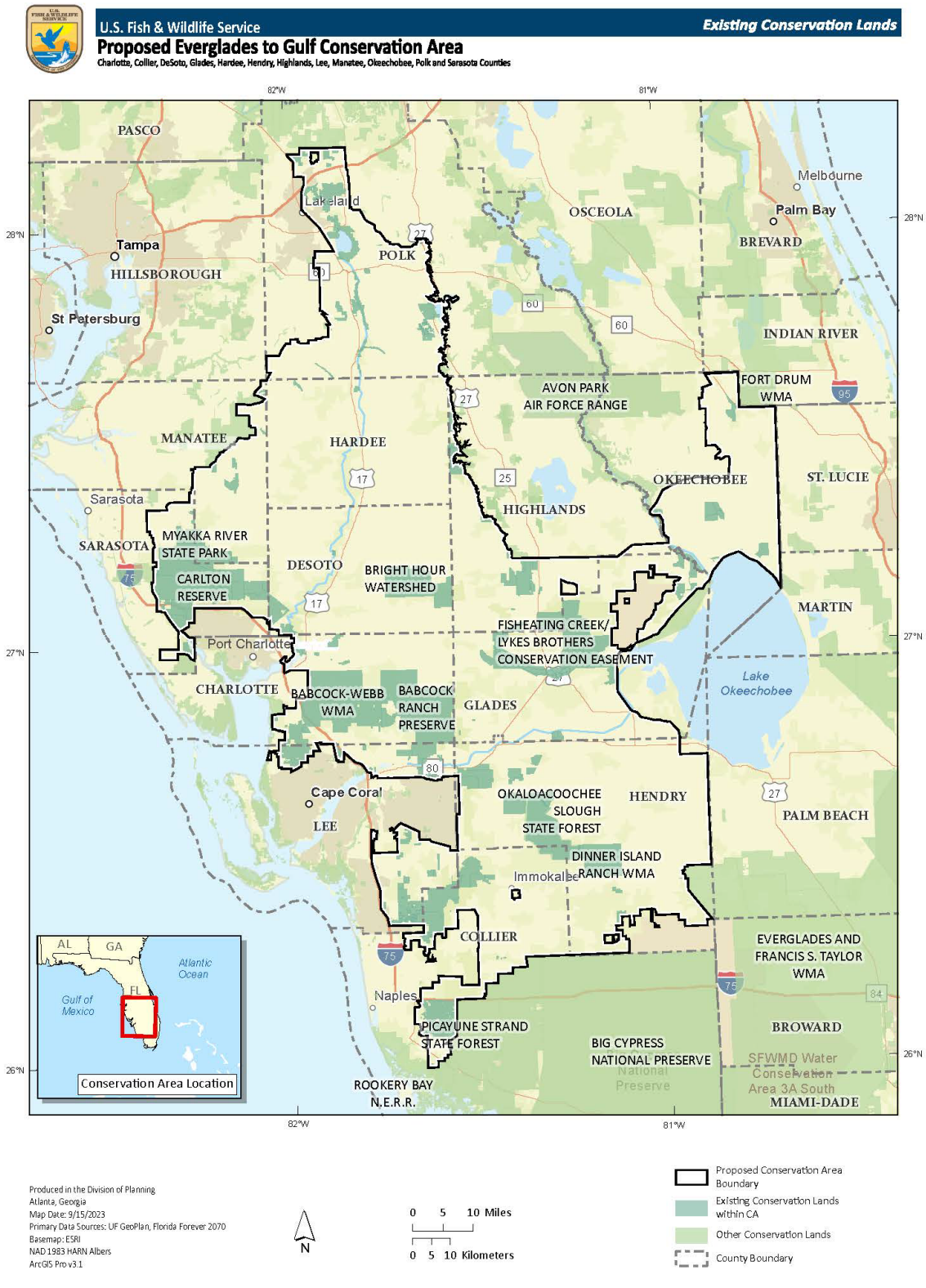


Figure 6. Existing Conservation Lands in the proposed Conservation Area

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 State fish and game agencies during the course of acquiring and managing units of the National Wildlife Refuge System. State wildlife management areas and units of the national wildlife refuge system provide the foundation for the protection of species and contribute to the overall health and sustainment of fish and wildlife species in the State of Florida.

Key State conservation agencies in this landscape include the FWC, FFS, FDACS, FDEP, SFWMD, and SWFWMD.

Management of State fish and wildlife resources is administered by FWC, FDACS, and FDEP for the long-term well-being and benefit of people. FWC protects and manages habitats for more than 575 species of wildlife, more than 200 native species of freshwater fish, and more than 500 native species of saltwater fish; while balancing these species' needs with the needs of over 22 million residents (U.S. Census Bureau 2022) and the 122 million annual visitors (FDOT 2021) who share the land and water with Florida's wildlife.

The FWC responsibilities include:

- Law Enforcement – to protect fish and wildlife, keep waterways safe for millions of boaters, and cooperate with other law enforcement agencies providing homeland security.
- Research – to provide information for the FWC and others to make management decisions based on the best science available involving fish and wildlife populations, habitat issues, and the human-dimension aspects of conservation.
- Management – to manage the State's fish and wildlife resources based on the latest scientific data to conserve some of the most complex and delicate ecosystems in the world along with a wide diversity of species.
- Outreach – to communicate with a variety of audiences to encourage participation and responsible citizenship and stewardship of the State's natural resources.

FWC, FDACS, and FDEP manage State lands and waters. FWC directly manages 6.07 million acres of Wildlife Management Areas. FDEP manages 175 State parks covering nearly 800,000 acres 42 aquatic preserves, three National Estuarine Research Reserves, and the Florida Key National Marine Sanctuary: totaling over 5 million acres of submerged lands and coastal uplands.

FFS manages over 1.2 million acres of State forests in Florida for multiple public uses including timber, recreation, and wildlife habitat. Operating from 15 districts throughout the State, FFS maintains a mission to protect and manage the forest resources of Florida, ensuring that they are available for future generations. Wildfire prevention and suppression are key components in FDOF's efforts. FFS is also the permitting agency responsible for authorizing prescribed burns throughout Florida including federal lands.

The SFWMD and SWFWMD are two of five State water management agencies. The districts are responsible for water management, water supply, and the conservation and protection of water resources, while providing environmental, economic, and recreational benefits in all or part of 29 south and southwest Florida counties. Together, the SFWMD and SWFWMD along with their partners manage more than 1.452 million acres (SFWMD 2023, SWFWMD 2023) for the purposes of protecting, supplying, and conserving the region's water resources.

The State's participation and contribution throughout this land protection process will provide for ongoing opportunities and open dialogue to improve the ecological sustainment of fish and wildlife in the State of Florida.

RELATIONSHIP TO TRIBAL NATIONS

The Service and Tribal Nations recognize the need for strong, healthy communication and relationships so that we can work together to improve and enhance conservation of fish and wildlife resources and shared natural and cultural resource goals and objectives. The Service's engagement with and responsibilities to Tribes are guided primarily by doctrines of reserved rights, statutes, treaties, judicial mandates, Executive Orders, Presidential proclamations, and Secretary's Orders. The United States' trust responsibility is a well-established legal obligation that originates from the unique, historical relationship between the United States and Tribal Nations. The trust responsibility consists of the highest moral obligations that the United States must meet to ensure the protection of Tribal and individual Indian lands, assets, resources, and treaty and similarly recognized rights.

The Federal Government recognizes the valuable contributions of the Indigenous Knowledge (also called Indigenous Traditional Knowledge, Traditional Knowledge, Traditional Ecological Knowledge, and Native Science) that Tribal Nations and Indigenous Peoples have gained and passed down from generation to generation. Indigenous Knowledge combines observations, oral and written knowledge, innovations, practices, and beliefs over long terms and spanning generations, interweaving biological, physical, social, cultural, and spiritual systems. The Federal Government's consideration and inclusion of Indigenous Knowledge is guided by respect for the sovereignty and self-determination of Tribal Nations, the Nation-to-Nation relationship between the United States and Tribal Nations and the United States' trust responsibility, and the need for the consent of and honest engagement with Tribal Nations and Indigenous Peoples. For any effort, the Tribal Nation(s) or Indigenous People(s) involved clearly drive whether or not to share Indigenous Knowledge and whether or not their Indigenous Knowledge should be applied in Federal contexts; the Federal Government respects these decisions. Indigenous Knowledge offers critical insight into the historic and scientific significance of an area, providing an important foundation for understanding, analysis, and decision making. Consultation and collaboration with Tribal Nations and Indigenous Peoples is critical to ensuring that Indigenous Knowledge is considered and applied in a manner that respects Tribal sovereignty and achieves mutually beneficial outcomes. Indigenous Knowledge can play a key role in relation to the Federal Government's planning, analysis, decision making, and compliance under a variety of laws, regulations, and policies, importantly the Endangered Species Act (16 U.S.C. §§1531-1544), National Environmental Policy Act (42 U.S.C. §§4321 et seq. and 40 CFR Chapter V Subchapter A), Marine Mammal Protection Act (16 U.S.C. Chapter 31), Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Chapter 38), National Historic Preservation Act (Title 54 U.S.C.), and Native American Graves Protection and Repatriation Act (25 U.S.C. §§3001-3013).

Tribal Nations are also important partners in the Greater Everglades landscape. The Service also works with the Tribes to ensure timely and effective cooperation and collaboration. During this planning process, the Service contacted several Tribal Nations with interest in this landscape: Seminole Tribe of Florida; Miccosukee Tribe of Indians of Florida; Seminole Nation of Oklahoma; Muscogee (Creek) Nation; and Poarch Band of Creeks. The Service and the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida met and discussed the role of the Service in land protection and opportunities in Southwest Florida and opportunities for the Service and Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida to collaborate on conservation objectives. The Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida contributed as active members of the planning team to develop this proposal.

III. LAND PROTECTION STRATEGY

ACTION AND OBJECTIVES

CONSERVATION AREA DEVELOPMENT

The proposed Conservation Area is approximately 4 million acres in Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Lee, Manatee, Polk, and Sarasota Counties. While defining the proposed Conservation Area certain criteria were considered. Foremost was the ecological priorities based on the work of the University of Florida Center for Landscape Conservation Planning (Morris et al. 2022). The ecological priorities model is intended to showcase the national importance of the conservation priorities and opportunities in southwest Florida that are deserving of concerted cooperative efforts by federal, State, and regional partners to protect additional conservation lands before these opportunities are lost in one of the fasting developing regions in the United States. The conservation priorities analysis that determined the ecological priorities combined data from the Critical Lands and Waters Identification Project, the 2021 update of the Florida Ecological Greenways Network, and updated focal species and natural community priorities. In addition, a conservation protection opportunities model was created to help assess the protection potential of currently unprotected lands based on their ability to qualify under the criteria for existing land conservation programs both federal and State programs. The conservation protection opportunities layer included landowners who submitted applications for inclusion in conservation protection programs, which demonstrate a willingness to participate in conservation initiatives. A threats GIS data layer was also created using existing data sources to identify potential threat of conversion to development for unprotected conservation priority areas. The development threat layer is a combination of statewide Future Land Use data obtained from the Florida Geographic Data Library and the Florida 2070 Trend Development Scenario (Carr and Zwick 2016a) created by the University of Florida and obtained from the Florida Geographic Data Library. This information provided a perspective of urgency for protection for consideration in the proposed Conservation Area.

The proposed Conservation Area was refined to focus on the inclusion of the watersheds of Peace River, Myakka River, Fisheating Creek, and Caloosahatchee River. Occasionally the boundary drifted from an existing watershed to reflect the entirety of a parcel based on ownership or ensure connectivity with existing conservation lands. The northern boundary stretches to include a portion north of Interstate 4 to ensure connectivity for wildlife by including several proposed locations for wildlife crossings. On the eastern boundary, any portion of Okeechobee County that was not included in the Everglades Headwaters NWR and CA was included in the acquisition boundary. This includes an area within the St Johns River Water Management District which is intended to provide connectivity opportunity for wildlife. Additionally, any portion of the proposed acquisition boundary that abuts the boundary of Everglades Headwaters NWR and CA is seamlessly connected. Throughout the proposed Conservation Area areas that are extremely developed (subdivisions, airports, etc.) without opportunity for protection have been generally eliminated from acquisition boundary as well. Attention was taken on the western portion of the boundary to maximize protection of watersheds draining into the Charlotte Harbor to ensure water quality protection. Additionally, the western portion of the boundary is based on remaining protection opportunities to preserve species movement from coastal areas inland despite development pressure and sea level rise. The southern boundary of the acquisition area does not include parcels within the existing acquisition boundaries of Florida Panther NWR, J. N. Ding Darling NWR, Caloosahatchee NWR, Ten Thousand Islands NWR, Pine Island NWR, Matlacha Pass NWR, and Island Bay NWR.

The Service is proposing acquisition of less-than-fee-title lands within the proposed Conservation Area. Up to 10% of the total proposed Conservation Area could be acquired as fee-title lands. The Service proposes that acquiring identified habitat areas through Alternative B of the EA over time would provide for the protection of imperiled species, enhance habitat connectivity, protect water resources, and mitigate the effects of global climate change. It would also help many of the more common game and nongame species. Additionally, this proposed Conservation Area would provide opportunities for wildlife-dependent recreation and new and dynamic partnerships.

Less-than-Fee-Title Acquisition

The Service proposes acquisition of less-than-fee-title interests within the proposed Conservation Area. Participation by landowners in the proposed easements and agreements would be voluntary.

Landowners within an approved proposed Conservation Area would be under no obligation to sell interest in their properties to the Service. If less-than-fee-title interests in lands within the proposed Conservation Area were to be acquired, they would reflect the vision, purposes, and goals of the overall project, and would be subject to the terms and conditions of whatever easement, agreements, and/or other tool(s) used for less-than-fee-title acquisition. Less-than-fee-title acquisitions (e.g., conservation easements) would be acquired in perpetuity.

These less-than-fee-title interests would provide important opportunities for conservation, while at the same time maintaining private ownership rights and responsibilities. Landowners in the proposed Conservation Area may voluntarily choose to participate, and participating lands would remain in private ownership. Private landowners who elected to participate would continue to control activities on their lands in accordance with the easement or agreement they negotiated.

Maximum Fee-Title Interest

The Service also proposes a maximum fee-title interest in approximately 400,000 (10% of the proposed Conservation Area) acres acquired in properties from willing landowners only. Landowners within the area would be under no obligation to sell their properties to the Service. Lands acquired by the Service from willing landowners would be included within the boundary of the proposed Conservation Area. Any proposal to expand beyond the authorized 400,000 acres or 10% of the proposed Conservation Area would require an additional separate planning effort by the Service, including public involvement, in accordance with applicable laws and policies.

Public uses for consideration for this proposed Conservation Area would include six priority public uses: hunting, fishing, environmental education, interpretation, wildlife observation, and photography. Potential public uses supporting priority public uses would also be considered (depending on the specifics of a particular property acquired), may include bicycling, boating, hiking, jogging, horseback riding, camping (with limitations), ORV use (with limitations), and facilities to support any of the approved uses. The Service is committed to working with the FWC to facilitate public use activities, specifically hunting and fishing. Uses would be approved through the appropriateness and compatibility requirements in the National Wildlife Refuge System Administration Act and the Refuge Recreation Act.

For properties that the Service would own in fee-title, habitat restoration and management would provide threatened, endangered, and resident wildlife with suitable habitat. Where appropriate, prescribed fire would be

used to remove excess vegetation and restore native plant communities. Invasive species would be controlled through manual, mechanical, and chemical means. Cultural and historical resources would be protected and cultural, traditional, and medicinal use opportunities would be provided. Additionally, interpretive programs and materials would allow the public to better understand and appreciate these important resources.

LAND PROTECTION PRIORITIES

The Service's Proposed Action (Alternative B) would result in the protection of approximately 4 million acres, using a combination of fee-title acquisitions and less-than-fee-title acquisitions (e.g., conservation easements and cooperative agreements) from willing sellers. The Service believes these are the minimum interests necessary to conserve and protect the fish and wildlife resources in the proposed area.

Much of the land included in the proposed Conservation Area currently has (or could have, upon restoration) important habitat value and high protentional for helping support a range of species. Lands included in the proposed Conservation Area also have high potential for ensuring habitat connectivity between the proposed Conservation Area and surrounding conservation lands, and in providing corridors between sites.

The Proposed Conservation Area was delineated after engaging numerous interested parties in the area and considering a variety of conservation and public benefits. The considerations included but were not limited to key wildlife species and habitats, habitat diversity, landscape resiliency, wildlife-dependent public recreation, Tribal Nation interests, water quality, infrastructure development within and outside the proposed Conservation Area, community expansion and economics, past establishment proposals, current data and trends, working lands, potential for working partnerships, wildlife corridor opportunities, existing land conservation projects, industry, etc. The proposed Conservation Area strives for wildlife habitat conservation and restoration for the benefit of wildlife and people.

Lands have been prioritized for acquisition using the listed criteria.

- Ecological importance
- Landscape connectivity and wildlife corridors
- Restoration of wetlands and water quality
- Existing and potential threats

The conservation priorities analysis that determined the ecological priorities combined data from the Critical Lands and Waters Identification Project, the 2021 update of the Florida Ecological Greenways Network, and updated focal species and natural community priorities. The ecological priorities are identified as high, moderate-high, and moderate. All three categories contain important resources for protection and are a priority to acquire. In addition, a conservation protection opportunities model was created in the 2022 Southwest Florida Landscape Conservation Design to help assess the protection potential of currently unprotected lands based on their ability to qualify under the criteria for existing land conservation programs both federal and State programs. The conservation protection opportunities layer included landowners who submitted applications for inclusion in conservation protection programs, which demonstrate a willingness to participate in conservation initiatives. This provided opportunity to identify willing landowners and properties where State funding could be available to leverage. These lists are always evolving, as new properties apply and are added to the list, but it provides a starting point for identifying landowners and partnership opportunities. A threats Geographical Information System (GIS) data layer was also created using existing data sources to identify potential threat of conversion to development for unprotected conservation priority areas. The development threat layer is a combination of statewide Future Land Use data obtained from the Florida Geographic Data Library and the Florida 2070 Trend Development Scenario created by the University of Florida and obtained from the Florida

Geographic Data Library. In the northern half of the acquisition area, lands that have been restored after mining operations have ceased, left fallow post mining, currently being mined, or proposed for future mining operations have been included as well. Opportunities may exist to ensure connectivity for wildlife by including these areas. Throughout the acquisition area, agricultural lands that have the potential for restoration and/or wildlife connectivity have also been included for consideration. All Tribal lands within the proposed Conservation Area were not included. Existing conservation lands within the proposed Conservation Area would not be considered for acquisition.

Based on a GIS-based land prioritization analysis for the LCD (Appendix E), categories of land acquisition have been established as Priority 1 (Figure 7), Priority 2 (Figure 8), Priority 3 (Figure 9), and Priority 4 (Figure 10) areas. However, attributes of each group may increase the suitability for increasing a lower ranked priority group to a higher ranked priority group [e.g., a property needing habitat restoration (Priority 4) may provide a critical habitat linkage after restoration, thus warranting elevating it to a Priority 1, Priority 2, or Priority 3 rating]. In addition to the initial rank scoring of an individual property, a site visit and best professional judgment or management assessment would be used to assure properties receive appropriate consideration. A map of the lands within each of the four priority groups is given below. Figure 11 depicts high, moderate-high, moderate, and low protection opportunities and Figure 12 depicts development threats within the proposed Conservation Area.

Priority 1 – High Ecological Priority

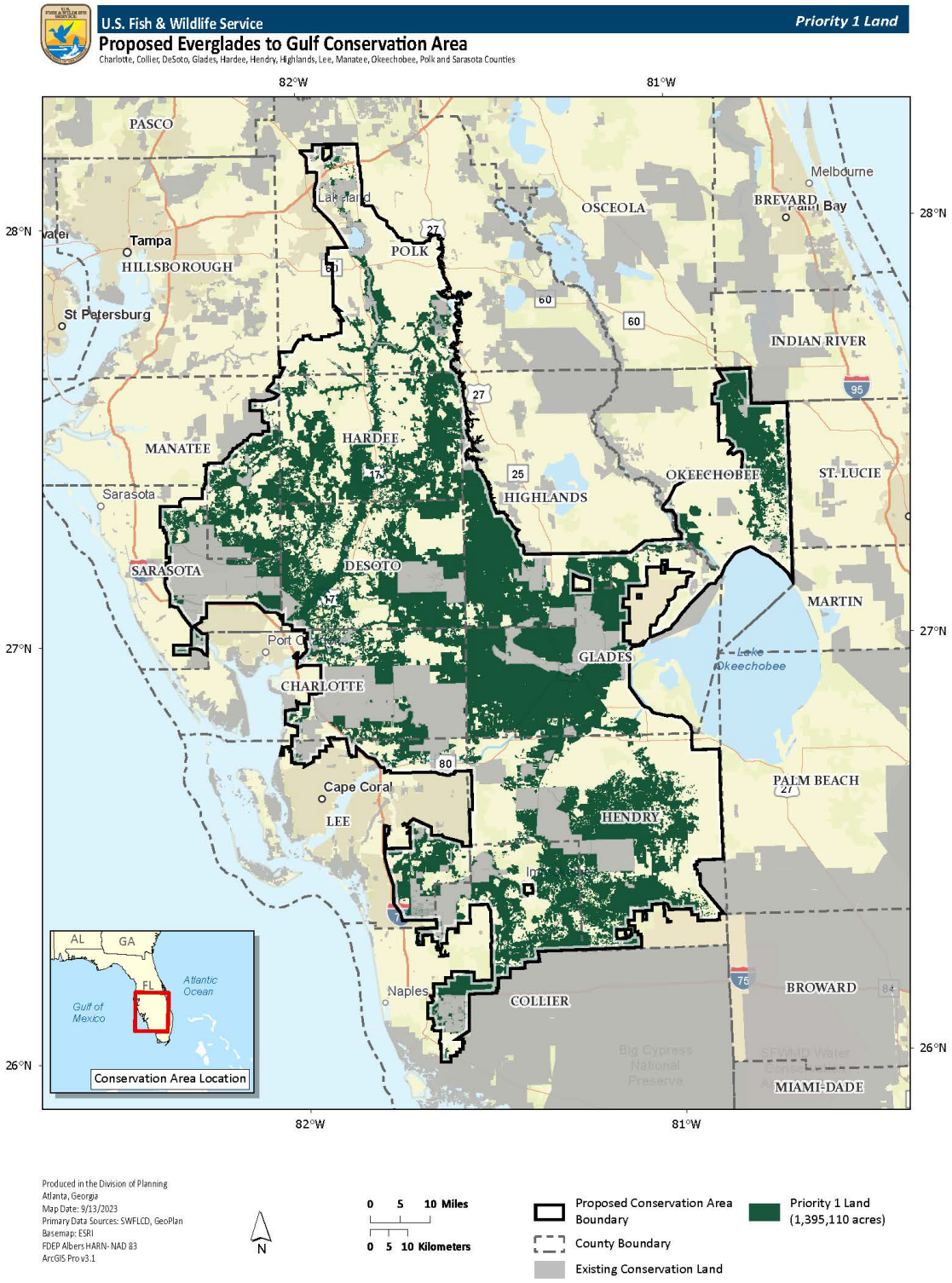


Figure 7. Priority 1-Lands within the proposed Conservation Area that have been identified as a high ecological priority (Morris et al. 2022, Appendix E).

Priority 2- Moderate-High Ecological Priority

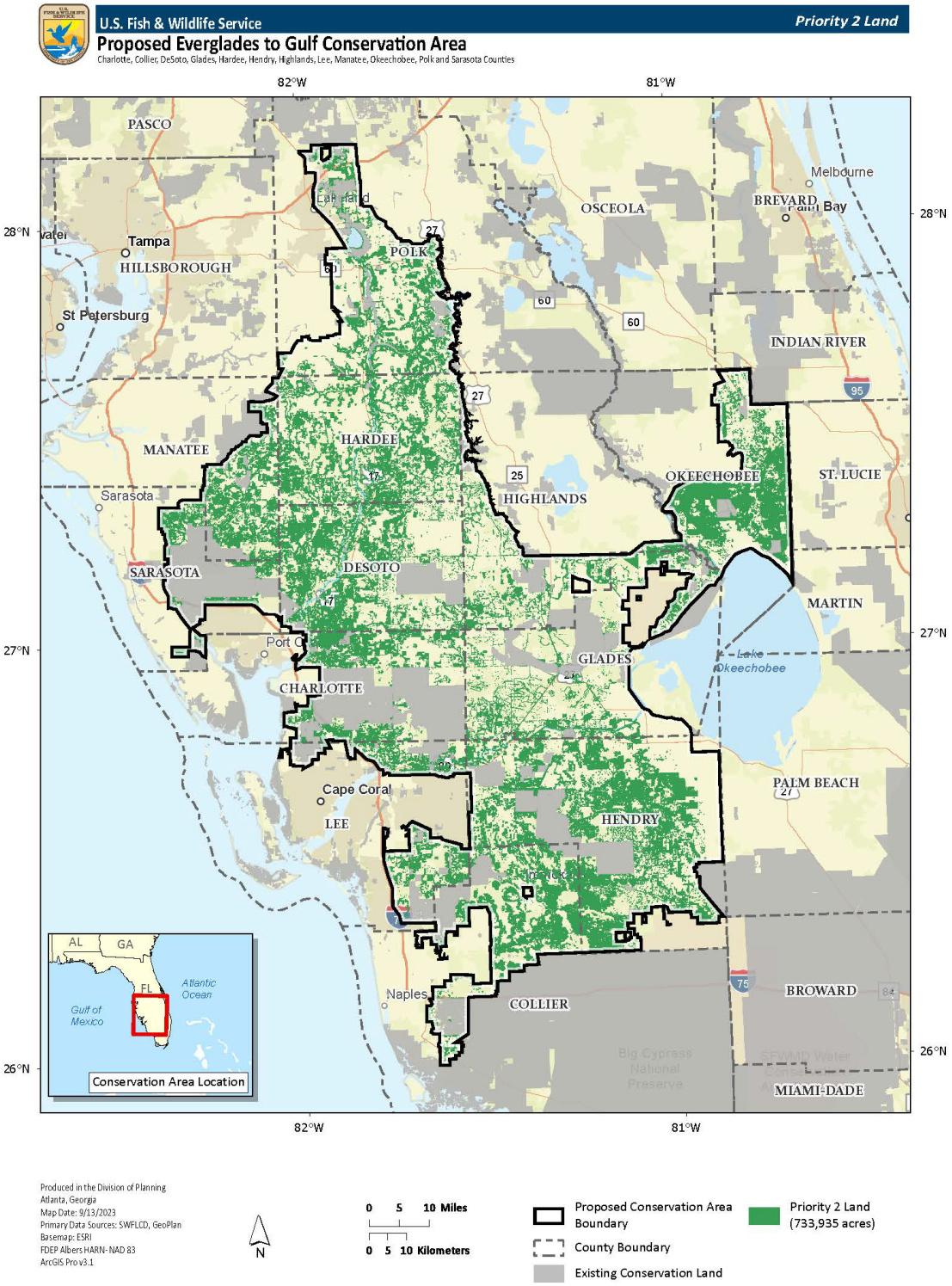


Figure 8. Priority 2- Lands within the proposed Conservation Area that have been identified as moderate-high ecological priority (Morris et al. 2022, Appendix E).

Priority 3- Moderate Ecological Priority

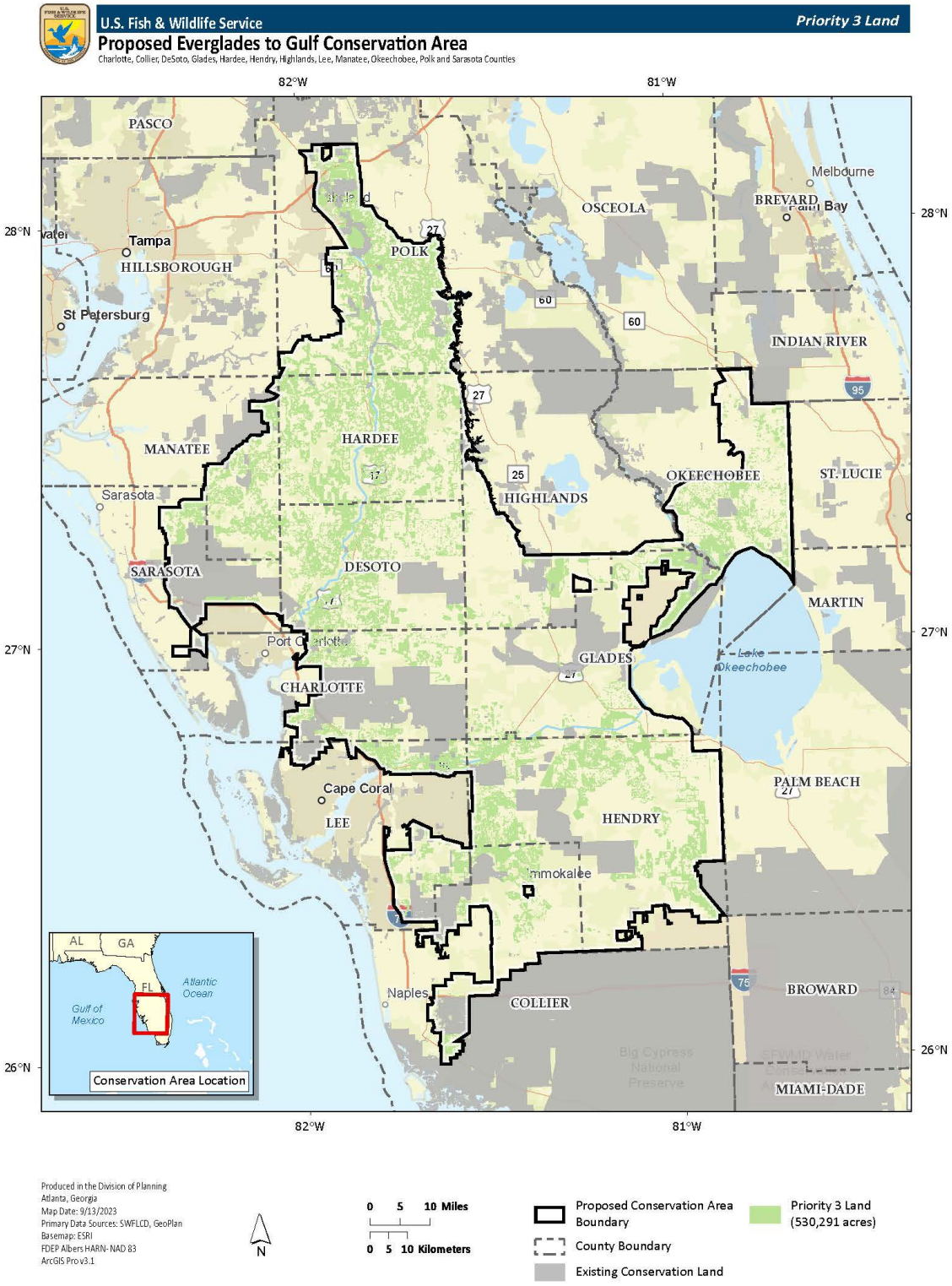


Figure 9. Priority 3-Lands within the proposed Conservation Area that have been identified as moderate ecological priority (Morris et al. 2022, Appendix E).

Priority 4- Low Priority

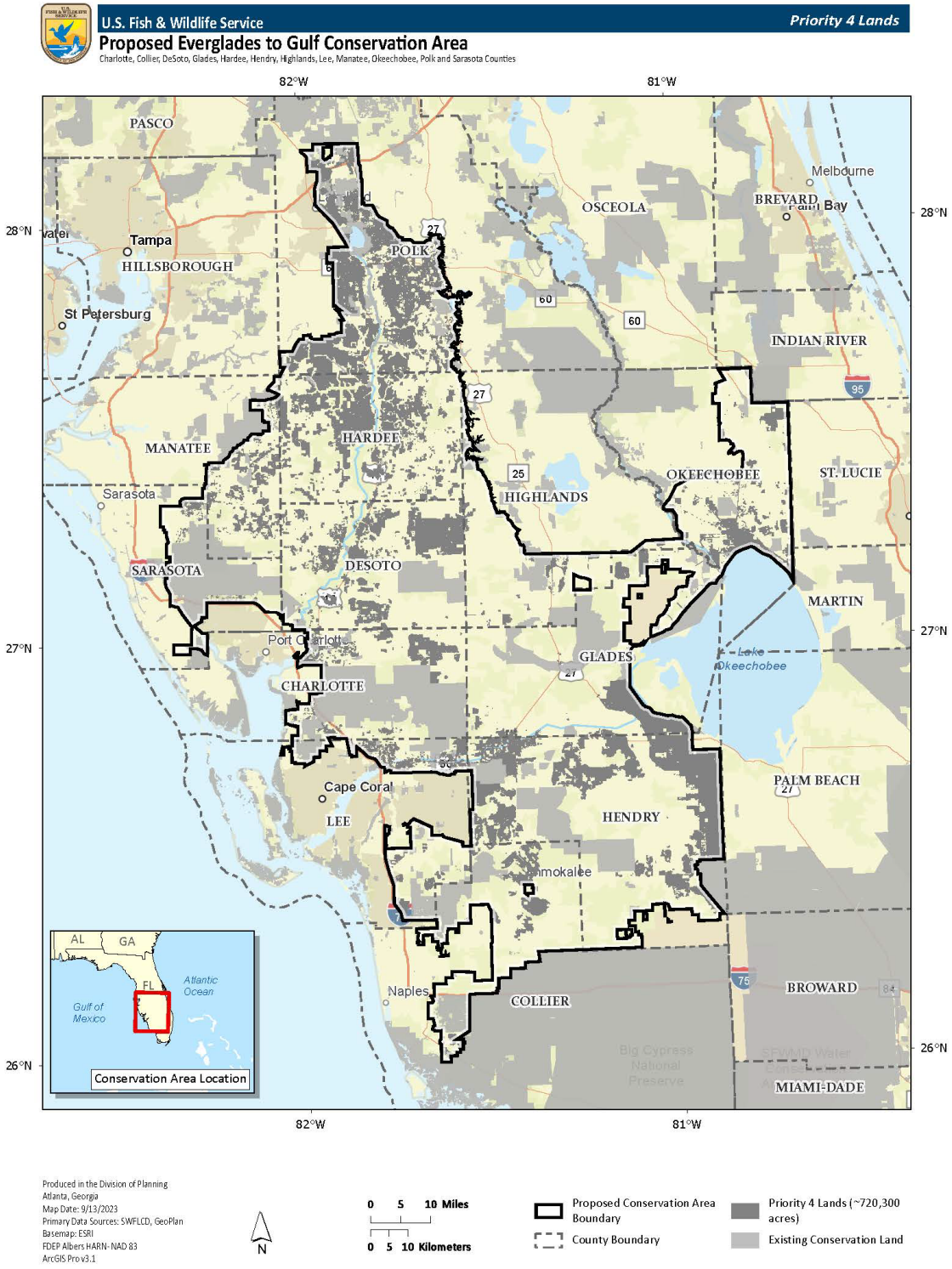


Figure 10. Priority 4- Lands within the proposed Conservation Area that may be consider low priority could still be considered for acquisition for connectivity purposes but may not rank as an ecological priority.

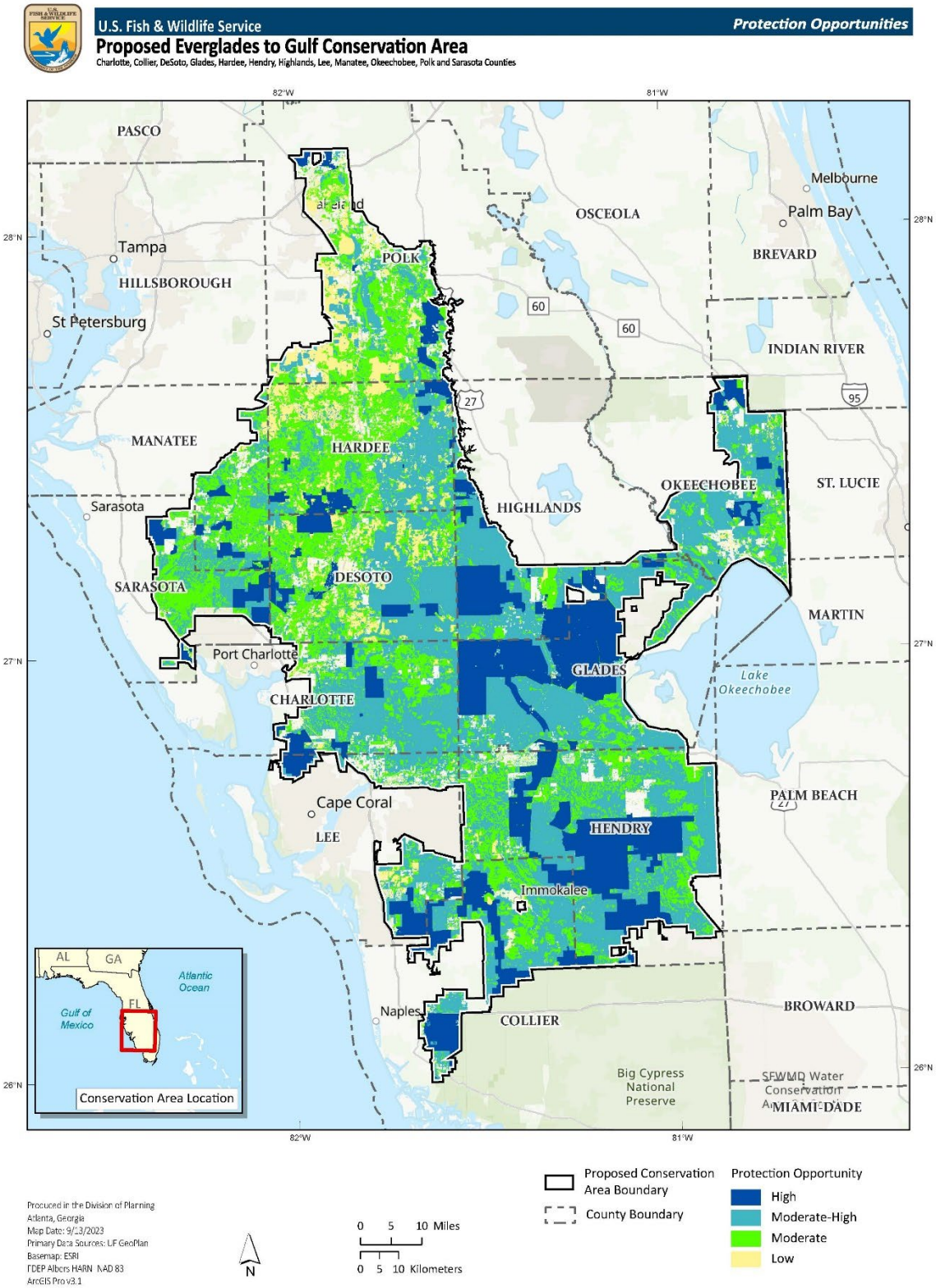


Figure 11. Protection Opportunities in the Proposed Conservation Area

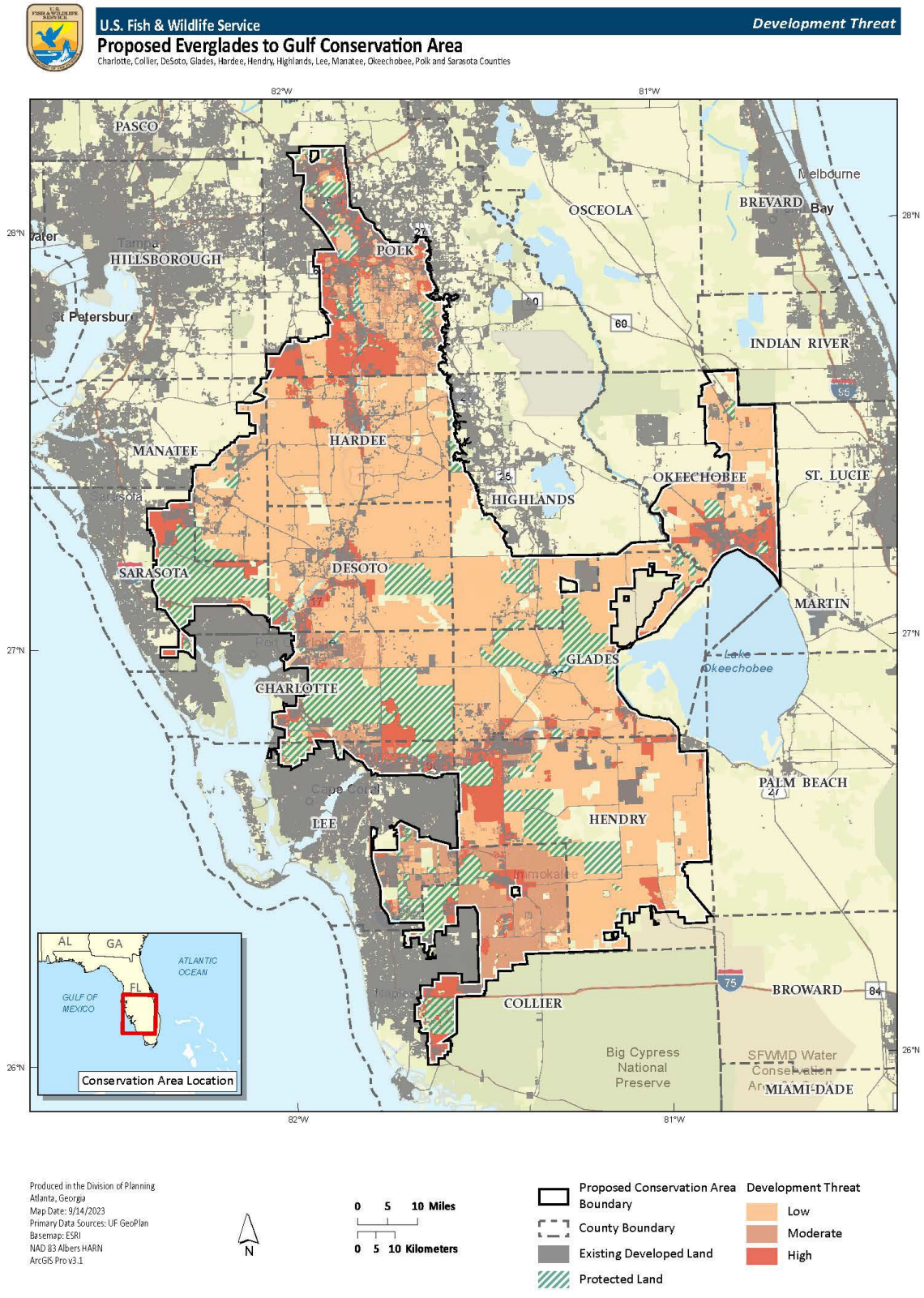


Figure 12. Development Threats in the proposed Conservation Area.

Table 2. Units by County for the proposed Everglades to Gulf Conservation Area

County	Number of Parcels	Acres	Protected Acres	Percent Protected
Charlotte	23,011	317,421	145,381	45.8
Collier	24,765	309,929	53,949	17.4
DeSoto	18,600	408,325	40,481	9.9
Glades	11,188	453,700	71,086	15.7
Hardee	14,664	408,536	1,122	0.3
Hendry	30,008	669,477	79,250	11.8
Highlands	8,708	246,729	33,655	13.6
Lee	33,312	179,753	42,885	23.9
Manatee	2,997	163,403	17,266	10.6
Okeechobee	21,328	276,854	12,128	4.4
Polk	78,520	406,891	36,108	8.9
Sarasota	10,167	164,382	92,435	56.2

LAND PROTECTION OPTIONS

The Service acquires lands and interests in lands, such as easements, and management rights in lands through leases or cooperative agreements, consistent with legislation or other congressional guidelines and executive orders, for the conservation of fish and wildlife and to provide wildlife-dependent public use for recreational and educational purposes. These lands include units of the national wildlife refuge system, national fish hatcheries, research stations, and other areas.

If approved, the Service would use the following options to implement this Land Protection Plan:

Option 1: Management or land protection by others
Option 2: Less-than-fee-title acquisition by the Service
Option 3: Fee-title acquisition by the Service

When land is needed to achieve fish and wildlife conservation objectives, the Service seeks to acquire the minimum interest necessary to meet those objectives and acquire it only from willing sellers. The proposal includes a combination of Options 1, 2, and 3 above. The Service believes this approach offers a cost-effective way of achieving the protection needed to accomplish proposed Conservation Area goals and objectives, while also attempting to meet the needs of local landowners.

Option 1. A great deal of land that is ecologically important is contained in the proposed project area. These lands are already owned by our partners or managed by our partners through conservation easements. It should also be noted that the conservation and protection of this landscape fits well into several partner agency initiatives. Management and protection of lands by others would continue, and the proposed project would complement those efforts.

Option 2. Under option 2, the Service would protect and manage land by acquiring only a partial interest from willing landowners, typically in the form of a conservation easement. Other less-than-fee-title acquisition methods that may be employed include leases, mitigation and conservation banks, and/or cooperative agreements. Most of the less-than-fee-title options leave the parcel in private ownership, while allowing the

Service partial control over land use in a way that enables the Service to meet our conservation goals, as well as providing the landowner continued stewardship and management of their lands. The structure of such easements would provide permanent protection of existing wildlife habitats while also allowing habitat management or improvements and access to sensitive habitats, such as for endangered species or migratory birds. The Service would determine, on a case-by-case basis, and negotiate with each landowner, the extent of the rights the Service would be interested in buying. Those may vary, depending on the configuration and location of the parcel, the current extent of development, the nature of wildlife activities in the immediate vicinity, the needs of the landowner, and other considerations. Less-than-fee-title acquisitions (e.g., conservation easements) would be acquired in perpetuity.

In general, any less-than-fee-title acquisition would maintain the land in its current configuration with no further subdivision or development. Easements are a property right, and typically are perpetual. If a landowner later sells the property, the easement continues as part of the title. Properties subject to easements generally remain on the tax rolls, although the change in market value may reduce the assessment. The Service does not pay refuge revenue sharing (i.e., funds the Service pays to counties in lieu of taxes) on easement rights. Where the Service identify conservation easements, the Service would be interested primarily in purchasing development rights and some wildlife management rights such as restoring wetland or grassland habitat. Easements are best when:

- only minimal management of the resource is needed, but there is a desire to ensure the continuation of current undeveloped uses and to prevent fragmentation over the long term;
- a landowner is interested in maintaining ownership of the land, does not want it to be further developed, and would like to realize the benefits of selling development rights;
- current land use regulations do not limit the potential for adverse management practices;
- the protection strategy calls for the protection of a watershed area that can be accommodated with passive management; or
- only a portion of the parcel contains lands of interest to the Service.

The determination of value for purchasing a conservation easement involves an appraisal of the rights to be purchased, based on recent market conditions and structure in the area (See Land Protection Methods section).

Acceptance of interest in conservation and mitigation banks or entering into management agreements typically involves the acceptance of less-than-fee-title interest. In these instances, the Service would accept the management responsibility while ownership would remain with the landowner. In those instances where the acceptance involves fee-title transfer, the parcel would either need to be located within the proposed Conservation Area or the Service would be required to conduct additional acquisition planning according to The National Environmental Policy Act (NEPA) guidelines.

Option 3. Under Option 3, the Service would acquire parcels in fee-title from willing sellers, thereby acquiring all rights of ownership. This option provides the Service the most flexibility in managing priority lands and ensuring the protection in perpetuity of nationally significant trust resources and providing opportunities to engage the public with wildlife-dependent recreation and education opportunities and provide cultural, traditional, and medicinal use opportunities.

Generally, the lands the Service would acquire in fee-title require active management (e.g., controlling invasive species, mowing or prescribed burning, planting, or managing for the six priority public uses). The Service only proposes fee-title acquisition when adequate land protection is not assured under other ownerships, active land

management is required, or it is determined the current landowner would be interested in a fee-title transaction and is unwilling to sell a partial interest such as a conservation easement.

In some cases, it may become necessary to convert a previously acquired conservation easement to fee-title acquisition: for example, when an owner is interested in selling the remainder of interest in the land on which the Service has acquired an easement. The Service would evaluate this need on a case-by-case basis.

SERVICE LAND ACQUISITION POLICY

If a landowner expresses an interest and gives the Service permission, an appraisal would be completed on behalf of the Service by the Department of the Interior Appraisal and Valuation Services Office (AVSO) to determine its fair market value. Once an AVSO approved appraisal has been obtained by the Service, an offer for the landowner's consideration can be presented.

Appraisals completed by AVSO must meet federal as well as professional appraisal standards. In all acquisition cases, the Service is required by federal law to offer 100 percent of the property's appraised market value, which is typically based on comparable sales of similar types of properties.

The proposed Conservation Area boundaries were delineated after engaging numerous interested parties in the area and considering a variety of conservation and public benefits. The considerations included but were not limited to key wildlife species and habitats, habitat diversity, landscape resiliency, public recreation potential, Tribal Nation interests, flooding frequency and duration, water quality, infrastructure development within and outside the proposed Conservation Area, community expansion and economics, past establishment proposals, current data and trends, working lands, potential for working partnerships, wildlife corridor opportunities, existing land conservation projects, industry, etc. Designation of a final Conservation Area would give the Service the approval to negotiate with landowners that may be interested or may become interested in selling their land in the future. With this internal approval in place, the Service can react more quickly as important lands become available. The Service's long-established policy is to work with willing sellers as funds become available. Lands within this proposed Conservation Area do not become a unit of the refuge system unless their owners willingly sell or donate them to the Service.

During the planning process, the 7-million-acre Study Area was refined and reduced to an approximately 4-million-acre proposed Conservation Area. It is within this proposed Conservation Area, if it were approved, that the Service would have the ability to work with willing landowners and partners on conservation programs and agreements. The Service could acquire less-than-fee-title interests within the proposed Conservation Area. Additionally, the Service would have the authority to acquire up to 10% of acres in fee-title. Any proposal to expand beyond the authorized 10% of the approve proposed Conservation Area acres would require an additional planning effort by the Service, including public involvement, in accordance with applicable laws and policies. Participation would be voluntary. Landowners within an approved Conservation Area would be under no obligation to sell interest in their properties to the Service. The proposed Conservation Area would provide important opportunities for conservation, while at the same time maintaining the ability of the ranching community to persist. Landowners in the proposed Conservation Area may voluntarily choose to participate and participating lands would remain in private ownership. Private landowners who elected to participate would continue to control activities on their lands. As lands were acquired, they would become part of the Conservation Area, which would reflect the vision, purposes, and goals of the overall project, but would be subject to the terms and conditions of whatever easement, agreements, and/or other tool(s) that would be used

for less-than-fee-title acquisition. Less-than-fee-title acquisitions (e.g., conservation easements) would be acquired in perpetuity.

Funding

The two primary sources of funding for land acquisition are the Land and Water Conservation Fund (LWCF) and the Migratory Bird Conservation Fund (MBCF). The primary sources of income to the LWCF are fees paid by companies drilling offshore for oil and gas, and oil and gas lease revenues from federal lands. The primary sources of income to the MBCF are the sale of Migratory Bird Hunting and Conservation Stamps (also known as Duck Stamps) and import duties on arms and ammunition. The Service would seek funding from the LWCF and MBCF for fee-title and conservation easement acquisitions if the proposed project is approved.

At this point in time, the Service is unable to predict where and when refuge unit lands would be acquired within the proposed CA. Because the cost of acquisition varies widely depending on the characteristics of the tract and the method of acquisition, it is impossible to pre-determine the precise cost of acquisition and easements within the proposed 4-million-acre Conservation Area.

This range in value is affected by the following factors:

- Land types, i.e., Agriculture, Forest and Woodland, etc.
- Ownership size. Tract sizes range from less than one acre to more than xx acres.
- Legal interest(s) acquired (conservation easement).
- Other factors that affect per acre land value.
- The total acreages of fee-title vs. conservation easement interest acquired.

Table 3. Land Sales by County

County	**Current Countywide Average Per-Acre Values**
Charlotte	$6,273
Collier	$6,408
DeSoto	$6,608
Glades	$7,541
Hardee	$6,852
Hendry	$5,954
Highlands	$11,000
Lee	$15,925
Manatee	$4,286
Okeechobee	$6,129
Polk	$5,188
Sarasota	$17,461

It is important to note that these costs are only provided as an approximation based on currently available information. Donations, the ratio of fee-title to conservation easement purchases, and land value fluctuations over time are among the factors that would likely influence the costs associated with completion of the proposed Conservation Area.

IV. COORDINATION

COORDINATION WITH CONSERVATION PARTNERS

Service staff have been continuously engaged with interested parties including local, State, Federal, Tribal, non-governmental agencies, and private landowners. Specifically, since January 2022 through April 2023, strong interest in meeting with the National Wildlife Refuge System staff to discuss conservation activities and needs in southwest Florida have occurred. Staff participated in over 30 meetings. Topics discussed at the meetings included:

- general Service conservation activities on private lands;
- Florida Panther conservation efforts by the Service;
- the need to protect sensitive bird areas;
- the need for corridor protection for wildlife;
- collaboration potential of the Service and other State and Federal land acquisition agencies such as: Florida Forever (Florida Department of Environmental Protection), The Rural and Family Lands Protection Program (Florida Department of Agricultural and Consumer Services-FDACS) Forest Legacy (Florida Forest Service, FDACS), and Wetland Reserve Easement Program (Natural Resource Conservation Service (NRCS);
- management of conservation easements and fee-title lands by the National Wildlife Refuge System; and
- the Fisheating Creek and Florida Panther NWR Landscape Conservation Design completed in 2016 and encouragement to expand efforts for conservation protection, cultural and traditional use and access of Department of Interior lands, and the need for protection of working landscapes.

TRIBAL COORDINATION

The Service engaged with Tribal Nations, including the Seminole Nation of Oklahoma, Poarch Band of Creek Indians, Miccosukee Tribe of Indians of Florida, Seminole Indian Tribe of Florida, and the Muscogee Nation early in the scoping process. At the request of the Miccosukee Tribe of Indians of Florida, a follow-up meeting occurred between the Service and the Miccosukee Tribe to discuss the Landscape Conservation Design (Morris et al. 2017) and the planning process. The Service and the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida met and discussed the role of the Service in land protection and opportunities in Southwest Florida and opportunities for the Service and Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida to collaborate on conservation objectives. The Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida contributed as active members of the planning team to develop this proposal.

ELECTED OFFICIAL CONTACTS

On March 13, 2023, The Service's National and Regional Congressional and Legislative Affairs Specialists notified Congressional staff in the offices below about the proposed Conservation Area.

- Florida Senators
    - The Acting Regional Director for the Southeast Region and the Regional Congressional and Legislative Affairs specialist met with a Senator Rubio staffer in Washington DC on June 8; the staffer supported the concept, especially for easements on agricultural lands.
    - The Action Regional Director for the Southeast Region made phone notification to the Policy Adviser to Senator Rick Scott's office on March 13, 2023.
- Florida Representatives:

    - Rep Darren Soto
    - Rep Vern Buchanan
    - Rep Gregg Steube
    - Rep Scott Franklin
    - Rep Byron Donalds
    - Rep Mario Diaz-Balart
- Senate Appropriations Interior Subcommittee
- House Appropriations Interior Subcommittee
- Senate Environment and Public Works Committee
- House Natural Resources Committee
- House Leadership – Speaker Pelosi, House Majority Leader Hoyer, House Minority Leader McCarthy
- Congressional Research Service

PUBLIC OUTREACH

Scoping

The 35-day scoping period for this project began on March 14, 2023, with a U.S. Fish and Wildlife Service press release announcing the proposed action and requesting public input. It ended on April 18, 2023. Seven public scoping meetings were conducted, including a virtual meeting with intergovernmental partners, two virtual meetings open to the public, and four in-person meetings. The dates and locations of the meeting were as follows: Intergovernmental virtual (March 24, 2023), Wauchula, FL (March 28, 2023), Arcadia, FL (March 30, 2023), Immokalee, FL (April 3, 2023), virtual (April 5, 2023), Labelle, FL (April 7, 2023), and virtual (April 12, 2023). A link to a webpage explaining the details regarding the dates and locations of the public scoping meetings and how to register and submit comments was included in the Service's initial press release.

Articles and information produced by other entities have also appeared in the press, including a YouTube video published by Defenders of Wildlife (January 27, 2023) and articles published by The Beaches Leader (March 14, 2023), POLITICO Pro (March 14, 2023), WGCU (March 14, 2023), National Wildlife Refuge Association (March 28, 2023), and Fort Meyers News-Press (April 5, 2023).

Collectively, the seven public scoping meetings had 171 attendees, including individual citizens; Avon Park Airforce Base; Florida Department of Transportation; Florida Department of Environmental Protection; Miccosukee Tribe; Florida Fish and Wildlife Conservation Commission; U.S. Army Corps of Engineers; National Park Service; Seminole Tribe of Florida; Southwest Florida Water Management District; South Florida Water Management District; Big Cypress National Preserve; Audubon of Florida; Center for Biological Diversity; Gray Ranch LLC; Conservation Foundation of the Gulf Coast; Strickland Ranch; Defenders of Wildlife; Cypress Chapter Izaak Walton League of America; Earth Justice; Audubon of the Western Everglades; Conservation Collier; South Florida Wetlands Management District; The Nature Conservancy; University of Florida Center for Landscape Conservation Planning; National Wildlife Refuge Association; Backcountry Hunters and Anglers; Florida Conservation Group; Lee County; National Wildlife Federation; Salty Science; Friends of the Florida Panther Refuge; City of Bonita Springs Community Development; JB Ranch; National Oceanic and Atmospheric Administration; Coastal & Heartland National Estuary Partnership; Friends of Bosque del Apache; Friends of Alaska National Wildlife Refuges; Family Lands Remembered; Florida Cattlemen's Association; Live Wildly Foundation; Everglades Foundation, Delta Waterfowl and American Daughters of Conservation; Environmental Lands Management and Acquisition Committee; Highlands County Board of County Commissioners; Friends of the Fakahatchee; Florida Trail Association; American Sportfishing Association; Conservancy of Southwest Florida; Sarasota County Parks, Recreation, and Natural Resources; Artemis Sportswomen (National Wildlife

Federation); Florida Wildlife Corridor Foundation; Ancient Islands Group Florida Sierra Club; Ding Darling Wildlife Society; National Parks Conservation Association; Sarasota County Government; Florida Park Service; Stantec; The Friends of Rachel Carson NWR; Venetian Golf and River Club; H.W. Lochner, Inc.; Wildlands Conservation; and Hendry County.

The Service received approximately 2,600 comments, all of which were generally supportive. Substantive comments primarily focused on prioritizing habitats and wildlife, public use considerations, partnership opportunities, Tribal interests, restoration considerations, and willing landowner and easement interests.

SPECIAL CONSIDERATIONS

Lands within the proposed Conservation Area have been reviewed by the Service for inclusion in the National Wilderness Preservation System according to criteria set forth in the Wilderness Act of 1964. Based on the Service's July 27,2023 assessment, the proposed Conservation Area was found not to be suitable for wilderness designation since:

- No areas meet the Wilderness minimum size requirement of 5,000 contiguous roadless acres;
- No areas contain any units of sufficient size for preservation as Wilderness;
- Areas under consideration have been altered by historic and ongoing human activities; and/or
- No areas include outstanding opportunities for solitude or for primitive recreation.

The proposed Conservation Area comprises a landscape that is largely rural, with agriculture, forestry, ranching, and outdoor recreation/tourism. Most tracts in the proposed Conservation Area are impacted by human use throughout the landscape. The extensive network of roadways, altered landscapes, increasing population, and development would make a wilderness experience improbable. Therefore, wilderness designation for any units of the proposed Conservation Area is not appropriate.

V. REFERENCES

Anderson, M. G., A. Barnett, M. Clark, C. Ferree, A. Olivero Sheldon, and J. Prince. 2016. *Resilient sites for terrestrial conservation in eastern North America*. The Nature Conservancy, Eastern Conservation Science. 204 pp.

Auffhammer, M. 2018. Quantifying economic damages from climate change. Journal of Economic Perspectives 32:33–52.

Barnes, C. S., N. E. Alexis, J. A. Bernstein, J. R. Cohn, J. G. Demain, E. Horner, E. Levetin, A. Nel, W. Phipatanakul. 2013. Climate change and our environment: The effect on respiratory and allergic disease. The Journal of Allergy and Clinical Immunology: In Practice 1:137–141.

Bellard, C., W. Thuiller, B. Leroy, P. Genovesi, M. Bakkenes, and F. Courchamp. 2013. Will climate change promote future invasions? Global Change Biology 19:3740–3748.

Berry, H. L., K. Bowen, and T. Kjellstrom. 2010. Climate change and mental health: A causal pathways framework. International Journal of Public Health 55:123–132.

Brown, S., C. Hickey, B. Harrington, and R. Gill (Eds.). 2001. The U.S. shorebird conservation plan. 2nd Edition. Manomet Center for Conservation Sciences, Manomet, MA.

Carr, M. and P. D. Zwick. 2016. *Florida 2070 mapping Florida's future – alternative patterns of development in 2070*. Summary Report. 1000 Friends of Florida; UF Geoplan Center. 18 pp. https://1000friendsofflorida.org/florida2070/wp-content/uploads/2016/09/florida2070summaryfinal.pdf

Central Florida Regional Planning Council. 2014. *Highlands County 2030 comprehensive conservation plan*. 588 pp. Accessed July 2023. https://cms2.revize.com/revize/highlandscountyfl/departments/development_services/planning/uploads/Highlands_County_Comp_Plan.pdf

Collier County Comprehensive Watershed Improvement Plan. 2016. *Collier County comprehensive watershed improvement plan*. Collier County; Rookery Bay National Estuarine Research Reserve. 84 pp. https://www.colliercountyfl.gov/home/showpublisheddocument/78252/636588818494730000

Conserving and Restoring America the Beautiful. 2021. *Conserving America the beautiful. A preliminary report to the National Climate Task Force recommending a ten-year, locally led campaign to conserve and restore the lands and waters upon which we all depend, and that bind us together as Americans*. 24 pp. Accessed July 2023. https://www.doi.gov/sites/doi.gov/files/report-conserving-and-restoring-america-the-beautiful-2021.pdf

De Blois, J.,T. Kjellstrom, S. Agewall, J. A. Ezekowitz, P. W. Armstrong, and D. Atar. 2015. The effects of climate change on cardiac health. Cardiology 131:209–217.

Florida Department of Transportation. 2022. *Florida aviation economic impact study*. Statewide Executive Study. Florida Department of Transportation. 9 pp. https://www.fdot.gov/aviation/economicimpact22.shtm#:~:text=In%202021%20(the%20study's%20data,of%20Florida's%20world%2Dclass%20airports.

Florida Fish and Wildlife Conservation Commission (FWC). 2006. Florida's cooperative conservation blueprint. Florida Fish and Wildlife Conservation Commission. Accessed July 2023. https://myfwc.com/conservation/special-initiatives/blueprint/

Florida Fish and Wildlife Conservation Commission (FWC). 2016. *Florida's imperiled species management plan 2016-2026*. Tallahassee, FL. 185 pp. Accessed July 2023. https://myfwc.com/media/2030/imperiled-species-management-plan.pdf

Florida Fish and Wildlife Conservation Commission (FWC). 2019. *Florida's wildlife legacy initiative: Florida's State Wildlife Action Plan*. Tallahassee, FL. 254 pp. Accessed July 2023. https://myfwc.com/media/22767/2019-action-plan.pdf

Florida Fish and Wildlife Conservation Commission (FWC) and Florida Natural Areas Inventory. 2022. Florida cooperative land cover map. Version 3.6. https://myfwc.com/research/gis/wildlife/cooperative-land-cover/#:~:text=The%20Florida%20Land%20Cover%20Classification%20System%20is%20a%20single%2Dstatewide,WMDs)%2C%20and%20the%20FWC.

Garcia, L., C. Anastasiou, and D. Tomasko. 2020. *Charlotte Harbor Surface Water Improvement and Management* (SWIM) *Plan*. Southwest Florida Water Management District, Brooksville, FL. 112 pp. Accessed July 2023.

https://www.swfwmd.state.fl.us/sites/default/files/medias/documents/CHSWIMPlanNov2020GBapprovedFinal.pdf

Giorgini, P., P. Di Giosia, M. Petrarca, F. Lattanzio, C. A. Stamerra, and C. Ferri. 2017. Climate changes and human health: A review of the effect of environmental stressors on cardiovascular diseases across epidemiology and biological mechanisms. Current Pharmaceutical Design 23:3247–3261.

Great American Outdoors Act. 2020. Pub. L. No. 116-152 (H.R. 1957). https://www.govinfo.gov/app/details/PLAW-116publ152.

Heartland 2060. 2020. *Heartland 2060: Building a resilient region revisited*. 20 pp. https://heartlandregionaltpo.org/download/HL2060-Revisited-Final_ADA.pdf

Intergovernmental Panel on Climate Change. 2023. Summary for policymakers. In [Core Writing Team, H. Lee and J. Romero (Eds.)]. *Climate change 2023: Synthesis report*. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland, 36 pp.

Koch, M. S., C. Coronado, M. W. Miller, D. T. Rudnick, E. Stabenau, R. B. Halley, and F. H. Sklar. 2015. Climate change projected effects on coastal foundation communities of the greater Everglades using a 2060 scenario: Need for a new management paradigm. Environmental Management 55:857–875.

Kushlan, J. A., M. J. Steinkamp, K. C. Parsons, J. Capp, M. Acosta 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 1. Waterbird Conservation for the Americas, Washington, D.C. 78 pp. Accessed July 2023. https://www.fws.gov/sites/default/files/documents/north-america-waterbird-conservation-plan.pdf

Lafferty, K. D. 2009. The ecology of climate change and infectious diseases. Ecology 904:888–900.

Laloë, J.-O., N. Esteban, J. Berkel, and G. C. Hays. 2016. Sand temperatures for nesting sea turtles in the Caribbean: Implications for hatchling sex ratios in the face of climate change. Journal of Experimental Marine Biology and Ecology 474:92–99.

Lieber, M., P. Chin-Hong, K. Kelly, M. Dandu, and S. D Weiser. 2022. A systematic review and meta-analysis assessing the impact of droughts, flooding, and climate variability on malnutrition. Global Public Health 17:68–82.

Miller, L. A. and M. C. Harwell. 2022. Connecting future environmental trends and assessments of fish and wildlife resources of concern: A case study of Big Pine Key, Florida. Sustainability 14:14553.

Morris, J., T. Hoctor, and K. Godsea. 2017. Southwest Florida Landscape Conservation Design. Report prepared by National Wildlife Refuge Association and the University of Florida Center for Landscape Conservation Planning for the Peninsular Florida Landscape Conservation Cooperative and U.S. Fish and Wildlife Service, Vero Beach, Florida.

Morris, J., T. Hoctor, and K. Burchett. 2022. Southwest Florida Landscape Conservation Design. Report prepared by Florida Conservation Group, the University of Florida Center for Landscape Conservation Planning, and National Wildlife Refuge Association for the U.S. Fish and Wildlife Service National Wildlife Refuge System.

National Oceanic and Atmospheric Administration. 2023. *Digital coast sea level rise viewer*. Accessed July 2023. https://coast.noaa.gov/slr/

North American Bird Conservation Initiative. 2022. *The State of the Birds, United States of America*. 17 pp. Accessed July 2023. https://www.stateofthebirds.org/2022/wp-content/uploads/2022/10/state-of-the-birds-2022-spreads.pdf

North American Waterfowl Management Plan. 2018. *North American Waterfowl Management Plan (NAWMP) update: Connecting people, waterfowl, and wetlands*. 46 pp. https://nawmp.org/sites/default/files/2018-12/6056%202018%20NAWMP%20Update_EN16.pdf

Noss, R. F. 2011. Between the devil and the deep blue sea: Florida's unenviable position with respect to sea-level rise. Climatic Change 107:1–16.

Noss, R. F., J. S. Reece, T. Hoctor, and J. Oetting. 2014. *Adaptation to sea-level rise in Florida: Biological conservation priorities*. Final Report to the Kresge Foundation, Grant Request Number 244146. https://conservation.dcp.ufl.edu/wp-content/uploads/2020/02/Noss-et-al-2014-adaptation-to-sea-level-rise-in-Florida_species-and-natural-communities.pdf

Nungesser, M., C. Saunders, C. Coronado-Molina. J. Obeysekera, J. Johnson, C. McVoy, and B. Benscoter. 2015. Potential effects of climate change on Florida's Everglades. Environmental Management 55:824–835.

Oetting, J., T. Hoctor, and M. Volk. 2016. *Critical Lands and Waters Identification Project (CLIP)*. Version 4.0. Technical Report – September 2016. Florida Natural Areas Inventory; Florida State University; Center for Landscape Conservation Planning, University of Florida, Gainesville, FL. 140 pp. Accessed July 2023. https://www.fnai.org/PDFs/CLIP_v4_technical_report.pdf

Pearlstine, L. G., E. V. Pearlstine, and N. G. Aumen. 2010. A review of the ecological consequences and management implications of climate change for the Everglades. Journal of the North American Benthological Society 29:1510–1526.

Presidential Memorandum. 2010. America's great outdoors. Memorandum for the Secretary of Interior, the Administrator of the Environmental Protection Agency, and the Chair of the Council on Environmental Quality. Subject: A 21st Century Strategy for America's Great Outdoors. Accessed July 2023. https://obamawhitehouse.archives.gov/the-press-office/presidential-memorandum-americas-great-outdoors

Rahel, F. J., B. Bierwagen, and Y. Taniguchi. 2008. Managing aquatic species of conservation concern in the face of climate change and invasive species. Conservation Biology 22:551–561.

Rayer, S. and Y. Wang. 2022. Projections of Florida population by county, 2025–2050, with estimates for 2021. Bureau of Economic and Business Research 55:192. https://www.bebr.ufl.edu/wp-content/uploads/2022/02/projections_2022.pdf

Resilient Lands and Waters Initiative. 2016. *Resilient lands and waters initiative*. 38 pp. Accessed July 2023. https://www.noaa.gov/sites/default/files/legacy/document/2019/Jun/DOCUMENT%20_Resilient%20Lands%20and%20Waters%20Final%20Report-111516%20%281%9.pdf

Robinson, R. A., H. Q. P. Crick, J. A. Learmonth, I. Maclean, C. D. Thomas, F. Bairlein, M. C. Forchhammer, C. M. Francis, J. A. Gill, B. J. Godley, J. Harwood, G. C. Hays, B. Huntley, A. M. Hutson, G. J. Pierce, M. M. Rehfisch, D. W. Sims, M. Begona Santos, T. H. Sparks, D. A. Stroud, and M. E. Visser. 2009. Travelling through a warming world: Climate change and migratory species. Endangered Species Research 7:87–99.

Rosenberg, K. V., J. A. Kennedy, R. Dettmers, R. P. Ford, D. Reynolds, J. D. Alexander, C. J. Beardmore, P. J. Blancher, R. E. Bogart, G. S. Butcher, A. F. Camfield, A. Couturier, D. W. Demarest, W. E. Easton, J. J. Giocomo, R. H. Keller, A. E. Mini, A. O. Panjabi, D. N. Pashley, T. D. Rich, J. M. Ruth, H. Stabins, J. Stanton, and T. Will. 2016. *Partners in flight landbird conservation plan: 2016 Revision for Canada and continental United States*. Partners in Flight Science Committee. 119 pp. Accessed July 2023. https://www.partnersinflight.org/wp-content/uploads/2016/08/pif-continental-plan-final-spread-single.pdf

South Florida Water Management District. 2023. *2023 South Florida environmental report highlights*. South Florida Water Management District. Accessed August 2023. https://www.sfwmd.gov/sites/default/files/2023_sfer_highlights_FINAL_HR.pdf

Southeast Conservation Adaptation Strategy. 2022. Southeast conservation blueprint 2022. http://secassoutheast.org/blueprint

Southwest Florida Water Management District. 2023. *Consolidated annual report March 1, 2023*. Southwest Florida Water Management District. Accessed August 2023 https://www.swfwmd.state.fl.us/sites/default/files/medias/documents/FY2023_Board-Approved-CAR.pdf

Stanton, E. A. and F. Ackerman. 2007. *Florida and climate change: The costs of inaction*. Global Development and Environment Institute, Tufts University, Medford, MA. https://www.bu.edu/eci/files/2019/11/Florida_hr.pdf

Stys, B., T. Foster, M. M.P. B. Fuentes, B. Glazer, K. Karish, N. Montero, and J. S. Reece. 2017. Climate change impacts on Florida's biodiversity and ecology. In E. P. Chassignet, J. W. Jones, V. Misra, and J. Obeysekera (Eds.). *Florida's climate: Changes, variations, & impacts*. https://www.researchgate.net/publication/321918626_Climate_Change_Impacts_on_Florida's_Biodiversity_and_Ecology

Tetra Tech, Inc., Miller Legg, and Central Florida Regional Planning Council. 2010. *Avon Park Airforce Range joint land use study*. 303 pp.

U.S. Army Corps of Engineers and South Florida Water Management District. 2015. *Southwest Florida comprehensive watershed plan: A habitat quilt tied by threads of water reconnecting a sustainable landscape*. 186 pp. Accessed July 2023. https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/2515/

U.S. Census Bureau. n.d. QuickFacts Florida. United States Census Bureau. Accessed August 2023. https://www.census.gov/quickfacts/fact/table/FL/PST045222

U.S. Fish and Wildlife Service. 1999. *South Florida field office multi-species recovery plan*. U.S. Fish and Wildlife Service, Southeast Region, Atlanta, GA. 24 pp. Accessed July 2023. https://ecos.fws.gov/docs/recovery_plan/sfl_msrp/execsum.pdf

U.S. Fish and Wildlife Service. 2010. *Rising to the challenge: Strategic plan for responding to accelerating climate change*. U.S. Fish and Wildlife Service. 36 pp. Accessed July 2023. https://climatechange.lta.org/wp-content/uploads/cct/2015/02/CCStrategicPlan.pdf

U.S. Fish and Wildlife Service. 2023. IPaC information for planning and consultation. U.S. Fish and Wildlife Service. Accessed August 2023. https://ipac.ecosphere.fws.gov/

U.S. Global Change Research Program. 2018. *Impacts, risks, and adaptation in the United States: Fourth national climate assessment* (D. R. Reidmiller, C. W. Avery, D. R. Easterling, K. E. Kunkel, K. L. M. Lewis, T. K. Maycock, and B. C. Stewart [Eds.]). Volume II. U.S. Global Change Research Program, Washington, D.C. 1515 pp. doi: 10.7930/NCA4.2018.

Volk, M. I., T. Hoctor, B. B. Nettles, R. Hilsenbeck, F. E. Putz, and J. Oetting. 2017. Florida's land use and land cover change in the past 100 years. In E. P. Chassignet, J. W. Jones, V. Misra, and J. Obeysekera (Eds). *Florida's climate changes, variations, & impacts.* Florida Climate Institute, Gainesville, FL. pp. 52–82.

Warner, K., C. Ehrhart, A. D. Sherbinin, S. Adamo, and T. Chai-Onn. 2009. *In search of shelter: Mapping the effects of climate change on human migration and displacement*. UN High Commissioner for Refugees. https://www.ciesin.columbia.edu/documents/clim-migr-report-june09_final.pdf

Ye, R. Z., A. L. Wright, K. Inglett, Y. Wang, A. V. Ogram, and K. R. Reddy. 2009. Land-use effects on soil nutrient cycling and microbial community dynamics in the Everglades Agricultural Area, Florida. Communications in Soil Science and Plant Analysis 40:2725–2742.

Zhang, Z., J. J. Wang, X. Lyu, M. Jiang, J. Bhadha, and A. Wright. 2019. Impacts of land use change on soil organic matter chemistry in the Everglades, Florida - a characterization with pyrolysis-gas chromatography–mass spectrometry. Geoderma 338:393–400.

APPENDIX A. DRAFT ENVIRONMENTAL ASSESSMENT

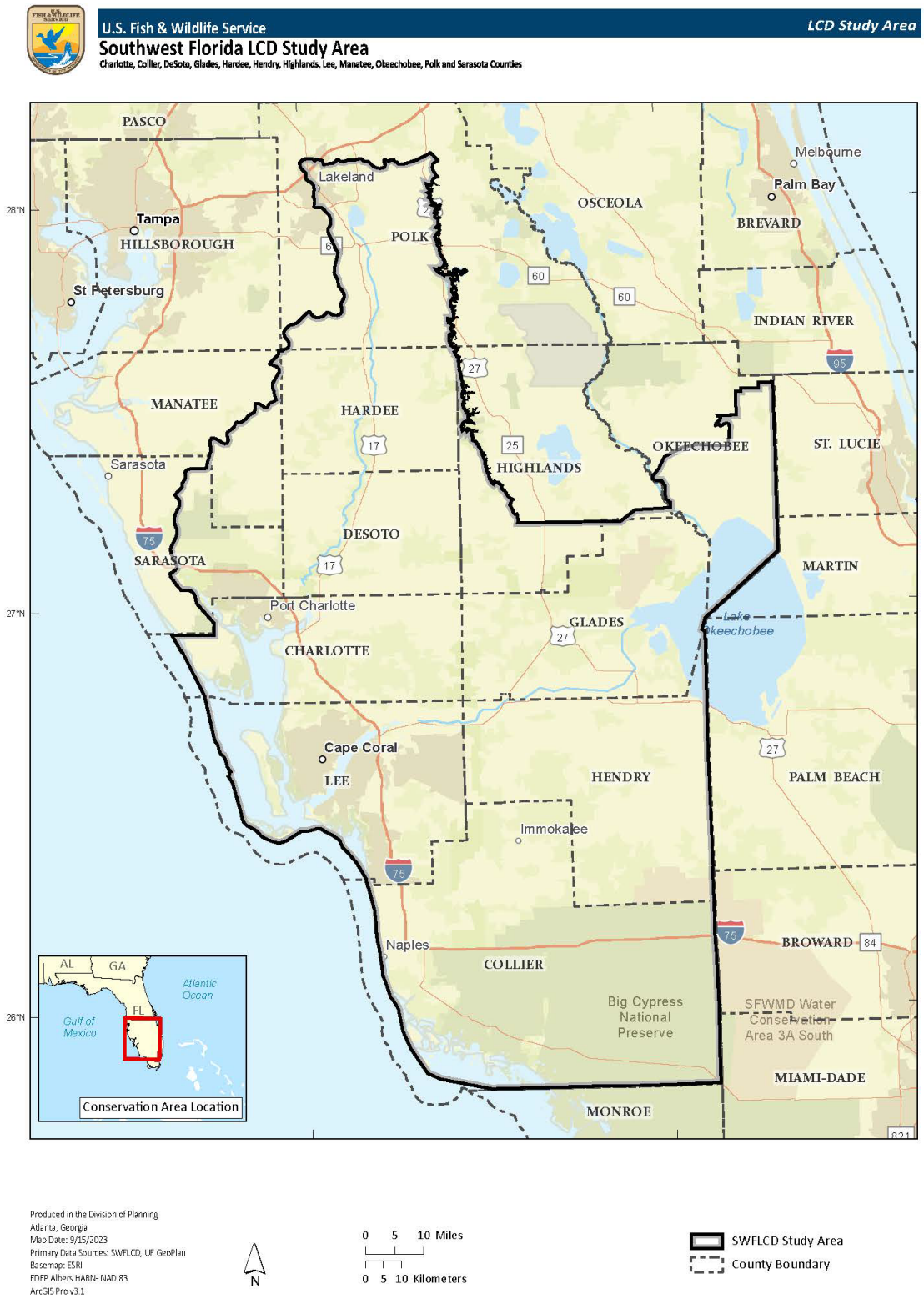
I. PURPOSE AND NEED FOR ACTION

INTRODUCTION

The U.S. Fish and Wildlife Service (Service), Southeast Region, proposes to conserve, protect and manage one of the most important regional conservation landscapes in the United States through the establishment of the Proposed Everglades to Gulf Conservation Area (Conservation Area) which would be located within the Study Area used for the Southwest Florida Landscape Conservation Design (LCD) (Appendix E). The LCD Study Area incorporates almost 7 million acres of land and water from the western Everglades north to include the Caloosahatchee watershed to the headwaters of the Peace River, west to incorporate the Myakka River watershed, and east to the Lake Wales Ridge, Fisheating Creek watershed and the northwestern half of Lake Okeechobee (EA Figure 1).

Working with the key partners, as well as with other state and local governments, Tribal Nations, businesses, non-governmental organizations, and the public, the Service examined the needs for wildlife habitat protection within the biologically important Greater Everglades, Caloosahatchee, Fisheating Creek, Peace River and Myakka River watersheds (EA Figure 1). During the planning process, this Study Area was further refined to encompass a smaller, approximately 4-million-acre area referred to as the Everglades to Gulf Conservation Area which would be equivalent to the acquisition boundary. The proposed Conservation Area spans twelve counties and encompasses the Greater Everglades, the northern portion of Lake Okeechobee and the watersheds of the Caloosahatchee River, Fisheating Creek, Peace River, and Myakka River. Within the proposed Conservation Area, the Service proposes to acquire less-than-fee-title in the proposed Conservation Area. In addition, the Service would also pursue fee-title interest in up to 10% of the proposed Conservation Area to support the shared goals of conservation efforts in this important landscape.

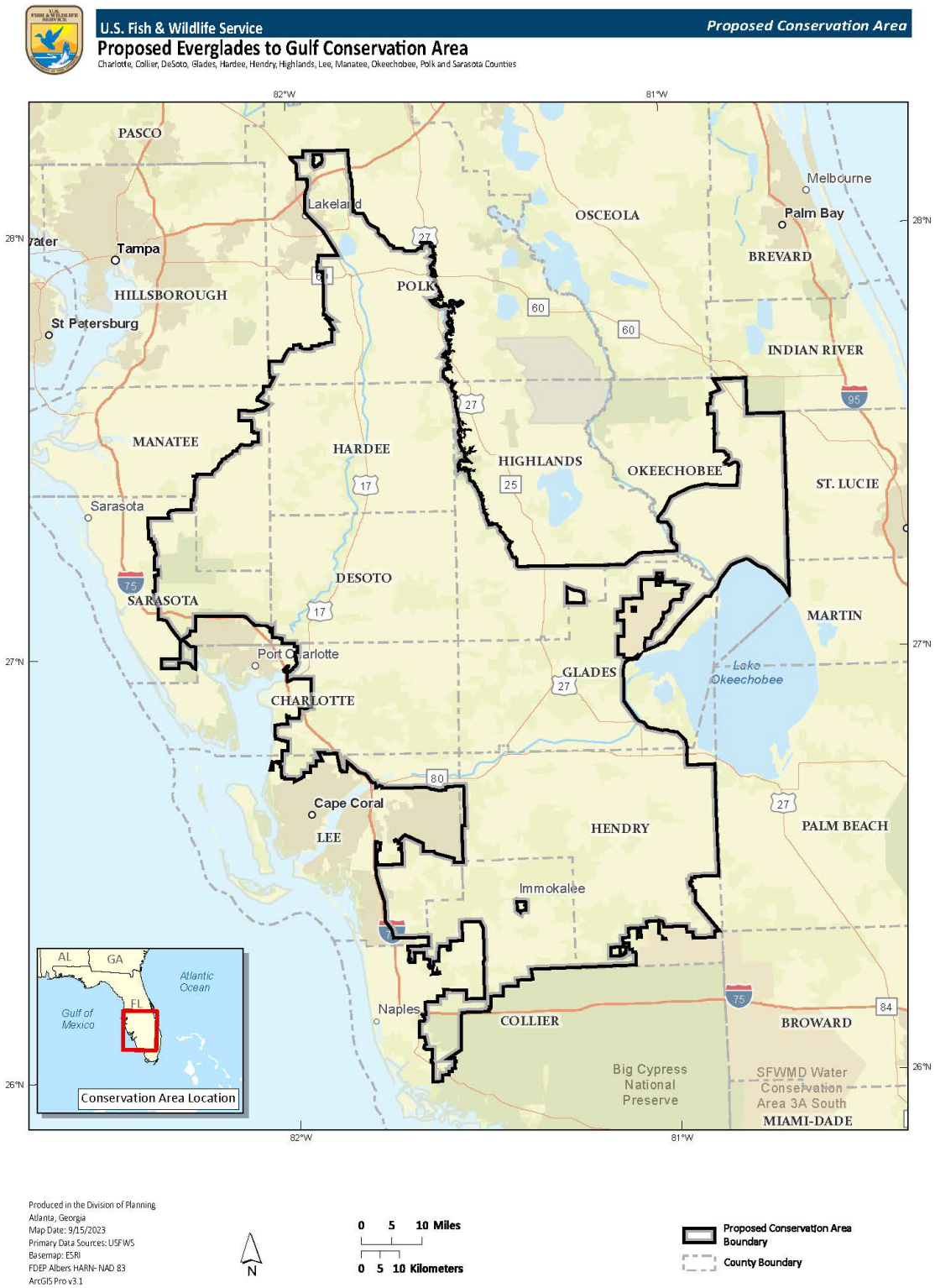
It is crucial to note the Service's policy is to work with willing sellers to acquire less-than-fee-title or fee-title interest in property. Landowners within the proposed Conservation Area would be under no obligation to sell interest in their properties to the Service. The proposed Conservation Area would provide important opportunities for conservation, while at the same time maintaining the ability of the ranching community to persist. Landowners in the proposed Conservation Area may voluntarily choose to participate, and participating lands would remain in private ownership. Private landowners who elect to participate would continue to control activities on their lands.



EA Figure 1. LCD Study Area Boundary

SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of this Draft Environmental Assessment (EA) is limited to the acquisition, in less-than-fee-title, and in fee-title of lands for the establishment of the Everglades to Gulf Conservation Area (EA Figure 2). Information and analysis are provided for the proposed Conservation Area. This Draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A Conceptual Management Plan and Interim Compatibility Determinations (Appendix B) are included to provide general outlines on how the lands would be managed. The appendices are provided as general information for the public in its review of the project. The Service would develop a comprehensive conservation plan, a 15-year management plan, and needed step-down management plans (e.g., a step-down plan addressing hunting would likely be developed within 3-5 years of acquisition of property sufficient to support hunting), for the proposed Conservation Area. These plans would be developed and reviewed in accordance with Department of Interior requirements of the National Environmental Policy Act.



EA Figure 2. Proposed Everglades to Gulf Conservation Area

PURPOSE AND NEED

In coordination with partners, the purpose of the proposed Everglades to Gulf Conservation Area is to strategically conserve and restore a functional network of natural and working lands to protect ecologically important habitats, vulnerable wildlife, watersheds, water quality, biodiversity, Everglades restoration, cultural resources, and wildlife corridors in southwest Florida to buffer these resources against present and future threats including but not limited to, development and climate change. In addition, enhance wildlife-dependent recreational opportunities and provide cultural, traditional, and medicinal use opportunities while promoting activities that complement and support the purposes of the proposed Everglades to Gulf Conservation Area and other partner-driven conservation initiatives that exist in southwest Florida.

The need of the proposed action is to meet the Service's priorities and mandates as outlined by the National Wildlife Refuge System Administration Act to "plan and direct the continued growth of the System in a manner that is best designed to accomplish the mission of the System, to contribute to the conservation of the ecosystems of the United States, to complement efforts of States and other Federal agencies to conserve fish and wildlife and their habitats, and to increase support for the System and participation from conservation partners and the public" (16 U.S.C. 668dd(a)(4)(C)). Additionally, there is a need for increased resource protection in this part of Florida, as various growing threats are likely to continue to put natural resources at risk. These threats include but are not limited to the listed items.

- Southwest Florida is one of the most rapidly growing parts of the United States with an extreme level of human population growth, fast-pace and large scale of habitat loss due to new development, and rapidly expanding coastal developed areas that are moving further inland to threaten important habitats, watersheds, and a sustainable rural landscape.
- The fresh and saltwater ecosystems of Southwest Florida are increasingly impacted by stormwater and nutrient pollution that is fueling blue-green algae blooms in Lake Okeechobee and the Caloosahatchee River (as well as other significant freshwater bodies) and increasingly frequent, severe, and longer duration red tide events in coastal estuaries and marine waters.
- Southwest Florida is particularly vulnerable to sea level rise associated with climate change because of its low and very gradual topographic gradient and high level of coastal development;
- Protecting connected landscape gradients from current coastline and natural coastal ecosystems to inland areas is essential for a resilient adaptation strategy for natural systems across the region.

BACKGROUND

The Study Area from the LCD (2022) (Appendix E) represents the current breeding range and best potential population expansion areas for the Florida panther, with over a million acres of unprotected habitat for other listed and focal species, unique natural communities, the heart of Florida's unique prairie ranching landscape, Greater Everglades watersheds, and the entire Peace River and Myakka river watersheds, which are essential for the health of Charlotte Harbor, a National Estuary and epicenter of natural resource based tourism and economic activity in southwest Florida. The Study Area is also an essential keystone for the Florida Wildlife Corridor, which is delineated by the State of Florida as the top three priorities within the Florida Ecological Greenways Network (FEGN). The Florida Wildlife Corridor has recently become a statewide conservation priority for the Florida Legislature and Governor, who have expressed their commitment to its protection through a significant increase in conservation protection land funding for the Florida Forever and Rural and Family Lands Protection programs. This Study Area represents an unprecedented landscape-scale conservation opportunity

with great potential for both large scale conservation funding and cooperative opportunities between federal, State, regional, and local partners. In fact, Florida's ecological and economic future is dependent on conservation success in this region.

Southwest Florida fosters a unique set of natural communities and species with notable threats from rapid human population growth and climate change. However, this region also harbors a largely intact rural landscape essential to the Florida panther and a host of other federal and State listed species and species at-risk. It plays a very important role in the ecological integrity of both the Everglades and Charlotte Harbor watersheds. Important opportunities still exist to protect large working landscapes and functional ecological connections between conservation areas to address many of the region's biodiversity and water resource conservation goals. Conservation opportunities include:

- History of cooperative conservation efforts in the region including:
    - Served as the pilot project area for the Florida Fish and Wildlife Conservation Commission's Cooperative Conservation Blueprint (FWC Blueprint); a science and stakeholder driven multi-year project that the Service can build upon;
    - Served as a focal area for the Peninsular Florida Landscape Conservation Cooperative;
    - Development of a smaller-scaled Southwest Florida Landscape Conservation Design in 2017;
    - Contained in the Resilient Lands and Waters Initiative, which is an effort to support collaborative landscape partnerships where federal agencies work with partners to conserve and restore important lands and waters and make them more resilient to changing climate.
- The region is home to many ranches providing landscape-scale conservation opportunities with willing landowners vitally interested in conservation easements (many of these ranches have gone through the intensive State vetting process and provide immediate conservation opportunities to leverage State funding);
- The State's Florida Wildlife Corridor Initiative and land protection funding provides a large potential State match to potential priority wildlife corridor and refuge conservation projects occurring in much of the region.

The Service refined the 7-million-acre LCD Study Area to propose the 4-million-acre Conservation Area which is analyzed in this draft plan.

NATIONAL WILDLIFE REFUGE SYSTEM OVERVIEW

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" (National Wildlife Refuge System Improvement Act of 1997).

Units of the National Wildlife Refuge System provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in conserving threatened and endangered species.

Units of the National Wildlife Refuge System offer a wide variety of wildlife-dependent recreational opportunities, and many have visitor centers, wildlife trails, and environmental education programs. Nationwide, about 72 million visitors annually hunt, fish, observe, and photograph wildlife, or participate in educational and

interpretive activities (Big 6) on refuge system units. In the Southeast Region, there were over 20 million visits to support the Big 6 uses.

PROPOSED ACTION

Southwest Florida has a combination of ecological significance, threats to ecological integrity, and conservation protection opportunities that make it unique in Florida and the United States. The region also has a long history of conservation planning and partnerships that make it "shovel ready" for regional landscape-scale conservation action through significantly enhanced fee simple and easement land protection and restoration funding. Federal funding in partnership with recently expanded State funding could achieve large-scale land protection needed to:

- Assist with the restoration of the Everglades.
- Enhance the viability and recovery of the Florida Panther and over 100 other threatened and endangered species and 17 At-risk species.
- Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy especially the Caloosahatchee River watershed, Fisheating Creek watershed, the Peace River watershed, the Myakka River watershed, Okaloacoochee Slough, Corkscrew Swamp, and Charlotte Harbor.
- Maintain unique natural communities and species adapted to the unique subtropical environment.
- Conserve habitat diversity and complexity.
- Improve and increase resiliency.
- Facilitate protection of a regional scale wildlife corridor through the protection of a functional landscape mosaic of natural communities and ranchlands.
- Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species.
- Complement other conservation initiatives.
- Foster existing partnerships and seek new partnerships.
- Conserve cultural sites and landscapes.
- Provide cultural, traditional, and medicinal use opportunities on fee-title lands.
- Provide wildlife dependent recreational opportunities on fee-title lands.

The scope of this Draft EA is limited to working with partners to establish a proposed Conservation Area which would in include the acquisition, in fee-title and in less-than-fee-title, of lands. The proposed Conservation Area is approximately 4-million-acre area which would be equivalent to the acquisition boundary. Information and analysis are provided for the proposed Conservation Area. This Draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A Conceptual Management Plan and Interim Compatibility Determinations (Appendix B) are included to provide general outlines on how the lands would be managed. The appendices are provided as general information for the public in its review of the project. The Service would develop a comprehensive conservation plan, a 15-year management plan, and needed step-down management plans (e.g., a step-down plan addressing hunting would likely be developed within 3-5 years of acquisition of property sufficient to support hunting), for the proposed Conservation Area. These plans would be developed and reviewed in accordance with Department of Interior requirements of the National Environmental Policy Act.

For lands that the Service acquires in fee-title, habitat restoration and management would provide threatened, endangered, at-risk and resident wildlife with suitable habitat. Wetland drainage ditches may be filled to restore historic water storage capacity and provide breeding grounds for waterfowl. Prescribed fire would be used to remove excess vegetation and restore native plant communities. Invasive species would be controlled through manual, mechanical, and/or chemical means. Cultural and historical resources would be protected, and interpretive programs and materials would allow the public to better understand and appreciate these important resources.

The Service would acquire, protect, conserve, and manage important natural resources of this landscape through fee-title purchases, leases, donations, conservation easements, mitigation and conservation banks, and/or cooperative agreements from willing sellers. All lands and waters acquired would be managed by the service as the Everglades to Gulf Conservation Area. The overall objectives of the proposed Conservation Area would be to provide wildlife corridors essential for species viability and adaptation opportunities in response to climate change; restore wetland and upland habitats for a wide range of imperiled species; contribute the restoration efforts of the Greater Everglades; complement other conservation initiatives; protect rural landscape mosaics of natural communities and ranchland to combat habitat fragmentation; conserve habitat diversity and complexity; maintain unique natural communities and species adapted to unique subtropical environments; sustain and protect over 100 State and Federally threatened and endangered species, 17 at-risk species, and 18 Birds of Conservation Concern; protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy; foster new and existing partnerships; conserve and protect cultural sites and landscapes; provide cultural, traditional, medicinal use opportunities to Tribal Nations; and provide opportunities for public wildlife-dependent outdoor interpretation, education, and recreation.

Public uses for consideration for the proposed Conservation Area would include six priority public uses: hunting, fishing, environmental education, interpretation, wildlife observation, and photography. Potential public uses supporting priority public uses would also be considered (depending on the specifics of a particular property acquired), may include bicycling, boating, hiking, jogging, horseback riding, camping (with limitations), ORV use (with limitations), and facilities to support any of the approved uses. The Service is committed to working with the FWC to facilitate public use activities, specifically hunting and fishing. Uses would be approved through the appropriateness and compatibility requirements in the National Wildlife Refuge System Administration Act and the Refuge Recreation Act.

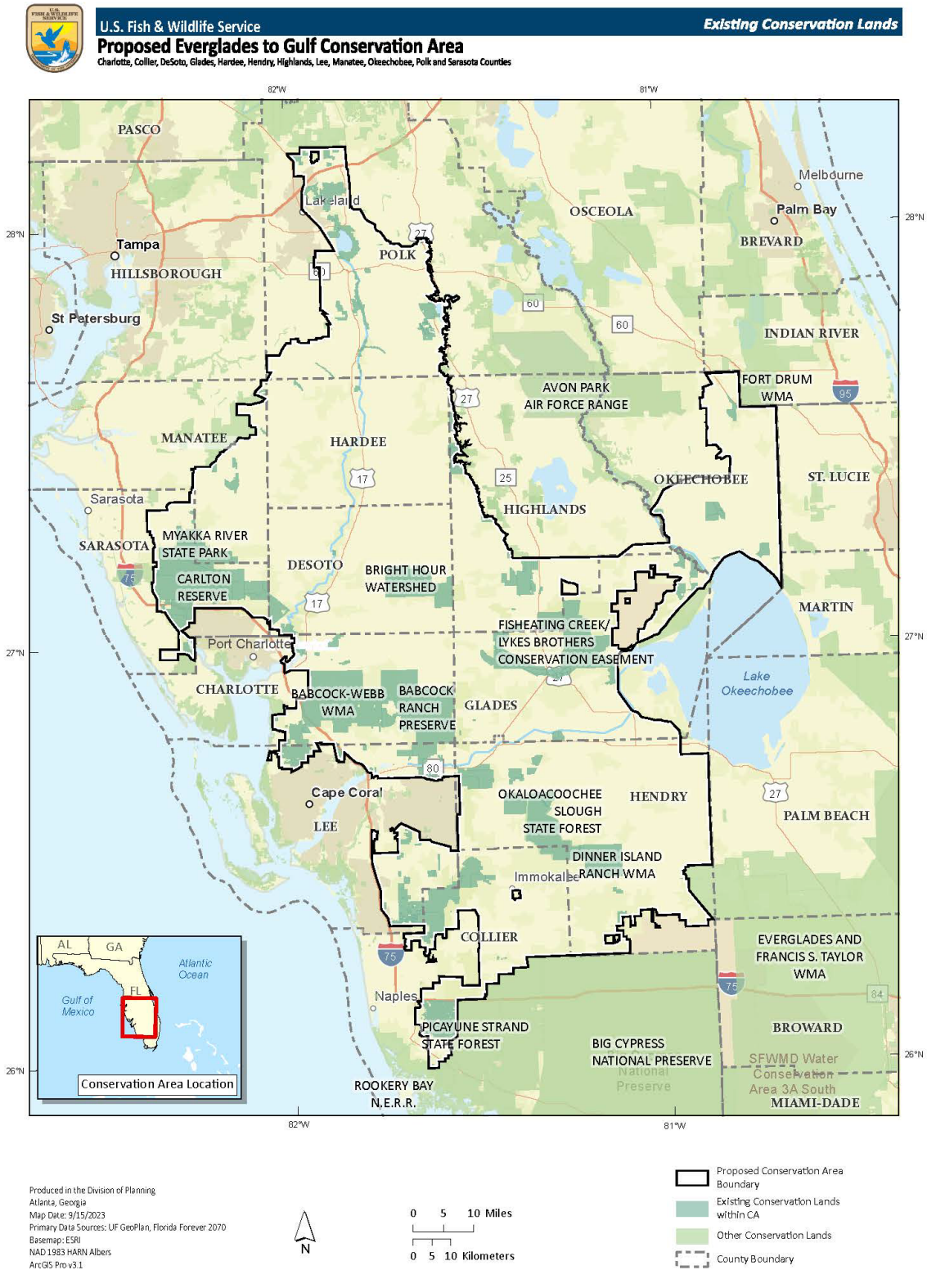
It is anticipated that funding for this project would be provided primarily through the Land and Water Conservation Fund and the North American Wetlands Conservation Act. The authority for the use of these funds for land acquisition is the National Wildlife Refuge System Administration Act; Endangered Species Act Of 1973; Emergency Wetlands Resources Act Of 1986; The Migratory Bird Conservation Act Of 1929; fish and Wildlife Act Of 1956; and Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended.

RELATED RESOURCES

The proposed Conservation Area would contribute to many of these, conservation and mitigation banks, national and international conservation plans and initiatives. During the planning process for this project, the Service engaged with Tribal Nations, including the Seminole Nation of Oklahoma, Poarch Band of Creek Indians, Miccosukee Tribe of Indians of Florida, Seminole Indian Tribe of Florida, and the Muscogee (Creek) Nation early in the scoping process. The Service and the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida met and discussed the role of the Service in land protection and opportunities in Southwest Florida and opportunities for the Service and Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida to

collaborate on conservation objectives. The Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida contributed as active members of the planning team to develop this proposal.

EA Figure 3 depicts current conservation lands and waters within the proposed Conservation Area. Many of our partners already own or have future plans to protect lands in the project area through conservation or agricultural easements. Still others have completed on-the-ground habitat restoration projects throughout the area. These partners use their individual mission statements to focus protection and restoration efforts. Taken together, those mission statements cover the protection of State and federal threatened and endangered species, rare habitats, prairie and flatwoods habitats, ranchlands, and recreational areas that have been identified through the scoping process as being important to the long-term ecological health, economy, and way of life of the region.



EA Figure 3. Conservation Lands within the proposed Conservation Area.

Table 4. Ownership of Lands in the proposed Conservation Area. Source: Southeast Conservation Blueprint Summary 2023)

Ownership	Acres	Percent of Area
Federal	143	<0.1%
State/province	299,085	7.5%
Regional	142,251	3.6%
Local	73,419	1.8%
Private non-profit conserved lands	12,295	0.3%
Private conservation lands	278,429	7.0%
Designation	2,585	<0.1%
Not conserved	*3,197,182*	*79.8%*
Total Area	4,005,389	100%

Protected areas (U.S. Geological Survey Gap Analysis Project 2022)) found with the proposed Conservation Area footprint include but are not limited to:

- Babcock Ranch Preserve (Trustees of the Internal Improvement Trust Fund; 73,239 acres)
- Fred C. Babcock-Cecil M. Webb Wildlife Management Area (Florida Fish and Wildlife Conservation Commission; 67,375 acres)
- Wetlands Reserve Program, Highlands, FL (42,561 acres)
- Fisheating Creek/Lykes Brothers Conservation Easement (PVT; 41,526 acres)
- Myakka River State Park (Trustees of the Internal Improvement Trust Fund; 37,197 acres)
- Wetlands Reserve Program, Hendry, FL (34,736 acres)
- Okaloacoochee Slough State Forest (South Florida Water Management District; 32,347 acres)
- Bright Hour Watershed (PVT; 32,250 acres)
- Corkscrew Regional Ecosystem Watershed (South Florida Water Management District; 27,534 acres)
- T. Mabry Carlton, Jr. Memorial Reserve (Sarasota County; 24,577 acres)
- Dinner Island Ranch Wildlife Management Area (Trustees of the Internal Improvement Trust Fund; 21,706 acres)
- Fisheating Creek Wildlife Management Area (Trustees of the Internal Improvement Trust Fund; 18,373 acres)
- Picayune Strand State Forest (Trustees of the Internal Improvement Trust Fund; 18,348 acres)
- River of Grass (South Florida Water Management District; 17,905 acres)
- Yucca Pens Unit (Trustees of the Internal Improvement Trust Fund; 15,035 acres)
- Corkscrew Swamp Sanctuary (National Audubon Society, Inc.; 11,679 acres)
- Archbold Biological Station (Archbold Expeditions, Inc.; 8,823 acres)
- Fisheating Creek/Smoak Groves Conservation Easement (PVT; 8,377 acres)
- Spirit of the Wild Wildlife Management Area (Trustees of the Internal Improvement Trust Fund; 7,648 acres)
- Myakkahatchee Creek Conservation Easement (PVT; 7,631 acres)
- Tenoroc Fish Management Area (Trustees of the Internal Improvement Trust Fund; 7,528 acres)
- Wetlands Reserve Program, Okeechobee, FL (7,504 acres)
- Caloosahatchee Basin Water Storage Reservoir (South Florida Water Management District; 7,133 acres)

SPECIAL CONSIDERATIONS

Lands within the proposed Conservation Area have been reviewed by the Service for inclusion in the National Wilderness Preservation System according to criteria set forth in the Wilderness Act of 1964. Based on the Service's July 27, 2023, assessment the proposed Conservation Area was found not to be suitable for wilderness designation since:

- No areas meet the Wilderness minimum size requirement of 5,000 contiguous roadless acres;
- No areas contain any units of sufficient size for preservation as Wilderness;
- Areas under consideration have been altered by historic and ongoing human activities; and/or
- No areas include outstanding opportunities for solitude or for primitive recreation.

The proposed Conservation Area comprises a landscape that is largely rural, with agriculture, forestry, ranching, and outdoor recreation/tourism. Most tracts in the proposed Conservation Area are impacted by human use throughout the landscape. The extensive network of roadways, altered landscapes, increasing population, and development would make a wilderness experience improbable. Therefore, wilderness designation for any units of the proposed Conservation Area is not appropriate.

COORDINATION AND CONSULTATION

During the planning process, the Service coordinated and consulted with a mix of governmental entities with interest in the landscape. Several federal and State agencies serve as key partners in this landscape, including NRCS; Avon Park Air Force Range; FWC; FDACS; FFS, FDACS; FDEP; Florida Division of State Lands; SWFWMD and SFWMD. These partners were keys to the development of this project.

Service staff have been continuously engaged with interested parties including local, State, Federal, Tribal, non-governmental agencies, and private landowners. Specifically, since January 2022 through April 2023, strong interest in meeting with the National Wildlife Refuge System staff to discuss conservation activities and needs in southwest Florida have occurred. Staff participated in over 30 meetings. Topics discussed at the meetings included:

- General Service conservation activities on private lands;
- Florida Panther conservation efforts by the Service;
- The need to protect sensitive bird areas;
- The need for corridor protection for wildlife;
- Collaboration potential of the Service and other State and Federal land acquisition agencies such as: Florida Forever (Florida Department of Environmental Protection), The Rural and Family Lands Protection Program (Florida Department of Agricultural and Consumer Services-FDACS) Forest Legacy (Florida Forest Service, FDACS), and Wetland Reserve Easement Program (Natural Resource Conservation Service (NRCS);
- Management of conservation easements and fee-title lands by the National Wildlife Refuge System; and
- The Fisheating Creek and Florida Panther NWR Landscape Conservation Design completed in 2016 and encouragement to expand efforts for conservation protection, cultural and traditional use and access of Department of Interior lands, and the need for protection of working landscapes.

Tribal Nations are also important partners in the Greater Everglades landscape. The Service works with the Tribal Nations to ensure timely and effective cooperation and collaboration. During the planning for this project, the Service engaged with Tribal Nations, including the Seminole Nation of Oklahoma, Poarch Band of Creek Indians, Miccosukee Tribe of Indians of Florida, Seminole Indian Tribe of Florida, and the Muscogee Nation early in the scoping process. At the request of the Miccosukee Tribe of Indians of Florida, a follow-up meeting

occurred between the Service and the Miccosukee Tribe to discuss the Southwest Florida Landscape Conservation Design (Morris et al. 2017) and the planning process. The Service and the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida met and discussed the role of the Service in land protection and opportunities in Southwest Florida and opportunities for the Service and Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida to collaborate on conservation objectives. The Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida contributed as active members of the planning team to develop this proposal.

PUBLIC PARTICIPATION

PUBLIC SCOPING

The 35-day scoping period for this project began on March 14, 2023, with a U.S. Fish and Wildlife Service press release announcing the proposed action and requesting public input. It ended on April 18, 2023. Seven public scoping meetings were conducted, including a virtual meeting with intergovernmental partners, two virtual meetings open to the public, and four in-person meetings. For those who could not attend, the scoping presentation was posted on the proposed Conservation Area's website and viewed 190 times. The dates and locations of the meeting were as follows: Intergovernmental virtual (March 24, 2023), Wauchula, FL (March 28, 2023), Arcadia, FL (March 30, 2023), Immokalee, FL (April 3, 2023), virtual (April 5, 2023), Labelle, FL (April 7, 2023), and virtual (April 12, 2023). A link to a webpage explaining the details regarding the dates and locations of the public scoping meetings and how to register and submit comments was included in the Service's initial press release.

Articles and information produced by other entities have also appeared in the press, including a YouTube video published by Defenders of Wildlife (January 27, 2023) and articles published by The Beaches Leader (March 14, 2023), POLITICO Pro (March 14, 2023), WGCU (March 14, 2023), National Wildlife Refuge Association (March 28, 2023), and Fort Meyers News-Press (April 5, 2023).

Collectively, the seven public scoping meetings had 171 attendees, including individual citizens; von Park Airforce Base; Florida Department of Transportation; Florida Department of Environmental Protection; Miccosukee Tribe; Florida Fish and Wildlife Conservation Commission; U.S. Army Corps of Engineers; National Park Service; Seminole Tribe of Florida; Southwest Florida Water Management District; South Florida Water Management District; Big Cypress National Preserve; Audubon Florida; Center for Biological Diversity; Gray Ranch LLC; Conservation Foundation of the Gulf Coast; Strickland Ranch; Defenders of Wildlife; Cypress Chapter Izaak Walton League of America; Audubon Western Everglades; Conservation Collier; South Florida Wetlands Management District; Backcountry Hunters and Anglers; Lee County; National Wildlife Federation; Salty Science; Friends of the Florida Panther Refuge; City of Bonita Springs Community Development; JB Ranch; National Oceanic and Atmospheric Administration; Coastal & Heartland National Estuary Partnership; Friends of Bosque del Apache; Friends of Alaska National Wildlife Refuges; Family Lands Remembered; Florida Cattlemen's Association; Live Wildly Foundation; Delta Waterfowl; American Daughters of Conservation; Environmental Lands Management and Acquisition Committee; Highlands County Board of County Commissioners; Friends of the Fakahatchee; Florida Trail Association; American Sportfishing Association; Conservancy of Southwest Florida; Sarasota County Parks, Recreation, and Natural Resources; Artemis Sportswomen (National Wildlife Federation); Ancient Islands Group Florida Sierra Club; Ding Darling Wildlife Society; National Parks Conservation Association; Sarasota County Government; Florida Park Service; Stantec; The Friends of Rachel Carson NWR; Venetian Golf and River Club; H.W. Lochner, Inc.; Wildlands Conservation; Earth Justice; Everglades Foundation; Florida Conservation Group; National Wildlife Refuge Association; The Nature Conservancy; University of Florida Center for Landscape Conservation Planning; Florida Wildlife Corridor

Foundation; Safari Club International; National Wildlife Foundation; National Wild Turkey Foundation; Everglades Coordinating Council; Southwest Florida Working Dog Association; Future Hunters of Florida; Florida Cattleman Association; Conservation Florida; Wildland Scapes; Common Ground Ecology; Archbold Biological Station; and Hendry County.

The Service received approximately 2,600 comments, all of which were generally supportive. Substantive comments primarily focused on prioritizing habitats and wildlife, public use considerations, partnership opportunities, Tribal interests, restoration considerations, and willing landowner and easement interests.

Public scoping comments were categorized into five main categories (i.e., Wildlife and Habitat, Resource Protection, Recreation and other uses, Administration, and General), with appropriate subcategories, including those listed.

- Wildlife and Habitat
    - General
    - Florida Panther
    - Water Quality and Quantity
    - Wildlife Corridors and Migration
    - Ecosystem Services
    - Grazing on fee-title lands
    - Ecological priorities within Southwest Florida
    - Land management of fee-title lands and easements owned by the Service
- Resource Protection
    - Land Acquisition/Protection Process
    - Fee-title and Less-than-Fee-title Acquisition
    - Contaminants – Evaluation of Properties for Inclusion
    - Specific Properties/Sites
    - Specific Boundary for the Proposed Conservation Area
    - Cultural Resources/History within Southwest Florida
    - Wilderness
    - Restoration of mined lands
    - Tribal access to National Wildlife Refuge System lands
- Recreation and other uses
    - General
    - Hunting
    - Fishing
    - Wildlife Observation and Photography
    - ATV/ORV Use
    - Access
    - Bicycling
    - Boating
    - Horseback riding
    - Grazing
    - Tribal access
    - Haying
- Administration
    - General

    - Funding/Budget
    - Property Taxes/Refuge Revenue Sharing Payment
    - Management Plan
    - Partnerships/Outreach
- General
    - Economy
    - Means to achieve land protection
    - Development Patterns/Pressure
    - Other Examples of Federal Management
    - Planning Process
    - General

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter presents the alternatives including our Proposed Alternative that the Service believes best meets the purposes, vision, and goals for the proposed Conservation Area. The vision is "together with our partners, will preserve wildlife corridors containing a mosaic of natural communities and working lands with rich cultural history and traditions for the benefit of all people. All species and habitats will be protected and contain the resiliency to facilitate adaption due to the impacts of climate change and development. Additionally, protection and management actions within the landscape will improve water quality, water storage, provide wildlife dependent recreational opportunity, and support Florida's family farms and ranches."

Emphasizing migratory birds, listed species, and wetlands, while protecting the important fish and wildlife resources of this landscape, the listed purposes have been developed for the establishment of the proposed Conservation Area.

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)

"…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)

"…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)

"…to conserve and protect migratory birds..., including species that are listed...as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)

"…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and

wildlife resources....” 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)

"…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

Four overarching goals were developed for the proposed Conservation Area. The goals are intentionally broad, descriptive statements of the desired future conditions. They embrace the proposed purposes and vision statement. The goals address a functional conservation landscape; habitat for fish and wildlife; water quality, quantity, and storage; opportunities for Tribal Nations; and wildlife-dependent recreation, as listed.

1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Conservation Area would aid in the maintenance and recovery of Florida panther populations and protect many rare and endemic species, including over 100 Federally and State-listed Threatened and Endangered species, such as the Florida scrub-jay, Audubon’s crested caracara, wood stork, Florida bonneted bat, Everglade snail kite, Eastern indigo snake and sand skink, thereby protecting natural communities found only in south Florida and species adapted to Florida’s unique subtropical environment. In addition, the Service would conserve important rural landscape mosaics, including ranchlands, to combat habitat fragmentation and protect wildlife corridors essential to many species’ viability and adaptation responses to climate change. Important wildlife corridors essential for listed species viability and adaptation opportunities in response to climate change would be provided. The proposed Conservation Area would also provide opportunities to restore important wetlands, provide water storage, and improve water quality for the Greater Everglades, Myakka River, Peace River, Fisheating Creek, and Caloosahatchee River watersheds, and coastal estuaries including Charlotte Harbor.

2. Provide Science-Driven Landscape-Level Conservation. The proposed Conservation Area would contribute to protection of a functional conservation landscape composed of a mosaic of natural communities and ranchlands that would prevent further habitat fragmentation, provide functional habitat for wide-ranging listed species, and facilitate watershed and prescribed fire management. The proposed Conservation Area would allow the Service to protect and restore water resources within multiple watersheds to improve water quality and quantity; maintain and enhance ecological integrity, recreation, and the economy; and improve and secure water supplies, benefiting humans and wildlife. The landscape-scale ecological priorities within the proposed Conservation Area are identified with the best available ecological and spatial data based on conservation science, landscape ecology, tribal indigenous knowledge, and spatial analysis.

3. Conserve Important Lands and Waters for the Benefit of All People. Visitors to the proposed Conservation Area fee-title lands would enjoy opportunities for compatible wildlife-dependent recreation which may include hunting, fishing, wildlife observation, photography, environmental education, and interpretation, while increasing knowledge of and support for conservation. Fee-title lands could also provide cultural, traditional, and medicinal use opportunities. Willing landowners could protect their private land through conservation easements and stewardship programs while providing important ecosystem services for all people. The Everglades and southwest Florida watersheds require protection of remaining functional wetlands and floodplains, and restoration of hydrology to avoid

further impairment and improve water quality and supply including Charlotte Harbor, an essential economic engine for south and southwest Florida.

4. Promote Conservation Partnerships Working with Adaptive and Flexible Tools and Strategies. Collaboration in science, education, research, and land acquisition (including conservation easements) would facilitate the development of new partnerships and strengthen existing partnerships with natural resource organizations, private landowners, government agencies, Tribal Nations, and local decision-makers. The partnerships would help inform land management decisions and encourage continued responsible stewardship of natural and rural landscapes essential for listed species protection, associated natural resources, while facilitating resiliency and adaptation to climate change.

Objectives associated with the proposed Conservation Area would:

- Assist with the restoration of the Everglades.
- Enhance the viability and recovery of the Florida Panther and over 100 other threatened and endangered species and 17 At-risk species.
- Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy especially the Caloosahatchee River watershed, Fisheating Creek watershed, the Peace River watershed, the Myakka River watershed, Okaloacoochee Slough, Corkscrew Swamp, and Charlotte Harbor.
- Maintain unique natural communities and species adapted to the unique subtropical environment.
- Conserve habitat diversity and complexity.
- Improve and increase resiliency.
- Facilitate protection of a regional scale wildlife corridor through the protection of a functional landscape mosaic of natural communities and ranchlands.
- Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species.
- Complement other conservation initiatives.
- Foster existing partnerships and seek new partnerships.
- Conserve cultural sites and landscapes.
- Provide cultural, traditional, and medicinal use opportunities on fee-title lands.
- Provide wildlife dependent recreational opportunities on fee-title lands.

The scope of this Draft EA is limited to the acquisition, in less-than-fee-title and fee-title, of lands for the establishment of the proposed Everglades to Gulf Conservation Area. This draft EA is not intended to cover the development and/or implementation of detailed, specific programs for the administration and management of those lands. A Conceptual Management Plan and Interim Compatibility Determinations (Appendix B and C) are included to provide general outlines on how the lands would be managed. The appendices are provided as general information for the public in its review of the project. The Service would development a comprehensive conservation plan, a 15-year management plan, and appropriate step-down management plans for the proposed Conservation Area within 15-years of the final EA. These plans would be developed and reviewed in accordance with the Department of the Interior requirements of the National Environmental Policy Act.

FORMULATING ALTERNATIVES

Under the National Environmental Policy Act (NEPA), the Service developed and evaluated a reasonable range of alternatives based on the issues raised during internal and public scoping by the Service, the public, other

federal agencies, Tribal Nations, State and local governmental agencies, organization, and other interested parties. The Proposed Action defines what the Service plans to do or recommend, but cannot implement without considering other reasonable, environmentally sensitive alternatives. Other reasonable alternatives to the Proposed Action that could also be viewed as fulfilling the proposed purposes of the refuge system unit are described in this Draft EA. This offers the Service and the reviewing public an opportunity to consider a range of reasonable alternatives for the Proposed Action, thus fulfilling one of the key tenets of NEPA.

Alternatives describe complementary management approaches for achieving the missions of the Service and Refuge System, the purposes for which the refuge system unit would be established, and its vision and goals, while responding to issues and opportunities identified during the planning process.

Based on this process to identify and evaluate alternatives, the Service selected two alternatives, including the NEPA-required No Action Alternative, to provide a baseline for comparing the action alternative. The alternatives evaluated in detail are listed.

- Alternative A. (No Action Alternative)
- Alternative B. Conservation Area Partnership Approach (Proposed Action Alternative)

ALTERNATIVES EVALUATED BUT DISCARDED

One alternative that was discussed but discarded was to focus exclusively on utilizing conservation easements (i.e., Service purchase of only certain landowner rights and privileges such as development rights) without any fee-title acquisitions (i.e., Service ownership of all landowner rights and privileges). It was determined that this approach would not provide the Service the opportunity to provide wildlife-dependent outdoor recreation and education opportunities and not provide cultural, traditional, and medicinal use opportunities on fee-title lands. Since the specifics of conservation easements are highly dependent upon the landowners, the Service could not guarantee under this alternative the ability to provide opportunities for wildlife-dependent recreation and education or the ability to provide cultural, traditional, and medicinal use opportunities on fee-title lands. Although a conservation easements-only approach was determined not to be feasible, conservation easements are useful tools that were incorporated into a more robust approach to landscape-scale conservation that is outlined in the Proposed Alternative.

DESCRIPTION OF ALTERNATIVES

ALTERNATIVE A – NO ACTION

This alternative represents the current state of land protection activity in the landscape without a conservation area designation by the Service. The Service would take no action to establish the proposed Conservation Area within this area of interest. This alternative is referred to interchangeably as “Alternative A” or “No Action Alternative” throughout this document.

Currently, the landscape is dominated by a mix of active cattle ranches, scattered homesteads, farms, communities, lakes, river corridors, wetland basins, grassland savannahs, sandhills, and scrub habitat. A mix of conservation lands ranging from agricultural conservation easements to private conservation lands to municipal, State, Tribal Nations, and federal ownerships is also present. Under this alternative, habitat protection and management would continue by existing organizations and government programs. Approximately 625,760 acres of the proposed Conservation Area is currently protected and managed.

Under the No Action Alternative, lands trusts, the State of Florida, and other conservation land managers would continue to protect some of the lands in the 7-million-acre Study Area defined in the LCD. Florida has a history of funding land protection efforts, and since 2001 the Florida Forever program has acquired more than 942,807 acres of land. Almost 3,518,094 acres of lands are proposed for acquisition under Florida Forever in 2022, with 947,680 acres of unprotected Florida Forever projects within the Study Area. In addition, the Study Area has 78,527 acres of Rural and Family Lands Protection Program (RFLPP) projects and will likely have well over 100,000 acres in RFLPP after the proposed new projects in the current cycle are evaluated; these are lands that will be eligible for conservation easements. Though State funding for conservation land protection varied greatly, currently approximately $300 million per year cumulatively for the Florida Forever and RFLPP programs has occurred over the last three years (2021-2023). Southwest Florida is one of the fastest growing regions in the United States, with a rapid loss of rural land to residential and commercial development. Phosphate mining is another significant land use within the Study Area, primarily the Peace River watershed. Cumulatively, even the recently increased levels of State conservation land protection funding cannot keep up with the demand for permanent protection from willing landowners or the pace of development. This means that every dollar counts; more federal funding to augment State funding can make a crucial difference in protecting areas strategic for conservation before they are no longer suitable to support wildlife and habitat. It will take decades to protect all the areas important for conservation in the Study Area, but more funding now will decrease future costs and reduce the threat of loss of the most important areas.

Under this Alternative no new opportunities would be pursued by the Service for wildlife-dependent recreational public uses. Uses include hunting, fishing, environmental education, interpretation, wildlife observation, and photography. No new opportunities on Service-acquired fee-title lands for cultural, traditional, and medicinal use opportunities would occur.

The desired fish and wildlife protection objectives, therefore, cannot be achieved to any degree under this alternative. Specifically, implementation of the No Action Alternative would not achieve our objectives and would have adverse impacts to the area's valuable fish and wildlife habitats.

The role of Alternative A in terms of ability to meet each of the four overarching goals is detailed below.

1. Protect, Restore, and Manage Habitats for Fish and Wildlife.
Under the No Action Alternative, protection and management of wildlife and their habitats would be limited to existing conservation lands and programs, leaving remaining habitats vulnerable to a variety of threats, including development patterns and pressures. Development pressure would continue to threaten this landscape. Alternative A would maintain protection of approximately 625,760 acres of habitats currently protected by agricultural easements, private conservation, municipal, State, and federal ownerships. The Service would continue to work with partners to leverage site-specific grants for restoration and protection and offer management guidance for federally listed species.

2. Provide Science-Driven Landscape-Level Conservation. The existing conservation lands currently represents approximately 625,760 acres within the proposed Conservation Area. These lands are often times disparate and do not allow for the genetic interchange of isolated populations of species, such as the Florida grasshopper sparrow. Some species found within this landscape, such as Florida black bear and Florida panther, require vast areas to forage, find mates, breed, and raise young. Under Alternative A, the fragmented landscape of this area currently limits habitat use, migration, and dispersal of a variety of species.

It is anticipated that the human environment and the natural environment would ultimately be impacted by sea level rise and a forced inland and upslope retreat would be forthcoming. Under Alternative A, the fragmentation of this landscape and the anticipated human development patterns would continue to limit the ability of wildlife species and plant communities to respond to the impacts associated with global climate and human demographic changes.

Conservation lands in this landscape would continue to be managed by their respective agencies and organizations under the No Action Alternative, but no further Service efforts to connect them would likely be forthcoming. Additional conservation lands managed by other agencies may be added to the conservation landscape through programs such as the Florida Wildlife Corridor Initiative. Based on this collective effort, protection of habitats currently protected by agricultural easements, private conservation, municipal, State, and federal ownerships (such as NRCS WRE program) would continue.

Ranches provide considerable amounts of wildlife habitat in this area. Improved pasture, riparian corridors, and wetland basins provide habitat for species such as Audubon's crested caracara, southeastern kestrel, and wood stork. Threats to this agricultural community abound. Planned urban growth immediately removes both wildlife habitat and agricultural production from the landscape. Infrastructure required to accommodate this growth follows with the development and associated increases in roadways and utilities. Changing demographics of the ranch community also impact the ability of the ranching traditions to exist. Additionally, even conservation measures, such as deep-water storage, could threaten habitat values, depending upon their placement in the landscape.

Under the No Action Alternative, agricultural lands would remain in place on the landscape for some amount of time, but these lands could continue to face the threat of development.

3. Conserve Important Lands and Waters for the Benefit of All People.
The Service seeks opportunities to promote appropriate and compatible wildlife-dependent recreation on units of the National Wildlife Refuge System. There would be no fee-title land acquisition, therefore, no Service-based recreational opportunities would be provided under the No Action Alternative. A number of wildlife-dependent recreational activities that already exist within the landscape and would continue. Hunting and fishing would occur under regulations administered by the FWC. Much hunting occurs on private lands. Public hunting occurs on approximately 5.9 million acres of public lands in Florida.

Fishing is recreationally and economically important to the local population. Areas throughout the proposed Conservation Area would continue to provide recreation fishing opportunities. There would be no Service-based fishing opportunities.

FWC, as well as other federal, State, county, municipal, and private organizations provide outdoor wildlife-dependent recreation and educational opportunities. These activities would continue under the No Action Alternative.

There would be no fee-title land acquisition, therefore, no Service-based opportunities to provide cultural, traditional, and medicinal use for Tribals Nations would be provided under the No Action Alternative.

Future habitat protection under existing laws and regulations may be insufficient to prevent substantial degradation of the area's fish and wildlife resource values. Federal executive orders involving the protection of

wetlands and floodplains only apply to federal agencies. They do not apply to habitat alterations by non-federal entities which receive no federal funds.

On Dec. 22, 2020, the U.S. Environmental Protection Agency (EPA) published their approval of Florida's State 404 Program in the Federal Register, and the Florida Department of Environmental Protection (DEP) began administering the State 404 Program on that date. The primary deterrent against the loss of resource values is the Section 404 permit program, which is administered under the authority of the Clean Water Act. This program requires permits for most types of work in wetlands. Wetlands in the project area would be regulated under this program. In addition, the State of Florida has regulatory authority over the area and would not permit any developments that would violate the State's water quality standards.

However, there is no assurance that the protection offered by these regulations would be consistent with protection of the area's fish and wildlife resources. The regulatory programs are designed to accomplish different objectives. In addition, these programs are subject to changes in the law and to varying definitions and interpretations, potentially to the detriment of wetlands. The regulatory authority provides for the issuance of Section 10 and/or Section 404 permits when it is not contrary to the public interest to do so and provided other conditions are met. Fish and wildlife conservation is only one of several public interest factors that are considered in these permit issuance decisions. If fish and wildlife conservation is outweighed by other factors, permits that would alter the wetlands in the refuge system unit could be issued.

4. Promote Conservation Partnerships Working with Adaptive and Flexible Tools and Strategies.
There is management and land protection occurring on State and non-governmental organizations lands, depending on staff levels and funding. This would continue under the No Action Alternative. The Service could not acquire or manage fee or less-than-fee acreage containing habitat for the benefit of wildlife species within the proposed Conservation Area as part of the proposed Conservation Area. However, partner organizations and agencies would likely protect and manage some of this habitat.

ALTERNATIVE B – CONSERVATION AREA PARTNERSHIP APPROACH (PROPOSED ALTERNATIVE)

Under Alternative B, the Proposed Action Alternative, the Service would work with Tribal Nations, State, local, private, and federal partners towards a common vision for the conservation of the Greater Everglades and watersheds of the Caloosahatchee River, Fisheating Creek, Myakka River, and Peace River, and tributaries entering the northern portion of Lake Okeechobee. This alternative would protect and meet the needs of both rare and common wildlife, provide wildlife corridors linking existing conservation lands, and restore additional wetlands and wetland function, as well as provide opportunities for wildlife-dependent priority public uses and provide cultural, traditional, and medicinal uses. Public uses for consideration for this proposed Conservation Area would include six wildlife-dependent priority public uses: hunting, fishing, environmental education, interpretation, wildlife observation, and photography (Big 6). Potential public uses supporting the Big 6 uses would also be considered (depending on the specifics of a particular property acquired) and may include bicycling, boating, hiking, jogging, horseback riding, camping (with limitations), ORV use (with limitations), and facilities to support any of the approved uses. The Service is committed to working with the FWC to facilitate public use activities, specifically hunting and fishing. All uses would be approved through the appropriateness and compatibility requirements in the National Wildlife Refuge System Administration Act and the Refuge Recreation Act.

The Land Protection Plan would be approved, and the proposed Everglades to Gulf Conservation Area would be authorized and established. Working with willing landowners, protection of lands under Alternative B would

include the authority to acquire less-than-fee-title lands within the proposed Conservation Area. Additionally, up to 10% of acres in fee-title could be acquired within the proposed Conservation Area. The proposed Conservation Area would be approximately 4 million acres located in Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Lee, Manatee, Okeechobee, Polk, Sarasota Counties, Florida (EA Figure 2).

1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Conservation Area would aid in the maintenance and recovery of Florida panther populations and protect many rare and endemic species, including over 100 Federally and State-listed Threatened and Endangered species, such as the Florida scrub-jay, Audubon's crested caracara, wood stork, Florida bonneted bat, Everglade snail kite, Eastern indigo snake and sand skink, thereby protecting natural communities found only in south Florida and species adapted to Florida's unique subtropical environment. In addition, the Service would conserve important rural landscape mosaics, including ranchlands, to combat habitat fragmentation and protect wildlife corridors essential to many species' viability and adaptation responses to climate change. Important wildlife corridors essential for listed species viability and adaptation opportunities in response to climate change would be provided. The proposed Conservation Area would also provide opportunities to restore important wetlands, provide water storage, and improve water quality for the Greater Everglades, Myakka River, Peace River, Fisheating Creek, and Caloosahatchee River watersheds, and coastal estuaries including Charlotte Harbor.

2. Provide Science-Driven Landscape-Level Conservation. The proposed Conservation Area would contribute to protection of a functional conservation landscape composed of a mosaic of natural communities and ranchlands that would prevent further habitat fragmentation, provide functional habitat for wide-ranging listed species, and facilitate watershed and prescribed fire management. The proposed Conservation Area would allow the Service to protect and restore water resources within multiple watersheds to improve water quality and quantity; maintain and enhance ecological integrity, recreation, and the economy; and improve and secure water supplies, benefiting humans and wildlife. The landscape-scale ecological priorities within the proposed Conservation Area are identified with the best available ecological and spatial data based on conservation science, landscape ecology, tribal indigenous knowledge, and spatial analysis.

3. Conserve Important Lands and Waters for the Benefit of All People. Visitors to the proposed Conservation Area fee-title lands would enjoy opportunities for compatible wildlife-dependent recreation which may include hunting, fishing, wildlife observation, photography, environmental education, and interpretation, while increasing knowledge of and support for conservation. Fee-title lands could also provide cultural, traditional, and medicinal use opportunities. Willing landowners could protect their private land through conservation easements and stewardship programs while providing important ecosystem services for all people. The Everglades and southwest Florida watersheds require protection of remaining functional wetlands and floodplains, and restoration of hydrology to avoid further impairment and improve water quality and supply including Charlotte Harbor, an essential economic engine for south and southwest Florida.

4. Promote Conservation Partnerships Working with Adaptive and Flexible Tools and Strategies. Collaboration in science, education, research, and land acquisition (including conservation easements) would facilitate the development of new partnerships and strengthen existing partnerships with natural resource organizations, private landowners, government agencies, Tribal Nations, and local decision-makers. The partnerships would help inform land management decisions and encourage continued responsible stewardship of natural and rural landscapes essential for listed species protection, associated natural resources, while facilitating resiliency and adaptation to climate change. Establishing a proposed Conservation Area would give the Service a "seat at the table" with the many partners already working within this extremely important area and provide the opportunity for all conservation partners to leverage resources to achieve protection objectives.

SUMMARY

Partnerships with surrounding landowners, and Tribal Nations, municipal, State, and other federal agencies and non-governmental organizations would be the key to successful management of the proposed Conservation Area. This document was developed cooperatively with Tribal Nations and State partnering agencies. It is supported by the land conservation partners working in the southwest Florida landscape. The Service would continue to cooperate with the conservation partners, all of whom are instrumental in helping accomplish habitat management goals and objectives.

Taken together, the respective missions of the groups engaged in partnership discussions cover the protection of ranchland, listed species, a wide variety of habitat types, and open space that the local community has identified as important for conservation. Based on this effort, Alternative B (Proposed Alternative) identifies approximately 4 million acres that would conserve the area's most important areas for maintaining biological integrity, diversity, resiliency, water quantity and quality, and the overall environmental health of the refuge system unit, and would provide habitat connectivity to other areas of protected lands, resulting in a more functional conservation landscape and wildlife corridor.

Many of the organizations with whom the Service is collaborating have already protected key habitats in this landscape and would continue to do so within the limits of their available resources. If the proposed Conservation Area becomes a reality, there is a clear need for continued local, State, Tribal Nations, and federal support. The Service recognizes its inability to solve the problems of habitat fragmentation, urban development, altered ecological processes, impacts from sea level rise and global climate change, and land protection on its own. Thus, it is incumbent upon all agencies and organizations to continue the efforts of communication and cooperation. Through this effort, the Service would work to combine its efforts with those of its existing partners, as well as numerous other partners yet to be identified. The Service would continue discussions with FWC regarding the co-management opportunities of hunting, fishing, and other recreational activities associated with this project. If possible, the Service would provide Americans with Disabilities Act (ADA)-compliant hunts, and youth hunts. Generally, the Service would allow hunting, based on State hunting seasons and consistent with the Conservation Area's comprehensive conservation plan and hunt plan. Fishing would be allowed, where accessible, and the proposed Conservation Area may be able to support fishing derbies for children. A Hunt and Sports Fishing Plan and Opening Hunt and Sports Fishing Package would be developed generally 3-5 years after fee-title acquisition to establish land and water base to support the use.

The Service and the Refuge System would work toward the overarching goals outlined in this document, addressing a functional conservation landscape; habitat for fish and wildlife; conserving lands and water; promoting partnerships and wildlife-dependent recreation and education. It is clear that partnerships with the public; Tribal Nations; landowners; neighbors; conservation organizations; and municipal, State, and other federal agencies would be the only path to a successful Conservation Area.

III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section is organized by affected resource categories and for each affected resource discusses both (1) the existing environmental and socioeconomic baseline in the action area for each resource and (2) the effects and impacts of the proposed action and any alternatives on each resource. The effects and impacts of the proposed action considered here are changes to the human environment, whether adverse or beneficial, that are direct, indirect, or cumulative. This EA includes the written analyses of the environmental consequences on a resource

only when the impacts on that resource could be more than negligible and therefore considered an "affected resource." Any resources that will not be more than negligibly impacted by the action have been dismissed from further analysis. It is organized under the following four major topics: physical resources (i.e., topography, soils, climate, and air and water quality), biological resources (i.e., habitats and fish and wildlife species), cultural resources, and socioeconomic conditions.

PHYSICAL ENVIRONMENT

TOPOGRAPHY AND GEOLOGY

Affected Environment

Southwestern Florida is an extremely low-lying area within the proposed Conservation Area. Geologically, Florida perches on top of what geologists call the "Florida Platform," a mostly underwater plateau (Bostick et al. 2022). Due to sea-level fluctuations through geologic time, the Florida Platform has been both entirely underwater (during interglacial periods) and entirely above sea level (during glacial periods) (Bostick et al. 2022). Today, only about one-third of the Florida Platform is above sea level. The current shape of Florida's coastline is merely a geologic snapshot because the sea level constantly fluctuates with our planet's climate cycles.

The Florida Department of Environmental Protection has divided Florida into ten regional geomorphological districts based on landform similarities, the relationships to surrounding features, and geologic processes affecting the area, mainly coastal, fluvial, and karst processes. Most of the proposed Conservation Area is within the Peace River and Everglades districts. Small portions of the proposed Conservation Area are within the Lakes District and Barrier Island Sequence District. The characteristics of the Peace River, Everglades, Lakes, and Barrier Island Sequence districts, as described in Williams et al. (2022), are as follows:

- The Peace River District is characterized by streams and rivers that occur because of the low permeability Oligocene-Pliocene Hawthorn Group sediments that underlie most of the district and the limited occurrence of collapsed sinkholes. The low-relief terrain of the district gently slopes toward the Gulf of Mexico coast. Extensive phosphate mining has occurred in parts of this district, resulting in widespread landform modification.

- The Everglades District includes some of the youngest strata and landscapes in Florida. The geomorphological features in this district range from areas underlain by Pliocene-Pleistocene sediments to Holocene sediments. Wetlands characterize many areas; others include Pleistocene to Holocene carbonate islands and coastal ridges. Drainage in much of the district consists of surface water sheet flow, predominantly from north to south. All of the provinces in the district share several characteristics, including that they are geologically young; their landforms are closely related to Pliocene-Pleistocene coastal and marine shelf sedimentation and Holocene wetland development; and drainage is mostly by way of sloughs, sheet flow in wetlands, and poorly defined stream systems.

- The Lakes District occupies much of central peninsular Florida. It is a geomorphically complex district with large sinkholes and sinkhole lakes on ridges and in the valleys between the multiple ridges that occur in the area. The sinkholes range from simple, more-or-less round depressions like those near Lake Alfred, to complex, coalesced sinks that form uvalas and poljes, such as Crooked Lake near Babson Park. The Lakes District also contains the headwaters of the Peace River. The upper part of the

Peace River valley contains several swallets, including some in-channel siphons and others that capture water only during high-flow conditions. In addition, sand mining is a major industry in the district because of the abundance of quartz sand.

- The Barrier Island Sequence District occurs along and inland from Florida's Atlantic Coast. The proposed Conservation Area only occur within a small inland portion of this district, which consists of the lower end of the Kissimmee River valley and the lowlands surrounding the northern half of Lake Okeechobee.

In addition to the geomorphological features described above, there are more than 1,000 springs recognized in Florida (Florida Geological Survey n.d.) and eight within the proposed Conservation Area: one each in Hardee, Lee, and Manatee counties; two in Polk County, and three in Sarasota County (Florida Department of Environmental Protection 2023). Springs are points where groundwater discharge occurs at natural openings called vents. Under artesian pressure, groundwater can forcefully flow out onto Earth's surface, creating a spring. Springs and spring-fed rivers support the local ecology and provide ample opportunity for recreation to the visitors and residents of Florida. Further, the quality of spring water reflects groundwater quality, which is exceedingly important in Florida, where more than 90% of residents drink groundwater (Florida Geological Survey n.d.).

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

The Service is unaware of any short-term or long-term adverse impacts the proposed action would have on Florida's topography and geology or planned actions that would significantly affect Florida's topography and geology. Conversely, the proposed action would allow the Service to acquire less-than-fee and fee-title properties, including wetlands, within the proposed Conservation Area. Wetlands are remarkably good at building up soils to outpace sea level rise, which could buffer the State against topographical changes due to sea level rise; however, many wetlands are unlikely to be able to keep pace with rapid climate change-induced sea level rise, which will likely result in the submergence of some portions of Florida's low-lying areas and the alteration of present-day Florida's topography.

Florida is one of the states most susceptible to sea level rise due to its low-lying elevation and more than 8,400 miles of shoreline (Florida Climate Center n.d.) Satellite altimetry data indicate that the average rate of sea level rise in the southeastern United States has been about 3.0 mm (0.12 inches) per year since the early 1990s, roughly equal to the global rate of sea level rise (Florida Climate Center n.d.). Sea levels across Florida are as much as 8 inches higher than they were in 1950, and the rate of sea level rise is accelerating (Florida Climate Center n.d.).

It is virtually certain that global mean sea levels will continue to rise throughout the 21st century and beyond. According to the latest science on sea level rise projections for the United States (Sweet et al. 2022), sea level rise over the next 30 years along the U.S. coastline is projected to be 10–12 inches (0.3–0.4 inches per year), on average, which will be as much as what has been measured over the past 100 years from 1920 to 2020. This indicates that accelerated sea level rise is likely to continue. Some parts of low-lying coastal Florida will become submerged, altering the State's topography.

Florida has experienced moderate to severe erosion of some of its shorelines and beaches during the 20th century. Most erosion can be attributed to manmade inlets, storms, and sea level rise; however, it is difficult to determine how much erosion is caused by sea level rise (Williams et al. 2009). Further, there is a high degree of

variability in shoreline erosion rates. Some areas along Florida's coast display rapid erosion, while others may have a net gain in sand over time (Absalonsen and Dean 2010). Florida is likely to continue experiencing topographical changes along its coast due to natural and manmade factors.

Impacts of Affected Resources

Alternative A

Under this alternative, additional lands would not be protected or conserved within the proposed Conservation Area and potential impacts such as mining could occur on those parcels, thus positive impacts with regard to the topography in the proposed Conservation Area are not anticipated. No beneficial impacts to the geology of the proposed Conservation Area are expected under this alternative. Some lands that remain unprotected could be used for mining operations. While localized negative impacts of these types of topography changes may be experienced, the negative impacts to topography across the approximately 4-million-acre proposed Conservation Area under the No Action Alternative are anticipated to be minor. The effects of mining operations on the underlying geology can be substantial, but they are limited to a particular site. Hence, because the proposed Conservation Area is large compared to the surface area occupied by mines, minor negative impacts to the underlying geology of the area are anticipated.

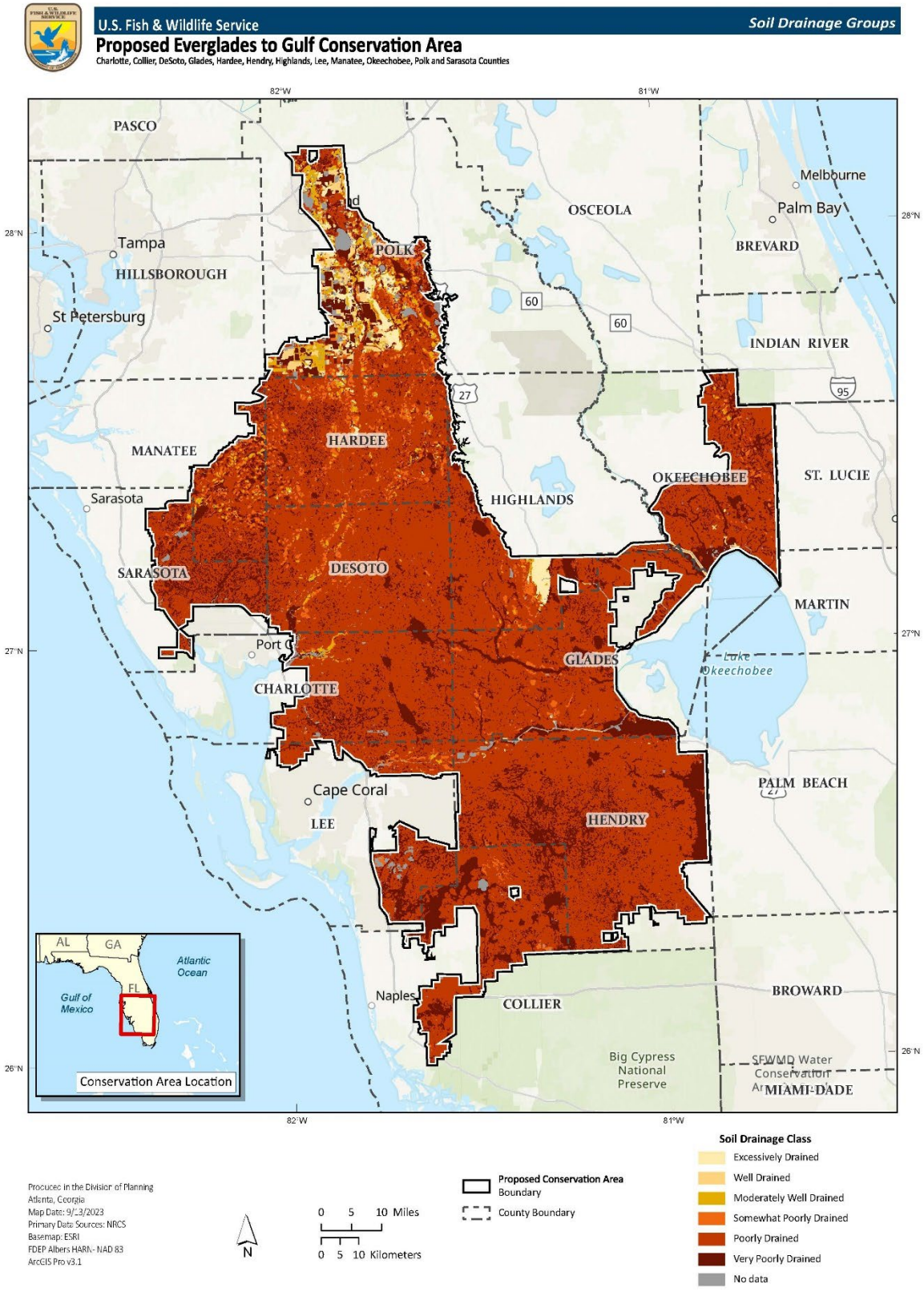
Alternative B

Under this alternative, the topography and geology would be protected within the footprint of the proposed Conservation Area as they could be protected from large construction projects and mining operations, resulting in additional benefits. No construction activities would occur that would impact the topography. Any possible new construction (i.e., visitor center, offices) is not expected to result in adverse impacts to this resource.

SOILS

Affected Environment

The soils within the proposed Conservation Area grade from excessively drained to well drained to poorly drained to very poorly drained soils that include a composite of upland and hydric soil classifications (EA Figure 4, EA Table 1). Upland soils typically include entisols and spodosols, whereas hydric soils generally include histosols and mollisols. The more xeric entisols are soils with little profile development and are characteristically classified as excessively well drained to well drained. These soils typically support sandhill and scrub vegetation. The water table is 4 to 6 feet below the surface. These soils are very rarely flooded. Scrubby flatwoods are a type of scrub found on less xeric soils than sandhill or other types of scrub, but have drier soils than flatwoods soils. More mesic flatwood soils are generally composed of spodosols. Spodosols have a well-defined internal profile with a spodic horizon (a zone of accumulated organic matter, clay, and aluminum - a hardpan). The water table is within a foot of the surface during the rainy season and can be as deep as 40 inches (101.6 cm) during dry periods. Since the spodic horizon is relatively impermeable, perched water tables can occur. The native vegetation is slash pine (*Pinus elliottii* var. *densa*), and longleaf pine (*Pinus palustris*) with gallberry, palmetto, and *Lyonia* spp. in the understory. Hydric soils are found around lake edges, in bayheads, and in the depression marshes. Most of these soils have either a mollic epipedon (mollisols) or are organic soils (histosols). These soils remain flooded for most of the year. Native vegetation varies. In the bayheads, one can find bay trees (*Persea* spp.), maples (*Acer* spp.), and other hydric trees, while in the depression marshes the primary vegetation is grasses and forbs.



EA Figure 4. Soil Drainage Groups in the proposed Conservation Area

EA Table 1. Soil Classification Map in the proposed Conservation Area.

NRCS Soil Component Name	Soil Order	Drainage Class	Acres	Percent
Adamsville	Entisol	Somewhat Poorly Drained	10,558	0.26
Adamsville variant	Entisol	Somewhat Poorly Drained	628	0.02
Anclote	Mollisol	Very Poorly Drained	10,056	0.25
Apopka	Ultisol	Well Drained	2,414	0.06
Aquents	Entisol	Poorly Drained	162	0.00
Archbold	Entisol	Moderately Well Drained	4,626	0.12
Arents	Entisol	Moderately Well Drained	22,592	0.56
Arents	Entisol	Somewhat Poorly Drained	3,316	0.08
Arents	Entisol	Well Drained	30,956	0.77
Astatula	Entisol	Excessively Drained	3,935	0.10
Astor	Mollisol	Very Poorly Drained	10,050	0.25
Basinger	Entisol	Poorly Drained	224,078	5.59
Basinger	Entisol	Very Poorly Drained	19,501	0.49
Braden	Ultisol	Somewhat Poorly Drained	31	0.00
Bradenton	Alfisol	Poorly Drained	91,796	2.29
Brighton	Histosol	Very Poorly Drained	455	0.01
Brynwood	Entisol	Poorly Drained	55,444	1.38
Brynwood	Entisol	Very Poorly Drained	8,082	0.20
Caloosa	Entisol	Somewhat Poorly Drained	3,016	0.08
Canaveral	Entisol	Moderately Well Drained	71	0.00
Canaveral	Entisol	Somewhat Poorly Drained	12	0.00
Candler	Entisol	Excessively Drained	25,771	0.64
Canova	Alfisol	Very Poorly Drained	4,447	0.11

NRCS Soil Component Name	Soil Order	Drainage Class	Acres	Percent
Cassia	Spodosol	Moderately Well Drained	2,296	0.06
Cassia	Spodosol	Somewhat Poorly Drained	11,261	0.28
Chobee	Mollisol	Very Poorly Drained	49,769	1.24
Chobee variant	Mollisol	Very Poorly Drained	11	0.00
Clewiston	Inceptisol	Very Poorly Drained	16,625	0.42
Cocoa	Entisol	Moderately Well Drained	934	0.02
Copeland	Mollisol	Very Poorly Drained	5,576	0.14
Cypress lake	Alfisol	Poorly Drained	95,385	2.38
Cypress lake	Alfisol	Very Poorly Drained	60,316	1.51
Dania	Histosol	Very Poorly Drained	5,912	0.15
Daytona	Spodosol	Moderately Well Drained	1,924	0.05
Delray	Mollisol	Very Poorly Drained	31,079	0.78
Denaud	Inceptisol	Very Poorly Drained	1,735	0.04
Duette	Spodosol	Moderately Well Drained	6,282	0.16
Dumps	N/A	No Data	162	0.00
Durbin	Histosol	Very Poorly Drained	1,735	0.04
Eaton	Alfisol	Very Poorly Drained	3,073	0.08
Eaugallie	Spodosol	Poorly Drained	135,914	3.39
Electra	Spodosol	Somewhat Poorly Drained	2,089	0.05
Estero	Spodosol	Very Poorly Drained	594	0.01
Farmton	Spodosol	Poorly Drained	40,957	1.02
Felda	Alfisol	Poorly Drained	80,577	2.01
Felda	Alfisol	Very Poorly Drained	32,425	0.81
Floridana	Mollisol	Very Poorly Drained	117,567	2.94

NRCS Soil Component Name	Soil Order	Drainage Class	Acres	Percent
Fort meade	Inceptisol	Well Drained	4,984	0.12
Ft. Drum	Inceptisol	Poorly Drained	9,143	0.23
Ft. Green	Alfisol	Poorly Drained	4,553	0.11
Gator	Histosol	Very Poorly Drained	31,708	0.79
Gentry	Mollisol	Very Poorly Drained	7,961	0.20
Gypsum land	N/A	No Data	805	0.02
Haplaquents	Entisol	Very Poorly Drained	3,678	0.09
Heights	Alfisol	Poorly Drained	10,189	0.25
Hicoria	Alfisol	Very Poorly Drained	4,517	0.11
Hilolo	Alfisol	Poorly Drained	2,079	0.05
Holopaw	Alfisol	Poorly Drained	73,106	1.83
Holopaw	Alfisol	Very Poorly Drained	42,234	1.05
Hontoon	Histosol	Very Poorly Drained	8,992	0.22
Hydraquents, clayey	Entisol	Very Poorly Drained	34,594	0.86
Immokalee	Spodosol	Poorly Drained	458,725	11.45
Isles	Alfisol	Very Poorly Drained	7,045	0.18
Jenada	Entisol	Poorly Drained	28,084	0.70
Jonathan	Spodosol	Moderately Well Drained	1,879	0.05
Jupiter	Mollisol	Poorly Drained	8,758	0.22
Kaliga	Histosol	Very Poorly Drained	22,696	0.57
Kendrick	Ultisol	Well Drained	201	0.01
Kesson	Entisol	Very Poorly Drained	1,266	0.03
Lauderhill	Histosol	Very Poorly Drained	12,836	0.32
Lochloosa	Ultisol	Somewhat Poorly Drained	1,030	0.03
Lynne	Spodosol	Poorly Drained	2,837	0.07
Malabar	Alfisol	Poorly Drained	150,141	3.75
Malabar	Alfisol	Very Poorly Drained	12,016	0.30
Manatee	Mollisol	Very Poorly Drained	11,225	0.28

NRCS Soil Component Name	Soil Order	Drainage Class	Acres	Percent
Matlacha	Entisol	Somewhat Poorly Drained	3,401	0.08
Millhopper	Ultisol	Moderately Well Drained	2,390	0.06
Myakka	Spodosol	Poorly Drained	295,601	7.38
Myakka	Spodosol	Very Poorly Drained	3,323	0.08
Narcoossee	Spodosol	Somewhat Poorly Drained	643	0.02
Neilhurst	Entisol	Excessively Drained	13,223	0.33
Nittaw	Mollisol	Very Poorly Drained	5,384	0.13
Notcom	No Data	No Data	25	0.00
Ochopee	Inceptisol	Poorly Drained	215	0.01
Ochopee	Inceptisol	Very Poorly Drained	93	0.00
Okeelanta	Histosol	Very Poorly Drained	20,593	0.51
Oldsmar	Spodosol	Poorly Drained	196,338	4.90
Oldsmar	Spodosol	Very Poorly Drained	680	0.02
Ona	Spodosol	Poorly Drained	32,708	0.82
Orlando	Inceptisol	Moderately Well Drained	6	0.00
Orsino	Entisol	Moderately Well Drained	4,399	0.11
Pahokee	Histosol	Very Poorly Drained	8,108	0.20
Paisley	Alfisol	Poorly Drained	2,738	0.07
Palmetto	Ultisol	Poorly Drained	1,680	0.04
Paola	Entisol	Excessively Drained	7,069	0.18
Parkwood	Alfisol	Poorly Drained	2,330	0.06
Parkwood variant	Alfisol	Poorly Drained	845	0.02
Peckish	Entisol	Very Poorly Drained	117	0.00
Pennsuco	Entisol	Very Poorly Drained	545	0.01
Pineda	Alfisol	Poorly Drained	170,213	4.25
Pineda	Alfisol	Very Poorly Drained	21,123	0.53
Pinellas	Alfisol	Poorly Drained	117	0.00

NRCS Soil Component Name	Soil Order	Drainage Class	Acres	Percent
Pits	N/A	No Data	162	0.00
Pits	N/A	Poorly Drained	88	0.00
Placid	Inceptisol	Very Poorly Drained	21,515	0.54
Pomello	Spodosol	Moderately Well Drained	6,027	0.15
Pomello	Spodosol	Somewhat Poorly Drained	33,105	0.83
Pomona	Spodosol	Poorly Drained	110,954	2.77
Pompano	Entisol	Poorly Drained	13,617	0.34
Pompano	Entisol	Very Poorly Drained	8,589	0.21
Popash	Alfisol	Very Poorly Drained	5,421	0.14
Pople	Alfisol	Poorly Drained	14,197	0.35
Punta	Spodosol	Poorly Drained	1,752	0.04
Quartzipsaments	Entisol	Moderately Well Drained	234	0.01
Riviera	Alfisol	Poorly Drained	48,778	1.22
Riviera	Alfisol	Very Poorly Drained	19,570	0.49
Samsula	Histosol	Very Poorly Drained	18,657	0.47
Sanibel	Inceptisol	Very Poorly Drained	4,764	0.12
Satellite	Entisol	Somewhat Poorly Drained	10,451	0.26
Smyrna	Spodosol	Poorly Drained	188,916	4.72
Sparr	Ultisol	Somewhat Poorly Drained	12,456	0.31
St. Augustine	Entisol	Somewhat Poorly Drained	20	0.00
St. Johns	Spodosol	Poorly Drained	5,110	0.13
St. Lucie	Entisol	Excessively Drained	3,288	0.08
Tavares	Entisol	Moderately Well Drained	30,898	0.77
Tequesta	Alfisol	Very Poorly Drained	9,319	0.23
Terra ceia	Histosol	Very Poorly Drained	9,103	0.23
Tomoka	Histosol	Very Poorly Drained	1,820	0.05

NRCS Soil Component Name	Soil Order	Drainage Class	Acres	Percent
Tuscawilla	Alfisol	Poorly Drained	20,902	0.52
Udifluvents	Entisol	No Data	2,384	0.06
Udorthents	Entisol	No Data	771	0.02
Udorthents	Entisol	Well Drained	4,136	0.10
Urban land	Entisol	No Data	2,294	0.06
Valkaria	Entisol	Poorly Drained	69,905	1.75
Valkaria	Entisol	Very Poorly Drained	1,520	0.04
Wabasso	Spodosol	Poorly Drained	126,021	3.15
Open water	N/A	No Data	65,058	1.63
Wauchula	Spodosol	Poorly Drained	9,548	0.24
Waveland	Spodosol	Poorly Drained	30,396	0.76
Winder	Alfisol	Poorly Drained	593	0.01
Winder	Alfisol	Very Poorly Drained	62,097	1.55
Wulfert	Histosol	Very Poorly Drained	3,375	0.08
Zolfo	Spodosol	Somewhat Poorly Drained	40,364	1.01

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

The Service is unaware of any other environmental trends or planned actions that would adversely impact soils, including the Proposed Action. No significant adverse or beneficial short-term, long-term, or cumulative impacts would be anticipated for soils.

Impacts of Affected Resources

Alternative A

No beneficial impacts to soils in the proposed Conservation Area are expected under the No Action Alternative, since no additional protection or conservation of these resources is proposed. In unprotected areas, soils would continue to be disturbed as a result of various land use practices, including agricultural operations, road-building, and the construction of buildings, parking lots, and other infrastructure needed to support expanding human settlements. Natural soil-formation processes would no longer occur in areas covered by impervious surfaces (e.g., roads, parking lots, and buildings). Soil compaction is also expected at sites where construction occurs. Additionally, soils would continue to be degraded by various contaminants resulting from the application of agricultural chemicals and run-off from roads and urban areas. Overall, the Service expects the effects on soils to constitute a minor negative impact.

Alternative B

Soils within the proposed Conservation Area would be protected from disturbance and degradation associated with agriculture and development. There would be some minimal, localized adverse effects on soils under this alternative resulting from the construction of an office and public use buildings. Some limited construction (e.g., expanding an existing dwelling) may be allowed on the conservation easements, depending on the type of

agreements that are made with landowners. Those details are not available at this time. However, it is anticipated that any impacts to soils resulting from those activities would be minor.

WEATHER AND CLIMATE

Affected Environment

Southwest Florida is located in what is referred to as the subtropics, between the temperate zone to the north and the tropical zone to the south. The tropical climate shifts northward from mid-May to mid-October due to the Earth's axial tilt. Southwest Florida has warm, wet summers and mild, dry winters. The wet season begins around mid-May and usually ends as the dry season begins in mid-October. A combination of local, regional, and global events, regimes, and oscillations drives the weather and climate of southwest Florida.

During the wet season, Atlantic and Caribbean tropical and sub-tropical air masses dominate Florida. Warm, humid conditions with frequent showers and thunderstorms characterize the wet season. Although the wet season usually begins in mid-May, it varies from year-to-year. The beginning of the wet season is primarily determined by the onset of almost daily showers and thunderstorms over the Florida peninsula and late-night and morning showers and thunderstorms over the eastern Gulf of Mexico. Most rainfall is from convective thunderstorms produced from the daily sea breezes from Florida's west and east coasts. Another significant source of rainfall during the wet season is from tropical weather systems (i.e., tropical waves, tropical depressions, tropical storms, and hurricanes). The dry season begins in mid-October and ends in mid-May. Periodic surges of cool, dry continental air move through Florida during the dry season, producing short duration rain events followed by long periods of dry weather. Occasionally, continental cold fronts bring near-freezing temperatures to the region.

El Niño and the Southern Oscillation is a periodic fluctuation (i.e., every 2–7 years) in sea surface temperatures (El Niño) and the air pressure of the overlying atmosphere (Southern Oscillation) across the equatorial Pacific Ocean. The presence of an El Niño, or its opposite—La Niña—sufficiently modifies the general flow of the atmosphere, affecting ocean temperatures and weather conditions in many parts of the world. In southwest Florida, El Niño results in an unusually wet dry season, a colder winter than during La Niña or a neutral phase, decreased Atlantic Ocean hurricanes, above-average surface water levels, and fewer wildfires with smaller burn areas. La Niña causes a drier-than-normal dry season, below-average surface water levels, increased Atlantic Ocean hurricanes, and more wildfires with larger burn areas. During neutral phases, more deep freezes occur even if the winter is not consistently as cool.

The Atlantic multidecadal oscillation is an ongoing series of long-duration changes in the sea surface temperature of the North Atlantic Ocean, with a full oscillation cycle taking roughly 60 years to complete (Kerr 2000), resulting in warm and cool phases lasting about 30 years. Temperature changes associated with the Atlantic multidecadal oscillation have been shown to affect weather and climate around the North Atlantic basin and possibly throughout the global tropics (Enfield et al. 2001, Kerr 2005, Sutton and Hodson 2005, Knight et al. 2006, Semenov et al. 2010). Since the mid-1990s, the planet has been in a warm phase. Rainfall in central and south Florida becomes more plentiful when the Atlantic is in its warm rather than cool phase (NOAA n.d.). Further, the number of tropical storms that mature into severe hurricanes is much greater during warm phase than cool phases, while droughts and wildfires are more frequent during cool phases (NOAA n.d.) Computer models cannot accurately predict exactly when the Atlantic multi-decadal oscillation will switch phases. However, it is possible to calculate the probability that a change in the Atlantic multi-decadal oscillation will

occur within a given timeframe in the future. Scientists believe the planet is currently transitioning into a cool phase (Frajka-Williams et al. 2017).

Florida is particularly vulnerable to hurricanes because it is a peninsula with subtropical warm water on three sides. The hurricane season begins June 1 and ends November 30; however, hurricanes sometimes strike outside this period. Typically, hurricanes developing in the Main Development Region (MDR: 10° N to 20° N and 20° W to 60° W) of the North Atlantic move in a generally westward direction across the North Atlantic Ocean, making landfall on Caribbean Sea islands and landmasses along the Gulf of Mexico and the United States' southeastern seaboard. Based on data from 1900 to 2007, on average, a hurricane struck Florida every two years and a strong hurricane every four years (Malmstadt et al. 2009).

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

The El Niño Southern Oscillation and Atlantic Multidecadal Oscillation typically affect Florida's weather and climate trends somewhat predictably. However, unprecedented changes in the Earth's climate make it more difficult to predict future weather trends.

The Service is unaware of any planned actions that would have a discernable positive or adverse impact on Florida's weather and climate, including the proposed action. No significant adverse or beneficial short-term, long-term, or cumulative impacts on Florida's weather and climate are anticipated. The environmental trends, planned actions, and cumulative impacts regarding climate change are addressed in the Climate Change section below.

Impacts of Affected Resources

Alternative A and B:

The Service does not anticipate any substantial short-term or long-term beneficial or adverse impacts on Florida's weather and climate; however, some parcel acquisition could maintain a natural buffer which could increase resiliency to storm events and water surges and reduce damage to infrastructure and development.

CLIMATE CHANGE

Affected Environment

Greenhouse gas emissions caused by human activities have caused the Earth to warm, with the global surface temperature increasing faster since 1970 than in any other 50-year period over at least the last 2000 years (IPCC 2023). From 2011–2020, the global temperature was 1.1°C higher than from 1850–1900. Larger increases have occurred over land (1.59°C) than over the ocean (0.88°C) (IPCC 2023). The primary sources of greenhouse gas emissions include unsustainable energy use, land use and land-use change, and consumption-based lifestyles (IPCC 2023).

Increasing temperatures have contributed to glacial melting and the thermal expansion of ocean water, resulting in sea level rise. Historically, the average rate of global sea level rise was 1.3 mm per year between 1901 and 1971, increasing to 1.9 mm per year between 1971 and 2006, and further increasing to 3.7 mm per year between 2006 and 2018 (IPCC 2023). Human influence is certain to be the main driver of these increases since at least 1971 (IPCC 2023). Florida is extremely vulnerable to the effects of sea-level rise due to a combination of low land elevations, a high-water table, peninsular geography of being surrounded by ocean on three sides, susceptibility to tropical cyclones, and a large and growing human population that is mostly concentrated along the coasts (Noss et al. 2014). Sea-level rise and increased intensity of storm surges in Florida are leading to the

erosion and saltwater inundation of beaches and barrier islands, greater property damages, saltwater intrusion into drinking water supplies, and adverse impacts on coastal ecosystems and species (Noss 2011). The National Oceanic and Atmospheric Administration estimates that by 2060, sea level off the coasts of Naples and Fort Myers will rise by 1.4 ft under their intermediate scenario and 1.9 ft under their intermediate-high scenario (NOAA 2023). Scientists are confident sea levels will continue to rise during the coming decades, likely worsening these impacts.

Human-induced climate change has caused substantial damage to Earth's terrestrial and aquatic ecosystems. Mass wildlife mortality events have been recorded worldwide on land and in the ocean, while ecosystems have experienced increasingly irreversible changes. Florida's species are vulnerable to these climate change impacts and out of 1,200 species tracked by the Florida Natural Areas Inventory, housed within the Florida Resources and Environmental Analysis Center at Florida State University, 25% are likely to lose at least half of their current habitat due to sea level rise alone (Stys et al. 2017). Florida's wildlife populations and ecosystems are likely to experience many challenges related to climate change, including but not limited to the inability of species to migrate inland due to human modification of the landscape Noss et al. (2014); negative impacts from phenological changes, such as mistimed migrations (Robinson et al. 2009); changes in the population dynamics of species with temperature-dependent sex determination (Laloë et al. 2016); disruption of synchronized co-evolutionary relationships, like that between plants and their pollinators; enhanced fitness and range shifts of invasive species (Rahel et al. 2008, Bellard et al. 2013); vegetation root zone saltwater intrusion (Miller et al. 2022); and habitat migration and alteration (Pearlstine et al. 2010, Koch et al. 2015, Nungesser et al. 2015). The negative impacts on Florida's wildlife and habitats associated with climate change are expected to increase as warming continues.

Global warming is also leading to changes in Florida's precipitation patterns (Miller et al. 2022). Annual precipitation has increased by 5% since 1900 in southwest Florida (U.S. Global Change Research Program 2018). Since the 1970's, heavy downpours have increased in frequency and intensity by 27% and are increasing flooding along barrier islands, coastal beaches, and in low-lying areas. Model simulations predict changes in seasonal precipitation for southwest Florida with increases in dry season rainfall up to 20% and decreases in wet season rainfall up to 30% (NOAA 2017). A decrease in wet season rainfall will lead to lower water levels and increased droughts during a time that plants are water-dependent for growing and flowering and wetland bird species are foraging. The change in timing of rainfall will stress ecosystems and cause changes in vegetation types. An increase in dry season rainfall will increase water levels and hydroperiods during the important time of year when many birds are preparing to breed and nest, migratory birds are stopping over to forage, alligators are preparing nesting holes, and plants are becoming more dormant (Miller et al. 2022).

The impacts associated with climate change are not restricted to wildlife and ecosystems. Because humans are intimately intertwined with the environment, climate change also affects humans and human systems. Changes in freshwater availability and the productivity of agriculture, livestock, and fisheries have been observed, resulting in food and water insecurity (IPCC 2023). Climate change has also caused adverse impacts on human health and well-being related to infectious diseases (Lafferty 2009), heat stress, respiratory illnesses (Barnes et al. 2013), cardiovascular issues (De Blois et al. 2015, Giorgini et al. 2017), malnutrition (Lieber et al. 2022), mental health (Berry et al. 2010, Cianconi et al. 2020), and displacement (Warner et al. 2009). In addition, economic damages from climate change have been detected (Stanton and Ackerman 2007, Hsiang et al. 2017, Auffhammer 2018) in climate-exposed sectors, such as realty, agriculture, forestry, fishery, energy, and tourism (IPCC 2023). Further, urban infrastructure, including transportation, water, sanitation, and energy systems, has been compromised by climate-related events (IPCC 2023). These documented impacts are concentrated amongst

economically and socially marginalized urban residents and are driven by changes in multiple physical climate conditions, which are increasingly attributed to human influence (IPCC 2023).

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

Currently, the Service uses the Resist-Accept-Direct framework to strategically address ecological transformation caused by climate change, especially transformation occurring under novel conditions. Recognizing the need for coordinated action, representatives of several natural resource management agencies met in 2018 to develop a framework to address ecological transformation. This resulted in the Resist-Accept-Direct framework, which helps managers consider all potential adaptation responses. The first response, "Resist," represents traditional wildlife management in which management actions are implemented to counteract changes and restore habitats and populations to baseline conditions. The second response, "Accept," is a conscious decision to take a hands-off approach to ecological transformation caused by climate change, allowing habitats to transition without intervention. This method accepts the loss of some species and habitats and the establishment of others. The third response, "Direct," involves using projections of future conditions and steering the ecological change in ways that continue to support biodiversity and provide ecosystem services. The Service would implement other applicable frameworks to strategically address ecological transformation caused by climate change, especially transformation occurring under novel conditions as they come available.

Impacts of Affected Resources

Alternative A

There would be no beneficial impacts on climate change under the No Action Alternative. Other federal, State, Tribal Nations, and non-governmental organization would continue to collaborate to address climate change concerns within the proposed Conservation Area; however, the Service would be unable to collaborate with partners to implement climate change adaptation initiatives in communities within the proposed Conservation Area; participate in coordinated efforts with other federal agencies, State agencies, non-governmental organizations, and Tribal Nations to address climate change concerns within the proposed Conservation Area; acquire fee-title properties or conservation easements to maintain carbon storage capacity within the proposed Conservation Area and limit future developments and the associated increases in greenhouse gas emissions; or implementation of initiatives such as, Resist-Accept-Direct framework, to strategically address ecological transformation caused by climate change, especially transformation occurring under novel conditions.

Alternative B

The Service would collaborate with partners to ensure the best available climate science is used to inform natural resource management; support and implement climate change adaptation efforts in local communities, with a particular focus on social and environmental justice; support strategies that promote coordinated climate change actions among federal agencies, State agencies, non-governmental organizations, and Tribal Nations; acquire fee-title properties and conservation easements to maintain carbon storage capacity within the proposed Conservation Area and reduce development; and use initiatives such as, Resist-Accept-Direct framework and other applicable frameworks to strategically address ecological transformation caused by climate change, especially transformation occurring under novel conditions.

Air Quality

Affected Environment

The Clean Air Act of 1970 (as amended in 1977 and 1990) regulates emissions from stationary and mobile sources. It also authorizes the Environmental Protection Agency to establish National Ambient Air Quality Standards for six criteria pollutants, including particulate matter ($PM_{2.5 \text{ and }} PM_{10}$), ozone ($O_3$), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and lead (Pb). Air quality standards are divided into two categories: primary and secondary. The primary air quality standards set limits to protect public health, including the health of sensitive populations, such as asthmatics, children, and the elderly. The secondary air quality standards set limits to protect public welfare, including damage to animals, crops, vegetation, and buildings and protection from decreased visibility. If the air quality in a geographic area meets or is cleaner than the national standard, it is called an "attainment" area; areas that do not meet the national standard are called "nonattainment" areas. Areas that were once in nonattainment but currently meet or exceed standards are identified as "maintenance" areas.

Florida is part of the Environmental Protection Agency's Southeast Region, which also includes Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. On regional and national scales, all six criteria air pollutants have been improving (EPA 2023a). Nationally, lead (Pb) concentrations decreased by 88% from 2010 to 2022 (EPA 2023a). From 2000 to 2022, carbon dioxide (CO) concentrations in the Southeast Region have decreased by 67%, ozone (O_3) by 25%, sulfur dioxide (SO_2) by 78%, and nitrogen dioxide (NO_2) by 44% (EPA 2023a). Fine particulate matter ($PM_{2.5)}$ and coarse particulate matter (PM_{10}) concentrations in the Southeast Region have decreased by 48% and 31%, respectively, from 2000 to 2022 (EPA 2023a).

The Florida Department of Environmental Protection uses a monitoring network to measure the six criteria air pollutants' concentrations within the State. Five of the eleven counties within the proposed Conservation Area have air quality monitoring stations: one in Collier County, one in Highlands County, three in Lee County, three in Manatee County, and three in Polk County (EPA 2023b). Of the eleven counties that are partially or entirely within the proposed Conservation Area, only Polk County had areas in nonattainment status in the last ten years (EPA 2023c). Parts of Polk County were designated as nonattainment areas for sulfur dioxide ($S0_2$) in 2018 and 2019 and were redesignated as maintenance areas in 2020 (EPA 2023c).

Air quality declines tend to be correlated to increasing urbanization, due to higher levels of traffic, increases in air pollution from point sources, and reductions in vegetated areas (Song et al. 2008). Trees have been shown to reduce the concentration of ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and particulate matter less than 10 and 2.5 microns in diameter (PM10 and PM2.5), primarily through direct uptake and adhesion to stems and leaves Some tree species naturally produce volatile organic compounds that can convert to ozone under certain atmospheric conditions, such as high temperatures and stagnant air (Chameides et al. 1988). However, because vegetated areas also remove ozone and other air pollutants from the atmosphere, there tends to be net reduction in air quality as areas become increasingly developed and forests are lost (Song et al. 2008).

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

The Service is unaware of any other environmental trends or planned actions that would adversely impact air quality, including the Proposed Action. No significant adverse or beneficial short-term, long-term, or cumulative impacts would be anticipated for air quality.

Impacts of Affected Resources

Alternative A
Positive effects on air quality in the proposed Conservation Area are not expected under this alternative, since no additional protection or conservation of these resources is proposed. Other federal agencies, State agencies, Tribal Nations, and non-governmental organizations could conserve land within the proposed Conservation Area, which would reduce the introduction of new sources of air pollution and help the State remain in attainment status for the six criteria air pollutants. Under this alternative, unprotected lands that are currently in a natural state may continue to be converted to agriculture and urban areas. Hence, the Service expects the No Action Alternative to have a minor adverse impact on air quality within the proposed Conservation Area.

Alternative B
With the establishment of the proposed Conservation Area, the Service expects reduced future development within the proposed Conservation Area, such as residential, commercial, and industrial development, thereby decreasing the introduction of new air pollution sources. Therefore, the proposed action would positively affect air quality, helping the State remain in attainment status for the six criteria air pollutants and minimizing the potential harm to human health and well-being, the agricultural industry, wildlife, and habitats.

Under this Alternative, operations and facilities, public visitation, and habitat management on fee-title acquired lands would contribute some short-term pollutants to the atmosphere, affecting air quality. Visitation to Service owned fee-title lands within the proposed Conservation Area would be associated with a number of vehicles on the refuge system units. The low rate of speed necessitated would minimize emissions of air pollutants. In addition, the number of vehicles on the refuge system units at any given time would not be expected to create a significant impact to air quality.

Prescribed burning would be a valuable habitat management tool within several habitats on fee-title lands and conservation easements. Prescribed fires release several air pollutants, including CO and particulate matter. One positive consequence of prescribed fire is the reduction in the frequency and intensity of wildfires, which tend to release larger amounts of air pollutants (Hill et al. 2022). Overall, the negative consequences to air quality associated with this alternative are expected to be minor.

HYDROLOGY AND WATER QUANTITY

Affected Environment
Everglades restoration will improve the timing, volume, and distribution of water throughout the affected Watersheds primarily by increasing regional storage capacity, removing barriers to flow, and carefully redistributing water within the system to match natural cycles more closely. The increase in regional storage capacity is also expected to increase water resource benefits for other water-related needs of the region, including water supply and flood protection.

The proposed Conservation Area includes five distinct basins, including two river basins (Myakka and Peace) that drain into the Charlotte Harbor Estuary. The proposed Conservation Area also includes the Caloosahatchee River, Fisheating Creek and a portion of the Big Cypress basins.

Greater Charlotte Harbor Watershed
The Greater Charlotte Harbor watershed is the largest in Southwest Florida and includes three basins of the Myakka River and Peace River and the Charlotte Harbor Proper. It begins at the headwaters of the Myakka River in Manatee County and Peace River in Lakeland and extends down to Port Charlotte where the rivers empty into Charlotte Harbor (CHNEP 2019).

Myakka River

The 66-mile river begins its southerly flow from headwaters in Manatee and Hardee counties. After following a narrow floodplain forest corridor, the river slows and enters a series of lakes in Myakka River State Park. Deer Prairie Creek and Big Slough feed the river as it widens and enters Charlotte Harbor. The 34-mile portion of Myakka River in Sarasota County is designated a "Florida Wild and Scenic River."

Peace River

The Peace River watershed expands over 2,315 square miles and starts at the Green Swamp in central Polk County, draining a series of wetlands and lakes. The rate of flow is directly proportional to groundwater levels. Underground and overland flows follow natural and altered paths through canals, flood control structures, former and active phosphate mines, wetlands, and Lake Handcock. South of Lake Handcock, canals and tributaries combine to define the main channel of the Peace River that eventually flows over 100 miles southwest to Charlotte Harbor.

Fisheating Creek

Fisheating Creek basin is approximate 850 square miles in Highland, Glades, Hendry and Okeechobee Counties. The major source of water is a Fisheating Creek that flows into Lake Okeechobee (Paudel and Su 2020). It is the second largest natural source for the lake Okeechobee, being the only remaining free flowing water course feeding into the Lake. Fisheating Creek is 51 miles long. It flows southward through Cypress Swamp area in the southwestern part of Highland County and Glades County, turning a mile eastward to north county road and flows about 30 miles to Lake Okeechobee. The headwater adjoins Peace River/Charlotte Harbor basin on the west and the Kissimmee River Basin by the higher lake region on the north and east. During droughts there is little or no flow in the Creek, which is due to high evapotranspiration rates and lack of continued groundwater inflow. In the lower course Fisheating Creek flows in an easterly direction for about 20 miles and enters lake Okeechobee on western shore at the settlement of the Lake, rather than to Creek, thus making drainage boundaries indeterminate.

Caloosahatchee River

The Caloosahatchee River is highly managed waterway connecting to Lake Okeechobee. Historically, the Caloosahatchee River was a shallow, meandering 50-mile-long river originating in the natural marshlands west of Lake Okeechobee. In 1881, a Canal (C-43) was dredged to connect the Caloosahatchee River to Lake Okeechobee. After the initial dredging, three lock and dam structures were added to control flow and stage height in the Lake and Canal. As part of the "Central and Southern Florida Project for Flood Control and Other Purposes,' The River/Canal was widened and deepened to ensure high water levels in Lake Okeechobee can be managed to prevent harmful flooding in adjacent areas. The River is no longer free-flowing and is operated as two "pools" maintained at different elevations between the locks. These actions provided a navigable connection between the west coast of Florida and Lake Okeechobee and made the Caloosahatchee Estuary on of the major outlets for water drainage from the vast Upper Kissimmee, Fisheating Creek and Lake Okeechobee basins.

Big Cypress Basin

The Big Cypress Basin is characterized as a rain driven system with a flooded shallow sheet of surface water starting shortly after the onset of the rainy season (usually in June) and ending in the winter dry season after surface waters recede. This Basin is exceptionally flat, with a typical gradient of only 5 to 10 inches per mile. Surface water hydrology of the Big Cypress Basin is typically characterized as a "sheetflow" flooding regime.

During the wet season, the landscape becomes covered with a shallow, continuous expanse of water that flows slowly toward the coastal Ten Thousand Islands region.

Groundwater/Aquifers

In west-central Florida and Southwest Florida, the groundwater system is composed of three main units: the Surficial Aquifer, the Intermediate Aquifer System and the Floridan Aquifer System. The Surficial Aquifer is the uppermost unconfined aquifer. It is composed primarily of unconsolidated sand but may also contain clay and/or shell deposits. The Surficial Aquifer varies widely in thickness throughout the Southwest Florida area, from completely absent in areas of the north to greater than 250 feet thick in the ridge areas of Polk and Highlands counties. In the southern portion, the surficial aquifer is underlain by a confining unit separating it from the underlying aquifer. However, in the northern portion, this clay-confining unit is thin and discontinuous. As a result, the water table sometimes lies directly above and is often in direct connection with the underlying Upper Floridan Aquifer.

In southwestern Florida, aquifers that lie between the Surficial Aquifer System and the Floridan Aquifer System are collectively referred to as the Intermediate Aquifer System. This aquifer system starts in Hillsborough and Polk counties and extends south through Lee and Collier counties. The Intermediate Aquifer System is under confined conditions and is mainly comprised of permeable layers of sand, shell and limestone separated by clay confining units. It is the main source of water supply for Sarasota, Charlotte and Lee counties where the underlying Floridan Aquifer contains brackish water. In general, the thickness of the Intermediate Aquifer System decreases from south to north, ranging from over 400 feet in Charlotte County to less than 50 feet in central Hillsborough County.

The Floridan Aquifer System is a highly productive aquifer system that covers all of Florida and areas of Alabama, Georgia, and South Carolina. The Floridan Aquifer System is further subdivided into the Upper Floridan Aquifer and the Lower Floridan Aquifer. In Southwest Florida, the Upper Floridan Aquifer generally contains good water quality and is the principal source of water for much of the proposed Conservation Area. Underlying the Upper Floridan Aquifer is a sequence of relatively impermeable rocks, which serve as a confining unit separating the fresher water of the Upper Floridan Aquifer from the primarily saline water found in the Lower Floridan Aquifer in the southwest Florida area. The Upper Floridan Aquifer consists of a thick continuous series of carbonate rocks, hundreds of feet thick, made up of limestone and dolomite. The thickness of the Upper Floridan Aquifer tends to increase from north to south, ranging from several hundred feet in the north to over 1,400 feet in portions of Manatee and Sarasota counties. In general, the Upper Floridan Aquifer is confined over most of the central and southern portions of Southwest Florida.

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

Urbanization is rapidly transforming south and southwest Florida's natural landscapes. Although some conservation and restoration is occurring within the proposed Conservation Area, it is likely insufficient to prevent cumulative impacts on hydrology. The cumulative impacts of residential, commercial, and industrial development combined with agriculture and increased water demand would likely adversely impact the proposed Conservation Area's natural hydrology.

The Service is aware of some of the water management districts' upcoming projects that may beneficially or adversely impact the area's natural hydrology. However, any beneficial impacts from these plans are unlikely to offset the negative impacts on hydrology from residential, commercial, and industrial development and agriculture. See Southwest Florida Water Management District (2023) and South Florida Water Management District (2023a) for a complete list of current and upcoming projects.

There are extensive opportunities for wetland restoration and dispersed water storage in the Fisheating, Peace, and Myakka watersheds through the Natural Resource Conservation Service (NRCS) Wetland Reserve Easement Program, a federal partner that can assist with needed land protection and restoration.

Impacts of Affected Resources

Alternative A
This alternative is not expected to provide additional protection or conservation of hydrology and water quantity of the area and no beneficial impacts are anticipated. Although some hydrological restoration would be conducted under this alternative, the flow of water on most unprotected lands in the proposed Conservation Area would continue to be altered as a result of the construction of drainage ditches, roads, and other impervious surfaces. Impervious surfaces associated with urbanized areas reduce the area available for rainwater to percolate into the soil. At a more local level, increased storm water volumes and peak discharge rates associated with urbanization can produce drastic changes in stream channels, resulting in eroded banks and more frequent flooding that can cause damage to adjacent property, homes, and wildlife habitat. Increased surface run-off associated with urban areas would also have regional effects. Developed areas also tend to exacerbate periods of water shortage. Because impervious surfaces limit the amount of water that seeps into the ground, less water is stored in subsurface areas. Subsurface water plays an important part in the hydrology of an area by providing streams and rivers with a steady supply of water during droughts. As more lands are urbanized, the water-storage ability of an area is reduced, limiting water supplies needed for wildlife and human use.

As with hydrology, water quantity in the proposed Conservation Area is expected to continue to be negatively affected under this Alternative. The amount of water available for wildlife, native habitats, and recreational opportunities would decline, as more water would be diverted to support increasing populations. Under the No Action Alternative, hydrology and water quantity would not be protected in approximately 4 million acres of the proposed Conservation Area, constituting a minor negative impact across the proposed Conservation Area.

Alternative B
This Alternative is expected to result in positive impacts to the hydrology and water quantity within the proposed Conservation Area. Lands acquired within the proposed Conservation Area by the Service would be protected from the construction of extensive drainage ditches, roads, and large areas of impervious surfaces associated with development that would otherwise alter the hydrology.

There could be some localized impacts to hydrology and water quantity resulting from construction projects on fee-title acquired lands (i.e., Service-construction would not occur on conservation easements). Although additional environmental studies would likely be conducted in association with any future construction, it is not believed that there would be significant impacts to the hydrology or water quantity. Overall, the negative effects on hydrology and water quantity are believed to be minor under this alternative.

WATER QUALITY

Affected Environment
The proposed conservation area is primarily located within two water management districts, the Southwest Florida Water Management District and South Florida Water Management District, with a very small portion of the proposed conservation area falling within the St. Johns River Water Management District. Of the 12 counties

within the proposed conservation area, the Southwest Florida Water Management District contains DeSoto, Hardee, Manatee, Sarasota, and parts of Charlotte, Highlands, and Polk counties, and the South Florida Water Management District contains Collier, Glades, Hendry, Lee, and parts of Charlotte, Highlands, Okeechobee, and Polk counties.

The Southwest Florida Water Management District has an abundance of surface waters used for various purposes by the people who live and work there, those who are visiting, and the fish and wildlife that depend on the area's water resources. Excessive nutrient loading remains the largest single threat to water resources (Southwest Florida Water Management District 2023). While nutrients are essential to life and ecosystem functions, excessive nutrients can cause nuisance algal and plant growth; oxygen depletion; loss of water clarity, desirable species, and biodiversity; flavor effects on drinking water; increased probability of human and animal pathogens; and other water quality impairments. Of the total water bodies within the district with sufficient data to satisfy assessment criteria (679 out of 1,438 water bodies), 59.5% were determined to be healthy and 40.5% unhealthy in 2022 based on nine nutrient-related parameters (Southwest Florida Water Management District 2023).

The Southwest Florida Water Management District also assesses biological conditions as indicators of water quality, including dissolved oxygen, habitat conditions, and the health of aquatic insect communities. The biological conditions provide information on all activities occurring within the watershed and can be used to establish baseline characteristics, characterize the overall condition of a watershed, identify potential problem pollutants, target more intensive diagnostic sampling, and support land use planning and management. The Florida Department of Environmental Protection primarily uses the Stream Condition Index, stream floral metrics, and Lake Vegetation index (Florida Department of Environmental Protection 2022) to evaluate the biological conditions in surface waters. Of the 283 watersheds or stream reaches assessed in 2022 within the district, 109 watersheds or stream reaches were determined to be impaired based on biological assessments (Southwest Florida Water Management District 2023).

Increasing nitrate-nitrogen levels in Upper Floridan aquifer groundwater discharging from springs is a continuing concern in the district and statewide. While not yet posing significant human health impacts, increasing nitrate concentrations stimulate the growth of aquatic vegetation, which can alter the ecological function of springs and receiving water bodies. Of the 48 springs assessed in 2022, 18 were classified as improving and 30 as degrading (Southwest Florida Water Management District 2023).

The South Florida Water Management District has invested in stormwater treatment areas, or human-constructed wetlands, to remove and store nutrients through plant growth and the accumulation of dead plant material that is slowly converted to a layer of peat soil. Five stormwater treatment areas south of Lake Okeechobee are now removing excess nutrients from agricultural runoff water and, in some cases, runoff from urban tributaries before discharging it into the Everglades and other natural areas. Since 1994, the stormwater treatment areas have treated 8.2 trillion gallons of water and reduced the total phosphorus load by 77% (South Florida Water Management District 2023a).

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

The Southwest Florida Water Management District reported that in 2015 the Florida Department of Environmental Protection changed the water quality reporting criteria, increasing the number of nutrient-related parameters from two to nine. Therefore, the Southwest Florida Water Management District cautions that comparing their data to years prior to 2015 is no longer suggested. Data regarding nutrient levels from 2015 to 2022 are variable and do not suggest a clear positive or negative trend. However, the data used to determine if a

water resource has healthy biological conditions does show a clear trend—the percentage of watersheds and streams within the Southwest Florida Water Management District is steadily declining.

The South Florida Water Management District reports data differently than the Southwest Florida Water Management District. Compared to data from 1979 to 1983, water quality data collected from 2013 to 2017 indicate that water quality improvement efforts, including stormwater treatment areas, have improved phosphorus concentrations in the Everglades from an average of 24 ppb to nine ppb (South Florida Water Management District 2023b). However, 12 monitoring sites in the Everglades still have phosphorus concentrations exceeding 10 ppb (South Florida Water Management District 2023b).

The Service is aware of ongoing and future water resource improvement projects being conducted by the Southwest Florida Water Management District and South Florida Management District. The water management districts in south and southwest Florida and their partners are collaborating to implement projects and plans focused on improving water quality. For example, the Districts' plans to improve water quality include assisting with septic to sewer conversions, monitoring trends to assess the ecological conditions of springs and other water resource systems, developing and implementing water quality projects aimed at reducing nutrient loading, restoring saltwater and freshwater wetlands, reducing water use, and reducing saltwater intrusion into aquifers (South Florida Water Management District 2023a and Southwest Florida Water Management District 2023). Further, the South Florida Water Management District is constructing a 6,500-acre stormwater treatment area as part of the Everglades Agricultural Area reservoir project. For a comprehensive project list, see Southwest Florida Water Management District (2023) and South Florida Water Management District (2023a).

Although the water management districts within the proposed conservation area are implementing projects and plans to improve or maintain water quality in their respective regions, water quality may be at risk due to the expected addition of 1.1 million people into the 12 counties within the proposed conservation area by 2050 (Rayer and Wang 2022) and the projected urbanization of 7% of the proposed conservation area (Southeast Conservation Adaptation Strategy 2022). Urbanization increases impervious surfaces such as parking lots, rooftops, roads, and sidewalks, resulting in runoff and creating additional avenues for transporting pollutants from the landscape into water bodies. However, agriculture within the study area is expected to decrease (Carr and Zwick 2016), which could offset some of the adverse impacts of urbanization. In addition, other conservation entities will likely conserve some land within the conservation area, benefitting water quality. Given the many factors that could affect water quality in the future, it is still being determined how the cumulative impacts of water quality improvement projects, increased urbanization, land conservation, and decreased agriculture will result in positive or adverse short-term or long-term impacts on water quality trends.

Impacts of Affected Resources

Alternative A

Under the No Action alternative, the Service could not collaborate with partners, including the water management districts, to implement plans and projects focused on improving water quality or conserving lands and wetlands that contribute to maintaining good water quality throughout the proposed Conservation Area. Further, the Service would be unable to protect land to prevent urbanization. The urbanization projected to occur within the proposed conservation area could overload water resources with sediments and pollutants, increasing sediment load, eutrophication, algal blooms, fecal bacteria concentration, nutrient loads, and pH (Nagy et al. 2011, Freeman et al. 2019). It is still being determined whether water quality improvement practices and projects within the Study Area, coupled with the decrease in agriculture and associated reduction in nutrient runoff, will offset the adverse impacts of urbanization on water quality.

Alternative B

The water quality found within the proposed Conservation Area is generally felt to be sufficient to achieve our objectives and this Alternative is expected to result in benefits to water quality in the proposed Conservation Area. The combination of fee-title and less-than-fee-title lands would protect from future development.

In general, it is believed that any negative consequences to water quality resulting from the proposed Conservation Area would be limited to increased sediment loads during wetland restoration activity resulting in minor negative impacts. These effects could be minimized or eliminated by conducting construction during the dry season (November through May).

Under Alternative B, there may be some impacts to water quality resulting from new construction, proposed Conservation Area operations, and visitor use. The construction of office and visitor-use buildings, parking areas, trails, and other facilities and infrastructure needed for operations and public use programs would cause some vegetation clearing, soil disturbance, and associated runoff. Best management practices would be used to minimize these effects if construction of an office, visitor use buildings, parking area, trails, and other facilities occur on fee-title owned lands up to 10% of the total proposed Conservation Area. Runoff from roads and parking lots would cause some oils, grease, and other materials from vehicles to leach into soils or be carried as runoff into low-lying areas. Stormwater retention/detention ponds would help mitigate most of the water quality impacts associated with runoff.

Prescribed fires and clearing of nonnative plants would cause some vegetation to be removed, leaving soils exposed to runoff and erosion. In general, it is expected that runoff would be buffered by vegetated areas and would likely not contaminate waterbodies. If nonnative plant removal operations were to occur in riparian zones, best management practices would help ensure that impacts to water quality were kept to a minimum. Use of approved herbicides for controlling nonnative plants could cause some of these chemicals to leach into the groundwater or make their way into surface waters. Adherence to product usage guidelines and Service requirements would keep any of these adverse effects to water quality at a minimum.

Public use would include hunting, with some associated trampling of vegetation. This is expected to be a minimal impact, given that hunter densities would likely be sufficiently low to reduce the chances of foot paths from becoming established. Erosion associated with wildlife watching would be minimized by limiting these activities to trails, and possibly, overlooks and observation towers. For anglers, some improved access (e.g., boardwalks and docks) to fishing areas would likely be constructed, minimizing erosion to shorelines.
In general, it is believed that any negative consequences to water quality would be minor.

NOISE

Affected Environment

Due to the large size of the proposed Conservation Area, noise levels would vary, ranging from natural areas with little to no human-related noise pollution to urban areas dominated by human noise sources.

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

The Service is unaware of any other environmental trends or planned actions that would adversely impact noise, including the Proposed Action. No significant adverse or beneficial short-term, long-term, or cumulative impacts would be anticipated for noise.

Impacts of Affected Resources

Alternative A
The soundscape of the proposed Conservation Area is not expected to benefit under the No Action Alternative. Other federal agencies, State agencies, Tribal Nations, and non-governmental organizations could conserve land within the proposed Conservation Area, reducing the introduction of new noise sources within the proposed Conservation Area. The Service would be unable to reduce the introduction of human noise sources within the proposed Conservation Area, such as the noises associated with urbanization. Wildlife would likely be impacted by new noise sources, with possible responses and effects including altered vocal behaviors, reduced abundance in noisy habitats, changes in vigilance and foraging behaviors, and negative impacts on individual fitness and the structure of ecological communities (Shannon et al. 2016).

Alternative B
The Service could collaborate with partners to buy fee-title properties, conservation easements, or accept land donations, thereby reducing the introduction of new noise sources within the proposed Conservation Area. Reducing new noise sources within the proposed Conservation Area, such as the noises associated with urbanization, would benefit wildlife by minimizing their exposure to disruptive noise levels and preventing behavioral responses that could negatively impact their fitness. Sources of noise from farm machinery, heavy traffic, and industrial operations would not occur within Service-acquired lands in the proposed Conservation Area, providing minor benefits to this resource.

Some noise would be associated with use of vehicles by Service staff and the visiting public on Service fee-title lands. Because high levels of speed would not be permitted, associated noise levels would be kept to a minimum. Hunting would cause some noise disturbance, but the frequency and duration would be at levels that would keep it at minimal levels. On less-than-fee-title lands, the would be some landowner and public uses that would generate noise. It is not expected that these would have any significant effects on the area's soundscape as they are similar to what currently occurs on many of the lands. Overall, it is expected that the proposed Conservation Area have a minor negative impact on this resource.

BIOLOGICAL ENVIRONMENT

Description of Environmental Trends, Planned Actions, and Cumulative Impacts
The following environmental trends, planned actions, and cumulative impacts would affect and apply to all species within the biological environment. The most important ecological threats and problems facing the proposed Conservation Area are directly related to the rapidly growing human population and associated use and development of the landscape. From 2010 to 2070, the South Florida population is expected to grow 68% percent to 11.67 million, with the most dramatic growth occurring in Collier and Lee counties (Carr and Zwick 2016a). Associated use and development of the landscape is likely to increase in intensity over the next several decades, leading to further habitat fragmentation and urban development, altered ecological processes, invasive species, and impacts from global climate change.

Climate change is one of the most compelling conservation challenges. Accelerated climate change will be expected to amplify current resource management challenges involving habitat fragmentation, degradation, and loss, as well as urbanization, invasive species, disease, parasites, and water management. As rising temperatures affect the dynamics of complex natural systems, the potential exists for mass species extinctions and disruptions. Fortunately, the Service is in a unique position to help wildlife and ecosystems adapt.

Greenhouse gas emissions caused by human activities have caused the Earth to warm, with the global surface temperature increasing faster since 1970 than in any other 50-year period over at least the last 2000 years (IPCC 2023). From 2011–2020, the global temperature was 1.1°C higher than from 1850–1900. Larger increases have occurred over land (1.59°C) than over the ocean (0.88°C) (IPCC 2023). The primary sources of greenhouse gas emissions include unsustainable energy use, land use and land-use change, and consumption-based lifestyles (IPCC 2023).

Increasing temperatures have contributed to glacial melting and the thermal expansion of ocean water, resulting in sea level rise. Historically, the average rate of global sea level rise was 1.3 mm per year between 1901 and 1971, increasing to 1.9 mm per year between 1971 and 2006, and further increasing to 3.7 mm per year between 2006 and 2018 (IPCC 2023). Human influence is certain to be the main driver of these increases since at least 1971 (IPCC 2023). Florida is extremely vulnerable to the effects of sea-level rise due to a combination of low land elevations, a high-water table, peninsular geography of being surrounded by ocean on three sides, susceptibility to tropical cyclones, and a large and growing human population that is mostly concentrated along the coasts (Noss et al. 2014). Sea-level rise and increased intensity of storm surges in Florida are leading to the erosion and saltwater inundation of beaches and barrier islands, greater property damages, saltwater intrusion into drinking water supplies, and adverse impacts on coastal ecosystems and species (Noss 2011). The National Oceanic and Atmospheric Administration (NOAA) estimates that by 2060, sea level off the coasts of Naples and Fort Myers will rise by 1.4 ft under their intermediate scenario and 1.9 ft under their intermediate-high scenario (NOAA 2023). Scientists are confident sea levels will continue to rise during the coming decades, likely worsening these impacts.

Human-induced climate change has caused substantial damage to Earth's terrestrial and aquatic ecosystems. Mass wildlife mortality events have been recorded worldwide on land and in the ocean, while ecosystems have experienced increasingly irreversible changes. Florida's species are vulnerable to these climate change impacts and out of 1,200 species tracked by the Florida Natural Areas Inventory, housed within the Florida Resources and Environmental Analysis Center at Florida State University, 25% are likely to lose at least half of their current habitat due to sea level rise alone (Stys et al. 2017). Florida's wildlife populations and ecosystems are likely to experience many challenges related to climate change, including but not limited to the inability of species to migrate inland due to human modification of the landscape Noss et al. (2014); negative impacts from phenological changes, such as mistimed migrations (Robinson et al. 2009); changes in the population dynamics of species with temperature-dependent sex determination (Laloë et al. 2016); disruption of synchronized co-evolutionary relationships, like that between plants and their pollinators; enhanced fitness and range shifts of invasive species (Rahel et al. 2008, Bellard et al. 2013); vegetation root zone saltwater intrusion (Miller et al. 2003); and habitat migration and alteration (Pearlstine et al. 2010, Koch et al. 2015, Nungesser et al. 2015). The negative impacts on Florida's wildlife and habitats associated with climate change are expected to increase as warming continues.

Global warming is also leading to changes in Florida's precipitation patterns (Miller et al. 2022). Annual precipitation has increased by 5% since 1900 in southwest Florida (U.S. Global Change Research Program 2018). Since the 1970's, heavy downpours have increased in frequency and intensity by 27% and are increasing flooding along barrier islands, coastal beaches, and in low-lying areas. Model simulations predict changes in seasonal precipitation for southwest Florida with increases in dry season rainfall up to 20% and decreases in wet season rainfall up to 30% (NOAA 2017). A decrease in wet season rainfall will lead to lower water levels and increased droughts during a time that plants are water-dependent for growing and flowering and wetland bird species are foraging. The change in timing of rainfall will stress ecosystems and cause changes in vegetation types. An increase in dry season rainfall will increase water levels and hydroperiods during the important time of

year when many birds are preparing to breed and nest, migratory birds are stopping over to forage, alligators are preparing nesting holes, and plants are becoming more dormant (Miller et al. 2022).

The impacts associated with climate change are not restricted to wildlife and ecosystems. Because humans are intimately intertwined with the environment, climate change also affects humans and human systems. Changes in freshwater availability and the productivity of agriculture, livestock, and fisheries have been observed, resulting in food and water insecurity (IPCC 2023). Climate change has also caused adverse impacts on human health and well-being related to infectious diseases (Lafferty 2009), heat stress, respiratory illnesses (Barnes et al. 2013), cardiovascular issues (De Blois et al. 2015, Giorgini et al. 2017), malnutrition (Lieber et al. 2022), mental health (Berry et al. 2010, Cianconi et al. 2020), and displacement (Warner et al. 2009). In addition, economic damages from climate change have been detected (Stanton and Ackerman 2007, Hsiang et al. 2017, Auffhammer 2018) in climate-exposed sectors, such as realty, agriculture, forestry, fishery, energy, and tourism (IPCC 2023). Further, urban infrastructure, including transportation, water, sanitation, and energy systems, has been compromised by climate-related events (IPCC 2023). These documented impacts are concentrated amongst economically and socially marginalized urban residents and are driven by changes in multiple physical climate conditions, which are increasingly attributed to human influence (IPCC 2023).

FOCAL NATURAL COMMUNITIES

Affected Environment

The six land cover class types used to characterize the proposed Conservation Area, dry prairie, freshwater forested wetland, hardwood forested upland, high pine and sand scrub, pine flatwoods, and wet prairie and freshwater marsh, were created by lumping land cover classes from the Florida Land Cover Map (Florida Fish and Wildlife Commission and Florida Natural Areas Inventory 2022). For a complete description of how land cover classes were developed for this document, see Appendix D.

Dry Prairie

Dry prairie is a treeless community of low shrubs and grasses occupying vast, level expanses and is associated with sand soils over an organic or clay hardpan. Common shrubs and herbs include wiregrass, dwarf live oak, stunted saw palmetto, bottlebrush threeawn, and broomsedge bluestem. Fires occur every one to two years. This land cover class also includes palmetto prairies, which are found in seldom-flooded dry sand areas in which saw palmetto is the dominant vegetation. Common associates of saw palmetto in this cover type are fetterbush, tar flower, gallberry, wire grass, and brown grasses. There are 78,966 acres of the dry prairie land cover class within the proposed Conservation Area.

Freshwater Forested Wetland

The freshwater forested wetland land cover class is a combination of several habitats: baygall, swamp bay, south Florida bayhead, cypress/pine/cabbage palm mixed wetland hardwood, other hardwood wetland, and hydric hammock. There are 206,776 acres of the freshwater forested wetland land cover class within the proposed Conservation Area. The habitats that comprise the freshwater forested wetland land cover class are characterized as follows:

- Baygall habitats consist of slope or depression wetlands with peat substrate, usually saturated and occasionally inundated. Common vegetation includes a closed canopy of evergreen trees, loblolly bay, sweetbay, swamp bay, titi, and fetterbush. Naturally occurring fire is rare or absent.
- Bay swamp consists of large or small peat-filled depressions. The depressions are forested and dominated by bay species.

- South Florida bayhead is found on tree islands in glades marshes on peat substrate, south of Lake Okeechobee in the central and southern peninsula. This habitat may have an open or closed canopy containing swamp bay, sweetbay, dahoon, coastal plain willow, and coco plum.
- Cypress/pine/cabbage palm communities include cypress, pine, and cabbage palm in combinations where no species dominates. This habitat typically forms a transition between moist upland and hydric sites.
- Mixed wetland hardwoods are hardwood communities composed of various hardwood species tolerant of hydric conditions yet exhibiting an ill-defined mixture of species.
- Other hardwood wetlands are a mix of hydrophytic hardwood trees that experience a short hydroperiod. Cypress or tupelo may be occasional or infrequent in the canopy.
- Hydric hammocks are composed of lowlands with sand, clay, and organic soil over limestone. This mesic-hydric habitat experiences occasional to rare fires and contains diamond-leaved oak, live oak, cabbage palm, red cedar, and mixed hardwoods.

Upland Hardwood/Hammock

Harwood forested uplands, comprising 67,760 acres of the proposed Conservation Area, consist of several habitats: cabbage palm hammock, cabbage palm forest, live oak forest, mesic hammock, prairie mesic hammock, oak-cabbage palm forests, mixed hardwoods, and upland hardwood forests. The habitats included in the hardwood forested uplands land cover class are characterized as follows:

- Cabbage palm hammock is defined as any forested (over 25% canopy closure) wetland community where cabbage palms are the dominant tree species.
- Cabbage palm forest is purely or predominantly cabbage palm and is found on sandy soil. Other tree species associated with cabbage palm forests include various large and small hardwoods. In South Florida, cabbage palm forests may be strongly associated with slash or longleaf pine.
- Live oak forest is also considered an upland temperate hammock in which live oak is either pure or predominant. This habitat type, which may contain sweetgum, magnolia, holly, and laurel oak, is common along the upper banks of Florida's lakes and streams.
- Mesic hammock consists of flat land with sand and organic soil; is primarily in the central peninsula; experiences occasional or rare fire; and typically has live oaks, cabbage palms, southern magnolias, pignut hickories, and saw palmettos.
- Prairie mesic hammock is an isolated stand within a matrix of pyrogenic vegetation; experiences occasional fire; and contains live oaks, cabbage palms, and saw palmettos.
- Oak-cabbage palm forest has a closed canopy of hardwood species, primarily live oak and cabbage palm, that is naturally protected from fire. Human activity has heavily impacted this habitat, primarily through clearing for agriculture and urbanization. Canopy closure must be 25% or more with at least 67% dominance by a combination of live oak and cabbage palm to be included in this habitat.
- Mixed hardwoods are a hardwood community that includes any combination of large and small hardwood tree species, none of which can be identified as dominating the canopy.
- Upland hardwood forests are found in the panhandle and central peninsula. They are composed of a closed deciduous or mixed deciduous and evergreen canopy, with associated species including American beech, southern magnolia, hackberry, swamp chestnut oak, white oak, horse sugar, flowering dogwood, and mixed hardwoods. Fire is rare or absent in upland hardwood forests.

High Pine and Sand Scrub

The high pine and sand scrub land cover class accounts for 16,524 acres within the proposed conservation area and is comprised of scrub habitat, including oak scrub and sand pine scrub, and sandhill habitat. The habitat types included in this land cover class are characterized as follows:

- Scrub habitat contains open or dense shrubs with or without a pine canopy, sand pine, scrub oaks, or Florida rosemary. It is a fire-maintained system and is found statewide except in the extreme southern peninsula and the Florida Keys.
- Oak scrub is a dry hardwood community typically consisting of clumped patches of low-growing oaks interspersed with bare areas of white sand. This community occurs in areas of deep, well-washed, sterile sands, and it is the same understory complex of scrubby oaks and other ground cover species that occurs in the sand pine scrub community. It is usually dominated by shrubby oaks, myrtle oak, Chapman's oak, and sand live oak.
- Sand pine scrub is found on ridges throughout the State; has a canopy of sand pine; and has an understory of the three shrubby oaks, including myrtle oak, Chapman's oak, sand live oak, or less commonly, Florida rosemary.
- Sandhill is an upland habitat with a deep sand substrate, occurring from the panhandle to the central peninsula. It experiences frequent fire every one to three years and has an open canopy of longleaf pine or turkey oak with a wiregrass understory.

Pine Flatwoods

The pine flatwoods land cover class, occurring on 413,010 acres in the proposed conservation area, contains wet flatwoods, cabbage palm flatwoods, hydric pine flatwoods, hydric pine savanna, mesic flatwoods, and scrubby flatwoods. The habitats used in this cover class are characterized as follows:

- Wet flatwood habitat consists of flat land with a sand substrate that is seasonally inundated. It is found statewide except in the extreme southern peninsula and Keys. Fire occurs every two to four years in grassy wet flatwoods and every five to 10 years in shrubby wet flatwoods. A closed-to-open pine canopy with a grassy or shrubby understory is typical. Associated species include slash pine, pond pine, large gallberry, fetterbush, sweetbay, cabbage palm, wiregrass, and toothache grass.
- Cabbage palm flatwoods are located on shelly sand or where limestone is near the surface. It has a pine canopy over a cabbage palm understory.
- Hydric pine flatwoods are open forest communities with sparse canopies of longleaf or slash pines and ground covers of grasses, forbs, and wetland shrubs.
- Mesic flatwoods consist of flat land with a sand substrate. This moderately wet habitat is found statewide except in the extreme southern peninsula and the Keys. It experiences frequent fire every two to four years and has an open pine canopy with a layer of low shrubs and herbs. Associated species include longleaf pine or slash pine, saw palmetto, gallberry, dwarf live oak, and wiregrass.
- Scrubby flatwoods are composed of flat land with a sand substrate, are considered xeric-mesic, and are found statewide except extreme southern peninsula Keys. Occasional fire occurs every three to 15 years. Vegetation in scrubby flatwoods consists of widely scattered pine canopy over saw palmetto and scrub oaks, longleaf pine, sand live oak, myrtle oak, Chapman's oak, saw palmetto, and wiregrass.

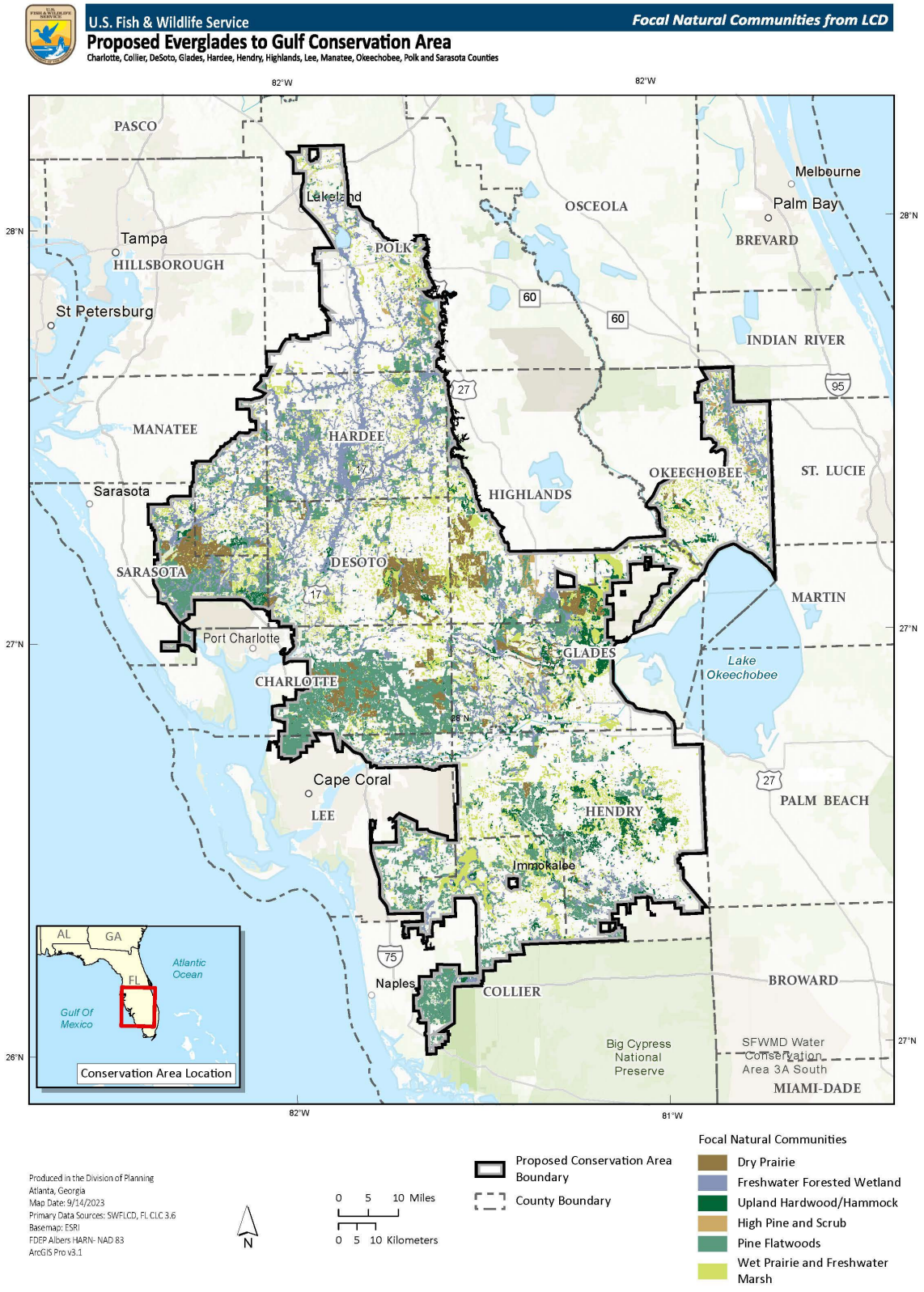
Wet Prairie and Freshwater Marsh

The wet prairie and freshwater marsh land cover class consists of prairies and bogs (including wet prairie) and marshes (including isolated freshwater marshes). This land cover class occurs on 319,660 acres in the proposed conservation area. The habitats contained in the wet prairie and freshwater marsh land cover class are characterized as follows:

- Prairies and bogs have a short hydroperiod and are dominated by grasses, sedges, and titi.
- Wet prairie consists of flat land or slope with sand or clayey sand substrate. It is usually saturated but only occasionally inundated and is found statewide, excluding the extreme southern peninsula. Prairies and bogs experience frequent fire every two to four years. This habitat is treeless and has a dense

herbaceous community with few shrubs, wiregrass, blue maidencane, cutthroat grass, wiry beaksedges, flattened pipewort, toothache grass, pitcher plants, and yellow-eyed grass.

- Marshes have long hydroperiods and are dominated by grasses, sedges, broadleaf emergents, floating aquatics, or shrubs.
- Isolated freshwater marshes are typically small and are considered isolated when there is no apparent surface water connection to perennial rivers and streams, estuaries, or the ocean.



EA Figure 5. Focal Natural Communities

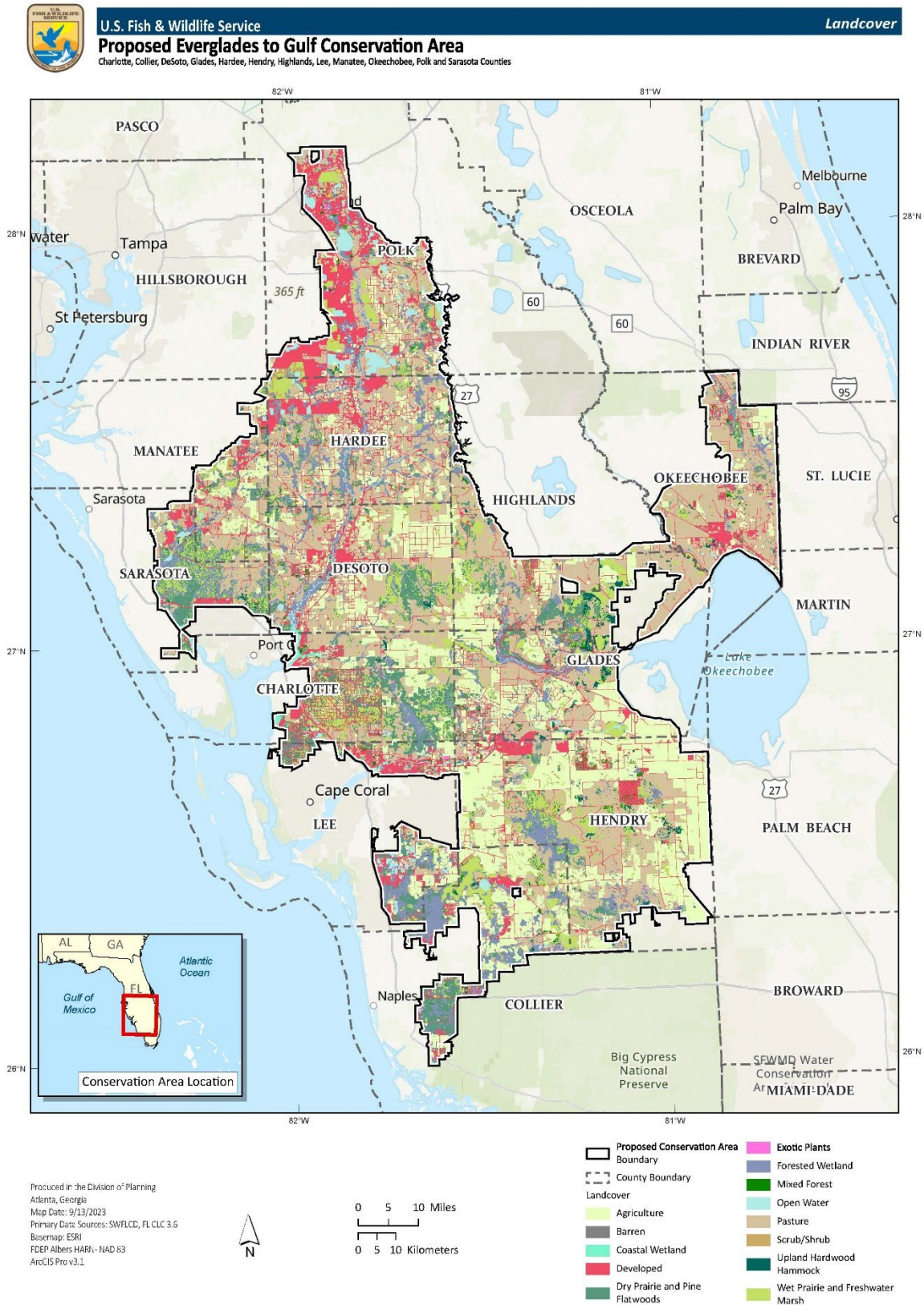
EA Table 2 summarizes the general types and amounts of lands defined as Focal Natural Communities in the LCD within the Proposed Conservation area. Numerous habitats could benefit from large-scale management (Figure 5).

EA Table 2. Focal Natural Communities

Proposed CA Map Unit	SWFLCD Focal Natural Community	Protected (acres)	Unprotected (acres)	Total
Dry Prairie	Dry Prairie	48,952	30,014	78,966
Freshwater Forested Wetland	Bay Wetland	2,133	5,327	7,460
Freshwater Forested Wetland	Cypress/Pine/Cabbage Palm	2,629	20,905	23,534
Freshwater Forested Wetland	Freshwater Hardwood Wetland	23,869	144,417	168,286
Freshwater Forested Wetland	Hydric Hammock	2,945	4,550	7,495
Upland Hardwood/Hammock	Upland Hammock	13,878	53,882	66,075
Upland Hardwood/Hammock	Upland Hardwoods	53	1,632	1,685
High Pine and Scrub	Sandhill	625	12	637
High Pine and Scrub	Scrub	3,028	12,859	15,887
Pine Flatwoods	Hydric Flatwoods	43,569	32,765	76,334
Pine Flatwoods	Mesic Flatwoods	134,401	168,710	321,111
Pine Flatwoods	Scrubby Flatwoods	5,773	9,792	15,565
Wet Prairie and Freshwater Marsh	Freshwater Marsh	48,080	200,021	248,101
Wet Prairie and Freshwater Marsh	Wet Prairie	19,262	52,296	71,559

Land Cover

Aside from the Focal Natural Communities, there are 172 different land covers(FWC and Florida Natural Areas Inventory 2022) within the approximately 4-million-acre proposed Conservation Area. These have been combined into 13 land cover categories for the purpose of analysis in this document (EA Table 3). EA Figure 6 shows similarly grouped land uses within the proposed Conservation Area. Although there are many land covers, approximately 79 percent of the proposed Conservation Area is comprised of only 20 land uses (EA Table 8).



EA Figure 6. Landcover Types

EA Table 3. Landcover within the proposed Conservation Area.

Land Cover Type	Acres in Conservation Area	Percent
Agriculture	835,153	20.9
Barren	450	0.0
Coastal Wetland	7,200	0.2
Developed	404,617	10.1
Dry Prairie and Pine Flatwoods	491,976	12.3
Exotic Plants	7,623	0.2
Forested Wetland	398,021	9.9
Mixed Forest	68,124	1.7
Open Water	92,668	2.3
Pasture (Improved, Unimproved, Woodland)	1,061,358	26.5
Scrub/Shrub (Including High Pine and Brushland)	59,425	1.5
Upland Hardwood/Hammock	68,723	1.7
Wet Prairie and Freshwater Marsh	510,062	12.7
Total	**4,005,398**	**100.0**

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

In addition to the Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above and based on the information presented in the Florida 2070 Report (Carr and Zwick 2016b), the Service anticipates that existing native and natural habitats would be lost to residential and agricultural development. The water resources of the upper basin would be impacted by increased stormwater runoff from the increase in impervious surfaces (e.g., roads, parking lots), leading to a deterioration of water quality of the area lakes and streams (stormwater runoff can contain pollutants such as nutrients, pesticides, endocrine disrupters, garbage, and petrochemicals). The loss of groundwater recharge (due to increased impervious surfaces) and the increase in residential and agricultural water consumption would increase the frequency of drying events of these water bodies and could reduce or disrupted. The Service also knows that landowners within the project area have expressed interest in converting their pasture habitat, which supports federally listed species, to bio-fuel production facilities. This would reduce or eliminate the habitat quality for many species. The loss of this and similar pasture or rangeland habitats would limit the ability of land managers to protect, conserve, or restore the dry prairie ecosystem that once existed there. Besides these rare and unique habitats, the Service would expect overall losses of other ecologically valuable habitats (e.g., pine flatwoods, hardwood hammocks, forested and herbaceous wetlands, and pastures) as they are converted to residential and more intensive agricultural uses. Additional adverse effects from urbanization would be related to increased roads and traffic leading to a higher likelihood of road-killed animals and a higher incidence of feral cats that could prey on native animal species.

The Service and adjacent conservation land managers would continue conservation management activities to protect and manage habitats and vegetation on the proposed Conservation Area and in the surrounding landscape. Habitats and vegetation would continue to be impacted by outside factors, including human

population increases and associated development patterns, climate change, and invasive species, and land management practices on lands in the proposed Conservation Area. This would result in altered habitats, and with a rapidly growing human population, impacts to habitats are only anticipated to increase. Ditching for infrastructure, residential and agricultural development has altered natural hydrology, and has promoted generally drier soils. As a result, many of the ecological communities and processes have been negatively impacted. The long-term ecological health is inextricably linked to hydrology and fire, which are the two major ecosystem drivers that maintain and enhance ecosystem integrity on habitats within the proposed Conservation Area.

Impacts of Affected Resources

Alternative A
Under the No Action Alternative, uncertainty exists as to the potential for beneficial impacts to native habitats and species. Although adverse impacts to native habitats and species are anticipated under the No Action Alternative, additional conservation efforts could be undertaken by public, private, and/or governmental organizations. However, given past actions and trends, it is anticipated that human population growth and development would continue, and that further development of the landscape would continue to convert native habitats and natural systems to developed lands, resulting in continued loss of these resources and further fragmenting remaining natural lands and waters.

At least some habitats would be developed under the No Action Alternative. In addition to development, further damage to habitat would be expected from feral hog (*Sus scrofa*) rooting and other invasive species, including coral ardisia (*Ardisia crenata*), Chinese privet (*Ligustrum sinense*), camphor tree (*Cinnamomum camphora*), Japanese climbing fern (*Lygodium japonicum*), and heavenly bamboo (*Nandina domestica*) (Florida Natural Areas Inventory 2010); logging, and incompatible recreation. It is also probable that habitat would experience more fragmentation from road construction. Some inland scrub habitats would also likely be converted into intensely managed pine plantations, pasture, or citrus groves (Weekley et al. 2008). Fire suppression would degrade some inland scrub, transforming it into woodland. Further degradation would likely occur from resource extraction, incompatible recreation and forestry practices, road construction, and invasive species and be made worse by temperature and precipitation impacts caused by climate change (FWC 2016).

Alternative B
With implementation of Alternative B, the proposed Conservation Area would become a more connected and functional landscape that may allow habitats and species to shift in response to climate and human demographic change. A large addition to the conservation landscape would build larger linkages to the fragmented landscape of this area which currently limits habitat use, migration, and dispersal of a variety of species. The existing and projected loss or fragmentation of habitats could still be problematic at the broader landscape level; however, Alternative B would alleviate more localized habitat in the proposed Conservation Area.

The proposed Conservation Area would provide an important link for migratory birds and important habitat for both rare and common wildlife. Proposed habitat management would complement the management of adjacent and nearby conserved lands, both public and private, thus enhancing the Service's wildlife management contribution to the regional landscape and helping to make the entire landscape a more functional conservation.

With the implementation of Alternative B, habitats and adjacent wetlands would be afforded additional protection, and the Service expects benefits to natural habitats. At this time, the Service cannot predict the

relative amounts of different habitats that would eventually make up the proposed Conservation Area, but it would conceivably have more forested and wetland ratio to what is found in the overall currently.

Protecting the adjacent buffer areas would be critical to the long-term conservation. These vegetated areas help protect water resources that are important to the waterways. Forests, for instance, can absorb and slowly release water; providing a flow of water that sustains the river up-stream, even during some droughts. Conversely, vegetated lands help prevent sedimentation and limit flash floods.

Working lands could be moderately affected if acres were removed from availability; however, lands other than agricultural are considered within the proposed Conservation Area. Prime agricultural lands would likely not be for sale and purchasing of substantial acreage of land from willing landowners by the Service would take decades to accomplish, therefore the impact would be gradual and considered minimal.

The Service anticipates that existing natural habitats could also be lost to urban development under the Proposed Alternative. This would fragment remaining natural lands and waters. However, the Service expects that the distribution of these impacts might change if the Proposed Alternative was implemented. For example, a frequent real estate selling point is the ability to own land where there are fewer neighbors, and some people may desire to live adjacent to a protected natural area. This could entice residential development around the lands not already protected. In this event, the periphery of these areas could be affected by adjacent landowners (human disturbance) and wildlife connectivity could be reduced. In the interim, the price for these adjacent lots may also increase due to their anticipated desirability. That increase in cost, may make it more difficult for the Service or other conservation organizations or entities to buy additional lands or easements in those areas. In general, the Service expected impacts to habitats under this alternative to be minor.

FISH AND WILDLIFE

General Wildlife Diversity

Affected Environment

More than 500 amphibian, reptile, bird, and mammal species have been identified providing habitat for a variety of resident and migratory birds within the proposed Conservation Area. Over 200 of these birds are considered migrant, either utilizing habitat in the project area as stopover sites as they migrate or residing locally for a portion of the year.

Blue-winged teal and mottled duck are the two most commonly observed waterfowl species, with many other species of waterfowl noted throughout the winter period including green-winged teal (*Anas crecca*), hooded merganser (*Lophodytes cullulatus*), and wood duck (*Aix sponsa*). The American wigeon (*Anas americana*), northern pintail (*A. acuta*), northern shoveler (*A. clypeata*), ring-necked duck (*Aythya collaris*), and black-bellied whistling duck (*Dendrocygna autumnalis*) are present but are not regularly observed (SFWMD 2010). Arthropods are also abundant on and near the proposed Conservation Area. There are a large number of endemic insects including the emerald moth (*Nemouria outina*) which feeds solely on rosemary, the bee fly (*Bombyliidae* sp.) which is the primary pollinator for the scrub balm, and the scrub millipede (*Floridobolus penneri*). The scarab beetle (*Scarabaeidae* sp.) and gopher cricket (*Gryllus* sp.) are both obligate commensals that are only found in gopher tortoise burrows.

Aquatic invertebrates are an integral component of the food web within the proposed Conservation Area linking different trophic levels. Riverine water bodies support mayflies and caddisflies, while more lacustrine water

bodies are dominated by crustaceans, midges, beetles, and dragonflies. Grazing invertebrates such as the grass shrimp (*Palaemonetes paludosus*) comprise a large portion of the aquatic invertebrate biomass. The Florida apple snail (*Pomacea paludosa*) is also important because it is eaten by many animal species including the endangered Everglade snail kite.

A wide variety of wildlife species can be found throughout the proposed Conservation Area footprint. Game species such as bobwhite quail (*Colinus virginianus*), wild turkey (*Meleagris gallopavo*), raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), grey squirrel (*Sciurus carolinensis*), and rabbit (*Sylvilagus spp.*) occur in abundance, providing ample hunting and wildlife observation opportunities. The feral hog, although a nonnative and nuisance species, is also considered a game species and can be found in overabundance in many areas throughout Florida.

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

See Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above.

Impacts of Affected Resources

Alternative A

Under the No Action Alternative, there would be no benefits to native fish or wildlife populations on unprotected lands within the proposed Conservation Area with the possible exception of those species that can tolerate some urbanization. These could include species such as gray squirrel, opossum (*Didelphis virginiana*), blue jay (*Cyanocitta cristata*), mockingbird (*Mimus polyglottos*), black racer (*Coluber constrictor*), Cooper's hawk (*Accipiter cooperii*), white ibis (*Eudocimus albus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), and various insects (e.g., love bug (*Plecia nearctica*), mosquito (*Culicidae spp.*), and cockroach (*Periplaneta americana*). As native and natural habitats continue to decline in quality and spatial extent, and as habitat patches become more fragmented, the animal species that use these habitats would decline in numbers or fitness. The No Action Alternative would promote this decline in Florida's fauna and because some of these species are endemic or greatly restricted in their distribution, it may contribute to the future listing of species under the Endangered Species Act. Additionally, nonnative animal species (e.g., starling (*Sturnus vulagris*), Cuban tree frog (*Osteopilus septentrionalis*), fire ant (*Solenopsis spp.*), and pollution tolerant fishes like blue tilapia (*Oreochrimis aureus*), or Asian swamp eel (*Monoprterus albus*) may become more prevalent furthering the disruption of the native ecosystems.

Alternative B

All of these species would be expected to use the proposed Conservation Area under Alternative B. There are approximately 500 non-listed fish, amphibian, reptile, bird, and mammal species potentially present in the proposed Conservation Area that would benefit under Alternative B. These additional lands acquired by the Service within the proposed Conservation Area would provide additional habitat for these non-listed species. Under Alternative B, the largest benefit would be to those species that occupy primarily pastures, grasslands, prairies, wetlands, or pine flatwoods.

Birds of Conservation Concern/Peninsular Florida

Affected Environment

The proposed Conservation Area lies within Bird Conservation Region 31(Peninsular Florida). Though these birds are protected under the Migratory Bird Treaty Act, they have also been identified as those that are most likely to become listed species unless additional conservation measures are implemented. There are 22 species (EA Table 4) that fall within the proposed Conservation Area. Bird species with a sport-hunting season, listed

species under the Endangered Species Act, and any bird listed as accidental or introduced by humans would not be considered for Birds of Conservation Concern status.

EA Table 4. The common names, scientific names, and status of Birds of Conservation Concern within the proposed Conservation Area (USFWS 2021a).

Common Name	Scientific Name
American Kestrel (Southeast)	*Falco sparverius Paulus**
American Oystercatcher	*Haematopus palliates**
Bachman's Sparrow	*Aimophila aestivalis*
Black Skimmer	*Rynchops niger*
Chimney Swift	*Chaetura pelagica*
Dunlin	*Calidris alpina*
Florida Burrowing Owl	*Athene cunicularia floridana**
Gull-billed Tern	*Gelochelidon nilotica*
Henslow's Sparrow	*Ammodramus henslowii*
King Rail	*Rallus elegans*
Least Tern (Atlantic/Interior)	*Sternula antillarum antillarum/athalassos**
Lesser Yellowlegs	*Tringa flavipes*
Mangrove Cuckoo	*Coccyzus minor*
Pectoral Sandpiper	*Calidris melanotos*
Prairie Warbler (Florida)	*Dendroica discolor*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Semipalmated Sandpiper	*Calidris pusilla*
Short-Billed Dowitcher	*Limnodromus griseus*
Swallow-tailed Kite	*Elanoides forficatus*
Whimbrel	*Numenius phaeopus*
Willet	*Tringa semipalmata*
Yellow Rail	*Coturnicops noveboracensis*

*****State threatened in Florida.

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

See Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above.

Impacts of Affected Resources

Alternative A

The No Action Alternative there could be decline in Florida's fauna and because some of these species are endemic or greatly restricted in their distribution, it may contribute to the future listing of species under the Endangered Species Act.

Alternative B

All of these species would be expected to use the proposed Conservation Area under Alternative B. There are approximately 22 species potentially present in the proposed Conservation Area that would benefit under

Alternative B. These additional lands acquired by the Service within the proposed Conservation Area would provide additional habitat for these Conservation Birds Of Concern.

FEDERAL/STATE LISTED AND PRIORITY AT-RISK SPECIES

Federally Endangered, Threatened, and Candidate Species

BIRDS

Description of Environmental Trends, Planned Actions, and Cumulative Impacts
See Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above.

Audubon's Crested Caracara
Affected Environment
The federally threatened Audubon's crested caracara (*Polyborus plancus audubonii or Caracara plancus cheriway*) is a large species of raptor that occurs in south-central Florida, including all or parts of Brevard, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Indian River, Manatee, Martin, Okeechobee, Osceola, Palm Beach, Polk, and St. Lucie counties (Dwyer 2010), especially on privately owned cattle ranches (Morrison and Humphrey 2001) and in wet prairies with cabbage palms. It may also be found in open or semi-open grasslands, pastures, pampas, palm savannas, deserts, river edges, and sometimes in marshes and open woodlands (Morrison and Dwyer 2021). Unlike the breeding season, crested caracaras sometimes use citrus groves during the non-breeding season (Morrison and Dwyer 2021). Based on current knowledge of over 150 nest sites within a limited portion of the bird's range in Florida, over 500 individuals inhabit Florida (USFWS 2009). However, abundance estimates have been dubious and remain problematic due to the bird's low detectability and surveyors' limited access to suitable habitats on private lands (Humphrey and Morrison 1997). In addition, population trends are difficult to interpret because of the bird's long lifespan, site fidelity, and the lack of data on the recruitment rates of young (Morrison 1996).

Habitat loss, vehicle collisions, hydrologic changes, and sea level rise threaten crested caracaras. A population viability analysis demonstrated that while it may be stable under present conditions, Florida's crested caracara population is sensitive to even modest habitat loss (Root and Barnes 2007). Habitat loss and degradation due to agriculture, urban development and disrupted fire regimes have significantly reduced available habitat (Morrison 2006). Vehicle strikes are also a major threat, causing substantial mortality among immature birds (Morrison 1996). Hydrological changes can negatively impact crested caracaras, with egg laying and food availability being tied to rainfall cycles (Morrison 1999). Restoration projects focused on restoring historical hydrology, especially those involving constructing large reservoirs, pose a substantial threat to suitable habitat availability (USFWS 2009). In addition, climatic changes and sea level rise may result in the loss of suitable habitat through inundation or vegetative composition changes. Finally, stochastic events, like environmental disasters, could significantly reduce the caracara population because of its isolation and reliance on a specific habitat.

This proposal would support the following action items in the *South Florida Field Office Multi-Species Recovery Plan* (USFWS 1999), which includes the crested caracara:

- Encourage landowners to maintain habitat for caracara and other prairie species.
- Encourage landowners to protect caracara and their nesting sites by providing incentives.
- Establish habitat management guidelines to protect nests and nesting pairs of caracara.

- Encourage the purchase of unprotected lands that support Audubon's crested caracaras.
- Maintain and enhance habitat on acquired lands or lands under easement/agreement.
- Conduct prescribed burns at periodic intervals.
- Maintain pastures in native vegetation to the extent possible.
- Locate active caracara territories in Glades, DeSoto, Highlands, Okeechobee, and Osceola Counties.
- Inform landowners of presence of caracara on their property.
- Monitor caracara on public lands to evaluate management actions.
- Use conservation easements and other non-fee-title ownership options to maintain habitat.
- Do not allow reforestation of prairies.
- Establish appropriate burn seasonality.
- Expand caracara habitat in occupied areas.
- Restore habitat in currently unoccupied areas.
- Determine why certain caracara habitat areas are not used.
- Determine which elements to modify to make unused areas suitable for caracara.
- Inform the public.
- Locate and map caracara potential habitat that can be restored for reintroductions.
- Encourage natural colonization of restored habitats by caracara.
- Compile caracara data into a central database at one location.
- Increase public awareness of the biology, ecology, status, and trends of the caracara.

Impacts of Affected Resources

Alternative A
Under the No Action Alternative, at least some development and degradation of prairie habitat within the proposed Conservation Area would be expected, reducing the suitable habitat available to Audubon's crested caracara. A reduction in suitable habitat would adversely impact the reproduction potential of the species, possibly negatively affecting its population trends.

The further loss of this species' preferred habitat (dry or wet prairies and pastures) along with the anticipated reduction in its wetland-dependent prey-base may reduce the distribution of this species in the proposed Conservation Area. The Service would expect that entire territories could be lost due to development (habitat fragmentation) and this would, therefore, reduce the reproductive potential of the species.

Alternative B
Habitats within the proposed Conservation Area include pastures, dry prairie, herbaceous wetlands, and shrub and brushland. Protected contiguous habitats under Alternative B could support many caracara home ranges. If the habitat quality is optimal (either now or after restoration of uplands and wetlands), then Alternative B could possibly support more caracara home ranges and should increase the forage base for local caracaras.

Black Rail
Affected Environment
Black rails (*Laterallus jamaicensis*) are secretive marsh birds reported in 32 counties and on 45 named properties in Florida (Watts 2016). They have been reported using diverse habitats, including tidal salt marshes, interior freshwater wetlands, abandoned mines and impoundments, grassy fields, and coastal prairies (Watts 2016). Likely the greatest threats to the species are factors that alter hydrology, such as groundwater

withdrawal (Watts 2016), habitat loss, tidal flooding, increases in storm frequency and intensity, sea level rise, and incompatible land management.

Impacts of Affected Resources

Alternative A
Some suitable habitats for black rails would likely be lost to commercial, industrial, agricultural, and residential development, with road construction causing further fragmentation. Increased urbanization and agriculture would likely degrade remaining suitable habitats by increasing runoff pollutants, fragmenting the landscape, and altering hydrology. Without proper management, the salt and brackish marshes used by this species could become dominated by invasive species, altering the food web and decreasing available habitat. These adverse effects would likely decrease black rail populations in southwest Florida.

Alternative B
Foraging and nesting habitat for the black rail would increase under Alternative B. Important habitats such as, salt and brackish marsh, would be potentially available to be protected and actively managed if owned by the Service. Where appropriate, fee-title lands could further be actively managed to restore proper hydrology improving foraging and potential nesting habitat. Invasive species management would also benefit the black rail under Alternative B. Conservation easements would also benefit the black rail, further restricting commercial, residential, industrial, and agricultural development. Water quality would also increase with acquisition of important habitat within the proposed Conservation Area.

Everglade Snail Kite
Affected Environment
The federally endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), a medium-sized raptor, is a food specialist that feeds almost entirely on apple snails (*Pomacea* spp.). These snails are found in palustrine emergent, long-hydroperiod wetlands, lakes, streams, canals, and ditches. The current distribution of the snail kite in Florida is limited to six large freshwater ecosystems including the Upper St. Johns marshes, Kissimmee River Basin, Lake Okeechobee, Loxahatchee Slough, Everglades, and Big Cypress basin (USFWS 2019a) within the central and southern portions of the State. Although the snail kite forages in various surface water types, droughts and water management practices have degraded suitable snail kite habitat. Water quality degradation, particularly phosphorus runoff from agricultural and urban sources, and the loss of wetlands also threaten the species.

Recovery Plan for the Endangered Everglade Snail Kite (2019a) states: "The principal threat to the snail kite is the loss, fragmentation, and degradation of wetlands (Factor A). Hydrologic conditions, both natural and unnatural (i.e., water management), may adversely affect snail kite nest success and juvenile survival both directly (e.g., increased predation) and indirectly (e.g., decreased foraging opportunities). For example, rapid recession rates during the dry (breeding) season and associated low water levels can allow nests to become accessible to land-based predators, resulting in decreased nest success. Extremely low water levels and rapid recession rates can limit foraging opportunities for juvenile and nesting adult snail kites, both of which require a sufficient forage base in the vicinity of the nest. Snail kite foraging on this larger nonnative snail was thought to be a problem a few years ago, but evidence now seems to indicate that all size classes of this snail are available to the kites.

This proposal would support the listed recovery actions for snail kites.

- Estimate population size and survival through mark/resighting of banded snail kite.
- Monitor population size and survival over time through long-term mark/resighting of banded snail kite.
- Control or remove exotic vegetation in wetlands.
- Use controlled burns to open up areas of overly dense vegetation in lake littoral zones and marshes.
- Prevent cultural eutrophication of lakes and marshes.
- Reverse the expansion of cattails in portions of the Everglades.
- Investigate, plan, and carry out restoration projects for snail kites in the Kissimmee, Okeechobee, and Everglades watershed.
- Monitor snail kite habitat and ecological processes.
- Expand and refine existing information on movements and distribution of snail kites, particularly related to drought.
- Expand information on survival of juvenile and adult snail kites.
- Monitor contaminants in snail kites and apple snails.
- Increase public awareness of ecological relationships, environmental stressors, and restoration activities in south Florida.
- Increase public awareness of snail kites.

Impacts of Affected Resources

Alternative A
Some commercial, residential, industrial, and agricultural development would be expected to occur in the shallow freshwater marshes and shallow grassy lake shorelines used by the Everglade snail kite. A decrease in water quality from polluted runoff would likely accompany the increase in development. In addition to increased water pollution, the development would likely alter the landscape's natural hydrology. Further, invasive species could spread under the No Action Alternative due to a lack of management. These adverse impacts could negatively impact this species' population trends in southwest Florida. Finally, the Service could not acquire any of the critical habitat within the proposed Conservation Area.

Alternative B
Foraging and nesting habitat for the snail kite would increase under Alternative B. These important long hydroperiod wetlands and open water habitats would be potentially available to be protected and actively managed if owned by the Service. Where appropriate, fee-title lands could further be managed with fire to open densely vegetated areas improving foraging and potential nesting habitat. Invasive species management would also benefit the snail kite under Alternative B. Conservation easements would also benefit the snail kite, further restricting commercial, residential, industrial, and agricultural development. Water quality would increase with acquisition of critical habitat within the proposed Conservation Area.

Florida Grasshopper Sparrow
Affected Environment
The federally endangered Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) is a habitat specialist, occupying only native fire-maintained dry prairie. It has been extirpated from many counties in Florida and now only occurs in Highlands, Okeechobee, Osceola, and Polk counties (USFWS 2023). As of 2022, there are five known breeding aggregations with 102 confirmed Florida grasshopper sparrow breeding pairs, which include 136 singing males (USFWS 2023). The five breeding aggregations are Three Lakes, Kissimmee Prairie, Avon Park, Deluca Preserve, and Corrigan Ranch (USFWS 2023). Significant threats to this species include habitat loss, predation, and extreme weather events (USFWS 2023).

Furthermore, the following goals in *the South Florida Multi-Species Recovery Plan* (USFWS 1999), which includes the Florida grasshopper sparrow, are supported by this proposal:

- Continue prescribed burns at periodic intervals.
- Determine the distribution and abundance of Florida grasshopper sparrows.
- Maintain and enhance Florida grasshopper sparrow habitat on acquired lands or lands under conservation easement or agreement.
- Encourage purchase of lands to protect Florida grasshopper sparrows.
- Discourage changes in present level of cattle grazing where conducive to Florida grasshopper sparrows.
- Maintain pastures in native vegetation to the extent possible.
- Do not allow reforestation of prairies.
- Identify areas of suitable unoccupied habitat for Florida grasshopper sparrows.
- Continue research on Florida grasshopper sparrow /habitat interactions.
- Develop information on Florida grasshopper sparrow biology, including genetic/ecological studies.
- Continue winter ecology studies of Florida grasshopper sparrows.
- Develop a reserve design for Florida grasshopper sparrows.
- Monitor Florida grasshopper sparrows on public land to evaluate management actions.
- Restore selected areas for Florida grasshopper sparrows as needed.
- Expand Florida grasshopper sparrow habitat in occupied areas, locate and restore habitat in unoccupied areas.
- Encourage natural colonization of restored habitat by Florida grasshopper sparrows.
- Monitor the success of reintroduced Florida grasshopper sparrows.
- Increase public awareness of and provide information on the biology, ecology, and status of the Florida grasshopper sparrows.

In an attempt to stem the population decline, a draft Action Plan was developed in August 2012. Of the ten total objectives in the draft Action Plan, five specific objectives could be supported by the proposal, as listed.

Objective 3: Confirm Florida grasshopper sparrow status and identify additional locations occupied by Florida grasshopper sparrow.
Objective 4: Increase acreage of dry prairie habitat managed for the Florida grasshopper sparrow.
Objective 7: Determine need and feasibility of captive propagation and reintroduction of Florida grasshopper sparrow.
Objective 9: Manage fire ant populations and directly evaluate their effects on Florida grasshopper sparrow populations.
Objective 10: Increase public knowledge of the status of the Florida grasshopper sparrow and engage communities in actions to prevent extinction.

Impacts of Affected Resources

Alternative A
Additional loss of suitable habitat from development, especially the conversion of open prairie habitat into agricultural fields, would likely continue. Further, the Service would be unable to collaborate with its partners to restore Florida grasshopper sparrow habitat within the proposed Conservation Area. Because of this species' extremely small population size, the continued destruction of suitable habitats coupled with a lack of restoration could lead to extinction.

Alternative B
Within the proposed Conservation Area restoration of improved pasture habitat providing important nesting and foraging habitat for this species. Management actions including, fire, would also be able to be utilized on lands owned by the Service to improve habitat. Collaboration with partners to restore Florida grasshopper sparrow habitat and working with private landowners within the proposed Conservation Area would also be possible under Alternative B.

Florida Scrub-Jay
Affected Environment
The federally threatened Florida scrub-jay (*Aphelocoma coerulescens*) is a territorial habitat specialist found only in peninsular Florida in low-growing oak scrub with well-drained sandy soils (Woolfenden and Fitzpatrick 2020). Florida scrub-jays historically occurred from Levy, Gilchrist, Alachua, Clay, and Duval counties southward but have been extirpated from many counties, now only occurring from Flagler, Marion, and Citrus counties south to Collier, Glades, and Palm Beach counties (Woolfendend and Fitzpatrick 2020). Considerable evidence exists that the extant populations of Florida scrub-jays have declined to less than 10% of their pre-European settlement numbers (Boughton and Bowman 2011). There were approximately 4,000 breeding pairs or family groups range-wide as of 1993 (Woolfenden and Fitzpatrick 2020). More recent estimates suggest 3,400 to 3,600 range-wide, suggesting the population is declining (USFWS 2019b). Florida scrub-jays are vulnerable to direct habitat loss due to commercial, residential, and agricultural development; habitat fragmentation; and habitat degradation from fire suppression (USFWS 2019b). Additional threats include catastrophic disease outbreaks, suburban demographic sinks, inbreeding and loss of genetic diversity, extirpation of small populations, climate change, and road mortality (USFWS 2019b).

The specific recovery strategy outlined in this species' recovery plan (USFWS 2019c) is described as follows "A successful recovery strategy for the Florida Scrub-Jay requires incorporating representation (genetic and ecological diversity), resiliency (sufficient population size), and redundancy (sufficient number of populations) into a plan to realize a stable or increasing overall population capable of withstanding both catastrophic events (including disease outbreaks, unusually intense and widespread fires, protracted periods of poor land management) and reductions in local population viability caused by inbreeding. The recovery strategy emphasizes creating and maintaining viable Florida Scrub-Jay populations across most of the 5 species' remaining range of genetic variability. To accomplish this, the strategy prioritizes large landscapes that provide optimal opportunities for long-term persistence of Florida Scrub-Jay populations within a majority of their distinct genetic units. Within these large landscapes, the strategy also emphasizes maintaining and improving connectivity to facilitate dispersal among local populations within their respective genetic unit. The strategy incorporates a core ecological premise of species representation, resiliency, and redundancy by identifying landscapes within genetic units that still have potential networks of connected habitat patches capable of supporting large Florida Scrub-Jay populations. These areas, referred to as "focal landscapes," were developed from a comprehensive range-wide habitat mapping exercise. The analysis utilized the best available habitat data to identify areas capable of supporting potential local populations. The areas were categorized and prioritized based on the amount and connectivity of potential habitat. The Florida Scrub-Jay Species Status Assessment expounds on the rationale and decision process justifying the identification, development, and metrics for the focal landscapes. The strategy also incorporates specific requirements for habitat management on all landscapes deemed to have potential for long-term persistence. Without active habitat management, even the largest, best protected, and seemingly most viable Florida Scrub-Jay populations decline and eventually go extinct. (Revised 2019) that this proposal would support include those listed."

Impacts of Affected Resources

Alternative A
Some portions of the scrubby flatwood habitat within the proposed Conservation Area would likely be converted into agricultural, industrial, residential, and commercial development, resulting in less habitat for the Florida scrub-jay. Because scrub-jays require a minimum of five hectares per territory (USFWS 2019b), development-induced fragmentation could render some territories uninhabitable if this threshold is not maintained. With an increase in residential development, the feasibility of conducting the prescribed fire necessary to maintain optimal scrub-jay habitat would decrease, resulting in habitat degradation. The loss and degradation of suitable habitat could lessen this species' reproductive and dispersal success, negatively impacting its population trends and altering its spatial distribution.

Alternative B
Restoration and protection of scrub-jay habitat within the proposed Conservation Area would benefit this species by increasing population numbers and improving preferred habitats. Where appropriate, fee-title lands could further be managed with prescribed fire to open densely vegetated areas improving foraging and potential nesting habitat. Invasive species management would also benefit the scrub jay under Alternative B. Conservation easements would benefit the scrub jay, further restricting commercial, residential, industrial, and agricultural development. Water quality would increase with acquisition of important habitat within the proposed Conservation Area.

Piping Plover
Affected Environment
The piping plover (*Charadrius melodus*) is a small shorebird federally listed as threatened. Piping plovers do not breed in Florida but spend much of the year wintering there. In the 2011 International Piping Plover Census, 206 piping plovers were counted in Florida, with 83 on the Atlantic Coast and 223 on the Gulf Coast (Elliot-Smith 2015). In late March and early April, they leave for breeding grounds that consist of sandy beaches, sand flats, and mudflats in coastal areas. Piping plovers are threatened by beach development, which has reduced the amount of suitable wintering habitat. In addition, frequent human disturbance has been shown to impact plovers, resulting in decreased body mass (Gibson et al. 2018). Other threats include predation from raccoons, skunks, and foxes.

Impacts of Affected Resources

Alternative A
Coastal development, including shoreline hardening, would likely continue within the proposed Conservation Area, decreasing suitable habitat availability and fragmenting the landscape. Habitat loss and fragmentation would likely cause a reduction in the carrying capacity of coastal habitats, with an associated decrease in population. Without management, exotic species could degrade suitable habitats limiting wintering habitat for this species. Incompatible recreation would likely reduce shorebirds' overwintering and foraging success through disturbance.

Alternative B
Protection and restoration within the proposed Conservation Area of key piping plover habitats from development, disturbance, fragmentation would benefit this species. Management using time and space zoning for wildlife-dependent recreational activities would also increase protection of this species from disturbance and increase foraging success.

Red-Cockaded Woodpecker

Affected Environment

The red-cockaded woodpecker (RCW) (*Picoides borealis*) is a federally endangered species in the southeastern United States that has been extirpated from parts of its northern range. The U.S. Fish and Wildlife Service estimated a range-wide population of 7,800 active clusters as of 2020, up from an estimated 4,694 clusters in 1993 (USFWS 2020a) due to successful conservation and management to increase the population. Thus, the red-cockaded woodpecker is a conservation-reliant species.

They prefer extensive mature open longleaf pine (*Pinus palustris*) forest maintained by frequent (1–5-year intervals) fire. However, they may use loblolly (*Pinus taeda*), slash (*Pinus elliottii*), shortleaf (*Pinus echinata*), Virginia (*Pinus virginiana*), pond (*Pinus serotina*), and pitch (*Pinus rigida*) pines. There are an estimated 3.3 million acres of longleaf pine forests in the southeastern United States, representing a decline of approximately 88 million acres compared to historical estimates (Oswalt et al. 2012). Therefore, this species is primarily threatened by habitat loss compounded by fire suppression, resulting in insufficient suitable habitat. Several other risk factors influence red-cockaded woodpecker populations, including southern pine beetle outbreaks, sea level rise, land use changes, invasive species, kleptoparasitism, and management dependence (e.g., artificial cavities and prescribed fire) (USFWS 2020). In addition, stochastic events, such as wildfires, drought, and extreme storm events, can affect these birds (USFWS 2020).

Impacts of Affected Resources

Alternative A

Within the proposed Conservation Area, some of the mature longleaf pine habitats preferred by red-cockaded woodpeckers would likely be developed, possibly forcing this species into using less-than-optimal habitats and lowering their reproductive success. Fire suppression would become more common and prescribed fire less feasible as development increases, especially residential development. A lack of prescribed fire and invasive species management would likely result in hardwood intrusion, degrading the quality of the longleaf pine habitat available to red-cockaded woodpeckers.

Alternative B

Sandhill and pine flatwoods habitats within the proposed Conservation Area would contain suitable habitat for nesting RCWs. Foraging and nesting habitat for RCWs would increase under Alternative B. These important habitats would be potentially available to be protected and actively managed if owned by the Service. Where appropriate, fee-title lands could further be managed with fire to open densely vegetated areas improving foraging and potential nesting habitat. Invasive species management would also benefit this species under Alternative B. Conservation easements would further restrict commercial, residential, industrial, and agricultural development.

MAMMALS

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

See Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above.

Florida Bonneted Bat

Affected Environment

The endangered Florida bonneted bat (*Eumops floridanus*) is endemic to Florida and is the State's largest bat species. They primarily roost in tall, mature trees or artificial structures and use various habitats, including pine, flatwoods, scrubby flatwoods, pine rocklands, royal palm hammocks, mixed and hardwood hammocks, cypress, and sand pine scrub. The bats also roost in buildings, under bridges, and in bat houses and forage over ponds, streams, and wetlands (Marks and Marks 2008). The destruction of natural roost sites threatens the Florida bonneted bat. Because its range is so small, natural disasters, such as hurricanes, also pose a significant risk to the species.

In general, open, freshwater and wetlands provide prime foraging areas for bats. During the dry season, bats become more dependent on remaining ponds, streams, and wetland areas for foraging. The presence of roosting habitat is also critical (e.g., tree cavities and spaces under roof tiles). The population size is not known, and no population viability analyses are available. Anecdotal evidence from the 1950s and 1960s suggests that this species was more common along Florida's southeast coast compared with the present. Collaborative conservation efforts have focused on: (1) conducting acoustic surveys within the species' historic range to better understand movements and threats, and to refine delineation of the range; (2) locating natural roosts and identifying factors influencing roost selection; (3) evaluating impacts to individuals living in and around urban areas; (4) using various techniques to accurately and safely monitor existing populations; and (5) increasing public awareness of this endangered species.

In 2022, the Service designate critical habitat in approximately 1.2 million acres across nine units in 13 counties throughout central and south Florida. Critical habitat, as defined by the ESA, is a specific geographic area that contain features essential to the conservation of a threatened or endangered species that may require special management and protection. Critical habitat may include areas that are not currently occupied by the species but are essential for its conservation.

Impacts of Affected Resources

Alternative A
An increase in development could increase the number of potential roost sites. However, whether the increase in the artificial roost sites would be less than, equal to, or surpass the number of natural roost sites lost to development would depend on where the development occurred.

The Service would be unable to work with conservation partners to protect any of the critical habitat designated for Florida bonneted bat within the proposed Conservation Area. The continued degradation of quality aquatic resources would reduce the foraging habitat available to this species, while the loss of trees would decrease the availability of suitable roosting locations. Because this bat species only produces one pup per breeding season, losing potential roost sites would likely be especially devastating. However, information about this species is limited. Therefore, it is difficult to predict further the adverse impacts of the No Action Alternative on the Florida bonneted bat.

Alternative B
The proposed Conservation Area lies within areas where the Florida bonneted bat and designated critical habitat is known to occur. Through fee-title acquisition and conservation easements, habitat that supports the Florida bonneted bat would be protected resulting in positive impacts to the species. The Service expects this proposal would support the Florida bonneted bat, especially in areas where pine flatwoods exist.

West Indian Manatee

Affected Environment

West Indian manatees (*Trichechus manatus*) are one of North America's largest coastal marine mammals. The U.S. Department of Interior downlisted the West Indian manatee in 2017 form endangered to threatened under the federal Endangered Species Act. Manatees are protected under the Endangered Species Act and the Marine Mammal Protection Act. Manatees migrate through fresh, brackish, and marine water, maintaining a seasonal distribution based on water temperatures. They can be found in many waterways throughout Florida and within the proposed Conservation Area. Distribution is affected by aquatic vegetation availability, proximity to channels of at least 2 m in depth, and the location of freshwater sources. Because of their low speed and high buoyancy, manatees are often killed by vessels, which is the primary cause of human-related mortality. Manatees are also negatively impacted by changing water temperatures and red tides.

Intensive coastal development throughout Florida poses a long-term threat to the Florida manatee. There are three major approaches to address this problem listed in the recovery plan (USFWS 2001).

1. FWS, FWC, Georgia Department of Natural Resources (GDNR), and other recovery partners review and comment on applications for federal and State permits for construction projects in manatee habitat areas and to minimize their impacts. Under section 7 of the ESA, FWS annually reviews hundreds of permit applications to the COE for construction projects in waters and wetlands that include or are adjacent to important manatee habitat. FWC and GDNR provide similar reviews to their respective State's environmental permitting programs.
2. The development of county manatee protection plans. The provisions of these plans are anticipated to be implemented through amendments to local growth management plans under the Florida's Local Government Comprehensive Planning and Land Development Regulation Act of 1985. In addition to boat speed rules, manatee protection plans are to include boat facility siting policies and other measures to protect manatees and their habitat.
3. Both FWS and the State of Florida have taken steps to acquire and add new areas containing important manatee habitat to federal and State protected area systems. Both the State of Florida and FWS are continuing cooperative efforts with a view towards establishing a network of important manatee habitats throughout Florida.

Impacts of Affected Resources

Alternative A

The Service could not collaborate with its partners to protect important acreage within the proposed Conservation Area from commercial, industrial, residential, and agricultural development, which would likely result in the continued degradation of water resources and decreased quality of the aquatic habitat available to manatees. Decreased water quality could alter aquatic plant composition and abundance, reducing this species' food availability. If decreasing water quality were to be accompanied by an increase in turbidity, it might make it difficult for boaters to spot manatees, likely increasing vessel-related injuries and mortalities.

Alternative B

The proposed Action Alternative would support the three major approaches to address threats to manatee populations in Florida resulting in positive benefits. Working with partners and collaboration to address threats to manatees in the proposed Conservation Area will improve habitat quantity and quality for this species. Water quality and restoration of water resources through conservation and protection under Alternative B would improve habitat and food availability.

Florida Panther

Affected Environment

The federally Endangered Florida panther (*Puma concolor coryi*) once roamed much of the southeastern United States but has been extirpated from most of its historical range. It is now restricted to less than 5% of its former range (Frakes et al. 2015), with remaining Florida panthers comprising a small population in southwest Florida.

Historically occurring throughout the southeastern United States, the Florida panther today is restricted to one breeding population located in south Florida. The panther population has increased from an estimated 12-20 (excluding kittens) in the early 1970s to an estimated 120 to 230 in 2023. Florida panthers use wetlands, swamps, upland forests, and stands of saw palmetto and are wide-ranging, requiring large, contiguous areas of suitable habitat to satisfy their energetic, reproductive, and social needs (USFWS 2008). Panther habitat continues to be lost to urbanization, residential development, conversion to agriculture, and mining (USFWS 2008), making habitat loss, degradation, and fragmentation among its greatest threats. Florida panthers are also susceptible to traffic-related mortality (Schwab 2006), with 25 deaths being attributed to vehicle mortality in 2022 (FWC n.d.a). Using telemetry data collected from 2004 to 2013, Frakes et al. (2015) identified 5579 km^2 of suitable breeding habitat remaining in southern Florida, 1399 km^2 of which is in non-protected private ownership.

The recovery strategy for the Florida panther is to maintain, restore, and expand the panther population and its habitat in south Florida, expand this population into south-central Florida, reintroduce at least two additional viable populations within the historic range outside of south and south-central Florida, and facilitate panther recovery through public awareness and education.

The 2008 Panther Recovery Plan indicates that delisting would be considered when:

- Three viable, self-sustaining populations of at least 240 individuals (adults and subadults) each have been established and subsequently maintained for a minimum of twelve years; and
- Sufficient habitat quality, quantity, and spatial configuration to support these populations is retained/protected or secured for the long-term.

The recent conservation acquisitions of key properties along the north and south bank of the Caloosahatchee River have occurred to secure a key corridor that panthers can use to extend the population's range northward into South-central Florida.

Impacts of Affected Resources

Alternative A

The No Action Alternative would prevent the Service from collaborating with its partners to protect, manage, and restore panther habitat within the proposed Conservation Area, leaving millions of acres vulnerable to commercial, industrial, agricultural, and residential development. Development would lead to habitat loss, fragmentation, and degradation, reducing the panther's available range and food sources and increasing the risk of human-panther conflicts. Development also increases the human population density, leading to more vehicle injuries and fatalities among panthers.

Alternative B

The proposed Conservation Area is a key link to the recovery of the panther in south Florida. The proposed Conservation Area would secure a conservation corridor that would allow panthers to extend the existing core population from its current restricted range to suitable habitats increasing the range and size of the population.

REPTILES

Description of Environmental Trends, Planned Actions, and Cumulative Impacts
See Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above.

Blue-Tailed Mole Skink and Sand Skink
Affected Environment
The blue-tailed mole skink (*Eumeces egregius lividus*) is a small, fossorial lizard that occupies dry upland habitats and is federally listed as threatened. The blue-tailed mole skink is one of five subspecies differentiated by coloration and morphology. It only occurs in Osceola County and on the southern Lake Wales Ridge in Polk and Highlands counties (USFWS 2021b). Because they spend much of their time beneath the surface of the sand, they are relatively difficult to study. Therefore, most studies have merely looked for presence or absence and have not provided population estimates or densities, so it is difficult to make inferences or conclusions about population or demographic trends (USFWS 2021b). Its habitat comprises dry upland communities, including rosemary and oak-dominated scrub, turkey oak barrens, dry and longleaf pine savanna, and dry hammocks. Habitat loss, fragmentation, and land use change threaten the species, and active management is necessary to maintain suitable habitats. Fire suppression, improper stand management, competition by invasive plant species, and loss of genetic diversity also threaten the existence of the bluetail mole skink.

The sand skink (*Neoseps reynoldsi*) is federally listed as threatened and is a small, fossorial lizard that occurs on the sandy ridges of interior central Florida from Marion County south to Highlands County (USFWS 1999). The sand skink is widespread in native dry uplands with sandy substrates (USFWS 1999). Due to the fossorial nature of this species, it is difficult to obtain population estimates. Commonly occupied native habitats include Florida scrub and scrubby flatwoods and high pine communities that include sandhill, longleaf pine/turkey oak, turkey oak barrens, and dry hammock. The species is threatened by habitat loss, fragmentation, and land use change, and active management is necessary to maintain suitable habitats. Fire suppression, improper stand management, competition by invasive plant species, and loss of genetic diversity also threaten the existence of the sand skink.

Because these skinks live a fossorial or underground lifestyle and are difficult to study, the Service lacks the demographic information necessary to complete a population viability analyses. Except for a few locations, the Service has little information about status and trends. Most skink studies have documented skink presence or absence or have estimated densities at specific locations but have not provided population estimates. Because of the ongoing habitat loss and degradation within the proposed Conservation Area, it is likely that overall populations of both species are declining. Habitat conversion has reduced skink habitat and populations of both skinks are declining. The limiting factor for skink recovery is an adequate amount of suitable habitat. Potentially suitable habitat has experienced degradation through fire exclusion. Skinks require early successional habitat that has many open sandy patches; fire suppression causes the vegetation to grow dense and fill in the sandy patches.

This proposal would support the listed recovery plan goals for the sand skink and bluetail mole skink.

- Control exotic species.

- Compile distribution data for sand skinks from all available sources.
- Protect sand skinks on public lands.
- Protect sand skinks on private lands.
- Develop standardized survey techniques.
- Continue federal acquisition efforts for the sand skink.
- Support State acquisition efforts.
- Encourage acquisition by non-governmental organizations.
- Develop scrub habitat management guidelines.
- Develop cooperative scrub management programs.
- Control off-road access.
- Control overgrowth.
- Conduct research to determine habitat needs for this species.
- Monitor status of sand skink habitat.
- Increase public awareness of the scrub ecosystem.
- Conduct distribution surveys to determine additional sites in need of protection.
- Control pesticide use in or adjacent to sand skink habitat.
- Support studies of reproduction, fecundity, and longevity.
- Monitor sand skink populations.
- Increase public awareness of sand skinks.

Impacts of Affected Resources

Alternative A

Pike et al. (2008) indicated that skinks can occupy degraded or converted habitats, including overgrown scrub, pine plantations, citrus groves, old fields, or pastures, if soil types are suitable regardless of vegetation cover. However, it is unclear if the skink densities and reproductive success in these altered habitats are like those of native skink habitats.

Under the No Action Alternative, the continued development of xeric soils and scrub habitats along with agriculture; incompatible forestry practices, unplanned fire, recreational activities, and resource extraction; road construction; and invasive species (FWC 2016) would likely reduce the quality of and fragment native skink habitat.

Alternative B

The sandhill, scrub, and scrubby pine flatwoods habitats within the proposed Conservation Area still contain many patches of open sand that are suitable for maintaining skink populations. Under Alternative B, protecting and managing suitable habitat would likely increase, decreasing invasive species and fragmentation of habitats. Appropriate management activities on fee-title lands within the proposed Conservation Area would also improve habitat, increasing reproductive success and native habitats for this species.

Eastern Indigo Snake

Affected Environment

The federally threatened eastern indigo snake (*Drymarchon couperi*) is the longest non-venomous snake in North America, reaching 8.5 feet. It is currently declining (USFWS 2019d). this snake is a habitat generalist and does not require any specific habitat. It is often found in close association with gopher tortoise burrows. This snake's range has been reduced to portions of southern Georgia and Florida. In Florida, the eastern indigo snake

has been documented throughout the State (Enge et al. 2013, USFWS 2019e). Suitable habitat includes pine flatwoods, scrubby flatwoods, high pine (dry and longleaf pine savanna), dry prairie, tropical hardwood hammock, the edges of freshwater marshes, agricultural fields, coastal dunes, and human-altered habitats. Threats to this species include the loss, degradation, and fragmentation of habitat and vehicle mortality.

The specific recovery actions include:

- Delineate populations.
- Acquire and/or manage necessary habitat.
- Determine habitat needs.
- Study population ecology, movements, and food habits.
- Prohibit gassing tortoise burrows on public land.
- Evaluate pesticide effects.
- Develop population monitoring methods.
- Monitor population and habitat trends.
- Produce and distribute educational materials.
- Seek cooperation of owners and leaseholders of large tracts of sandhill habitat.

The *Recovery Plan for the Eastern Indigo Snake* (USFWS 2019f) includes the following recovery actions that would be supported by this project:

- Initiate and continue long-term monitoring on selected protected sites across the range of the species.
- Protect habitat via land acquisition along corridors of known occupied habitats, such as the river corridors of southeastern Georgia and the central ridge systems of Florida.
- Promote habitat restoration and appropriate management on occupied lands in public ownership.

Impacts of Affected Resources

Alternative A
Habitat modification and destruction of the eastern indigo snake habitats within the proposed Conservation Area would likely continue. Eastern indigo snakes have large home ranges and travel great distances, especially males; therefore, habitat fragmentation may be especially troublesome (USFWS 2019d). As urbanization of natural areas progresses, fragmented habitat patches would become smaller, probably sustaining fewer snakes and creating islands of fragmented habitat with little or no connectivity in a landscape of unsuitable habitat. The increased traffic associated with development would likely cause more vehicle-related fatalities, potentially negatively affecting this species' population (Godley and Moler 2013). This development would also negatively impact the gopher tortoise, the burrows of which eastern indigo snakes use for breeding, feeding, and sheltering. Thus, a decrease in the availability of these burrows would likely adversely affect eastern indigo snake populations.

Alternative B
The proposed Conservation Area provides substantial natural and semi-natural habitats that support the eastern indigo snake and gopher tortoises. Protecting native upland habitats as well as improving public awareness would support recovery goals of this species. Dry prairie, scrub and sandhill, pine flatwoods and mesic temperate hammock habitats currently in private ownership in the proposed Conservation Area that could possibly be acquired would assist in the recovery of indigo snakes.

State/ At-Risk Species

BIRDS

Black-Whiskered Vireo

Affected Environment

In the U.S., the black-whiskered vireo's (*Vireo altiloquus*) breeding range is limited to southern Florida's coastal mangroves and hardwood forests. In Florida, this species is most abundant in mangrove forests, probably due to the lack of suitable areas of lowland subtropical and dry limestone forests (Chace et al. 2020). Black-whiskered vireos may be susceptible to brood parasitism by the shiny cowbird (*Molothrus bonariensis*) (Chace et al. 2020). High parasitism rates on the black-whiskered vireo in many portions of its range have led to concerns about the negative impact of parasitism on the black-whiskered vireo's reproductive success. These birds are also vulnerable to habitat loss and may be sensitive to urbanization (Bancroft et al. 1995).

Impacts of Affected Resources

Alternative A

The No Action Alternative would likely result in these species' mangrove swamp habitat being adversely impacted by several threats, including coastal development; harmful algal blooms; incompatible recreation, industrial operations, beach nourishment, impoundments, and dam operations; invasive species; surface and groundwater withdrawal; the construction of roads, bridges, and causeways; and nutrient loading caused by urbanization (FWC 2016). The adverse impacts of these threats would likely decrease the availability of suitable habitats, resulting in population decreases.

Alternative B

Under Alternative B, protecting and managing suitable habitat within the proposed Conservation Area would likely increase, decreasing invasive species and fragmentation of habitats. Appropriate management activities on fee-title lands within the proposed Conservation Area will also improve habitat, increasing reproductive success and native habitats for this species.

Florida Burrowing Owl

Affected Environment

The Florida burrowing owl (federal bird of conservation concern and State species of special concern) is a small, ground-nesting owl that prefers well-drained open habitats, such as dry prairie and rangeland. The Florida burrowing owl often nests in abandoned gopher tortoise burrows. Individuals of this species are widely distributed throughout the State. Historically, Florida burrowing owls (*Athene cunicularia floridana*) lived in treeless, open areas with little understory vegetation and well-drained, loose soils suitable for burrows, sometimes using burrows built by gopher tortoises (*Gopherus polyphemus*). However, clearing for development, the conversion of woodland into pastures, and the draining and filling of wetlands have facilitated the movement of this species into suburban areas (Millsap and Bear 2000, Millsap 2002). Recent population estimates for this species are lacking. In 1990, Millsap and Bear (1990) estimated that the adult population numbered between 3,000 and 10,000. The main threat to this species is habitat loss, though predation, heavy flooding, harassment, and vehicle strikes are also detrimental.

Impacts of Affected Resources

Alternative A
The No Action Alternative would likely result in more development in southwest Florida. Some development like airports, golf courses, and pastures could create additional habitat for this species. However, whether this additional habitat would be less than, equal to, or greater than the amount of habitat destroyed by development is unknown.

The No Action Alternative would negatively impact the Florida burrowing owl population, mainly from habitat destruction, degradation, and fragmentation. The construction of residential, commercial, and industrial, areas would likely decrease the habitat available to this species. Road construction and the associated increase in traffic would fragment suitable habitats and likely cause more vehicle-related injuries and fatalities. Further, incompatible recreation and human disturbance could negatively impact Florida burrowing owls. Lastly, fire suppression could make understory vegetation denser, making it difficult for this species to construct the underground burrows they use for sheltering and breeding.

Alternative B
The proposed Conservation Area contains large areas of native prairie and improved pasture containing gopher tortoise burrows that provide excellent nesting opportunities for this small owl. Under Alternative B, protecting and managing suitable habitat would likely increase, decreasing invasive species and fragmentation of habitats. Appropriate management activities on fee-title lands within the proposed Conservation Area would also improve habitat, increasing reproductive success and native habitats for this species.

Florida Sandhill Crane
Affected Environment
The Florida sandhill crane (*Grus canadensis pratensis*) is a federal bird of conservation concern and State threatened. It is the non-migratory subspecies of the sandhill crane (*Grus canadensis*), a large wading bird that nests in freshwater marshes or wet prairies surrounded by open water to protect the nest from terrestrial predators. The Florida sandhill crane forages in the wetlands and adjacent native prairie and improved pasture. Nesbitt and Hatchitt (2008) estimated the statewide population of Florida sandhill cranes at 4,594 individuals in 2003. Nesbitt and Hatchitt (2008) also estimated that suitable habitat declined by 16.6% during each ten-year increment from 1974 to 2003, making habitat loss one of the primary threats to this species.

Impacts of Affected Resources

Alternative A
Continued habitat loss and modification due to commercial, residential, industrial, and agricultural development would be expected. These activities would likely cause a decrease in wetland quality from runoff pollution. Increasing road construction and traffic volumes associated with expanding urbanization could cause more vehicle collisions because sandhill cranes sometimes forage in grassy areas along transportation routes.

Alternative B
The proposed Conservation Area contains large amounts of wetland and upland habitats suitable for Florida sandhill crane nesting and foraging. Under Alternative B, protecting and managing suitable habitat would likely increase, decreasing invasive species and fragmentation of habitats. Appropriate management activities on fee-title lands within the proposed Conservation Area will also improve habitat, increasing reproductive success and native habitats for this species.

Mangrove Cuckoo

Affected Environment

Mangrove cuckoos (*Coccyzus minor*) occupy mangrove forests in southern Florida. Due to their secretive nature and the inaccessibility of mangrove forests, the mangrove cuckoo is extremely understudied. In Florida, the restriction of this species to coastal areas makes it highly susceptible to habitat loss, fragmentation, and human encroachment (Karim 2007). Thus, an overall decline in density is likely due to the continued removal of mangroves and coastal plant communities for residential and recreational development. Mangrove cuckoos may also be vulnerable to catastrophic disease outbreaks, with significant declines between 2000 and 2008 in the Ten Thousand Islands possibly caused by West Nile virus (Lloyd and Doyle 2011). Climate change could also negatively impact this bird's low-lying habitat.

Impacts of Affected Resources

Alternative A

The No Action Alternative would likely result in these species' mangrove swamp habitat being adversely impacted by several threats, including coastal development; harmful algal blooms; incompatible recreation, industrial operations, beach nourishment, impoundments, and dam operations; invasive species; surface and groundwater withdrawal; the construction of roads, bridges, and causeways; and nutrient loading caused by urbanization (FWC 2016). The adverse impacts of these threats would likely decrease the availability of suitable habitats, resulting in population decreases.

Alternative B

Under Alternative B, protecting and managing suitable habitat within the proposed Conservation Area would likely increase, decreasing invasive species and fragmentation of habitats. Appropriate management activities on fee-title lands within the proposed Conservation Area would also improve habitat, increasing reproductive success and native habitats for this species.

Swallow-Tailed Kite

Affected Environment

The swallow-tailed kite (*Elanoides forficatus*) is a black and white raptor with a forked tail that arrives in Florida to breed in early March. They require tall trees in open pine woods near marsh or prairie, cypress swamps, or other riverside swamp forests with abundant prey. Historically, the swallow-tailed kite's breeding range covered most southeastern states, extending north to the Great Lakes. However, their range has been restricted to the southeastern Atlantic and Gulf coast states since the 1940s (Meyer 2020). The biggest threat to this bird is habitat loss, which forces them to nest in flimsy trees, making their nests susceptible to wind damage.

Once widespread, the swallow-tailed kite (federal bird of conservation concern) has disappeared from much of its historic range because of forested wetland loss resulting from excessive logging. Migrating between South America and the United States, many swallow-tailed kites nest in Florida. These kites require mature forested wetlands and pinelands for nesting and pre-migration roosting, and marshes and prairies for foraging. The Fisheating Creek Basin is known to host one of the most important roost sites for this species.

Impacts of Affected Resources

Alternative A
Some destruction and degradation of the wetland forests used by swallow-tailed kites would be expected due to residential, commercial, industrial, and agricultural development. Habitat destruction would likely force swallow-tailed kites on flimsy trees, resulting in lower reproductive success due to wind throw. Further, the development would likely alter hydrology and increase the volume of polluted runoff entering wetland forests. Invasive species could also become problematic without appropriate management.

Alternative B
The proposed Conservation Area offers multiple opportunities for habitat protection and management (including thinning and prescribed fire), which could improve and enhance use by swallow-tailed kites. The proposed Conservation Area provides nesting habitat (i.e., mature cypress trees) for swallow-tailed kites. But more importantly, there is a communal roost in the southern end of the proposed Conservation Area that serves as a staging and foraging area for approximately 60 percent of the overall kite population prior to their annual migration to the Yucatan Peninsula. The quantity and quality of the insect forage base here is critical for the successful migration across hundreds of miles of ocean. By improving overall conditions in this area for insect production (i.e., through wetland restoration), and protection or restoration of cypress wetlands, the proposal would increase the number of swallow-tailed kites in Florida.

Wading Bird Guild
Affected Environment
Thirteen species of long-legged wading birds may occur in the proposed Conservation Area, including the American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), glossy ibis (*Plegadis falcinellus*), white ibis (*Eudocimus albus*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), little blue heron (Egretta *caerulea*), tricolored (Louisiana) heron (*Egretta tricolor*), black-crowned night-heron (*Nycticorax nycticorax*), yellow-crowned night-heron (*Nyctanassa violacea*), and roseate spoonbill (*Platalea ajaja*). These species are indicators of the overall health of ecosystems because they require shallow water with abundant prey for foraging and shrubs or trees for nesting.

Impacts of Affected Resources

Alternative A
The No Action Alternative would leave suitable wetland habitats, which wading birds rely on for feeding, breeding, and sheltering, vulnerable to development. Urban and agricultural development would likely alter hydrological patterns and reduce the availability of suitable habitats. Urbanization and agriculture could also cause increased predation by urban-dwelling predators (e.g., raccoons) and more pollutants to enter the watershed, degrading wetland habitats. Further, incompatible recreation could decrease wading birds' foraging and reproductive success due to repeated disturbance.

Alternative B
Protection and restoration of key wetland habitats within the proposed Conservation Area from development, disturbance, fragmentation would benefit these species. Management using time and space zoning for wildlife-dependent recreational activities on Service-owned fee-title lands would also increase protection of this species from disturbance and increase nesting and foraging success.

Mammals

Big Cypress Fox Squirrel and Southeastern Fox Squirrel

Affected Environment

The Big Cypress fox squirrel (*Sciurus niger avicennia*) is a mostly ground-dwelling species. It can be found in natural and human-dominated landscapes, including live oak woods, coastal broadleaf evergreen hammocks, tropical hardwood forests, slash pine savannah, mangrove swamps, golf courses, suburban neighborhoods, and parks (Williams and Humprey 1979, Humphrey and Jodice 1992, Hafner et al. 1998). This species inhabits the Everglades region in Lee County to the southern part of Dade County. Big Cypress fox squirrels are vulnerable to squirrel pox virus, land use change, and fire suppression.

Southeastern fox squirrels (*Sciurus niger niger*) are found throughout Florida, occupying open, fire-maintained longleaf pine, turkey oak, sandhills, and flatwoods. They eat longleaf pine seeds and turkey oak acorns but will also eat fungi, fruit, and buds. Fox squirrels are an important ecosystem component, dispersing seeds, serving as a food source to predators, and eating ectomycorrhizal fungi (Johnson 1996). This species is mainly threatened by habitat loss, fire suppression, and vehicular mortality.

Impacts of Affected Resources

Alternative A

Some of the habitats used by the Big Cypress and southeastern fox squirrel within the proposed Conservation Area would likely undergo land use change, being converted into residential, commercial, agricultural, and industrial areas. Incompatible management, like fire suppression, would allow understory growth and make previously suitable habitats uninhabitable. Without appropriate management, viruses like squirrel pox could become more common in the squirrel population. Under the No Action Alternative, we would expect additional losses of the Big Cypress fox squirrel and southeastern fox squirrel habitat [sandhills, high pine (dry, longleaf pine savanna), pine flatwoods, pastures, and other open, ruderal habitats with scattered pines and oaks]. If the overall abundance of oak trees decreases with the No Action Alternative, these squirrels would lose some of their important seasonal food and nesting materials.

Alternative B

The Service would collaborate with partners to strategically conserve habitats used by these species within the proposed Conservation Area, increasing management, restoration, and enhancement through use of prescribed fire and other mechanical tools. Further, the Service could conduct research to help inform decisions regarding these species and coordinate with other federal agencies, State agencies, non-governmental organizations, and Tribal Nations to implement landscape-scale conservation efforts.

Everglades Mink

Affected Environment

The Everglades mink (*Mustela vison evergladensis*) is a midsized member of the weasel family that is not well understood. It inhabits shallow, freshwater marshes in southern Florida (Humphrey and Setzer 1989, Humphrey 1992) and feeds on small mammals, snakes, and insects (Humphrey 1992). The Everglades mink faces many threats, including habitat loss and degradation due to development, logging, pesticide use, and wetland modification (Humphrey and Zinn 1982, Humphrey 1992). In addition, the introduction of Burmese pythons (*Python bivittatus*) and canine distemper into mink habitat could result in increased mortality.

Impacts of Affected Resources

Alternative A
Land use change, including agricultural, commercial, residential, and industrial development, would likely destroy some of the shallow freshwater habitats used by minks within the proposed Conservation Area. Such development could alter hydrology and increase runoff pollution, adversely affecting this species. Wetland drainage, road construction, canal construction, and logging would likely further alter the hydrology of some shallow freshwater habitats, negatively impacting the Everglades mink population in southwest Florida. In addition, a lack of management could increase invasive species like the Burmese python, wherein more predations would be expected. Finally, a lack of management could also increase the prevalence of canine distemper, a deadly virulent disease affecting the mink's central nervous, respiratory, and digestive systems.

Alternative B
The Service could collaborate with partners to strategically conserve habitats within the proposed Conservation Area used by these species, decreasing chances of development and its associated negative impacts. The Service would also be able to manage, restore, and enhance habitats to benefit these species and the habitats on which they depend. Under Alternative B, protecting and managing suitable habitat would likely increase, decreasing invasive species and fragmentation of habitats. Appropriate management activities on fee-title lands within the proposed Conservation Area would also improve habitat, increasing water quality and management.

Reptiles

Eastern Diamondback Rattlesnake
Affected Environment
The eastern diamondback rattlesnake (*Crotalus adamanteus*), a solitary ambush predator, is the largest rattlesnake species in the United States by length and weight. This species is currently under review for federal listing. Its range includes eastern Louisiana, southern Mississippi, Alabama, Georgia, eastern South Carolina, southern North Carolina, and all of Florida. This species, whose pre-settlement habitat was longleaf pine (Means 2006), is declining (Martin and Means 2000, Timmerman and Martin 2003) due to habitat loss. Eastern diamondback rattlesnakes also use pine flatwoods, wiregrass areas, and turkey oak habitats. They avoid inclement weather by sheltering in gopher tortoise burrows, armadillo holes, stump holes, and root channels.

Impacts of Affected Resources

Alternative A
The development of the diamondback rattlesnake's preferred habitat, which includes longleaf pine savannas, pine flatwoods, wiregrass areas, and turkey oak habitats, would be expected. Urbanization would make it difficult to conduct the prescribed fire necessary to prevent the growth of oaks and other hardwood trees and promote the germination of pine trees and plants, leading to habitat degradation. An increase in development would also create more traffic, which could lead to more vehicle fatalities.

Alternative B
The proposed Conservation Area provides substantial natural and semi-natural habitats that support this snake species. Protecting native upland habitats as well as improving public awareness would support recovery goals of this species. Management of longleaf pine habitats currently in private ownership in the proposed Conservation Area would assist in the recovery of the rattlesnake.

Gopher Tortoise

Affected Environment

The federally threatened gopher tortoise (*Gopherus polyphemus*) belongs to a group of land tortoises that originated in North America 60 million years ago, making it one of the oldest living species. It can be found throughout Florida and in the southern portions of Georgia, South Carolina, Mississippi, Alabama, and the tip of eastern Louisiana. Gopher tortoises require well-drained, sandy soils for burrowing and nest construction (Landers et al. 1980, Auffenberg and Franz 1982). Longleaf pine and oak uplands, dry hammock, sand pine and oak ridges (beach scrub), and ruderal (disturbed) habitats most often provide the conditions necessary to support gopher tortoises (Auffenberg and Franz 1982). Gopher tortoises' burrows provide homes for other animals, including indigo snakes, gopher frogs, mice, foxes, skunks, opossums, rabbits, quail, armadillos, burrowing owls, snakes, lizards, frogs, toads, and other invertebrates (up to about 250 other species of animals).

Recovery actions for those populations that would be supported by this proposal include those listed.

- Protection and management of publicly owned habitat.
- Population survey.
- Assess range-wide status.
- Law enforcement strategy.
- Protection and management of private lands.
- Cooperative agreements.
- Research population viability.
- Telemetry studies.
- Relocate reproductively isolated tortoises.

Impacts of Affected Resources

Alternative A

Gopher tortoise habitat within the proposed Conservation Area would likely continue to be developed and modified to accommodate commercial, residential, agricultural, and industrial uses. Although gopher tortoises can sometimes survive in disturbed areas, such habitats support lower population densities than undisturbed habitats. Thus, population declines would be expected due to habitat destruction and modification from these activities. Because upwards of 350 other species rely on gopher tortoise burrows for feeding, breeding, and sheltering, decreasing gopher tortoise populations would likely negatively impact the broader ecosystem.

Alternative B

The proposed alternative would positively impact gopher tortoise, allowing the Service to collaborate with partners to conserve, restore, and manage upland habitats; manage upland invasive species; enhance and manage wildlife-dependent recreational uses; and educate the public about gopher tortoise life history.

Florida Scrub Lizard

Affected Environment

The Florida scrub lizard (*Sceloporus woodi*) is under review for federal listing. They are endemic to Florida, with three disjunct populations within the peninsula. Florida scrub lizards occur in dry upland habitats with open, sandy areas near vegetation that provide shade, cover, and perch sites. Scrub habitat is naturally fragmented, but agriculture and development have caused significant additional fragmentation, threatening the species (Adkins Giese et al. 2012). In addition, fire suppression, which can transform scrub habitats into dry hammocks

or sand pine forests with unfavorable conditions (Greenberg et al. 1994, Tiebout and Anderson 2001), is also a threat.

Impacts of Affected Resources

Alternative A
Within the proposed Conservation Area, some dry uplands, such as scrub, sandhill, and scrubby flatwoods, would be converted into commercial, industrial, residential, and agricultural areas, reducing the habitat available to this species. As development spreads, conducting the prescribed burning necessary to maintain the Florida scrub lizard's optimal habitat conditions would be more challenging, resulting in habitat degradation.

Alternative B
Dry uplands that this species uses would be managed and protected under Alternative B. Prescribed fire could be utilized on lands acquired by the Service resulting in habitat enhancement for this species. The Service could work with partners to further protect this species and habitat within the proposed Conservation Area.

Gopher Frog
Affected Environment
The gopher frog is currently under review for listing. The gopher frog (*Lithobates capito*) is endemic to upland, fire-maintained pine forests in the southeastern coastal plain and requires open, isolated wetlands for breeding and often shelters in gopher tortoise burrows. They occupy the coastal plains of Georgia, South Carolina, North Carolina, and most of Florida. Gopher frogs face various threats, including habitat loss and alteration, off-road vehicles, climate change, predation, and disease.

Impacts of Affected Resources

Alternative A
Some of the longleaf pine, xeric oak, sandhills, and ponds used by gopher frogs within the proposed Conservation Area would likely be converted into residential, commercial, agricultural, or industrial areas. The accompanying increase in runoff pollutants could decrease water quality and reduce this species' reproductive success. Further, without proper management, off-road vehicles could degrade suitable habitats, and the accidental or intentional introduction of predatory fish into otherwise predator-free ponds could also adversely affect reproductive success. In addition, incompatible management like fire suppression would likely alter habitats, making suitable habitats unsuitable. These impacts would also affect the gopher tortoise, whose burrows the gopher frog depends on for survival.

Alternative B
The Service could use less-than-fee conservation easements and fee-title acquisitions within the proposed Conservation Area to reduce residential, commercial, and industrial development and prevent the destruction, degradation, and fragmentation of suitable gopher frog habitat. By decreasing development, the Service would contribute to conserving the gopher frog by reducing the introduction of new pollution sources that could degrade water quality and adversely affect gopher frog populations. The Service could also conduct management activities, such as prescribed fire, to maintain and restore gopher frog habitat. In addition, the Service could manage the use of off-road vehicles on its fee-title properties, which would benefit the gopher frog by preventing habitat degradation and direct mortality. These actions would also benefit the gopher tortoise, which creates burrows used by gopher frogs.

Short-Tailed Snake

Affected Environment

The short-tailed snake (*Lampropeltis extenuata*) is a small and slender snake adapted to digging and living underground and is currently under review for listing. This species is endemic to Florida and primarily inhabits longleaf pine and dry oak sandhills from the Suwannee River south to Highlands County. The diet of the short-tailed snake primarily consists of small smooth-scaled snakes, notably crowned snakes (*Tantilla relicta*). The clear-cutting of longleaf pine and turkey oak in their habitat negatively impacts this species by decreasing suitable habitat and prey availability.

Impacts of Affected Resources

Alternative A

Habitat loss, degradation, and development would likely occur in the short-tailed snake's dry upland habitats, resulting in less suitable habitat availability. As development increase, it becomes less feasible to conduct prescribed burns, which are needed to maintain this species' habitat in optimal condition.

Alternative B

The Service could collaborate with partners to conserve dry upland habitat, protecting suitable habitat for the short-tailed snake and decreasing development and its associated negative impacts within the proposed Conservation Area. The Service could also conduct active management activities, such as prescribed burns, to maintain or restore optimal short-tailed snake habitat.

Hognose Snake

Affected Environment

The southern hognose snake (*Heterodon simus*) is a small, heavy-bodied colubrid that lives in sandy, upland habitats, such as fire-dependent longleaf pine habitats. This snake is still common on the Brooksville Ridge and along the Suwannee River in upland habitat. It is also present on Eglin Air Force Base (FWC n.d.b). However, populations are scarce or extirpated in Orange, Seminole, and Pinellas counties, which have undergone extensive urban development (FWC n.d.b). This species is vulnerable to habitat loss and road mortality.

Impacts of Affected Resources

Alternative A

Development, including residential, commercial, agricultural, and industrial, would likely occur in the southern hognose snake's preferred sandhill and open, grassy ruderal habitats. Such development would destroy, degrade, and fragment this species' preferred habitat, likely increasing road mortality and negatively impacting population trends. Without proper oversight, people would likely continue collecting hognose snakes and keeping them as pets.

Alternative B

Through less-than-fee conservation easements and fee-title acquisitions, the Service could protect the southern hognose snake's preferred habitats, including sandhill and open grassy ruderal habitats. Such easements and acquisitions would reduce the predicted residential, commercial, and industrial development within the proposed Conservation Area (Carr and Zwick 2016a), decreasing the destruction, degradation, and fragmentation of suitable habitat. The Service could also manage fee-title properties to benefit hognose snakes. In addition, the Service could educate the public about the importance of hognose snake conservation to reduce the instances in which the snakes are retrieved from the wild to be kept as pets.

At-Risk Species

The U.S. Fish and Wildlife Service Southeast Region defines at-risk species as:

- Species petitioned for listing under the Endangered Species Act
- Candidate species for listing under the Endangered Species Act (species that warrant listing but have not been listed due to higher listing priorities and limited resources)
- Species proposed for listing under the Endangered Species Act (species with a proposed draft rule published in the federal Register)

At-risk species status and occurrence information provides a snapshot in time. Animal and plant populations move across landscapes, appearing in areas where conditions are favorable for life history needs to reproduce, grow, and shelter, and disappearing where threats appear. At-risk species knowledge and actual species status and occurrence constantly change and evolve over time and space.

Federal, State, and At-risk Listed Species

EA Table 5. Common names, scientific names, type, and statuses for Federal and State-listed species (FWC 2021, USFWS 2023b).

State Legal Status: Animals: FT = federally threatened, FE = federally endangered, ST = state-threatened, SE- state endangered, S/A = similarity of appearance, N= Not Listed, FXN=. Plants: E=endangered, T=threatened, N=not listed

Common Name	Scientific Name	Type	Federal Status	State Status
American Bird's Nest Fern	*Asplenium serratum*	Plant	Not Listed	E
American Bumble Bee	*Bombus pensylvanicus*	Insect	At-Risk	NA
American Crocodile	*Crocodylus acutus*	Reptile	Threatened	FT
American Oystercatcher	*Haematopus palliatus*	Bird	Not Listed	ST
Ashe's Savory	*Calamintha ashei*	Plant	Not Listed	T
Audubon's Crested Caracara	*Polyborus plancus audubonii*	Bird	Threatened	FT
Avon Park Harebells, Avon Park Rabbit-Bells	*Crotalaria avonensis*	Plant	Endangered	E
Banded Wild-Pine	*Tillandsia flexuosa*	Plant	Not Listed	T
Beautiful Pawpaw	*Deeringothamnus pulchellus*	Plant	Endangered	E
Big Cypress Fox Squirrel	*Scirus niger avicennia*	Mammal	Not Listed	ST
Blue Calamintha Bee	*Osmia calaminthae*	Insect	At-Risk	N
Bluetail Mole Skink	*Eumeces egregius lividus*	Reptile	Threatened	FT
Britton's Beargrass	*Nolina brittoniana*	Plant	Endangered	E
Carter's Mustard, Carter's Warea	*Warea carteri*	Plant	Endangered	E
Clamshell Orchid	*Prosthechea cochleata*	Plant	Not Listed	E
Coastal Vervain	*Glandularia maritima*	Plant	Not Listed	E
Cowhorn Orchid	*Cyrtopodium punctatum*	Plant	Not Listed	E
Cutthroatgrass	*Coleataenia abscissa*	Plant	Not Listed	E

Common Name	Scientific Name	Type	Federal Status	State Status
Delicate Ionopsis	*Ionopsis utricularioides*	Plant	Not Listed	E
Dukes' Skipper	*Euphyes dukesi calhouni*	Insect	At-Risk	N
Eastern Beard Grass Skipper	*Atrytone arogos arogos*	Insect	At-Risk	N
Eastern Black Rail	*Laterallus jamaicensis jamaicensis*	Bird	Threatened	FT
Eastern Diamondback Rattlesnake	*Crotalus adamanteus*	Reptile	At-Risk	N
Eastern Indigo Snake	*Drymarchon couperi*	Reptile	Threatened	FT
Edison's Ascyrum	*Hypericum edisonianum*	Plant	At-risk	N
Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	Bird	Endangered	FE
Everglades Mink	*Neovison vison evergladensis*	Mammal	Not Listed	ST
Fakahatchee Guzmania, West Indian Tufted Air plant	*Guzmania monostachia*	Plant	Not Listed	E
Florida Beargrass	*Nolina atopocarpa*	Plant	Not Listed	T
Florida Bonamia	*Bonamia grandiflora*	Plant	Threatened	E
Florida Bonneted Bat	*Eumops floridanus*	Mammal	Endangered	FE
Florida Burrowing Owl	*Athene cunicularia floridana*	Bird	Not Listed	ST
Florida Golden Aster	*Chrysopsis floridana*	Plant	Endangered	E
Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*	Bird	Endangered	FE
Florida Leafwing Butterfly	*Anaea troglodyta floridalis*	Insect	Endangered	FE
Florida Loosetrife, Lowland Loosestrife	*Lythrum flagellare*	Plant	At-Risk	N
Florida Manatee	*Trichechus manatus latirostris*	Mammal	Threatened	N
Florida Panther	*Puma concolor coryi*	Mammal	Endangered	FE
Florida Perforate Cladonia, Perforate Reindeer Lichen	*Cladonia perforata*	Lichen	Endangered	E
Florida Pinesnake	*Pituophis melanoleucus mugitus*	Reptile	At-Risk	ST
Florida Prairie-Clover	*Dalea carthagenensis floridana*	Plant	Endangered	E
Florida Sandhill Crane	*Antigone canadensis pratensis*	Bird	Not Listed	ST
Florida Scrub Lizard	*Sceloporus woodi*	Reptile	At-Risk	N
Florida Scrub-Jay	*Aphelocoma coerulescens*	Bird	Threatened	FT
Florida Spiny-Pod	*Matelea floridana*	Plant	Not Listed	E
Florida Willow	*Salix floridana*	Plant	At-Risk	N

Common Name	Scientific Name	Type	Federal Status	State Status
Florida Ziziphus	*Ziziphus celata*	Plant	Endangered	E
Fuzzy-wuzzy Air Plant	*Tillandsia pruinosa*	Plant	Not Listed	E
Garrett's Mint	*Dicerandra christmanii*	Plant	Endangered	E
Ghost Orchid	*Dendrophylax lindenii*	Plant	At-Risk	N
Golden Leather Fern	*Acrostichum aureum*	Plant	Not Listed	T
Gopher Frog	*Lithobates capito*	Amphibian	At-Risk	N
Gopher Tortoise	*Gopherus polyphemus*	Reptile	Threatened	ST
Hammock Rein Orchid	*Habenaria distans*	Plant	Not Listed	E
Hand Fern	*Cheiroglossa palmata*	Plant	Not Listed	E
Hartwrightia	*Hartwrightia floridana*	Plant	At-Risk	N
Highlands Goldenaster	*Chrysopsis highlandsensis*	Plant	Not Listed	E
Highlands Scrub Hypericum	*Hypericum cumulicola*	Plant	Endangered	E
Incised Groove-Bur	*Agrimonia incisa*	Plant	Not Listed	T
Large-flowered Rosemary	*Conradina grandiflora*	Plant	Not Listed	T
Large-plumed Beaksedge	*Rhynchospora megaplumosa*	Plant	Not Listed	E
Least Tern	*Sternula antillarum*	Bird	Delisted	ST
Lewton's Polygala	*Polygala lewtonii*	Plant	Endangered	E
Little Blue Heron	*Egretta caerulea*	Bird	Not Listed	ST
Many-flowered Grass-Pink	*Calopogon multiflorus*	Plant	Not Listed	T
Meadow Jointvetch	*Aeschynomene pratensis* var. *pratensis*	Plant	At-Risk	T
Monarch Butterfly	*Danaus plexippus*	Insect	Candidate	N
Needleleaf Waternymph, Narrowleaf Naiad	*Najas filifolia*	Plant	At-Risk	T
Night-scented Orchid	*Epidendrum nocturnum*	Plant	Not Listed	E
Nodding Pinweed	*Lechea cernua*	Plant	Not Listed	T
Okeechobee Gourd	*Cucurbita okeechobeensis okeechobeensis*	Plant	Endangered	E
Papery Whitlow-Wort, Paper-Like Nailwort	*Paronychia chartacea*	Plant	Threatened	T
Piedmont Jointgrass	*Coelorachis tuberculosa*	Plant	Not Listed	T
Pigeon Wings, Scrub Pigeon-Wing	*Clitoria fragrans*	Plant	Threatened	T
Pine Pinweed	*Lechea divaricata*	Plant	Not Listed	E
Pineland Jacquemontia	*Jacquemontia curtissii*	Plant	Not Listed	T
Pinewoods Bluestem	*Andropogon arctatus*	Plant	Not Listed	T
Powdery Catopsis	*Catopsis berteroniana*	Plant	Not Listed	E
Pygmy Fringe-Tree	*Chionanthus pygmaeus*	Plant	Endangered	E

Common Name	Scientific Name	Type	Federal Status	State Status
Ray Fern	*Schizaea pennula*	Plant	Not Listed	E
Red-Cockaded Woodpecker	*Picoides borealis*	Bird	Endangered	FE
Reddish Egret	*Egretta rufescens*	Bird	Not Listed	ST
Redmargin Zephyrlily	*Zephyranthes simpsonii*	Plant	Not Listed	T
Roseate Spoonbill	*Platalea ajaja*	Bird	Not Listed	ST
Sand Skink	*Neoseps reynoldsi*	Reptile	Threatened	FT
Sandlace, Small's Jointweed	*Polygonella myriophylla*	Plant	Endangered	E
Scrub Blazingstar, Florida Blazing Star	*Liatris ohlingerae*	Plant	Endangered	E
Scrub Bluestem	*Schizachyrium niveum*	Plant	Not Listed	E
Scrub Buckwheat	*Eriogonum longifolium* var. *gnaphalifolium*	Plant	Threatened	T
Scrub Lupine	*Lupinus aridorum*	Plant	Endangered	E
Scrub Mint	*Dicerandra frutescens*	Plant	Endangered	E
Scrub Plum	*Prunus geniculata*	Plant	Endangered	E
Scrub Spurge	*Euphorbia rosescens*	Plant	Not Listed	E
Scrub Stylisma	*Stylisma abdita*	Plant	Not Listed	E
Short-leaved Rosemary	*Conradina brevifolia*	Plant	Endangered	E
Short-tailed Snake	*Stilosoma extenuatum*	Reptile	At-Risk	N
Sleeping Beauty Waterlily	*Nymphaea jamesoniana*	Plant	Not Listed	E
Small's Flax	*Linum carteri* var. *smallii*	Plant	Not Listed	E
Snakeroot, Wedge-Leaved Button-Snakeroot	*Eryngium cuneifolium*	Plant	Endangered	E
Southeastern American Kestrel	*Falco sparverius paulus*	Bird	Not Listed	ST
Southern Ladies'-Tresses	*Spiranthes torta*	Plant	Not Listed	E
Southern Plains Bumblebee	*Bombus fraternus*	Insect	At-Risk	N
Tailed Strap Fern	*Campyloneurum costatum*	Plant	Not Listed	E
Tampa Vervain	*Glandularia tampensis*	Plant	Not Listed	E
Tricolored Heron	*Egretta tricolor*	Bird	Not Listed	ST
West Indian Manatee	*Trichechus manatus*	Mammal	Threatened	FT
Wide-Leaf Warea	*Warea amplexifolia*	Plant	Endangered	E
Wireweed, Florida Jointweed	*Polygonella basiramia*	Plant	Endangered	E
Wood Stork	*Mycteria americana*	Bird	Threatened	FT

Impacts of Affected Resources

Alternative A
The no action alternative would negatively impact the 17 federally at-risk species that occur in the proposed Conservation Area. The projected urbanization within the proposed Conservation Area (Southeast Conservation Adaptation Strategy 2022) and its associated effects would likely destroy, degrade, and fragment some habitats used by at-risk species. Further, fire suppression and a lack of landscape-scale management could result in lesser-quality habitat. The Service would be unable to collaborate with partners to conserve, restore, or enhance habitats used by at-risk species. Conservation of such species would depend entirely on other conservation entities.

Alternative B
The Service could collaborate with partners to strategically conserve habitats used by the 17 at-risk species, decreasing development and its associated negative impacts in the proposed Conservation Area. The Service would also be able to manage, restore, and enhance habitats to benefit at-risk species and the habitats on which they depend. Further, the Service could conduct research to help inform decisions regarding at-risk species and coordinate with other federal agencies, State agencies, non-governmental organizations, and Tribal Nations to implement landscape-scale conservation efforts.

FEDERALLY PROTECTED PLANTS
Environmental Trends, Planned Actions, and Cumulative Impacts
See Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above.

Affected Environment
The recovery plans for these plants are based primarily on preserving existing habitat (because their distribution is limited) or acquiring lands where they historically existed with the intent of reintroducing them into former areas.

The other recovery actions supporting listed plants that the proposal would support include the listed items.

- Control invasive species.
- Conduct controlled burns at appropriate times and frequencies.
- Conduct research for species needs and population stability.
- Educate and inform the public.
- Monitor species survival and distribution.
- Enforcement of illegal removal of plants.
- Develop management plans that limit access where necessary.

See EA Table 5 for the common names, scientific names, types, and statuses of federally listed plants and lichens within the proposed Conservation Area (USFWS 2023c).

Impacts of Affected Resources

Alternative A
The Service could not contribute to the conservation of rare plant species within the proposed Conservation Area by collaborating with partners, acquiring less-than-fee and fee-title properties, or conducting active or passive natural resource management. Development within the proposed Conservation Area would likely

destroy some habitats important to listed plant species. In addition, invasive species would continue to spread and degrade habitat. Finally, fire suppression would negatively impact listed plant species that require fire to thrive. Plant conservation within the proposed Conservation Area would depend entirely on other conservation entities.

Alternative B

Under Alternative B, the Service could collaborate with partners to protect and restore listed plant species and their habitats by fee-title and less-than-fee-title. The Service could use various strategies, including passive and active management, to conserve vulnerable plants, such as controlling invasive species, conducting prescribed fire or allowing natural fire to return to the area, periodically monitoring plant populations to identify population and distribution trends, enforcing laws regarding the illegal removal of plants; and educate the public about the area's rare plants.

FISHERY RESOURCES

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

In addition to the information from Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above, Florida is expected to become hotter and drier and experience climate instability (including increasing temperatures, higher high temperatures, lower low temperatures, increased heat waves, increased extreme drought, increased extreme flooding, and increased intensity and occurrence of hurricanes and other extreme weather events). Additionally, the State will see changes in water temperatures and chemistry, habitat and species assemblages, landforms and geomorphic processes, land use, human health, air temperature and chemistry, and human infrastructure and economy (Beever et. al. 2009). Near term consequences of climate change and sea level rise in Florida include: increased saltwater intrusion, likely decreased availability of freshwater for potable use, and increased risk of flooding during major rain events, while other impacts likely to be seen include more extreme precipitation patterns; shorter, wetter rainy season; extremely dry winters; increased likelihood of multi-year drought; increased risk of ground and surface water contamination from flooding; heat stress on humans and wildlife; dehydration of soils and plants' greater wildfire risk; harmful algal blooms; increased risks of impacts from insects and insect-borne diseases; and reduction of water available to human and natural systems (Heimlich et al. 2009).

Affected Environment

Recreational, Non-Recreational, and Subsistence Fisheries

The fishery resources within the proposed Conservation Area can be generally divided into recreational (or sport) fisheries, non-recreational fisheries, subsistence fisheries, and nonnative aquatic species. EA Table 6 lists the fish species within the proposed Conservation Area.

Non-recreational fish species add to the diversity in the proposed Conservation Area. Some of these smaller species are important as forage for larger fish, wading birds, alligators, otters, and other predators. They are represented by the following families: sunfish (*Centrarchidae*), shad (*Clupeidae*), minnow (*Cyprinidae*), and killifish (*Cyprinodontidae*). Anywhere the public has access, there is also likely to be some subsistence fishing (including for nonnative species such as *Tilapia* spp. and other cichlids).

EA Table 6. Fish species list occurring in the Proposed Conservation Area.
Updated August 2023; Nonnative species are noted with an asterisk.

Common Name	Scientific Name
African jewelfish*	*Hemichromis letourneuxi*
Amazon sailfin catfish*	*Pterygoplichthys pardalis*
American eel	*Anguilla rostrata*
Asian swamp eel*	*Monopterus albus*
Atlantic needlefish	*Strongylura marina*
Blue tilapia*	*Oreochromis aureus*
Black acara*	Cichlasoma bimaculatum
Black crappie	*Pomoxis nigromaculatus*
Blackchin tilapia*	Sarotherodon melanotheron
Bluefin killifish	*Lucania goodei*
Bluegill	*Lepomis macrochirus*
Bowfin	*Amia calva*
Brown bullhead	*Ameiurus nebulosus*
Brown hoplo*	*Hoplosternum littorale*
Brook silverside	*Labidesthes sicculus*
Bluespotted sunfish	*Enneacanthus gloriosus*
Butterfly peacock bass*	Cichla ocellaris
Clown knifefish*	Chitala ornata
Chain pickerel	*Esox niger*
Channel catfish	*Ictalurus punctatus*
Dollar sunfish	*Lepomis marginatus*
Everglades pygmy sunfish	*Elassoma evergladei*
Florida gar	*Lepisosteus platyrhincus*
Flagfish	*Jordanella floridae*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Golden silverside	*Labidesthes vanhyningi*
Golden topminnow	*Fundulus chrysotus*
Grass carp*	*Ctenopharyngodon idella*
Green swordtail*	*Xiphophorus hellerii*
Hogchocker	*Trinectes maculatus*
Inland silverside	*Menidia beryllina*
Lake chubsucker	*Erimyzon sucetta*
Least killifish	*Heterandria formosa*
Longnose gar	*Lepisosteus osseus*
Lined topminnow	*Fundulus lineolatus*
Largemouth bass	*Micropterus salmoides*
Mayan Cichlid	*Cichlasoma urophthalmus*

Common Name	Scientific Name
Mozambique tilapia*	*Oreochromis mossambicus*
Eastern mosquitofish	*Gambusia holbrooki*
Nile tilapia*	*Oreochromis niloticus*
Okefenokee pygmy sunfish	*Elassoma okefenokee*
Orinoco sailfin catfish*	*Pterygoplichthys multiradiatus*
Oscar*	*Astronotus ocellatus*
Pirate perch	*Aphredoderus sayanus*
Pond loach*	*Misgurnus anguillicaudatus*
Pugnose minnow	*Opsopoedus emiliae*
Redbreast sunfish	*Lepomis auritus*
Redear sunfish	*Lepomis microlophus*
Redface topminnow	*Fundulus rubrifrons*
Redfin pickerel	*Esox americanus*
Red drum	*Sciaenops ocellatus*
Sailfin molly	*Poecilia latipinna*
Seminole killifish	*Fundulus seminolis*
Sheepshead minnow	*Cyprinodon variegatus*
Common snook	*Centropomus undecimalis*
Spotted sunfish	*Lepomis punctatus*
Spotted tilapia*	*Tilapia mariae*
Striped mullet	*Mugil cephalus*
Suckermouth catfish*	*Hypostomus plecostomus*
Swamp darter	*Etheostoma fusiforme*
Tadpole madtom	*Noturus gyrinus*
Taillight shiner	*Notropis maculatus*
Tarpon	*Megalops atlanticus*
Threadfin shad	*Dorosoma petenense*
Vermiculated sailfin catfish*	*Pterygoplichthys disjunctivus*
Walking catfish*	*Clarias batrachus*
Warmouth	*Lepomis gulosus*
White catfish	*Ameiurus catus*
Yellow bullhead	*Ameiurus natalis*

Impacts of Affected Resources

Alternative A

The Service would be unable to collaborate with partners to protect aquatic species, including listed fish; manage, protect, or restore aquatic habitat essential to vulnerable fish species; manage invasive species; engage with the public regarding conserving aquatic resources and preventing the spread of aquatic invasive

species; or expand aquatic-based recreational uses. Development would occur within the proposed Conservation Area, negatively impacting aquatic resources by decreasing water quality. As urbanization within the proposed Conservation Area continues, incompatible aquatic recreational uses may become more common. Further, invasive species could spread due to a lack of management. The conservation, management, and restoration of aquatic resources within the conservation would depend on other federal agencies, State agencies, non-governmental organizations, and Tribal Nations.

Alternative B

The proposed Conservation Area would positively impact fisheries resources, allowing the Service to collaborate with partners to conserve aquatic species; conserve, restore, and enhance aquatic habitat; manage aquatic invasive species; enhance recreational uses of aquatic resources; improve water quality; and educate the public about limiting the spread of aquatic invasive species.

NONNATIVE AND INVASIVE ANIMALS AND PLANTS

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

In addition to the information in Environmental Trends, Planned Actions, and Cumulative Impacts under Biological Resource above, the IPCC estimates that 20-30 percent of plant and animal species will be at risk of extinction if temperatures climb more than 1.5° to 2.5°C (Riebeek 2010). Computer models suggest that the overall climate of Florida may warm, resulting in more frequent extremely hot summer days and a longer growing season (U.S. Environmental Protection Agency undated). A warmer climate could allow heat-loving exotic plant species, such as the invasive Melaleuca, Lygodium, and cogon grass to expand their ranges. However, warmer winters lead to fewer frosts, consequently, tropical plants and trees that are vulnerable to cold temperatures may also benefit.

Facing the climate change challenge requires working on a landscape level to integrate the Service efforts with partners from other federal, State and Tribal Nations, conservation groups, academic institutions, private landowners, and recreational users. Moving forward, the Service would engage partners in a dialogue about working together to apply our resources with the best science to ensure landscapes are resilient and capable of sustaining America's fish and wildlife for generations to come.

Affected Environment

The transport of species beyond their native ranges by human actions is breaking down biogeographical barriers and resulting in the global reorganization of plants and animals (Capinha et al. 2015; van Kleunen et al. 2015). More people and goods are moving further and more frequently via many different trade and transport networks under current globalization trends. These networks can play a major role in the introduction of exotic species to new locations, with global trade networks having been identified as key pathways for the unintended entry and spread of many invasive species (Hulme 2009, Chapman et al. 2017).

Florida has the second worst invasive exotic plant problem in the United States. Over 25,000 exotic plants have been introduced to Florida since the New World was discovered. With its subtropical climate, south Florida provides ideal growing conditions for the introduction and spread of non-native exotic plants. Often when these non-native plants arrive in areas where they did not ecologically evolve, there are no natural enemies or other plants that can limit their growth and spread. Without natural limits to their expansion in new environments, these non-native plants invade and dominate areas quickly, and often result in monotypic stands of non-native vegetation.

Most of the non-native plant and animal species introduced to a new area are relatively benign, pose only negligible impacts, or are beneficial (Mack et al. 2000, Aukema et al. 2010, Schlaepfer et al. 2011); yet the minority of introduced species that are invasive cause billions of dollars of damage annually (Pimental et al. 2005, Lovell et al. 2006, Aukema et al. 2011, Paini et al. 2016). Further, invasive plants and animals can alter ecosystems and ecosystem processes (Gordon 1998, Dukes and Mooney 2004, Vilà et al. 2011); negatively impact vulnerable species (Dueñas et al. 2021), including federally threatened and endangered species (Dove et al. 2011); and change biodiversity and native species abundances (Dorcas et al. 2012, Gallardo et al. 2015).

Of the approximately 4,878 plant species growing without cultivation in Florida, 1,562 are non-native (Wunderlin et al. 2023). Many non-native plants were originally introduced as garden ornamentals, crops, forages, or soil stabilizers. Others were accidentally introduced as contaminants of seed or as hitchhikers on animals or materials. Approximately 79 non-native plant species in central and south Florida have been identified as Category 1 invasives by the Florida Exotic Pest Plant Council (Florida Exotic Pest Plant Council [FLEPPC] 2019) and 83 as category 2 (EA Table 6). Category 1 invasives are exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives (FLEPPC 2019). In contrast, Category 2 invasives have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category 1 species (FLEPPC 2019).

Accurate statistics regarding the number of non-native fish and wildlife species documented in Florida are unavailable in the literature; however, the South Florida Water Management District (2018) and Florida Fish and Wildlife Conservation Commission (2022) suggest there are 130 or more invasive animal species reproducing in the wild in Florida. Some of the more prolific invasive fish and wildlife species are listed in EA Table 7.

The following are some of the more problematic non-indigenous, invasive animals that occur in the proposed Conservation Area. These species can disrupt ecosystems by changing the structure of plant and animal communities or displacing native species.

Feral Hog

Feral hog impact native habitats through soil and vegetation disturbance by rooting, interspecific competition for resources, and predation of native flora and fauna. This species is present throughout the proposed Conservation Area. Feral hog populations are managed through hunts and removal programs to help minimize the impacts to native wildlife and habitat.

Coyote

The coyote (*Canis latrans*) is an exotic species becoming more common in Florida. Coyotes can use most upland or wetland habitats, and have a wide-ranging diet (feeding on rodents, rabbits, lizards, snakes, insects, grasses, watermelon, persimmons, wild berries, grains, fish, turtle eggs, and carrion). They can be a major predator on deer fawns and turkey poults. Little is known about coyote ecology in Florida; it is not known if predation on deer could adversely affect the food source for the Florida panther. Coyotes will kill or injure calves, poultry, hogs, goats, and domestic dogs and cats. With the increase of occurrence of this species, loss of livestock could be problematic, and ranchers may have to allocate some resources towards coyote control.

Cane Toad (Marine Toad, Giant Toad)

Breeding populations of the cane toad (*Rhinella marina*) have been established in most of central and south Florida since the early 1970s; however, the cane toad is mainly associated with disturbed agricultural and residential areas. This species is a threat to native fauna. Its large size and aggressive nature allow the cane

toad to out-compete and prey on native species. The toxicity of the cane toad makes it unpalatable to most potential predators; consequently, there is little predator control of the species.

Cuban Treefrog

The Cuban tree frog is established in all counties in the proposed Conservation Area. It has been observed to prey on native frogs and toads. The species has the potential to disrupt and displace native species in natural habitats, and therefore, is viewed as a potential problem for restoration of native herpetofaunal communities in this landscape.

Non-native Apple Snails

Nonnative apple snails, Island apple snail (*Pomacea insularum*), Channeled applesnail (*P. canaliculate*), Spike-topped apple snail (*P. diffusa*), and Titan applesnail (*P. haustrum*) are present in all counties within the proposed Conservation Area except Hardee County and Desoto County (FWC n.d.c, EDDMapS 2023). This species has potential to reduce abundance of the native Florida apple snail (*P. paludosa*), the primary food source of the endangered Everglade snail kite. Snail kite foraging on this larger nonnative snail was thought to be a problem a few years ago, but evidence now seems to indicate that all size classes of this snail are available to the kites.

EA Table 6. Category 1 and 2 invasive species in central and south Florida. Data source: Florida Exotic Pest Plant Council (FLEPPC 2019).

Common Name	Scientific Name	Zone	Category
Rosary Pea	*Abrus precatorius*	Central, South	1
Ear-leaf Acacia	*Acacia auriculiformis*	Central, South	1
Mimosa, Silk Tree	*Albizia julibrissin*	North, Central	1
Woman's Tongue	*Albizia lebbeck*	Central, South	1
Coral Ardisia	*Ardisia crenata*	North, Central, South	1
Shoe Button Ardisia	*Ardisia elliptica*	Central, South	1
Asparagus Fern	*Asparagus aethiopicus*	North, Central, South	1
Orchid Tree	*Bauhinia variegata*	Central, South	1
Bishop Wood Tree	*Bischofia javanica*	Central, South	1
Santa Maria	*Calophyllum antillanum*	South	1
Australian-Pine	*Casuarina equisetifolia*	North, Central, South	1
Suckering Australian-Pine	*Casuarina glauca*	Central, South	1
Elephant Grass, Napier Grass	*Cenchrus purpureus*	North, Central, South	1
Camphor-Tree	*Cinnamomum camphora*	North, Central, South	1
Wild Taro	*Colocasia esculenta*	North, Central, South	1
Latherleaf	*Colubrina asiatica*	South	1
Carrotwood	*Cupaniopsis anacardioides*	Central, South	1
Japanese False Spleenwort	*Deparia petersenii*	North, Central	1

Common Name	Scientific Name	Zone	Category
Winged Yam	*Dioscorea alata*	North, Central, South	1
Air Potato	*Dioscorea bulbifera*	North, Central, South	1
Cat's-Claw Vine	*Dolichandra unguis-cati*	North, Central, South	1
Water-Hyacinth	*Eichhornia crassipes*	North, Central, South	1
Surinam Cherry	*Eugenia uniflora*	Central, South	1
Laurel Fig	*Ficus microcarpa*[1]	Central, South	1
Hydrilla	*Hydrilla verticillata*	North, Central, South	1
Green Hygro	*Hygrophila polysperma*	North, Central, South	1
West Indian Marsh Grass	*Hymenachne amplexicaulis*	North, Central, South	1
Cogon Grass	*Imperata cylindrica*	North, Central, South	1
Water-Spinach	*Ipomoea aquatica*	Central	1
Gold Coast Jasmine	*Jasminum dichotomum*	Central, South	1
Brazilian Jasmine	*Jasminum fluminense*	Central, South	1
Lantana, Shrub Verbena	*Lantana strigocamara*	North, Central, South	1
Glossy Privet	*Ligustrum lucidum*	North, Central	1
Chinese Privet	*Ligustrum sinense*	North, Central, South	1
Japanese Honeysuckle	*Lonicera japonica*	North, Central, South	1
Peruvian Primrose Willow	*Ludwigia peruviana*	North, Central, South	1
Black Mangrove	*Lumnitzera racemosa*	South	1
Tropical American Watergrass	*Luziola subintegra*	South	1
Japanese Climbing Fern	*Lygodium japonicum*	North, Central, South	1
Old World Climbing Fern	*Lygodium microphyllum*	North, Central, South	1
Sapodilla	*Manilkara zapota*	South	1
Melaleuca, Paper Bark	*Melaleuca quinquenervia*	Central, South	1
Natal Grass	*Melinis repens*	Central, South	1
Serpent Fern, Wart Fern	*Microsorum grossum*	South	1
Catclaw Mimosa	*Mimosa pigra*	Central, South	1
Heavenly Bamboo, Nandina	*Nandina domestica*	North, Central	1
Asian Sword Fern	*Nephrolepis brownii*	Central, South	1

Common Name	Scientific Name	Zone	Category
Sword Fern	*Nephrolepis cordifolia*	North, Central, South	1
Burma Reed	*Neyraudia reynaudiana*	South	1
Crested Floating Heart	*Nymphoides cristata*	Central, South	1
Sewer Vine	*Paederia cruddasiana*	South	1
Skunk Vine	*Paederia foetida*	North, Central, South	1
Torpedo Grass	*Panicum repens*	North, Central, South	1
Water-Lettuce	*Pistia stratiotes*	North, Central, South	1
Strawberry Guava	*Psidium cattleianum*	Central, South	1
Guava	*Psidium guajava*	Central, South	1
Kudzu	*Pueraria montana* var. *lobata*	North, Central, South	1
Downy Rose-Myrtle	*Rhodomyrtus tomentosa*	Central, South	1
Mexican Petunia	*Ruellia simplex*	North, Central, South	1
Water Spangles	*Salvinia minima*	North, Central, South	1
Beach Naupaka, Half-Flower	*Scaevola taccada*	North, Central, South	1
Schefflera, Umbrella Tree	*Schefflera actinophylla*	Central, South	1
Brazilian Pepper	*Schinus terebinthifolia*	North, Central, South	1
Wright's Nut Rush	*Scleria lacustris*	Central, South	1
Tropical Nut Rush	*Scleria microcarpa*	Central, South	1
Christmas Senna, Climbing Cassia	*Senna pendula* var. *glabrata*	Central, South	1
Wetland Night Shade	*Solanum tampicense*	Central, South	1
Tropical Soda Apple	*Solanum viarum*	North, Central, South	1
West Indian Dropseed	*Sporobolus jacquemontii*	Central, South	1
Arrowhead Vine	*Syngonium podophyllum*	North, Central, South	1
Java Plum	*Syzygium cumini*	Central, South	1
Incised Halberd Fern	*Tectaria incisa*	South	1
Jeweled Maidenhair Fern	*Thelypteris opulenta*	South	1
Seaside Mahoe	*Thespesia populnea*	Central, South	1
Small-Leaf Spiderwort	*Tradescantia fluminensis*	North, Central	1
Oyster Plant	*Tradescantia spathacea*	Central, South	1
Chinese Tallow-Tree	*Triadica sebifera*	North, Central, South	1

Common Name	Scientific Name	Zone	Category
Caesar's Weed	*Urena lobata*	North, Central, South	1
Para Grass	*Urochloa mutica*	North, Central, South	1
Red Sandalwood	*Adenanthera pavonina*	South	2
Sisal Hemp	*Agave sisalana*	Central, South	2
Devil Tree	*Alstonia macrophylla*	South	2
Alligator Weed	*Alternanthera philoxeroides*	North, Central, South	2
Coral Vine	*Antigonon leptopus*	North, Central, South	2
Calico Flower	*Aristolochia elegans*	North, Central, South	2
Ganges Primrose	*Asystasia gangetica*	Central, South	2
Wax Begonia	*Begonia cucullata*	North, Central, South	2
Paper Mulberry	*Broussonetia papyrifera*	North, Central, South	2
Large-Leafed Mangrove	*Bruguiera gymnorrhiza*	South	2
Inch Plant	*Callisia fragrans*	Central, South	2
River Sheoak	*Casuarina cunninghamiana*	Central, South	2
Trumpet Tree	*Cecropia palmata*	South	2
Mission Grass	*Cenchrus polystachios*	South	2
Fountain Grass	*Cenchrus setaceus*	South	2
Day Jessamine	*Cestrum diurnum*	Central, South	2
Bamboo Palm	*Chamaedorea seifrizii*	South	2
Japanese Clematis	*Clematis terniflora*	North, Central	2
Coconut Palm	*Cocos nucifera*	South	2
Redflower Ragleaf	*Crassocephalum crepidioides*	Central, South	2
Madagascar Rubber Vine	*Cryptostegia madagascariensis*	Central, South	2
Umbrella Plant	*Cyperus involucratus*	Central, South	2
Dwarf Papyrus	*Cyperus prolifer*	Central, South	2
Durban Crow's-Foot Grass	*Dactyloctenium aegyptium*	Central, South	2
Indian Rosewood, Sissoo	*Dalbergia sissoo*	Central, South	2
Spurge-Creeper	*Dalechampia scandens*	South	2
Spanish Arbor Vine, Wood-Rose	*Distimake tuberosus*	Central, South	2
Bowstring Hemp	*Dracaena hyacinthoides*	Central, South	2
Silverthorn, Thorny Olive	*Elaeagnus pungens*	North, Central	2
Pothos	*Epipremnum pinnatum* cv. Aureum	Central, South	2
Chinese Crown Orchid	*Eulophia graminea*	Central, South	2
Council Tree, False Banyan	*Ficus altissima*	South	2

Common Name	Scientific Name	Zone	Category
Governor's Plum	*Flacourtia indica*	South	2
Limpo Grass	*Hemarthria altissima*	Central, South	2
Redwing	*Heteropterys brachtiata*	South	2
Jaragua	*Hyparrhenia rufa*	North, Central, South	2
Shrub Morning-Glory	*Ipomoea carnea subsp fistulosa*	Central, South	2
Mother Of Millions	*Kalanchoe x houghtonii*	North, Central, South	2
Life Plant	*Kalanchoe pinnata*	Central, South	2
Flame Gold Tree	*Koelreuteria elegans* subsp. *formosana*	Central, South	2
Spotted Duckweed	*Landoltia punctata*	North, Central, South	2
Lead Tree	*Leucaena leucocephala*	North, Central, South	2
Asian Marsh Weed	*Limnophila sessiliflora*	North,Central, South	2
Chinese Fan Palm	*Livistona chinensis*	Central, South	2
Wild Bush Bean	*Macroptilium lathyroides*	North, Central, South	2
Bottlebrush	*Melaleuca viminalis*	Central, South	2
Chinaberry	*Melia azedarach*	North, Central, South	2
Molasses Grass	*Melinis minutiflora*	Central South	2
Mile-A-Minute Vine	*Mikania micrantha*	South	2
Balsam-Apple	*Momordica charantia*	North, Central, South	2
Orange-Jessamine	*Murraya paniculata*	South	2
Eurasian Water-Milfoil	*Myriophyllum spicatum*	North, Central, South	2
Twin-Flowered Passion Vine	*Passiflora biflora*	South	2
Senegal Date Palm	*Phoenix reclinata*	Central, South	2
Golden Bamboo	*Phyllostachys aurea*	North, Central	2
Taiwanese Cheese Wood	*Pittosporum pentandrum*	South	2
Staghorn Fern	*Platycerium bifurcatum*	South	2
Praxelis	*Praxelis clematidea*	Central	2
Chinese Brake, Ladder Brake	*Pteris vittata*	North, Central, South	2
Solitary Palm	*Ptychosperma elegans*	South	2
Large Flower Mexican Clover	*Richardia grandiflora*	North, Central, South	2
Castor Bean	*Ricinus communis*	North, Central, South	2
Dwarf Rotala, Roundleaf Toothcup	*Rotala rotundifolia*	South	2

Common Name	Scientific Name	Zone	Category
Green Shrimp Plant	*Ruellia blechum*	North, Central, South	2
Rattlebox	*Sesbania punicea*	North, Central, South	2
Mata-Pasto	*Sida planicaulis*	Central, South	2
Twinleaf Nightshade	*Solanum diphyllum*	North, Central, South	2
Turkey Berry	*Solanum torvum*	North, Central, South	2
Shrubby False Button Weed	*Spermacoce verticillata*	Central, South	2
Wedelia	*Sphagneticola trilobata*	North, Central, South	2
Nettle-Leaf Porter Weed	*Stachytarpheta cayennensis*	South	2
Queen Palm	*Syagrus romanzoffiana*	Central, South	2
Malabar Plum, Rose-Apple	*Syzygium jambos*	North, Central, South	2
Mahoe, Sea Hibiscus	*Taliparititi tiliaceum*	Central, South	2
Tropical-Almond	*Terminalia catappa*	Central, South	2
Australian–Almond	*Terminalia muelleri*	Central, South	2
Puncture Vine, Burr-Nut	*Tribulus cistoides*	North, Central, South	2
Guinea Grass	*Urochloa maxima*	North, Central, South	2
Tung-Oil Tree	*Vernicia fordii*	North, Central, South	2
Simple-Leaf Chaste Tree	*Vitex trifolia*	Central, South	2
Washington Fan Palm	*Washingtonia robusta*	Central, South	2
Chinese Wisteria	*Wisteria sinensis*	North, Central	2
Malanga, Elephant Ear	*Xanthosoma sagittifolium*	North, Central, South	2

EA Table 7. Invasive wildlife species found in Florida.

Common Name	Scientific Name	Type
African Clawed Frog	*Xenopus laevi*	Amphibian
African Sacred Ibis	*Threskiornis aethiopicus*	Bird
Argentine Black and White Tegu	*Salvator merianae*	Reptile
Asian Clam	*Corbicula fluminea*	Invertebrate
Burmese Python	*Python molurus bivittatus*	Reptile
Cane Toad	*Rhinella marina*	Amphibian
Coyote	*Canis latrans*	Mammal
Cuban Treefrog	*Ostepilus spetentrionalis*	Amphibian
Egyptian Goose	*Alopochen aegyptiaca*	Bird

Common Name	Scientific Name	Type
Feral Hog	*Sus scrofa*	Mammal
Gambian Pouched Rat	*Cricetomys gambianus*	Mammal
Giant African Land Snail	*Lissachatina fulica*	Invertebrate
Green Iguana	*Iguana iguana*	Reptile
Island Apple Snail	*Pomacea insularum*	Invertebrate
Muscovy Duck	*Cairina moschata*	Bird
New Guinea Flatworm	*Platydemus manokwari*	Invertebrate
Nile Monitor	*Varanus niloticus*	Reptile
Red-Bellied Squirrel	*Rubrisciurus rubriventer*	Mammal

Impacts of Affected Resources

Alternative A

Invasive species management within the proposed Conservation Area would depend on other federal agencies, State agencies, non-governmental organizations, and Tribal Nations. The Service would be unable to collaborate with partners within the proposed Conservation Area to prevent the introduction and spread of invasive species, implement early detection and rapid response efforts, reduce the likelihood of new infestations, control or eradicate established invasive species, or improve invasive species data management and research to inform decision-making.

Alternative B

The establishment of the proposed Conservation Area would allow the Service to work with partners to prevent the introduction and spread of invasive species into and within the proposed Conservation Area; implement early detection and rapid response efforts in coordination with other federal agencies, State agencies, Tribal Nations, and non-governmental organizations to reduce the likelihood of new infestations becoming established; cost-effectively control or eradicate established invasive species populations to reduce negative impacts and help restore ecosystems; and improve invasive species data management and research to inform decision-making.

The Service anticipates that nonnative invasive species would be controlled on lands acquired by the Service under Alternative B. This would serve to improve the overall ecology of the proposed Conservation Area by limiting further spread of these species. Some of the nonnative species (feral hogs, tilapia, and other cichlid fishes) are sport and subsistence species. The reduction of these species' abundance may represent a minor adverse effect to some people utilizing the species for sport and subsistence; however, it is unlikely that we would ever completely eradicate these species under Alternative B. The expectation is that we would provide improved habitat conditions for native species that could replace these nonnative species.

SOCIOECONOMIC ENVIRONMENT

The proposed Conservation Area is located across a 12-county area located in southwest and central Florida, as listed.

Charlotte County	Glades County	Highlands County	Okeechobee County
Collier County	Hardee County	Lee County	Polk County
DeSoto County	Hendry County	Manatee County	Sarasota County

The socioeconomic section compares aggregated data at the county, 12-county proposed Conservation Area level, State, and national scales to develop an understanding of socioeconomic conditions and trends and to analyze the Proposed Action.

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

Although Florida's natural landscape has been negatively impacted by development, agriculture, and resource extraction, the State has protected and restored some of its lands. Florida has been identified by government agencies, non-governmental organizations, and Tribal Nations as a conservation target due to its subtropical location, peninsular geography, many endemic and imperiled species, and rapid development (Volk et al. 2017). Today, Florida has a substantial portion of its lands conserved through various methods. As of 2017, local, State, and federal partners have protected approximately 9.5 million acres through fee-title ownership and another 760,400 acres under conservation easements, equaling 29.4% of the State (Volk et al. 2017). Further, conservation entities have worked with the agricultural industry to protect agricultural lands that support species like grassland birds.

Affected Environment

POPULATION

In 2021, the combined population of these 12 diverse counties was 3.1 million, while the Florida population was over 21 million. The 2021 population in the 12 counties ranged from 12,183 to 752,251 with six of the counties each having populations of about 100,000 or less and five counties each having populations over 350,000. Net migration accounted for 92.6% of the population change from 2010 to 2021 for the 12 counties, which was slightly lower than for the rest of Florida (94.5%). The population change from 2000 to 2021 for the 12 counties was 50.7%, which was well above the rates for the US (17.6%) and Florida (35.7%). Further, from 1970 to 2021, the population for the 12 counties grew from 709,875 to 3.1 million, a 356% increase, which was greater than the 218% increase for the State of Florida. (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

Medium range population projections based on US Census Bureau and the Florida Bureau of Economic and Business Research data show a predicted 44.25% population increase for the State of Florida from 2010 to 2070 to 33.7 million, while the 12 counties in the proposed Conservation Area show a slightly larger 49.18% population increase in that time to over 5.2 million. For these 12 counties, the data show a range of predicted population growth from 2010 to 2070 of -2.32% (DeSoto County) to 60.1% (Lee County) with three counties (DeSoto, Hardee, and Hendry counties) showing less than 10% population growth and with four counties (Lee, Collier, Manatee, and Polk counties) showing greater than 50% population growth over that time frame (Carr and Zwick 2016b).

Median age in 2021 for the 12 counties ranged from 35.1 to 59.7 years old. The median ages for Hendry and Hardee counties were younger than the US (38.4) and Florida (42.3); the median ages for Okeechobee, Polk, and DeSoto counties were older than the US, but younger than for Florida; and the median ages for Charlotte, Collier, Glades, Highlands, Manatee, Lee, and Sarasota counties were older than the US and Florida. From 2010 to 2021, all 12 counties saw an increase in the median age with increases ranging from 0.7 to 4.9 years; only Polk County had an increase below the US (1.5 years) and only Okeechobee County had an increase similar to the US but below Florida (2 years), while the remaining 10 counties saw increases in median age greater than the US and Florida. (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

In 2021, the total minority population for the 12 counties ranged from 17% to 69.4% with an average of 34.1%, which is below the US (40.6%) and Florida (47.4%). Hendry County had a total minority population of 69.4% in 2021, while Hardee County had 54%, DeSoto County had 46%, Polk County had 44%, and Glades County had 41.2%. Seven counties (Charlotte, Collier, Highlands, Lee, Manatee, Okeechobee, and Sarasota counties) had lower percentages of total minority population in 2021 compared to the US and Florida. DeSoto, Glades, and Polk counties had percentages of total minority population between the US and Florida, while Hardee (54%) and Hendry (69.4%) counties had percentages well above the US and Florida. When looking at race, in 2021 the 12 counties averaged more white and less black or African American, ranging from 67.7% to 87.9% (averaging 78.1%) for white alone and ranging from 4.3% to 15% (averaging 9%) for black or African American alone compared to the US (68.2% and 12.6%, respectively) and Florida (67.7% and 15.7%, respectively). When looking at the Hispanic or Latino population of any race in 2021, the 12 counties ranged from 7.8% to 55.1% (averaging 21.1%) Hispanic or Latino of any race with nine of the counties above 20% compared to the US (18.4%) and Florida (26.2%). Hendry County had 55.1% Hispanic or Latino of any race in 2021 with Hardee County at 44.3%, DeSoto County at 31.9%, Collier County at 28.5%, and Okeechobee County at 26.4%. In 2021, the percentage of people reporting speaking English less than very well ranged from 3.4% to 21.6% with an average of 8.5% for the 12 counties with Collier, Hardee, and Hendry counties above the US (8.2%) and Florida (11.8%); with DeSoto, Glades, Lee, Okeechobee, and Polk counties between the US and Florida; and with Charlotte, Highlands, Manatee, and Sarasota counties below the US and Florida. (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

EMPLOYMENT AND INCOME

Per capita income in 2021 ranged from $19,673 to $51,296 with most of the counties (DeSoto, Glades, Hardee, Hendry, Highlands, Okeechobee, and Polk counties) below the US ($37,638) and Florida ($35,216), while Charlotte, Lee, and Manatee counties were similar to the US and Florida, and while Sarasota and Collier counties were above the US and Florida. In 2021, median household income ranged from $38,088 to $75,543 with most of the counties (Charlotte, DeSoto, Glades, Hardee, Hendry, Highlands, Okeechobee, and Polk counties) below the US ($69,021) and Florida ($61,777), while Lee and Manatee counties were above Florida and below the US, while Sarasota County was above Florida and similar to the US, and while Collier County was above both the US and Florida. As expected, the median household income was greater for the coastal counties compared to the inland counties. (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

For all 12 counties, the percentage of families below the poverty line in 2021 ranged between 5.2% and 23.4% with a combined average of 8.6%, which is lower than for Florida (9.3%) and similar to the US (8.9%). While five counties (Charlotte, Collier, Lee, Manatee, and Sarasota counties) were below the US and Florida with a smaller percentage of families below the poverty line, seven counties (DeSoto, Glades, Hardee, Hendry, Highlands, Okeechobee, and Polk counties) had a higher percentage of families below the poverty line. Similarly, for all 12 counties, the percentage of single mother families below the poverty line in 2021 ranged from 1.5% to 10% with a combined average of 3%, which is lower than for the US (3.9%) and Florida (3.6%). While Glades County was similar to the US and Florida, compared to the US and Florida, six counties (Charlotte, Collier, Highlands, Lee, Manatee, and Sarasota counties) had a lower percentage of single mother families below the poverty line and five counties (DeSoto, Hardee, Hendry, Okeechobee, and Polk counties) had a higher percentage. Within the 12 counties, poverty rates in 2021 were higher for black or African Americans (21%) and Native American Indians (21.2%) compared to other races and ethnicities. While the poverty rate was similar to the US (21.7%) and Florida (20.5%) for black or African Americans, it was higher than both the US (5.1%) and Florida (18.2%) for Native American Indians. For Hispanic or Latino of any race, poverty rates in 2021 for the 12 counties was 19%, which

was greater than for the US (17.7%) and Florida (15.9%). (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

The unemployment rate for the 12 counties in 2021 was 4.5%, which was similar to Florida (4.6%) and below the US (5.3%). Since 1976, the unemployment rate has trended downwards in the 12 counties with a low of 2.5% in 2006 and a high of 11.7% in 2010. From 1970 to 2021, employment in the 12 counties grew from 290,187 to over 1.6 million, a 480% increase, which is greater than the 356% population increase over the same time period for the 12 counties, and which is greater than the State's employment increase of 346% over the same time period. Also, from 1970 to 2021, personal income in the 12 counties grew 955% from $21,246.6 million to $224,173.3 million, which was at a greater rate than for the State (588%) (adjusted for inflation). From 2000 to 2021, the 12 counties have seen personal income increase by 102.9%, which was greater than for the US (56.4%) and Florida (82.3%); employment increase by 53.3%, which was greater than the US (21.6%) and Florida (48.9%); average earnings per job increase by 9.2%, which was less than the US (13.1%) but higher than Florida (5.7%); and per capita income increase 34.6%, which was slightly higher than for the US (32.9%) and Florida (34.3%). However, average earnings per job in 2021 for the 12 counties was $57,291, which was lower than for both the US ($76,669) and Florida ($62,449). (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

TOURISM

Florida's tourism industry generated $105.1 billion in 2021 with $101.9 billion contributing back to the Florida economy. Approximately 51% ($52.3 billion) of total value added was attributed to businesses that directly support tourism activity and the remaining 49% ($49.6 billion) came from economic activity generated by the tourism supply chain and other downstream businesses. Florida retained nearly 97 cents of every tourism dollar spent in the State in 2021. The industry supported nearly 1.7 million jobs ranking it the 4th largest industry in the State in 2021. This includes the more than 1.1 million jobs directly supported by visitors, another 251,000 jobs supported by tourism supply industries and 336,000 jobs supported through the impact of employees in those industries spending wages on various goods and services in the State. Tax revenue generated $15.9 billion in federal tax and $13.6 billion from State and local tax. In 2021, Counties in the proposed Conservation Area ranked among the top 20 by value added included Lee, Sarasota, Collier, Manatee, and Polk Counties. Counties in the proposed Conservation Area ranked among the top 20 by visitor spending includes Lee, Collier, Sarasota, Polk, and Manatee Counties (Rockport Analytics 2022).

WILDLIFE-DEPENDENT RECREATION

Banking on Nature 2017: The Economic Contributions of National Wildlife Refuge Recreational Visitation to Local Communities, (Caudill and Carver 2019) examined the local economic contributions of recreational visits to 162 national wildlife refuges in 47 states and 1 territory for the fiscal year (FY) 2017 (October 1, 2016 – September 30, 2017). According to the report, approximately 53.6 million people visited national wildlife refuges generating almost $3.2 billion in total economic activity and supported over 41,000 jobs, generating about $1.1 billion in employment income. Additionally, recreational spending on refuges generated nearly $229 million in tax revenue at the local, county, State, and federal levels.

Florida's outdoor recreation providers can be classified into five categories: federal government, State government, county government, municipal government, and private sector providers. Both federal and State agencies are concerned with areas and facilities designed to accommodate the demand for resource-based outdoor recreation. County and municipal governments are the primary suppliers of the public facilities needed for user-oriented recreation, although some also provide areas and facilities to meet part of the need for

resource-based outdoor recreation. Outdoor recreation, both resource-based and user-based, contributed an estimated $145 billion to the State's economy in 2017 (FDEP 2019).

ECOSYSTEM SERVICES

Payment for Ecosystem Services (PES)

The term "ecosystem services" describes an ecosystem management approach that is focused on linking ecosystem structure and function with the production of specific services and benefits (de Groot et al. 2010). Payments for ecosystem services (PES) is a strategy that pays landowners for the services and benefits produced by ecosystems on their land (Ferraro and Kiss 2002). The approach is "market-based" when trade negotiations about service provision are made between ecosystem service provider(s) and buyer(s) (Ferraro 2008). In the United States, the ecosystem service provider is typically a landowner, with enforceable private property rights, who can control how the land is used and thereby ensure that certain ecosystem services are provided. The buyer is typically a government agency representing public demand for ecosystem service benefits. The negotiations between the provider and the buyer center on the conditions set out in the conservation contract. Conditions typically pertain to payment levels, how payments are linked with quantified levels of ecosystem services, and monitoring/enforcement procedures that guarantee delivery of service.

The USDA's Natural Resources Conservation Service (NRCS) provides technical and financial assistance for conservation practices that improve Florida panther habitat through the Regional Conservation Partnership Program-Conservation Stewardship Program (RCPP-CSP). Although more than 20,000 acres are enrolled in this RCPP-CSP project, NRCS struggles to find participants. Many of the ranchers within the panther range are not enrolled in the RCPP-CSP program due to the Adjusted Gross Income (AGI) limitation on this program. The ranchers not already enrolled represent the majority of landowners in panther range. When considering appropriate land use classifications within the Primary and Dispersal Zones of the Panther Focus Areas located north of I-75 in Collier, Lee, Hendry and Glades Counties and focusing on lands that contain desirable panther habitat within this area, FWC estimates there are approximately 190,000 acres of private lands that they would like to enroll in a PES program. Consequently, FWC is embarking on its own PES Pilot Program that will complement the RCPP-CSP program and compensate landowners who provide panther habitat and manage for panther occupancy. The program will also create an additional opportunity for ranchers to be compensated for panther depredations. In 2022, the Service awarded FWC a $430,000 grant under Section 6 of the ESA. This grant assists with funding the PES Pilot Program. The proposed Conservation Area can contribute to PES initiatives by raising awareness of the need to promote the PES program and continuing to engage in identifying possible funding mechanisms to advance the Program.

Depredation Compensation and Florida Panthers

A panther depredation occurs when a panther kills or injures domestic animals such as goats, sheep, calves, dogs or house cats. Panthers are carnivores that primarily prey on white-tailed deer, hogs and raccoons but they are opportunistic hunters, and their diet varies. Any unsecured domestic animal may be at risk to depredation. The best way to protect household pets and backyard hobby animals is to keep them indoors or in a predator-resistant enclosure, especially at night. In order for an enclosure to provide adequate protection against panthers, it must be totally enclosed. Many large ranches provide quality habitat for native wildlife. Because cattle typically roam across expansive landscapes, panther depredations are difficult to prevent or even detect. Due to their size, adult cattle are not typically preyed on but calves up to 300 pounds have been killed by panthers. A study conducted by the University of Florida's Department of Wildlife Ecology and Conservation found that calf losses due to panther depredation ranged from one to five percent annually on two ranches in southwest Florida. The U.S. Department of Agriculture's Farm Services Administration has a Livestock Indemnity Program that offers partial payment for livestock losses caused by animals protected by

Federal law, such as the Florida panther. The Bergeron Everglades Foundation offers compensation for calves lost to panthers, upon verification by panther biologists. While livestock-guard animals, particularly certain breeds of dogs, have been used in other parts of the world for other predators, they have not been studied or evaluated in Florida in regard to panthers. Various agencies and organizations offer assistance programs depending on the particular set of circumstances. The Conservancy of Southwest Florida and Defenders of Wildlife offer cost share programs to help individuals acquire a predator resistant enclosure to secure their pets and hobby livestock. Additionally, The Conservancy has a compensation program intended for small-scale cattle farmers with herds up to 300 head who have lost calves due to panther predation. Large-scale commercial cattle ranchers can apply for compensation for livestock losses caused by federally protected animals (such as the Florida panther) through the U.S. Department of Agriculture's Farm Services Administration Livestock Indemnity Program.

The proposed Conservation Area can contribute to this initiative by raising awareness of the need to promote actions that prevent and reduce negative panther and people interactions and raise awareness of these methods through strategic communication and environmental education and interpretive efforts by the Service. The proposed Conservation Area can provide staffing that can support agencies and partners in the collective effort to compensate cattle farmers for their losses. As urban sprawl and the associated infrastructure of roads and services advance into rural areas, opportunities for wildlife to roam without interaction with people, pets, and livestock decrease. The proposed Conservation Area can contribute to the preservation and protection of landscape scale wildlife corridors which can provide safe passage for species and enable little to no interaction with people and livestock.

LAND USE

The three largest industry sectors across the 12 counties in 2021 were retail trade (191,926 jobs), health care and social assistance (178,762 jobs), and government (137,471 jobs), which generally reflected the State's top three (health care and social assistance, retail trade, and government). From 2001 to 2021, the three industry sectors that added the newest jobs in the 12 counties were real estate and rental and leasing (72,032 new jobs), health care and social assistance (71,053 new jobs), and transportation and warehousing (59,237 new jobs). For the 12 counties in 2021, employment jobs break out into service jobs (77.5%), non-service jobs (14.3%), and government jobs (8.2%), which is generally similar to the US (73.5%, 14.5%, and 12%, respectively) and Florida (80%, 11%, and 9%, respectively). (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

Farming continues to be an important industry in Florida and in the 12 counties in the proposed Conservation Area. In the U.S. Department of Agriculture's (USDA's) 2017 Census of Agriculture, the State of Florida's agriculture sales in 2017 were 78% crops and 22% livestock, poultry, and products. The market value of Florida's agricultural products was over $7 billion with farm-related income of over $328 million and net cash farm income of over $1.2 billion in 2017. In 2017, the top crops in Florida, by acres, were on over 1.66 million acres out of a total of 9.7 million acres of agriculture for the State: forage (hay/haylage, 422,551 acres), oranges (422,421 acres), sugarcane for sugar (386,428 acres), vegetables harvested (245,375 acres), and peanuts for nuts (186,803 acres). Agriculture activities occurred in 2017 in the 12 counties on a total of over 3.3 million acres, ranging from 71,165 acres in Sarasota County to 487,128 acres in Polk County. Only two of the 12 counties had less than 100,000 acres each in agriculture with one county at nearly 300,000 acres and with six counties at over 300,000 acres each in 2017. Average farm size for the State of Florida was 204 acres in 2017. For the 12 counties in 2017, average farm size ranged from 109 acres to 1,211 acres with a combined average of 383 acres per farm (greater than the State average) on 8,730 farms and with 558 farms at 1,000 acres or greater. The 12 counties varied widely in the breakdown of sales by crops versus livestock, poultry, and products, ranging from 14% to 97% crops and 3% to

86% livestock in 2017. However, all except Okeechobee County, had 60% or more of sales in crops in 2017. The total market value of agriculture products sold in 2017 for the 12 counties was over $2.2 billion (30.3% of the State's total) with farm-related income of over $64 million and net cash farm income of over $262 million. For the 12 counties in 2017, the percentage of farms by use (cropland, pastureland, or woodland) varied from 10% to 63% for croplands (with only Collier County at greater than 50% croplands), 19% to 69% pasturelands (with a total of five counties with greater than 50% in pasturelands and with a total of 10 counties with 30% or more in pasturelands), and 7% to 42% woodlands (with 10 counties at 20% or less in woodlands). (USDA 2019)

Land ownership in the 12 counties in 2021 was 75.8% private and 9.7% Federal (of which 0.7% is the USFWS), which reflects the State of Florida at 73.7% private and 10.8% Federal (of which 0.7% is the USFWS), but which is lower than the US at 61.1% private and 27.5% Federal (of which 3.9% is USFWS). The percentage of land ownership in the 12 counties in 2021 ranged from 34.2% to 96.8% private and 0% to 49.5% Federal, with all counties above 75% private, except Charlotte and Collier counties. Charlotte County, which includes Babcock Ranch Preserve, Fred C. Babcock/Cecil M. Webb Wildlife Management Area, Charlotte Harbor Preserve State Park, Cape Haze Aquatic Preserve, and Gasparilla Sound-Charlotte Harbor Aquatic Preserve, had 61.6% private and 0% Federal land ownership in 2021. Standing apart from the other counties, Collier County, which includes Big Cypress National Preserve, Picayune Strand State Forest, Fakahatchee Strand State Preserve, Big Cypress Wildlife Management Area, Florida Panther NWR, and Audubon's Corkscrew Swamp, was 34.2% private and 49.5% Federal (of which 3.6% is the USFWS) in 2021. USFWS payments to local counties in the proposed Conservation Area totaled $294,066 in 2021: $9,321 to Highlands County, $10,599 to Polk County, $77,895 to Lee County, and $196,251 to Collier County reflecting J.N. "Ding" Darling, Matlacha Pass, Caloosahatchee, Pine Island, Island Bay, Florida Panther, Lake Wales Ridge, and Everglades Headwaters NWRs. (Based on U.S. Department of Commerce American Community Survey data, Headwaters Economics 2023)

Florida has experienced significant land cover and land use changes since pre-European settlement. Land use trends throughout the State's history have been directly influenced by the natural resources, geomorphology, and climate that exist within the State (Volk et al. 2017). Population growth has also substantially impacted land use patterns and required new development and expanded infrastructure, such as railroads and highways, to accommodate the growing population. Further, land cover and land use patterns in Florida have been heavily impacted by the agriculture and resource extraction industries, which have caused the fragmentation, degradation, and destruction of some of Florida's natural landscapes and disrupted natural ecosystem processes; however, some portions of Florida's landscape have been protected and restored.

There are 172 different land covers (based on the Florida Cooperative Landcover v3.6 data) within the approximately 4-million-acre Conservation Area. These have been combined into 13 land cover categories for the purpose of analysis in this document (EA Table 3). EA Figure 6 shows similarly grouped land uses within the Conservation Area. Although there are many land covers, approximately 79 percent of the Conservation Area is comprised of only 20 land uses (EA Table 8).

EA Table 8. Primary Land Uses within the proposed Conservation Area

Landcover Type	Acres in Conservation Area	Percent of Conservation Area
Improved Pasture	985,573	24.61
Mesic Flatwoods	321,111	8.02

Landcover Type	Acres in Conservation Area	Percent of Conservation Area
Citrus	302,744	7.56
Marshes	175,995	4.39
Mixed Wetland Hardwoods	163,345	4.08
Sugarcane	149,963	3.74
Orchards/Groves	124,878	3.12
Irrigated Row Crops	116,754	2.91
Mixed Scrub-Shrub Wetland	84,963	2.12
Unimproved/Woodland Pasture	75,785	1.89
Transportation	75,030	1.87
Dry Prairie	74,086	1.85
Isolated Freshwater Marsh	72,106	1.80
Wet Prairie	71,559	1.79
Coniferous Plantations	68,489	1.71
Residential, Low Density	66,067	1.65
Rural Open	64,852	1.62
Cypress	58,470	1.46
Extractive	56,167	1.40
Mixed Hardwood-Coniferous	50,457	1.26

TRANSPORTATION FACILITIES AND UTILITY CORRIDORS

Transportation facilities within the proposed Conservation Area include numerous roadways and highways, airports, railroad lines, and utility lines.

Roads and Highways
The most noticeable transportation facility within the proposed Conservation Area is the network of roads and highways. U.S. Highway 17, also known as the Coastal Highway, runs north to south and extends from Winchester, Virginia down to Punta Gorda, Florida and crosses the proposed Conservation Area in Polk, Hardee, DeSoto, and Charlotte Counties. Numerous highways and Interstates (e.g., I-4, SR 60, US 98, SR 70, SR 80, and I-75) cut east-west across the proposed Conservation Area. All these roads serve to fragment natural and native habitats and the high rates of traffic on these roads cause animal mortality.

Airports
There are 74 airports within the proposed Conservation Area. Eleven of the airports are municipal or county operated airports available to the public. The remainder are private airports, most of which are small grass airports (less than 15 acres). Identifying the locations of the airports within the proposed Conservation Area is important due to Federal Aviation Association guidelines that limit wetland restoration (or other bird attractants) within 2,000 feet of runways.

Railroad Lines
There are multiple railways within the proposed Conservation Area. Amtrak operates passenger lines that cross the proposed Conservation Area in Okeechobee and Polk Counties. CSX Transportation operates Class 1, Class 2, and Class 3 freight lines within the proposed Conservation Area.

Utility Corridors
Florida Gas Transmission Company operates two natural gas pipelines in the proposed Conservation Area, one of which runs parallel to SR 70 in DeSoto, Highlands, and Okeechobee Counties. The other runs north-south through Polk, Hardee, DeSoto, Charlotte and Lee Counties. The Gulfstream Natural Gas Systems, LLC, also operates a natural gas pipeline that runs east-west across Manatee, Hardee, Polk and Highlands Counties within the proposed Conservation Area. The pipeline rights-of-way are maintained as low-cut herbaceous ground cover and vary from 50 to 200 feet wide.

Impacts of Affected Resources

Alternative A

Under the No Action Alternative, natural areas would continue to be lost due to increased population growth, demand for biofuels, and mineral extraction. Under the No Action Alternative, many natural lands in the proposed Conservation Area are at risk of being converted to urban and other uses largely incompatible with wildlife conservation (Zwick and Carr 2006). Present uses would continue, and development may also occur on lands suitable for conservation easements or fee-title acquisition.

Alternative B

Significant adverse socioeconomic impacts ae not predicted as a result of the Proposed Action. There would be an overall positive effect on the socioeconomic environment as a result of the outline in the Draft LPP. Positive benefits for communities in Florida would include: increased property values, increased watershed protection, included opportunities for public use activities, and increased revenues for local businesses from visitors who participate in hunt, fishing, and wildlife observation. *Banking on Nature 2017: The Economic Contributions of National Wildlife Refuge Recreational Visitation to Local Communities*, (Caudill and Carver 2019) examined the local economic contributions of recreational visits to 162 national wildlife refuges in 47 states and 1 territory for

the fiscal year (FY) 2017 (October 1, 2016 – September 30, 2017). According to the report, approximately 53.6 million people visited national wildlife refuges generating almost $3.2 billion in total economic activity and supported over 41,000 jobs, generating about $1.1 billion in employment income. Additionally, recreational spending on refuges generated nearly $229 million in tax revenue at the local, county, State, and federal levels.

Units of the National Wildlife Refuge System connect visitors to their natural resource heritage and seek to provide them with an understanding and appreciation of fish and wildlife ecology that serves a foundational role in the environment. Wildlife-dependent recreation on refuge units also generates economic benefits to local communities.

Opportunities for outdoor recreation draw millions of people each year to national wildlife refuges, boosting local economies. Many visitors take part in heritage sports such as hunting and fishing. Others enjoy hiking, paddling, wildlife viewing or nature photography. All these activities offer visitors a chance to unplug from the stresses of modern life and reconnect with the natural surroundings. A 2012 study *Amenity Values of Proximity to National Wildlife Refuges* determined that refuges can have a positive effect on nearby home values (Taylor et al. 2012).

The potential exists for some adverse impacts, namely a potential decline in tax revenue to local governments (as lands come under Service ownership). However, this decline may or may not occur, since those lost tax revenues will be offset by the Federal Government. The Refuge Revenue Sharing Act of June 15, 1935, as amended (16 U.S.C. 715s), requires the Service to make payments to local taxing authorities, typically counties, to offset the loss of local tax revenues due to federal ownership. The Service makes annual payments to local taxing authorities, based on the estimated values of lands that the Service owns located in those jurisdictions. Money for these payments comes from the sale of oil and gas leases, timber sales, grazing fees, the sale of other Refuge System resources, and from congressional appropriations, which are intended to make up the difference between the net receipts from the refuge Revenue Sharing Fund and the total amount due to local taxing authorities. The actual refuge Revenue Sharing payment does vary from year-to-year because Congress may or may not appropriate sufficient funds to make full payment. For the nearby Everglades Headwaters NWR and CA, 2021 Refuge Revenue Sharing payments were: $16,257 for 3,313 acres in Okeechobee County and $5,700 for 1,854 acres in Polk County, while 2020 Refuge Revenue Sharing payments were: $9,005 for 2,000 acres in Okeechobee County and $5,749 for 1,854 acres in Polk County.

Under Alternative B, the total area of protected lands used for habitat and wildlife conservation and compatible wildlife-dependent recreation would increase in the proposed Conservation Area on fee-title lands generating additional revenue for the local economy. Currently, approximately 3,379,640 acres of the land in the proposed Conservation Area are unprotected. Many of these acres of unprotected lands, have been altered for intensive agriculture, urban use, transportation/utility corridors, and mining/spoil sites. In addition, the proposed Conservation Area contains open water in the form of lakes, rivers, canals, and stormwater retention ponds. It must be noted that lands currently not substantially altered for urban, transportation, or agricultural uses include areas of unknown size that have been degraded by past uses or are fragments isolated from larger contiguous protected lands. A potential adverse effect under Alternative B is the loss of land available for agriculture, urban development, and other non-conservation uses. On fee-title lands the Service would make Refuge Revenue Sharing payments for fee-title lands within the proposed Conservation Area.

CULTURAL RESOURCES

Description of Environmental Trends, Planned Actions, and Cumulative Impacts

Water management has been a critical factor in altering and controlling the proposed Conservation Area's landscape. The earliest efforts are seen at Belle Glade sites, such as Fort Center, and represent a specialized adaptation to area's wetlands, savannahs, and hammocks (1000 BCE-1715 CE). Belle Glade sites are characterized by elaborate earthworks, which include ponds, borrow pits, ditches, canals, and linear and annular embankments. The Federal Swamp Act of 1850 transferred federal wetlands and overflowed lands to the states with caveat that proceeds of any sales go to drainage and land reclamation. Florida created the Trustees of the Internal Improvement Trust Fund in 1855 to handle such sales and to oversee drainage and reclamation projects. Following the American Civil War, the Internal Improvement Trust Fund sought to re-invigorate the land reclamation process and contracted Hamilton Disston in 1881, to drain extensive areas in the Kissimmee and Caloosahatchee Basins. Disston would procure rights or titles to alternate sections of land along his canals. His first major drainage and water transportation project was a series of canals connecting Lake Kissimmee, Lake Hatchineha, Cypress Lake, and Lake Tohopekaliga and a canal from Lake Okeechobee west to Lake Hicpochee and to Lake Flirt. To deal with the increased amount of water flowing into Lake Okeechobee, Disston cut canals into the Caloosahatchee, Miami, and St. Lucie Rivers. Levee construction was planned to contain rivers in banks and to prevent water from re-flooding drained marsh areas. The Everglades Drainage District was established in 1913. The District extended just north of Lake Okeechobee south to the end of the peninsula and was charged with permanently lowering the Lake's water levels and preventing overflow into the Everglades. Its primary objective was the expansion of agricultural lands, primarily for sugar cane cultivation. The District was bankrupt and out of business by 1928. Beginning in the late 1930s, the Central and South Florida Flood Control Project, under the direction of USACE, sought further to tame the watershed and its surrounding area for flood control and to ensure a supply of freshwater for human consumption and agriculture. The USACE channelized the sinuous Kissimmee River and constructed a network of canals, levees, and control structures. The USACE's flood control and water storage projects achieved these objectives but have led to extensive damage of wetlands heavily used by migratory waterfowl, decreased water quality, and the eutrophication of Lake Okeechobee (Poplin et al. 1996).

Affected Environment

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archaeological Resources Protection Act require the Service to evaluate the effects of any of its actions on cultural resources (e.g., historic, architectural, and archaeological) that are listed or eligible for listing in the National Register of Historic Places (NRHP). In accordance with these regulations, the Service has initiated consultation of this undertaking with the Florida State Historic Preservation Office and the Tribal Historic Preservation Offices for the Seminole Tribe of Florida, the Miccosukee Tribe of Indians of Florida, the Seminole Nation, the Muscogee Nation, and the Poarch Band of Creeks.

The body of federal historic preservation laws has grown dramatically since the enactment of the Antiquities Act of 1906. Several themes recur in these laws, their promulgating regulations, and more recent executive orders. They include: (1) Each agency is to systematically inventory the historic properties on its 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 are 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 as Native American tribes, in addressing how a project or management activity may impact specific archaeological sites and landscapes deemed important to those groups. The Service, like other federal agencies, is legally mandated to inventory, assess, and protect cultural

resources located on those lands that the agency owns, manages, or controls. The Service's cultural resource policy is delineated in 614 FW 1-6 and 126 FW 1-2. In the Service's Southeast Region, the cultural resource review and compliance process is initiated by contacting the Regional Historic Preservation Officer/Regional Archaeologist (RHPO/RA). The RHPO/RA will determine whether the undertaking has the potential to impact cultural resources, identify the "area of potential effect," determine the appropriate level of scientific investigation necessary to ensure legal compliance, and initiate consultation with the pertinent State Historic Preservation Office (SHPO) and federally recognized tribes.

The cultural resources discussion which follows will provide a thumbnail sketch of the cultural history of this portion of Florida. Using the LCD Study Area base map as a guide, the Service reviewed the Florida Master Site Files (FMSF) to identify the number and type of historic properties, as well as available technical reports. EA Table 9 provides an initial breakdown.

EA Table 9. Initial review of the Florida Master Site Files. Source: Florida Master Site Plan.

Descriptor	Number
Number of 24-minute quadrangles	160
Total number of recorded historic properties	19,213
Archaeological sites	3,580
Archaeological with burials/human remains	296
Structures	14,729
Cemeteries	150
Bridges	174
Resource Groups	589
National Register-listed properties/historic districts	221
Technical Reports	1940

EA Table 10 provides a partial breakdown of 2,015 archaeological sites by type. Several of the type categories identified on the site forms have been combined due to similarity.

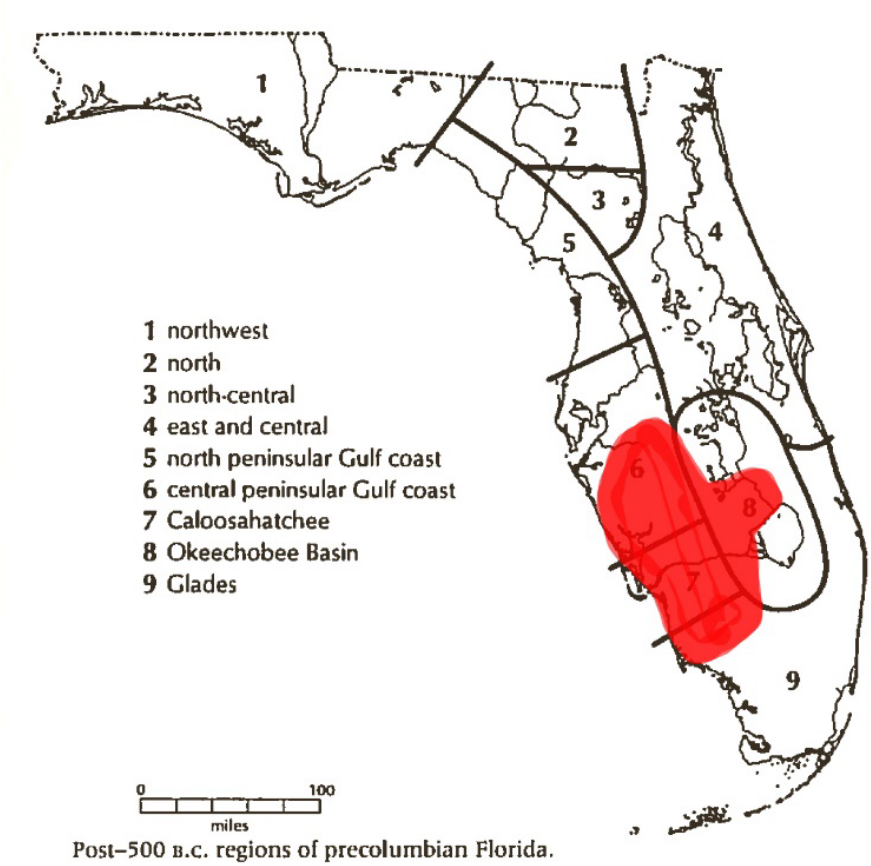
EA Table 10. Site Type

Site Type	Number
Unknown Aboriginal Occupation	34
Non-cultural	6
Isolated Finds	111
Artifact Scatter [varying density; includes lithic, ceramic, faunal and shell]	529
Aboriginal Open-Air Habitation Sites	525
Shell Middens	135
Shell Rings	1
Shell Works	19
Faunal Middens	30
Pre-Contact Earthworks [including mounds]	201
Burial Mounds	89
Tree Island Sites	2
Cave/Sink/Rock Shelter Sites	5
Aboriginal Log Boats	10

Historic Period Scatters	80
Historic Towns	19
Architectural Ruins	58
Homestead Sites	93
Historic Farm Sites	37
Ranching-related Sites	4
Abandoned Fields/Groves	5
Historic Fort Sites	18
WWII- or post-war military sites	23
Historic Earthwork	17
Submerged Sites [All time periods]	156

A more detailed cultural resources management plan, which includes sections describing recorded historic properties and past historical and archaeological investigations, would be drafted at a future date if needed, and/or cultural resources would be further detailed in a comprehensive conservation plan and a subsequent step-down plan. These plans would include, but are not limited to, identification of relevant historic contexts, reviews of the Florida Master Site Files and available technical literature, oral history interviews, Phase I archaeological and historical surveys of lands acquired in fee-title by the Service, and follow-up testing of identified historic properties to ascertain their eligibility for inclusion on the National Register of Historic Places.

The Study Area spans four cultural regions, each with their own cultural chronology. The regions include the Central Peninsular Gulf Coast, the Caloosahatchee, the Okeechobee, and the Glades (Figure 7). The following brief discussion reflects the eastern portion of the Study Area near Lake Okeechobee.



Post–500 B.C. regions of precolumbian Florida.

EA Figure 7 Cultural regions of pre-contact Florida. The LCD Study Area spans portions of the Central Peninsular Gulf Coast, the Caloosahatchee, the Okeechobee Basin, and the Glades regions.

Although the earliest known human occupation in Florida dates to the Paleoindian Period (ca. 10,000-8,000 BCE), the first widespread human settlement in the Kissimmee watershed and Lake Okeechobee basin occurs during the Belle Glade I Period (800 BCE-200 CE). In the Caloosahatchee region, which is west of Lake Okeechobee and extends to Florida's Gulf Coast, widespread occupation occurs during the Caloosahatchee I Period (500 BCE – 500 CE). Earlier sites, such as the Nalcrest Site, Harney Flats, Little Salt Springs, and Warm Mineral Springs, have been recorded in the Study Area. The Nalcrest Site is a Late Paleoindian/Early Archaic lithic workshop, which included a variety of microlithic tools and cores likely used for leatherworking and/or processing plant fibers for cordage and basketry (Milanich 1994). Geological evidence indicates that the Kissimmee River is a relatively young river that did not consistently flow prior to 3000 BCE, which may account for the sparseness of Paleoindian and Archaic Period sites (Osborn et al. 2008). Warm Mineral Springs and Little Salt Springs are wet sites associated with sinkholes and springs that yielded extensive information on animals heavily exploited by Paleoindian populations. These animals included many extinct species, such as giant land tortoise, sloth, tapir, horse, camelids, and mammoths, as well as modern species such as white-tailed deer, fish, turtles, shellfish, rabbit, wood ibis, racoon, and panther (Milanich 1994).

The Belle Glade Period spans 1000 BCE to 1715 CE and is divided into five discrete subperiods. Sites dating to this time period often have elaborate earthworks that include mounds, burrows, ponds, ditches, canals, and linear and annular embankments. One of the better known and most elaborate Belle Glade sites is Fort Center,

which was excavated by Sears (1982). Smaller and less elaborate sites are seen throughout the basin close to rivers and on hammocks along deep water sloughs, marshes, and seasonal ponds (Newman et al. 2000). Belle Glade Plain and Glade Plain wares dominate the early cultural sequence. Decorated wares and St. Johns types appear later. Belle Glade populations exploited a range of plants and animals, though they may have modified wet areas for use as gardens or agricultural fields. Sears (1982) recovered maize pollen from several locations at Fort Center; the earliest date is ca. 450 BCE coming out of the fill of circular ditches. As Milanich (1994) noted, it is undetermined now whether maize constituted a major component of the diet or a highly specialized commodity for specific high-status residents (Poplin et al. 1996).

The Caloosahatchee region is west of the Okeechobee Basin and the Belle Glade culture. The Caloosahatchee River served as a major "canoe" highway connecting the coastal populations with groups in the Okeechobee Basin. The coastal zone, stretching from Charlotte Harbor south to the Ten Thousand Islands region, provided access to rich estuarine and marine fisheries and shellfish. Extensive shell mounds and shellwork sites can be found along the coast, such as Mound Key in Estero Bay; Pineland Site on Pine Island; and Dismal Key, Pumpkin Key, and Fakahatchee Key in the Ten Thousand Islands (Schwadron 2010; Schwadron et al. 2020). Throughout this period, evidence of sea level and salinity fluctuations can be seen in changing site locations and types of shellfish being exploited. By Calooshatchee III [ca. 1200 – 1350 CE], St. Johns Checked Stamped wares appear in the assemblage. Belle Glade Plain wares declined in popularity between 1350 CE and European contact. The area's ceramic assemblage during this period mirrors that seen in the Glades region. Most of the pottery is undecorated with Glades Tooled wares present in both regions. The Europeans encountered the Calusa, the dominant indigenous polity in the region. The Calusa were a complex maritime/estuarine hunter-gatherer chiefdom with ties to over 50 to 70 towns scattered across southwestern Florida. Ethnohistoric accounts describe the polity as a sedentary, highly socially stratified chiefdom led by Carlos, a cacique or paramount chief, with a hereditary elite group of principal men and second group of vassals and commoners (Schwadron 2010; Marquardt 1992).

European explorers and colonists stayed primarily along Florida's coastal margins, though at least one group of Spanish soldiers based in Tampa Bay traveled inland meeting Urriaparocoxi in 1539 near Lake Apopka. Urriaparocoxi was the paramount chief of the Tampa Bay region. The LCD Study Area was part of Florida referred to by the Spanish as "la rinconada," which loosely translated as corner or nook. Several tribes were mentioned in and around this area, such as the Jororo, the Ais, the Guacata, and the Jaega (Swanton 1979). Two Jororo sites – the Goodnow Mound near Sebring in Highlands County and the Philip Mound near Lake Marian in Polk County – have yielded 17th century Spanish artifacts, though it is unclear whether this represents direct contact between the Jororo and the Spanish or a movement of goods through an existing trade network. The Jororo were described by the Spanish as hunter-gatherers heavily reliant on fishing and wild plants. Their language was different from the Timucuans of the coastal and St. Johns basin (Osborn et al. 2008). By the late 1700s, most of Florida's indigenous groups had been devastated by European-introduced diseases, conflicts with European settlers, and cultural disruption. The LCD Study Area remained largely unknown and unmapped by European and, later American, settlers until the mid-19th century (Newman et al. 2000).

In the early 18th century, the Spanish encouraged the Lower Creeks to move into northern Florida. The Spanish called these groups "cimarrones" or "wild ones." As the "cimarrones" moved further into the Florida peninsula and away from the Creek sphere of influence, they emerged as the Seminoles (Weisman 1999). The history and archaeology of the Seminole and Miccosukee Tribes have been the subject of numerous investigations (MacCauley 1887; Fairbanks 1978; Wright 1986; Kersey 1987; Carr and Steele 1993; Covington 1993; Weisman 1999, 2000). The reader is referred to these well-written and accessible volumes. The LCD Study Area has and continues to play an important role in Seminole history, ethos, and sovereignty. Village and campsites

associated with Chief Jumper, Sam Jones, Chipco, and Tallahassee; "old Indian fields" and pastures for cattle; Green Corn Dance grounds; and sites and battlefields associated with the Seminole Wars are scattered throughout five counties of the LCD Study Area. Six Seminole reservations are scattered across this area and include the Brighton, Big Cypress, Immokalee, Hollywood, and Tampa Reservations (Masson et al. 1987; Carr and Steele 1993; Mahoney 2017; Mullins 2017; Weisman 1999). The Miccosukee's lands are primarily along Alligator Alley and adjacent to the Big Cypress Natural Preserve.

The Armed Occupation Act of 1842 and the Federal Swamp Act of 1850 opened the Kissimmee watershed to American settlement. Ranchers and cattle herds spread over the vast prairies east of the central Florida ridge. During the American Civil War, ranchers provided beef to both the Confederate and Union forces. After the war, they found new markets first in Cuba and then locally. Other industries, such as commercial citrus groves, phosphate mining, timber and naval stores' production, formed the foundation of the area's economy. By the mid-19th century, cattle families, such as the Streaty Parker, Benjamin and Joseph Guy, A. E. Godwin, John M. Pearce, Mitchell Alderman, and Eli Morgan, ran cattle first on open range lands along the Kissimmee River. Open range gave way to fenced pasturage following the early 20th century outbreak of the fever or "Texas" tick. In 1924 Florida enacted a law making cattle dipping compulsory. The State provided funding for dipping vats, as well as financial incentives for each cow dipped. During the tick epidemic, cattlemen needed to treat their cattle every eleven days. Dipping vats became centers of social activities during this period. In addition to dipping vats, other traces of the cattle industry can be found throughout the LCD Study Area. These traces include remains of cow pens, farmsteads, ranch houses, cattle camps, and fence lines (Newman et al. 2000; Hughes and Groover 1999). Akermen (2007) provides a detailed account of Florida's cowmen and the cattle business.

Impacts of Affected Resources

Alternative A

There could be some cumulative adverse impacts to cultural resources under the No Action Alternative. Less land would be protected from development, increasing the risk of disturbance or destruction of cultural resources.

Alternative B

Under Alternatives B, beneficial effects would occur because of increased land protection. The Service believes that the acquisition of lands will have no adverse effect on any known or yet-to-be identified NRHP-eligible cultural resources. However, in the future, if the Service plans or permits any actions that might affect eligible cultural resources, it would carry out appropriate site identifications, evaluations, and protection measures as specified in the regulations and in Service directives and manuals. In addition, increased field surveys would likely be conducted on Service-owned lands to identify and protect any sites discovered. Project-related and research-driving investigations would help elucidate the area's history, cultural adaption to changing ecological and climatic conditions, and paleoecology. The proposed Conservation Area spans 12 counties and encompasses the northwestern Everglades, the northern margin of Lake Okeechobee and the watersheds of the Caloosahatchee River, Fisheating Creek, Peace River, and Myakka River. Given the history of this area, cultural resource sites are expected to be encountered. Further, the proposed Conservation Area encompasses numerous sites of interest to the Seminole Tribe of Florida, the Miccosukee Tribe of Indians of Florida, and the Seminole Nation. Sites that might be encountered within the approximately 4-million-acre proposed Conservation Area include green corn dance sites, villages, camps, cemeteries, and historic landscapes. Additional consultation would be conducted with the Tribal Elders and the Tribal Historic Preservation Offices to identify sites and landscapes of significance to the individual Tribes, as well as to provide context. This consultation provides the foundation for sharing information on the Tribes' past and current cultural practices

and landscape management throughout the area. A component of these consultation is the establishment of protocols to protect each Tribe's intellectual property. Partnering with Tribal Nations would aid in identify and protection sites, cultural landscapes, and specific biota of importance to the Tribes. Planned interpretation and environmental education programs would continue to promote public understanding and appreciation of the area's rich cultural resources.

ENVIRONMENTAL JUSTICE

Description of Cumulative Impacts, Environmental Trends, and Planned Actions

The Service is unaware of any other environmental trends or planned actions that would adversely impact environmental justice, including the Proposed Action. No significant adverse or beneficial short-term, long-term, or cumulative impacts would be anticipated for environmental justice.

Affected Environment

The changing demographics of urban areas, loose permitting requirements, and exclusionary zoning laws have funneled racial and ethnic minorities into areas with greater environmental degradation and reduced support (Taylor 2014). When urban areas were developing across the U.S., zones reserved exclusively for residential purposes were often expensive. Meanwhile, mixed-use zones were more affordable but allowed residential and industrial buildings to be built side by side. These zoning practices led to a higher population density in areas closer to environmental hazards (Taylor 2014). Residents of environmentally degraded areas cannot or will not move because of a lack of financial resources, ownership of current land, and a sense of place (Taylor 2014).

In response to such environmental injustices, Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs federal agencies to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations," including tribal populations.

This section examines low-income populations, people of color populations, and thirteen environmental justice indexes within the counties that comprise the proposed Conservation Area using the U.S. Environmental Protection Agency's (EPA) EJScreen tool (EPA 2023). EJScreen is an environmental justice mapping and screening tool that provides federal agencies with a nationally consistent dataset and approach for combining environmental and demographic indicators. The EPA defines low-income as the percentage of a population with household incomes less than or equal to twice the federal poverty level. People of color are defined as individuals who list their racial status as a race other than white alone or their ethnicity as Hispanic or Latino.

Some counties that are partially or entirely within the proposed Conservation Area have a substantial number of low-income and people of color populations, according to EJScreen. Nine out of 12 counties scored higher than the 50th percentile for people of color populations compared to the U.S. (EA Table 11; EPA 2023), meaning nine counties have people of color populations greater than 50% of the counties in the United States. Further, 10 out of 12 counties scored higher than the 50th percentile for low-income populations (EPA 2023). Polk, Hendry, and Hardee counties had the three highest percentiles for people of color populations at 78th, 77th, and 69th, respectively (EA Table 11; EPA 2023). The three highest percentiles for low-income populations were Hendry (86th), Desoto (85th), and Hardee (80th) counties (EA Table 11; EPA 2023).

Thirteen environmental justice indexes, including particulate matter 2.5, ozone, diesel particulate matter, air toxics cancer risk, air toxics respiratory hazards index, traffic releases to air, traffic proximity, lead paint, Risk Management Plan facility proximity, hazardous waste proximity, superfund proximity, underground storage

tanks, and wastewater discharge, were evaluated for all 12 counties. Each environmental justice index combines two demographic factors, low-income and people of color populations, with a single environmental factor. The indexes are further explained in EA Table 12. Five indexes had an average (12-county average) score greater than the 50th percentile: ozone, diesel particulate matter, air toxics respiratory hazards index, traffic proximity, and underground storage tanks; however, individual counties scored significantly higher than the 50th percentile for many indexes, which are summarized in EA Table 13 (EPA 2023).

EA Table 11. Socioeconomic indicator scores for people of color and low-income populations reported by county. Socioeconomic indicator scores are reported as U.S. percentile. Scores over the 50th percentile are underlined. Source: EJScreen (EPA 2023).

Socioeconomic Indicator (U.S. %tile)	Charlotte	Collier	DeSoto	Glades	Hardee	Hendry	Highlands	Lee	Manatee	Okeechobee	Polk	Sarasota	Avg
People of Color Pop.	34	57	63	59	69	77	54	54	49	57	78	35	57
Low-Income Pop.	52	49	85	79	80	86	70	55	52	73	68	41	66

EA Table 12. Descriptions, data sources, and data retrieval years for EJScreen's 13 environmental justice indexes (EPA 2023).

Index	Description	Data Source	Data Year
Particulate matter 2.5 ($PM_{2.5}$)	Annual average of $PM_{2.5}$ air levels	EPA's Office of Air and Radiation	2019
Ozone	Average of the annual top ten daily maximum 8-hour ozone concentrations in air	EPA's Office of Air and Radiation	2019
Diesel Particulate Matter	Diesel particulate matter air level	EPA Hazardous Air Pollutants	2019
Air Toxics Cancer Risk	Lifetime cancer risk from air toxics inhalation	EPA Hazardous Air Pollutants	2019
Air Toxics Respiratory Hazard Index	Ratio of exposure concentration to health-based reference concentration	EPA Hazardous Air Pollutants	2019
Toxic Releases to Air	Risk-Screening Environmental Indicators model of toxicity-weighted air concentrations of chemicals listed by the Toxics Release Inventory	2021 Risk-Screening Environmental Indicators Geographic Microdata	2019

Index	Description	Data Source	Data Year
Traffic Proximity and Volume	Count of vehicles at major roads within 500 meters divided by distance in meters	2020 U.S. Department of Transportation	2021
Lead Paint	Percent of housing units built pre-1960	U.S. Census Bureau American Community Survey	2020
Superfund Proximity	Count of proposed or listed superfund sites within 5 km (or nearest one beyond 5 km) divided by distance in kilometers	EPA Comprehensive Environmental Response, Compensation, and Liability Information System	2017–2021
Risk Management Plan Facility Proximity	Count of Risk Management Plan facilities within 5 km (or nearest one beyond 5 km), each divided by distance in kilometers	EPA Risk Management Plan database	2022
Hazardous Waste Proximity	Count of hazardous waste facilities (Treatment, Storage, and Disposal Facilities and Large Quantity Generators) within 5 km (or nearest beyond 5 km), each divided by distance in kilometers	Treatment, Storage, and Disposal Facilities data calculated from the EPA's RCRA Info database	2022
Underground Storage Tanks and Leaking Underground Storage Tanks	Count of leaking underground storage tanks (multiplied by a factor of 7.7) and the number of underground storage tanks within a 1,500-foot buffered block group	EPA Underground Storage Tank Finder	2022
Wastewater Discharge	Risk-Screening Environmental Indicators-modeled toxic concentrations at stream segments within 500 meters divided by distance in kilometers	Risk-Screening Environmental Indicators-modeled toxic concentrations to stream reach segments	2022

EA Table 13. EJScreen environmental index scores for 13 variables measured by county. Environmental index scores are reported as U.S. percentile. Scores over the 50th percentile are underlined. Source: EJScreen (EPA 2023)

EJ Index (U.S. %tile)	Charlott	Collier	DeSoto	Glades	Hardee	Hendry	Highlands	Lee	Manatee	Okeechobee	Polk	Sarasota	Avg
Particulate Matter 2.5	30	33	50	36	53	49	37	43	43	35	70	28	42
Ozone	36	32	60	53	68	63	58	48	62	43	77	42	54
Diesel Particulate Matter	40	54	59	29	41	53	40	52	61	48	87	46	51
Air Toxics Cancer Risk	31	58	31	29	30	33	37	63	42	28	76	35	41
Air Toxics Respiratory HI	44	54	67	63	67	85	59	54	51	64	88	42	62
Toxic Releases to Air	2	46	9	28	46	57	16	16	42	12	85	6	30
Traffic Proximity	40	50	57	35	57	60	45	53	55	46	71	42	51
Lead Paint	22	19	61	47	65	55	42	23	36	34	25	27	38
Superfund Proximity	6	3	17	23	37	30	15	3	49	44	58	19	25
RMP Facility Proximity	39	52	33	36	36	65	37	49	57	70	61	34	47

EJ Index (U.S. %tile)	Charlott	Collier	DeSoto	Glades	Hardee	Hendry	Highlands	Lee	Manatee	Okeechobee	Polk	Sarasota	Avg
Hazardous Waste Proximity	2	39	3	5	22	10	32	37	49	11	57	17	24
Underground Storage Tanks	43	59	73	64	71	78	58	57	64	67	74	49	63
Wastewater Discharge	30	NA	65	3	71	NA	21	68	38	9	40	32	38

Impacts of Affected Resources

Alternative A

Under the No Action Alternative, the Service would not establish the proposed Conservation Area and would be unable to purchase fee-title properties or conservation easements. The Service could not collaborate with partners and community members to address environmental justice issues within the proposed Conservation Area by conserving land and reducing development that could worsen environmental injustices, such as industrial development. Communities within the proposed Conservation Area subjected to environmental injustices would likely experience worsening conditions, such as heightened exposure to pollution and corresponding health risks, limited access to adequate environmental services, and loss of land and resource rights.

Alternative B

Under the proposed alternative, the Service would establish the proposed Conservation Area and be authorized to purchase land and conservation easements from willing landowners. Establishing the proposed Conservation Area would not disproportionately adversely impact low-income or minority communities. Conversely, establishing a proposed Conservation Area may improve environmental justice by providing equitable access to nature, reducing the disproportionate impact of pollution on communities of color and economically disadvantaged communities, and addressing the legacies of racism and injustice in natural resource protection. Additionally, the acquisition of fee-title lands may contribute to providing additional cultural, traditional, and medicinal use opportunities to Tribal Nations.

However, the Service's land acquisition program focuses on acquiring high-quality habitat, often under the assumptions that areas with low habitat fragmentation are more desirable than areas with high fragmentation, large blocks of contiguous habitat are better than small blocks, and areas close together are more beneficial than areas separated by great distances. These assumptions would likely lead the Service to focus on less densely populated areas, which are less likely to be in the proximity of minority or low-income communities. High-quality habitat is also often near other already protected lands because of the high conservation values of the area (Loucks et al. 2008; McDonald and Boucher 2011). Acquisition of habitat in such an area would add more conservation lands to communities that already benefit from nearby protected lands and may not address

the inequitable pattern where minority and low-income communities contain fewer and lower-quality natural areas (Landau et al 2020).

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects are the effects of those actions that could cause harm to the human environment and that cannot be avoided, even with mitigation measures. There would be some minor, localized unavoidable adverse effects under all the alternatives. All would be mitigated, so there would in fact be no significant unavoidable adverse impacts under any of the alternatives.

Alternative A

The No Action Alternative would maintain the status quo for development and growth, thus contributing to the unavoidable effects of such development (e.g., increased air emissions, increased impervious surface and stormwater runoff, increased noise).

Alternative B

Under Alternatives B, there could be, for example, localized adverse effects of building a new headquarters and upgrading access roads. There would be property tax losses to towns and increased visitation that could be unavoidable effects in those years that revenue sharing payments are less than local property taxes. However, none of these effects rises to the level of significance.

RELATIONSHIP BETWEEN SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Alternative A

The No Action Alternative is expected to diminish the long-term productivity and sustainability of natural resources in the proposed Conservation Area.

Alternative B

Alternatives B would strive to maintain or enhance the long-term productivity and sustainability of natural resources on fee-title lands in the proposed Conservation Area. This alternative would strive to conserve federal trust species and State listed species and the habitats they depend on, as evidenced by management activities described in the Conceptual Management Plan (Appendix B and C). This alternative also outlines outreach and environmental education activities that would encourage visitors to be better stewards of the environment.

POTENTIAL IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Alternative A would have no long-term effect on potential irreversible and irretrievable commitments of federal financial resources. Establishing a proposed Conservation Area with a combination of fee-title and less-than-fee-title lands, as described under Alternatives B, may contribute to irreversible and irretrievable commitments of federal financial resources. For example, the possible construction or modification of an office and associated visitor facility and access road(s) is a viable consideration. These activities typically require long-term commitments of resources. Another irreversible commitment of resources impacting local communities is Service land acquisition. Once the lands are purchased, it is unlikely that they would revert back to private ownership.

SUMMARY

Southwest Florida contains abundant natural resources, including physical and biological resources, such as unique geomorphological characteristics, various water resources, diverse habitats, and many wildlife species.

Examples of federally threatened and endangered species likely in southwest Florida include the Florida panther, Audubon's crested caracara, Everglade snail kite, Florida grasshopper sparrow, and red-cockaded woodpecker. Florida's subtropical climate and diverse habitats support these and many other species; however, southwest Florida's natural resources are being negatively impacted by numerous threats, including climate change; residential, commercial, industrial, and agricultural development; invasive species; the suppression of natural processes; and the loss of genetic diversity.

Through coordination with State and other federal agencies, Tribal Nations, non-profit organizations, local governments, universities, and the public, the U.S. Fish and Wildlife Service has strategically identified an approximately four-million-acre area in southwest Florida that contains high-quality priority resources, the protection of which would benefit humans and wildlife. The Service would collaborate with partners to achieve various goals, including but not limited to protecting, managing, and restoring habitats for fish and wildlife; implementing science-driven landscape-level conservation; conserving important lands and waters for the benefit of all people; and promoting conservation partnerships that use adaptive tools and strategies to achieve conservation.

To achieve these goals, the Service proposes using a combination of less-than-fee and up to 10% fee-title acquisitions to protect land within the proposed Conservation Area. Fee-title acquisitions would be prioritized based on ecological importance, landscape connectivity and presence of wildlife corridors, wetland restoration opportunities and contributions to water quality maintenance, and existing and anticipated threats. The Service would manage fee-title properties to benefit wildlife and maintain or create high-quality habitat. In addition, the Service would consider wildlife-dependent recreation opportunities on fee-title lands when appropriate and compatible.

Based on the nature of the project, the location of the site and the current land use, the proposed alternative (Alternative B) would not have any significant effects on the quality of the human environment including public health and safety. Further, because the purpose of the project is to protect, conserve, maintain, and where possible, enhance the natural habitat of the lands within the conservation area, the project is not expected to have any significant adverse effects on the area's wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

Implementation of the proposed alternative is unlikely to involve any highly uncertain, unique, unknown, or controversial effects on the human environment. The proposed alternative would not establish a precedent for future actions with significant effects, nor would it represent a decision in principle about a future consideration. No cumulatively significant impacts on the environment are anticipated.

In addition, the project would not significantly affect any unique characteristic of the geographic area, such as historical or cultural resources, wild and scenic rivers, or ecologically critical areas. The project would not significantly affect any site listed in or eligible for listing in the National Register of Historic Places, nor would it cause loss or destruction of significant scientific, cultural, or historic resources. The area's cultural resources would be protected under the regulations of the National Historic Preservation Act of 1966, as amended, the Archaeological Resources Protection Act, and the Advisory Council on Historic Preservation (36 CFR 800). The Florida State Historic Preservation Office would be contacted whenever any future management activities have the potential to affect cultural resource sites.

All tracts acquired by the Service in fee-title would be removed from local real estate tax rolls, because federal government agencies are not required to pay state or local taxes. However, the Service makes annual

payments to local governments in lieu of real estate taxes, as required by the Refuge Revenue Sharing Act (Public Law 95-469). Payment for acquired land is computed on whichever of the following formulas is greatest: (1) Three-fourths of 1 percent of the fair market value of the lands acquired in fee-title; (2) 25 percent of the net refuge receipts collected; or (3) 75 cents per acre of the lands acquired in fee-title. The estimated annual revenue-sharing payment that would be made to the individual county would depend on the amount of acreage acquired in fee-title. No actions would be taken that would lead to a violation of federal, state, or local laws imposed for the protection of the environment. Consistent with the Act, payments are prorated based on available funding.

RECOMMENDATION

The Service has selected Alternative B, as the proposed alternative, because it better serves the outlined purpose and need, stated goals and objectives, and vision and purposes of the proposed Conservation Area. Through the establishment of Everglades to Gulf Conservation Area, as described in Alternative B, the Service would be able to fully participate with other conservation partners in the management and protection of the wildlife and habitats within the project area. Connectivity between existing conservation lands would be enhanced, movement corridors would be protected, and threatened and endangered species would receive additional management attention. Opportunities for wildlife-dependent recreational activities and cultural, traditional, and medicinal use opportunities would be increased on fee-title acquired lands, and the existing rural working landscape would receive further protection from development pressure. Further, any cultural resources found within the Service-owned lands in the proposed Conservation Area would be afforded protection by the Service.

IV. INFORMATION ON PREPARERS

PLANNING TEAM

Stephanie Bruner, Administrative Officer, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Kathleen Burchett, Refuge Supervisor, Area II (Florida, Puerto Rico, U.S. Virgin Islands, and AL/MS Coast), U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Deborah Burr, Program Administrator, Office of Environmental Services, Florida Department of Environmental Protection
Kevin Cunniff, Chief Sustainability Officer, Miccosukee Tribe of Indians of Florida
Theodore Darnell, Partners for Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, Southeast Region, Florida Ecological Services Field Office
Justin Dewey, Realty Specialist, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Karli Eckel, Environmental Science Manager, Seminole Tribe of Florida
Cindy Fury, Wildlife Biologist, U.S. Fish and Wildlife Service, Florida/Caribbean Migratory Bird Field Office
Kevin Godsea, Project Leader, Southwest Florida Refuge Complex, U.S. Fish and Wildlife Service, National Wildlife Refuge System
Anthony Grossman, Landowner Assistance Program Administrator, Florida Fish and Wildlife Conservation Commission
Tom Hoctor, Contractor, Director, Center of Landscape Conservation Planning, University of Florida
Laura Housh, Planning Branch Chief, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Bernard Howard, Heritage and Environmental Resource Office Assistant Director, Seminole Tribe of Florida
Joseph John, Heritage and Environmental Resource Office, Program Analyst I, Seminole Tribe of Florida
Richard Kanaski, Regional Archaeologist, U.S. Fish and Wildlife Service, National Wildlife Refuge System, Southeast Region
Michelle Krauser, Natural Resource Planner, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Adam Malcomb, Biologist, U.S. Fish and Wildlife Service, Southeast Region, Science Applications Program
Catherine McCurdy, Geographer/GIS Specialist, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
William Miller, Refuge Manager, NPR Hobe Sound NWR, U.S. Fish and Wildlife Service, National Wildlife Refuge System
Julie Morris, Contractor, Florida and Gulf Programs Manager, National Wildlife Refuge Association and Director, Florida Conservation Group
Sine Murray, Former Program Manager, Office of Environmental Service, Florida Department of Environmental Protection
Jereme Phillips, Deputy Refuge Supervisor, Area II (Florida, Caribbean, & AL/MS Coast), U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Thomas Reinert, Regional Director, Florida Fish and Wildlife Conservation Commission

Jamie Schieler, Wildlife Refuge Specialist, ARM Loxahatchee NWR, U.S. Fish and Wildlife Service, National Wildlife Refuge System
Pamala Wingrove, Division Chief, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System

OTHER CONTRIBUTORS TO THE DOCUMENT:
Vic Coffman, Regional Chief Refuge Law Enforcement, U.S. Fish and Wildlife Service, Southeast Region
Tina Blancett, Natural Resource Planner, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Cheri Ehrhardt, Natural Resource Planner, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
John Galvez, Supervisor, U.S. Fish and Wildlife Service, Southeast Region, Fisheries
Beth Goldstein, Deputy Realty Officer, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Chuck Hunter, Division of Strategic Resource Management Chief, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Lori Miller, Refuge Ecologist, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Edward Perri, Fisheries Biologist, U.S. Fish and Wildlife Service, Southeast Region, Fish and Aquatic Conservation
David Shindle, Panther Coordinator, U.S. Fish and Wildlife Service, Ecological Services
William Thomas, Invasive Species Strike Team Leader, U.S. Fish and Wildlife Service, National Wildlife Refuge System
Deke Thompkins, Congressional and Legislative Affairs Specialist, U.S. Fish and Wildlife Service, Southeast Region, Office of Communications
John Wallace, Deputy Fire Management Coordinator, U.S. Fish and Wildlife Service, Southeast Region, National Wildlife Refuge System
Jane Whaley, Deputy Regional Chief Refuge Law Enforcement, U.S. Fish and Wildlife Service, Southeast Region

STATE COORDINATION
To serve shared visions, missions, goals, and objectives, the Service and the State of Florida would continue to work closely together to conserve and manage the fish and wildlife resources of the nation under a variety of laws, regulations, and policies. Key State conservation agencies in this landscape include the FWC, FFS, FDACS, FDEP, SFWMD, and SWFWMD.

Management of State fish and wildlife resources is administered by FWC, FDACS, and FDEP for the long-term well-being and benefit of people. FWC protects and manages habitats for more than 575 species of wildlife, more than 200 native species of freshwater fish, and more than 500 native species of saltwater fish; while balancing these species' needs with the needs of over 22 million residents (U.S. Census Bureau n.d.) and the 122 million annual visitors (Florida Department of Transportation 2021) who share the land and water with Florida's wildlife.

The FWC responsibilities include:

- Law Enforcement – to protect fish and wildlife, keep waterways safe for millions of boaters, and cooperate with other law enforcement agencies providing homeland security.
- Research – to provide information for the FWC and others to make management decisions based on the best science available involving fish and wildlife populations, habitat issues, and the human-dimension aspects of conservation.
- Management – to manage the State's fish and wildlife resources based on the latest scientific data to conserve some of the most complex and delicate ecosystems in the world along with a wide diversity of species.
- Outreach – to communicate with a variety of audiences to encourage participation and responsible citizenship and stewardship of the State's natural resources.

FWC, FDACS, and FDEP manage State lands and waters. FWC directly manages 6.07 million acres of Wildlife Management Areas. FDEP manages 175 State parks covering nearly 800,000 acres 42 aquatic preserves, three National Estuarine Research Reserves, and the Florida Key National Marine Sanctuary: totaling over 5 million acres of submerged lands and coastal uplands.

FFS manages over 1.2 million acres of State forests in Florida for multiple public uses including timber, recreation, and wildlife habitat. Operating from 15 districts throughout the State, FFS maintains a mission to protect and manage the forest resources of Florida, ensuring that they are available for future generations. Wildfire prevention and suppression are key components in FDOF's efforts. FFS is also the permitting agency responsible for authorizing prescribed burns throughout Florida including federal lands.

The SFWMD and SWFWMD are two of five State water management agencies. The Districts are responsible for water management, water supply, and the conservation and protection of water resources, while providing environmental, economic, and recreational benefits in all or part of 29 south and southwest Florida counties. Together, the SFWMD and SWFWMD along with their partners manage more than 1.452 million acres (SFWMD 2023, SWFWMD 2023) for the purposes of protecting, supplying, and conserving the region's water resources.

The State's participation and contribution throughout this land protection process will provide for ongoing opportunities and open dialogue to improve the ecological sustainment of fish and wildlife in the State of Florida

TRIBAL COORDINATION

The Service and Tribal Nations recognize the need for strong, healthy communication and relationships so that we can work together to improve and enhance conservation of fish and wildlife resources and shared natural and cultural resource goals and objectives. The Service's engagement with and responsibilities to Tribal Nations are guided primarily by doctrines of reserved rights, statutes, treaties, judicial mandates, Executive Orders, Presidential proclamations, and Secretary's Orders. The United States' trust responsibility is a well-established legal obligation that originates from the unique, historical relationship between the United States and Tribal Nations. The trust responsibility consists of the highest moral obligations that the United States must meet to ensure the protection of Tribal Nations and individual Indian lands, assets, resources, and treaty and similarly recognized rights.

The Federal Government recognizes the valuable contributions of the Indigenous Knowledge (also called Indigenous Traditional Knowledge, Traditional Knowledge, Traditional Ecological Knowledge, and Native Science) that Tribal Nations and Indigenous Peoples have gained and passed down from generation to generation. Indigenous Knowledge combines observations, oral and written knowledge, innovations, practices, and beliefs over long terms and spanning generations, interweaving biological, physical, social, cultural, and spiritual systems. The Federal Government's consideration and inclusion of Indigenous Knowledge is guided by respect for the sovereignty and self-determination of Tribal Nations, the Nation-to-Nation relationship between the United States and Tribal Nations and the United States' trust responsibility, and the need for the consent of and honest engagement with Tribal Nations and Indigenous Peoples. For any particular effort, the Tribal Nation(s) or Indigenous People(s) involved clearly drive whether or not to share Indigenous Knowledge and whether or not their Indigenous Knowledge should be applied in Federal contexts; the Federal Government respects these decisions. Indigenous Knowledge offers critical insight into the historic and scientific significance of an area, providing an important foundation for understanding, analysis, and decision making. Consultation and collaboration with Tribal Nations and Indigenous Peoples is critical to ensuring that Indigenous Knowledge is considered and applied in a manner that respects Tribal sovereignty and achieves mutually beneficial outcomes. Indigenous Knowledge can play a key role in relation to the Federal Government's planning, analysis, decision making, and compliance under a variety of laws, regulations, and policies, importantly the Endangered Species Act (16 U.S.C. §§1531-1544), National Environmental Policy Act (42 U.S.C. §§4321 et seq. and 40 CFR Chapter V Subchapter A), Marine Mammal Protection Act (16 U.S.C. Chapter 31), Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Chapter 38), National Historic Preservation Act (Title 54 U.S.C.), and Native American Graves Protection and Repatriation Act (25 U.S.C. §§3001-3013).

Tribal Nations are also important partners in the Greater Everglades landscape. The Service works with the Tribal Nations to ensure timely and effective cooperation and collaboration. During the planning for this project, the Service engaged with Tribal Nations, including the Seminole Nation of Oklahoma, Poarch Band of Creek Indians, Miccosukee Tribe of Indians of Florida, Seminole Indian Tribe of Florida, and the Muscogee Nation early in the scoping process. At the request of the Miccosukee Tribe of Indians of Florida, a follow-up meeting occurred between the Service and the Miccosukee Tribe to discuss the Landscape Conservation Design (Morris et al. 2017) and the planning process. The Service and the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida met and discussed the role of the Service in land protection and opportunities in Southwest Florida and opportunities for the Service and Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida to collaborate on conservation objectives. The Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida contributed as active members of the planning team to develop this proposal.

V. REFERENCES

Absalonsen, L. and R. Dean. 2010. *Characteristics of the shoreline change along the sandy beaches of the State of Florida: An atlas*. Department of Civil and Coastal Engineering University of Florida, Gainesville, FL. https://www.researchgate.net/publication/266355192_Characteristics_of_the_Shoreline_Change_Along_the_Sandy_Beaches_of_the_State_of_Florida_An_Atlas

Adkins Giese, C. L., D. N. Greenwald, and T. Curry. 2012. *Petition to list 53 amphibians and reptiles in the United States as threatened or endangered species under the Endangered Species Act*. Center for Biological Diversity, Tucson, AZ. 454 pp.

Akerman, J. A., Jr. 2007. *Florida cowman: A history of Florida cattle raising*. 5th Edition. Florida Cattlemen's Association, Kissimmee, FL.

Auffenberg, W. and R. Franz. 1982. The status and distribution of the gopher tortoise (*Gopherus polyphemus*). In R. B. Bury (Ed.). *North American tortoises: Conservation and ecology* (pp. 95–126). U.S. Fish and Wildlife Service, Wildlife Research Report 12.

Auffhammer, M. 2018. Quantifying economic damages from climate change. Journal of Economic Perspectives 32:33–52.

Aukema, J. E., B. Leung, K. Kovacs, C. Chivers, K. O. Britton, J. Englin, S. J. Frankel, R. G. Haight, T. P. Holmes, A. M. Liebhold, D. G. McCullough, B. Von Holle. 2011. Economic impacts of non-native forest insects in the continental United States. PLoS ONE 6:e24587.

Aukema, J. E., D. G. McCullough, B. Von Holle, A. M. Liebhold, K. O. Britton, S. J. Frankel. 2010. Historical accumulation of nonindigenous forest pests in the continental United States. BioScience 60:886.

Bancroft, G. T., A. M. Strong, and M. Carrington. 1995. Deforestation and its effects on forest-nesting birds in the Florida Keys. Conservation Biology 9:835–844.

Barnes, C. S., N. E. Alexis, J. A. Bernstein, J. R. Cohn, J. G. Demain, E. Horner, E. Levetin, A. Nel, W. Phipatanakul. 2013. Climate change and our environment: The effect on respiratory and allergic disease. The Journal of Allergy and Clinical Immunology: In Practice 1:137–141.

Beever, J., III, W. Gray, D. Trescott, D. Cobb, J. Utley, and L. B. Beever. 2009. *Comprehensive southwest Florida/Charlotte Harbor climate change vulnerability assessment*. Southwest Florida Regional Planning Council and Charlotte Harbor National Estuary Program Technical Report 09-3. 311 pp. https://www.swfrpc.org/wp-content/uploads/Projects/Ecosystem_Services/Vulnerability_Assessment_Final.pdf

Bellard, C., W. Thuiller, B. Leroy, P. Genovesi, M. Bakkenes, and F. Courchamp. 2013. Will climate change promote future invasions? Global Change Biology 19:3740–3748.

Berry, H. L., K. Bowen, and T. Kjellstrom. 2010. Climate change and mental health: A causal pathways framework. International Journal of Public Health 55:123–132.

Bostick, K. W., S. A. Johnson, and M. B. Main. 2022. Florida's geological history. UF IFAS Extension, University of Florida. Accessed August 2023. https://edis.ifas.ufl.edu/publication/UW208

Boughton, R. K. and R. Bowman. 2011. *State wide assessment of Florida scrub-jays on managed areas: A comparison of current populations to the results of the 1992-93 survey*. A report submitted to the United States Fish and Wildlife Service. Archbold Biological Station, Venus, FL. https://www.archbold-station.org/documents/publicationspdf/Boughton&Bowman-2011-FSJAssessmentManagedLands.pdf

Capinha, C., F. Essl, H. Seebens, D. Moser, and H. M. Pereira. 2015. The dispersal of alien species redefines biogeography in the Anthropocene. Science 348:1248.

Carr, R. S. and W. S. Steele. 1993. *Seminole heritage survey*. Archaeological and Historical Conservancy Technical Report No. 74. Miami, FL.

Carr, M. and P. D. Zwick. 2016. *Florida 2070 mapping Florida's future – alternative patterns of development in 2070*. Summary Report. 1000 Friends of Florida; UF Geoplan Center. 18 pp. https://1000friendsofflorida.org/florida2070/wp-content/uploads/2016/09/florida2070summaryfinal.pdf

Carr, M. and P. D. Zwick. 2016b. *Florida 2070 mapping Florida's future – alternative patterns of development in 2070*. Technical Report. 1000 Friends of Florida; UF Geoplan Center. 41 pp. https://1000friendsofflorida.org/florida2070/wp-content/uploads/2016/09/florida2070technicalreportfinal.pdf

Caudill, J. and E. Carver. 2019. Banking on nature 2017: The economic contributions of National Wildlife Refuge recreational visitation to local communities. U.S. Fish and Wildlife Service, Falls Church, VA. https://www.fws.gov/sites/default/files/documents/USFWS_Banking_on_Nature_2017.pdf

Chace, J. F., B. L. Woodworth, and A. Cruz. 2020. Black-whiskered vireo (*Vireo altiloquus*), version 1.0. In A. F. Poole and F. B. Gill (Eds). Birds of the World. Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bow.bkwvir.01

Chameides, W. L., R. W. Lindsay, J. Richardson, and C. S. Kiang. 1988. The role of biogenic hydrocarbons in urban photochemical smog: Atlanta as a case study. Science 241:1473–1475.

Chapman, D. S, B. V. Purse, H. E. Roy, and J. M. Bullock. 2017. Global trade networks determine the distribution of invasive non-native species. Global Ecology and Biogeography 26:907.

Cianconi, P., S. Bettor, and L. Janiri. 2020. The impact of climate change on mental health: A systematic descriptive review. Frontiers in Psychiatry 11:74.

Coastal & Heartland National Estuary Partnership (CHNEP). 2019. *2019 Comprehensive conservation and management plan for the CHNEP area in central and southern Florida*. Coastal & Heartland National Estuary Partnership. http://anyflip.com/wqnz/qrvm/

Covington, J. W. 1993. *The Seminoles of Florida*. University Press of Florida, Gainesville, FL.

Darby, P. C., R. E. Bennetts, and L. B. Karunaratne. 2006. Apple snail densities in habitats used by foraging snail kites. Florida Field Naturalist 34:37–68.

Darby, P. C., L. B. Karunaratne, and R. E. Bennetts. 2005. *The influence of hydrology and associated habitat structure on spatial and temporal patterns of apple snail abundance and recruitment*. Unpublished report for the U.S. Geological Survey. University of West Florida, Pensacola, FL.

De Blois, J.,T. Kjellstrom, S. Agewall, J. A. Ezekowitz, P. W. Armstrong, and D. Atar. 2015. The effects of climate change on cardiac health. Cardiology 131:209–217.

Dorcas, M. E., J. D. Willson, R. N. Reed, R. W. Snow, M. R. Rochford, M. A. Miller, W. E. Meshaka, Jr., P. T. Andreadis, F. H. Mazzotti, C. M. Romagosa, and K. M. Hart. 2012. Severe mammal declines coincide with proliferation of invasive Burmese pythons in Everglades National Park. Proceedings of the National Academy of Sciences 109:2418..

Dove, C. J., R. W. Snow, M. R. Rochford, and F. J. Mazzotti. 2011. Birds consumed by the invasive Burmese python (*Python molurus bivittatus*) in Everglades National Park, Florida, USA. The Wilson Journal of Ornithology 123:126.

Dueñas, M. A., D. J. Hemming, A. Roberts, and H. Diaz-Soltero. 2021. The threat of invasive species to IUCN-listed critically endangered species: A systematic review. Global Ecology and Conservation 26:e01476.

Dukes, J. S. and H. A. Mooney. 2004. Disruption of ecosystem processes in western North America by invasive species. Revista Chilena de Historia Natural 77:411.

Dwyer, J. F. 2010. *Ecology of non-breeding and breeding crested caracaras (Caracara cheriway) in Florida*. PhD dissertation, Virginia Polytechnic Institute and State University, Blacksburg, VA.

EDDMapS. 2023. Early detection & distribution mapping system. The University of Georgia - Center for Invasive Species and Ecosystem Health. http://www.eddmaps.org/

Elliott-Smith, E., M. Bidwell, A. E. Holland, and S. M. Haig. 2015. *Data from the 2011 international piping plover census*. U.S. Geological Survey Data Series 922. http://dx.doi.org/10.3133/ds922

Enfield, D. B., A. M. Mestas-Nunez, and P. J Trimble. 2001. The Atlantic multidecadal oscillation and its relation to rainfall and river flows in the continental US. Geophysical Research Letters 28:2077–2080.

Enge, K. M., D. J. Stevenson, M. J. Elliott, and J. M. Bauder. 2013. The historical and current distribution of the eastern indigo snake (*Drymarchon couperi*). Herpetological Conservation and Biology 8:288–307.

Environmental Protection Agency (EPA). 2023a. National air quality: Status and trends of key air pollutants. Accessed July 2023. https://www.epa.gov/air-trends

Environmental Protection Agency (EPA). 2023b. Florida Department of Environmental Protection geospatial open data. Ambient air monitoring sites. Accessed July 2023. https://geodata.dep.state.fl.us/datasets/FDEP::ambient-air-monitoring-sites/explore?location=37.451377%2C-53.707894%2C3.48

Environmental Protection Agency (EPA). 2023c. Green book. Florida nonattainment/maintenance status for each county by year for all criteria pollutants. Accessed July 2023. https://www3.epa.gov/airquality/greenbook/anayo_fl.html

Fairbanks, C. H. 1978. The ethno-archaeology of the Florida Seminole. In J. T. Milanich and S. Proctor (Eds.). *Tachachale: Essays on the Indians of Florida and southeast Georgia during the Historic Period* (pp. 163–193). University Press of Florida, Gainesville, FL.

Florida Climate Center. n.d. *Sea level rise and coastal risk*. The Florida Climate Center, Florida State University, Tallahassee, FL. 7pp. https://climatecenter.fsu.edu/images/docs/SLR.pdf

Florida Department of Environmental Protection. 2019. *Outdoor recreation in Florida. 2019 Statewide comprehensive outdoor recreation plan*. Division of Recreation and Parks, Tallahassee, FL. 138 pp. https://floridadep.gov/sites/default/files/1SCORP%20Chapters.pdf

Florida Department of Environmental Protection (FDEP). 2022. Bioassessment methods. Florida Department of Environmental Protection. Accessed August 2023. https://floridadep.gov/dear/bioassessment/content/bioassessment-methods

Florida Department of Environmental Protection (FDEP). 2023. Florida springs. FDEP Open Data Administrator. Florida Department of Environmental Protection. Accessed August 2023. https://geodata.dep.state.fl.us/datasets/FDEP::florida-springs/explore?location=28.581437%2C-84.175450%2C6.78

Florida Exotic Pest Plant Council (FLEPPC). 2019. *List of invasive plant species*. Florida Exotic Pest Plant Council. www.fleppc.org

Florida Fish and Wildlife Conservation Commission (FWC). n.d.a. Panther pulse. Florida Fish and Wildlife Conservation Commission. Accessed May 2023. https://myfwc.com/wildlifehabitats/wildlife/panther/pulse/

Florida Fish and Wildlife Conservation Commission (FWC). n.d.b. Southern hog-nosed snake. Florida Fish and Wildlife Conservation Commission. Accessed May 2023. https://myfwc.com/research/wildlife/amphibians-reptiles/snakes/southern-hognose/#:~:text=The%20southern%20hog%2Dnosed%20snake,have%20undergone%20extensive%20urban%20development

Florida Fish and Wildlife Conservation Commission (FWC). n.d.c. *Non-native apple snails in Florida*. Florida Fish and Wildlife Conservation Commission. https://www.ces.fau.edu/files/education/resources/FWC_applesnails_FLMS_handout.pdf

Florida Fish and Wildlife Conservation Commission (FWC). 2016. *A guide to climate change adaptation for conservation.* Version 1. 295 pp.

Florida Fish and Wildlife Conservation Commission (FWC). 2021*. Endangered and threatened species management and conservation plan*. Progress Report, Fiscal Year 2020-21. Florida Fish and Wildlife Conservation Commission. 107 pp. https://myfwc.com/media/28338/2020-21endangeredspeciesreport.pdf

Florida Fish and Wildlife Conservation Commission (FWC). 2022. FWC taking bold steps to prevent new invasive species in Florida. Florida Fish and Wildlife Conservation Commission. Accessed July 2023. https://myfwc.com/news/all-news/nonnative-223/#:~:text=More%20than%20500%20nonnative%20species,are%20reproducing%20in%20the%20wil

Florida Fish and Wildlife Conservation Commission (FWC) and Florida Natural Areas Inventory. 2022. Florida Cooperative Land Cover Map. Version 3.6 Vector. Tallahassee, FL.https://myfwc.com/research/gis/wildlife/cooperative-land-cover/#:~:text=The%20Florida%20Land%20Cover%20Classification%20System%20is%20a%20single%2Dstatewide,WMDs)%2C%20and%20the%20FWC.

Florida Geological Survey. n.d. Springs. Florida Geological Survey, Florida Department of Environmental Protection. Accessed August 2023. https://floridadep.gov/fgs/fgs/content/springs

Florida Natural Areas Inventory. 2010. *Guide to the natural communities of Florida: 2010 edition*. 279 pp. https://www.fnai.org/PDFs/Full_FNAI-Natural-Community-Classification-Guide-2010_20150218.pdf

Frajka-Williams, E., C. Beaulieu, and A. Duchez. 2017. Emerging negative Atlantic multidecadal oscillation index in spite of warm subtropics. Scientific Reports 7:11224. https://doi.org/10.1038/s41598-017-11046-x

Frakes, R. A., R. C. Belden, B. E. Wood, and F. E. James. 2015. Landscape analysis of adult Florida panther habitat. PLoS ONE 10:e0133044.

Freeman, L. A., D. R. Corbett, A. M. Fitzgerald, D. A. Lemley, A. Quigg and C. N. Steppe. 2019. Impacts of urbanization and development on estuarine ecosystems and water quality. Estuaries and Coasts 42:1821–1838.

Gallardo, B., M. Clavero, M. I. Sánchez, and M. Vilà. 2016. Global ecological impacts of invasive species in aquatic ecosystems. Global Change Biology 22:151.

Gibson, D., M. K. Chaplin, K. L. Hunt, M. J. Friedrich, C. E. Weithman, L. M. Addison, V. Cavalieri, S. Coleman, F. J. Cuthbert, J. D. Fraser, W. Golder, D. Hoffman, S. M. Karpanty, A. Van Zoeren, and D. H. Catlin. 2018. Impacts of anthropogenic disturbance on body condition, survival, and site fidelity of nonbreeding piping plovers. The Condor 120:566–580.

Giorgini, P., P. Di Giosia, M. Petrarca, F. Lattanzio, C. A. Stamerra, and C. Ferri. 2017. Climate changes and human health: A review of the effect of environmental stressors on cardiovascular diseases across epidemiology and biological mechanisms. Current Pharmaceutical Design 23:3247–3261.

Godley, J. S. and P. E. Moler. 2013. Population declines of eastern indigo snakes (*Drymarchon couperi*) over three decades in the Gulf Hammock Wildlife Management Area, Florida, USA. Herpetological Conservation and Biology 8:359–365.

Gordon, D. R. 1998. Effects of invasive, non-indigenous plant species on ecosystem processes: Lessons from Florida. Ecological Applications 8:975.

Greenberg, C. H., D. G. Neary, and L. D. Harris. 1994. Effect of high-intensity wildfire and silvicultural treatments on reptile communities in sand-pine scrub. Conservation Biology 8:1047–1057.

Hafner, D. J., E. Yensen, and G. L. Kirkland, Jr. 1998. *North American Rodents*. Status Survey and Conservation Action Plan. IUCN/SSC Rodent Specialist Group. IUCN. Gland, Switzerland, and Cambridge, UK. https://portals.iucn.org/library/sites/library/files/documents/1998-039.pdf

Headwaters Economics. 2023. U.S. Fish and Wildlife Service socioeconomic profile: Key Cave National Wildlife Refuge. Selected Locations: Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Lee, Manatee, Okeechobee, Polk, and Sarasota counties and the State of Florida. Headwaters Economics Economic Profile System. Accessed July 2023. https://headwaterseconomics.org/apps/economic-profile-system/

Heimlich, B. N., F. Bloetscher, D. E. Meeroff, and J. Murley. 2009. Southeast Florida's resilient water resources: Adaptation to sea level rise and other climate change impacts. Florida Atlantic University, Boca Raton, FL. 122 pp. https://www.ces.fau.edu/files/projects/climate_change/SE_Florida_Resilient_Water_Resources.pdf

Hill, L. L., J. M. Jaeger, and A. Smith. 2022. Can prescribed fires mitigate health harm? A review of air quality and public health implication of wildfire and prescribed fire. Physicians, Scientists, and

Engineers for Healthy Energy; American Lung Association. 54 pp. https://www.lung.org/getmedia/fd7ff728-56d9-4b33-82eb-abd06f01bc3b/pse_wildfire-and-prescribed-fire-brief_final.pdf

Himes, J. G., N. J. Douglass, R. A. Pruner, A. M. Croft, and E. M. Seckinger. 2006. *Status and distribution of the snowy plover in Florida*. 2006 Study Final Report. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL. 27 pp. https://flshorebirdalliance.org/media/1188/himes-douglass-2006-snpl-report.pdf

Hsiang, S., R. Kopp, A. Jina, J. Rising, M. Delgado, S. Mohan, D. J. Rasmussen, R. Muir-Wood, P. Wilson, M. Oppenheimer, K. Larsen, and T. Houser. 2017. Estimating economic damage from climate change in the United States. Science 356:1362–1369.

Hughes, D. and A. Groover. 1999. *Pearce Homestead – historic preservation plan*. Prepared for Florida's Heartland Rural Economic Development Initiative. Janus Research, St. Petersburg, FL.

Hulme, P. E. 2009. Trade, transport and trouble: Managing invasive species pathways in an era of globalization. Journal of Applied Ecology 46:10.

Humphrey, S. R. 1992. Southern Florida population of mink *Mustela vison* (in part). In S.R. Humphrey (Ed.). *Rare and endangered biota of Florida: Mammals* (pp. 319–327). Volume 1. University Press of Florida, Gainesville, FL.

Humphrey, S. R. and P. G. R. Jodice. 1992. Big Cypress fox squirrel *Sciurus niger avicennia*. In S. R. Humphrey (Ed.). *Rare and endangered biota of Florida: Mammals* (pp. 224–233). Volume I. University Press of Florida, Gainesville, FL.

Humphrey, S. R. and J. L. Morrison. 1997. *Habitat associations, reproduction, and foraging ecology of Audubon's crested caracara in south-central Florida*. Final Report. University of Florida, Gainesville, FL.

Humphrey, S. R. and H. W. Setzer. 1989. Geographic variation and taxonomic revision of mink (*Mustela vison*) in Florida. Journal of Mammalogy 70:241–252.

Humphrey, S. R. and T. L. Zinn. 1982. Seasonal habitat use by river otters and Everglades mink in Florida. The Journal of Wildlife Management 46:375–381.

Intergovernmental Panel on Climate Change (IPCC). 2023. Summary for policymakers. In H. Lee and J. Romero (Eds.). *Climate change 2023: Synthesis report*. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland. 36 pp.

Johnson, C. N. 1996. Interactions between mammals and ectomycorrhizal fungi. Trends in Ecology & Evolution 11:503–507.

Karim, A. 2007. *Status and use of tropical hardwood hammocks and forested residential areas as habitat for resident and neotropical migratory birds in the Florida Keys.* MSc Thesis, University of Florida, Gainesville, FL.

Kawula, R. and J. Redner. 2018. *Florida land cover classification system*. Center for Spatial Analysis, Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission, Tallahassee, FL. https://myfwc.com/media/20455/land-cover-classification-revision-2018.pdf

Kent, A. M., C. Faulhaber, and C. Watson. 2017. *Peninsular Florida bird conservation region (BCR 31) plan*. Prepared by Normandeau Associates, Inc. for the Florida Fish and Wildlife Conservation Commission and U.S. Fish and Wildlife Service. 97 pp. https://www.acjv.org/documents/BCR_31_final.pdf

Kerr, R. A. 2000. A North Atlantic climate pacemaker for the centuries. Science 288:1984–1986.

Kerr, R. A. 2005. Atlantic climate pacemaker for millennia past, decades hence? Science 309:41–43.

Kersey, H. A., Jr. 1987. *The Seminole and Miccosukee Tribes: A critical bibliography*. Indiana University Press, Bloomington, IN.

Knight J. R., C. K. Folland, and A. A. Scaife. 2006. Climate impacts of the Atlantic multidecadal oscillation. Geophysical Research Letters 33:L17706.

Koch, M. S., C. Coronado, M. W. Miller, D. T. Rudnick, E. Stabenau, R. B. Halley, and F. H. Sklar. 2015. Climate change projected effects on coastal foundation communities of the greater Everglades using a 2060 scenario: Need for a new management paradigm. Environmental Management 55:857–875.

Kushlan, J. A. 1975. Population changes of the apple snail (*Pomacea paludosa*) in the southern Everglades. Nautilus 89:21–23.

Lafferty, K. D. 2009. The ecology of climate change and infectious diseases. Ecology 904:888–900.

Laloë, J.-O., N. Esteban, J. Berkel, and G. C. Hays. 2016. Sand temperatures for nesting sea turtles in the Caribbean: Implications for hatchling sex ratios in the face of climate change. Journal of Experimental Marine Biology and Ecology 474:92–99.

Landau, V. A., M. L. McClure, and B. G. Dickson. 2020. Analysis of the disparities in nature loss and access to nature. Conservation Science Partners: Truckee, CA, USA.

Landers, J. L., J. A. Garner, and W. A. McRae. 1980. Reproduction of the gopher tortoise (*Gopherus polyphemus*). American Midland Naturalist 103:353–359.

Lieber, M., P. Chin-Hong, K. Kelly, M. Dandu, and S. D Weiser. 2022. A systematic review and meta-analysis assessing the impact of droughts, flooding, and climate variability on malnutrition. Global Public Health 17:68–82.

Lloyd, J. D. and T. Doyle. 2011. Abundance and population trends of mangrove birds in southwest Florida. Journal of Field Ornithology 82:132–139.

Loucks, C., T. H. Ricketts, R. Naidoo, J. Lamoreux, and J. Hoekstra. 2008. Explaining the global pattern of protected area coverage: Relative importance of vertebrate biodiversity, human activities and agricultural suitability. Journal of Biogeography 35:1337–1348.

Lovell, S. J., S. F. Stone, and L. Fernandez. 2006. The economic impacts of aquatic invasive species: A review of the literature. Agricultural and Resource Economics Review 35:195–208.

MacCauley, C. 1887. The Seminole Indians of Florida. In *Fifth annual report of the Bureau of Ethnology* (pp. 469–531). Washington, D.C.

Mack, R. N., D. Simberloff, M. Lonsdale, H. Evans, M. Clout, and F. A. Bazzaz. 2000. Biotic invasions: Causes, epidemiology, global consequences, and control. Ecological Applications 10:689.

Malmstadt, J., K. Scheitlin, and J. Elsner. 2009. Florida hurricanes and damage costs. Southeastern Geographer 49:108–131.

Marks, G. E. and C. S. Marks. 2008. Status of the Florida bonneted bat (*Eumops floridanus*). Final report. Submitted by the Florida Bat Conservancy under grant agreement number 401815G192. Florida Bat Conservancy, Bay Pines, FL.

Martin, W. H. and D. B. Means. 2000. Geographic distribution and habitat relationships of the eastern diamondback rattlesnake, *Crotalus adamanteus*. Herpetological Natural History 7:9–35.

Masson, M., R. S. Carr, D. Goldman, and W. Steele. 1987. *Archaeological investigations of the Taylor Camp Site (8OB13), Okeechobee County, Florida. Okeechobee Battlefield Project Phase II*. Archaeological and Historical Conservancy, Inc. of Florida, Miami, FL.

McDonald, R. I. and T. M. Boucher. 2011. Global development and the future of the protected area strategy. Biological Conservation 144:383–392.

Means, D. B. 2006. Vertebrate faunal diversity of longleaf pine savannas. In S. Jose, E. Jokela, and D. Miller (Eds.). *Longleaf pine ecosystems: Ecology, management, and restoration* (pp. 155–213). Springer, NY.

Meyer, K. D. 2020. Swallow-tailed kite (*Elanoides forficatus*), version 1.0. In A. F. Poole and F. B. Gill (Eds.). Birds of the world. Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bow.swtkit.01

Milanich, J. L. 1994. *Archaeology of precolumbian Florida*. University Press of Florida, Gainesville, FL.

Miller, L. A. and M. C. Harwell. 2022. Connecting future environmental trends and assessments of fish and wildlife resources of concern: A case study of Big Pine Key, Florida. Sustainability 14:14553.

Millsap, B. A. 2002. Survival of Florida burrowing owls along an urban-development gradient. Journal of Raptor Research 36:3–10.

Millsap, B. A. and C. Bear. 1990. Double-brooding by Florida burrowing owls. Wilson Bulletin 102:313–317.

Millsap, B. A. and C. Bear. 2000. Density and reproduction of burrowing owls along an urban development gradient. Journal of Wildlife Management 64:33–41.

Mooij, W. M., R. E. Bennetts, W. M. Kitchens, and D. L. DeAngelis. 2002. Exploring the effect of drought extent and interval on the Florida snail kite: Interplay between spatial and temporal scales. Ecological Modelling 149:25–39.

Morris, J., T. Hoctor, and K. Godsea. 2017. Southwest Florida Landscape Conservation Design. Report prepared by National Wildlife Refuge Association and the University of Florida Center for Landscape Conservation Planning for the Peninsular Florida Landscape Conservation Cooperative and U.S. Fish and Wildlife Service, Vero Beach, Florida.

Morris, J., T. Hoctor, and K. Burchett. 2022. Southwest Florida Landscape Conservation Design. Report prepared by Florida Conservation Group, the University of Florida Center for Landscape Conservation Planning, and National Wildlife Refuge Association for the U.S. Fish and Wildlife Service National Wildlife Refuge System.

Morrison, J. L. 1996. Crested caracara (*Caracara plancus*). In A. Poole and F. Gill (Eds). The birds of North America, No. 249 (pp. 1–28). The Academy of Natural Sciences, Philadelphia, PA; American Ornithologists' Union, Washington, D.C.

Morrison, J. L. 1999. Breeding biology and productivity of Florida's crested caracaras. Condor 101:505–517.

Morrison, J. L. 2006. The crested caracara in the changing grasslands of Florida. In R. F. Noss (Ed.). *Land of fire and water: The Florida dry prairie ecosystem* (pp. 211–215). Proceedings of the Florida Dry Prairie Conference. Painter, DeLeon Springs, FL.

Morrison, J. L. and J. F. Dwyer. 2021. Crested caracara (*Caracara plancus*), version 1.0. In A. F. Poole (Ed). Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bow.y00678.01

Morrison, J. L. and S. R. Humphrey. 2001. Conservation value of private lands for crested caracaras in Florida. Conservation Biology 15:675–684.

Nagy, C. R., G. Lockaby, L. Kalin, and C. J. Anderson. 2012. Effects of urbanization on stream hydrology and water quality: The Florida Gulf Coast. Hydrological Processes 26:2019–2030.

National Oceanic and Atmospheric Administration (NOAA). n.d. Frequently asked questions about the Atlantic multidecadal oscillation (AMO). Accessed July 2023. https://www.aoml.noaa.gov/phod/amo_faq.php#:~:text=Rainfall%20in%20central%20and%20south,by%2040%25%20between%20AMO%20extremes.

National Oceanic and Atmospheric Administration (NOAA). 2023. Digital coast sea level rise viewer. Accessed July 2023. https://coast.noaa.gov/slr/

Nesbitt, S. A. and J. L. Hatchitt. 2008. Trends in habitat and population of Florida sandhill cranes. North American Crane Workshop Proceedings 189. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1189&context=nacwgproc

Newman, C., M. Memory, and B. Swann. 2000. *Assessment and documentation of cultural resources of the Kissimmee Prairie Preserve State Park, Okeechobee County, Florida*. C.A.R.L. Archaeological Survey, Bureau of Archaeological Research, Division of Historical Resources, Tallahassee, FL. https://core.tdar.org/browse/site-name/7678/8ob241

Noss, R. F. 2011. Between the devil and the deep blue sea: Florida's unenviable position with respect to sea-level rise. Climatic Change 107:1–16.

Noss, R. F., J. S. Reece, T. Hoctor, and J. Oetting. 2014. *Adaptation to sea-level rise in Florida: Biological conservation priorities*. Final Report to the Kresge Foundation Grant Request
Number 244146. https://conservation.dcp.ufl.edu/wp-content/uploads/2020/02/Noss-et-al-2014-adaptation-to-sea-level-rise-in-Florida_species-and-natural-communities.pdf

Nungesser, M., C. Saunders, C. Coronado-Molina. J. Obeysekera, J. Johnson, C. McVoy, and B. Benscoter. 2015. Potential effects of climate change on Florida's Everglades. Environmental Management 55:824–835.

Osburn, T., M. Wilder, L. O'Steen, and B. M. Carrier Jones. 2008. *Phase I and phase II archaeological investigations, Avon Park Air Force Range, Polk and Highlands counties, Florida*. U.S. Air Force Air Combat Command Series, Reports of Investigations Number 34. Geo-Marine, Inc., Hampton, VA. https://core.tdar.org/document/391195/phase-i-and-phase-ii-archaeological-investigations-avon-park-air-force-range-polk-and-highlands-counties-florida

Oswalt, C. M., J. A. Cooper, D. G. Brockway, H. W. Brooks, J. L. Walker, K. F. Connor, S. O. Oswalt, and R. C. Conner. 2012. *History and current condition of longleaf pine in the Southern United States*. United States Department of Agriculture; Forest Service Southern Research Station. General Technical Report SRS-166. https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs166.pdf

Page, G. W., L. E. Stenzel, J. S. Warriner, J. C. Warriner, and P. W. Paton. 2020. Snowy plover (*Charadrius nivosus*), version 1.0. In A. F. Poole (Ed.). Birds of the world. Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bow.snoplo5.01

Paini, D. R., A. W. Sheppard, D. C. Cook, P. J. De Barro, S. P. Worner, and M. B. Thomas. 2016. Global threat to agriculture from invasive species. Proceedings of the National Academy of Sciences 113:7575–7579.

Paudel, S. and H. Su. 2020. *Draft Fisheating Creek case study*. MSc Thesis, Florida Atlantic University, Boca Raton, FL. https://www.fau.edu/engineering/research/cwr3/pdf/21-fisheating-creek.pdf

Pearlstine, L. G., E. V. Pearlstine, and N. G. Aumen. 2010. A review of the ecological consequences and management implications of climate change for the Everglades. Journal of the North American Benthological Society 29:1510–1526.

Pike, D. A., K. S. Peterman, R. S. Mejeur, M. D. Green, K. D. Nelson, and J. H. Exum. 2008. Sampling techniques and methods for determining the special distribution of sand skinks (*Plestiodon reynoldsi*). Florida Scientist 71:93–104. http://www.jstor.org/stable/24321577

Pimental, D., R. Zuniga, and D. Morrison. 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. Ecological Economics 52:273.

Poplin, E. C., T. McMakin, and B. G. Harvey. 1996. *Phase I historic resources survey Kissimmee River Restoration Project, Osceola and Polk counties, Florida (Draft).* Prepared for U.S. Army Corps of Engineers, Jacksonville and Mobile districts. Brockington and Associates, Charleston, SC.

Raghavendra, A., A. Dai, S. M. Milrad, and S. R. Cloutier-Bisbee. 2019. Floridian heatwaves and extreme precipitation: Future climate projections. Climate Dynamics 52:495–508.

Rahel, F. J., B. Bierwagen, and Y. Taniguchi. 2008. Managing aquatic species of conservation concern in the face of climate change and invasive species. Conservation Biology 22:551–561.

Rayer, S. and Y. Wang. 2022. Projections of Florida population by county, 2025–2050, with estimates for 2021. Bureau of Economic and Business Research 55:192. https://www.bebr.ufl.edu/wp-content/uploads/2022/02/projections_2022.pdf

Riebeek, H. 2010. Global warming. NASA Earth Observatory. Accessed August 2023. https://earthobservatory.nasa.gov/features/GlobalWarming

Robinson, R. A., H. Q. P. Crick, J. A. Learmonth, I. Maclean, C. D. Thomas, F. Bairlein, M. C. Forchhammer, C. M. Francis, J. A. Gill, B. J. Godley, J. Harwood, G. C. Hays, B. Huntley, A. M. Hutson, G. J. Pierce, M. M. Rehfisch, D. W. Sims, M. Begona Santos, T. H. Sparks, D. A. Stroud, and M. E. Visser. 2009.
Travelling through a warming world: Climate change and migratory species. Endangered Species

Research 7:87–99.

Rockport Analytics. 2022. *Travel and tourism makes a convincing comeback from the COVID-19 pandemic. The 2021 economic & fiscal impact of tourism in Florida*. 37 pp. https://www.visitflorida.org/media/30679/florida-visitor-economic-impact-study.pdf

Root, K. V. and J. Barnes. 2007. *Risk assessment for Audubon's crested caracara (Caracara cheriway) in Florida*. Final report to the U.S. Fish and Wildlife Service. Florida Fish and Wildlife Conservation Commission.

Schlaepfer, M. A., D. F. Sax, and J. D. Olden. 2011. The potential conservation value of non-native species. Conservation Biology 25:428–37.

Schwab, A. C. 2006. *The influence of roads on the Florida panther*. MSc Thesis, University of South Florida, Tampa, FL.

Sears, W. H. 1982. *Fort Center: An archaeological site in the Lake Okeechobee Basin*. Florida Museum of Natural History: Ripley P. Bullen Monographs in Anthropology and History, Number 4. 223 pp. University Press of Florida, Gainesville, FL.

Semenov V. A., M. Latif, D. Dommenget, N. S. Keenlyside, A. Strehz, T. Martin, and W. Park. 2010. The impact of North Atlantic-Arctic multidecadal variability on northern hemisphere surface air temperature. Journal of Climate 23:5668–5677.

Shannon, G., M. F. McKenna, L. M. Angeloni, K. R. Crooks, K. M. Fristrup, E. Brown, K. A. Warner, M. D. Nelson, C. White, J. Briggs, S. McFarland, and G. Wittemyer. 2016. A synthesis of two decades of research documenting the effects of noise on wildlife. Biological Reviews 91:982–1005.

Song, J., A. Webb, B. Parmenter, D. T. Allen, and E. McDonald-Buller. 2008. The impacts of urbanization on emissions and air quality: Comparison of four visions of Austin, Texas. Environmental science & Technology 42:7294–7300.

South Florida Water Management District. 2018. *2018 South Florida environmental report*. South Florida Water Management District. Accessed July 2023. https://apps.sfwmd.gov/sfwmd/SFER/2018_sfer_final/v1/sfer_toc_v1.pdf

South Florida Water Management District. 2023a. 2023 *South Florida environmental report highlights*. South Florida Water Management District. Accessed August 2023. https://www.sfwmd.gov/sites/default/files/2023_sfer_highlights_FINAL_HR.pdf

South Florida Water Management District. 2023b. *Harmful nutrients in the Everglades now reduced by 90%.* South Florida Water Management District. Accessed August 2023. https://www.sfwmd.gov/sites/default/files/documents/infographic_everglades_wq.pdf

Southeast Conservation Adaptation Strategy. 2022. Southeast conservation blueprint 2022. http://secassoutheast.org/blueprint

Southwest Florida Water Management District. 2023. *Consolidated annual report March 1, 2023*. Southwest Florida Water Management District. Accessed August 2023 https://www.swfwmd.state.fl.us/sites/default/files/medias/documents/FY2023_Board-Approved-CAR.pdf

Stanton, E. A. and F. Ackerman. 2007. *Florida and climate change: The costs of inaction*. Global Development and Environment Institute, Tufts University, Medford, MA. https://www.bu.edu/eci/files/2019/11/Florida_hr.pdf

Stys, B., T. Foster, M. M. P. B. Fuentes, B. Glazer, K. Karish, N. Montero, and J. S. Reece. 2017. Climate change impacts on Florida's biodiversity and ecology. In E. P. Chassignet, J. W. Jones, V. Misra, and J. Obeysekera (Eds.). Florida's climate: Changes, variations, & impacts. https://www.researchgate.net/publication/321918626_Climate_Change_Impacts_on_Florida's_Biodiversity_and_Ecology

Sutton, R. T. and D. L. R. Hodson. 2005. Atlantic Ocean forcing of North American and European summer climate. Science 309:115–118.

Swanton, J. R. 1979. *The Indians of the southeastern United States* [reprint of the 1946 edition]. Bureau of American Ethnology Bulletin 137. Smithsonian Institution, Washington, D.C.

Sweet, W. V., B. D. Hamlington, R. E. Kopp, C. P. Weaver, P. L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A. S. Genz, J. P. Krasting, E. Larour, D. Marcy, J. J. Marra, J. Obeysekera, M. Osler, M. Pendleton, D. Roman, L. Schmied, W. Veatch, K. D. White, and C. Zuzak. 2022. *Global and regional sea level rise scenarios for the United States: Updated mean projections and extreme water level probabilities along U.S. coastlines*. NOAA Technical Report NOS 01. National Oceanic and Atmospheric Administration, National Ocean Service, Silver Spring, MD, 111 pp. https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report-sections.html

Sykes, P. W., Jr. 1979. Status of the Everglade kite in Florida 1968-1978. Wilson Bulletin 91:495–511.

Sykes, P. W., Jr. 1983. Recent population trend of the snail kite in Florida and its relationship to water levels. Journal of Field Ornithology 54:237–246.

Taylor, D. 2014. *Toxic communities: Environmental racism, industrial pollution, and residential mobility.* New York University Press. 352 pp.

Taylor, L. O., X. Liu, and T. Hamilton. 2012. Amenity values of proximity to National Wildlife Refuges. Center for Environmental and Resource Economic Policy, North Carolina State University, Raleigh, NC. 86 pp. https://www.doi.gov/sites/doi.gov/files/uploads/NWRSAmenityReportApril2012withCovers8.pdf

Tiebout, H. M., III and R. A. Anderson. 2001. Mesocosm experiments on habitat choice by an endemic lizard: Implications for timber management. Journal of Herpetology 35:173–185.

Timmerman, W. W. and W. H. Martin. 2003. Conservation guide to the eastern diamondback rattlesnake*, Crotalus adamanteus*. Society for the Study of Amphibians and Reptiles Herpetological Circular 32. 55 pp.

University of Florida GeoPlan Center. Florida 2070 Project: 2010 Base Scenario Protected Lands. Gainesville, FL.

U.S. Census Bureau. n.d. QuickFacts Florida. Accessed August 2023. https://www.census.gov/quickfacts/fact/table/FL/PST045222

U.S. Department of Agriculture. 2019. 2017 Census of agriculture. United States summary and state data. County profiles for Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Lee, Manatee, Okeechobee, Polk, and Sarasota counties; State profile for Florida. National Agricultural Statistics Service, Washington, D.C. https://www.nass.usda.gov/AgCensus/

U.S. Department of Agriculture. 2021. Natural Recourses Conservation Service. Soil Survey Geographic (Ssurgo) Database for Florida. Gainesville, FL.

U.S. Environmental Protection Agency (EPA). 2023. EJScreen: EPA's Environmental justice screening and mapping tool. Version 2.2. Accessed July 2023. https://ejscreen.epa.gov/mapper/

U.S. Fish and Wildlife Service (USFWS). 1999. *South Florida field office multi-species recovery plan*. U.S. Fish and Wildlife Service, Southeast Region, Atlanta, GA. https://ecos.fws.gov/docs/recovery_plan/140903.pdf

U.S. Fish and Wildlife Service (USFWS). 2001. *Florida manatee recovery plan (Trichechus manatus latirostris).* Third Revision. U.S. Fish and Wildlife Service, Southeast Region. 194 pp. https://ecos.fws.gov/docs/recovery_plan/011030.pdf

U.S. Fish and Wildlife Service (USFWS). 2008. *Florida panther recovery plan (Puma concolor coryi)*. 3rd Revision. The Florida Panther Recovery Team, South Florida Ecological Services Office, U.S. Fish and Wildlife Service. https://ecos.fws.gov/docs/recovery_plan/081218.pdf

U.S. Fish and Wildlife Service (USFWS). 2009. *Florida population of the Audubon's crested caracara (Polyborus plancus audubonii) = northern crested caracara (Caracara cheriway)*. 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Southeast Region, South Florida Ecological Services Field Office, Vero Beach, FL.

U.S. Fish and Wildlife Service (USFWS). 2019a. *Recovery plan for the endangered Everglade snail kite (Rostrhamus sociabilis plumbeus)*. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Southeast Region, Atlanta, GA.

U.S. Fish and Wildlife Service (USFWS). 2019b. *Species status assessment Florida scrub-jay (Aphelocoma coerulescens)*. Version 1.0. U.S. Fish and Wildlife Service, North Florida Ecological Services, Jacksonville, FL. https://ecos.fws.gov/ServCat/DownloadFile/170166

U.S. Fish and Wildlife Service. 2019c. *Draft revised recovery plan for the Florida scrub-jay (Aphelocoma coerulescens).* U.S. Fish and Wildlife Service, Ecological Services, Jacksonville, FL. 7 pp. https://ecos.fws.gov/docs/recovery_plan/20190926%20Florida%20Scrub-Jay%20Revised%20Recovery%20Plan_1a.pdf Jay%20Draft%20Revised%20Recovery%20Plan.pdf#:~:text=Introduction%3A%20This%20Recovery%20Plan%20revises%20the%20original%20Florida,of%20Endangered%20and%20Threatened%20Wildlife%20%2850%20CFR%2017.11%29.

U.S. Fish and Wildlife Service (USFWS). 2019d. *Eastern indigo snake Drymarchon corais* couperi. 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Southeast Region, Georgia Ecological Services Field Office, Athens, GA.

U.S. Fish and Wildlife Service (USFWS). 2019e. *Species status assessment report for the eastern indigo snake (Drymarchon couperi)*. Version 1.1. U.S. Fish and Wildlife Service, Southeast Region, Georgia Ecological Services Field Office, Athens, GA.

U.S. Fish and Wildlife Service (USFWS). 2019f. *Draft revised recovery plan for the eastern indigo snake*. U.S. Fish and Wildlife Service, Southeast Region, Athens, GA. 8pp. https://www.fws.gov/sites/default/files/documents/news-attached-files/Eastern%20Indigo%20Snake%20Draft%20Revised%20Recovery%20Plan.pdf#:~:text=Recovery%20Strategy%3A%20The%20recovery%20strategy%20for%20the%20eastern,land%20management%20and%20provides%20demographic%20and%20ecological%20data.

U.S. Fish and Wildlife Service (USFWS). 2020. *Species status assessment report for the red-cockaded woodpecker (Picoides borealis)*. Version 1.3. U.S. Fish and Wildlife Service, Southeast Region, Atlanta, GA. https://ecos.fws.gov/ServCat/DownloadFile/188805

U.S. Fish and Wildlife Service. 2021a. Birds of Conservation Concern 2021. United States Department of the Interior, U.S. Fish and Wildlife Service, Migratory Birds, Falls Church, Virginia. http://www.fws.gov/birds/management/ managed-species/birds-of-conservation-concern.php

U.S. Fish and Wildlife Service (USFWS). 2021b. *Blue-tailed Mole Skink (Eumeces egregius lividus)*. 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, South Atlantic-Gulf Region, Florida Ecological Services Field Office, Vero Beach, FL.

U.S. Fish and Wildlife Service (USFWS). 2023a. *Florida grasshopper sparrow (Ammodramus savannarum floridanus).* Status Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Southeast Region, Florida Ecological Services Office. https://ecos.fws.gov/docs/tess/species_nonpublish/4092.pdf

U.S. Fish and Wildlife Service. 2023b. Southeast at-risk species finder. U.S. Fish and Wildlife Service. Accessed July 2023. https://experience.arcgis.com/experience/c578e0f4d7ab48a7a9648abe76296ec4/page/Welcome/?org=fws&views=Data-Dictionary

U.S. Fish and Wildlife Service. 2023c. IPaC information for planning and consultation. U.S. Fish and Wildlife Service. Accessed August 2023. https://ipac.ecosphere.fws.gov/

U.S. Geological Survey Gap Analysis Project. 2022. Protected areas database of the United States (PAD-US) 3.0: U.S. Geological Survey data release. https://doi.org/10.5066/P9Q9LQ4B

U.S. Global Change Research Program. 2018. *Impacts, risks, and adaptation in the United States: Fourth national climate assessment* (D. R. Reidmiller, C. W. Avery, D. R. Easterling, K. E. Kunkel, K. L. M. Lewis, T. K. Maycock, and B. C. Stewart [Eds.]. Volume II. U.S. Global Change Research Program, Washington, D.C. 1515 pp. doi: 10.7930/NCA4.2018.

van Kleunen, M., W. Dawson, F. Essl, J. Pergl, M. Winter, E. Weber, H. Kreft, P. Weigelt, J. Kartesz, M. Nishino, L. A. Antonova, J. F. Barcelona, F. J. Cabezas, D. Cárdenas, J. Cárdenas-Toro, N. Castaño, E. Chacón, C. Chatelain, A. L. Ebel, E. Figueiredo, N. Fuentes, Q. J. Groom, L. Henderson, Inderjit, A. Kupriyanov, S. Masciadri, J. Meerman, O. Morozova, D. Moser, D. L. Nickrent, A. Patzelt, P. B. Pelser, M. P. Baptiste, M. Poopath, M. Schulze, H. Seebens, W. Shu, J. Thomas, M. Velayos, J. J. Wieringa, and P. Pyšek. 2015. Global exchange and accumulation of non-native plants. Nature 525:100.

Vilà, M., J. L. Espinar, M. Hejda, P. E Hulme, V. Jarošík, J. L. Maron, J. Pergl, U. Schaffner, Y. Sun, and P. Pyšek. 2011. Ecological impacts of invasive alien plants: A meta-analysis of their effects on species, communities and ecosystems. Ecology Letters 14:702.

Florida Department of Transportation. 2022. *Florida aviation economic impact study*. Statewide Executive Study. Florida Department of Transportation. 9 pp. https://www.fdot.gov/aviation/economicimpact22.shtm#:~:text=In%202021%20(the%20study's%20data,of%20Florida's%20world%2Dclass%20airports.

Volk, M. I., T. Hoctor, B. B. Nettles, R. Hilsenbeck, F. E. Putz, and J. Oetting. 2017. Florida's land use and land cover change in the past 100 years. In E. P. Chassignet, J. W. Jones, V. Misra, and J. Obeysekera (Eds). *Florida's climate changes, variations, & impacts.* Florida Climate Institute, Gainesville, FL. pp. 52–82.

Warner, K., C. Ehrhart, A. D. Sherbinin, S. Adamo, and T. Chai-Onn. 2009. *In search of shelter: Mapping the effects of climate change on human migration and displacement*. UN High Commissioner for Refugees. https://www.ciesin.columbia.edu/documents/clim-migr-report-june09_final.pdf

Watts, B. D. 2016. *Status and distribution of the eastern black rail along the Atlantic and Gulf coasts of North America*. The Center for Conservation Biology Technical Report Series: CCBTR-16-09. College of William and Mary & Virginia Commonwealth University. Williamsburg, VA. 148 pp.

Weekley, C. W., E. S. Menges, and R. L. Pickert. 2008. An ecological map of Florida's Lake Wales Ridge: A new boundary delineation and an assessment of post-Columbian habitat loss. Florida Scientist 71:45–64.

Weisman, B. R. 1999. *Unconquered people: Florida's Seminole and Miccosukee Indians*. University Press of Florida, Gainesville, FL.

Weisman, B. R. 2000 Archaeological perspectives on Florida Seminole ethnogenesis. In B. G. McEwan (Ed.). *Indians of the greater southeast: Historical archaeology and ethnohistory* (pp. 299–317). University Press of Florida, Gainesville, FL.

Williams, S .J., B. T. Gutierrez, J. G. Titus, S. K. Gill, D. R. Cahoon, E. R. Thieler, K. E. Anderson, D. FitzGerald, V. Burkett, and J. Samenow. 2009: Sea-level rise and its effects on the coast. In J. G. Titus (coordinating lead author), K. E. Anderson, D. R . Cahoon, D. B. Gesch, S. K. Gill, B. T. Gutierrez, E. R. Thieler, and S. J. Williams (lead authors). *Coastal sensitivity to sea-level rise: A focus on the Mid-Atlantic Region*. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. U.S. Environmental Protection Agency, Washington, D.C. pp. 11–24. https://www.globalchange.gov/sites/globalchange/files/sap4-1-final-report-all.pdf

Williams, K. S. and S. R. Humphrey. 1979. Distribution and status of the endangered Big Cypress fox squirrel (*Sciurus niger avicennia*) in Florida. Florida Scientist 42:201–205.

Williams, C. P., T. M. Scott, and S. B. Upchurch. 2022 *Florida geomorphology atlas*. Florida Geological Survey Special Publication 59. 238 pp. https://publicfiles.dep.state.fl.us/FGS/Geological_Investigations/Geomorphology/SpecialPublication59/FloridaGeomorphologyAtlas_SP59.pdf

Woolfenden, G. E. and J. W. Fitzpatrick. 2020. Florida scrub-jay (*Aphelocoma coerulescens*), version 1.0. In A. F. Poole and F. B. Gill (Eds.). Birds of the world. Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bow.flsjay.01

Wright, J. L., Jr. 1986. *Creeks and Seminoles: The destruction and regeneration of the Muscogulge People*. University of Nebraska Press, Lincoln, NE.

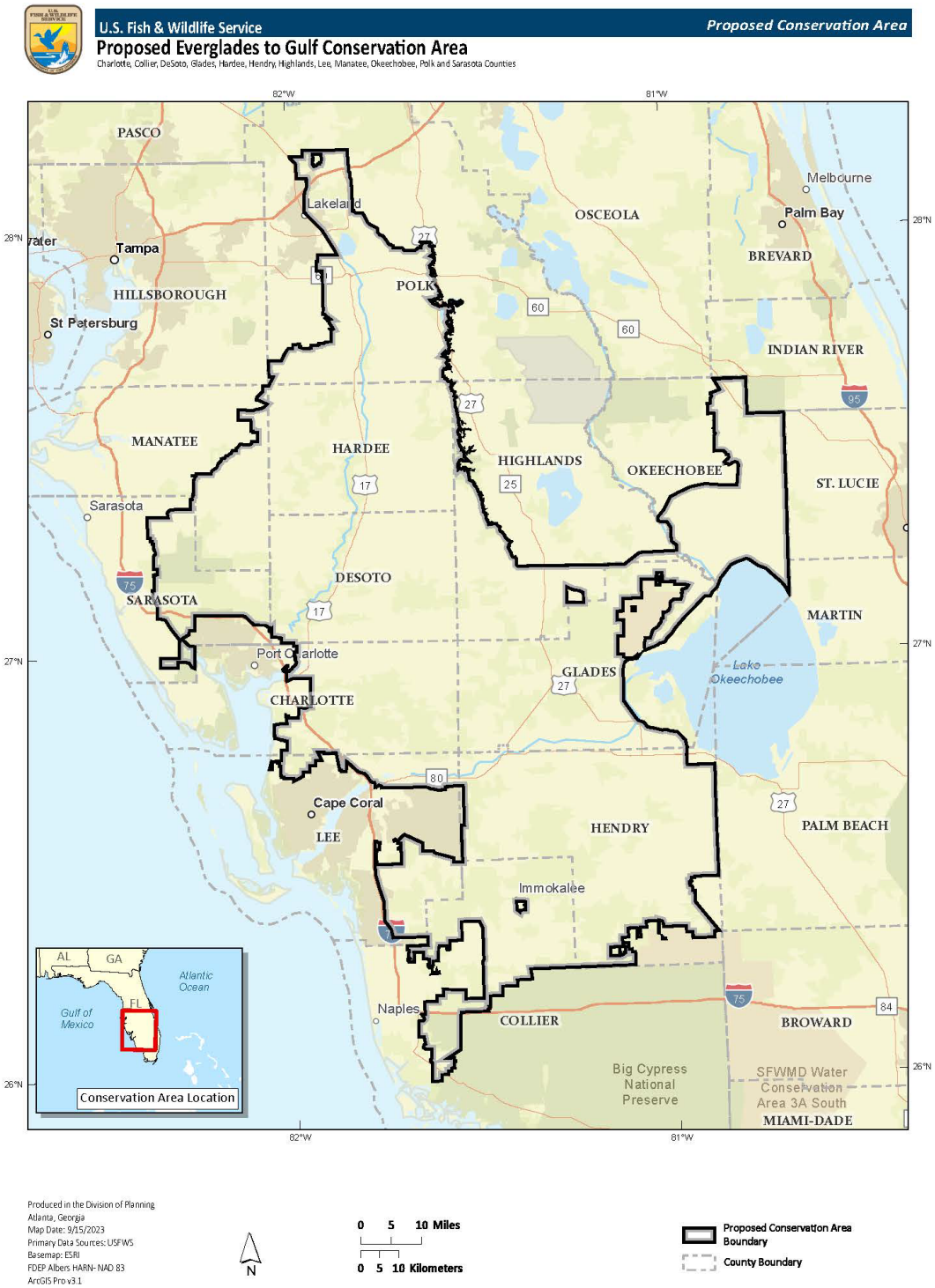
Wunderlin, R. P., B. F. Hansen, A. R. Franck, and F. B. Essig. 2023. Atlas of Florida Plants [S. M. Landry and K. N. Campbell (application development), University of South Water Institute] Institute for Systematic Botany, University of South Florida, Tampa, FL. Accessed July 2023.

Zwick, P. D. and M. Carr. 2006. *Florida 2060, a population distribution scenario for the State of Florida*. Prepared for 1000 Friends of Florida. 29 pp. https://www.pinellas.wateratlas.usf.edu/upload/documents/Florida-2060-Report-Final_1000FofF.p

APPENDIX B. CONCEPTUAL MANAGEMENT PLAN

INTRODUCTION

This plan for the proposed Everglades to Gulf Conservation Area presents a general outline on how the fee-title acquisition lands within the proposed Conservation Area would be operated and managed. As a conceptual plan, it does not provide extensive detail, pinpoint exactly where facilities would be, or show where public use would be allowed. Those details would be included in the formal refuge management planning with input from the public and in accordance with the National Environmental Policy Act, as well as the appropriateness and compatibility requirements in the National Wildlife Refuge System Administration Act and the Refuge Recreation Act. This Plan seeks to address and should help answer many of the questions commonly asked by interested parties.



CMP Figure 1 Proposed Conservation Area.

GOALS OF THE NATIONAL WILDLIFE REFUGE SYSTEM

The mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997 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 wildlife and habitat vision for national wildlife refuges stresses that wildlife comes first; that ecosystems, biodiversity, and wilderness are vital concepts in refuge management; that refuges must be healthy, and growth must be strategic; and that the refuge system serves as a model for habitat management with broad participation from others.

Actions were initiated in 1997 to comply with the direction of this new legislation, including an effort to complete comprehensive conservation plans for all refuges. These plans are completed with full public involvement and help guide the future management of refuges by establishing natural resource and outdoor recreation/environmental education programs. Consistent with the National Wildlife Refuge System Improvement Act (Improvement Act), approved plans serve as guidelines for refuge management over a 15-year period. The Improvement Act states that each refuge shall be managed to:

- Fulfill the mission of the Refuge System;
- Fulfill the individual purposes of each refuge unit;
- Consider the needs of wildlife first;
- Fulfill requirements of comprehensive conservation plans that are prepared 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
- Allow refuge managers authority to determine compatible public uses.

National Wildlife Refuges connect visitors to their natural resource heritage and seek to provide them with an understanding and appreciation of fish and wildlife ecology that serves a foundational role in the environment. Wildlife-dependent recreation on refuges also generates economic benefits to local communities. The report, *Banking on Nature 2017: The Economic Contributions of National Wildlife Refuge Recreational Visitation to Local Communities*, (Caudill and Carver 2019) examined the local economic contributions of recreational visits to 162 national wildlife refuges in 47 states and 1 territory for the fiscal year (FY) 2017 (October 1, 2016 – September 30, 2017). According to the report, approximately 53.6 million people visited national wildlife refuges generating almost $3.2 billion in total economic activity and supported over 41,000 jobs, generating about $1.1 billion in employment income. Additionally, recreational spending on refuges generated nearly $229 million in tax revenue at the local, county, State, and federal levels.

Other findings also validate the belief that communities near refuges benefit economically. A 2012 study *Amenity Values of Proximity to National Wildlife Refuges* determined that refuges can have a positive effect on nearby home values (Taylor et al. 2012).

The Improvement Act stipulates that CCPs be prepared in consultation with federal and State governmental agencies and adjoining private landowners and that the Service develop and implement a process to ensure an opportunity for active public involvement in the preparation and revision (every 15 years) of the CCPs. All lands of the National Wildlife Refuge System would be managed in accordance with an approved CCP that would guide management decisions and set forth strategies for achieving refuge unit purposes. Each CCP would be consistent with sound resource management principles, practices, and legal mandates including Service compatibility standards and other Service policies, guidelines, and planning documents (602 FW 1).

LAWS GUIDING THE NATIONAL WILDLIFE REFUGE SYSTEM

A number of laws, policies and regulations, including the following, govern the acquisition and management of land, including the Improvement Act, the National Wildlife Refuge System Administration Act, Endangered Species Act, and Migratory Bird Treaty Act.

National Wildlife Refuge System Improvement Act of 1997

The Improvement Act guides the development and operation of the Refuge System. It clearly identifies the mission of the Refuge System; requires the Secretary of the Interior to maintain the biological integrity, diversity, and environmental health of refuge lands; mandates a "wildlife first" policy on refuges; and requires comprehensive conservation planning. It also designates the following six wildlife-dependent recreational uses as priority public uses of the Refuge System: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. The Improvement Act amended the National Wildlife Refuge System Administration Act of 1966, which continues to serve as the parent legislation for the Refuge System.

National Wildlife Refuge System Administration Act of 1966

This Act defines the Refuge System, including refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, wildlife management areas, and waterfowl production areas. It also authorizes the Secretary of the Interior to permit any use of an area, provided the use is compatible with the major purposes for establishing the area.

Endangered Species Act of 1973 (as amended)

The Endangered Species Act (ESA) directs all federal agencies to participate in endangered species conservation by protecting threatened and endangered species and restoring them to a secure status in the wild. Section 7 of the Act charges federal agencies to aid in the conservation of species listed as threatened or endangered under the ESA and requires federal agencies to ensure that their activities will not jeopardize the continued existence of ESA-listed species or adversely modify designated, critical habitats.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act protects all migratory birds and their parts (including eggs, nests, and feathers) from illegal trade. The Migratory Bird Treaty Act is a domestic law that acknowledges the

United States' involvement in four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. The bird resource is considered shared because these birds migrate between countries at some point during their annual life cycle.

National Environmental Policy Act of 1969
The National Environmental Policy Act requires that all federal agencies consult fully with the public in planning any action that may significantly affect the quality of the human or natural environment.

Land and Water Conservation Act
The Land and Water Conservation Fund uses funds from certain user fees, the proceeds from the disposal of surplus federal property, the federal tax on motorboat fuels, and oil and gas lease revenues (primarily Outer Continental Shelf oil monies) to fund matching grants to states for outdoor recreation projects and to fund land acquisition for various federal agencies.

Migratory Bird Conservation Act
The Migratory Bird Conservation Act provides for the acquisition of suitable habitats for use as migratory bird refuges, and the administration, maintenance, and development of these areas, under the administration of the Secretary of the Interior.

Archaeological Resources Protection Act of 1979
The Archaeological Resources Protection Act provides protection for archeological resources on public lands by prohibiting the "excavation, removal, damage or defacing of any archeological resource located on public or Indian lands," and sets up criminal penalties for those acts. It also encourages the increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals having archeological resources or data obtained before 1979.

National Historic Preservation Act of 1966
The National Historic Preservation Act requires all federal agencies to consider the effects of their undertaking on properties meeting criteria for the National Register of historic places and ensures that historic preservation fully integrates into the ongoing programs and missions of federal agencies.

PURPOSE OF ESTABLISHMENT AND LAND ACQUISITION AUTHORITY

Emphasizing migratory birds, listed species, and wetlands, while protecting the important fish and wildlife resources of this landscape, the listed purposes have been developed for the establishment of the proposed Conservation Area.

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)

"…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)

"…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions

…" 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)

"…to conserve and protect migratory birds…, including species that are listed…as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)

"…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources…." 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)

"…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species …" 16 U.S.C. 460k-1 "… the Secretary … may accept and use … real … property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors …" 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

VISION FOR THE PROPOSED EVERGLADES TO GULF CONSERVATION AREA

The vision for Everglades to Gulf Conservation Area is:

Together with our partners, we will preserve wildlife corridors containing a mosaic of natural communities and working lands with rich cultural history and traditions for the benefit of all people. All species and habitats will be protected and contain the resiliency to facilitate adaption due to the impacts of climate change and development. Additionally, protection and management actions within the landscape will improve water quality, water storage, provide wildlife dependent recreational opportunity, and support Florida's family farms and ranches.

GOALS AND OBJECTIVES FOR THE PROPOSED EVERGLADES TO GULF CONSERVATION AREA

Four overarching goals were developed for the proposed Conservation Area. The goals are intentionally broad, descriptive statements of the desired future conditions. They embrace the proposed purposes and vision statement. The goals address a functional conservation landscape; habitat for fish and wildlife; water quality, quantity, and storage; opportunities for Tribal Nations; and wildlife-dependent recreation, as listed.

1. Protect, Restore, and Manage Habitats for Fish and Wildlife. The proposed Conservation Area would aid in the maintenance and recovery of Florida panther populations and protect many rare and endemic species, including over 100 Federally and State-listed Threatened and Endangered species, such as the Florida scrub-jay, Audubon's crested caracara, wood stork, Florida bonneted bat, Everglade snail kite, Eastern indigo snake and sand skink, thereby protecting natural communities found only in south Florida and species adapted to Florida's unique subtropical environment. In addition, the Service would conserve important rural landscape mosaics, including ranchlands, to combat habitat fragmentation and protect wildlife corridors essential to many species' viability and

adaptation responses to climate change. Important wildlife corridors essential for listed species viability and adaptation opportunities in response to climate change would be provided. The proposed Conservation Area would also provide opportunities to restore important wetlands, provide water storage, and improve water quality for the Greater Everglades, Myakka River, Peace River, Fisheating Creek, and Caloosahatchee River watersheds, and coastal estuaries including Charlotte Harbor.

2. Provide Science-Driven Landscape-Level Conservation. The proposed Conservation Area would contribute to protection of a functional conservation landscape composed of a mosaic of natural communities and ranchlands that would prevent further habitat fragmentation, provide functional habitat for wide-ranging listed species, and facilitate watershed and prescribed fire management. The proposed Conservation Area would allow the Service to protect and restore water resources within multiple watersheds to improve water quality and quantity; maintain and enhance ecological integrity, recreation, and the economy; and improve and secure water supplies, benefiting humans and wildlife. The landscape-scale ecological priorities within the proposed Conservation Area are identified with the best available ecological and spatial data based on conservation science, landscape ecology, tribal indigenous knowledge, and spatial analysis.

3. Conserve Important Lands and Waters for the Benefit of All People. Visitors to the proposed Conservation Area fee-title lands would enjoy opportunities for compatible wildlife-dependent recreation which may include hunting, fishing, wildlife observation, photography, environmental education, and interpretation, while increasing knowledge of and support for conservation. Fee-title lands could also provide cultural, traditional, and medicinal use opportunities. Willing landowners could protect their private land through conservation easements and stewardship programs while providing important ecosystem services for all people. The Everglades and southwest Florida watersheds require protection of remaining functional wetlands and floodplains, and restoration of hydrology to avoid further impairment and improve water quality and supply including Charlotte Harbor, an essential economic engine for south and southwest Florida.

4. Promote Conservation Partnerships Working with Adaptive and Flexible Tools and Strategies. Collaboration in science, education, research, and land acquisition (including conservation easements) would facilitate the development of new partnerships and strengthen existing partnerships with natural resource organizations, private landowners, government agencies, Tribal Nations, and local decision-makers. The partnerships would help inform land management decisions and encourage continued responsible stewardship of natural and rural landscapes essential for listed species protection, associated natural resources, while facilitating resiliency and adaptation to climate change.

Objectives associated with the proposed Conservation Area would:

- Assist with the restoration of the Everglades.
- Enhance the viability and recovery of the Florida Panther and over 100 other threatened and endangered species and 17 At-risk species.
- Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy especially the Caloosahatchee River watershed, Fisheating Creek watershed, the Peace River watershed, the Myakka River watershed, Okaloacoochee Slough, Corkscrew Swamp, and Charlotte Harbor.
- Maintain unique natural communities and species adapted to the unique subtropical environment.

- Conserve habitat diversity and complexity.
- Improve and increase resiliency.
- Facilitate protection of a regional scale wildlife corridor through the protection of a functional landscape mosaic of natural communities and ranchlands.
- Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species.
- Complement other conservation initiatives.
- Foster existing partnerships and seek new partnerships.
- Conserve cultural sites and landscapes.
- Provide cultural, traditional, and medicinal use opportunities on fee-title lands.
- Provide wildlife dependent recreational opportunities on fee-title lands.

MANAGEMENT OF THE PROPOSED EVERGLADES TO GULF CONSERVATION AREA

ADMINISTRATION

The proposed Conservation Area would be a unit of the National Wildlife Refuge System. The Everglades Headwaters Complex currently located in Vero Beach, FL would provide oversight of refuge administration and management.

The proposed Conservation Area may be managed as part of a refuge complex and later as stand-alone refuge unit. Further, management functions such as a prescribed fire program would be supported by area refuges such as Everglades Headwaters NWR and Conservation Area, Merritt Island NWR, Arthur R. Marshall Loxahatchee NWR, and Florida Panther NWR. As part of a refuge complex, the proposed Conservation Area would have no on-site staff initially and would share staff and equipment with one or more other refuges. As the management and operational needs of the proposed Conservation Area grow in size and complexity, the proposed Conservation Area may become a stand-alone refuge unit. Initially, refuge staff of the Everglades Headwaters NWR and Conservation Area would have the responsibility for managing the newly established proposed Conservation Area. During the interim period, the Service would seek funding for refuge staff within the proposed Conservation Area. Generally, a stand-alone refuge unit has dedicated staff and equipment and is based in local facilities. The proposed Conservation Area may also require additional staff to administer conservation easement program.

As lands are acquired, the proposed Conservation Area may be delineated into management units that would align with the four watersheds (Myakka, Peace, Fisheating, and Caloosahatchee).

The refuge manager would not initiate or permit a new use of a national wildlife refuge unit or expand, renew, or extend an existing use of a National Wildlife Refuge unit unless it has been determined that the use is appropriate and compatible with the mission of the National Wildlife Refuge System and the purposes of each specific refuge unit. Further, the same use may be deemed compatible on some refuge units, but not others due to refuge-specific differences.

FACILITIES

As no actual lands have been acquired, it is difficult to discuss specifics of facilities and

improvements that may be appropriate to effectively manage the proposed Conservation Area. This document will discuss general approaches adopted on other units of the National Wildlife Refuge System as well as unique partnership opportunities that may present themselves in this landscape. As such, the Service may opt for the listed facilities when and where appropriate and compatible.

Conversion of existing trails and roads to public use and/or refuge management access corridors may occur. Such roads may also be abandoned to limit access to sensitive habitats and protected species. Roads and trails may only be open during certain times of year or may have other restriction to protect wildlife resources or to provide access for visitor programs, such as hunting activities. Vehicle access to Service resources would only be allowed on designated roads and trails. Small areas may also be constructed to provide for adequate and safe parking of vehicles in potential public use area.

Because of the potential wide geographic distribution of fee-title lands across this landscape, one or more headquarters and visitor contact stations may be established through the adaptive reuse of buildings acquired through land acquisition (e.g., farmhouse or hunt lodges may be used as an office or education facility). Additionally, shared facility use options may be available with interested partners who already have adequately sized facilities in the area and available space. Other potential future on-site improvements, including additional trails, improved access roads, observation platforms, photography blinds, and parking area may be discussed in a future comprehensive conservation plan and associated step-down plan. The construction of new facilities or conversion of existing structures in contingent upon availability of funds and acquisition of appropriate sites.

Where facility construction, operation, or maintenance may conflict with the conservation of federally listed species, appropriate measures (e.g., buffers and seasonal restrictions) would be identified and implemented to avoid adverse effects. This would be done in consultation with the Service's Ecological Field Office located in Vero Beach, FL.

Generally, public use areas would be open during daylight hours, unless a biological or safety justification supports closure. Some areas could be closed to the public and other (except for emergency, fire, and police response) seasonally or year-round if deemed necessary for protection of sensitive resources, property, and public, etc. Special use permits would be issued to researchers, educations groups, and other on an as-need basis, providing that the activities are compatible with the proposed Conservation Area purposes, goal, and objective, and contribute to the ecological understanding, biological survey, or baseline data needs.

FUNDING

The Service would maintain a current inventory of management needs in appropriate Service database(s) and update the associated costs and priorities annually. Those databases provide a mechanism for each unit of the National Wildlife Refuge System to identify its essential staffing, mission-critical projects, and major needs and form a realistic assessment of the funding needed to meet each refuge unit's goals, objectives, and strategies.

No funding has yet been identified or approved to support management. Any funding would be dependent upon a variety of factors, including national and Regional budget priorities and allocations.

The annual budget for the proposed Conservation Area is estimated to be approximately $500,000 to

cover salaries, equipment maintenance, supplies, and routine equipment and construction material purchases. Large construction projects such as an office, shop facilities, a visitor center, large water control structures, and roads could total $20 million over a 30-year period, or an average of approximately $667,000 per year. Land acquisition funding would primarily be funded by the Land Water Conservation Fund (LWCF). Funding for acquisition under LWCF is appropriated annually by Congress and dedicated to specifically designated acquisition priorities.

STAFFING

Staffing on units of the National Wildlife Refuge System is based on a number of factors including size and complexity, proximity to other refuges, and appropriated funding. Based on these and other factors, the proposed Conservation Area may be managed as a unit of a refuge complex or as a stand-alone refuge unit. At this time, it is difficult to delineate staffing specifics, because of the uncertainties associated with the refuge's land acquisition activity, management program complexity, resource issues, funding, and other factors.

Initially, the proposed Conservation Area would likely be managed as a unit under the supervision and management of the Everglades Headwaters Complex, which includes Everglades Headwaters NWR & Conservation Area, Lake Wales Ridge NWR, Archie Carr NWR, and Pelican Island NWR. Staff from nearby refuges may also be used to support needed staffing functions. The Service's Southeast Regional Office evaluates and determines staffing needs and priorities. A refuge manager, Federal Wildlife Officer, and equipment operator or maintenance position may be added as lands are acquired over time. Temporary employees during the field season could include biological aides and high school youth through the Youth Conservation Corps. In addition to technical expertise, refuge staff are selected based on their abilities to work effectively with the public and neighboring landowners. In the long term, the Service's Southeast Regional Office would evaluate the need for additional full-time staff based on management needs, project loads, public use activities, and other factors, and could move forward with providing additional staff when justified. The ability to fill staff positions would depend on availability of funds and Regional priorities. The Regional Office would also provide technical assistance on matters such as engineering, public use planning, and migratory bird management.

LAW ENFORCEMENT

The proposed Conservation Area would be supported by Federal Wildlife Officers assigned to both the South Florida Patrol District and the North Florida Patrol District. The Service would also establish formal, cooperative agreements with local law enforcement departments, the county sheriff's departments, and FWC to assist with protection and appropriate law enforcement response for the proposed Conservation Area.

FIRE MANAGEMENT

It is the policy of the Service to use prescribed fire treatments when it is the most appropriate management tool for reaching habitat objectives. Wildfires, however, would be managed utilizing the appropriate response to ensure the safety of firefighters and the public. The range of appropriate

response options vary depending on the location of an unplanned fire. Options for managing these fires are outlined in the proposed Conservation Area's Fire Management Plan.

Refuge units generally have staff trained in fire management and an array of equipment for fire suppression. To supplement these capabilities, cooperative agreements and contracts with State agencies and local fire departments are usually put together to tap local firefighting expertise. This is especially important for structure fires since local fire departments have special training and experience in this type of firefighting.

INVASIVE SPECIES MANAGEMENT

In summary, working partnerships with surrounding landowners; conservation organizations; and municipal, State, and federal agencies would be critical to successful management of the proposed Conservation Area and priority lands within the southwest Florida landscape. The Service would continue to cooperate with our conservation partners, all of whom are instrumental in helping to accomplish habitat management goals and objectives. It is clear that partnerships with the public; landowners; neighbors; conservation organizations; and Tribal Nations, State, municipal, and other federal agencies would be essential a successful Everglades to Gulf Conservation Area.

POPULATION MONITORING

Surveys would be conducted regularly to track population trends of wildlife species of interest. This information is the basis for habitat management decisions.

Many surveys would be done in cooperation with the FWC to tie into their existing data bases. Also, college, university, or other agency research would be encouraged to collaborate on gathering information on both plant and wildlife species.

PUBLIC USE OPPORTUNITIES AND MANAGEMENT

Visitors of all abilities would enjoy opportunities for hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation, while increasing knowledge of and support for conservation of the important landscape of the proposed Conservation Area.

With the addition of Service-managed lands within the landscape, wildlife-dependent recreation and education opportunities would increase. The Service would work cooperatively with FWC and other partners to provide a variety of wildlife-dependent activities for the public.

The Improvement Act established six priority public uses on refuge units: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Although these priority uses must receive consideration in planning for public use, they also must be compatible with the purposes for which a refuge unit is established and the mission of the National Wildlife Refuge System. Compatibility Determinations, which evaluate the effects of a particular use or activity in the context of species or habitats on a refuge, aid in making those decisions. As fee-title lands are acquired, compatibility determinations would be used to decide which, where, and how public use opportunities would be permitted.

Public use opportunities contribute to the long-term protection of wildlife resources by promoting understanding, appreciation, and support for wildlife conservation. The six priority public uses would be accommodated to the maximum extent possible, without significant negative effects on wildlife or habitat. All public use activities are contingent upon availability of staff and funding to develop and implement these programs. The Service would promote opportunities for volunteers and develop community interpretive materials and programs to enhance awareness of and appreciation for the area's resources. School and other group programs would be encouraged. An increase in public use on the acquired fee-title lands would be expected due to the development of new public facilities and programs including hunting, fishing, hiking trails, observation platforms and overlooks, and other support facilities (e.g., parking lots, trailheads, and visitor contact stations). Most public access would be limited to daylight-use only, but the Service would consider overnight access as a component of other public use activities.

The Federal Government recognizes the valuable contributions of the Indigenous Knowledge that Tribal Nations and Indigenous Peoples have gained and passed down from generation to generation. Indigenous Knowledge combines observations, oral and written knowledge, innovations, practices, and beliefs over long terms and spanning generations, interweaving biological, physical, social, cultural, and spiritual systems. The Service would review specific requests and provide reasonable access to Tribal Nations to fee-title lands and waters for gathering plants for ceremonial, religious, medicinal, and traditional purposes when the activity is appropriate and compatible or when existing treaties allow or require such access. The Service would work collaboratively with the Tribal Nations with a Memorandum of Agreement to facilitate these requests.

Access

The proposed Conservation Area would be easily accessible via State and local roads. Existing access roads on acquired properties would be evaluated for use depending on access needs, presence of sensitive species and/or habitats, public use, and other potential future needs. Some roads may be retained and improved, while others may be abandoned and removed. Legal access to inholdings and homes would be maintained.

Hunting and Fishing

The Service would open designated tracts of newly acquired fee-title lands for hunting and fishing in accord with the State's regulations after reviewing and evaluating the biological, ecological, and human safety impacts. Hunting and fishing would open under the Federal Hunt and Sport Fishing Rulemaking process. Generally, newly acquired fee-title lands that have provided public (open to the general public) hunting and fishing opportunities may remain open, at their current level, under interim compatibility determinations until the Service has completed the planning process to formally open the unit, 3-5 years from acquiring lands suitable to sustain these opportunities. To this end, the Service would continue discussions with FWC regarding co-management opportunities of the hunting, fishing, and other recreational activities associated with the proposed Conservation Area. If possible, the Service would provide American with Disabilities Act (ADA)-compliant hunts and youth hunt opportunities. Generally, the Service would allow hunting, based on State hunting seasons and consistent with the Hunt Plan (once developed). The Service would collaborate with FWC in establishing a State wildlife management area for hunting and fishing. Youth fishing opportunities would be encouraged.

Wildlife Observation, Photography, Environmental Education, and Interpretation
The proposed Conservation Area would provide opportunities for wildlife observation, wildlife photography, and environmental education and interpretation on lands acquired in fee-title. Working with State and local agencies (e.g., FWC), the Service would study the feasibility of connecting existing hiking, bicycling, and horseback riding trails through fee-title lands. The proposed Conservation Area could also provide interpretive and environmental education programs and increase partnership opportunities to interpret the cultural and natural resources, including the role Native Americans and European settlers contributed to the environment of southwest Florida. Interpretive programs could focus on self-guiding facilities such as auto tour routes, signed trails, brochures, and interpretive signs along interesting features.

Environmental education, one of the six priority wildlife-dependent uses encouraged on fee-title lands, incorporates onsite, offsite, and distance-learning materials, activities, programs, and products that address the audience's course of study, the mission of the National Wildlife Refuge System, and the management purposes of the refuge unit. The goal of environmental education is to promote an awareness of the basic ecological foundations of the interrelationship between human activities and natural systems. Specific programs of study could include water quality and habitat restoration and the land stewardship of the ranching community. Through curriculum-based environmental education, on- and off-fee-title lands, staff, educators, and partners hope to motivate students and other persons interested in learning the role of management in the maintenance of healthy ecosystems, working landscapes, and conservation of fish and wildlife resources.

For years, national wildlife refuges have been connecting children with the land, teaching a conservation ethic. It is now apparent that such connections are of immense importance. The Service is committed to engaging children with nature for numerous reasons, including mental and physical health and awareness and understanding of the natural world.

The Service would attempt to work with local school districts to develop environmental education programs featuring the unique species and communities within the proposed Conservation Area, including contributions of the ranching and farming culture in sustaining a healthy environment and economy. The Service would work with the partners to promote environmental education, thereby maximizing the use of resources and time commitments for each partner organization. The Service would also consider the role of the Service in other potential opportunities such as small habitat restoration projects through the use of our Partners for Fish and Wildlife program in and around local schools, docent-led trail walks, birding festivals, guest lectures, youth hunting and fishing efforts, and even simple monitoring of various forms of wildlife on and off fee-title lands.

PARTNERSHIPS

The establishment of the proposed Conservation Area is one component of larger landscape-scale, partnership-driven initiatives. The Service currently is facilitating discussions with multiple agencies and organizations. Partners in this landscape have programs that are complementary to one another, and that it is not only important, but critical for any individual agency or organization to work collaboratively toward conservation in this landscape. Examples of these partnership activities include those listed below.

INVASIVE SPECIES MANAGEMENT

The Service collaborates with partners to contain the spread of invasive species including the Southwest Florida Cooperative Invasive Species Management Area, Southwest Florida Regional Invasive Plant Working Group, and the Sanibel Island Tri-partnership. These teams are composed of local land management agencies and organizations with an interest in the conservation of southwest Florida's natural resources. The Service would continue to collaborate in these efforts.

FIRE MANAGEMENT

Fire activities are coordinated among agencies and organizations within this landscape, under the authorities granted in the Reciprocal Fire Protection Act. The Master fire agreement with all participating agencies is updated every 5 years and outlines the duties and responsibilities to be taken by each agency when assisting the host unit on a fire event.

LAW ENFORCEMENT

The Service would establish formal, cooperative agreements with local law enforcement departments, the county sheriff's departments, and FWC to assist with protection and appropriate law enforcement response for the proposed Conservation Area. Conservation law enforcement personnel from the Service and FWC would also likely patrol intermittently and monitor hunting, fishing, and other public use activities.

WILDLIFE-DEPENDENT RECREATIONAL OPPORTUNITIES

The Service recognizes the need to provide increased opportunities for wildlife-dependent recreation and education and has included this as one of the primary goals lands acquired in fee-title. Hunting and fishing are two wildlife-dependent recreational activities that both the Service and FWC fully support. In an effort to continue and expand these opportunities for the public, the Service would discuss with FWC the opportunity to identify and manage lands that the Service might acquire in fee-title as wildlife management areas (WMAs). As the lead State agency for administering hunting programs, FWC has the expertise, experience, and established protocol for managing WMAs and the Service would explore the opportunity of entering into a cooperative agreement with FWC for the management of Service-owned lands as WMAs.

SUMMARY

In summary, working partnerships with surrounding landowners; conservation organizations; and municipal, State, and federal agencies would be critical to successful management of the proposed Conservation Area. The Service would continue to cooperate with conservation partners, all of whom are instrumental in helping to accomplish habitat management goals and objectives. It is clear that partnerships with the public; landowners; neighbors; conservation organizations; and Tribal Nations, State, municipal, and other federal agencies would an essential path to a successful Everglades to Gulf Conservation Area.

The rationale for each goal is summarized and described below.

Goal 1.
Protect, Restore, and Manage Habitats for Fish and Wildlife.
Objectives:
• Assist with the restoration of the Everglades. • Enhance the viability and recovery of the Florida Panther and over 100 other threatened and endangered species and 17 At-risk species. • Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy especially the Caloosahatchee River watershed, Fisheating Creek watershed, the Peace River watershed, the Myakka River watershed, Okaloacoochee Slough, Corkscrew Swamp, and Charlotte Harbor. • Maintain unique natural communities and species adapted to unique subtropical environment. • Conserve habitat diversity and complexity. • Improve and increase resiliency. • Facilitate protection of a regional scale wildlife corridor through the protection of a functional landscape mosaic of natural communities and ranchlands. • Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species.
Rationale
The proposed Conservation Area would aid in the maintenance and recovery of Florida panther populations and protect many rare and endemic species, including over 100 Federally and State-listed Threatened and Endangered species, such as the Florida scrub-jay, Audubon's crested caracara, wood stork, Florida bonneted bat, Everglade snail kite, Eastern indigo snake and sand skink, thereby protecting natural communities found only in south Florida and species adapted to Florida's unique subtropical environment. In addition, the Service would conserve important rural landscape mosaics, including ranchlands, to combat habitat fragmentation and protect wildlife corridors essential to many species' viability and adaptation responses to climate change. Important wildlife corridors essential for listed species viability and adaptation opportunities in response to climate change would be provided. The proposed Conservation Area would also provide opportunities to restore important wetlands, provide water storage, and improve water quality for the Greater Everglades, Myakka River, Peace River, Fisheating Creek, and Caloosahatchee River watersheds, and coastal estuaries including Charlotte Harbor.

Goal 2.
Provide Science-Driven Landscape-Level Conservation.
Objectives:
• Assist with the restoration of the Everglades. • Improve and increase resiliency. • Facilitate protection of a regional scale wildlife corridor through the protection of a functional • landscape mosaic of natural communities and ranchlands. • Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species. • Complement other conservation initiatives.

Rationale
The proposed Conservation Area would contribute to protection of a functional conservation landscape composed of a mosaic of natural communities and ranchlands that would prevent further habitat fragmentation, provide functional habitat for wide-ranging listed species, and facilitate watershed and prescribed fire management. The proposed Conservation Area would allow the Service to protect and restore water resources within multiple watersheds to improve water quality and quantity; maintain and enhance ecological integrity, recreation, and the economy; and improve and secure water supplies, benefiting humans and wildlife. Southwest Florida is particularly vulnerable to sea level rise associated with climate change because of its low and very gradual topographic gradient and high level of coastal development. Protecting connected landscape gradients from current coastline and natural coastal ecosystems to inland areas is essential for a resilient adaptation strategy for natural systems across the region. The landscape-scale ecological priorities within the proposed Conservation Area are identified with the best available ecological and spatial data based on conservation science, landscape ecology, and spatial analysis. Within this landscape, 42 Focal Species and 16 Natural Communities exist based on habitat models from Florida Natural Areas Inventory, FWC, and University of Florida Center for Landscape Conservation Planning. The habitats include transitional zones from dry to wet extremes which are crucial for providing opportunities for species resiliency and adaptation. The proposed Conservation Area contains one of the few regions in the eastern United States harboring a regional scale wildlife corridor relevant to the protection of many federal and State listed species including significant opportunities for range shifts in response to climate change. The proposed Conservation Area ecological priorities overlap with many State program priorities which are based on the top ecological priorities of the Florida Ecological Greenways Network (FEGN), Florida Wildlife Corridor, and landscape priorities identified in the Critical Lands and Waters Identification Project (CLIP) Landscape Integrity Model and the FEGN Coastal Connectivity Model. The FEGN/CLIP individual components are valuable indicators of ecological priorities for both biodiversity, surface water resources, and other landscape-level conservation priorities.

Goal 3.
Conserve Important Lands and Waters for the Benefit of All People.
Objectives:
• Assist with the restoration of the Everglades. • Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy especially the Caloosahatchee River watershed, Fisheating Creek watershed, the Peace River watershed, the Myakka River watershed, Okaloacoochee Slough, Corkscrew Swamp, and Charlotte Harbor. • Maintain unique natural communities and species adapted to unique subtropical environment. • Conserve habitat diversity and complexity. • Facilitate protection of a regional scale wildlife corridor through the protection of a functional • landscape mosaic of natural communities and ranchlands. • Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species. • Complement other conservation initiatives. • Conserve cultural sites and landscapes.

- Provide cultural, traditional, and medicinal use opportunities on fee-title lands.
- Provide wildlife dependent recreational opportunities on fee-title lands.

Rationale

Visitors to the proposed Conservation Area fee-title lands would enjoy opportunities for compatible wildlife-dependent recreation which may include hunting, fishing, wildlife observation, photography, environmental education, and interpretation, while increasing knowledge of and support for conservation. Willing landowners could protect their private land through conservation easements and stewardship programs while providing important ecosystem services for all people. The Greater Everglades and southwest Florida watersheds require protection of remaining functional wetlands and floodplains, and restoration of hydrology to avoid further impairment and improve water quality and supply including Charlotte Harbor, an essential economic engine for south and southwest Florida. The proposed Conservation Area would be a unit of the network of lands in southwest Florida that are part of the National Wildlife Refuge System. This includes six national wildlife refuges, Florida Panther NWR, Ten Thousand Islands NWR, Ding Darling NWR, Caloosahatchee NWR, Matlacha Pass NWR, and Pine Island NWR, which provide over 1.5 million wildlife-dependent recreational opportunities to visitors annually.

Goal 4.

Promote Conservation Partnerships Working with Adaptive and Flexible Tools and Strategies.

Objectives:

- Facilitate protection of a regional scale wildlife corridor through the protection of a functional
- landscape mosaic of natural communities and ranchlands.
- Facilitate resiliency and adaptation to climate change through protection and restoration of freshwater flows into coastal wetlands and protecting coastal to inland connectivity to provide a functional retreat for coastal species.
- Complement past, current, and future conservation efforts.
- Foster existing partnerships and seek new partnerships.
- Conserve cultural sites and landscapes.
- Provide cultural, traditional, and medicinal use opportunities on fee-title lands.
- Provide wildlife dependent recreational opportunities on fee-title lands.

Rationale

Collaboration in science, education, research, and land acquisition would facilitate the development of new partnerships and strengthen existing partnerships with natural resource organizations, private landowners, government agencies, Tribal Nations, and local decision-makers. For example, the proposed Conservation Area is contained in the Resilient Lands and Waters Initiative, which is an effort to support collaborative landscape partnerships where federal agencies work with partners to conserve and restore important lands and waters and make them more resilient to changing climate. These partnerships would help inform land management decisions and encourage continued responsible stewardship of natural and rural landscapes essential for listed species protection, associated natural resources, and facilitating resiliency and adaptation to climate change. Southwest Florida is one of the most rapidly growing parts of the United States with an extreme level of human population growth, fast-pace and large scale of habitat loss due to new development, and rapidly expanding coastal developed areas that are moving further inland to threaten important habitats, watersheds, and a sustainable rural landscape. The region is home to many ranches providing very important landscape-scale conservation opportunities with willing landowners vitally interested in conservation

easements.

ACQUISITION MANAGEMENT

Working with willing landowners, the protection of lands would be accomplished by targeting less-than-fee-title acquisitions within the approximately 4-million-acre proposed Conservation Area. Additionally, up to 10% fee-title would be targeted throughout the proposed Conservation Area. Less-than-fee-title acquisitions (e.g., conservation easements) would be acquired in perpetuity.

PUBLIC USE MANAGEMENT

Newly acquired fee-title lands with existing wildlife-dependent recreational public uses may be deemed compatible and could continue on an interim basis until the completion of a Comprehensive Conservation Plan or associated Step-Down Plan. Such decisions must be based on the compatibility standards and procedures.

Interim Public Uses for Consideration

Would these uses be provided during the interim phase?

Hunting: Yes, hunting could occur on those parcels acquired in fee-title where public (open to the general public) hunting is actively occurring prior to acquisition under current FWS policy and guidance. Interim use may occur until Hunt Plan and Opening Hunt Package is developed and approved (generally 3-5 years after fee-title acquisition to establish land base to support the use). Interim hunting may be limited by number of acres of fee-title lands acquired, Service policy, State hunting regulations, and potentially restricted access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Fishing : Yes, fishing could occur on those parcels acquired in fee-title where public (open to the general public) fishing is actively occurring prior to acquisition under current FWS policy and guidance. Interim use may occur until a Sports Fishing Plan and Opening Sports Fishing Package is developed and approved (generally 3-5 years after fee-title acquisition to establish land and water base to support the use). Interim fishing may be limited by number of acres of fee-title lands acquired, Service policy, State fishing regulations, and potentially restricted access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Environmental Education and Interpretation: Yes, limited due to staffing, partnership opportunities, and facilities.

Wildlife Observation and Photography: Yes, limited due to staffing, partnership opportunities, and facilities.

Boating: (Wind-driven, Human-powered, Motorized) Yes, in support of wildlife-dependent recreational uses limited due to staffing, partnership opportunities, and facilities. Also potentially limited by jurisdiction and location; State hunting and fishing regulations; motor type and size; and access to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Bicycling: Yes, in support of wildlife-dependent recreational uses. Generally restricted to improved roads or trails. Potentially limited by location and seasonality to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Camping: Yes, in support of hunting and environmental education, limited due to location, staffing, partnership opportunities, and facilities. Potentially limited by location and seasonality to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Horseback Riding: Yes, in support of wildlife-dependent recreational uses. Generally restricted to improved roads or trails. Potentially limited by location and seasonality to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Running and Jogging: Yes, in support of wildlife-dependent recreational uses. Generally restricted to improved roads or trails. Potentially limited by location and seasonality to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Hiking and Backpacking: Yes, in support of wildlife-dependent recreational uses. Generally restricted to improved roads or trails. Potentially limited by location and seasonality to address issues such as human safety, wildlife and/or habitat impacts, illegal activities, etc.

Off Road Vehicle use Yes, on a case-by-case basis for Mobility Impaired Visitors participating in hunting; restricted to improved roads or trails.

CULTURAL RESOURCES

Given the potential of cultural resources within the proposed Conservation Area and given the importance of this landscape to both the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida, the Service would develop a Cultural Resources Management Plan for the proposed Conservation Area. This Plan would include, but is not limited to, identification of relevant historic contexts, reviews of the Florida Master Site Files and available technical literature, oral history interviews, Phase I archaeological and historical surveys of lands acquired in fee-title by the Service, and follow-up testing of identified historic properties to ascertain their eligibility for inclusion on the National Register of Historic Places.

OPERATIONS AND PLANNING

Units of the NWRS are managed according to an annual work plan that summarizes goals and objectives for the upcoming year. Specific actions for on-the-ground-work, such as operation procedures, wildlife inventory plans, habitat management actions, public use, and other management activities are covered in detail in management plans. An annual work plan may generally state, for example, that 1,000 acres of invasive plant species will be controlled within the proposed Conservation Area, thus setting a target and goal for invasive species, control methods, timing of control, monitoring of effectiveness of the application, retreating areas, monitoring, and other actions for the year.

Long-term planning, outlined earlier, includes the preparation of a CCP and associated step-down plans, which describes the desired future conditions of a refuge and provides long-range guidance and management direction to achieve the purposes of the proposed Conservation Area.

REFERENCES

Caudill, J. and E. Carver. 2019. Banking on nature 2017: The economic contributions of National Wildlife Refuge recreational visitation to local communities. U.S. Fish and Wildlife Service, Falls Church, VA.
https://www.fws.gov/sites/default/files/documents/USFWS_Banking_on_Nature_2017.pdf

APPENDIX C. INTERIM COMPATIBILITY DETERMINATIONS

Draft Compatibility Determination
Title

Draft Interim Compatibility Determination for Wildlife Observation and Photography, Proposed Everglades to Gulf Conservation Area

Refuge Use Category

Wildlife Observation and Photography

Refuge Use Type(s)

Wildlife Observation and Photography

Supporting Uses

Bicycling, Boating (Wind-driven, Human-powered, and Motorized), Hiking and Backpacking, Running and Jogging, Horseback Riding

Refuge

Proposed Everglades to Gulf Conservation Area

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)

"…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)

"…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)

"…to conserve and protect migratory birds..., including species that are listed...as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)

"…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)

"…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as 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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

No

What is the use?

The uses are wildlife observation and wildlife photography. The supporting uses are bicycling, boating, hiking and backpacking, running and jogging, and horseback riding. The uses are defined as follows:

- Wildlife observation is the viewing of fish, wildlife, plants, or their habitats by visitors.
- Wildlife photography is visitation for the purpose of photographing natural or cultural resources (including fish, wildlife, plants, and their habitats) or public uses of those resources (not for commercial, news, or educational purposes). This compatibility determination does not cover photography for commercial or press use.
- Bicycling is riding a bicycle on or off roads, paths, or trails. Bicycling includes e-bikes as defined by Secretary Order 3376 and 15 U.S.C. § 2085 as follows:
    - i) "Class 1 electric bicycle" shall mean an electric bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour;
    - ii) "Class 2 electric bicycle" shall mean an electric bicycle equipped with a motor that may be used exclusively to propel the bicycle, and that is not capable of providing assistance when the bicycle reaches the speed of 20 miles per hour; and
    - iii) "Class 3 electric bicycle" shall mean an electric bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 28 miles per hour.
- Boating
    - Wind-driven boating is travel by sailboat, sailboard, surfboard, or similar boat with

sail(s) or kite(s) powered by the wind.

    - Human-powered boating is travel by canoe, kayak, raft, rowboat, paddleboard, or similar boat propelled through the water by oars, paddles, poles, or other human-powered devices.
    - Motorized boating is travel by boat powered by fossil fuel or electricity (including solar powered).
- Hiking and backpacking is the use of trails or back-country areas by hikers and backpackers (excludes interpretive trails or areas).
- Running and jogging is running or jogging on or off roads, paths, or trails.
- Horseback riding is riding a horse on or off designated trails.

Is the use a priority public use?

Yes

Where would the use be conducted?

These uses could be permitted on publicly accessible lands owned or managed by the U.S. Fish and Wildlife Service (Service) as part of the proposed Everglades to Gulf Conservation Area.

When would the use be conducted?

These uses would be permitted year-round from sunrise to sunset unless otherwise specified by signage and on the proposed Conservation Area's website.

How would the use be conducted?

Wildlife observation and photography are typically conducted on-foot by individuals or small groups and can be facilitated with trails, informational materials (e.g., brochures and signage), viewing areas, and wildlife observation programs. Brochures and maps detailing open trails, viewing areas, and hours of operation would be available on the proposed Conservation Area's website. These uses would be allowed during open hours of the Conservation Area from sunup to sundown and would occur in areas open to the public. Requests for access outside of those areas and times would be assessed through a Special Use Permit (SUP) application and approved or denied by the refuge manager.

Bicycling, running and jogging, and horseback riding would only be permitted on designated roads, trails, and paths.

Boat use and launch would be permitted on areas managed by the proposed Conservation Area and indicated on brochures and website.

Wildlife observation and photography and supporting activities conducted in groups larger than 10 would be allowed through issuance of a SUP by the Conservation Area manager.

Parking would be allowed only in indicated parking lots.

Why is this use being proposed or reevaluated?

Wildlife observation and photography are priority public uses as defined by the National Wildlife

Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Per the Improvement Act of 1997, these uses are to be prioritized over general uses. In addition, non-consumptive wildlife-dependent recreation provides opportunities for the public to connect with the proposed Conservation Area's natural and cultural resources, fostering appreciation and support for the Refuge System and its mission.

Availability of Resources

The resources necessary to provide and administer these uses are a rough estimation based on similar activities conducted at other units of the National Wildlife Refuge System. These uses will be open to the public when fee-title land has been acquired by the Service that allows for public access.

Personnel and supporting outreach materials requirements are estimated here. Any needs for infrastructure, should they arise, will be assessed at a later date.

The resources required would depend on the amount of publicly accessible land owned or managed within the proposed Conservation Area. The Service is expected to have the resources necessary to administer these uses in a limited capacity. More extensive opportunities and amenities would depend on available funding (e.g., budget, grants, donations) and volunteers.

Refuge staff would be responsible for:
1. Onsite evaluations to resolve public use issues.
2. Monitoring and evaluating impacts.
3. Maintaining signs.
4. Meeting with adjacent landowners and interested public.
5. Recruiting volunteers.
6. Preparing and presenting interpretive programs.
7. Maintaining self-guided interpretive materials (e.g., refuge brochures, refuge specific handouts, wildlife cameras and other web-based activities).
8. Revising outreach materials and developing new ones.
10. Installing and maintaining kiosks and updating kiosk information.

CMP Table 1. Estimated Costs for Implementing Wildlife Observation and Photography

Identifier	Estimated Annual Cost
Staff (Maintenance Workers, Biologist, and Refuge Managers)	$10,000
Developing and Producing Interpretive Materials	$10,000
Maintain Signage	$1,000
Total	$21,000
Off-setting Revenue	$0

Anticipated Impacts of the Use

Potential impacts of a proposed use on the proposed Conservation Area's purpose(s) and the Refuge System mission

Wildlife-dependent recreation, such as wildlife observation and photography, introduces visitors to the proposed Conservation Area and its resources and fosters environmental stewardship values. For example, nature-based activities can increase visitors' connection to nature (Rosa et al. 2019), inspiring participation in environmentally responsible behaviors (Lee and Jan 2015). Such connectedness and environmental awareness increase the public's support for the Refuge System and its mission.

The effects and impacts of wildlife observation and photography and its supporting uses covered in this CD, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the uses. Resources that would not be more than negligibly impacted by the proposed action and have been dismissed from further analysis. The Service may modify or eliminate the uses at any time to address resource concerns, unacceptable impacts, and public safety needs or to adapt to changing conditions.

These uses directly support Goal 3 of the proposed Conservation Area, Conserve Important Lands and Waters for the Benefit of All People and the mission of the National Wildlife Refuge System. By experiencing nature in person and viewing the natural resources of the Conservation Area, visitor will develop a greater appreciation for the natural world and increased conservation ethic.

Short-term Impacts Applicable to Wildlife Observation and Photography and All Supporting Uses

I. Wildlife

Human presence, including recreationists, can negatively affect birds by causing them to alter behaviors necessary for survival. Birds exhibit various behavioral and physiological responses to human disturbance and may avoid areas with high levels of human activity (Burger 1981). Physiological responses include the release of stress hormones (Müllner et al. 2004, Thiel et al. 2008) and increased heart rate (Weimerskirch et al. 2002). Behavioral responses include increased vigilance (Frid and Dill 2002), altered singing behavior (Gutzwiller et al. 1994), and flushing (Spahr 1990, Ikuta and Blumstein 2003, Beale and Monaghan 2004, Pease et al. 2005, McLeod et al. 2013, Livezey et al. 2016). Human disturbance can also cause birds to discontinue or avoid foraging (Burger and Gochfield 1998, Thomas et al. 2003, Yasue 2005, Martín et al. 2015) and instead spend more time displaying avoidance behaviors. Further, McNeil et al. (1992) suggested that some waterfowl and shorebird species may forage at night instead of during the day to avoid humans. These physiological and behavioral responses to human presence can force birds into suboptimal habitats, cause crowding in undisturbed habitat, leave eggs and chicks vulnerable to predators and heat stress, and increase intraspecific competition (Gill and Sutherland 2000, Frid and Dill 2002). Further, birds' responses to human activity cause birds to expend energy (Bélanger and Bédard 1990, Weimerskirch et al. 2002, Pease et al. 2005, Doherty et al. 2021) that would otherwise be used for survival, migration, and reproduction.

Mammals also exhibit avoidance behaviors in response to human activity (Hammitt and Cole 1998). Bats expend more energy when disturbed by humans (Speakman et al. 1991), and mammalian species across the globe have become nocturnal to avoid people (Gaynor et al. 2018). Mammals likely to experience adverse impacts from human disturbance are those with limited available habitat; these animals are forced to remain in the disturbed habitat due to a lack of suitable alternatives and suffer the consequences of human disturbance.

Consistent with other species, reptiles, amphibians, and arthropods engage in avoidance behaviors when encountering human disturbance (Frid and Dill 2002, Huang et al. 2011, Selman et al. 2013). However, the short-term impacts of human disturbance on these species are not well-studied.

Visitors may intentionally or unintentionally leave litter on Service owned lands, decreasing aesthetics and potentially endangering wildlife who could choke on or become entangled in refuse. The Service would monitor areas where recreation occurs to ensure litter is not being left on-site.

Generally, the negative impacts of recreationists on wildlife vary in severity based on several factors but can be minimized. For example, the negative impacts of disturbance become more severe with decreasing distance between humans and animals (Skagen et al. 2001, Beale and Monaghan 2005, Pease et al. 2005, Trulio and White 2017). If adverse impacts occur, the Service would create buffers around sensitive species, which can minimize the effects of human disturbance (Rodgers and Smith 1997, Ikuta and Blumstein 2003). Impact severity can also vary depending on the number of people present, with increasing numbers associated with greater disturbance (Burger and Gochfield 1998, Thomas et al. 2003, Beale and Monaghan 2004b, Yasue 2005, Pearce-Higgins et al. 2007). Thus, the Service may limit group sizes to protect wildlife. Finally, the Service may temporarily or permanently close areas if minimization measures are insufficient to protect wildlife or habitats.

II. Vegetation and Soil

Recreationists can trample vegetation on- and off-trail. A plant's response to trampling is heavily influenced by its morphological characteristics (Pescott and Stewart 2014, Marion et al. 2016). The brittle woody stems of shrubs and small trees and rigid stems of tall forbs are susceptible to trampling, which can damage buds and flowers and reduce seed production (Cole 1995, Cole and Monz 2002, Marion et al. 2016). Grasses, sedges, and low-growing herbs are more resistant due to flexible stems and underground perennating buds (Hill and Pickering 2009, Striker et al. 2011, Marion et al. 2016). Once trampling occurs, vegetation is slow to recover; however, studies have consistently shown that the most impact occurs with initial or low use, with a diminishing increase in impact associated with increasing traffic levels (Bostrom et al. 2021). The Service would restrict the uses to specific areas to reduce impact and continuously monitor vegetation for unexpected adverse impacts.

III. Invasive Species

Recreationists can be vectors for invasive plants. Seeds or other propagules can be transferred from one area to another via clothing or personal belongings and spread to nearby areas through self-propagation (Pickering and Hill 2007). Once established, invasive plants can out-compete native plants, altering habitats and indirectly impacting wildlife. The Service would manage invasive plants and educate visitors about this issue.

IV. Visitor Use, Safety, and Experience

Quantitative research documenting the impacts of multiple co-occurring uses on recreationists' experiences is scant. Crowding may deter some recreationists (Manning and Valliere 2001) from visiting the proposed Conservation Area. However, appropriate management can minimize conflicts by separating competitive user groups (Marcouiller et al. 2009) by area.

V. Law Enforcement

Law enforcement issues are possible, such as trespassing, disorderly conduct, and the illegal taking

of fish and other species. The proposed Conservation Area would be supported by Fish and Wildlife Officers assigned to both the South Florida Patrol District and the North Florida Patrol District.

Short-term Impacts Applicable to Specific Uses

I. Wildlife

Wildlife observers and photographers can negatively impact birds. Korschen (1992) reported that birdwatching was the least disturbing among activities that disturb wildlife. However, Klein (1993) suggested that approaching birds on foot was the most disruptive among typical refuge activities. Photographers may be especially likely to cause disturbance by lingering in a sensitive area or using recorded calls. Still, wildlife observation can help people connect with and develop an appreciation for nature, while photography can increase engagement by creating images that appeal to people's emotions (Hanisch 2017). Further, wildlife observation and photography can have more severe impacts on birds during the breeding season, negatively affecting reproductive success. Human disturbance may result in abandoned nests and breeding attempts (Acosta et al. 2007) or a shift in nest locations (Skagen et al. 2001).

Where compatible, bike riding, including the use of electric bicycles ("e-bikes"), facilitates opportunities for wildlife observation, photography, hunting, and other wildlife-dependent recreational opportunities. This use may provide opportunities for visitors to observe and learn about wildlife and refuge lands firsthand and at their own pace in an unobstructed environment. Cycling may reduce impacts associated with car-dependent recreation, including congestion and emissions. In addition, this use promotes the national and regional priority, Connecting People to Nature, and other health-related initiatives.

Minor impacts may occur in association with bicycling, such as wildlife disturbance, littering, soil erosion and compaction, and off-trail riding. Cyclists can disturb wildlife that are resting, foraging, and/or breeding along trails, resulting in overall negative impacts on fitness. Studies by Blumstein (2003) and Blumstein et al. (2004) show that 'flight-initiation-distance' varies by species and intruder starting distance as well as by things such as flock size, angle of approach, time of year, time of day, reproductive state, distance to refuge, and type of disturbance. Such impacts are typically temporary, and mirror those associated with other trail uses (Bennett & Zuelke 1999; Pease et al. 2005). Disturbances are likely to be greatest directly along trails, and decrease proportionately with distance from the trail edge. Common species have been shown to have a higher tolerance for disturbance compared to rare species and songbirds (Trails and Wildlife Task Force 1998; Miller et al. 2001). Seasonal regulation of trail use may also decrease negative impacts during breeding and nesting seasons; for instance, Hammitt and Cole (1998) note that females (such as deer) with young are more likely to flee from a disturbance than those without young. This indicates increased sensitivity to human disturbance during the breeding season. Trails may facilitate nest predation by increasing opportunities for access by mammalian predators. However, these impacts are associated with the existence of the trail itself, rather than the trail uses.

Bicycle wheels can cause physical impacts on soil surfaces. Cessford (1995) notes the shearing action of wheels creates damage to trails, which increases when trail conditions are wet or when traveling up a steep slope. However, soil erosion is largely avoidable with good trail design and maintenance. Properly designed drainage features will divert water from the trail, where vegetation and organic litter can filter out sediments (Volpe 2021). Bicycling along the edges of the trail or off trail may also cause vegetation to be trampled. Complete loss of vegetation cover occurs more quickly in shady forested areas and less quickly in open areas with resistant grassy vegetation. Once trampling

occurs, vegetation is slow to recover; however, studies have consistently shown that the most impact occurs with initial or low use with a diminishing increase in impact associated with increasing levels of traffic (Volpe 2021). Litter may be intentionally or incidentally deposited by trail users. Cyclists may also serve as vectors for invasive plant species when off-refuge seeds and plant material cling to clothing, footwear, equipment, and tires, and are deposited on the refuge. The threat of invasive plant establishment requires annual monitoring and treatment when necessary. Where designated public use trails are established in part to funnel visitors through approved areas and prevent impacts from occurring across larger areas of habitat, impacts related to soil compaction, litter, and transport of invasive plant material are similar to those associated with other trail user groups.

E-bikes and mountain bikes have similar impacts on trails. Studies on the impacts of e-bikes on wildlife are conflicting. Some studies suggest that e-bikes cause greater disturbance to wildlife than non-motorized bikes because they disrupt wildlife within a shorter distance. Other studies suggest that e-bikes cause less disturbance because they exit the area more quickly than non-motorized bikes (Nielson et al. 2019). If conflicts arise between e-bike users and non-motorized bicycle users, or if safety becomes an issue due to speed, the refuge may designate specific trails for specific user groups.

Since users engaged in bicycling travel at a faster rate than hikers, and may be more likely to disturb wildlife, this has potential to result in conflicts such as reducing the quality of experience for other visitors. The Service would monitor trails for impacts caused by e-bikes and modify the use should unanticipated impacts occur.

Disturbances to wildlife and other users by non-motorized boats are generally less severe than motorized activities (Graham and Cook 2008) due to the quiet nature of paddling or sailing and the generally low volume of non-motorized boats in any given area. Non-motorized boat disturbance is temporary and usually localized, with adverse impacts varying based on species (Batten 1977). However, non-motorized boats, such as kayaks and canoes, can approach wildlife more closely than larger, motorized vessels, which can greatly disturb roosting and nesting birds. Thus, the Service would ensure that sensitive wildlife sites, such as rookeries, are buffered.

Boating can cause short-term impacts on aquatic wildlife, including inducing physiological responses and behavioral changes and disrupting communication. Boat noise can cause sublethal stress responses in fish, increasing heart rate and decreasing stroke volume (Graham and Cooke 2008). Such physiological responses increase energy expenditure, which can have various adverse short-term impacts, such as increased susceptibility to predation and decreased foraging success. Other water-dwelling animals, like crustaceans, also exhibit behavioral and physiological stress responses to boat noise (Filiciotto et al. 2014). Boat-related disturbance has been shown to induce morphological and behavioral changes in the black bullhead (*Ameiurus melas*), resulting in observable changes to ciliary bundles and more time spent sheltering (Mickle et al. 2019). Some fish may spend less time guarding young in response to boat noise, exposing eggs and young to predation, which could influence the productivity of fish populations (Maxwell et al. 2018). Boat noise pollution can also disrupt communication among fish (Codarin et al. 2009), which may impede mate attraction, increase predation, and disorient the fish. The Service would restrict boating activities in areas with sensitive aquatic species to minimize the impacts of motorized boats on fish, crustaceans, and other water-dwelling organisms.

Boat strikes has been recognized as a significant danger to manatees (*Trichechus manatus latirostris*) in coastal Florida (Calleson and Frohlich 2007, USFWS 2001). At the development of the manatee recovery plan in 2001, boat strikes were recognized as the top threat to manatees causing an estimated 25% of mortality (USFWS 2001). Bassett et al. (2020) found that over 96% of adult manatees has watercraft related scars and that 1 in 4 manatees had scars from 10 or more encounters. Data showed that manatees on the west coast of Florida had more scars from those on the east coast. Actions including reducing boat speeds in manatee frequented areas and providing sanctuary areas for manatees at critical times of the year can be effective at reducing incidents of boat collisions.

Horseback riding can negatively impact wildlife species, including mammals, invertebrates, reptiles, amphibians, and birds. Horses can kill invertebrates and small animals by trampling them. They can also step on nests, destroying eggs or killing young who cannot flee. Littlemore and Barlow (2005) reported that heavy trampling can severely reduce the population densities of soil and litter-dwelling invertebrates by up to 89% in path centers and 57% at path margins when compared to undisturbed soil, suggesting that horses can negatively affect invertebrates. The Service would monitor horseback riding areas and modify the use when necessary to minimize the impacts of horseback riding on wildlife.

The seeds or other propagules of invasive plants could be transferred from one area to another via horses or their owners. However, the literature is inconsistent regarding the extent to which horses can transport invasive species. Some research suggests that horses are not major invasive species vectors (Landsberg et al. 2001, Gower 2008, Pickering 2010). Conversely, horses eat seeds that may be viable after ingestion, with studies confirming that such seed can germinate from horse dung in a range of environments (Mouissie et al. 2005, Törn et al. 2009). Further, the soil disturbance associated with horseback riding has been identified as contributing to establishing suitable environments for invasive species (Newsome et al. 2002). Additional research is required to understand horses' impacts on invasive species. The Service would monitor for invasive plants and educate the public about this issue.

II. Vegetation and Soil

Boats can damage vegetation on- and off-shore. For example, boaters could damage vegetation and compact soil while hauling canoes and kayaks to and from launch sites. Boats can also damage aquatic vegetation, reducing vegetation cover and height (Hansen et al. 2019, Sagerman et al. 2020). The Service would not allow boating in areas with especially vulnerable aquatic vegetation.

Horse riding has been associated with heavy trampling of vegetation and soils (Weaver and Dale 1978, Landsberg et al. 2001, Littlemore and Barlow 2005). In addition, grazing by horses can damage grasses and other palatable species (Newsome et al. 2004, 2008; Cater et al. 2008).

III. Visitor Use, Safety, and Experience

Horses may negatively impact visitors' experiences if visitors are uncomfortable around horses or if riders fail to clean up horse waste. Horses may also pose a safety threat to their riders and other visitors. The Service would only allow horseback riding on designated trails to protect visitors' safety and ensure horseback riding does not negatively impact other user groups' experiences.

Long-term Impacts Applicable to Wildlife Observation and Photography and All Supporting Uses

I. Wildlife

Without protective measures, continuous human disturbance can affect have long-term impacts on wildlife at the individual and population level. The possible effects of long-term disturbance on wildlife include changes in health, reproductive success, and distribution (Steven et al. 2011, Selman et al. 2013, Gibson et al. 2018, Doherty et al. 2021). A study in the southeastern United States showed that piping plovers at disturbed sites had lower body mass than birds at undisturbed sites (Gibson et al. 2018). Long-term disturbance also negatively impacts reptiles, with freshwater turtles at disturbed sites having poorer shell conditions than undisturbed sites (Selman et al. 2013). In addition, the continuous disturbances associated with nature-based recreation can reduce the number of nests built, eggs laid, and chicks hatched or fledged (Liddle 1997, Buckley 2004, Müllner et al. 2004, Liley and Sutherland 2007, Steven et al. 2011). Further, research has shown that human disturbance disrupts the movement patterns and distribution of various species, such as birds, mammals, reptiles, amphibians, fish, and arthropods (Doherty et al. 2021). Altered movement patterns can upset the balance between energy intake and the cost of travel, threatening reproductive rates, population viability, and ecosystem functions (Staggenborg et al. 2017, Perona et al. 2019). Although possible, these long-term impacts on the proposed Conservation Area are unlikely because staff would monitor impacts regularly and modify the use accordingly.

II. Vegetation and Soils

Invasive species can alter animal and plant composition, diversity, and abundance (Eiswerth et al. 2005, Davies and Sheley 2007). These changes may reduce native forage, cover, and water sources (Eiswerth et al. 2005). Certain invasive species may even impede access to other recreational activities, such as hydrilla, which blocks waterways.

Recreationists can trample vegetation, exposing soil and leading to long-term impacts. Once vegetation and organic litter are lost, exposed soils are subject to compaction, leading to increased erosion and wetland sedimentation (Cooke and Xia 2020). The consequences of compacted soil include increased temperatures, reduced moisture (Marion et al. 2016), reduced soil biota (Liddle 1997), and resistance to seed germination and penetration by plant roots (Alessa and Earnhart 2000). The Service would minimize soil compaction by restricting horseback riders to established trails and roads.

III. Economy

Opportunities for outdoor recreation could benefit the local economy by attracting visitors interested in exploring the outdoors on foot. These visitors would likely stimulate the local economy by staying in hotels, dining in restaurants, and shopping at local establishments.

Units of the National Wildlife Refuge System can influence local economies. A report on economic contributions of units of the National Wildlife Refuge System was commissioned by the Service in 2017 (Caudill and Carver 2019). Results revealed that visitation to units of the National Wildlife Refuge System in 2017 had an economic impact of $3.2 billion on local communities and supported more than 41,000 jobs nation-wide. Arthur R. Marshall Loxahatchee National Wildlife Refuge in south Florida specifically contributed about 202 jobs, $8.6 million in employment income, $1.6 million in total tax revenue, and $24.6 million in economic output.

Long-term Impacts Applicable to Specific Uses

I. Wildlife

Bicycling can have long-term impacts on wildlife and habitats, but with appropriate monitoring and minimization strategies, such impacts on the conservation area's resources can be minimized. For example, a study on bison (*Bison bison*), mule deer (*Odocoileus hemionu*), and pronghorn antelopes (*Odocoileus hemionu*) reported that these species exhibited the strongest responses to users above (at a higher elevation) versus users below them (Taylor & Knight 2003). These results suggest that informed trail design can minimize impacts. Further, a recent study in San Diego, California, found that wildlife positively responded to temporal closures of trails to hikers and cyclists, suggesting strategies to limit recreational use during breeding or other sensitive periods are effective (Larson et al. 2020).

II. Vegetation and Soils

Recreational boat traffic can have long-term impacts on submerged aquatic vegetation abundance in freshwater and coastal systems (Sagerman et al. 2020). Boating can reduce vegetation cover and height and alter its composition (Hansen et al. 2019). The loss and alteration of aquatic vegetation can affect its beneficial ecological functions. For example, several studies have shown that submerged vegetation's ability to reduce turbidity is related to its abundance and extent (Orth et al. 1999, Moore 2004, Austin et al. 2017). Further, fish (Hansen et al. 2019) and macroinvertebrate abundance (Diehl and Kornijów 1998, Attrill et al. 2000) increase with increasing vegetation abundance. The loss or reduction of these ecological functions can degrade ecosystems. Informed management can reduce these negative impacts on submerged vegetation (Sagerman et al. 2020).

III. Invasive Species

Small recreational boats can travel long distances, and their relatively low speeds make them ideal vectors for invasive species (Minchin et al. 2006), including invasive animals (Johnson et al. 2001, Power et al. 2004), plants (Buchan and Padilla 2000, Mullin et al. 2000), and algae (Chapman 1999, Farrell and Fletcher 2006). Recreational boaters often use their boats in more than one location, facilitating the spread of invasive species between water bodies. High-pressure washes in between uses effectively remove invasive species from boats, but many boaters do not wash their vessels regularly (Rothlisberger et al. 2010). Therefore, recreational boating may introduce new aquatic invasive species to the proposed Conservation Area that could impact local flora and fauna.

IV. Visitor Use, Safety, and Experience

An examination of impacts associated with hiking and mountain biking on bison, mule deer, and pronghorn antelope revealed the greatest disturbances when users passed tangentially above rather than below animals (Taylor and Knight 2003). The same study revealed alert behavior at greater distances when associated with off-trail use compared to users adhering to designated trail locations. Notably, this study revealed little difference in response to hikers compared to mountain bikers. Thus, long-term impacts may be mitigated through initial selection of appropriate trails for cycling and continued monitoring and enforcement to ensure compliance with trail regulations.

In some instances, habitat loss caused by bicycling and other recreational activities can cause species to abandon the habitat completely. A recent study in San Diego, California, found that wildlife positively responded to temporal closures of trails to hikers and cyclists, suggesting strategies to limit recreational use during breeding or other sensitive periods are effective (Larson et al. 2020). Users

engaged in bicycling may be more likely to cause some wildlife species to flee; this may reduce the quality of experience for other users, such as wildlife observers and photographers. Bicyclists, especially e-bike users, often travel at high rates of speed, which poses a safety risk to other visitors. In addition, research has shown that visitors notice obvious forms of trail impact, such as excessive muddiness, ruts, and tree roots, and that such impacts can degrade the quality of visitor experiences (Roggenbuck et al. 1993, Vaske et al. 1993). Poor trail conditions also make it more difficult to travel and may threaten visitor safety. To ensure visitors' safety, the Service would only allow bikes on designated trails. If conflicts among user groups arise, the Service would modify the use accordingly.

V. Visitor Use, Safety, and Experience

Boaters can endanger wildlife by intentionally or unintentionally polluting the water. Potential pollutants include exhaust gases, spilled fuel, and litter. Tightening engine bolts, replacing worn hydraulic lines, and using an oil tray or drip pan can prevent pollutants from entering the water. In addition, Sim et al. (2015) found that boating infrastructure alters local concentrations of pollutants. Areas near marinas, jetties, and boat ramps were found to have increased fine and moderate metal concentrations, with altered sediment faunal assemblages observed at adjacent sites. These effects were only observed within the structure's local vicinity and did not impact reference sites (Sim et al. 2015).

VI. Water Quality

Horse manure and urine contain nitrogen, phosphorous, and various heavy metals (Edwards et al. 1999, Westendorf 2009), which can have long-term impacts on water quality. Horse manure can introduce 1 g of phosphorus and 2.5 g of nitrogen into the ecosystem per horse per day (Westendorf 2009). These nutrients can runoff into local waterways, affecting riverbank and aquatic biota (Edwards et al. 1999, Westendorf 2009). Increased nutrient loads can also affect vegetation, allowing species that favor higher nutrient densities to dominate other species (Mouissie et al. 2005, Westendorf 2009).

With increased acquisition of fee-title land within the proposed Conservation Area and added uses there can arise conflicts between user grounds. Often uses such as wildlife observation and photography can interfere with education and outreach or hunting for instance. Most user conflicts can be avoided or minimized with careful planning. Uses can be separated in time and space to allow for the highest quality of all experiences possible. Strategies that may be employed include limiting wildlife observation and photography on areas where hunting occurs during hunting seasons. Conversely, hunting might be allowed only in areas not frequented by visitors engaging in wildlife observation and photography. Service staff will evaluate each unit of the proposed Conservation Area upon acquisition to determine the safest and most wildlife friendly structure of visitor uses.

Public Review and Comment

The draft compatibility determination will be available for public review and comment for 30 days from September – October 2023, in conjunction with the public comment period for the draft Everglades to Gulf Land Protection Plan and Environmental Assessment. The public comment period will be advertised through newspapers; radio; public meetings; and outreach to potentially interested parties, State agencies, and Tribes. It will also be available electronically at

https://www.fws.gov/project/everglades-to-gulf-conservation-area. The final compatibility determination will address concerns expressed during the public comment period.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

To ensure the proposed use is compatible with the Refuge System and the proposed Conservation Area's goals and objectives, wildlife observation and photography and its supporting uses would only occur with the following stipulations:

1. All visitors must remain on designated trails, roads, and designated public use areas. Only programs or visitors who obtain a Special Use Permit (SUP) allowing off-road or off-trail access may enter closed areas.
2. A special-use permit application must be submitted for groups or events involving ten or more people. The General Activity Special-Use Permit Application (FWS Form 3-1383G) and instructions on submitting a permit application can be found at https://www.fws.gov/sites/default/files/documents/Form-3-1383-General-Special-Use.pdf.
3. Fundraising cannot be conducted on-site.
4. Visitors are not permitted to use grills, stoves, or open flames.
5. Visitors must dispose of all garbage in the bins provided or pack all garbage to dispose of off-site.
6. E-bikes shall not exceed the speeds used to define each applicable Class of e-bike or speed limits posted on refuge roads and trails being traversed whichever is lower.
7. Horseback riders would be required to wear a helmet while on Service-owned property.
8. Horseback riders would be required to always maintain control of their horse.

Justification

The stipulations outlined above would help ensure that the use is compatible with the purposes of the proposed Conservation Area. As outlined in this compatibility determination, wildlife observation and photography and its supporting uses would not conflict with the national policy to maintain the proposed Conservation Area's biological diversity, integrity, and environmental health. The Service has determined that wildlife observation and photography at the proposed conservation area, in conjunction with the listed stipulations, would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose of the proposed Conservation Area. Instead, wildlife observation and photography and its supporting uses would allow visitors to enjoy the proposed Conservation Area's natural resources and develop an appreciation for the Refuge System and its mission.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

Literature Cited/References

Acosta, S., J. Thayer, W. Merkle, and C. Hellwig. 2007. *Alcatraz Island special event seabird disturbance monitoring report*. National Park Service. http://ww.prbo.org/refs/files/11883_Acostaetal.2007.pdf

Alessa L. and C. G. Earnhart. 2000. Effects of soil compaction on root and root hair morphology: Implications for campsite rehabilitation. In Cole, D., S. F. McCool, W. T. Borrie, and J. O'Loughlin, (Comps.). Wilderness science in a time of change conference—Vol. 5: Wilderness ecosystems, threats, and management, 1999 May 23–27. Missoula, MT. pp 99–104. USDA Forest Service, Proc. RMRS-P-15-Vol-5, Rocky Mountain Research Station, Ogden, UT.

Attrill, M. J., J. A. Strong, and A. A. Rowden. 2000. Are macroinvertebrate communities influenced by seagrass structural complexity? Ecography 23:114–121.

Austin, Å. N., J. P. Hansen, S. Donadi, and J. S. Eklöf. 2017. Relationships between aquatic vegetation and water turbidity: A field survey across seasons and spatial scales. PLoS ONE 12:e0181419.

Bassett, B. L., J. A. Hostetler, E. Leone, C. P. Shea, B. D. Barbeau, G. L. Lonati, A. L. Panike, A. Honaker, L. I. Ward-Geiger. 2020. Quantifying sublethal Florida manatee–watercraft interactions by examining scars on manatee carcasses. Endangered Species Research Vol. 43: 395–408.

Batten, L. A. 1977. Sailing on reservoirs and its effects on water birds. Biological Conservation 11:49–58.

Beale, C. M. and P. Monaghan. 2004a. Behavioural responses to human disturbance: A matter of choice? Animal Behavior 68:1065–1069. doi:10.1016/j.anbehav.2004.07.002

Beale, C. M. and P. Monaghan. 2004b. Human disturbance: People as predation-free predators? Journal of Applied Ecology 41:335–343. doi:10.1111/j.0021-8901.2004.00900.x

Beale, C. M. and P. Monaghan. 2005. Modeling the effects of limiting the number of visitors on failure rates of seabird nests. Conservation Biology 19: 2015–2019.

Bélanger, L. and J. Bédard. 1990. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54:36–41.

Bennett KA, Zuelke E. 1999. The effects of recreation on birds: a literature review. Delaware Natural Heritage Program, Smyrna, DE 19977.

Blumstein, D.T., Anthony, L.L., Harcourt, R.G. & Ross, G. (2003) Testing a key assumption of wildlife buffer zones: is flight initiation distance a species-specific trait? Biological Conservation, 110, 97–100Burger, J. 1981. Effect of human activity on birds at a coastal bay. Biological Conservation 21: 231-241

Blumstein, D.T., Fernandez-Juricic, E., LeDee, O., Larsen, E., Rodriguez-Prieto, I. & Zugmeyer, C. (2004) Avian risk assessment: effects of perching height and detectability. Ethology, 110, 273–285.

Bostrom, H., C. Crachiola, A. Kosnett, and B. Rasmussen. 2021. Bicycling impacts on National Wildlife Refuges. U.S. Department of Transportation. John A. Volpe National Transportation Systems Center. DOT-VNTSC-FWS-21-03. https://rosap.ntl.bts.gov/view/dot/59266

Buchan, L. A. J. and D. K. Padilla. 2000. Predicting the likelihood of Eurasian watermilfoil presence in lakes, a macrophyte monitoring tool. Ecological Applications 10:1442–1455.

Buckley, R. 2004. Impacts of ecotourism on birds. In Buckley, R., (Ed.). *Environmental impacts of ecotourism*. CAB International, Cambridge. pp. 187–209.

Burger, J. and M. Gochfield. 1998. Effects of ecotourists on bird behaviour at Loxahatchee National Wildlife Refuge, Florida. Environmental Conservation 25:13–18.

Calleson, Scott C. and R. Kipp Frohlich. 2007. Slower boat speeds reduce risks to manatees. Endangered Species Research. Vol. 3: 295–304.

Cater, C., R. Buckley, R. Hales, D. Newsome, C. Pickering, and A. Smith. 2008. High impact activities in parks: Best management practice and future research. Cooperative Research Centre for Sustainable Tourism.

Caudill, James and Erin Carver. 2019. Banking on Nature 2017: The Economic Contributions of National Wildlife Refuge Recreational Visitation to Local Communities. U.S. Fish and Wildlife Service, Falls Church, Virginia.

Cessford, G. R. 1995. Off-road mountain biking: A profile of participants and their recreation setting and experience preferences. Department of Conservation.

Chapman, A. S. 1999. From introduced species to invader: What determines variation in the success of *Codium fragile* ssp*. Tomentosoides* (Chlorophyta) in the North Atlantic Ocean? Helgoland Marine Research 52:277–289.

Codarin, A., L. E. Wysocki, F. Ladich, and M. Picciulin. 2009. Effects of ambient and boat noise on hearing and communication in three fish species living in a marine protected area (Miramare,

Italy). Marine Pollution Bulletin 58:1880-1887.

Cole, D. 1995. Experimental trampling of vegetation. II. Predictors of resistance and resilience. Journal of Applied Ecology 32:215–224.

Cole, D. and C. Monz. 2002. Trampling disturbance of high-elevation vegetation, Wind River Mountains, Wyoming, USA. Arctic, Antarctic, and Alpine Research 34:365–376.

Cooke, M. T. and L. Xia. 2020. Impacts of land-based recreation on water quality. Natural Areas Journal 40:179–188.

Davies, K. W. and R. L. Sheley. 2007. A conceptual framework for preventing the spatial dispersal of invasive plants. Weed Science 55:178–184.

Diehl, S. and R. Kornijów. 1998. Influence of submerged macrophytes on trophic interactions among fish and macroinvertebrates. In E. Jeppesen, M. Søndergaard, M. Søndergaard, and K. Christoffersen (Eds.). *The structuring role of submerged macrophytes in lakes* (pp. 24–46). Springer, New York, NY.

Doherty, T. S., G. C. Hayes, and D. A. Driscoll. 2021. Human disturbance causes widespread disruption of animal movement patterns. Nature Ecology & Evolution 5:512–519.

Edwards, D. R., P. A. Moore Jr., S. R. Workman, and E. L. Bushee. 1999. Runoff of metals from alum-treated horse manure and municipal sludge. Journal of the American Water Resources Association 35:155–165.

Eiswerth, M. E., T. D. Darden, W. S. Johnson, J. Agapoff, and T. R. Harris. 2005. Input–output modeling, outdoor recreation, and the economic impacts of weeds. Weed Science 53:130–137.

Farrell, P. and R. L. Fletcher. 2006. An investigation of dispersal of the introduced brown alga *Undaria pinnatifida* (Harvey) Suringar and its competition with some species on the man-made structures of Torquay Marina (Devon, UK). Journal of Experimental Marine Biology and Ecology 334:236–243.

Filiciotto, F., M. Vazzana, M. Celi, V. Maccarrone, M. Ceraulo, G. Buffa, V. Di Stefano, S. Mazzola, and G. Buscaino. 2014. Behavioural and biochemical stress responses of *Palinurus elephas* after exposure to boat noise pollution in tank. Marine Pollution Bulletin 84:104–114.

Frid, A. and L. M. Dill. 2002. Human-caused disturbance stimuli as a form of predation risk. Conservation Ecology 6.

Gaynor, K. M., C. E. Hojnowski, N. H. Carter, and J. S. Brashares. 2018. The influence of human disturbance on wildlife nocturnality. Science 360:1232–1235.

Gibson, D., M. K. Chaplin, K. L. Hunt, M. J. Friedrich, C. E. Weithman, L. M. Addison, V. Cavalieri, S. Coleman, F. J. Cuthbert, J. D. Fraser, W. Golder, D. Hoffman, S. M. Karpanty, A. Van Zoeren, and D. H. Catlin. 2018. Impacts of anthropogenic disturbance on body condition, survival, and site fidelity of nonbreeding piping plovers. The Condor 120:566–580.

Gill, J. A. and W. J. Sutherland. 2000. Predicting the consequences of human disturbance from behavioural decisions. In Gosling, L. M., and W. J. Sutherland, (Eds). Behaviour and Conservation. Cambridge University Press, Cambridge, UK. pp 51–64.

Gower, S. T. 2008. Are horses responsible for introducing non-native plants along forest trails in the eastern United States? Forest Ecology and Management 256:997–1003.

Graham, A. L. and S. J. Cooke. 2008. The effects of noise disturbance from various recreational boating activities common to inland waters on the cardiac physiology of a freshwater fish, the largemouth bass (*Micropterus salmoides*). Aquatic Conservation: Marine and Freshwater Ecosystems 18:1315–1324.

Gutzwiller, K. J., R. T. Wiedenmann, K. L. Clements, and S. H. Anderson. 1994. Effects of human intrusion on song occurrence and singing consistency in subalpine birds. The Auk 111:28–37.

Hammitt, W. E. and D. N. Cole. 1998. *Wildland recreation: Ecology and management* (2nd edition). New York: John Wiley & Sons, Inc.

Hanisch, E. 2017. Cameras for conservation: How photographing wildlife affects engagement with biodiversity. Centre for Science Communication, University of Otago, Dunedin, New Zealand. 182 pp. https://ourarchive.otago.ac.nz/bitstream/handle/10523/8089/HanischEmmaKN2017MSciComm.pdf?sequence=1&isAllowed=y

Hansen, J. P., G. Sundblad, U. Bergstrom, A. N. Austin, S. Donadi, B. K. Eriksson, and J. S. Eklof. 2019. Recreational boating degrades vegetation important for fish recruitment. Ambio 48:539–551.

Hill, W. and C. M. Pickering. 2009. Differences in the resistance of three subtropical vegetation types to experimental trampling. Journal of Environmental Management 90:1305–1312.

Huang, B., K. Lubarsky, T. Teng, and D. T. Blumstein. 2011. Take only pictures, leave only...fear? The effects of photography on the West Indian anole *Anolis cristatellus*. Current Zoology 57:77–82.

Ikuta, L. A. and D. T. Blumstein. 2003. Do fences protect birds from human disturbance? Biological Conservation 112:447–452. doi:10.1016/S0006-3207(02)00324-5

Johnson, L. E., A. Ricciardi, and J. T. Carlton. 2001. Overland dispersal of aquatic invasive species: A risk assessment of transient recreational boating. Ecological Applications 11:1789–1799.

Klein, M. L. 1993. Waterbird behavioral responses to human disturbance. Wildlife Society Bulletin 21:31–39.

Korschen, C. E. and R. B. Dahlgren. 1992. 13.2.15. Human disturbances of waterfowl: Causes, effects, and management. Waterfowl Management Handbook. Lafeyette, LA: U.S. Geological Survey National Wetlands Research Center. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1011&context=icwdmwfm

Landsberg, J., B. Logan, and D. Shorthouse. 2001. Horse riding in urban conservation areas: Reviewing scientific evidence to guide management. Ecological Management and Restoration 2:36–46.

Larson, C. L., S. E. Reed, and K. R. Crooks. 2020. Increased hiking and mountain biking are associated with declines in urban mammal activity. California Fish and Wildlife, Recreation Special Issue 52–61. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178952&inline=

Lee, T. H. and F. H. Jan. 2015 The effects of recreation experience, environmental attitude, and biospheric value on the environmentally responsible behavior of nature-based tourists. Environmental Management 56:193–208.

Liddle, M. 1997. *Recreation ecology: The ecological impact of outdoor recreation and ecotourism*. Chapman & Hall Ltd.

Liley, D. and W. J. Sutherland. 2007. Predicting the population consequences of human disturbance for ringed plovers *Charadrius hiaticula*: A game theory approach. Ibis 149:82–94.

Littlemore, J. and C. Barlow. 2005. Managing public access for wildlife in woodlands—ecological principles and guidelines for best practice. Quarterly Journal of Forestry 99:271–285.

Livezey, K. B., E. Fernández-Juricic, and D. T. Blumstein. 2016. Database and metadata of bird flight initiation distances worldwide to assist in estimating human disturbance effects and delineating buffer areas. Journal of Wildlife Management 7.

Manning, R. E. and W. A. Valliere. 2001. Coping in outdoor recreation: Causes and consequences of crowding and conflict among community residents. Journal of Leisure Research 33:410–426.

Marcouiller, D. W., I. Scott, and J. Prey. 2009. Outdoor recreation planning: A comprehensive approach to understanding use interaction. CABI Reviews, 2008, 1-12.

Marion, J. L., Y. Leung, H. Eagleston, and K. Burroughs. 2016. A review and synthesis of recreation ecology research findings on visitor impacts to wilderness and protected natural areas. Journal of Forestry 114:352–362.

Martín, B., S. Delgado, A. de la Cruz, S. Tirado, and M. Ferrer. 2015. Effects of human presence on the long-term trends of migrant and resident shorebirds: Evidence of local population declines. Animal Conservation 18:73–81.

Maxwell, R. J., A. J. Zolderdo, R. de Bruijn, J. W. Brownscombe, E. Staaterman, A. J. Gallagher, and S. J. Cooke. 2018. Does motor noise from recreational boats alter parental care behaviour of a nesting freshwater fish? Aquatic Conservation: Marine and Freshwater Ecosystems 28:969–978.

McLeod, E. M., P.-J. Guay, A. J. Taysom, R. W. Robinson, and M. A. Weston. 2013. Buses, cars, bicycles and walkers: The influence of the type of human transport on the flight responses of waterbirds. PLoS ONE 8:e82008.

McNeil, R., P. Drapeau, J. D. Goss-Custard. 1992. The occurrence and adaptive significance of nocturnal habitats in waterfowl. Biological Review 67: 381–419.

Mickle, M. F., C. M. Harris, O. P. Love, and D. M. Higgs. 2019. Behavioural and morphological changes in fish exposed to ecologically relevant boat noises. Canadian Journal of Fisheries and Aquatic Sciences 76:1845–1853.

Miller, S.G., R.L. Knight, and C.K. Miller. 2001. Wildlife responses to pedestrians and dogs. Wildlife Society Bulletin, 29(1): 124-132.

Minchin, D., O. Floerl, D. Savini, and A. Occhipinti-Ambrogi. 2006. Small craft and the spread of exotic species. In *The ecology of transportation: Managing mobility for the environment* (pp 99–118). Springer, Dordrecht.

Moore, K. A. 2004. Influence of seagrasses on water quality in shallow regions of the lower Chesapeake Bay. Journal of Coastal Research 2009:162–178.

Mouissie, A. M., P. Vos, H. M. C. Verhagen, and J. P. Bakker. 2005. Endozoochory by free-ranging, large herbivores: Ecological correlates and perspectives for restoration. Basic and Applied Ecology 6:547–558.

Mullin, B. H., L. W. J. Anderson, J. M. DiTomaso, R. E. Eplee, and K. D. Getsinger. 2000. *Invasive plant species*. Ames, IA: Council for Agricultural Science and Technology Issue Paper 13. 17 pp.

Müllner, A., K. E. Linsenmair, and M. Wikelski. 2004. Exposure to ecotourism reduces survival and affects stress responses in hoatzin chicks (*Opisthocomus hoazin*). Biological Conservation 118:549–558.

Newsome, D., D. Cole, and J. Marion. 2004. Environmental impacts associated with recreational horse riding. In Buckley, R. (ed.). *The environmental impacts of ecotourism* (pp. 61–82). CAB International, NY.

Newsome, D., A. Milewski, N. Phillips, and R. Annear. 2002. Effects of horse riding on national parks and other natural ecosystems in Australia: Implications for management. Journal of Ecotourism 1:52–74.

Newsome, D., A. Smith, and S. A. Moore. 2008. Horse riding in protected areas: A critical review and implications for research and management. Current Issues in Tourism 11:1–23.

Nielson, T., S. M. Palmatier, and A. Proffitt. 2019. *Literature review: Recreation conflicts focused on emerging e-bike technology*. Boulder County Parks and Open Space. https://assets.bouldercounty.gov/wp-content/uploads/2020/01/e-bike-literature-review.pdf

Orth, R. J., M. C. Harwell, and J. R. Fishman. 1999. A rapid and simple method for transplanting eelgrass using single, unanchored shoots. Aquatic Botany 64:77–85.

Pearce-Higgins, J. W., S. K. Finney, D. W. Yalden, and R. H. W. Langston. 2007. Testing the effects of recreational disturbance on two upland breeding waders. Ibis 149:44–55.

Pease, M. L., R. K. Rose, and M. J. Butler. 2005. Effects of human disturbance on the behavior of wintering ducks. Wildlife Society Bulletin 33:103–112.

Perona, A. M., V. Urios,, and P. López-López. 2019. Holidays? Not for all. Eagles have larger home ranges on holidays as a consequence of human disturbance. Biological Conservation 231:59–66.

Pescott. O. L. and G. B. Stewart. 2014. Assessing the impact of human trampling on vegetation: A systematic review and meta-analysis of experimental evidence. PeerJ 2:e360.

Pickering, C. 2010. Ten factors that affect the severity of environmental impacts of visitors in protected areas. Ambio 39:70–77

Pickering, C. and W. Hill. 2007. Impacts of recreation and tourism on plant diversity and vegetation in protected areas in Australia. Journal of Environmental Management 85:791–800.

Power, A. J., R. L. Walker, K. Payne, and D. Hurley. 2004. First occurrence of the nonindigenous Green Mussel, *Perna viridis* (Linnaeus, 1758) in Coastal Georgia, United States. Journal of Shellfish Research 23:741–744.

Rodgers, J. A. and H. T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25:139–145.

Roggenbuck, J. W., D. R. Williams, and A. E. Watson. 1993. Defining acceptable conditions in

wilderness. Environmental Management 17:187–197.

Rosa, C. D., S. Collado, C. C. Profice, and L. R. Larson. 2019. Nature-based recreation associated with connectedness to nature and leisure satisfaction among students in Brazil. Leisure Studies 38:682–691.

Rothlisberger, J. D., W. L. Chadderton, J. McNulty, and D. M. Lodge. 2010. Aquatic invasive species transport via trailered boats: What is being moved, who is moving it, and what can be done. Fisheries 35:121–132.

Sagerman, J., J. P. Hansen, and S. A. Wikström. 2020. Effects of boat traffic and mooring infrastructure on aquatic vegetation: A systematic review and meta-analysis. Ambio 49:517–530. https://doi.org/10.1007/s13280-019-01215-9

Selman, W., C. Qualls, and J. C. Owen. 2013. Effects of human disturbance on the behavior and physiology of an imperiled freshwater turtle. The Journal of Wildlife Management 77:877–885.

Sim, V. X. Y., K. A. Dafforn, S. L. Simpson, B. P. Kelaher, and E. L. Johnston. 2015. Sediment contaminants and infauna associated with recreational boating structures in a multi-use marine park. PLoS ONE 10:e0130537.

Skagen, S. K., C. P. Melcher, and E. Muths. 2001. The interplay of habitat change, human disturbance and species interactions in a waterbird colony. American Midland Naturalist 145:18–28.

Spahr, R. 1990. Factors affecting the distribution of bald eagles and effects of human activity on bald eagles wintering along the Boise River. MSc Thesis. Boise State University, Boise, ID.

Speakman, J. R., P. I. Webb, and P. A. Racey. 1991. Effects of disturbance on the energy expenditure of hibernating bats. Journal of Applied Ecology 28:1087–1104.

Staggenborg, J., H. Martin Schaefer, C. Strange, B. Naef-Daenzer, and M. U. Grüebler. 2017. Time and travelling costs during chick-rearing in relation to habitat quality in little owls *Athene noctua*. Ibis 159:519–531.

Steven, R., C. Pickering, and J. Guy Castley. 2011. A review of the impacts of nature based recreation on birds. Journal of Wildlife Management 99:2287–2294.

Striker G. G., F. P. O. Mollard, A. A. Grimoldi, R. J. C. León, and P. Insausti. 2011. Trampling enhances the dominance of graminoids over forbs in flooded grassland mesocosms. Applied Vegetation Science 14:95–106.

Taylor, A. and R. Knight. 2003. Wildlife Responses to recreation and associated visitor perceptions. Ecological Applications 13:951–963.

Thiel, D., S. Jenni-Eiermann, V. Braunisch, R. Palme, and L. Jenni. 2008. Ski tourism affects habitat use and evokes a physiological stress response in capercaillie *Tetrao urogallus*: A new methodological approach. Journal of Applied Ecology 45:845–853.

Thomas, K., R. G. Kvitek, and C. Bretz. 2003. Effects of human activity on the foraging behavior of sanderlings *Calidris alba*. Biological Conservation 109:67–71.

Törn, A, A. Tolvanen, Y. Norokorpi, R. Tervo, and P. Siikamaki. 2009. Comparing the impacts of hiking, skiing and horse riding on trail and vegetation in different types of forest. Journal of

Environmental Management 90:1427–1434.

Trails and Wildlife Task Force. 1998. Planning trails with wildlife in mind: A handbook for trail planners. Colorado State Parks, Denver Co. 51pp.

Trulio, L. and H. R. White. 2017. Winter waterfowl avoidance and tolerance of recreational trail use. Waterbirds 40:252–272.

U. S. Fish and Wildlife Service. 2001. Florida manatee recovery plan, (*Trichechus manatus latirostris*), third revision. US Fish and Wildlife Service, Atlanta, GA

Vaske, J. J., M. P. Donnelly, and B. Shelby. 1993. Establishing management standards: Selected examples of the normative approach. Environmental Management 17:629–643.

Volpe National Transportation Systems Center. 2021. Bicycling Impacts on National Wildlife Refuges. U.S. Department of Transportation. DOT-VNTSC-FWS-21-03.

Weaver, T. and D. Dale. 1978. Trampling effects of horses, hikers and bikes in meadows and forests. Journal of Applied Ecology 15:451–457.

Weimerskirch, H., S. A. Shaffer, G. Mabille, J. Martin, O. Boutard, J. L. Rouanet. 2002. Heart rate and energy expenditure of incubating wandering albatrosses: Basal levels, natural variation, and the effects of human disturbance. Journal of Experimental Biology 205:475–483.

Westendorf, M. 2009. Horses and manure. Fact Sheet FS036. Rutgers University, New Brunswick. https://njaes.rutgers.edu/fs036/

Yasue, M. 2005. The effects of human presence, flock size and prey density on shorebird foraging rates. Journal of Ethology 23:199–204.

Draft Compatibility Determination

Title

Draft Interim Compatibility Determination for Environmental Education and Interpretation, proposed Everglades to Gulf Conservation Area

Refuge Use Category

Environmental Education and Interpretation

Refuge Use Type(s)

Environmental Education and Interpretation

Supporting Uses

Boating, Bicycling, Natural Resource Collecting (non-commercial Plant Gathering, Animal Product Gathering, Fossil collecting, Metal collecting, Rock collecting)

Refuge

Proposed Everglades to Gulf Conservation Area

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)

"…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)

"…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)

"…to conserve and protect migratory birds..., including species that are listed...as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)

"…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)

"…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as 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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

No

What is the use?

The uses are environmental education and interpretation. This document defines environmental education as" on-refuge activities conducted by the Refuge System staff or authorized agents that use a planned process to foster awareness, knowledge, understanding, and appreciation in students about fish, wildlife, plants, ecology, natural sciences (such as astronomy), and refuge management." It defines wildlife interpretation as "on-refuge activities for refuge visitors conducted by National Wildlife Refuge System staff or authorized agents that are designed to foster an understanding and appreciation for natural and cultural resources, and associated management." On-refuge are lands owned in fee-title.
Boating is support of environmental education and interpretation to include the following use types:

Boating (airboats and hovercraft). Use of boats propelled by an airplane-like propeller(s) that allows travel in extremely shallow waters at high speed.

Boating (wind-driven). Travel by sailboat, sailboard, surfboard, or similar boat with sail(s) or kite(s) powered by the wind.

Boating (human-powered). Travel by canoe, kayak, raft, rowboat, paddleboard, or similar boat propelled through the water by oars, paddles, poles, or other human-powered devices.

Boating (motorized). Travel by boat powered by fossil fuel or electricity (including solar powered).

Bicycling in support of environmental education and interpretation is defined as; **Bicycling (including e-bikes).** Riding a bicycle on or off roads, paths, or trails.

Natural Resource collecting in support of environmental education and interpretation including:

Plant gathering (non-commercial). The collection of berries, fruits, grasses, marsh plants (e.g., cattails or sweet grass), seaweed, mushrooms, nuts, roots, wild rice or other plants, plant parts, or plant products for non-subsistence, non-research purposes.

Animal product gathering (non-commercial). The collection of shed antlers, owl pellets, seashells, bones or other animal parts or products for personal use or recreational purposes (does not include

hunting, fishing, aquaculture, or other collection of living organisms).

Fossil collecting (non-commercial). The collection of fossils for personal use or recreational purposes (does not include collecting for research).

Metal collecting (non-commercial). The collection of metal using a metal detector that detects the presence of metal inclusions hidden within objects, or metal objects buried underground.

Rock collecting (non-commercial). Collecting of rocks or minerals by hand for personal use or recreational purposes (does not include collecting for research).

Is the use a priority public use?

Yes

Where would the use be conducted?

These uses could be permitted on publicly accessible lands owned or managed by the U.S. Fish and Wildlife Service (Service) as part of the proposed Everglades to Gulf Conservation Area.

Boating and Bicycling would occur in areas open and accessible to the public as indicated through proposed Conservation Area brochures and website to include waters managed by the National Wildlife Refuge System. Bicycling in support of these uses would occur on trails and roads managed by the National Wildlife Refuge System and indicated on brochures and the station website.

When would the use be conducted?

These uses would be permitted year-round from sunrise to sunset unless otherwise specified by signage and on the station website. Programs proposed for outside of open hours would be accessed individually.

How would the use be conducted?

Environmental education and interpretation would occur on lands owned in fee-title and could include presentations, demonstrations, guided tours, and special events led by staff, volunteers, and authorized agents. Environmental education and interpretation could also include exhibits, signage, and printed information (e.g., brochures). These uses are typically conducted on-foot, by boat, or by bicycle by individuals or small groups and can be facilitated with trails, informational materials (e.g., brochures and signage), viewing areas, and wildlife observation programs. Brochures and maps detailing open trails, viewing areas, and hours of operation would be available on the proposed Conservation Area's website.
Natural resource collecting as described will occur only as part of a planned environmental education or interpretive program carried out by Service staff or agents of the Service. This assessment does not evaluate or extend to natural resource collection by individuals not associated with one of these programs. Any resources collected through implementation of these programs will remain as the property of the Service and will reside at a Service location unless laws and regulations governing those resources supersede this determination (e.g., Native American Artifacts).

Parking would be allowed only in indicated parking lots.

Why is this use being proposed or reevaluated?

Environmental education and interpretation are priority public uses as defined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Per the Improvement Act of 1997, these uses are to be prioritized over other general uses. In addition, environmental education and interpretation would provide the proposed Conservation Area with opportunities to educate the public in settings that transcend the classroom and accommodate a variety of learning styles, encourage environmental stewardship, and foster enthusiasm for the Refuge System and its mission.

Availability of Resources

Funding would be required for staff hours, interpretive materials (e.g., brochures, exhibits, etc.), basic infrastructure, and facilities. Personnel would be required to host educational events, create informational materials, and monitor event locations for adverse impacts. Basic infrastructure, such as access roads and parking lots, would be required to host large numbers of people. Facilities, like visitor contact stations and restrooms, would improve visitors' experience.

The funding required to administer these uses would depend on the size and frequency of educational events and the number of interpretive exhibits constructed on the proposed Conservation Area. The Service is expected to have the resources necessary to administer these uses in a limited capacity. More frequent events and amenities would depend on available funding (e.g., budget, grants, donations) and volunteers. An estimate is provided for implementation of a basic education and interpretation program for context.

Table 1. Estimated Costs for Implementing Environmental Education and Interpretation

Identifier	Estimated Annual Cost
Staff (Maintenance Workers, Visitor Service Specialists, and Refuge Managers)	$70,000
Program Development and Implementation	$10,000
Supporting Printed Materials and Web Support	$3,000
Total	$83,000
Off-setting Revenue	$0

Anticipated Impacts of the Use

Potential impacts of a proposed use on the proposed Conservation Area's purpose(s) and the Refuge System mission

Wildlife interpretation and environmental education activities introduce visitors to the Refuge System and its resources, fostering environmental stewardship values. For example, education and interpretation initiatives can increase visitors' connectedness to nature, positively affecting their ecological knowledge and environmental attitude development (Ardoin 2006, Farmer et al. 2010, Ernst and Theimer 2011, Kudryavtsev et al. 2012). Such connectedness and environmental awareness increase public support for the Refuge System and its mission. These uses directly support Goal 3 of the proposed Conservation Area, Conserve Important Lands and Waters for the Benefit of All People and the mission of the National Wildlife Refuge System. By experiencing nature in person and viewing the natural resources of the proposed Conservation Area, visitors would develop a greater

appreciation for the natural world and increased conservation ethic.

The effects and impacts of environmental education and wildlife interpretation covered in this CD, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the use would not be more than negligibly impacted by the proposed action and have been dismissed from further analysis. The Service may modify or eliminate the uses at any time to address resource concerns, unacceptable impacts, and public safety needs or to adapt to changing conditions.

Short-term impacts

Environmental education and interpretation can have positive and negative impacts on the Refuge System's resources. For example, educational and interpretive initiatives can increase the public's understanding of wildlife and their habitats and create opportunities for visitors to connect with the proposed Conservation Area. However, environmental education and interpretation can disturb wildlife and negatively impact sensitive habitats. The severity of disturbance on wildlife depends on the frequency, duration, and size of events and varies among species.

Birds commonly exhibit an immediate physiological stress response (Müllner et al. 2004, Thiel et al. 2008) to human disturbance and flush (Livezey et al. 2016), sometimes avoiding places with high levels of human activity (Burger 1981, Klein et al. 1995). Large numbers of people (Burger and Gochfield 1998, Thomas et al. 2003, Yasue 2005, Pearce-Higgins et al. 2007) and decreasing distance between the bird and source of disturbance (Skagen et al. 2001, Beale and Monaghan 2005, Pease et al. 2005, Trulio and White 2017) often worsen negative impacts.

Human disturbance can sometimes cause birds to discontinue or avoid foraging (Burger and Gochfield 1998, Thomas et al. 2003, Yasue 2005, Martín et al. 2015). At Arthur R. Marshall Loxahatchee NWR in southeast Florida, common gallinule (*Gallinula galeata*), sora rail (*Porzana carolina),* glossy ibis (*Plegadis falcinellus*), little blue heron (*Egretta caerulea*) and Louisiana heron (*Egretta tricolor*) foraged less in the presence of humans (Burger and Gochfield 1998). Similarly, Martín et al. (2015) suggested that human presence caused resident shorebird species to spend less time foraging and more time displaying avoidance behavior. McNeil et al. (1992) found that many waterfowl species avoid disturbance by altering their feeding schedule, foraging at night instead of during the day.

Environmental education and interpretation can have more severe impacts on wildlife during the breeding season, negatively affecting reproductive success. Human disturbance may result in abandoned nests and breeding attempts (Acosta et al. 2007) or a shift in nest locations (Skagen et al. 2001). In addition, disturbances may affect the reproductive fitness of males by impeding territory defense and mate attraction and altering singing behavior (Ewald and Carpenter 1978, Arcese 1987, Gutzwiller et al. 1994).

The short-term effects of human disturbance on other species, such as reptiles, amphibians, and mammals, are less well-studied. Like birds, many types of wildlife, including mammals, reptiles, amphibians, fish, and arthropods, engage in avoidance behaviors when encountering human disturbance (Frid and Dill 2002, Huang et al. 2011, Selman et al. 2013). Some mammals have also become more nocturnal, foraging at night to avoid daytime disturbance (Gaynor et al. 2018).

Collectively, these avoidance behaviors can cause increased energy expenditure (Pease et al. 2005, Doherty et al. 2021), force birds into suboptimal habitats, cause crowding in undisturbed habitat, and

increase intraspecific competition (Gill and Sutherland 2000, Frid and Dill 2002). However, several strategies can be used to minimize the effects of human disturbance. Adverse impacts typically become more common with decreasing distance between wildlife and the source of disturbance (Skagen et al. 2001, Beale and Monaghan 2005, Pease et al. 2005, Trulio and White 2017), suggesting that creating buffers around sensitive species would protect wildlife (Rodgers et al. 1997). In addition, impact severity depends on timing (Klein et al. 1995) and the number of people present, with increasing numbers associated with greater disturbance (Burger and Gochfield 1998, Thomas et al. 2003, Yasue 2005, Pearce-Higgins et al. 2007). When necessary, implementing seasonal closures has been shown to limit adverse impacts (Klein et al. 1995). Lastly, displaying informational signs would communicate the importance of respecting the proposed Conservation Area's rules and regulations.

Visitors could trample vegetation on- and off-trail. A plant's response to trampling is heavily influenced by its morphological characteristics (Pescott and Stewart 2014, Marion et al. 2016). The brittle woody stems of shrubs and small trees and rigid stems of tall forbs are susceptible to trampling, which can damage buds and flowers and reduce seed production (Cole 1995, Cole and Monz 2002, Marion et al. 2016). Grasses, sedges, and low-growing herbs are more resistant due to flexible stems and underground perennating buds (Hill and Pickering 2009, Striker et al. 2011, Marion et al. 2016). The Service would restrict the use of sensitive habitat and continuously monitor vegetation for unexpected adverse impacts.

Short term impacts due to motorized and non-motorized boating in support of environmental education and interpretation may include wildlife disturbance, littering, vandalism, and aquatic vegetation disturbance. Damage to habitat by walking or dragging a canoe or kayak to and from the launch sites is typically minimal and temporary.

Disturbances to wildlife and other users by non-motorized boats are generally less than motorized activities due to the quiet nature of paddling or sailing, and generally low volume of use in any given area. This disturbance is temporary and generally localized and may vary depending on wildlife species or type of bird (e.g., Batten 1977). Accessing boat launching facilities utilizing refuge roads may cause a minor amount of wildlife disturbance. While it is clear that temporary adverse impacts to wildlife may occur, Service staff will monitor this use to quickly identify any changes that lead to significant adverse impacts to wildlife and habitat.

In a study by Graham and Cook (2008), it was determined that canoe paddles create the least amount of noise compared to combustion engines and electric motors and produced approximately half of the cardiac output compared to the effects of a combustion engine in largemouth bass. When analyzing combustion engines, electric motors and paddling, the study also determined that "Recovery time for cardiac output and heart rate was similar for all three treatments and slightly longer than stroke volume" (Graham and Cook 2008). Paddling creates less noise compared to motorized boating, and thus will result in faster recovery times for largemouth bass and other fish species compared to other methods of boating.

Temporary disturbance to wildlife, such as the flushing of feeding or resting birds, is inherent to boating activities. Motorized and non-motorized boats have the potential to affect birds in multiple ways including but not limited at launch sites and during operation. Much disturbance is focused at launch areas or boaters/visitors moving too close to birds. It is recommended to provide at least 300 feet of distance to prevent disturbance to nesting and roosting birds (University of Florida 2022). Kayaks, canoes, and other small vessels have the ability to "approach much closer and greatly disturb roosting and nesting birds" (University of Florida 2022). Measures to minimize impacts will include education to the public participating in these activities to increase prevention, establishment zones

that restrict boating near known nesting sites, and enforcement of these closure areas.

Bike riding, including the use of electric bicycles ("e-bikes"), facilitates opportunities for environmental education and interpretation opportunities. This use may provide opportunities for visitors to observe and learn about wildlife and refuge lands firsthand and at their own pace in an unobstructed environment. Cycling may reduce impacts associated with motorized methods of travel, including congestion and emissions. In addition, this use promotes the national and regional priority, Connecting People to Nature, and other health-related initiatives.

Minor impacts may occur in association with bicycling, such as wildlife disturbance, littering, soil erosion and compaction, and off-trail riding. Cyclists can disturb wildlife that are resting, foraging, and/or breeding along trails, resulting in overall negative impacts on fitness. Studies by Blumstein (2003) and Blumstein et al. (2004) show that 'flight-initiation-distance' varies by species and intruder starting distance as well as by things such as flock size, angle of approach, time of year, time of day, reproductive state, distance to refuge, and type of disturbance. Such impacts are typically temporary, and mirror those associated with other trail uses (Bennett & Zuelke 1999; Pease et al. 2005). Disturbances are likely to be greatest directly along trails and decrease proportionately with distance from the trail edge. Common species have been shown to have a higher tolerance for disturbance compared to rare species and songbirds (Trails and Wildlife Task Force 1998; Miller et al. 2001). Seasonal regulation of trail use may also decrease negative impacts during breeding and nesting seasons; for instance, Hammitt and Cole (1998) note that females (such as deer) with young are more likely to flee from a disturbance than those without young. This indicates increased sensitivity to human disturbance during the breeding season. Trails may facilitate nest predation by increasing opportunities for access by mammalian predators. However, these impacts are associated with the existence of the trail itself, rather than the trail uses.

Bicycle wheels can cause physical impacts on soil surfaces. Cessford (1995) notes the shearing action of wheels creates damage to trails, which increases when trail conditions are wet or when traveling up a steep slope. However, soil erosion is largely avoidable with good trail design and maintenance. Properly designed drainage features will divert water from the trail, where vegetation and organic litter can filter out sediments (Volpe 2021). Bicycling along the edges of the trail or off trail may also cause vegetation to be trampled. Complete loss of vegetation cover occurs more quickly in shady forested areas and less quickly in open areas with resistant grassy vegetation. Once trampling occurs, vegetation is slow to recover; however, studies have consistently shown that the most impact occurs with initial or low use with a diminishing increase in impact associated with increasing levels of traffic (Volpe 2021). Litter may be intentionally or incidentally deposited by trail users. Cyclists may also serve as vectors for invasive plant species when off-refuge seeds and plant material cling to clothing, footwear, equipment, and tires, and are deposited on the refuge. The threat of invasive plant establishment requires annual monitoring and treatment when necessary. Where designated public use trails are established in part to funnel visitors through approved areas and prevent impacts from occurring across larger areas of habitat, impacts related to soil compaction, litter, and transport of invasive plant material are similar to those associated with other trail user groups.

E-bikes and mountain bikes have similar impacts on trails. Studies on the impacts of e-bikes on wildlife are conflicting. Some studies suggest that e-bikes cause greater disturbance to wildlife than non-motorized bikes because they disrupt wildlife within a shorter distance. Other studies suggest that e-bikes cause less disturbance because they exit the area more quickly than non-motorized bikes

(Nielson et al. 2019). If conflicts arise between e-bike users and non-motorized bicycle users, or if safety becomes an issue due to speed, the refuge may designate specific trails for specific user groups.

Since users engaged in bicycling travel at a faster rate than hikers, and may be more likely to disturb wildlife, this has potential to result in conflicts such as reducing the quality of experience for other visitors. The Service would monitor trails for impacts caused by e-bikes and modify the use should unanticipated impacts occur.

Short-term and localized impacts associated with natural resource collecting as an aspect of environmental education and interpretation are similar to those described above including vegetation trampling or temporary displacement of wildlife in the area where natural resource collection is occurring. Refuge habitats and non-target fish and wildlife will remain largely unaffected by natural resource collection on Conservation Area land. Non-commercial natural resource collection in accordance with applicable State and Federal regulations is not anticipated to result in significant short-term or long-term adverse impacts to the Refuge.

Long-term impacts

Wildlife interpretation and environmental education activities can have long-term impacts on wildlife and habitats. However, some species can habituate to human disturbance (Samia et al. 2015). In addition, appropriate minimization strategies and continuous monitoring can ensure wildlife interpretation and environmental education occur without causing more than negligible long-term impacts on the proposed Conservation Area's resources.

Animals experience various long-term effects due to disturbance. For example, male birds that respond to human intrusion by altering their singing behavior can suffer from lower reproductive fitness due to impaired territory defense and mate acquisition (Gutzwiller et al. 1994). Disrupted foraging behavior can cause decreased body mass (Gibson et al. 2018), increasing a bird's susceptibility to disease. Further, a literature review on the effects of nature-based recreation on birds reported that 28 out of 33 papers observed changes in abundance and reproductive success (Steven et al. 2011). Long-term disturbance also negatively impacts reptiles, with freshwater turtles at disturbed sites having poorer shell conditions than undisturbed sites (Selman et al. 2013). Mammals also suffer long-term consequences from human disturbance. Reed and Merenlender (2008) reported that human activity decreases carnivore density and shifts community composition from native to non-native species.

Visitors can introduce invasive plants, animals, and pathogens (Marion et al. 2006, Davies and Sheley 2007, Anderson et al. 2015) during interpretive and educational events. Seeds or other propagules can be transferred from one area to another via clothing or personal belongings and spread to nearby areas through self-propagation (Pickering and Hill 2007). Once present, invasive species can out-compete native plants and animals, thereby altering habitats (Marion et al. 2006, Anderson et al. 2015). Invasive species can alter animal and plant composition, diversity, and abundance (Eiswerth et al. 2005, Davies and Sheley 2007). These changes may reduce native forage, cover, and water sources (Eiswerth et al. 2005). Certain invasive species may even impede access to environmental education and wildlife interpretation sites, such as hydrilla, which blocks waterways.

Once vegetation and organic litter are lost to trampling, exposed soils are subject to compaction, leading to increased erosion and wetland sedimentation (Cooke and Xia 2020). The consequences of compacted soil include increased temperatures, reduced moisture (Marion et al. 2016), reduced soil biota (Liddle 1997), and resistance to seed germination and penetration by plant roots (Alessa and

Earnhart 2000). The Service could minimize soil compaction by education and interpretation activities to established trails and roads.

Hansen et al. (2019) determined that "Recreational boating and related moorings are associated with altered species composition and reduced cover and height of aquatic vegetation that constitute important habitats for juvenile fish." Individual fish may be impacted if coming in contact directly with a boat propeller which can have long term impacts on that individual if wounds are sublethal or lethal.

Boating can negatively affect wildlife through minor effects including water pollution from exhaust gases and spilled fuel. Measures should be implemented to prevent small spills such as proper maintenance on outboards/inboards and carrying appropriate supplies to effectively clean up unintended spills or leaks.

The Service plans to minimize the potential for these long-term impacts through limited use of these support uses in environmental education and interpretation programs and restricted use in sensitive wildlife areas.

Sim et al. (2019) found that boating infrastructure alters local environmental conditions. Areas near marinas, jetties, and boat ramps were found to have increased fine and moderate metal concentrations. Sediment faunal assemblages were also found to have changed when adjacent to these boating structures. However, these effects were only observed within the structure's local vicinity and did not impact reference sites. The Service can minimize the effects of boating infrastructure by concentrating infrastructure to fewer areas.

Boats are common vessels for transporting aquatic invasive species from one waterbody to another if not properly cleaned in-between uses. Boating may potentially introduce new aquatic invasive species to the Refuge that could have severe impacts on local flora and fauna. To prevent the spread of plants and animals to unwanted places, the Stop Aquatic Hitchhikers organization recommends cleaning all vessels and rinsing trailers with high pressure hot water when possible. Boats should also be drained of any excess water before leaving the water access area. Drying boats and equipment for at least 5 days in-between uses may also help prevent the spread of aquatic invasive species.

Without minimization measures in place, boating can cause direct impacts for bird populations, especially during nesting season. Audubon (2022) recommends landing and anchoring watercraft in a location away from nesting birds to prevent disturbance. Disturbance causing a bird to move away from its nest "makes chicks and eggs more vulnerable to predators and overheating" (Audubon 2022).

Bicycling can have long-term impacts on wildlife and habitats, but with appropriate monitoring and minimization strategies, such impacts on the conservation area's resources can be minimized. For example, a study on bison (*Bison bison*), mule deer (*Odocoileus hemionu*), and pronghorn antelopes (*Odocoileus hemionu*) reported that these species exhibited the strongest responses to users above (at a higher elevation) versus users below them (Taylor & Knight 2003). These results suggest that informed trail design can minimize impacts. Further, a recent study in San Diego, California, found that wildlife positively responded to temporal closures of trails to hikers and cyclists, suggesting strategies to limit recreational use during breeding or other sensitive periods are effective (Larson et al. 2020).

In some instances, habitat loss caused by bicycling and other recreational activities can cause species to abandon the habitat completely. A recent study in San Diego, California, found that wildlife

positively responded to temporal closures of trails to hikers and cyclists, suggesting strategies to limit recreational use during breeding or other sensitive periods are effective (Larson et al. 2020). Users engaged in bicycling may be more likely to cause some wildlife species to flee; this may reduce the quality of experience for other users, such as wildlife observers and photographers. Bicyclists, especially e-bike users, often travel at high rates of speed, which poses a safety risk to other visitors. In addition, research has shown that visitors notice obvious forms of trail impact, such as excessive muddiness, ruts, and tree roots, and that such impacts can degrade the quality of visitor experiences (Roggenbuck et al. 1993, Vaske et al. 1993). Poor trail conditions also make it more difficult to travel and may threaten visitor safety. To ensure visitors' safety, the Service would only allow bikes on designated trails. If conflicts among user groups arise, the Service would modify the use accordingly.

Potential conflicts can occur due to overlapping uses in the same place and time for instance wildlife observation and environmental education occurring outdoors may not be compatible. The Service would separate conflicting uses based on potential impacts to ensure the best possible experience for visitors.

Public Review and Comment

The draft compatibility determination will be available for public review and comment for 30 days from September – October 2023, in conjunction with the public comment period for the draft Everglades to Gulf Land Protection Plan and Environmental Assessment. The public comment period will be advertised through newspapers; radio; public meetings; and outreach to potentially interested parties, State agencies, and Tribes. It will also be available electronically at https://www.fws.gov/project/everglades-to-gulf-conservation-area. The final compatibility determination will address concerns expressed during the public comment period.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

To ensure the proposed use is compatible with the Refuge System and the proposed Conservation Area's goals and objectives, environmental education and interpretation would only occur with the following stipulations:

1. This use must be conducted in accordance with State and federal regulations (50 CFR) and any specific regulations published in the proposed Conservation Area's Public Use Regulations brochure. Prohibited activities are discussed in 50 CFR Part 27.
2. Environmental education and interpretation are subject to modification if on-site monitoring by Service personnel or authorized agents reveals unanticipated negative impacts on natural or cultural resources.
3. Areas may be temporarily or permanently closed to protect resources or prevent unwanted disturbance.
4. Bicycles and e-bikes will be restricted to designated trails and roads.

5. E-bikes shall not exceed the speeds used to define each applicable Class of e-bike or speed limits posted on refuge roads and trails being traversed whichever is lower.
6. Should Native American artifacts be discovered during implementation of these activities, all activities will be halted, and program participants removed from the location. The Refuge Manager and the Regional Archeologist will be notified immediately and appropriate actions to protect and conserve initiated.

Justification

The stipulations outlined above would help ensure that the use is compatible with the purposes of the proposed Conservation Area. As outlined in this compatibility determination, environmental education and interpretation would not conflict with the national policy to maintain the proposed Conservation Area's biological diversity, integrity, and environmental health. The Service has determined that environmental education and interpretation at the proposed Conservation Area, in conjunction with the listed stipulations, would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose of the proposed Conservation Area. Instead, environmental education and interpretation would allow visitors to enjoy the proposed Conservation Area natural resources and develop an appreciation for the Refuge System and its mission.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

Literature Cited/References

Acosta, S., J. Thayer, W. Merkle, and C. Hellwig. 2007. *Alcatraz Island special event seabird disturbance monitoring report*. National Park Service. http://ww.prbo.org/refs/files/11883_Acostaetal.2007.pdf

Alessa, L. and C. G. Earnhart. 2000. Effects of soil compaction on root and root hair morphology: Implications for campsite rehabilitation. In Cole, D. N., S. F. McCool, W. T. Borrie, J. O Loughlin (comps.). 2000. Wilderness science in a time of change conference-Volume 5: Wilderness ecosystems, threats, and management; 1999 May 23 27; Missoula, MT. Proceedings RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. pp. 99–104.

Anderson, L. G., S. Rocliffe, N. R. Haddaway, and A. M. Dunn. 2015. The role of tourism and recreation in the spread of non-native species: A systematic review and meta-analysis. PIoS ONE 10:p.e0140833.

Arcese, P. 1987. Age, intrusion pressure, and defense against floaters by territorial male song sparrows. Animal Behavior 35:773–784.

Ardoin, N. M. 2006. Toward an interdisciplinary understanding of place: Lessons for environmental education. Canadian Journal of Environmental Education 11:112–126.

Audubon. 2022 March 14. Audubon Alliance Guide to Boating with Birds: *Sharing the Waterways*. Audubon.https://www.westportct.gov/home/showpublisheddocument/43965/637571082181170000

Batten, L.A. 1977. Sailing on reservoirs and its effects on water birds. *Biological Conservation*, 11, 49-58.

Beale, C. M. and P. Monaghan. 2005. Modeling the effects of limiting the number of visitors on failure rates of seabird nests. *Conservation Biology* 19:2015–2019. doi:10.1111/j.1523-1739.2005.00256.x

Bennett KA, Zuelke E. 1999. The effects of recreation on birds: a literature review. Delaware Natural Heritage Program, Smyrna, DE 19977.

Blumstein, D.T., Anthony, L.L., Harcourt, R.G. & Ross, G. (2003) Testing a key assumption of wildlife buffer zones: is flight initiation distance a species-specific trait? Biological Conservation, 110, 97–100Burger, J. 1981. Effect of human activity on birds at a coastal bay. Biological Conservation 21: 231-241.

Blumstein, D.T., Fernandez-Juricic, E., LeDee, O., Larsen, E., Rodriguez-Prieto, I. & Zugmeyer, C. (2004) Avian risk assessment: effects of perching height and detectability. Ethology, 110, 273–285.

Burger, J. 1981. The effect of human activity on birds at a coastal bay. Biological Conservation 21:231–241.

Burger, J. and M. Gochfield. 1998. Effects of ecotourists on bird behaviour at Loxahatchee National Wildlife Refuge, Florida. Environmental Conservation 25:13–18.

Cessford, G. R. 1995. Off-road mountain biking: A profile of participants and their recreation setting and experience preferences. Department of Conservation.

Cole, D. 1995. Experimental trampling of vegetation. II. Predictors of resistance and resilience. Journal of Applied Ecology 32:215–224.

Cole, D. and C. Monz. 2002. Trampling disturbance of high-elevation vegetation, Wind River Mountains, Wyoming, USA. Arctic, Antarctic, and Alpine Research 34:365–376.

Cooke, M. T. and L. Xia. 2020. Impacts of land-based recreation on water quality. Natural Areas Journal 40:179–188.

Davies, K. W. and R. L. Sheley. 2007. A conceptual framework for preventing the spatial dispersal of invasive plants. Weed Science 55:178–184.

Doherty, T. S., G. C. Hayes, and D. A. Driscoll. 2021. Human disturbance causes widespread disruption of animal movement patterns. Nature Ecology & Evolution 5:512–519.

Eiswerth, M. E., T. D. Darden, W. S. Johnson, J. Agapoff, and T. R. Harris. 2005. Input–output modeling, outdoor recreation, and the economic impacts of weeds. Weed Science 53:130–137.

Ernst, J. and S. Theimer. 2011. Evaluating the effects of environmental education programming on connectedness to nature. Environmental Education Research 17:577–598.

Ewald, P. W. and F. L. Carpenter. 1978. Territorial responses to energy manipulations in the Anna hummingbird. Oecologia 31:277–292.

Farmer, J., D. Knapp, and G. M. Benton. 2010. An elementary school environmental education field trip: Long-term effects on ecological and environmental knowledge and attitude development. The Journal of Environmental Education 38:33–42.

Frid, A. and L. M. Dill. 2002. Human-caused disturbance stimuli as a form of predation risk. Conservation Ecology 6.

Gaynor, K. M., C. E. Hojnowski, N. H. Carter, and J. S. Brashares. 2018. The influence of human disturbance on wildlife nocturnality. Science 360:1232–1235.

Gibson, D., M. K. Chaplin, K. L. Hunt, M. J. Friedrich, C. E. Weithman, L. M. Addison, V. Cavalieri, S. Coleman, F. J. Cuthbert, J. D. Fraser, W. Golder, D. Hoffman, S. M Karpanty, A. Van Zoeren, and D. H. Catlin. 2018. Impacts of anthropogenic disturbance on body condition, survival, and site fidelity of nonbreeding piping plovers. The Condor: Ornithological Applications 120:566–580.

Gill, J. A. and W. J. Sutherland. 2000. Predicting the consequences of human disturbance from behavioural decisions. Behaviour and Conservation 55–64.

Graham, A. L. and Cooke, S. J. 2008. The effects of noise disturbance from various recreational boating activities common to inland waters on the cardiac physiology of a freshwater fish, the largemouth bass (*Micropterus salmoides*). *Aquatic Conservation: Marine and Freshwater Ecosystems*, 18, 1315-1324.

Gutzwiller, K. J., R. T. Wiedenmann, K. L. Clements, and S. H. Anderson. 1994. Effects of human intrusion on song occurrence and singing consistency in subalpine birds. The Auk 111:28–37.

Hammitt, W. E. and D. N. Cole. 1998. *Wildland recreation: Ecology and management* (2nd edition). New York: John Wiley & Sons, Inc.

Hansen, J.P., Sundblad, G., Bergstrom, U., Austin, A.N., Donadi S., Eriksson, B.K., & Eklof, J.S. 2019. Recreational boating degrades vegetation important for fish recruitment. Ambio. 48, 539-551.

Hill, W. and C. M. Pickering. 2009. Differences in the resistance of three subtropical vegetation types to experimental trampling. Journal of Environmental Management 90:1305–1312.

Huang, B., K. Lubarsky, T. Teng, and D. T. Blumstein. 2011. Take only pictures, leave only…fear? The effects of photography on the West Indian anole *Anolis cristatellus*. Current Zoology 57:77–82.

Klein, M. L., S. R. Humphrey, and H. F. Percival. 1995. Effects of ecotourism on distribution of waterbirds in a wildlife refuge. Conservation Biology 9:1454–1465.

Kudryavtsev, A., R. C. Stedman, and M. E. Krasny. 2012. Sense of place in environmental education. Environmental Education Research 18:229–250.

Liddle, M. 1997. *Recreation ecology: The ecological impact of outdoor recreation and ecotourism*. Chapman & Hall Ltd.

Livezey, K. B., E. Fernández-Juricic, and D. T. Blumstein. 2016. Database and metadata of bird flight initiation distances worldwide to assist in estimating human disturbance effects and delineating buffer areas. Journal of Wildlife Management 7.

Marion, J. L., Y. Leung, H. Eagleston, and K. Burroughs. 2016. A review and synthesis of recreation ecology research findings on visitor impacts to wilderness and protected natural areas. Journal of Forestry 114:352–362.

Marion, J. L., Y. F. Leung, and S. K. Nepal. 2006. Monitoring trail conditions: New methodological considerations. The George Wright Forum 23:36–49.

Martín, B., S. Delgado, A. de la Cruz, S. Tirado, and M. Ferrer. 2015. Effects of human presence on the long-term trends of migrant and resident shorebirds: Evidence of local population declines. Animal Conservation 18:73–81.

McNeil, R., P. Drapeau, J. D. Goss-Custard. 1992. The occurrence and adaptive significance of nocturnal habitats in waterfowl. Biological Review 67:381–419.

Miller, S.G., R.L. Knight, and C.K. Miller. 2001. Wildlife responses to pedestrians and dogs. Wildlife Society Bulletin, 29(1): 124-132.

Müllner, A., K. E. Linsenmair, and M. Wikelski. 2004. Exposure to ecotourism reduces survival and affects stress responses in hoatzin chicks (*Opisthocomus hoazin*). Biological Conservation 118:549–558.

Nielson, T., S. M. Palmatier, and A. Proffitt. 2019. *Literature review: Recreation conflicts focused on emerging e-bike technology*. Boulder County Parks and Open Space. https://assets.bouldercounty.gov/wp-content/uploads/2020/01/e-bike-literature-review.pdf

Pearce-Higgins, J. W., S. K. Finney, D. W. Yalden, and R. H. W. Langston. 2007. Testing the effects of recreational disturbance on two upland breeding waders. Ibis 149:44–55.

Pease, M. L., R. K. Rose, and M. J. Butler. 2005. Effects of human disturbance on the behavior of wintering ducks. Wildlife Society Bulletin 33:103–112.

Pescott. O. L. and G. B. Stewart. 2014. Assessing the impact of human trampling on vegetation: A systematic review and meta-analysis of experimental evidence. PeerJ 2:e360.

Pickering, C. and W. Hill. 2007. Impacts of recreation and tourism on plant diversity and vegetation in protected areas in Australia. Journal of Environmental Management 85:791–800.

Reed, S. E. and A. M. Merenlender. 2008. Quiet, nonconsumptive recreation reduces protected area effectiveness. Conservation Letters 1:146–154.

Rodgers, J. A. and H. T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25:139–145.

Samia, D., S. Nakagawa, F. Nomura, T. Rangel, and D. T. Blumstein. 2015. Increased tolerance to humans among disturbed wildlife. Nature Communications 6.

Selman, W., C. Qualls, and J. C. Owen. 2013. Effects of human disturbance on the behavior and physiology of an imperiled freshwater turtle. The Journal of Wildlife Management 77:877–885.

Sim V.X.Y., Dafforn K.A., Simpson S.L., Kelaher B.P., Johnston E.L. (2015) Sediment Contaminants and Infauna Associated with Recreational Boating Structures in a Multi-Use Marine Park.

Skagen, S. K., C. P. Melcher, and E. Muths. 2001 The interplay of habitat change, human disturbance and species interactions in a waterbird colony. American Midland Naturalist 145:18–28.

Steven, R., C. Pickering, and J. G. Castley. 2011. A review of the impacts of nature based recreation on birds. Journal of Environmental Management 92:2287–2294.

Striker G. G., F. P. O. Mollard, A. A. Grimoldi, R. J. C. León, and P. Insausti. 2011. Trampling enhances the dominance of graminoids over forbs in flooded grassland mesocosms. Applied Vegetation Science 14:95–106.

Taylor, A. and R. Knight. 2003. Wildlife Responses to recreation and associated visitor perceptions. Ecological Applications 13:951–963.

Thiel, D., S. Jenni-Eiermann, V. Braunisch, R. Palme, and L. Jenni. 2008. Ski tourism affects habitat use and evokes a physiological stress response in capercaillie *Tetrao urogallus*: A new methodological approach. Journal of Applied Ecology 45:845–853.

Thomas, K., R. G. Kvitek, and C. Bretz. 2003. Effects of human activity on the foraging behavior of sanderlings *Calidris alba*. Biological Conservation 109:67–71.

Trails and Wildlife Task Force. 1998. Planning trails with wildlife in mind: A handbook for trail planners. Colorado State Parks, Denver Co. 51pp.

Trulio, L. and H. R. White. 2017. Winter waterfowl avoidance and tolerance of recreational trail use. Waterbirds 40:252–272.

University of Florida. 2022 April 14. *Sustainable Human-Bird Interactions*. Bird-Friendly Fishing and Boating. https://ncbs.ifas.ufl.edu/sustainable-human-bird-interactions/

Volpe National Transportation Systems Center. 2021. Bicycling Impacts on National Wildlife Refuges. U.S. Department of Transportation. DOT-VNTSC-FWS-21-03.

Yasue, M. 2005. The effects of human presence, flock size and prey density on shorebird foraging rates. Journal of Ethology 23:199–204.

Draft Interim Compatibility Determination

Title

Draft Interim Compatibility Determination for Hunting, Proposed Everglades to Gulf Conservation Area

Refuge Use Category

Hunting

Refuge Use Type(s)

Hunting (Big Game, Upland Game, Waterfowl, Other Migratory Birds, and Special Events)

Refuge

Proposed Everglades to Gulf Conservation Area

Supporting Uses

Camping and Off-road and All-terrain Vehicles

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)

"…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)

"…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)

"…to conserve and protect migratory birds..., including species that are listed...as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)

"…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)

"…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as 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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

No, the uses are interim uses for the proposed Everglades to Gulf Conservation Area

What is the use?

The primary use is hunting, including big game, upland game, waterfowl, other migratory birds, and special events. The supporting uses are camping and off-road (ORV) or all-terrain (ATV) vehicles. For the purposes of this document, the uses are defined as:

- Big game hunting is the recreational hunting of big game (e.g., bear, feral pigs, and deer).
- Upland game hunting is the recreational hunting of upland game species (e.g., fox, quail, rabbit, squirrel, turkey, and others) and does not include hunting for predator control purposes.
- Waterfowl hunting is the recreational hunting of waterfowl species (e.g., ducks, geese, and swans).
- Other migratory bird hunting is the recreational hunting of migratory bird species other than waterfowl (e.g., dove, gallinule, pigeon, rail, snipe, and woodcock).
- Special events are educational or other special hunting events, including clinics and excluding tournament hunting.
- Camping is overnight primitive camping.
- Off-road or all-terrain vehicle use is the use of any motorized vehicle (except airboats, hovercraft, or personal watercraft) designed for, or capable of travel over land, water, sand, marsh, ice, or other natural terrain off designated routes of travel.

Is the use a priority public use?

Yes

Where would the use be conducted?

Because the proposed Conservation Area has yet to be established, exactly where hunting, camping,

and ORV/ATV use would occur is unknown; however, hunting, camping, and ORV/ATV use would only occur on fee-title properties open to public hunting immediately prior to service acquisition, determined to be conductive to a quality hunting experience, and large enough to support hunting activities. Each acquisition would be assessed for suitability to hunting activities.

When would the use be conducted?

Hunting would occur within seasons established by the State of Florida but may be more limited depending on species abundance, habitats, and other factors. Timing would depend on the species being hunted, other fish and wildlife species present, other public uses occurring in the area, habitats and vegetation present, and the size and geographical location of the fee-title property.

How would the use be conducted?

Hunting would be conducted through hunt permits issued by the Service and administered through the State permitting system. Limited quota hunts may be implemented on some fee-title lands as determined by species, property location, and demand. Implementation of the hunt program would be in consultation and coordination with the Florida Wildlife Resources Commission. Considerations for implementation incudes species being hunted, other fish and wildlife species present, other public uses occurring in the area, habitats and vegetation present, and the size and geographical location of the fee-title property.

ORV/ATV use would only be permitted for people with mobility impairments and would require a special use permit.

Camping in support of hunting would occur on designated camping areas only. Upon each acquisition of fee-title land, the Service will assess if adequate locations and space is suitable for camp sites in support of hunting. Only primitive camping sites will be used with no supporting facilities and with a strict "pack in, pack out" operation. Special Use Permits associated with hunting permits would be issued for camping by the Service.

Why is this use being proposed or reevaluated?

Hunting is a priority public use as defined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Per the Improvement Act of 1997, these uses are to be prioritized over general uses. Wildlife-dependent recreation, such as hunting, provides opportunities for the public to connect with the proposed conservation area's natural resources, fostering appreciation and support for the Refuge System and its mission.

Availability of Resources

A resource availability analysis cannot be completed because the proposed Conservation Area has not been established, funded, or staffed. Such an analysis would be conducted before opening any property to hunting or its supporting uses; the Service would only open a property to hunting and its supporting uses if sufficient resources are available to administer the uses effectively.

The funding required to administer this use would depend on the number of acquisitions in fee-title

that allow public hunting prior to acquisition. The Service is expected to have the resources necessary to administer these uses in a limited capacity. Hunting special events would depend on available funding. A general estimate is provided based on a limited hunt program without infrastructure. Initially, the Service would not charge for permits. Appropriate analysis and procedures would have to be prepared to determine if fees would be needed and feasible.

Table 1. Estimated Costs for Implementing Hunting

Identifier	Estimated Annual Cost
Staff (Maintenance Workers, Biologist, and Refuge Managers)	$5,000
Maintain Roads, Parking Lots, and Trails	$2,000
Hunt Brochures	$3,000
Law Enforcement	$4,000
Total	$14,000
Off-setting Revenue	$0

Anticipated Impacts of the Use

Potential impacts of a proposed use on the proposed Conservation Area's purpose(s) and the Refuge System mission

The effects and impacts of the proposed uses on the proposed Conservation Area's resources, whether adverse or beneficial, would be those that are reasonably foreseeable and have a reasonably close causal relationship to the proposed use. Resources that would not be more than negligibly impacted have been dismissed from further analysis.

Hunting directly supports Goal 3 of the Conservation Area, Conserve Important Lands and Waters for the Benefit of All People and the mission of the National Wildlife Refuge System. Hunting has a long and lasting tradition in the United States and fosters appreciation of nature and a conservation ethic. Hunting considered in this compatibility determination is limited to those lands acquired by the Service in fee-title on which public hunting existed prior to Service acquisition.

Short-term and Long-term Impacts of Hunting

Hunting invariably results in some target animals being killed, and others would be wounded and succumb later. However, wildlife management is directed toward wildlife populations and not individuals. Direct effects of hunting to target species (bear, feral pig, deer, fox, quail, rabbit, squirrel, turkey, ducks, geese, and swans, dove, gallinule, pigeon, rail, snipe, and woodcock) include mortality, wounding, and disturbance of target and non-target species (De Long 2002). Hunting potentially can alter behavior (e.g., foraging time), population structure, general health (e.g., weight loss), and distribution patterns of all wildlife within the hunt area (Owens 1977, Raveling 1979, White-Robinson 1982, Thomas 1983, Bartelt 1987, Cole and Knight 1990, Madsen 1995). Other target and non-target species would be disturbed (De Long 2002), but such disturbance is temporary and short term and not considered pervasive enough to result in negative impacts to populations. Most displacement of wildlife is minor; animals typically would remain within their normal home ranges. Most hunting on the refuges occurs during times of the year when most wildlife are not nesting, birthing, or raising offspring. The likelihood of a threatened, endangered, or candidate species suffering mortality or the

hunting activities causing disturbance rising to the level of take for federally-listed species occurring on the proposed Conservation Area's fee-title lands is remote.

Other potential short-term impacts from hunting include damage to vegetation (primarily trampling), littering, minor surface damage on roads/trails from motor vehicles and ATV/UTVs. Occasional conflicts between hunters and between hunters and non-hunting visitors to the refuges could occur. These conflicts typically involve the disturbance of wildlife with which hunters and non-hunters are both trying to find. Hunting would reduce the number of migratory game birds using the proposed Conservation Area based on the number killed during hunting season, but it is not expected to adversely affect their populations in the long term. The Service works closely with State and provincial governments, as well as with the public, in a joint effort to establish annual hunting regulations for migratory birds. The Service's Division of Migratory Birds establishes regulatory frameworks to manage all migratory bird hunting in the United States. These regulations establish limitations by which States can then create season lengths, bag limits and areas of migratory bird hunting. Refuges conduct waterfowl hunting within federal and State season frameworks and regulations.

Impacts to waterfowl and other species can be reduced by providing adjacent sanctuary areas where hunting does not occur and where birds can feed and rest relatively undisturbed. Sanctuaries or non-hunt areas have been identified as the most common solution to disturbance problems caused from hunting (Havera et. al 1992). In Denmark, hunting disturbance effects were experimentally tested by establishing two sanctuaries (Madsen 1995). Over a 5-year period, these sanctuaries became two of the most important staging areas for coastal waterfowl. Numbers of dabbling ducks and geese increased four- to 20-fold within the sanctuary (Madsen 1995). Thus, non-hunt areas apparently are very important to waterfowl populations subject to hunting as they ensure the continued presence of the affected species within the general vicinity of the hunt area, but perhaps more importantly, they allow waterfowl to minimize energy losses due to disturbance-caused movements and to forage, rest, and roost without interference.

Hunting would temporarily reduce numbers of upland game. However, the level of take of these species would not adversely affect their long-term population status. Florida Wildlife Resources Commission (FWRC) sets hunting seasons, bag limits, methods of take, and other regulations annually and the Conservation Area would operate within those parameters. Approval by FWRC is based on their monitoring of game harvests, population trends, and habitat and range occupancy throughout the State and assessment of hunter effort/participation, and the determination/acknowledgement that hunting seasons would not be detrimental to game species on a local, regional, or statewide scale.

Feral hogs are non-native, invasive species that compete with native wildlife species for habitat and food resources, damage wildlife habitat and habitat restoration areas, and can be vectors of disease to wildlife, domestic livestock, and humans (Arkansas Department of Agriculture 2020). The take of feral hogs on the Conservation Area would be restricted to incidental take during other hunts.

Providing carefully planned and managed hunting opportunities with restrictions that limit access to specific Conservation Area locations would generally minimize disturbance to wildlife populations, the environment, and non-consumptive users. Concerns are primarily centered on the possibility of impacting non-target species that are sensitive to disturbance.

Hunters and non-consumptive users would share many of the same areas of the proposed Conservation Area. Hunting activity may conflict with other forms of priority wildlife-dependent recreation. Discharging firearms may disturb the peace and serenity that non-hunters seek.

Hunting may result in long-term beneficial impacts to the human environment. This use may increase the viewer's understanding and appreciation of fish and wildlife, their habitat needs, and the role of the Refuge System in their conservation. Experiences shared with others increase public awareness of the proposed Conservation Area and, in turn, can help accomplish the mission of the Service.

Long-Term Impacts of Hunting

Incremental increases in activities by people engaged in the variety of allowed uses, including hunting, on the proposed Conservation Area that continue unchecked potentially could result in cumulative detrimental consequences to wildlife and/or habitats. However, Service and FWC staff would monitor these activities to ensure wildlife and other refuge resources are not affected in a detrimental manner. Various methods are available to refuge managers that can readily be implemented to effectively manage participant numbers and activity patterns to maintain a compatible, high-quality, low-impact, and safe hunting program on the proposed Conservation Area.

Hunting conducted in accordance with State and federal regulations is not expected to adversely affect wildlife populations that occur on the refuge and likely assists in maintaining the biological integrity, diversity, and environmental health of the refuges. Some species, such as white-tailed deer, now occur at population levels well above historical numbers. Left unchecked, high numbers of such species could adversely affect biological integrity, diversity, and environmental health. Hunting is a closely monitored and regulated wildlife management tool that aids in maintaining stability within wildlife populations and a healthy balance between wildlife populations and habitats. There would be no adverse cumulative effects to refuge plant or wildlife communities attributable to hunting.

In addition to environmental health, there also are other cumulative beneficial effects to hunting. Increased wildlife-dependent recreation (hunting, wildlife observation and photography, environmental education); beneficial use of renewable, sustainable wildlife resources; increased appreciation for wildlife conservation, and the role of national wildlife refuges in wildlife conservation, habitat management and restoration all ultimately result from hunting programs on national wildlife refuges. Additionally, increased revenues at the local, state, and national levels benefit economies and provide (federal) funding for wildlife research, habitat management, acquisition of wildlife habitats, supportive infrastructure, and educational programs designed to raise public awareness and support for wildlife conservation at the local, state, national, and international scales.

Short-term Impacts of Camping

The short-term impacts of camping on vegetation and soil can be locally severe but are usually restricted to a relatively small area within the campsite itself (Marion and Cole 1996). Short-term impacts on vegetation occur quickly, even with light use (Cole 1981) and may include the loss of ground vegetation cover. A plant's response to trampling is heavily influenced by its morphological characteristics (Pescott and Stewart 2014, Marion et al. 2016). The brittle woody stems of shrubs and small trees and rigid stems of tall forbs are susceptible to trampling, which damages buds and flowers and reduces seed production (Cole 1995a, Cole and Monz 2002, Marion et al. 2016). Grasses, sedges, and low-growing herbs are more resistant due to flexible stems and underground perennating buds (Hill and Pickering 2009, Striker et al. 2011, Marion et al. 2016). The extent of camping's impacts on vegetation is generally related to site use frequency, site durability, and group size (Cole 1995b). Most of the impact occurs when the campsite is opened and during the first year of use. Subsequent use of

new campsites, even a few nights per year, is sufficient to prevent their recovery (Scherrer and Pickering 2006, Cole 2013).

The impacts of camping can be more substantial when campfires are permitted. Gathering wood may result in tree damage from broken or cut limbs, axe scars, or felling. Collecting downed wood may increase the trampling of surrounding vegetation and reduce the amount of downed wood available to wildlife, possibly negatively impacting small mammal, reptile, and terrestrial amphibian communities. Fire pits often become receptacles for trash and may negatively affect the experience of subsequent campers. Further, campers could inadvertently start a wildfire. Because of these potential impacts, campfires would not be permitted outside of designated fire rings.

Improperly disposed of human and pet waste at campsites may compromise water quality by introducing pathogens and negatively affecting campsite aesthetics. Human waste, food disposal, and dishwashing may increase aquatic nutrient loads. Soap from improper dishwashing, trash, and fish-cleaning waste may pollute water. Pit toilets near the water on shallow, permeable soils can sometimes introduce coliform bacteria into the water. However, camping generally does not affect water quality to the extent of creating a public health concern, even in areas that receive heavy use (Cole 1981). To minimize these potential impacts the Service will host only primitive campsites and adhere to a policy of campers packing in and packing out all food, waste, and supplies.

Camping can alter or destroy wildlife habitats or displace wildlife from preferred habitats or resources. Camping may also modify or disrupt wildlife behavior. Human disturbance causes animals to increase energy expenditures, depleting energy reserves that would otherwise be used for survival and reproduction. Nesting birds may leave the nest in response to disturbance, exposing eggs to unsafe temperatures and predators. Larger groups are generally more likely to disturb wildlife (Beale and Monaghan 2004). Group camping will not be allowed in support of hunting to minimize the possibility of these impacts.

Humans may intentionally or unintentionally supply food to wildlife through littering, accidental spillage, or improper food storage. Human food may be unhealthy for wildlife or promote scavenging behavior, which may increase the vulnerability of animals to predation. Rodent populations often increase at campsites in response to the increased availability of human food and can negatively affect nesting songbirds. Bears, raccoons, and other scavengers may be attracted to improperly stored food, possibly damaging property and threatening visitor safety. The Service will monitor these impacts associated with hunting and support activities and adjust the use if impacts are observed.

Overused, poorly maintained campsites are visually unappealing and may negatively impact visitor experience. Conflicts may arise between visitors because of litter, noise, and overcrowding from campers. The proposed Conservation Area would modify the uses should conflicts arise among user groups.

Long-term Impacts of Camping

Once vegetation and organic litter are lost, exposed soils are subject to compaction, leading to increased erosion and wetland sedimentation (Cooke and Xia 2020). Erosion may expose tree roots, resulting in increased tree mortality due to wind throw. In addition, compacted soil can cause increased soil temperatures, reduced moisture (Marion et al. 2016), reduced soil biota (Liddle 1997), and resistance to seed germination and penetration by plant roots (Alessa and Earnhart 2000).

Recovery of closed campsites is usually a slow process. Even on fertile soils, full recovery may take years (Cole and Marion 1988, Marion and Cole 1996).

If effective minimization strategies are not implemented, wildlife can suffer long-term consequences that vary by species. For example, male birds that respond to human intrusion by altering their singing behavior can suffer from lower reproductive fitness due to impaired territory defense and mate acquisition (Gutzwiller et al. 1994). Disrupted foraging behavior can cause decreased body mass (Gibson et al. 2018), increasing a bird's susceptibility to disease. Further, a literature review on the effects of nature-based recreation on birds reported that 28 out of 33 papers observed changes in abundance and reproductive success (Steven et al. 2011). Long-term disturbance also negatively impacts reptiles, with freshwater turtles at disturbed sites having significantly poorer shell conditions than undisturbed sites (Selman et al. 2013). Mammals also suffer long-term consequences from human disturbance. Reed and Merenlender (2008) reported that human activity decreases carnivore density and shifts community composition from native to non-native species. In order to minimize these impacts, group sizes will be limited to no more than six campers per site.

Campfires can have severe effects on soils in a localized area. Campfires destroy organic matter in soil and can change soil chemistry, effectively sterilizing a site. These effects can persist over a long period and make vegetation regrowth difficult. In some cases, recovery may take years. If a campfire ignites a large-scale forest fire, the effects could be devastating.

Visitors can introduce invasive plants, animals, and pathogens (Marion et al. 2006, Davies and Sheley 2007, Anderson et al. 2015) while engaging in camping activities. Once present, invasive species can out-compete native plants and animals, thereby altering habitats (Marion et al. 2006, Anderson et al. 2015). Invasive species can alter animal and plant composition, diversity, and abundance (Eiswerth et al. 2005, Davies and Sheley 2007). These changes may reduce native forage, cover, and water sources (Eiswerth et al. 2005). Certain invasive species may even impede access to other recreational activities, such as hydrilla, which blocks waterways.

Long-term Impacts of ORV and ATV Use

ORV and ATVs can affect all forms of wildlife if effective minimization strategies are not implemented. Research has shown that areas where ORV and ATV use occur have lower species richness, diversity, and abundance of benthic macroinvertebrate communities compared to areas where ORV and ATV use is restricted (Schlacher and Thompson 2007, Schlacher et al. 2008, Walker and Schlacher 2011, Davies et al. 2016, Bom and Colling 2020). In addition, ORV and ATV use has been shown to result in reduced bird abundance (Barton and Holmes 2007, Tarr et al. 2010), disturbance and corresponding behavioral changes (Janis and Clark 2002, St-Louis et al. 2013, Jones et al. 2017), direct mortality, and nest destruction (Godwin et al. 2021).

ORV and ATV traffic can alter habitat structure and function through changes in the physiochemical properties of soil, loss of vegetative cover, and alterations of plant community structure and function (Slaughter et al. 1990, Navas Romero et al. 2019, Sumanapala and Wolf 2019). For example, soils can be physically damaged through increased compaction, which may alter the success of certain plant species, impacting species diversity (Brown and Schoknecht 2001, Assaeed et al. 2019). While vegetation loss is common with ORV and ATV activity (Al-Awadhi 2013, Cheung et al. 2021), community-level vegetation responses have also been found, including alterations in species composition and conditions that may favor the introduction and spread of invasive plants (Milchunas et al. 2000, Assaeed et al. 2019, Navas Romero et al. 2019). Further, ORVs and ATVs cause rutting,

which channels water into preferential flow paths, causing rill erosion. Rill erosion is soil removal due to the concentrated water flow and contributes to soil loss and increased stream sediment deposition (Meadows et al. 2008).

ORV and ATV operation in or near streams and waterways threatens water quality (Havlick 2002). ORV and ATV trails funnel water containing contaminants and sediment into streams, rivers, and lakes (Ouren et al. 2007). Contaminants can also be directly introduced into aquatic systems through oil and fuel spills, and emission particulates can be transported via wind, deposited onto vegetation, washed off vegetation surfaces by rain, and introduced into the watershed via runoff.

Visitor use, experience, and safety can be negatively impacted by ORVs and ATVs due to noise, causing wildlife to flush and flee, or decreasing aesthetics. In a study conducted on the effects of ATV use on other user groups by Watkins and Poudyal (2021), results showed varying levels of conflict with substantial differences in satisfaction between recreation groups and activity types and differences in group consensus levels regarding encounter experiences. Results were consistent with the premise that non-motorized recreationists perceive greater levels of conflict from motorized recreationists than vice versa (Jackson et al. 2003, Gibson and Fix 2014, Schroeder et al. 2020).

Cumulative impacts potentially could occur from the combination of these uses on the proposed Conservation Area including hunting, wildlife observation, photography, education, interpretation, habitat management and research. Programs that occur in the same space and time can cause decreased satisfaction from user groups and increase disturbance to wildlife from frequent human visitation, consumptive or non-consumptive. Management actions such as prescribed fire, water management and timber management are necessary aspects of refuge management, but the conduct of these activities may not be conducive to hunting activities occurring at the same time and location. Certain research activities may require areas free of public use/disturbance to accomplish research objectives. The Service considers all uses as activities that are planned/implemented on a yearly basis and programs are structured and administered to allow multiple uses to occur with minimal conflict. Conflicts are infrequent. Hunting seasons and locations would allow for hunters to pursue this public use while other uses may be located in other areas of the refuge or at other times to reduce potential conflicts.

Public Review and Comment

The draft compatibility determination will be available for public review and comment for 30 days from September – October 2023, in conjunction with the public comment period for the draft Everglades to Gulf Land Protection Plan and Environmental Assessment. The public comment period will be advertised through newspapers; radio; public meetings; and outreach to potentially interested parties, State agencies, and Tribes. It will also be available electronically at https://www.fws.gov/project/everglades-to-gulf-conservation-area. The final compatibility determination will address concerns expressed during the public comment period.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

The following stipulations would be necessary to ensure the uses are compatible:

1. Persons possessing, transporting, or carrying firearms on national wildlife refuges must comply with all provisions of federal, state, and local law. Persons may only use (discharge) firearms in accordance with Conservation Area's regulations.
2. All applicable state hunting licenses, state permits, Conservation Area's CITES tags, federal stamps, and Refuge hunt permits must be in the possession of the hunter.
3. Hunting programs will be administered as a state-managed WMA tract or a Service sponsored management program.
4. For all hunts, weapon restrictions will be in accordance with State of Florida regulations.
5. Vehicles will be restricted to existing designated roads and trails.
6. Off-road vehicle (ORV) use may be allowed for access along designated roads and trails or as indicated in Conservation Area public access brochures or web site.
7. Camping may be allowed to access remote areas during the hunting season.
8. All hunts will be designed in cooperation with state biologists and managers, to provide quality user opportunities based upon estimated wildlife population levels and biological parameters.
9. Hunt season dates and bag limits will be adjusted to meet current hunter densities and activities and may be adjusted as needed to achieve balanced population levels within carrying capacities, regardless of impacts to user opportunities.
10. Taking of any plants or other wildlife is prohibited.
11. As additional data are collected, Conservation Area-specific regulations or changes to the WMA could be implemented. These changes to the regulations could include, but may not be limited to the following: season dates that differ from those in surrounding state zones; permit requirements; and closed areas on a permanent or seasonal basis to reduce disturbance to specific wildlife species or habitats, such as bird rookeries, wintering waterfowl, or threatened or endangered species, as well as to provide for public safety. If evidence of unacceptable impacts begins to appear, it may be necessary to change the activity, move the activity, or eliminate the activity.
12. Fire is not permitted outside designated campfire rings.
13. The number of campers per campsite would be limited to six people or less.
14. Campers would require an approved special use permit.
15. Only tents would be permitted (i.e., no campers, RVs, etc.)
16. Cutting tree limbs (for firewood, etc.) would be prohibited.

Justification

The stipulations outlined above would help ensure that the uses are compatible with the purposes of the proposed Conservation Area. As outlined in this compatibility determination, hunting and its supporting uses would not be permitted on a fee-title property if the uses conflicted with the national

policy to maintain the proposed Conservation Area's biological diversity, integrity, and environmental health. The Service has determined that considering the required analyses and the listed stipulations, future hunting opportunities would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose of the proposed Conservation Area. Instead, hunting and its supporting uses would allow visitors to enjoy the proposed Conservation Area's natural resources and develop an appreciation for the Refuge System and its mission.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

Literature Cited/References

Al-Awadhi, J. M. 2013. A case assessment of the mechanisms involved in human-induced land degradation in Northeastern Kuwait. Land Degradation & Development 24:2–11.

Anderson, L. G., S. Rocliffe, N. R. Haddaway, and A. M. Dunn. 2015. The role of tourism and recreation in the spread of non-native species: A systematic review and meta-analysis. PloS ONE 10:p.e0140833.

Arkansas Department of Agriculture. 2020. Arkansas Feral Hog Handbook. Little Rock, AR. 20 pp.

Assaeed, A. M., S. L. Al-Rowaily, M. I. El-Bana, A. A. Abood, B. A. Dar, and A. K. Hegazy. 2019. Impact of off-road vehicles on soil and vegetation in a desert rangeland in Saudi Arabia. Saudi Journal Biological Sciences 26:1187–1193.

Bartelt, G. A. 1987. Effects of disturbance and hunting on the behavior of Canada goose family groups in east central Wisconsin. Journal of Wildlife Management 51:517-522.

Barton, D. C. and A. L. Holmes. 2007. Off-highway vehicle trail impacts on breeding songbirds in Northeastern California. Journal of Wildlife Management 71:1617–1620.

Beale, C. M. and P. Monaghan. 2004. Human disturbance: People as predation-free predators? Journal of Applied Ecology 41:335–343.

Bom, F. C. and L. A. Colling. 2020. Impact of vehicles on benthic macrofauna on a subtropical sand beach. Marine Ecology 41:1–9.

Brown, G. and N. Schoknecht. 2001. Off-road vehicles and vegetation patterning in a degraded desert ecosystem in Kuwait. Journal of Arid Environments 49:413–427.

Cheung, S. Y., I. J. Walker, S. W. Myint, and R. I. Dorn. 2021. Assessing land degradation induced by recreational activities in the Algodones Dunes, California using MODIS satellite imagery. Journal of Arid Environments 185:104334.

Cole, D. N. 1981. Managing ecological impacts at wilderness campsites: An evaluation of techniques. Journal of Forestry 79:86–89.

Cole, D. 1995a. Experimental trampling of vegetation. II. Predictors of resistance and resilience. Journal of Applied Ecology 32:215–224.

Cole, D. N. 1995b. Disturbance of natural vegetation by camping: Experimental applications of low-level stress. Environmental Management 19:405–416.

Cole, D. N. 2013. Long-term effectiveness of restoration treatments on closed wilderness campsites. Environmental Management 51:642–650.

Cole, D. N. and R. L. Knight. 1990. Impacts of recreation on biodiversity in wilderness. Utah State University. Vol. 0, Article 6.

Cole, D. N. and J. L. Marion. 1988. Recreation impacts in some riparian forests of the eastern United States. Environmental Management 12:99–107.

Cole, D. and C. Monz. 2002. Trampling disturbance of high-elevation vegetation, Wind River Mountains, Wyoming, USA. Arctic, Antarctic, and Alpine Research 34:365–376.

Cooke, M. T. and L. Xia. 2020. Impacts of land-based recreation on water quality. Natural Areas Journal 40:179–188.

Davies, K. W. and R. L. Sheley. 2007. A conceptual framework for preventing the spatial dispersal of invasive plants. Weed Science 55:178–184.

Davies, R., P. C. Speldewinde, and B. A. Stewart. 2016. Low level off-road vehicle (ORV) traffic negatively impacts macroinvertebrate assemblages at sandy beaches in south-Western Australia. Scientific Reports 6:1–8.

DeLong, A. K. 2002. Managing visitor use and disturbance of waterbirds - literature review of impacts and mitigation measures - prepared for Stillwater National Wildlife Refuge. Appendix L. In Stillwater National Wildlife Refuge Complex final environmental impact statement for the comprehensive conservation plan and boundary revision (Vol. II). Portland, Oregon: Department of the Interior, U.S. Fish and Wildlife Service, Region 1.

Eiswerth, M. E., T. D. Darden, W. S. Johnson, J. Agapoff, and T. R. Harris. 2005. Input–output modeling, outdoor recreation, and the economic impacts of weeds. Weed Science 53:130–137.

Gibson, D., M. K. Chaplin, K. L. Hunt, M. J. Friedrich, C. E. Weithman, L. M. Addison, V. Cavalieri, S. Coleman, F. J. Cuthbert, J. D. Fraser, W. Golder, D. Hoffman, S. M Karpanty, A. Van Zoeren, and D. H. Catlin. 2018. Impacts of anthropogenic disturbance on body condition, survival, and site fidelity of nonbreeding Piping Plovers. The Condor: Ornithological Applications 120:566–580.

Gibson, M. J. and P. J. Fix. 2014. Further classification of interpersonal versus social values conflict: Insights from motorized and non-motorized recreation river users. Journal of Outdoor Recreation and Tourism 7–8:1–7.

Godwin, C. D., J. S. Doody, and B. I. Crother. 2021. The impact of ATVs on survival of softshell turtle (*Apalone* spp.) nests. Journal of Herpetology 55:201–207.

Gutzwiller, K. J., R. T. Wiedenmann, K. L. Clements, and S. H. Anderson. 1994. Effects of human intrusion on song occurrence and singing consistency in subalpine birds. The Auk 111:28–37.

Havera, S. P., L. R. Boens, M. M. Georgi, and R. T. Shealy. 1992. Human disturbance of waterfowl on Keokuk Pool, Mississippi River. Wildlife Society Bulletin 20:290-298.

Havlick, D.G. 2002. *No place distant: Roads and motorized recreation on America's public lands*. Island Press. Washington, D.C. 297 p

Hill, W. and C. M. Pickering. 2009. Differences in the resistance of three subtropical vegetation types to experimental trampling. Journal of Environmental Management 90:1305–1312.

Jackson, S. A., W. Haider, and T. Elliot. 2003. Resolving inter-group conflict in winter recreation: Chilkoot trail national historic Site, British Columbia. Journal for Nature Conservation 11:317–323.

Janis, M. W. and J. D. Clark. 2002. Responses of Florida panthers to recreational deer and hog hunting. Journal of Wildlife Management. 66:839–848.

Jones, A. S., J. J. Anderson, B. G. Dickson, S. Boe, and E. S. Rubin. 2017. Off-highway vehicle road networks and kit fox space use. Journal of Wildlife Management 81:230–237.

Lee, T. H. and F. H. Jan. 2015 The effects of recreation experience, environmental attitude, and biospheric value on the environmentally responsible behavior of nature-based tourists. Environmental Management 56:193–208.

Liddle, M. 1997. *Recreation ecology: The ecological impact of outdoor recreation and ecotourism*. Chapman & Hall Ltd.

Madsen, J. 1995. Impacts of disturbance on migratory waterfowl. Ibis 137:S67-S74.

Marion, J. L. and D. N. Cole. 1996. Spatial and temporal variation in soil and vegetation impacts on campsites. Ecological Applications 6:520–530.

Marion, J. L., Y. F. Leung, H. Eagleston, and K. Burroughs. 2016. A review and synthesis of recreation ecology research findings on visitor impacts to wilderness and protected natural areas. Journal of Forestry 114:352–362.

Marion, J. L., Y. F. Leung, and S. K. Nepal. 2006. Monitoring trail conditions: New methodological considerations. The George Wright Forum 23:36–49.

Meadows, D., R. Foltz, and N. Geehan. 2008. *Effects of all-terrain vehicles on forested lands and grasslands*. United States Department of Agriculture. 124 pp. https://www.fs.usda.gov/rm/pubs_other/rmrs_2008_meadows_d001.pdf

Milchunas, D. G., K. A. Schulz, and R. B. Shaw. 2000. Plant community structure in relation to long-term disturbance by mechanized military maneuvers in a semiarid region. Environmental Management 25:525–539.

Navas Romero, A. L., M. A. Herrera Moratta, A. D. Dalmasso, and A. Barros. 2019. Quad bike impacts on vegetation and soil physicochemical properties in an arid ecosystem. Acta Oecologica 97:14–22.

Ouren, D. S., C. Haas, C. P. Melcher, S. C. Stewart, D. P. Phadrea, N. R. Sexton, L. Burris, T. Fancher, and Z. H. Bowen. 2007. *Environmental effects of off-highway vehicles on Bureau of Land Management lands: A literature synthesis, annotated bibliographies, extensive bibliographies, and internet resources*. U.S. Geological Survey. Open-File Report 2007-1353. 225 pp. https://pubs.er.usgs.gov/publication/ofr20071353

Owens, N. W. 1977. Responses of wintering brant geese to human disturbance. Wildfowl 28:514.

Pescott. O. L. and G. B. Stewart. 2014. Assessing the impact of human trampling on vegetation: A systematic review and meta-analysis of experimental evidence. PeerJ 2:e360.

Raveling, D. G. 1979. The annual cycle of body composition of Canada geese with special reference to control of reproduction. Auk 96:234-252.

Reed, S. E. and A. M. Merenlender. 2008. Quiet, nonconsumptive recreation reduces protected area effectiveness. Conservation Letters 1:146–154.

Rosa, C. D., S. Collado, C. C. Profice, and L. R. Larson. 2019. Nature-based recreation associated with connectedness to nature and leisure satisfaction among students in Brazil. Leisure Studies 38:682–691.

Scherrer, P. and C. M. Pickering. 2006. Recovery of alpine herbfield on a closed walking track in the Kosciuszko Alpine Zone, Australia. Arctic, Antarctic, and Alpine Research 38:239–248.

Schlacher, T. A., D. Richardson, and I. McLean. 2008. Impacts of off-road vehicles (ORVs) on macrobenthic assemblages on sandy beaches. Journal of Environmental Management 41:878–892.

Schlacher, T. A. and L. M. C. Thompson. 2007. Exposure of fauna to off-road vehicle (ORV) traffic on sandy beaches. Coastal Management. 35:567–583.

Schroeder, S. S., D. C. Fulton, L. Cornicelli, and L. E. McInenly. 2020. Recreation conflict, coping, and satisfaction: Minnesota grouse hunters' conflicts and coping response related to all-terrain vehicle users, hikers, and other hunters. Journal of Outdoor Recreation and Tourism 30:100282.

Selman, W., C. Qualls, and J. C. Owen. 2013. Effects of human disturbance on the behavior and physiology of an imperiled freshwater turtle. The Journal of Wildlife Management 77:877–885.

Slaughter, C. W., C. H. Racine, D. A. Walker, L. A. Johnson, and G. Abele. 1990. Use of off-road vehicles and mitigation of effects in Alaska permafrost environments: A review. Environmental Management 14:63–72.

St-Louis, A., S. Hamel, J. Mainguy, and S. D. Côté. 2013. Factors influencing the reaction of mountain goats towards all-terrain vehicles. The Journal of Wildlife Management 77:599–605.

Steven, R., C. Pickering, and J. G. Castley. 2011. A review of the impacts of nature based recreation on birds. Journal of Environmental Management 92:2287–2294.

Striker G. G., F. P. O. Mollard, A. A. Grimoldi, R. J. C. León, and P. Insausti. 2011. Trampling enhances the dominance of graminoids over forbs in flooded grassland mesocosms. Applied Vegetation Science 14:95–106.

Sumanapala, D. and I. D. Wolf. 2019. Recreational ecology: A review of research and gap analysis. Environments MDPI 6:20–23.

Tarr, N. M., T. R. Simons, and K. H. and Pollock. 2010. An Experimental assessment of vehicle disturbance effects on migratory shorebirds. Journal of Wildlife Management 74:1776–1783.

Thomas, V. G. 1983. Spring migration: the prelude to goose reproduction and a review of its implication. In Fourth Western Hemisphere Waterfowl and Waterbird Symposium, edited by H. Boyd. Ottawa, Canada: Canadian Wildlife Service.

Walker, S. J. and T. A. Schlacher. 2011. Impact of a pulse human disturbance experiment on macrofaunal assemblages on an Australian sandy beach. Journal of Coastal Research 27:184–192.

Watkins, C. E. and N. C. Poudyal. 2021. Recreation group encounters and impacts on satisfaction in Tennessee wildlife management areas. Human Dimensions of Wildlife 26:507–522.

White-Robinson, R. 1982. Inland and salt marsh feeding of wintering brant geese in Essex. Wildfowl 33:113-118.

Draft Interim Compatibility Determination

Title

Draft Interim Compatibility Determination for Fishing, Everglades to Gulf Conservation Area

Refuge Use Category

Fishing

Refuge Use Type(s)

Fishing (Non-commercial)

Supporting Uses

Boating (Wind-driven, Human-powered, Motorized)

Refuge

Proposed Everglades to Gulf Conservation Area

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act)

"…to conserve (A) fish or wildlife which are listed as endangered species or threatened species…or (B) plants…" 16 U.S.C. 1534 (Endangered Species Act of 1973)

"…the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." 16 U.S.C. 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)

"…to conserve and protect migratory birds..., including species that are listed...as endangered species or threatened species, and to restore or develop adequate wildlife habitat." 16 U.S.C. §715i (Migratory Bird Conservation Act)

"…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude..." 16 U.S.C. 742f(b)(1) "…for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. 742f(a)(4), (Secretarial powers to implement laws related to fish and wildlife) (Fish and Wildlife Act of 1956)

"…suitable for— (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. 460k-1 "... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. 460k-2 [Refuge Recreation Act (16 U.S.C. 460k-460k-4), as amended]

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as 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 (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

No, the use is an interim use for the proposed Everglades to Gulf Conservation Area.

What is the use?

The use is fishing with boating as a supporting use. For the purposes of this document, fishing and boating are defined as follows:

- Fishing (non-commercial) is defined as the harvest of fish, shellfish, or other aquatic organisms for recreational purposes and/or personal consumption (includes collection of bait for personal use).
- Boating
    - Wind-driven boating is travel by sailboat, sailboard, surfboard, or similar boat with sail(s) or kite(s) powered by the wind.
    - Human-powered boating is travel by canoe, kayak, raft, rowboat, paddleboard, or similar boat propelled through the water by oars, paddles, poles, or other human-powered devices.
    - Motorized boating is travel by boat powered by fossil fuel or electricity (including solar powered).

Is the use a priority public use?

Yes

Where would the use be conducted?

Fishing would occur on Service owned fee-title waters and from the banks of fee-title lands within the proposed Conservation Area. It would be limited to those waters that allow for public access by road or trail. Fishing would only occur on those waters open to public fishing prior to Service acquisition.

When would the use be conducted?

Fishing would occur from legal sunrise to legal sunset year-round within State established seasons. Restrictions may be made depending on the species being fished, other fish and wildlife species present, other public uses occurring in the area, habitats and vegetations present, and the size and geographical location of the waterbody.

How would the use be conducted?

Fishing would occur only on those areas of the proposed Conservation Area that were open to public fishing prior to Service acquisition and indicated on proposed Conservation Area maps and brochures. All State permitting requirements apply including licensing requirements and season, bag and size limits. The Service would consult with the State of Florida Fish and Wildlife Commission each year on regulations and additional management implementation.

Boating in support of fishing would be subject to State registration and licensing requirements. Launching of boats may only occur on officially designated boat ramps and parking of trailers would only be allowed in designated parking areas.

Why is this use being proposed or reevaluated?

Fishing is a priority public use as defined by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Per the Improvement Act of 1997, these uses are to be prioritized over general uses. Wildlife-dependent recreation, such as fishing and boating, provide opportunities for the public to connect with the proposed Conservation Area's natural resources, fostering appreciation and support for the Refuge System and its mission.

Availability of Resources

Fishing administration costs for the proposed Conservation Area are difficult to determine prior to acquisition of sufficient fee-title properties to allow this use. However, an estimate is provided of typical costs associated with this use on an annual basis. Costs including salary, equipment, maintenance, monitoring, and communication with the public would be approximately $15,000 annually. Off-setting costs may be implemented at a future date should demand and area be sufficient to require services above base operating costs for the Conservation Area.

Table 1. Estimated Costs for Implementing Fishing

Identifier	Estimated Cost
Staff (Maintenance Workers, Biologist, and Refuge Managers)	$8,000
Maintain roads, parking lots, boat ramps	$5,000
Brochures	$1,000
Maintain Signage	$1,000
Total	$15,000

Anticipated Impacts of the Use

Potential impacts of a proposed use on the proposed Conservation Area purpose(s) and the Refuge System mission

Fishing directly supports Goal 3 of the proposed Conservation Area, Conserve Important Lands and Waters for the Benefit of All People and the mission of the National Wildlife Refuge System. Fishing has a long and lasting tradition in the United States and fosters appreciation of nature and a conservation ethic. Fishing considered in this compatibility determination is limited to those lands acquired by the Service in fee-title on which public fishing existed prior to Service acquisition.

The effects and impacts of the proposed use on the proposed Conservation Area's resources, whether adverse or beneficial, would be those that are reasonably foreseeable and have a reasonably close causal relationship to the proposed use.

Short-term Impacts

Revenues generated by angler trip expenses, such as purchases of gear, supplies, and fishing licenses, provide local and state economic benefits through sales and fuel taxes, employment, and installation of boat ramps and other supportive infrastructure that benefit anglers and nonanglers. Federal excise taxes on recreational fishing tackle, trolling motors, fish finders, and other equipment used for recreational fishing, as well as Federal fuel taxes on motorboat/small engine fuels, generate funds that support State fisheries conservation, research, management, stocking, and educational efforts that benefit fish populations and habitats and consumptive users of fisheries resources. According to statistics in the 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Department of the Interior et al. 2018), freshwater anglers spent $29.9 billion on freshwater fishing trips and equipment.

Fishing invariably results in some negative effects to habitat and wildlife. Fish are killed; most are taken for consumption. Some individuals that are caught, handled, and released also will succumb. However, fisheries management is directed toward populations and not individuals. Some fish and other aquatic and terrestrial wildlife along anglers' routes of travel and at recreational fishing sites will be disturbed and disrupted from their normal activities (Cole and Knight 1990), but this disturbance and displacement is temporary, dispersed in its occurrence, and is not pervasive enough to result in significant negative impacts to populations.

Littering is typically evident around recreational fishing sites and travel routes. Unfortunately, littering results from all uses of the Refuge System. Litter is aesthetically unappealing and can be injurious to wildlife and aquatic organisms. Lead sinkers lost during fishing could be ingested by wildlife, possibly causing lead poisoning. Conflicts between anglers and non-fishing visitors to the refuges could occur. These conflicts typically involve the spontaneous disturbance of wildlife and fish with which anglers and non-anglers are both seeking contact. Additionally, there may be competition for use of popular recreational fishing spots. These conflicts are managed by monitoring and signage at high use areas. Conflicting uses can be successfully managed by structuring use locations, times, and visitor numbers to allow for enjoyable experiences for all.

Short-term Impacts (Boating)

The short-term impacts of boating (human-powered, wind-driven, and motorized) are expected to be minimal. Possible short-term impacts include wildlife disturbance, littering, and vegetation disturbance, with motorized boats more likely to cause wildlife disturbance than non-motorized boats.

Conversely, positive impacts include increased access to wildlife recreation, including the big six priority public uses, and opportunities for visitors to feel connected to the proposed Conservation Area's habitats and wildlife.

Disturbances to wildlife and other users by non-motorized boats are generally less severe than motorized activities (Graham and Cook 2008) due to the quiet nature of paddling or sailing and the generally low volume of non-motorized boats in any given area. Non-motorized boat disturbance is temporary and usually localized, with adverse impacts varying based on species (Batten 1977). However, non-motorized boats, such as kayaks and canoes, can approach wildlife more closely than larger, motorized vessels, which can greatly disturb roosting and nesting birds.

Boating can cause short-term impacts on aquatic wildlife, including inducing physiological responses and behavioral changes and disrupting communication. Boat noise can cause sublethal stress responses in fish, increasing heart rate and decreasing stroke volume (Graham and Cooke 2008). Such physiological responses increase energy expenditure, which can have various adverse short-term impacts, such as increased susceptibility to predation and decreased foraging success. Other water-dwelling animals, like crustaceans, also exhibit behavioral and physiological stress responses to boat noise (Filiciotto et al. 2014). Boat-related disturbance has been shown to induce morphological and behavioral changes in the black bullhead (*Ameiurus melas*), resulting in observable changes to ciliary bundles and more time spent sheltering (Mickle et al. 2019). Some fish may spend less time guarding young in response to boat noise, exposing eggs and young to predation, which could influence the productivity of fish populations (Maxwell et al. 2018). Boat noise pollution can also disrupt communication among fish (Codarin et al. 2009), which may impede mate attraction, increase predation, and disorient the fish. The Service would restrict boating activities in areas with sensitive aquatic species to minimize the impacts of motorized boats on fish, crustaceans, and other water-dwelling organisms.

With boating activities, temporary disturbance to birds, such as the flushing of feeding or resting birds (Peters and Otis 2006, Chatwin et al. 2013, Livezey et al. 2016), is unavoidable. Motorized and non-motorized boats can affect birds at launch sites and during operation. Flushing causes birds to use more energy and alter site use, increasing predation and decreasing foraging success. The Service would create buffers around sensitive habitats and vulnerable species' nesting and roosting sites when necessary to lessen the negative impacts on birds and other wildlife species.

Boats can damage vegetation on- and off-shore. For example, boaters could damage vegetation and compact soil while hauling canoes and kayaks to and from launch sites. Boats can also damage aquatic vegetation, reducing vegetation cover and height (Hansen et al. 2019, Sagerman et al. 2020). The Service would not allow boating in areas with especially vulnerable aquatic vegetation.

Law enforcement issues are possible, such as trespassing, disorderly conduct, and the illegal taking of fish and other species. The proposed Conservation Area would be supported by Fish and Wildlife Officers assigned to both the South Florida Law Enforcement District and the North Florida Law Enforcement District to ensure compliance with applicable laws and regulations when available.

Long-term Impacts

Recreational fishing could potentially cause negative impacts to fish populations if it occurs at unsustainably high levels or is not managed properly. Potential impacts to fish populations from fishing include direct mortality from harvest, injury to fish caught and released, changes in age and size class

distribution, changes in reproductive capacity and success, loss of genetic diversity, altered behavior, and changes in ecosystems and food webs (Lewin et al. 2006, Kline1993). While fishing does remove individuals from the population, we do not anticipate increased fishing opportunities would affect the fish population as a whole. Anglers must abide by the State's seasons, catch limits, and regulations, which were designed to protect the State's fish populations. Fishing pressure is projected to be minimal and sustainable.

Activities associated with fishing have caused mortality to manatees in Florida. The Florida Fish and Wildlife Conservation Commission has determined that marine debris including fishing line, buoys, trap lines, and tires are a serious source of harm to manatees in State waters. Reinart et al. (2017) reported that 11% of manatees necropsied over a 20-year period showed signs of entanglement or ingestion of marine debris. Education and enforcement of existing regulations are methods to reduce and prevent these impacts and will be employed through Conservation Area informational materials.

Effects that are minor when considered alone, but collectively may be important, are known as cumulative effects. Incremental increases in activities by people engaged in the variety of allowed uses, including recreational fishing that continue unchecked potentially could result in cumulative detrimental consequences to wildlife or habitats. The Service would monitor these activities to ensure wildlife and other refuge resources are not affected in a detrimental manner.

Various methods, such as spatial and temporal restrictions, monitoring, and signage, are available to refuge managers and can be readily implemented to effectively manage participant numbers and activity patterns to maintain a compatible, high-quality, low-impact, and safe recreational fishing program. Recreational fishing conducted in accordance with State and Federal regulations is not expected to adversely affect fish and wildlife populations and may assist in maintaining desirable age structure in fish populations and promoting the biological integrity, diversity, and environmental health of the refuges.

Cumulative impacts could occur from the combination of uses on Refuge System units including hunting, fishing, wildlife observation, photography, education, interpretation, habitat management, and research. Conflicting programs that occur in the same space and time can cause decreased satisfaction from user groups and increase disturbance to wildlife from frequent human visitation, consumptive or non-consumptive. The areas used by the public to fish and those areas frequented by users engaged in other activities are dispersed and often not overlapping temporally and spatially to such degree that there are any significant adverse cumulative effects to fish and wildlife and their habitat resources, public safety, or quality of the visitor experience.

Management actions, such as water management and research, are necessary aspects of refuge management; the conduct of these activities may not be conducive to fishing activities occurring at the same time and location. The Service considers all uses as activities that are planned and implemented on a yearly basis, and programs are structured to allow multiple uses to occur with minimal conflict. Recreational fishing seasons and locations allow for anglers to pursue this public use while other uses may be located in other areas or at other times to reduce potential conflicts.

In addition to environmental health, there are other cumulative beneficial effects to recreational fishing. Increased wildlife-dependent recreation (e.g., fishing, hunting, wildlife observation and photography, environmental education); beneficial use of renewable, sustainable aquatic resources; and increased appreciation for fish and wildlife conservation and the role of Refuge System Units in fish and wildlife conservation and habitat management and restoration are promoted through recreational fishing programs on National Wildlife Refuge System units. Additionally, increased

revenues at the local, State, and national levels benefit economies and provide (Federal) funding for fisheries research, habitat management, acquisition of habitats, supportive infrastructure, and educational programs designed to raise public awareness and support for fisheries conservation at the local, State, and national levels.

Long-term Impacts (Boating)

Boating can have long-term impacts on wildlife and the habitats on which they depend, including the loss and degradation of aquatic vegetation, water pollution, the establishment of invasive species, and population effects on birds and other wildlife. However, long-term impacts can be minimized when conducted in accordance with established federal regulations, laws, and policies.

Recreational boating can directly impact bird populations, especially during nesting season. Boats can cause birds to flush (Peters and Otis 2006, Livezey et al. 2016); such flushing makes chicks and eggs more vulnerable to predators and overheating (Audubon n.d.). Audubon (n.d.) recommends landing and anchoring watercraft away from nesting birds to prevent disturbance.

Boating indirectly affects birds when users participate in other activities, such as fishing. If not disposed of properly, excess fishing lines and netting can become a hazard for birds when used as nesting material or when individuals get caught in the remnants. Education and communication are important to spread awareness and prevent behaviors detrimental to wildlife.

Boat strikes has been recognized as a significant danger to manatees (*Trichechus manatus latirostris*) in coastal Florida (Calleson and Frohlich 2007, USFWS 2001). At the development of the manatee recovery plan in 2001, boat strikes were recognized as the top threat to manatees causing an estimated 25% of mortality (USFWS 2001). Bassett et al. (2020) found that over 96% of adult manatees has watercraft related scars and that 1 in 4 manatees had scars from 10 or more encounters. Data showed that manatees on the west coast of Florida had more scars from those on the east coast. Actions including reducing boat speeds in manatee frequented areas and providing sanctuary areas for manatees at critical times of the year can be effective at reducing incidents of boat collisions.

Boaters can endanger wildlife by intentionally or unintentionally polluting the water. Potential pollutants include exhaust gases, spilled fuel, and litter. Tightening engine bolts, replacing worn hydraulic lines, and using an oil tray or drip pan can prevent pollutants from entering the water (National Oceanic and Atmospheric Administration 2020). In addition, Sim et al. (2015) found that boating infrastructure alters local concentrations of pollutants. Areas near marinas, jetties, and boat ramps were found to have increased fine and moderate metal concentrations, with altered sediment faunal assemblages observed at adjacent sites. These effects were only observed within the structure's local vicinity and did not impact reference sites (Sim et al. 2015).

Recreational boat traffic can have long-term impacts on submerged aquatic vegetation abundance in freshwater and coastal systems (Sagerman et al. 2020). Boating can reduce vegetation cover and height and alter its composition (Hansen et al. 2019). The loss and alteration of aquatic vegetation can affect its beneficial ecological functions. For example, several studies have shown that submerged vegetation's ability to reduce turbidity is related to its abundance and extent (Orth et al. 1999, Moore 2004, Austin et al. 2017). Further, fish (Hansen et al. 2019) and macroinvertebrate abundance (Diehl and Kornijów 1998, Attrill et al. 2000) increase with increasing vegetation abundance. The loss or reduction of these ecological functions can degrade ecosystems. Informed management can reduce these negative impacts on submerged vegetation (Sagerman et al. 2020).

Small recreational boats can travel long distances, and their relatively low speeds make them ideal vectors for invasive species (Minchin et al. 2006), including invasive animals (Johnson et al. 2001, Power et al. 2004), plants (Buchan and Padilla 2000, Mullin et al. 2000), and algae (Chapman 1999, Farrell and Fletcher 2006). Recreational boaters often use their boats in more than one location, facilitating the spread of invasive species between water bodies. High-pressure washes in between uses effectively remove invasive species from boats, but many boaters do not wash their vessels regularly (Rothlisberger et al. 2010). Therefore, recreational boating may introduce new aquatic invasive species to the conservation area that could impact local flora and fauna. The Service would educate the public about this issue to minimize the spread of invasive species.

Public Review and Comment

The draft compatibility determination will be available for public review and comment for 30 days from September – October 2023, in conjunction with the public comment period for the draft Everglades to Gulf Land Protection Plan and Environmental Assessment. The public comment period will be advertised through newspapers; radio; public meetings; and outreach to potentially interested parties, State agencies, and Tribes. It will also be available electronically at https://www.fws.gov/project/everglades-to-gulf-conservation-area. The final compatibility determination will address concerns expressed during the public comment period.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

The following stipulations would be necessary to ensure the use is compatible:

1. Users would be required to possess all applicable State licenses, stamps, permits, and a picture ID at all times while on proposed Conservation Area fee-title lands.
2. Individuals utilizing the proposed Conservation Area would be subject to inspections of permits, licenses, fishing equipment, bag limits, boats, and vehicles by law enforcement officers.
3. Areas may be closed during nesting seasons or other critical times for wildlife and would be noticed through signage and on the Conservation Area website.
4. Cleaning fish on the proposed Conservation Area would be prohibited.
5. Commercial fishing is prohibited.
6. Frog gigging, cast nets, seines, trotlines, jugs, and yo-yos will be prohibited as they are largely non-selective for forage fish populations, are wasteful in removing critical forage biomass, exert deleterious mortality on forage fish, and promote unattended line fishing.

Justification

The stipulations outlined above would help ensure that the use is compatible with the purposes of the proposed Conservation Area. As outlined in this compatibility determination, fishing and boating would not be permitted on a fee-title property if the use conflicted with the national policy to maintain the proposed Conservation Area's biological diversity, integrity, and environmental health. The Service has determined that considering the required analyses and the listed stipulations, future fishing and associated boating opportunities would not materially interfere with or detract from the fulfillment of

the National Wildlife Refuge System mission or the purpose of the proposed Conservation Area. Instead, fishing and boating would allow visitors to enjoy the proposed Conservation Area's natural resources and develop an appreciation for the Refuge System and its mission.

Signature of Determination

Refuge Manager Signature and Date

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

Literature Cited/References

Attrill, M. J., J. A. Strong, and A. A. Rowden. 2000. Are macroinvertebrate communities influenced by seagrass structural complexity? Ecography 23:114–121.

Audubon. n.d. *Audubon alliance guide to boating with birds: Sharing the waterways.* https://www.westportct.gov/home/showpublisheddocument/43965/637571082181170000

Austin, Å. N., J. P. Hansen, S. Donadi, and J. S. Eklöf. 2017. Relationships between aquatic vegetation and water turbidity: A field survey across seasons and spatial scales. PLoS ONE 12:e0181419.

Bassett, B. L., J. A. Hostetler, E. Leone, C. P. Shea, B. D. Barbeau, G. L. Lonati, A. L. Panike, A. Honaker, L. I. Ward-Geiger. 2020. Quantifying sublethal Florida manatee–watercraft interactions by examining scars on manatee carcasses. Endangered Species Research Vol. 43: 395–408.

Batten, L. A. 1977. Sailing on reservoirs and its effects on water birds. Biological Conservation 11:49–58.

Buchan, L. A. J. and D. K. Padilla. 2000. Predicting the likelihood of Eurasian watermilfoil presence in lakes, a macrophyte monitoring tool. Ecological Applications 10:1442–1455.

Chapman, A. S. 1999. From introduced species to invader: What determines variation in the success of *Codium fragile* ssp. tomentosoides (Chlorophyta) in the North Atlantic Ocean? Helgoland Marine Research 52:277–289.

Chatwin, T. A., R. Joy, and A. E. Burger. 2013. Set-back distances to protect nesting and roosting seabirds off Vancouver Island from boat disturbance. Waterbirds: The International Journal of Waterbird Biology 36:43–52.

Calleson C. S., R. K. Frohlich. 2007. Slower boat speeds reduce risks to manatees. Endangered Species Research 3:295-304. https://doi.org/10.3354/esr00056

Codarin, A., L. E. Wysocki, F. Ladich, and M. Picciulin. 2009. Effects of ambient and boat noise on hearing and communication in three fish species living in a marine protected area (Miramare, Italy). Marine Pollution Bulletin 58:1880-1887.

Cole, D. N. and R. L. Knight. 1990. "Impacts of recreation on biodiversity in wilderness," *Natural Resources and Environmental Issues*: Vol. 0, Article 6.

Diehl, S. and R. Kornijów. 1998. Influence of submerged macrophytes on trophic interactions among fish and macroinvertebrates. In E. Jeppesen, M. Søndergaard, M. Søndergaard, and K. Christoffersen (Eds.). *The structuring role of submerged macrophytes in lakes* (pp. 24–46). Springer, New York, NY.

Farrell, P. and R. L. Fletcher. 2006. An investigation of dispersal of the introduced brown alga *Undaria pinnatifida* (Harvey) Suringar and its competition with some species on the man-made structures of Torquay Marina (Devon, UK). Journal of Experimental Marine Biology and Ecology 334:236–243.

Filiciotto, F., M. Vazzana, M. Celi, V. Maccarrone, M. Ceraulo, G. Buffa, V. Di Stefano, S. Mazzola, and G. Buscaino. 2014. Behavioural and biochemical stress responses of *Palinurus elephas* after exposure to boat noise pollution in tank. Marine Pollution Bulletin 84:104–114.

Florida Fish and Wildlife Commission. 2023. Human Related Impacts to Manatees. Retrieved September 14, 2023. https://myfwc.com/wildlifehabitats/wildlife/manatee/entanglement/

Graham, A. L. and S. J. Cooke. 2008. The effects of noise disturbance from various recreational boating activities common to inland waters on the cardiac physiology of a freshwater fish, the largemouth bass (*Micropterus salmoides*). Aquatic Conservation: Marine and Freshwater Ecosystems 18:1315–1324.

Hansen, J. P., G. Sundblad, U. Bergstrom, A. N. Austin, S. Donadi, B. K. Eriksson, and J. S. Eklof. 2019. Recreational boating degrades vegetation important for fish recruitment. Ambio 48:539–551.

Johnson, L. E., A. Ricciardi, and J. T. Carlton. 2001. Overland dispersal of aquatic invasive species: A risk assessment of transient recreational boating. Ecological Applications 11:1789–1799.

Kline, M.L. (1993). Waterbird behavioral responses to human disturbance. Wildlife Society Bulletin, 21, 31-39.

Lee, T. H. and F. H. Jan. 2015. The effects of recreation experience, environmental attitude, and biospheric value on the environmentally responsible behavior of nature-based tourists. Environmental Management 56:193–208.

Lewin, W.C., R. Arlinghaus, and T. Mehner, Documented and Potential Biological Impacts of Recreational Fishing. Fisheries Science. 14:305–367, 2006.

Livezey, K. B., E. Fernández-Juricic, and D. T. Blumstein. 2016. Database of bird flight initiation distances to assist in estimating effects from human disturbance and delineating buffer areas. Journal of Fish and Wildlife Management 7:181–191.

Maxwell, R. J., A. J. Zolderdo, R. de Bruijn, J. W. Brownscombe, E. Staaterman, A. J. Gallagher, and S. J. Cooke. 2018. Does motor noise from recreational boats alter parental care behaviour of a

nesting freshwater fish? Aquatic Conservation: Marine and Freshwater Ecosystems 28:969–978.

Mickle, M. F., C. M. Harris, O. P. Love, and D. M. Higgs. 2019. Behavioural and morphological changes in fish exposed to ecologically relevant boat noises. Canadian Journal of Fisheries and Aquatic Sciences 76:1845–1853.

Miller, L.A.; Harwell, M.C. 2022. Connecting Future Environmental Trends and Assessments of Fish and Wildlife Resources of Concern: A Case Study of Big Pine Key, Florida. Sustainability 2022, 14, 14553. https://doi.org/10.3390/ su142114553

Minchin, D., O. Floerl, D. Savini, and A. Occhipinti-Ambrogi. 2006. Small craft and the spread of exotic species. In *The ecology of transportation: Managing mobility for the environment* (pp 99–118). Springer, Dordrecht.

Moore, K. A. 2004. Influence of seagrasses on water quality in shallow regions of the lower Chesapeake Bay. Journal of Coastal Research 2009:162–178.

Mullin, B. H., L. W. J. Anderson, J. M. DiTomaso, R. E. Eplee, and K. D. Getsinger. 2000. *Invasive Plant Species*. Ames, IA: Council for Agricultural Science and Technology Issue Paper 13. 17 pp.

National Oceanic and Atmospheric Administration. 2020. *Safe Boating and Prevention of Small Oil Spills*. Office for Response and Restoration. https://response.restoration.noaa.gov/about/media/safe-boating-and prevention-small-oil-spills.html

Orth, R. J., M. C. Harwell, and J. R. Fishman. 1999. A rapid and simple method for transplanting eelgrass using single, unanchored shoots. Aquatic Botany 64:77–85.

Peters, K. A. and D. L. Otis. 2006. Wading bird response to recreational boat traffic: Does flushing translate into avoidance? Wildlife Society Bulletin 34:1383–1391.

Power, A. J., R. L. Walker, K. Payne, and D. Hurley. 2004. First occurrence of the nonindigenous Green Mussel, *Perna viridis* (Linnaeus, 1758) in Coastal Georgia, United States. Journal of Shellfish Research 23:741–744.

Reinert, T. R., A. C. Spellman, B. L. Bassett. 2017. Entanglement in and Ingestion of Fishing Gear and other Marine Debris by Florida Manatees, 1993-2012, "Manatee Interactions with Marine Debris".

Rosa, C. D., S. Collado, C. C. Profice, and L. R. Larson. 2019. Nature-based recreation associated with connectedness to nature and leisure satisfaction among students in Brazil. Leisure Studies 38:682–691.

Rothlisberger, J. D., W. L. Chadderton, J. McNulty, and D. M. Lodge. 2010. Aquatic invasive species transport via trailered boats: What is being moved, who is moving it, and what can be done. Fisheries 35:121–132.

Sagerman, J., J. P. Hansen, and S. A. Wikström. 2020. Effects of boat traffic and mooring infrastructure on aquatic vegetation: A systematic review and meta-analysis. Ambio 49:517–530. https://doi.org/10.1007/s13280-019-01215-9

Sim, V. X. Y., K. A. Dafforn, S. L. Simpson, B. P. Kelaher, and E. L. Johnston. 2015. Sediment contaminants and infauna associated with recreational boating structures in a multi-use marine park. PLoS ONE 10:e0130537.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

U. S. Fish and Wildlife Service. 2001. Florida manatee recovery plan, (*Trichechus manatus latirostris*), third revision. US Fish and Wildlife Service, Atlanta, GA

APPENDIX D. LAND COVER CLASSIFICATION TABLE

There are 172 different land covers (based on the 2022 Florida Cooperative Landcover v3.6 data) within the approximately 4-million-acre Conservation Area. These have been combined into 13 land cover categories for the purpose of analysis in this document.

Map Category	Landcover Type	Landcover Subtype	Acres
Agriculture	Cropland/Pasture	Fallow Cropland	6,959
Agriculture	Cropland/Pasture	Field Crops	21,670
Agriculture	Cropland/Pasture	Irrigated Row Crops	116,754
Agriculture	Cropland/Pasture	Row Crops	13,953
Agriculture	Orchards/Groves	Citrus	302,744
Agriculture	Orchards/Groves	Fallow Orchards	11,479
Agriculture	Orchards/Groves	Fruit Orchards	1
Agriculture	Orchards/Groves	Orchards/Groves	124,878
Agriculture	Orchards/Groves	Pecan	331
Agriculture	Other Agriculture	Feeding Operations	4,576
Agriculture	Other Agriculture	Other Agriculture	361
Agriculture	Other Agriculture	Specialty Farms	3,684
Agriculture	Sugarcane	Sugarcane	149,963
Agriculture	Tree Plantations	Coniferous Plantations	68,489
Agriculture	Tree Plantations	Hardwood Plantations	4
Agriculture	Tree Plantations	Wet Coniferous Plantations	31
Agriculture	Vineyard and Nurseries	Ornamentals	2,092
Agriculture	Vineyard and Nurseries	Sod Farms	763
Agriculture	Vineyard and Nurseries	Tree Nurseries	3,735
Agriculture	Vineyard and Nurseries	Vineyard and Nurseries	2,687
Barren	Bare Soil/Clear Cut	Bare Soil/Clear Cut	353
Barren	Barren, Sinkhole, and Outcrop Communities	Bare Soil	13
Barren	Unconsolidated substrate	Unconsolidated Substrate	84
Coastal Wetland	Mangrove Swamp	Mangrove Swamp	3,481
Coastal Wetland	Salt Marsh	Salt Marsh	3,719
Developed	Communication	Communication	279
Developed	Cultural - Terrestrial	Cultural - Terrestrial	17
Developed	Cultural - Terrestrial	Highway Rights of Way	259
Developed	Cultural - Terrestrial	Mowed Grass	718
Developed	Cultural - Terrestrial	Vegetative Berm	112
Developed	Extractive	Extractive	56,167
Developed	Extractive	Oil & Gas Fields	8
Developed	Extractive	Reclaimed Lands	21,254
Developed	Extractive	Rock Quarries	3,524

Map Category	Landcover Type	Landcover Subtype	Acres
Developed	Extractive	Sand and Gravel Pits	6,421
Developed	Extractive	Spoil Area	146
Developed	Extractive	Strip Mines	518
Developed	High Intensity Urban	Commercial and Services	8,934
Developed	High Intensity Urban	High Intensity Urban	66
Developed	High Intensity Urban	Industrial	6,311
Developed	High Intensity Urban	Institutional	5,382
Developed	High Intensity Urban	Residential, High Density > 5 Dwelling Units/AC	7,065
Developed	High Intensity Urban	Residential, Med. Density - 2-5 Dwelling Units/AC	28,011
Developed	Low Intensity Urban	Ballfields	259
Developed	Low Intensity Urban	Cemeteries	166
Developed	Low Intensity Urban	Community rec. facilities	182
Developed	Low Intensity Urban	Golf courses	5,982
Developed	Low Intensity Urban	Grass	668
Developed	Low Intensity Urban	Low Intensity Urban	2,856
Developed	Low Intensity Urban	Parks and Zoos	435
Developed	Low Intensity Urban	Residential, Low Density	66,067
Developed	Low Intensity Urban	Urban Open Forested	1,812
Developed	Low Intensity Urban	Urban Open Land	17,543
Developed	Low Intensity Urban	Urban Open Pine	766
Developed	Rural	Rural Open	64,852
Developed	Rural	Rural Structures	15,387
Developed	Transportation	Rails	115
Developed	Transportation	Roads	1
Developed	Transportation	Transportation	75,030
Developed	Utilities	Utilities	7,302
Dry Prairie and Pine Flatwoods	Dry Prairie	Dry Prairie	74,086
Dry Prairie and Pine Flatwoods	Mesic Flatwoods	Mesic Flatwoods	321,111
Dry Prairie and Pine Flatwoods	Palmetto Prairie	Palmetto Prairie	4,880
Dry Prairie and Pine Flatwoods	Scrubby Flatwoods	Scrubby Flatwoods	15,565
Dry Prairie and Pine Flatwoods	Wet Flatwoods	Cabbage Palm Flatwoods	11
Dry Prairie and Pine Flatwoods	Wet Flatwoods	Hydric Pine Flatwoods	32,396
Dry Prairie and Pine Flatwoods	Wet Flatwoods	Hydric Pine Savanna	77

Map Category	Landcover Type	Landcover Subtype	Acres
Dry Prairie and Pine Flatwoods	Wet Flatwoods	Wet Flatwoods	43,850
Exotic Plants	Exotic Plants	Australian Pine	75
Exotic Plants	Exotic Plants	Brazilian Pepper	3,724
Exotic Plants	Exotic Plants	Exotic Plants	713
Exotic Plants	Exotic Plants	Exotic Wetland Hardwoods	1,803
Exotic Plants	Exotic Plants	Melaleuca	1,307
Forested Wetland	Basin Swamp	Basin Swamp	3,366
Forested Wetland	Baygall	Bay Swamp	2,538
Forested Wetland	Baygall	Baygall	4,898
Forested Wetland	Baygall	South Florida Bayhead	24
Forested Wetland	Cypress	Cypress	58,470
Forested Wetland	Cypress/Tupelo (including mixed Cypress/Tupelo)	Cypress/Tupelo (including mixed Cypress/Tupelo)	12,919
Forested Wetland	Cypress/Tupelo (including mixed Cypress/Tupelo)	Tupelo	17
Forested Wetland	Dome Swamp	Dome Swamp	4,090
Forested Wetland	Floodplain Swamp	Floodplain Swamp	16,727
Forested Wetland	Freshwater Forested Wetlands	Bottomland Forest	328
Forested Wetland	Freshwater Forested Wetlands	Cypress/Hardwood Swamps	86
Forested Wetland	Freshwater Forested Wetlands	Cypress/Pine/Cabbage Palm	23,534
Forested Wetland	Freshwater Forested Wetlands	Mixed Hardwood-Coniferous Swamps	43,630
Forested Wetland	Freshwater Forested Wetlands	Mixed Wetland Hardwoods	163,345
Forested Wetland	Hydric Hammock	Cabbage Palm Hammock	1,741
Forested Wetland	Hydric Hammock	Hydric Hammock	7,495
Forested Wetland	Hydric Hammock	Prairie Hydric Hammock	3,420
Forested Wetland	Isolated Freshwater Swamp	Isolated Freshwater Swamp	12,380
Forested Wetland	Non-vegetated Wetland	Non-vegetated Wetland	15
Forested Wetland	Other Coniferous Wetlands	Other Coniferous Wetlands	2,128
Forested Wetland	Other Coniferous Wetlands	Pond Pine	5
Forested Wetland	Other Hardwood Wetlands	Other Hardwood Wetlands	4,941
Forested Wetland	Strand Swamp	Strand Swamp	31,921
Mixed Forest	Mixed Hardwood-Coniferous	Mixed Hardwood-Coniferous	50,457
Mixed Forest	Mixed Hardwood-Coniferous	Successional Hardwood Forest	5,103
Mixed Forest	Rural	Rural Open Forested	11,337

Map Category	Landcover Type	Landcover Subtype	Acres
Mixed Forest	Rural	Rural Open Pine	1,227
Open Water	Alluvial Stream	Alluvial Stream	8
Open Water	Alluvial Stream	Blackwater Stream	769
Open Water	Alluvial Stream	Natural Rivers and Streams	4,314
Open Water	Alluvial Stream	Riverine Sandbar	27
Open Water	Alluvial Stream	Tidally-influenced Stream	3
Open Water	Cultural-Estuarine	Estuarine Ditch/Channel	69
Open Water	Cultural-Lacustrine	Aquacultural Ponds	499
Open Water	Cultural-Lacustrine	Artificial Impoundment/Reservoir	18,500
Open Water	Cultural-Lacustrine	Artificial/Farm Pond	757
Open Water	Cultural-Lacustrine	Cultural - Lacustrine	13,276
Open Water	Cultural-Lacustrine	Industrial Cooling Pond	237
Open Water	Cultural-Lacustrine	Quarry Pond	19,538
Open Water	Cultural-Lacustrine	Sewage Treatment Pond	252
Open Water	Cultural-Lacustrine	Stormwater Treatment Areas	492
Open Water	Cultural-Riverine	Canal	6,984
Open Water	Cultural-Riverine	Cultural - Riverine	3
Open Water	Cultural-Riverine	Ditch/Artificial Intermittent Stream	304
Open Water	Estuarine	Estuarine	5,227
Open Water	Estuarine	Oyster Bar	2
Open Water	Lacustrine	Lacustrine	1,764
Open Water	Marine	Marine	0
Open Water	Natural Lakes and Ponds	Clastic Upland Lake	2
Open Water	Natural Lakes and Ponds	Flatwoods/Prairie/Marsh Lake	149
Open Water	Natural Lakes and Ponds	Limnetic	2
Open Water	Natural Lakes and Ponds	Littoral	0
Open Water	Natural Lakes and Ponds	Natural Lakes and Ponds	16,815
Open Water	Natural Lakes and Ponds	River Floodplain Lake/Swamp Lake	1,543
Open Water	Natural Lakes and Ponds	Sandhill Lake	40
Open Water	Riverine	Riverine	1,000
Open Water	Tidal Flat	Tidal Flat	92
Pasture	Improved Pasture	Improved Pasture	985,573
Pasture	Rural	Unimproved/Woodland Pasture	75,785
Scrub/Shrub	Coastal Scrub	Coastal Scrub	1
Scrub/Shrub	High Pine and Scrub	Upland Coniferous	466
Scrub/Shrub	High Pine and Scrub	Upland Mixed Woodland	135
Scrub/Shrub	Sand Pine Scrub	Sand Pine Scrub	2
Scrub/Shrub	Sandhill	Sandhill	637
Scrub/Shrub	Scrub	Oak Scrub	1

Map Category	Landcover Type	Landcover Subtype	Acres
Scrub/Shrub	Scrub	Scrub	15,885
Scrub/Shrub	Shrub and Brushland	Shrub and Brushland	42,299
Upland Hardwood Hammock	Mesic Hammock	Cabbage Palm	9,192
Upland Hardwood Hammock	Mesic Hammock	Live Oak	5,028
Upland Hardwood Hammock	Mesic Hammock	Mesic Hammock	25,653
Upland Hardwood Hammock	Mesic Hammock	Pine - Mesic Oak	1,713
Upland Hardwood Hammock	Mesic Hammock	Prairie Mesic Hammock	4,311
Upland Hardwood Hammock	Rockland Hammock	Rockland Hammock	38
Upland Hardwood Hammock	Rural	Oak - Cabbage Palm Forests	20,150
Upland Hardwood Hammock	Upland Hardwood Forest	Mixed Hardwoods	13
Upland Hardwood Hammock	Upland Hardwood Forest	Upland Hardwood Forest	1,672
Upland Hardwood Hammock	Xeric Hammock	Xeric Hammock	953
Wet Prairie and Freshwater Marsh	Cultural-Palustrine	Clearcut Wetland	92
Wet Prairie and Freshwater Marsh	Cultural-Palustrine	Cultural - Palustrine	18,393
Wet Prairie and Freshwater Marsh	Cultural-Palustrine	Grazed Wetlands	1,497
Wet Prairie and Freshwater Marsh	Cultural-Palustrine	Impounded Marsh	2,772
Wet Prairie and Freshwater Marsh	Floodplain Marsh	Floodplain Marsh	12,485
Wet Prairie and Freshwater Marsh	Freshwater Non-Forested Wetlands	Floating/Emergent Aquatic Vegetation	3,698
Wet Prairie and Freshwater Marsh	Freshwater Non-Forested Wetlands	Slough	1,134
Wet Prairie and Freshwater Marsh	Freshwater Non-Forested Wetlands	Submergent Aquatic Vegetation	1
Wet Prairie and Freshwater Marsh	Freshwater Non-Forested Wetlands	Water Lettuce	1
Wet Prairie and Freshwater Marsh	Isolated Freshwater Marsh	Basin Marsh	15,498
Wet Prairie and Freshwater Marsh	Isolated Freshwater Marsh	Depression Marsh	34,712

Map Category	Landcover Type	Landcover Subtype	Acres
Wet Prairie and Freshwater Marsh	Isolated Freshwater Marsh	Isolated Freshwater Marsh	72,106
Wet Prairie and Freshwater Marsh	Marshes	Glades Marsh	7,496
Wet Prairie and Freshwater Marsh	Marshes	Marshes	175,995
Wet Prairie and Freshwater Marsh	Marshes	Sawgrass	786
Wet Prairie and Freshwater Marsh	Marshes	Slough Marsh	6,835
Wet Prairie and Freshwater Marsh	Prairies and Bogs	Cutthroat Seep	1
Wet Prairie and Freshwater Marsh	Prairies and Bogs	Marl Prairie	4
Wet Prairie and Freshwater Marsh	Prairies and Bogs	Mixed Scrub-Shrub Wetland	84,963
Wet Prairie and Freshwater Marsh	Prairies and Bogs	Seepage Slope	14
Wet Prairie and Freshwater Marsh	Prairies and Bogs	Shrub Bog	20
Wet Prairie and Freshwater Marsh	Prairies and Bogs	Wet Prairie	71,559

APPENDIX E. LANDSCAPE CONSERVATION DESIGN (2022)

Southwest Florida Landscape Conservation Design

Final Report

February 2022

Florida Conservation Group

University of Florida Center for Landscape Conservation Planning

National Wildlife Refuge Association

Acknowledgements

This Report was developed and completed by Julie Morris of the Florida Conservation Group and National Wildlife Refuge Association and Dr. Tom Hoctor of the University Florida Center for Landscape Conservation Planning funded through a Cooperative Agreement with the U.S. Fish and Wildlife Service.

Cover image courtesy of Carlton Ward

Contents

A. Introduction

The following is the final report for the Landscape Conservation Design for Southwest Florida (referred to herein as the SWFLCD or LCD), which incorporates the northwestern Everglades, Caloosahatchee River, Fisheating Creek, Peace River, and Myakka River watersheds. This document provides the scientific analysis needed to provide the justification to further explore the need for a future Southwest Florida National Wildlife Refuge and Conservation Area. The LCD includes identification of biodiversity and ecosystem service conservation priorities in the context of both protection opportunities and threats in one of the most important regional conservation landscapes in the United States. Southwest Florida fosters a unique set of species with significant threats from rapid human population growth and climate change. However, this region also harbors a large and largely intact rural landscape essential to the Florida panther and a host of other federal and state listed species. It also plays a very important role in the ecological integrity of both the Everglades and Charlotte Harbor watersheds. Significant opportunities still exist to protect large working landscapes and functional ecological connections between conservation areas to address many of the region's biodiversity and water resource conservation goals.

The LCD includes updated Florida panther conservation priorities using the newest available data on panther habitat and corridor conservation priorities from the U.S. Fish and Wildlife Service (USFWS) and the University of Florida Center for Landscape Conservation Planning (CLCP). The LCD also includes an assessment of habitat priorities for many additional focal species including federal and state listed species as well as other species considered important by experts based on their rarity, fragmentation sensitivity, indicator, or keystone status. The LCD team also developed a list of focal natural communities and identified all remaining sites for each of those natural communities using the best available data. Beyond panthers, assessment of ecological connectivity is also incorporated through use of new Major River Riparian Buffer Connectivity and Coastal Resilience Connectivity models that are part of the new Florida Ecological Greenways Network (FEGN) completed in June 2021. The LCD also incorporates relevant data on surface water conservation priorities as well as wetland restoration opportunities.

All these conservation priorities are compared to both protection opportunities and development threats to help identify the sites with greatest potential for future conservation as well as the greatest need for near term conservation based on threat of potential conversion to development. Collectively, the new LCD provides a thorough foundation for conservation planning in the region for the USFWS regarding National Wildlife Refuges and federally listed species, as well as for myriad federal, state, and local partners.

The SWFLCD study area incorporates almost 7 million acres of land and water from the northwestern Everglades north to the headwaters of the Peace River, west to incorporate the Myakka River watershed, and east to the Lake Wales Ridge, Fisheating Creek and the western half of Lake Okeechobee (**Figure 1**). Though the Everglades Headwaters National Wildlife Refuge and Conservation Area (EHW NWR&CA) project area was included in the ecological priority, conservation opportunity, and development threat analyses conducted in this project, it is a separate study area that borders the SWFLCD to the northeast and encompasses much of the Kissimmee River watershed and significant portions of the Lake Wales Ridge. The EHNWR project area boundary has been included for reference in all maps in this report. Collectively, the SWFLCD and EHNWR represent the current breeding range and

best potential population expansion areas for the Florida panther, with over a million acres of unprotected habitat for other listed and focal species, unique natural communities, the heart of Florida's unique prairie ranching landscape, much of the Lake Okeechobee and Everglades watersheds, and the entire Peace River and Myakka river watersheds, which are essential for the health of Charlotte Harbor, a National Estuary and epicenter of natural resource based tourism and economic activity in southwest Florida (**Figure 2**). The SWFLCD region is also an essential keystone for the Florida Wildlife Corridor, which is delineated as the top three priorities within the FEGN. The Florida Wildlife Corridor has recently become a statewide conservation priority for the Florida Legislature and Governor, who have expressed their commitment to its protection through a significant increase in conservation protection land funding for the Florida Forever and Rural and Family Lands Protection programs. The SWFLCD (and EHW NWR&CA) represent an unprecedented landscape-scale conservation opportunity essential to the Florida panther, many other listed species, and south Florida's watersheds with great potential for both large scale conservation funding and cooperative opportunities between federal, state, regional, and local partners. In fact, Florida's ecological and economic future is dependent on conservation success in this region.

Figure 1. Southwest Florida Landscape Conservation Design Study Area.

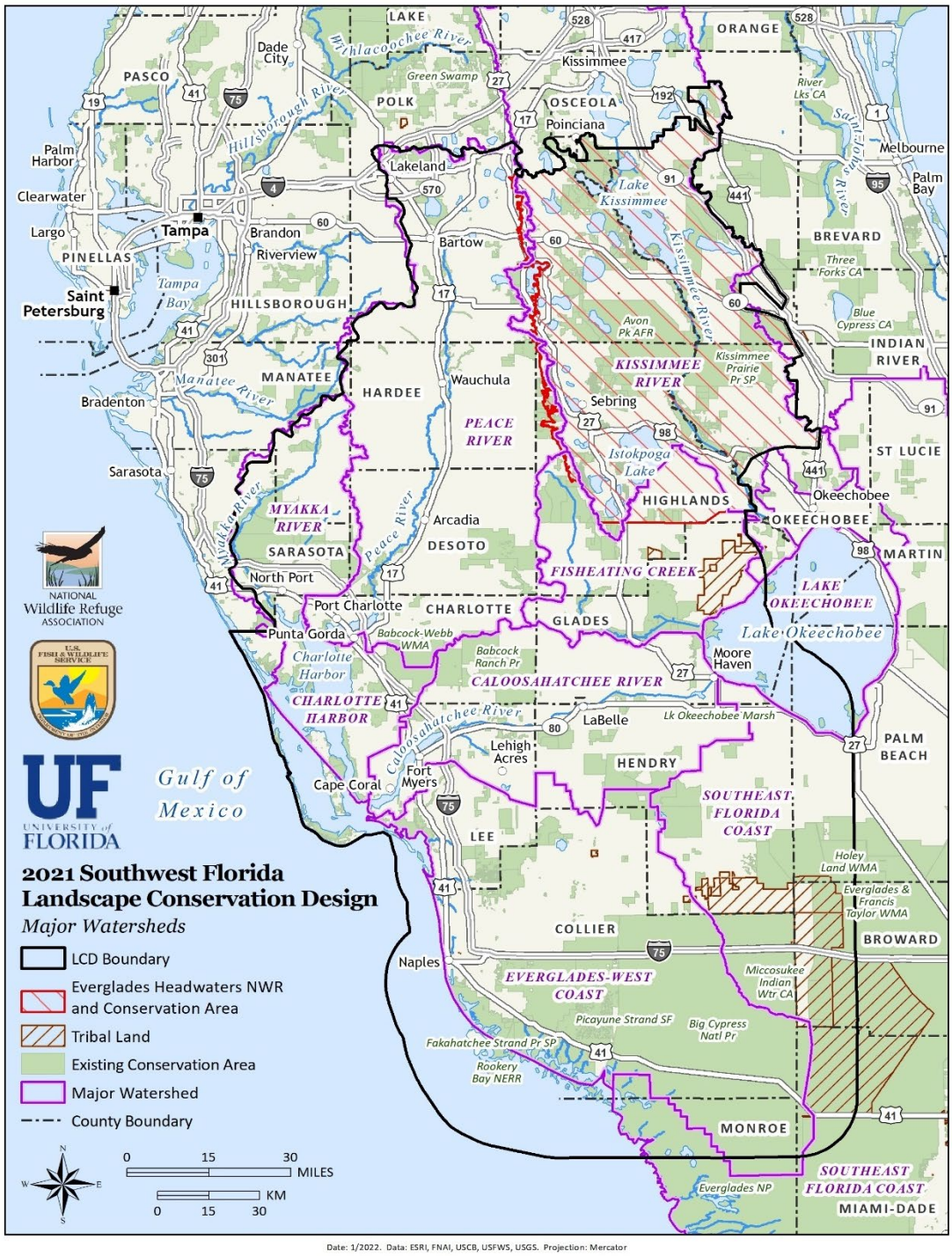


Figure 2. Major Watersheds in the Southwest Florida Landscape Conservation Design Study Area.

B. Rationale, Conservation Significance, and Threats

Southwest Florida has a combination of ecological significance, threats to ecological integrity, and conservation protection opportunities that make it unique in Florida and the United States. The region also has a long history of conservation planning and partnerships that make it "shovel ready" for regional landscape-scale conservation action through significantly enhanced fee simple and easement land protection and restoration funding. Significant federal funding in partnership with recently expanded state funding could achieve large-scale land protection needed to:

- Restore the Everglades;
- Sustain and recover the Florida panther;
- Protect and restore watersheds and coastal estuaries for ecological integrity, water supply, recreation, and the economy;
- Maintain unique natural communities and species adapted to a unique subtropical environment; and
- Protect still vast rural landscape mosaics of natural and ranch land to combat habitat fragmentation and provide wildlife corridors essential for listed species viability and adaptation opportunities in response to climate change.

The following sections describe some of the unique characteristics of the region in more detail and highlight the need for expedited landscape-scale conservation:

<u>Ecological Significance</u>

- Protects many rare and endemic species including 74 Federally and state listed Threatened and Endangered Species including Florida Panther, Florida Scrub-Jay, Crested Caracara, Woodstork, Bonneted Bat, and Everglade Snail Kite.
- Contains the habitat essential to the viability of the only existing breeding population of the Florida panther in the world.
- Protects watersheds essential to the health of the Everglades and the Charlotte Harbor National Estuary.
- Contains unique ecological transition zone from tropical to subtropical to temperate with very high diversity of natural communities and species with many natural communities and species found only in south Florida.
- Contains one of the few regions in the eastern United States harboring a regional scale wildlife corridor relevant to the protection of many federal and state listed species including significant opportunities for range shifts in response to climate change.
- Includes six national wildlife refuges (NWR) including: Florida Panther NWR, Ten Thousand Islands NWR, Ding Darling NWR, Caloosahatchee NWR, Matlacha Pass NWR, and Pine Island NWR.

<u>Threats</u>

- Southwest Florida is one of the most rapidly growing parts of the United States with an extreme level of human population growth, fast-pace and large scale of habitat loss due to new development, and rapidly expanding coastal developed areas that are moving further inland to threaten important habitats, watersheds, and a sustainable rural landscape.

- The fresh and saltwater ecosystems of Southwest Florida are increasingly impacted by stormwater and nutrient pollution that is fueling blue-green algae blooms in Lake Okeechobee and the Caloosahatchee River (as well as other significant freshwater bodies) and increasingly frequent, severe, and longer duration red tide events in coastal estuaries and marine waters.
- Southwest Florida is particularly vulnerable to sea level rise associated with climate change because of its low and very gradual topographic gradient and high level of coastal development; Protecting connected landscape gradients from current coastline and natural coastal ecosystems to inland areas is essential for a resilient adaptation strategy for natural systems across the region.

<u>Conservation Opportunities</u>

- Significant history of cooperative conservation efforts in the region including:
    - Served as the pilot project area for the Florida Fish and Wildlife Conservation Commission's Cooperative Conservation Blueprint (Blueprint); a science and stakeholder driven multi-year project that USFWS can build upon;
    - Served as a focal area for the Peninsular Florida Landscape Conservation Cooperative;
    - Development of a smaller-scaled Southwest Florida Landscape Conservation Design in 2017;
    - Contained in the Resilient Lands and Waters Initiative, which is an effort to support collaborative landscape partnerships where federal agencies work with partners to conserve and restore important lands and waters and make them more resilient to changing climate.
- The region is home to many ranches providing very significant landscape-scale conservation opportunities with willing landowners vitally interested in conservation easements (many of these ranches have gone through the intensive state vetting process and provide immediate conservation opportunities to leverage state funding);
- The State's new Florida Wildlife Corridor Initiative and land protection funding provides a large potential State match to potential priority wildlife corridor and refuge conservation projects occurring in much of the region

<u>Specific Water Threats and Opportunities</u>

- The estuaries of Southwest Florida in the Caloosahatchee and Southwest Everglades watersheds are impacted by poor water quality due to excess nutrients, as well as the quantity and timing of water delivery from Lake Okeechobee; Increased water storage and treatment in the greater Everglades ecosystem is needed to achieve the goals of Everglades restoration.
- Protection and restoration of the Fisheating Creek watershed is essential for restoration of Lake Okeechobee and all downstream ecosystems.
- The Peace and Myakka River watersheds are crucial to a healthy Charlotte Harbor Estuary (an estuary of National Significance) and Gulf of Mexico.
- The Peace River and Myakka River watersheds are increasingly impacted by development, intensive agriculture, and phosphate mining, but there are also significant opportunities to protect remaining natural uplands, wetlands, and ranchlands that all contribute to water resource protection.

- Protection of lands within the Peace River watershed will help protect critical water resources – its significance to water resources becomes even more important given future mining impacts to the River and Charlotte Harbor.
- There are extensive opportunities for wetland restoration and dispersed water storage in the Fisheating, Peace, and Myakka watersheds; the NRCS Wetland Reserve Easement Program is a federal partner that can assist with needed land protection and restoration.

C. Conservation Priorities Analysis

The conservation priorities analysis combines data from the Critical Lands and Waters Identification Project (CLIP), the 2021 update of the FEGN, and updated focal species habitat priorities. In addition, a conservation protection opportunities model was created to help assess the protection potential of currently unprotected lands based on their fit for criteria for existing land conservation programs. A threats GIS data layer was also created using existing data sources to identify potential threat of conversion to development for unprotected conservation priority areas.

This Report includes a description of the methods used and summary of the results identifying ecological priorities, conservation opportunities, and development threats using a series maps and statistics showing and characterizing the results. The ecological priorities model is intended to showcase the national significance of the conservation priorities and opportunities in southwest Florida that are deserving of concerted cooperative efforts by federal, state, and regional partners to protect additional conservation lands before these opportunities are lost in one of the fasting developing regions in the United States.

The ecological priorities model combines focal species habitat priority areas, relevant CLIP and FEGN data layers, and landscape-level conservation priorities into one GIS layer showing high, moderately high, and moderate conservation priorities. Conservation priority data used for this final synthesis include the following, grouped into four categories of conservation priority and using the best available GIS data from the Florida Geographic Data Library, Florida Natural Areas Inventory (FNAI), Florida Fish and Wildlife Conservation Commission (FWC), USFWS, and the University of Florida Center for Landscape Conservation Planning:

<u>Focal Species Priorities</u>

Focal species priorities were identified beginning with the same list of species used in the 2017 version of the SWFLCD. However, due to the expanded study area, a few additional species were added. The most appropriate habitat model for each focal species was selected based on available habitat models from the Florida Natural Areas Inventory, FWC, and University of Florida Center for Landscape Conservation Planning. Focal species priority was based on the G, T, or S rank of each species (provided by NatureServe/FNAI) depending on what was considered most appropriate depending on taxonomic status and geography. In most cases, the G or T rank was used, with G rank being the Global status of the species and T rank the subspecific status where applicable. For example, *Puma concolor* has a G rank of 5 whereas the subspecies Florida panther (*Puma concolor coryi*) is a T1. In addition, there are some species found in Florida, such as the short-tailed hawk, that are more common in the tropics and sub-tropics but are rare in the United States. For such species with geographically isolated populations on the Florida peninsula the S (State status) rank was used instead of the G rank. The G/T/S ranks are described as follows (see also the following for more information

https://help.natureserve.org/biotics/content/record_management/Element_Files/Element_Tracking/ETRACK_Definitions_of_Heritage_Conservation_Status_Ranks.htm):

G/T/S 1 = critically imperiled
G/T/S 2 = imperiled
G/T/S 3 = vulnerable
G/T/S 4 = apparently secure
G/T/S 5 = secure

The relevant G/T/S ranks were then converted to a numerical rank appropriate for developing a weighted priority index combining ranked potential habitat for each species and then all ranked natural communities into one raster GIS layer. Table 1 includes the list of focal species, their relevant G/T/S rank, the numerical weighted factor assigned, and the source of the habitat model for each species. Table 2 provides the same information for all focal natural communities. All habitat models were then added together and reclassified into two priority classes using the Quantile reclassification statistic in ArcGIS, with the areas in the top half of all summed rank scores identified as focal species priority areas. Such areas have a combination of high ranked species and species habitat. The University of Florida Center for Landscape Conservation Planning can be contacted for more information on the various sources of habitat models and ranking methods.

Table 1. Selected Focal Species, status ranked used for prioritization, priority rank, and habitat model selected for creating the focal species and natural community priorities.

Common Name	Status Rank	Priority Rank	Habitat Model Selected
American Crocodile	G2	5	FWC potential habitat
Eastern Diamondback Rattlesnake	G3	4	FWC FEGN PEA model
Eastern Indigo Snake	G3	4	FNAI FEGN PEA model
Gopher Tortoise	G3	4	UF habitat model
Ornate Diamondback Terrapin	G4	3	UF New LCD habitat model
Florida Scrub Lizard	G2/G3	5	UF New LCD habitat model
Florida Grasshopper Sparrow	T1	6	FNAI habitat model
Mottled Duck	G4	3	FWC potential habitat
Florida Scrub-Jay	G2	5	FWC potential habitat
Limpkin	G5	2	FWC Maxent habitat model
Florida Burrowing Owl	T3	4	FWC Maxent habitat model
Short-tailed Hawk	S1	6	FWC FEGN PEA model
Crested Caracara	S2	5	FNAI FEGN PEA model
Piping Plover	G3	4	FNAI habitat model
Snowy Plover	G3	4	FWC Maxent habitat model
Mangrove Cuckoo	S3	4	FWC potential habitat
Swallow-tailed Kite	S2	5	FWC FEGN PEA model
Southeastern American Kestrel	T4	3	FWC potential habitat
Florida Sandhill Crane	T2	5	FWC FEGN PEA model
Bald Eagle	G5	2	FWC potential habitat
American Oystercatcher	G5	2	UF habitat model
Wood Stork	G4	3	FNAI habitat model
Red-cockaded Woodpecker	G3	4	UF New LCD habitat model
Everglade Snail Kite	S2	5	FNAI FEGN PEA model
Least Tern	G4	3	FNAI habitat model
Black-whiskered Vireo	S3	4	FWC potential habitat
Wading Bird Guild	S3	4	FWC potential habitat
Florida Bonneted Bat	G1	6	New UF model
Everglades Mink	T3	4	New UF model
Florida Panther	T1	6	USFWS FEGN PEA model
Big Cypress Fox Squirrel	T2	5	FNAI habitat model
Southeastern Fox Squirrel	S3	4	FWC potential habitat
Florida Black Bear	T4	3	FWC FEGN PEA model
Gopher frog	G3	4	FWC Maxent habitat model
Short-tailed snake	G3	4	FWC Maxent habitat model
Blue-tailed mole skink	T2	5	FNAI habitat model
Sand skink	G3	4	FWC potential habitat
Pine snake	G4	3	FWC Maxent habitat model
Hognose snake	G2	5	FWC Maxent habitat model
Black rail	G3	4	FWC Maxent habitat model
Manatee	G2	5	FNAI FEGN PEA model
Florida mouse	G3	4	FWC Maxent habitat model

Green = Focal species added since 2017 LCD; Priority Ranks: 6 is highest rank and 2 is lowest; FWC = Florida Fish and Wildlife Conservation Commission; PEA = Priority Ecological Area; FNAI = Florida Natural Areas Inventory; UF = University of Florida Center for Landscape Conservation Planning

Focal Natural Communities

The Florida Cooperative Land Cover (CLC) version 3.4 dataset was used to identify all natural communities within the study area with State ranks from S1 to S4 as priorities for conservation efforts in the region. The list of natural communities (with some lumped into more general classes than the CLC site level classes) are:

Upland Hardwood/Hammock
Inland Scrub
Coastal Scrub
Sandhill
Dry Prairie
Mesic Flatwoods
Scrubby Flatwood
Coastal Grassland/Shrub
Coastal Upland Hammock
Wet Prairie
Freshwater Marsh
Cypress/Pine/Cabbage Palm
Hydric Flatwoods
Freshwater Hardwood Wetland
Bay Wetland
Hydric Hammock/Prairie Hammock

All such natural communities were given a rank of 1 and all other areas were given a rank of 0. The University of Florida Center for Landscape Conservation Planning can be contacted for more information on the various sources of habitat models and ranking methods.

Study Area Focal Species and Natural Community Priorities

The focal species and focal natural community layers were combined with a Maximum model approach where any area receiving a priority rank of 1 for either of these resource layers was given a value of 1. Any areas containing no high priorities for any of these resources received a value of 0 in the cumulative model.

FEGN and CLIP Ecological Priorities

The FEGN was updated in 2021 and is composed of many different Priority Ecological Area (PEA) and Ecological Connectivity models that are used to develop the base boundary of the FEGN. Critical Lands and Waters Identification Project (CLIP) data layers, many updated for inclusion in the recent FEGN update, are also relevant for identifying statewide biodiversity and water protection priorities. These FEGN/CLIP individual components are valuable indicators of ecological priorities for both biodiversity, surface water resources, and other landscape-level conservation priorities. The most applicable layers relevant to identify statewide biodiversity and surface water resources were selected for inclusion in this part of the ecological priorities model.

The biodiversity layers selected included:

- FEGN Florida Panther Priority Ecological Areas (based on USFWS Random Forest model)
- FEGN Florida Black Bear Priority Ecological Areas (based on new FWC Maxent habitat model)
- FEGN Landscape Species Priority Ecological Areas (based on combination of all landscape-dependent species habitat)
- FEGN Matrix Natural Communities Priority Ecological Areas (based on relevant natural communities in CLC v. 3.4)
- FEGN Air Force Priority Species Habitat Priority Ecological Areas
- CLIP/FEGN FNAI Rare Species Habitat Conservation Priorities
- CLIP/FEGN FNAI Under-Represented Natural Community Priorities
- CLIP/FEGN FWC Strategic Habitat Conservation Areas

The water resource protection priority layers selected included:

- FEGN Major River Riparian Buffer Connectivity
- CLIP/FEGN FNAI Priority Wetlands
- CLIP/FEGN FNAI Natural Floodplain
- CLIP Significant Surface Water Protection Priorities

Most of these layers were reclassified into values of 1 and 0 based on the FEGN PEA and Connectivity model methods. The exception is the CLIP Significant Surface Water Protection Priorities layer, which is not used in the FEGN modeling process. For CLIP Significant Surface Waters, the top two priorities (out of 7 priority levels) were given a value of 1 and all other areas were given a value of 0. Then all 12 of these layers were combined with a Maximum model approach where any area receiving a priority rank of 1 for any of these 12 resource layers was given a value of 1. Any areas containing no high priorities for any of these resources received a value of 0 in the cumulative model. For more information on CLIP data layers, please go to: https://www.fnai.org/services/clip. Contact the University of Florida Center for Landscape Conservation Planning for more information on the ranking methods for all layers used in the FEGN PEA or Connectivity modeling process.

Florida Ecological Greenways Network and Other Landscape Priorities

The top priorities in the FEGN (P1, P2, P3), which are now also called the Florida Wildlife Corridor per Florida Law, along with two additional layers representing specific landscape priorities in Southwest Florida were used. The two other layers are an updated version of the CLIP Landscape Integrity model, which identifies landscape level conservation priorities based on land use intensity and habitat patch size, and the new FEGN Coastal Connectivity Model. The FEGN P1-P3 priorities were reclassified as a value of 1 with all other areas given a value of 0.

The Landscape Integrity layer, which is also part of CLIP, was updated to support the assessment of Priority Ecological Areas in the 2021 FEGN update. The Landscape Integrity index has values of 1-10 with a value of 10 representing the largest and most natural areas within the state. In this analysis, all areas with Landscape Integrity scores of 10 or 9 (the two highest priorities) were reclassified as a value of 1 with all other areas given a value of 0. More information about how the Landscape Integrity layer is created can be found at: https://www.fnai.org/services/clip.

The FEGN Coastal Connectivity Model represents the best opportunity for coastal species and natural communities to retreat from sea level rise. Though some of these areas are included in the FEGN,

valuable areas for coastal retreat with more constraints from developed land uses usually are not within the FEGN. However, such areas are potentially significant for coastal focal species included in this analysis, and therefore merit inclusion as high landscape conservation priorities. Based on this, all areas within the FEGN Coastal Connectivity Model were given a value of 1 and all other areas were given a value of 0.

Finally, all three of these layers were combined with a Maximum model approach where any area receiving a priority rank of 1 for any of the three resource layers was given a value of 1. Any areas containing no high priorities for any of these resources received a value of 0 in the cumulative model.

Cumulative Conservation Priorities Model

To create the final cumulative model, all models using a summing approach were added. This resulted in four values from 0 to 3 where:

- Value 3 = Priority for all three models = High priority
- Value 2 = Priority for two of the three models = Moderate-high priority
- Value 1 = Priority for one of the three models = Moderate priority
- Value 0 = Not a priority in any of the three models = No or low conservation priority

Conservation Priority Land Category Statistics and Maps

Table 2 separates the high, moderate-high, and moderate ecological priorities into land categories including open water, existing conservation, proposed conservation (in Florida Forever or Rural and Family Lands Protection projects), and other private to indicate total protected ecological priorities and acres still needing protection. Based on Table 2 there are 1.1 million acres of unprotected high ecological priorities, 750,000 acres of unprotected moderate-high priorities, and 575,000 acres of unprotected moderate priorities. In addition, these statistics show that approximately 75% of proposed conservation lands are in high ecological priorities. The following maps (Figures 3-7) show each of the three individual components' ecological priority model results (Regional Focal Species and Natural Communities Priorities, CLIP and FEGN PEA Priorities, and Landscape Priorities), the cumulative final Ecological Priorities Model, and the Ecological Priorities Model compared to the Florida Wildlife Corridor.

Table 2. Land Categories and the SWFLCD Combined Ecological Priorities.

Land Category	**Combined Priority Rank**	**Acres**
Open Water	3-Highest	15,326
Existing Conservation	3-Highest	2,035,406
Proposed Conservation	3-Highest	332,958
Other Private	3-Highest	836,537
Open Water	2-Moderate-High	78,441
Existing Conservation	2-Moderate-High	163,049
Proposed Conservation	2-Moderate-High	94,944
Other Private	2-Moderate-High	661,378
Open Water	1-Moderate	423,271
Existing Conservation	1-Moderate	42,322
Proposed Conservation	1-Moderate	14,769
Other Private	1-Moderate	559,971

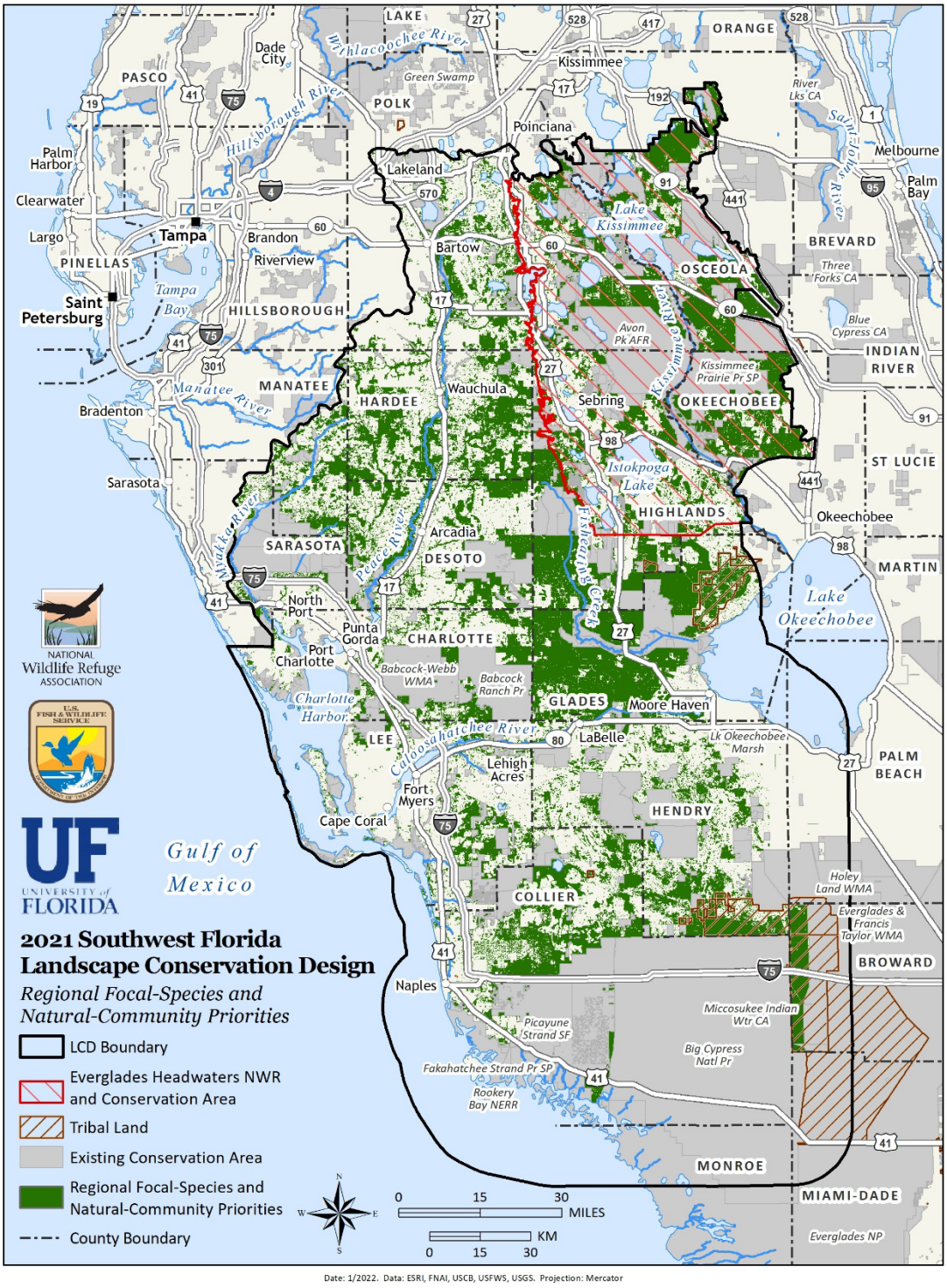


Figure 3. Focal Species and Natural Community Priorities

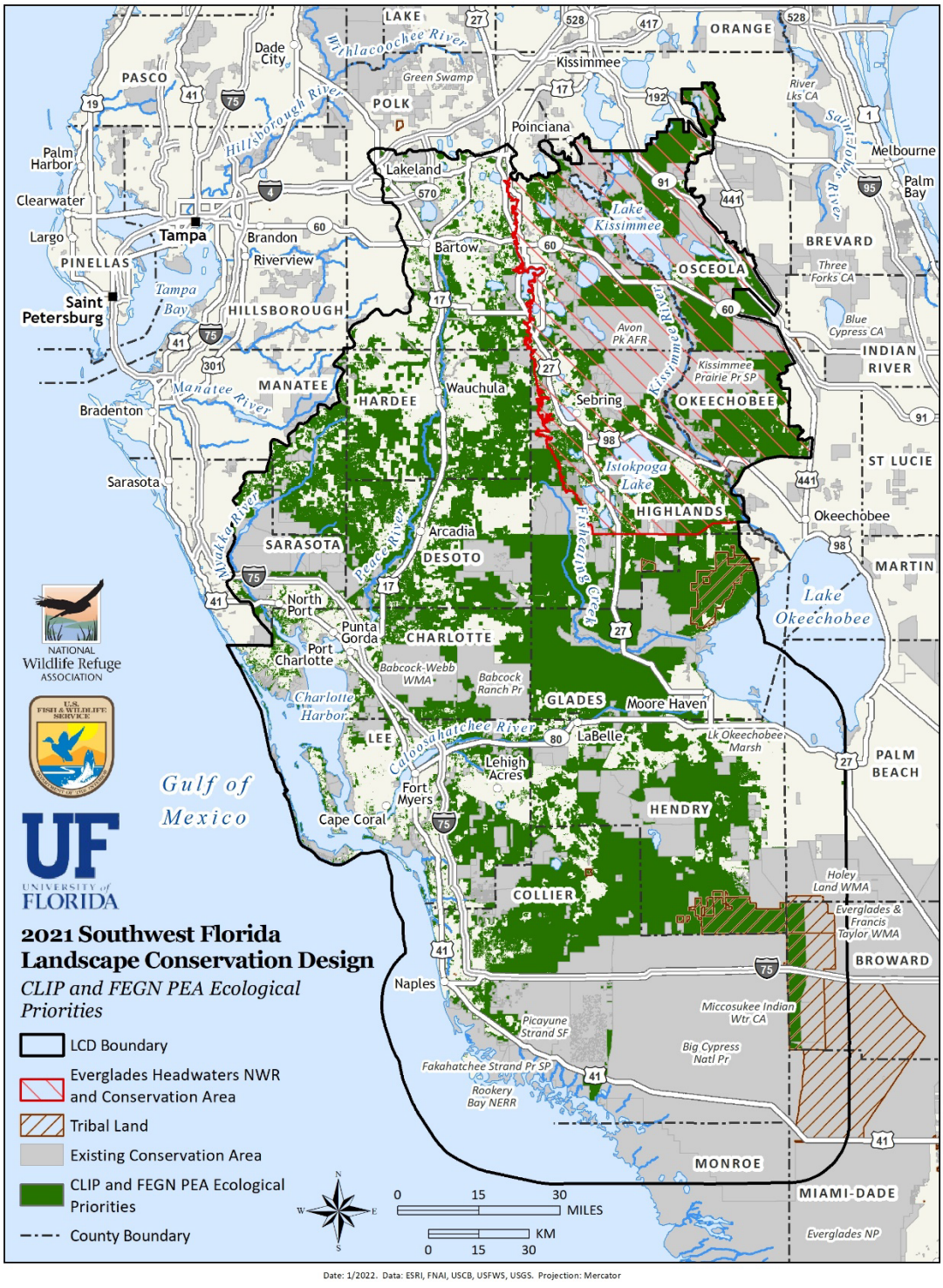


Figure 4. CLIP and FEGN PEA Ecological Priorities.

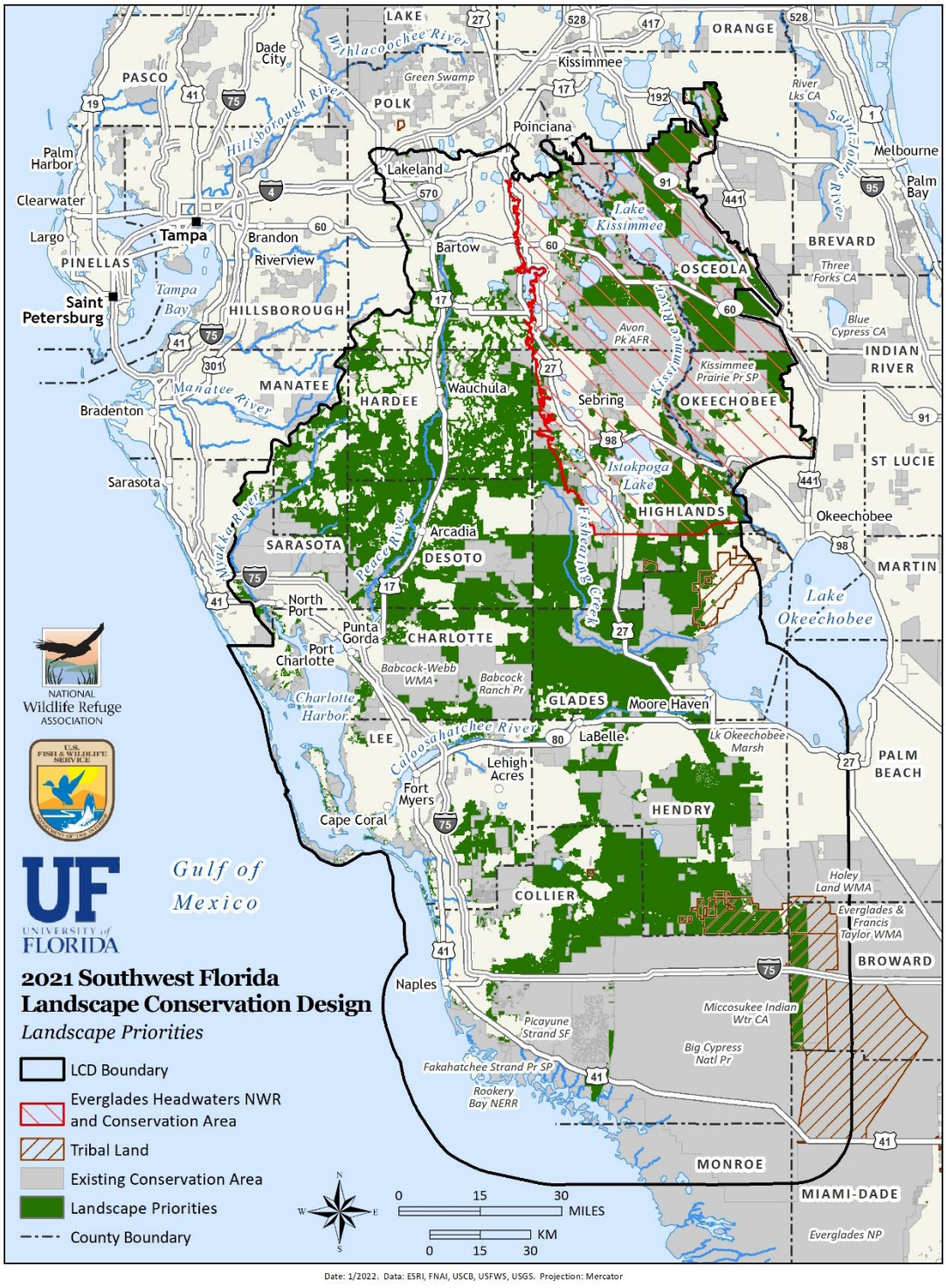


Figure 5. Landscape Priorities.

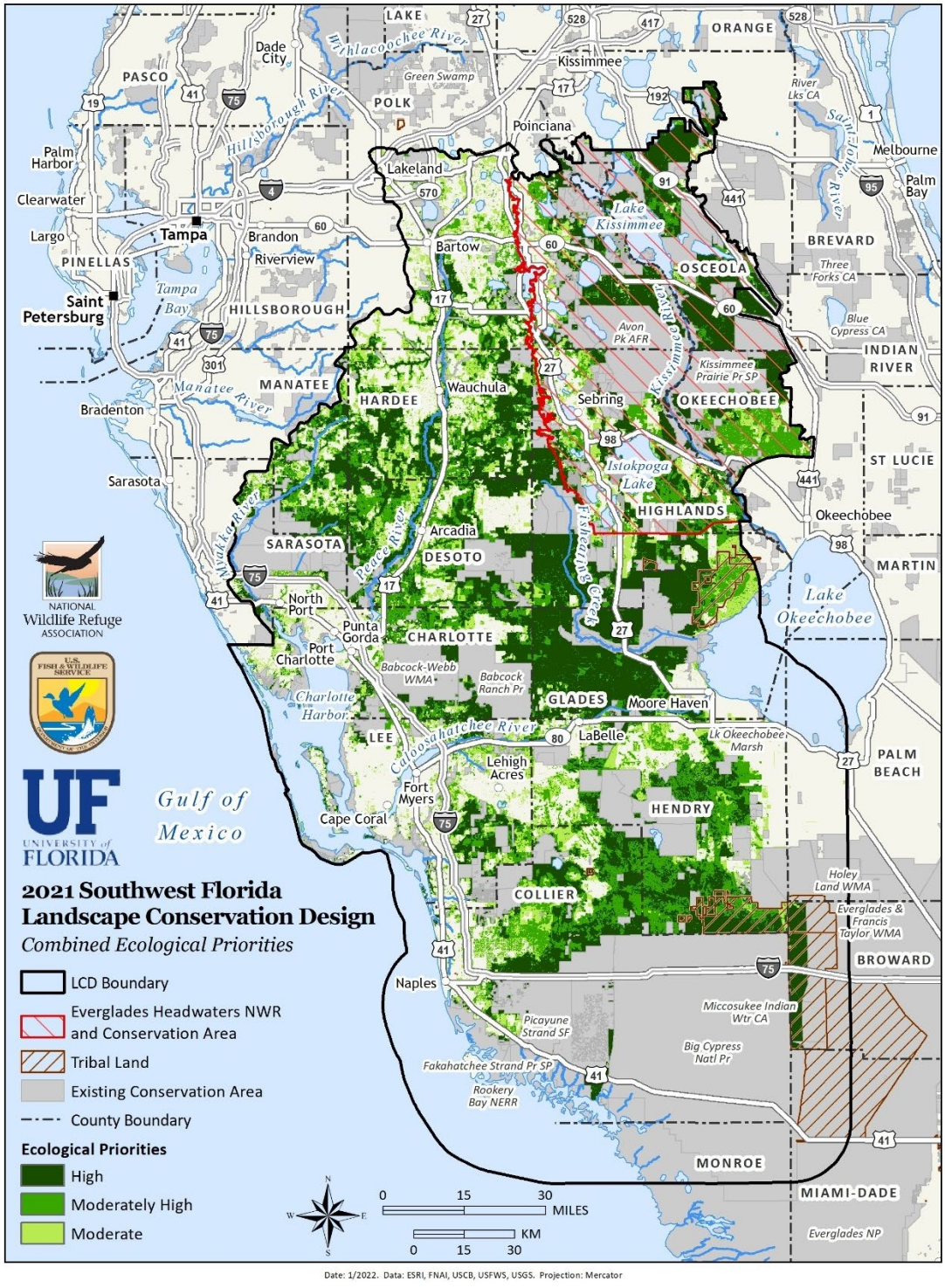


Figure 6. Combined Final SWFLCD Ecological Priorities.

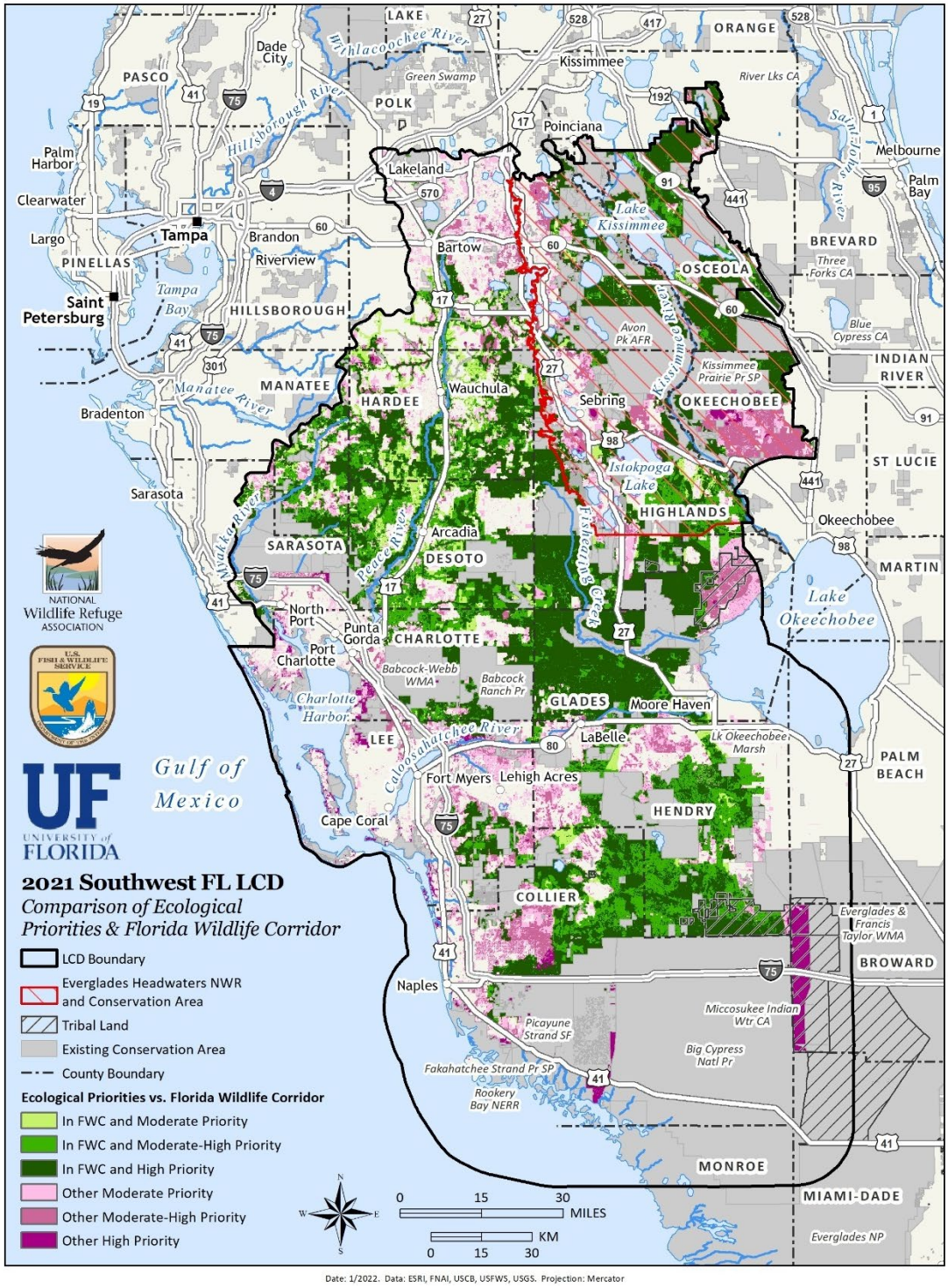


Figure 7. Map showing the high degree of overlap between the SWFLCD combined ecological priorities and the Florida Wildlife Corridor. A total of 93% of the unprotected high priorities, 65% of the unprotected moderate-high priorities, and 14% of the moderate priorities are within the Florida Wildlife Corridor.

D. Protection Opportunities Analysis

GIS data from the Florida Geographic Data Library, Florida Natural Areas Inventory (FNAI), FWC, Florida Department of Agriculture and Consumer Services, USFWS, and the University of Florida Center for Landscape Conservation Planning was used to develop prioritization models identifying the potential priority of all areas in the study area for relevant NRCS and USFWS easement programs. Only the program criteria that could be defensibly analyzed using GIS at the study area scale that address relevant land use, species, conservation priority, or restoration potential criteria were used. The latest available data for the Florida Forever and Rural and Family Lands Protection programs was obtained to identify areas that are current land conservation projects in those two Florida programs.

Note: Examination of NRCS and Forest Legacy criteria allows geospatial identification of areas that might be appropriate for these programs and potential opportunities for partnership on the landscape. The Florida Forever and RFLPP project areas identify properties that have already been through an intensive vetting process and that state programs have determined are worthy of protection. This allows us to identify willing landowners and properties where state funding would be available to leverage. These lists are always evolving, as new properties apply and are added to the list. But it provides a starting point for identifying landowners and partnership opportunities. Opportunities will continue to be updated going forward as statewide protection opportunity models currently being developed for the Florida Department of Agriculture and Consumer Services by the UF Center for Landscape Conservation Planning are completed. All available programs and partner opportunities will be examined during the Land Protection Planning process and beyond.

All models and the conservation project data were combined into a final protection opportunities model. Summary descriptions of the individual opportunity models and final cumulative opportunity model are included below. More detailed documentation of the models is available from the University of Florida Center for Landscape Conservation Planning.

<u>NRCS ALE Grassland</u>

1) Percent prime farmland
2) Percent pasture/rangeland
3) Proximity to conservation lands
4) Proximity to agricultural operations
5) Percent non-native improved or naturalized species
6) Listed or at-risk species habitat
7) Prairie or grassland natural communities

Scores were assigned following the scoring protocols in the ALE GSS scoring sheet. Total scores were summed and then reclassified into 4 priority classes using Natural Breaks in ArcGIS.

<u>NRCE ALE</u>

1) Percent prime farmland
2) Percent pasture/cropland
3) Proximity to conservation lands
4) Proximity to agricultural operations
5) Grassland of special environmental significance

6) Agricultural zoning
7) CLIP Biodiversity priority
8) Occurrence in NRCS Everglades Initiative counties, Avon Park Sentinel Landscape, watersheds that connect to the Gulf of Mexico

Scores were assigned following the scoring protocols in the ALE GSS scoring sheet. Total scores were summed and then reclassified into 4 priority classes using Natural Breaks in ArcGIS.

NRCS WRE

1) Restorable wetlands
2) Ponding soils factors
3) Priority natural communities
4) Proximity to existing WREs or other existing conservation lands
5) Within the Everglades Ecosystem, within or contiguous to a special designated water body, or within 2 miles of the coast
6) Bobwhite/Longleaf initiative areas
7) Listed species habitat
8) Panther Conservation Zones

Scores were assigned following the scoring protocols in the ALE GSS scoring sheet. Total scores were summed and then reclassified into 4 priority classes using Natural Breaks in ArcGIS.

Forest Legacy

1) FNAI Sustainable Forestry priority
2) CLIP 4.0 priority
3) Natural forest
4) FNAI Aquifer Recharge priority
5) Forest Legacy priority areas

This model was developed differently than the NRCS easement program models. The steps were to combine the CLIP 4.0 priorities and the FNAI Sustainable Forest priorities layers, averaging the values using an equal weighting scheme so that areas that were both high priority in the CLIP and Sustainable Forestry layers received the highest priority. Then this combined layer was combined with FNAI Aquifer recharge priorities using a “maximum” approach, where each cell in the new data layer was assigned the highest priority value based on either the Combined CLIP and Sustainable Forestry layer or the Aquifer Recharge layer. This combined priority model was then limited to only areas that were also: within counties containing priority regions for the Forest Legacy program AND were in natural forest land cover in patches 10 acres or larger. This results in a final Forest Legacy priority layer where areas of natural forest 10 acres or larger that occur in a Forest Legacy priority region are prioritized based on their importance for aquifer recharge, significance for sustainable forestry operations, and their CLIP priority level. To create the combination with the NRCS data, the priority values of 1-9 (with 9 as the highest priority) were reclassified into values of 1-4 using Natural Breaks in ArcGIS.

Existing Conservation Project Areas

1) Florida Forever projects
2) Rural and Family Lands Protection Program projects

Both Florida Forever and Rural and Family Lands Protection Program projects were given equal weight so that any area within a project for either program was given a value of 1 and areas outside current projects areas were given a value of 0.

Cumulative Protection Opportunities Model

- Value 4 (highest opportunity) = In a Florida Forever and/or Rural and Family Lands Protection Program project
- Value 3 = In a high priority area for NRCS ALE, ALE Grassland, WRE, or USFS/FDACs Forest Legacy programs
- Value 2 = In a moderate priority area for NRCS ALE, ALE Grassland, WRE, or USFS/FDACs Forest Legacy programs
- Value 1 (lowest opportunity) = All other areas within the study area

These four values were created by first combining the NRCS ALE, ALE Grassland, and WRE opportunity priorities and the Forest Legacy opportunity priorities using the following reclassification:

- P2 = any area with a value of 4 in any of the original models
- P3 = any area with a value of 3 in any of the original models
- P4 = any area with a value if 1 or 2 in any of the original models

This combined opportunity priorities layer was then combined with the Florida Forever and Rural and Family Lands Protection layer where any area within a Florida Forever or Rural and Family Lands Protection project was assigned the highest rank of P1, and then all other areas were assigned the value received for the opportunity priorities combined layer. Figure 8 shows the results of the Protection Opportunities Model.

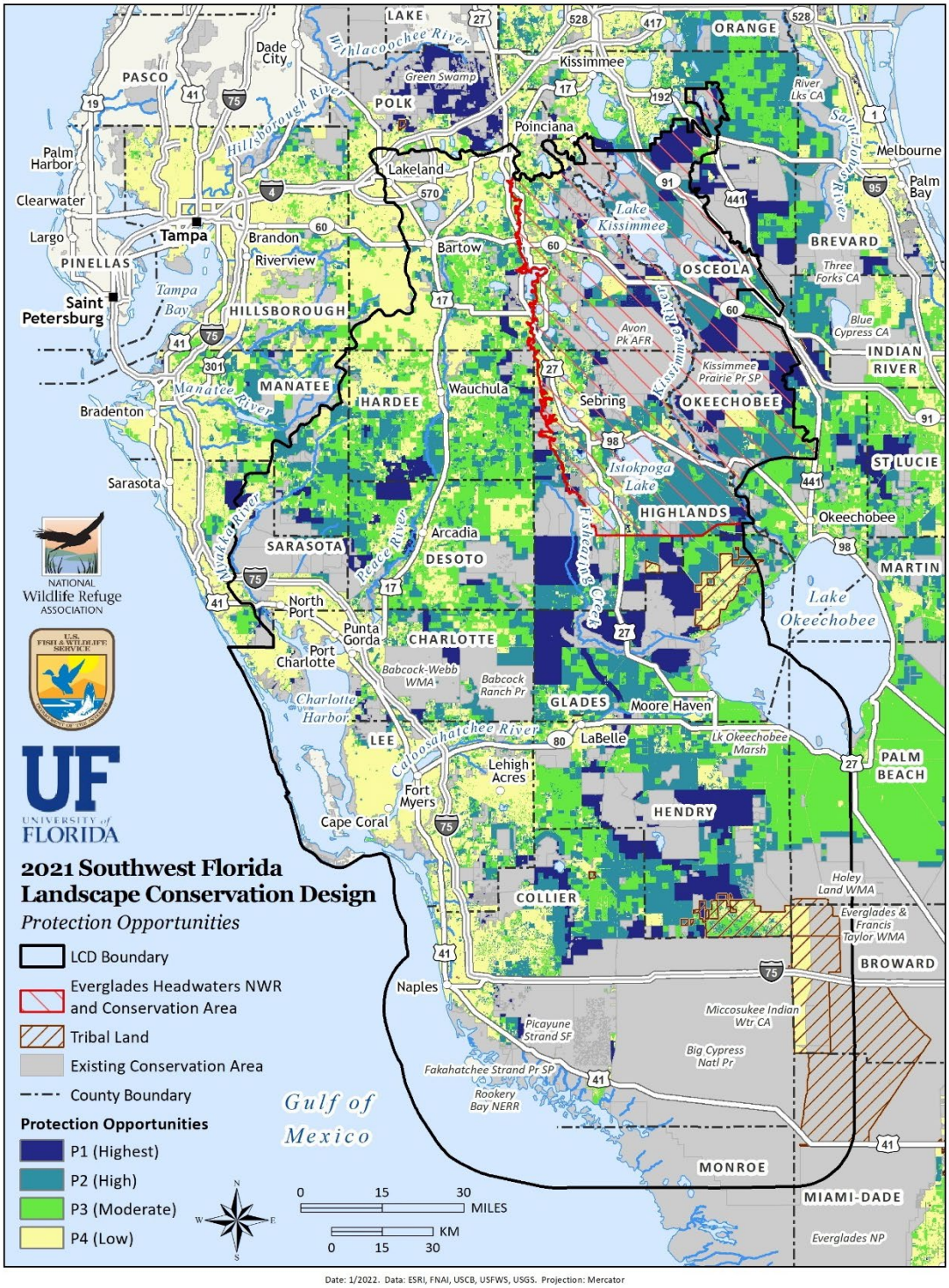


Figure 8. Protection Opportunities in the SWFLCD Study Area. P1 represents the highest protection opportunities and P4 areas are the lowest.

E. Development Threats Analysis

The development threat layer is a simple combination of statewide Future Land Use data obtained from the Florida Geographic Data Library and the Florida 2070 Trend Development Scenario created by the University of Florida and also obtained from the Florida Geographic Data Library. These GIS data layers were combined to obtain the following development threat values:

- Value 3 (highest development threat) = Depicted as future developed land in the Future Land Use Data
- Value 2 (moderate development threat) = Depicted as future developed land in the Florida 2070 Trend Scenario
- Value 1 (lowest development threat) = All other areas in the study area

It should be noted that Value 3 includes areas that are BOTH depicted as future development in the Future Land Use data and the Florida 2070 Trend Scenario data. There are some counties in the study area that have no threat level 2 values in them. This occurs in counties with low projected future human population growth and where potential future development in the Florida 2070 Trend Scenario completely overlaps with areas depicted as developed in Future Land Use data. Figure 9 shows the combined development threat model results for the SWFLCD study area.

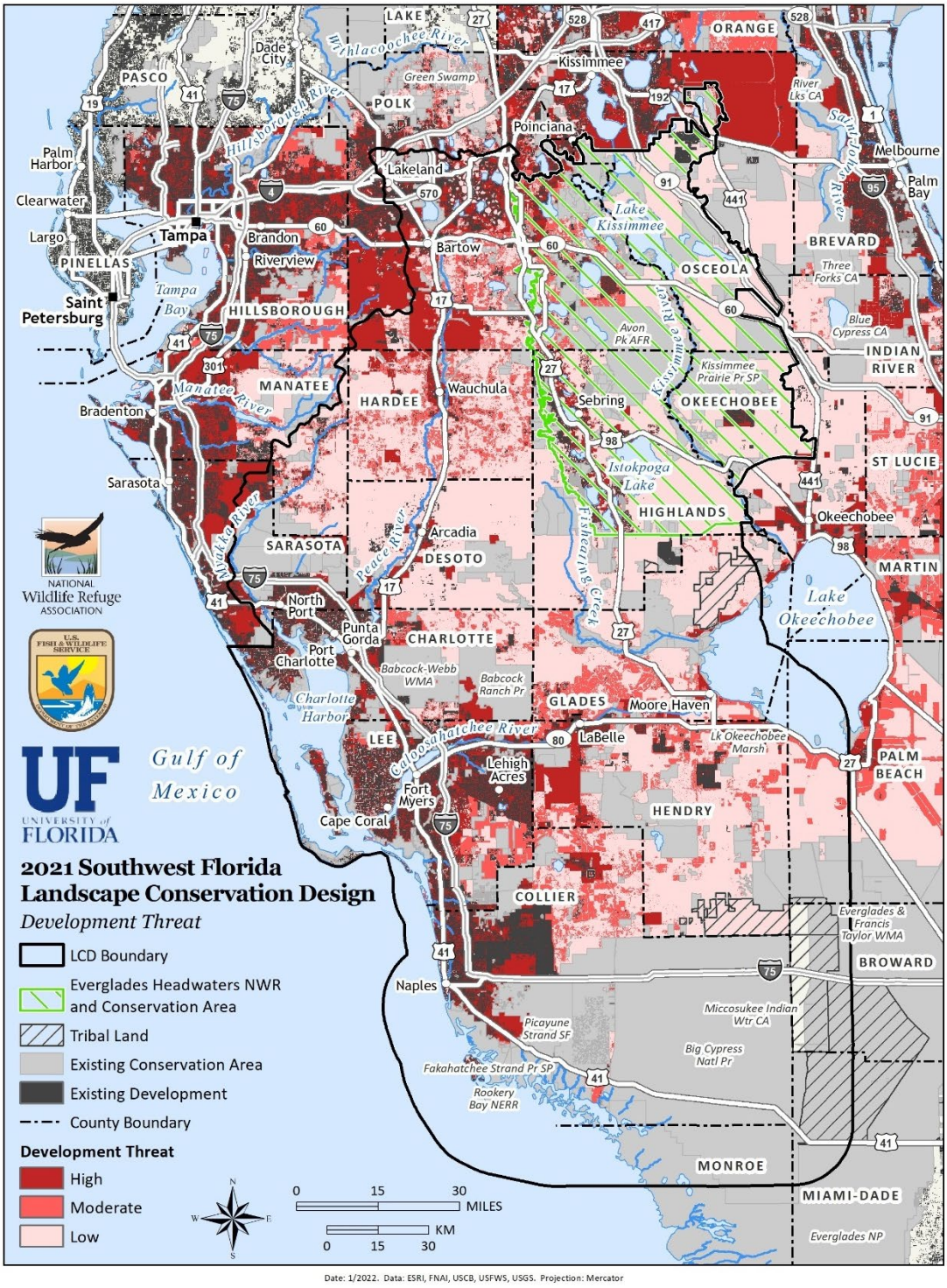


Figure 9. Development Threat in the SWFLCD Study Area.

F. Comparison of LCD Ecological Priorities, Protection Opportunities, and Development Threats

The SWFLCD Combined Ecological Priorities layer was combined with both the Protection Opportunities and Development Threats models to identify where there are combinations of high to moderately high ecological priorities, high protection opportunities, and/or high threats of conversion to development. First, to compare Protection Opportunities to the Combined Ecological Priorities (and Development Threats) we collapsed the Protection Opportunities from 4 priority ranks to 3 priority ranks using the following reclassification:

P1 – P2 = Highest Protection Opportunity
P3 = Moderate Protection Opportunity
P4 = Low Protection Opportunity

Figure 10 compares the Combined Ecological Priorities to Protection Opportunities Model. Figure 11 compares the Combined Ecological Priorities to Development Threats Model. Figure 12, Figure 13, and Figure 14 compare the highest, moderate-high, and moderate ecological priorities to both Protection Opportunities and Development Threats. Table 3 provides the acres in each combination of Combined Ecological Priorities and Protection Opportunities, and Table 4 provides the acres in each combination of Combined Ecological Priorities and Development Threat.

Table 3. Combined Ecological Priorities and Protection Opportunities acres.

Combination	**Acres**
High Ecological Priority-High Protection Opportunity	1,076,476
High Ecological Priority-Moderate Protection Opportunity	283,097
High Ecological Priority-Low Protection Opportunity	221,298
Moderate-High Ecological Priority-High Protection Opportunity	507,297
Moderate-High Ecological Priority-Moderate Protection Opportunity	256,912
Moderate-High Ecological Priority-Low Protection Opportunity	293,223
Moderate Ecological Priority-High Protection Opportunity	149,693
Moderate Ecological Priority-Moderate Protection Opportunity	224,057
Moderate Ecological Priority-Low Protection Opportunity	811,429

Table 4. Combined Ecological Priorities and Development Threat acres.

Combination	**Acres**
High Ecological Priority-High Threat	157,496
High Ecological Priority-Moderate Threat	222,644
High Ecological Priority-Low Threat	1,159,557
Moderate-High Ecological Priority-High Threat	194,266
Moderate-High Ecological Priority-Moderate Threat	153,354
Moderate-High Ecological Priority-Low Threat	695,579
Moderate Ecological Priority-High Threat	253,296
Moderate Ecological Priority-Moderate Threat	109,967
Moderate Ecological Priority-Low Threat	791,722

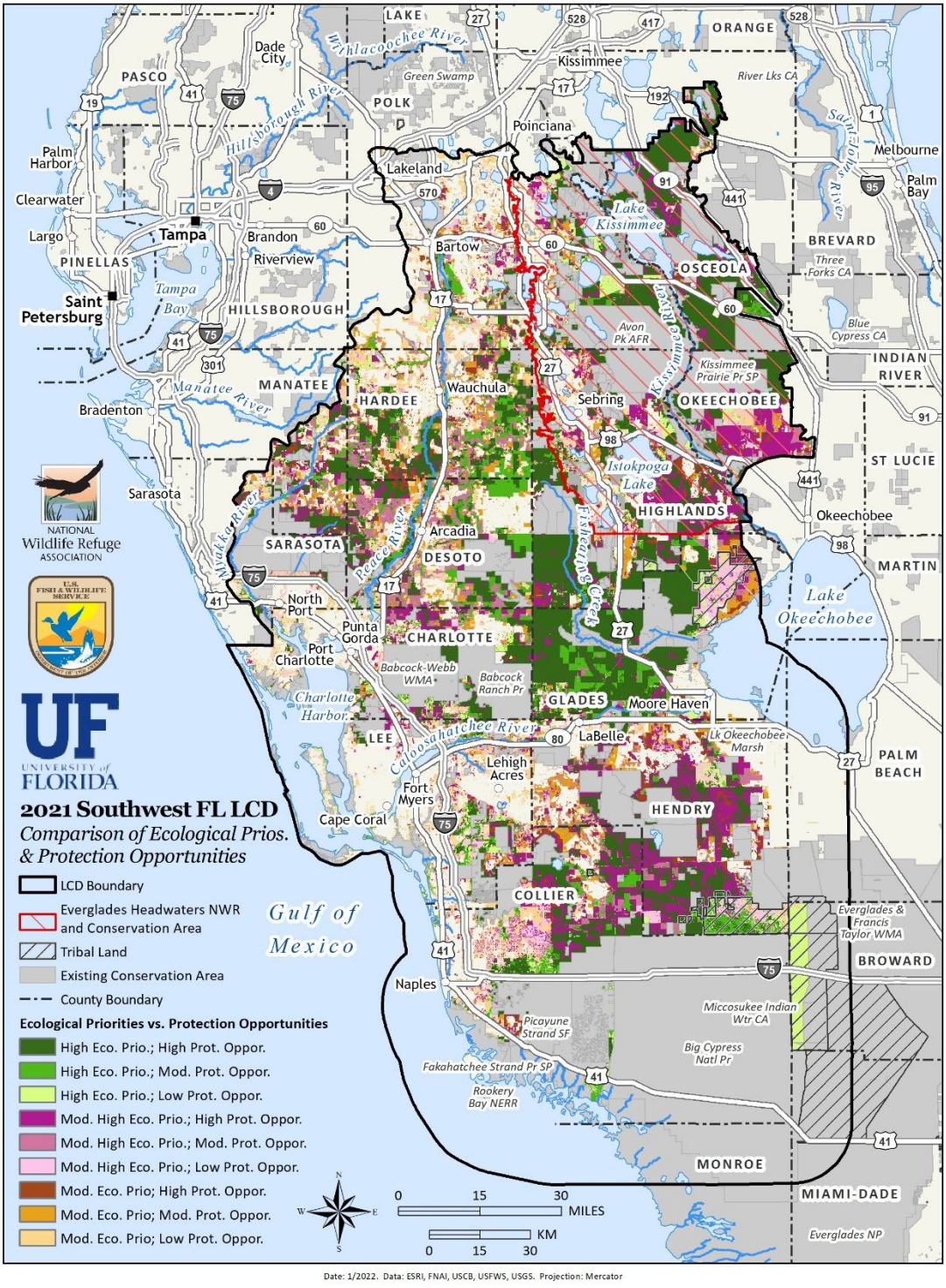


Figure 10. Combined Ecological Priorities compared to Protection Opportunities.

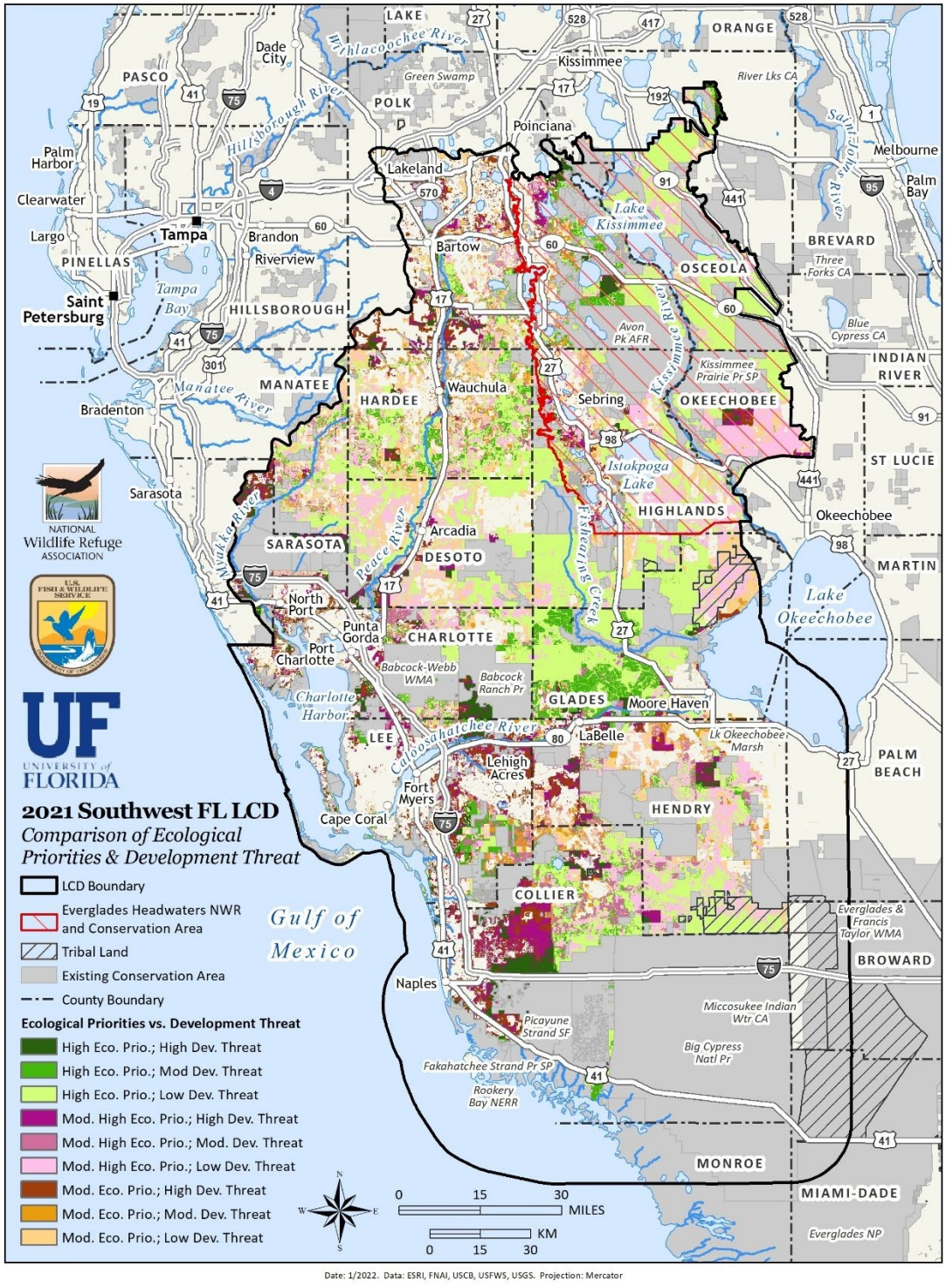


Figure 11. Combined Ecological Priorities compared to Development Threats.

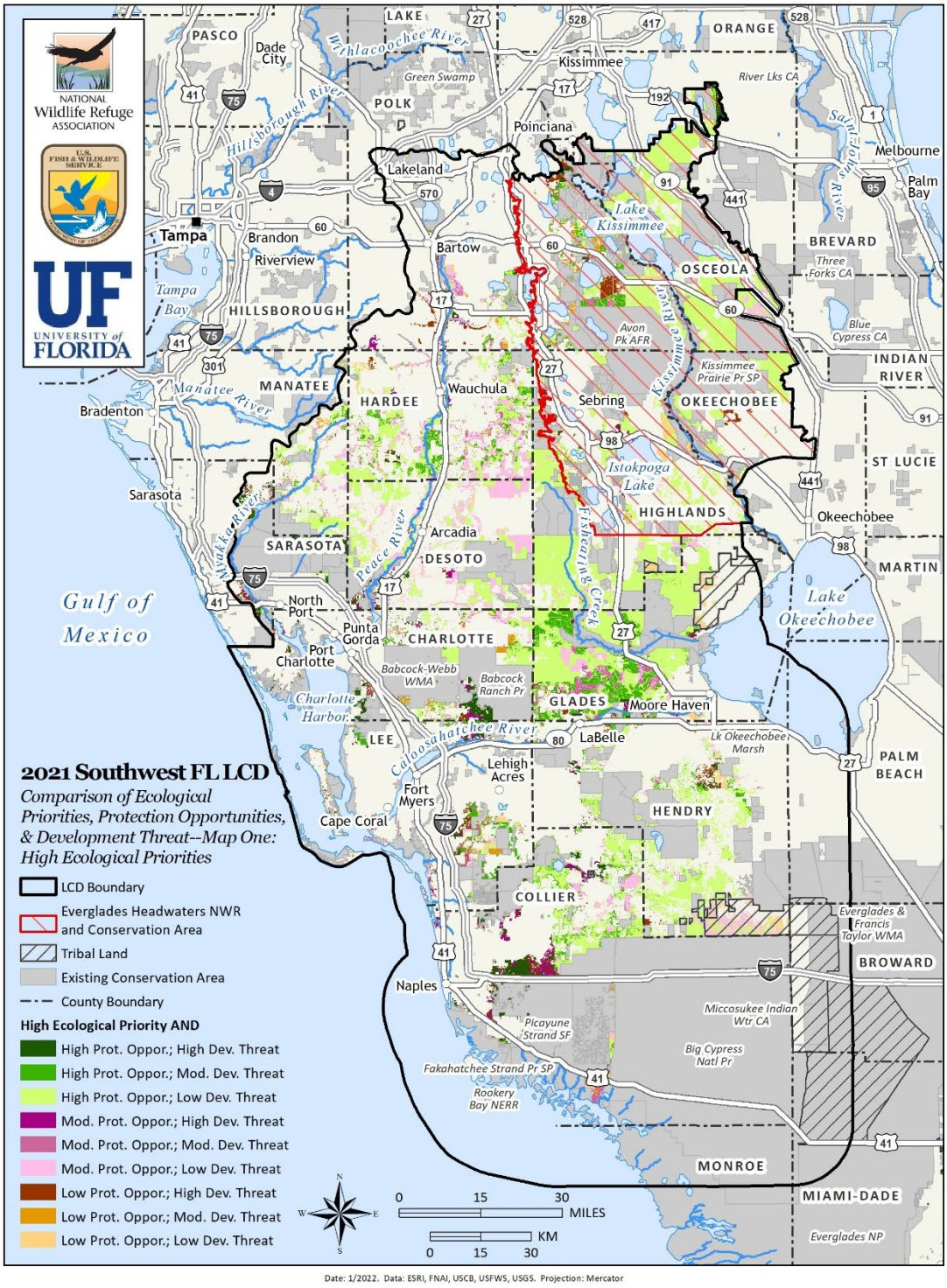


Figure 12. Highest combined Ecological Priorities compared to both Protection Opportunities and Development Threats.

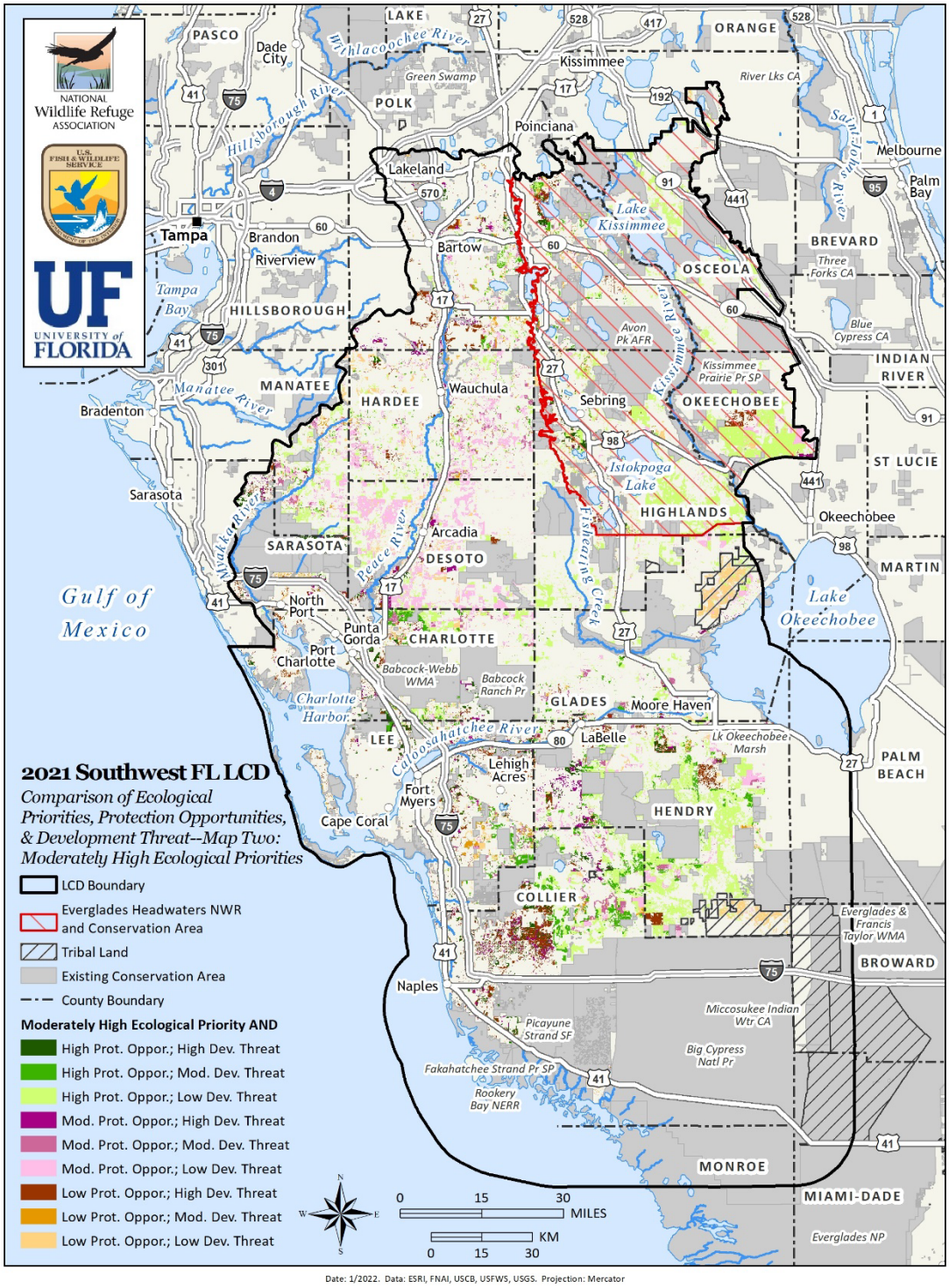


Figure 13. Moderate-high combined Ecological Priorities compared to both Protection Opportunities and Development Threats.

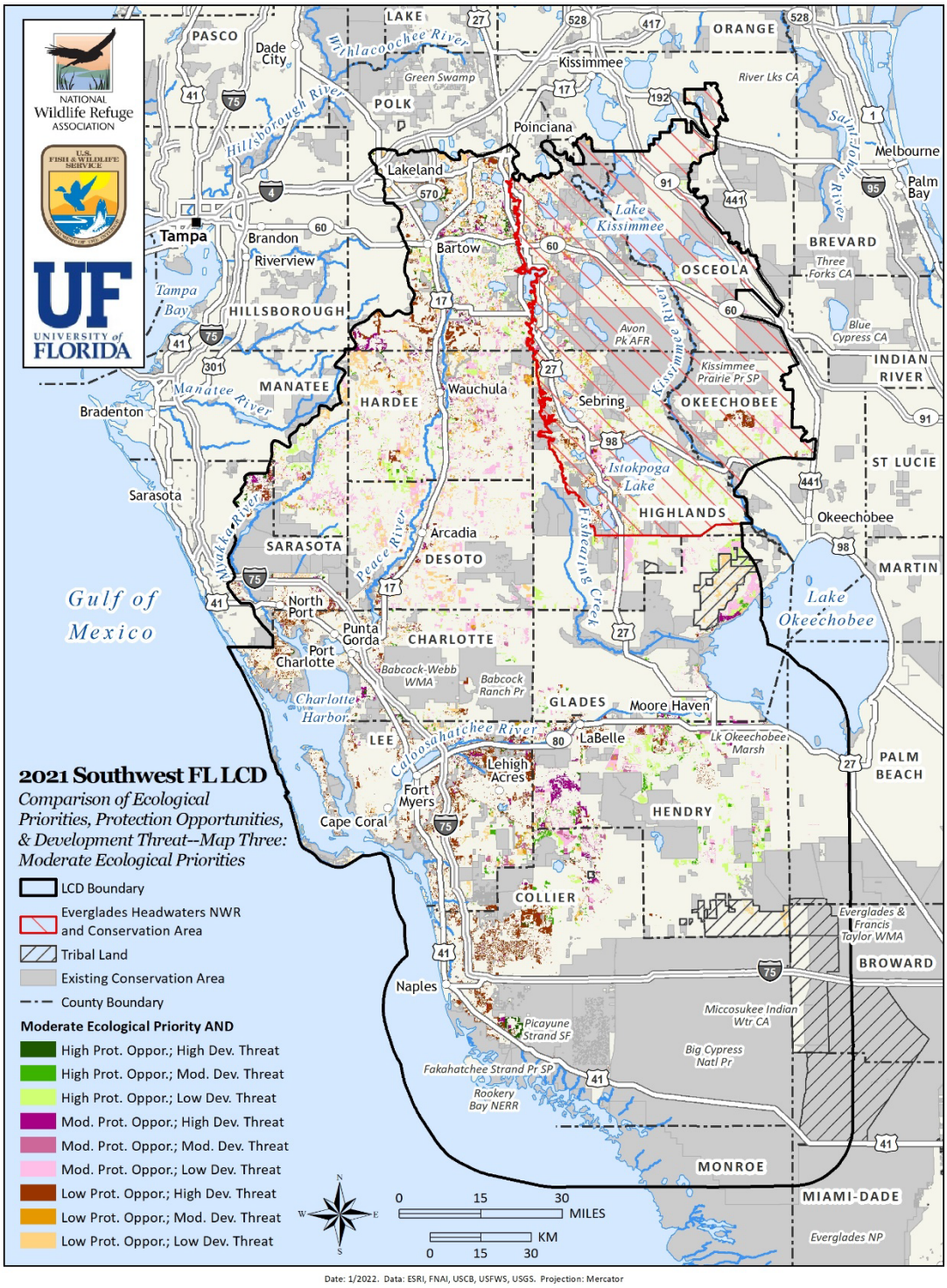


Figure 14. Moderate combined Ecological Priorities compared to both Protection Opportunities and Development Threats.

G. Partnership Opportunities, Programs, and Recommendations

A variety of key agency, non-governmental, and other conservation partners already exist within the SWFLCD study area. If the Land Protection Strategy is approved and the Land Protection Plan process moves forward, efforts will be made with the following groups (and more) to garner input on priorities and develop partnerships. Many of these groups were consulted during the 2017 SWFLCD, as well as previous regional initiatives by the USFWS. Initial conversations have been made with many of the agencies and stakeholder groups listed below and will continue, in order to advance conservation objectives. Additionally, a group of representatives similar to the Florida Sportsmen's Trust Group in the EHW NWR&CA will be established.

Key Agency Partners:

U.S. Fish and Wildlife Service

Florida Fish and Wildlife Conservation Commission

Florida Department of Environmental Protection

Natural Resource Conservation Service

Florida Department of Agriculture and Consumer Services

South Florida Water Management District

Southwest Florida Water Management District

Counties within the study area boundary

Big Cypress National Preserve

Everglades National Park

Non-Governmental Organizations (not all inclusive):

National Wildlife Refuge Association

Florida Conservation Group

Audubon of Florida

Audubon Western Everglades

Defenders of Wildlife

Florida Wildlife Federation

Everglades Foundation

National Parks Conservation Association

Coastal and Heartland National Estuary Partnership

Archbold Biological Station

Florida Wildlife Corridor Coalition

Earth Justice

The Nature Conservancy

Conservation Florida

Conservation Fund

Conservation Foundation of the Gulf Coast

WildLandscapes International

Florida Cattlemen's Association

Florida Farm Bureau

Sportsmen's Community (not all inclusive):

Florida Chapter of Backcountry Hunters and Anglers

American Daughters of Conservation

Safari Club International

Cypress Chapter Izaak Walton League of America

Florida Airboat Association

All Florida

Cast and Blast Florida

Lake Okeechobee Airboat Association

Kissimmee River Valley Sportsmens Association

Angler Action Foundation

Florida Sportsmen Conservation Association

Future of Hunting in Florida

Academia:

University of Florida

Florida Natural Areas Inventory

University of Florida Extension (for various counties)

Florida Gulf Coast University

Conservation Land Protection Acquisition and Easement Programs

There are a multitude of land acquisition and easement programs that are active throughout the study area. Partnering with these programs is essential to achieving meaningful conservation on the ground. The southwest Florida region has a long history of agency and stakeholder conservation partnerships. FWC's Cooperative Conservation Blueprint regional pilot project (Blueprint) completed in southwest Florida provided a starting point for a discussion regarding future efforts to effect protection of conservation priorities through voluntary conservation land protection and incentives programs. This effort took place between 2007 and 2014. Significant work on conservation incentives has been accomplished. The Blueprint provides a building block to work from, as more detailed planning efforts are initiated. Additional work by the Peninsular Florida Landscape Conservation Cooperative provided successful models for establishing a framework for agency partnerships, and land protection efforts in the EHW NWR&CA have demonstrated the success of such partnerships. These models will serve as templates as conservation planning and implementation within the study area is initiated. Building solid relationships with landowners is a critical first step as public engagement in the planning efforts advances. Leveraging existing conservation programs can advance conservation on a landscape-scale. The programs listed below can potentially bring additional protection; no particular program or specific properties are endorsed. All bring unique attributes that can advance conservation partnerships.

1) Florida Department of Environmental Protection-Division of State Lands: Florida Forever

Florida Forever is the state land acquisition program and is led by the Florida Department of Environmental Protection (DEP). The program has a strict protocol for acceptance including an application process that is a year to 18 months in duration. To be considered, each acquisition project is ranked and placed into categories. Projects are ranked based on environmental and natural resource value. The program purchases properties with high conservation value using both fee-simple and less-than-fee acquisition strategies (conservation easements). USFWS has built a strong partnership with the Florida Forever Program by working together on land protection within the EHW NWR&CA. **Figures 15 and 16** depict the Florida Forever Projects in this study area. Future partnerships can be identified in the areas where Florida Forever Projects overlap with the priorities identified in the LCD. Table 2 earlier in the report shows that there are over 400,000 acres of high or moderate-high SWFLCD Combined Ecological Priorities within Florida Forever and/or Rural and Family Lands Protection projects. As part of efforts to protect the Florida Wildlife Corridor, the Florida Forever program received $400 million in funding for the 2021-2022 Florida fiscal year. The expectation is that a similar level of funding will be provided in 2022-2023, which, if so, will provide enormous lift and opportunity for landscape-scale conservation projects in Southwest Florida.

2) Florida Forest Service: Rural and Family Lands Protection Program (RFLPP)

The RFLPP is an agricultural easement program led by the Florida Forest Service which is part of the Florida Department of Agriculture and Consumer Services. The program is designed to protect important agricultural lands through the acquisition of permanent land conservation easements. The purpose of the program is to protect working landscapes, and easements are not restrictive. The program is very popular among landowners who would like to continue their agricultural operations. Projects are ranked based on the quality of their agricultural operations. The application and acceptance process is 6 months. It takes a year before projects are formally on the acquisition list. RFLPP frequently partners with the NRCS ALE program on conservation easements. RFLPP and USFWS have a strong working

relationship through the work accomplished in the EHW NWR&CA. **Figures 15 and 16** depict the RFLPP projects in the study area. Future partnerships can be identified in the areas where the RFLPP Projects overlap with the priorities identified in this LCD.

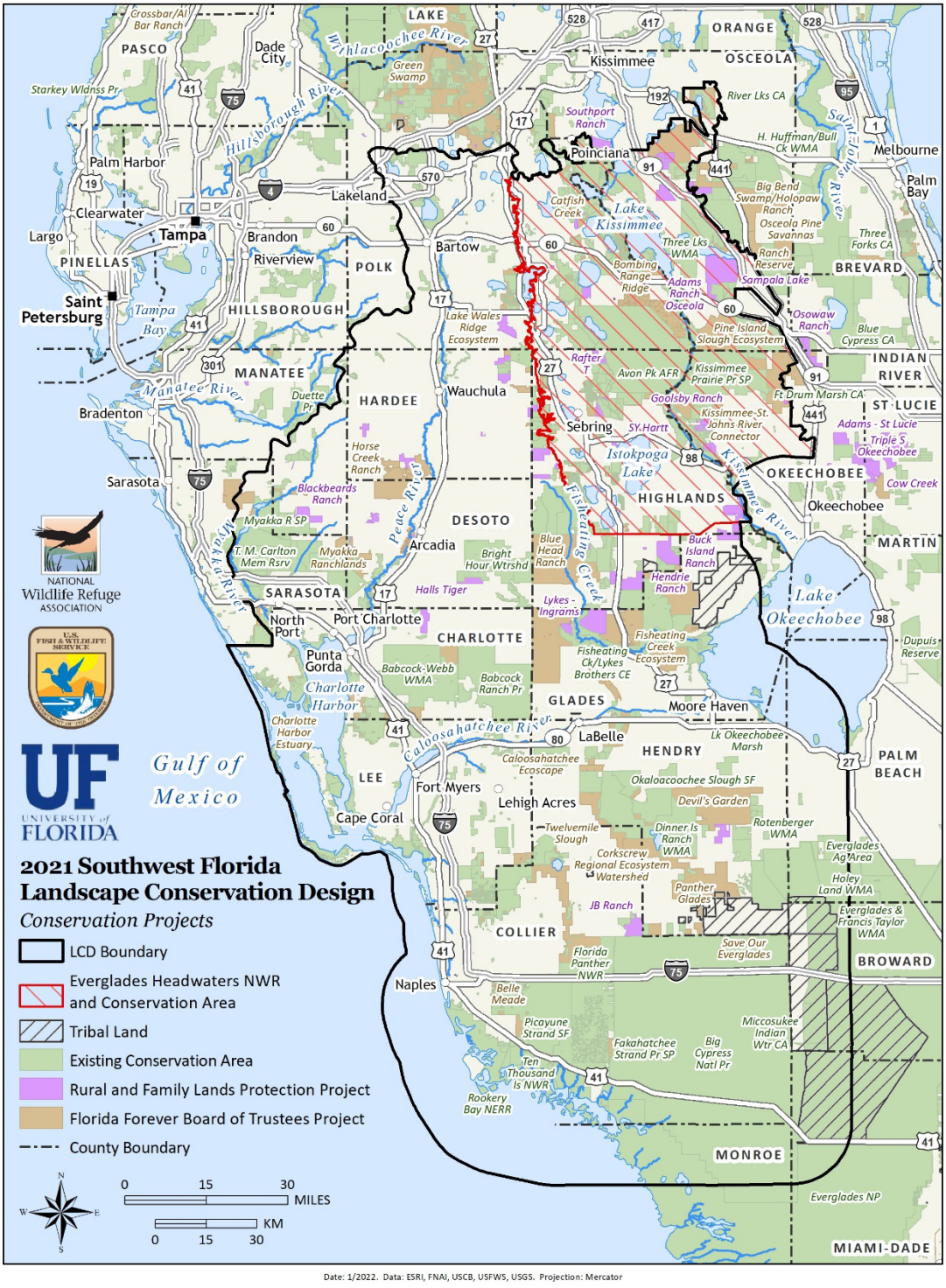


Figure 15. Florida Forever and Rural and Family Lands Protection projects in the SWFLCD Study Area.

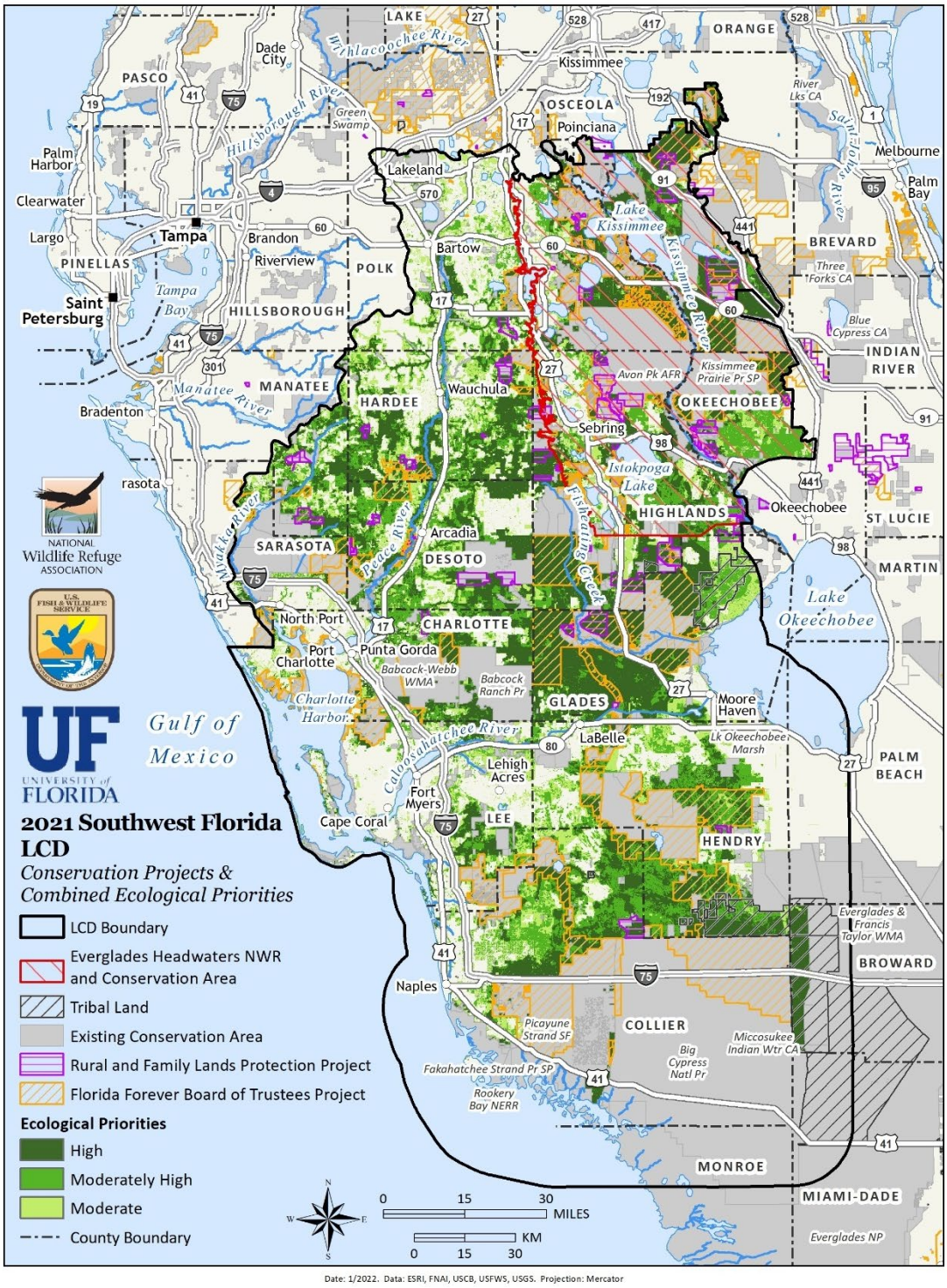


Figure 16. Florida Forever and Rural and Family Lands Protection projects shown on top of the SWFLCD Combined Ecological Priorities.

3) Florida Forest Service: The Forest Legacy Program

The Forest Legacy Program aims to protect and conserve forests that are threatened by conversion to non-forest uses. The program is led by the Florida Forest Service and the U.S. Forest Service makes the final selections and distributes the funds. The Florida Forest Service places an emphasis on purchasing conservation easements, although past projects to date have been fee-simple. The Florida program focuses on conservation easements to ensure that forests in Florida remain economically viable. The program can partner with other state and county government entities to leverage funding.

The state's Forest Legacy Area map identifies which portions of the state are eligible for protection under the Forest Legacy program. Current Forest Legacy Areas are mapped at: https://www.fdacs.gov/Forest-Wildfire/Our-Forests/Land-Planning-and-Administration/Florida-Forest-Legacy-Program/Florida-Forest-Legacy-Areas-Map

4) NRCS: The Agricultural Conservation Easement Program (ACEP)

The ACEP provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect, and enhance enrolled wetlands. NRCS easement programs are very popular in Florida and well-funded.

5) NRCS: Wetland Reserve Easement (WRE)

The WRE Program under the NRCS ACEP is an easement program that purchases conservation easements on degraded or former wetlands in need of restoration. NRCS prioritizes wetlands that have been converted into other agricultural uses. NRCS prioritizes applications based on the easement's potential for protecting and enhancing habitat for migratory birds and other wildlife. WRE's are more restrictive than other easements. NRCS has the right to restrict grazing rights for restoration purposes. NRCS has not done this and have indicated it is highly unlikely they ever will, as cattle are an important management tool in Florida. A reduced rate grazing option is also potentially available. WRE's tend to have a higher dollar value than other easements, due to their restrictive nature.

6) NRCS-: Agricultural Land Easement (ALE)

The ALE is a partnership program and is geared for working landscapes. NRCS provides financial assistance to eligible partners for purchasing ALE's that protect the agricultural use and conservation values of eligible land. Eligible partners include Indian tribes, state and local governments and non-governmental organizations that have farmland or grassland protection programs. The ALE program will provide up to 50% match for working agricultural lands and 75% where there are grasslands of special significance. NRCS does not purchase these easements, rather they contribute to the partner that is acquiring the easement. The Rural and Family Lands Protection Program (RFLPP) under the Florida Forest Service has been successfully partnering with the NRCS ALE program for several years, as have some local governments and land trusts.

7) Southwest Florida Water Management District (SWFWMD)

SWFWMD has purview over the water resources in the northwestern portion of the study area. They have historically had a strong program in purchasing fee-simple and less-then-fee lands that meet certain criteria.

8) South Florida Water Management District (SFWMD)

SFWMD has purview over the water resources in the southern and northeastern portion of the study area. They have historically had a strong program in purchasing fee-simple and less-then-fee lands that meet certain criteria. The majority of their land acquisition is focused on identified lands for Everglades restoration needs.

9) County Programs

Several county land protection programs exist within the study area. Collier County Conservation Collier, Sarasota County's Environmentally Sensitive Lands Acquisition Program, Lee County's Conservation 20/20, and Conservation Charlotte are examples of county programs with a history of success within the study area.

Other Relevant Incentive Programs

Many landowners may prefer to engage in incentive programs that do not involve selling their land or conservation easements. Examples include Wetland Mitigation Banking, Species Conservation Banking, South Florida Water Management District Dispersed Water Storage, FWC's pilot Gopher Tortoise Payment for Ecosystem Services Program and many others. Existing and potential incentive programs will be explored during the planning process.

H. Conclusion

The SWFLCD provides data, maps, and recommendations for engaging in successful landscape-scale conservation in southwest Florida. Recent updates to Florida panther habitat data and the recent update of the FEGN provide a solid science foundation for determining biodiversity and ecosystem service priorities across the region. There is much work to do, with approximately 1.85 million acres of currently unprotected high and moderate-high ecological priorities with the SWFLCD region (See Table 2). However, approximately 400,000 acres of these priority areas are already within active land protection projects in either the Florida Forever program or Rural and Family Lands Protection program. Recent increases in State of Florida conservation land protection funding ($400 million for fiscal year 2021-2022) combined with federal (and regional) initiatives and partners provide a greatly enhanced opportunity to protect the most strategic wildlife corridors and other landscape-scale conservation priorities essential for conserving the region's biodiversity and ecosystem services, while maintaining a viable and compatible ranching and natural resource-based economy. This includes many opportunities to protect and restore wetlands and watersheds critical to the health and recovery of both the Everglades and Charlotte Harbor watersheds. The SWFLCD provides an important foundation to guide USFWS conservation planning efforts, especially regarding identifying and working to protect common priorities with a diverse set of partners, programs, and funding sources.

The SWFLCD is the foundation for next steps needed to achieve the conservation goals in this region including development of Land Protection Plans for national wildlife refuges working with the many conservation partners mentioned in this report. With the FEGN, the FWC's Blueprint, the work of the Peninsular Florida Landscape Conservation Cooperative, land protection efforts in the EHW NWR&CA, the Avon Park Air Force Range Sentinel Landscape, the Florida Wildlife Corridor, and expanded funding for the Florida Forever program, the time is right to build on these recent past and existing partnerships to engage in effective collaborative landscape-scale conservation planning in Southwest Florida. The science guiding conservation planning efforts is clear that there is a significant need for additional land protection with conservation values supported by multiple federal, state, regional, and local partners. Further planning is warranted and necessary to select strategic priorities that are best suited for addressing multiple conservation goals working with partners and willing landowners. Through the more than decade of regional science and planning work, the USFWS is well positioned and prepared to engage with multiple existing partners to achieve landscape-scale wildlife, water, and working landscape conservation. Establishment of a national wildlife refuge and conservation area could provide significant additional impetus and resources to such efforts, including building off the successes in the adjacent EHW NWR&CA.