Ramsar Information Sheet

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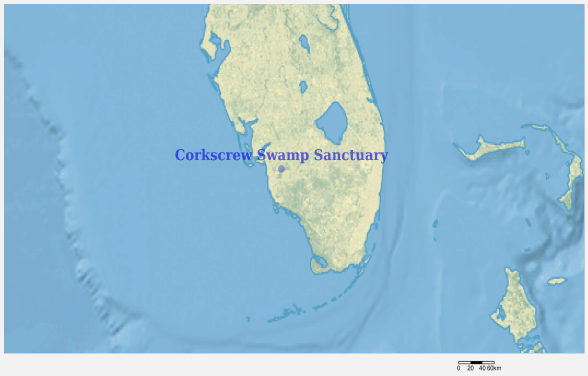
United States of America

Corkscrew Swamp Sanctuary



Designation date	23 March 2009
Site number	1888
Coordinates	26°23'49"N 81°36'56"W
Area	5 261,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

Audubon's Corkscrew Swamp Sanctuary, located in southwestern Florida (USA), is a 5,261 ha relic of Old Florida. At the heart of the western Everglades, this National Audubon Society sanctuary contains upland and wetland habitats that were once common throughout South Florida but since the mid-1900s have been largely lost or degraded due to widespread drainage, logging, and development. Central to the Sanctuary, both geographically and arguably in ecological importance, is the largest remaining old-growth bald cypress (Taxodium distichum) forest in the world. The old-growth bald cypress trees, estimated to be ~500 years old, along with the surrounding marsh, wet prairie, and hydric pine flatwoods and adjacent hardwood hammocks, support a rich biodiversity of plants and animals, including 29 known Threatened or Endangered plant species and 15 known Threatened or Endangered animal species. The old-growth cypress has been a known primary nesting site for federally Threatened Wood Storks (Mycteria americana) since the early 1900s. This colony was once one of the largest and most productive Wood Stork colonies in the United States. While productivity has declined in recent decades with degradation and loss of wetlands throughout the Everglades system, the colony still supports >1% of the documented Wood Stork nesting effort in the Southeastern United States. The sanctuary also provides habitat for federally Endangered Florida panther (Puma concolor coryi), who have been documented reproducing, raising young, and ranging throughout the sanctuary, and whose annual population in recent years represents 2-4% of the estimated population. In addition to active land management and ecological research programs, the Sanctuary features a visitor center, educational programming and a 2.25-mile raised boardwalk that extends into the old-growth bald cypress forest. Currently, the greatest threats to the ecological integrity of this site are a documented dry-season over-draining (efforts are underway to determine the cause), regional loss of wetlands that help provide habitat for wide-ranging resident species, and global climate change. In addition to the Ramsar designation, Corkscrew Swamp Sanctuary has been identified as a National Natural Landmark (U.S. Department of the Interior), an Important Bird Area (Bird Life International) and a Wetland of Distinction (Society of Wetland Scientists).

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency: Corkscrew Swamp Sanctuary

Postal address:
375 Sanctuary Road
Naples, Florida 34120

National Ramsar Administrative Authority

Institution/agency: U.S. Fish & Wildlife Service

Postal address:
1849 C Street, NW, 312 MIB
Washington, DC 20240
United States of America

2.1.2 - Period of collection of data and information used to compile the RIS

From year: 2008

To year: 2020

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish): Corkscrew Swamp Sanctuary

2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A. Changes to Site boundary	Yes ○ No ◉
(Update) B. Changes to Site area	No change to area
(Update) For secretariat only: This update is an extension	☐

2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS?	No

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image
<1 file(s) uploaded>

Former maps: 0

Boundaries description

The boundary is the legal property boundary of Corkscrew Swamp Sanctuary (CSS), owned in fee simple by National Audubon Society.

Corkscrew Swamp Sanctuary is a 13,000-acre (ca. 5,261 ha) National Audubon Society ("Audubon") wildlife sanctuary in northern Collier County, Florida (USA) that lies northeast of Naples, Florida approximately 10 miles (ca. 16 km) east of Interstate 75. The Sanctuary is bound on the northeast, south, and portions of the west by state-owned conservation land. The Sanctuary includes land acquired from the Panther Island Mitigation Bank (PIMB), a 2,778-acre (ca. 1,124 ha) site in Collier County, bordering Lee County, that lies roughly seven miles (ca. 11 km) east of Interstate 75. These parcels were transferred from Panther Island Mitigation Bank to National Audubon Society and incorporated as part of the Sanctuary and are therefore included as part of the Ramsar site.

2.2.2 - General location

a) In which large administrative region does the site lie? Florida

b) What is the nearest town or population centre? Naples

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes ○ No ◉

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes ○ No ◉

2.2.4 - Area of the Site

Official area, in hectares (ha): 5261

Area, in hectares (ha) as calculated from GIS boundaries: 5340.938

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
WWF Terrestrial Ecoregions	Florida peninsula ecoregion, temperate coniferous forest combined with subtropical mixed forest/savanna
WWF Terrestrial Ecoregions	Nearctic/Neotropic
WWF Terrestrial Ecoregions	Everglades (Neotropical), NT0904

Other biogeographic regionalisation scheme

World Wildlife Fund ecoregion classification (Olsen et al. 2001, Abell et al. 2008)

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

☑ Criterion 1: Representative, rare or unique natural or near-natural wetland types

Other ecosystem services provided	Corkscrew Swamp Sanctuary contains marsh, wet prairie, and hydric pine flatwoods and adjacent hardwood hammocks, support a rich biodiversity of plants and animals, and is home to the largest remaining old-growth bald cypress trees in the world.
Other reasons	Corkscrew Swamp Sanctuary contains the largest remaining old-growth bald cypress forest in the world. Once common throughout the southeastern United States, bald cypress has been systematically logged throughout its range and few sizable old-growth parcels remain. The largest bald cypress trees within the Sanctuary are estimated to be approximately 500 years old, their age limited by a severe wildfire that decimated the swamp and left a detectable ash layer within the peat. The old-growth cypress forest provides critical water storage capacity (the longest hydroperiod natural wetland type in this region) and the canopy and understory support a rich biodiversity of flora and fauna.

☑ Criterion 2 : Rare species and threatened ecological communities

☑ Criterion 3 : Biological diversity

Justification	A 2018 floristic inventory of Corkscrew Swamp Sanctuary (Wilder & McCollom 2018) documented individuals of 126 families, 401 genera, 756 species, and 773 infrageneric taxa. These include 16 taxa listed as Endangered and 13 taxa listed as Threatened for Florida, and 3 taxa listed as Extirpated, 5 taxa listed as Historical, and 28 taxa listed as Critically Imperilled for South Florida (see Plant Species (3.2)).

☑ Criterion 4 : Support during critical life cycle stage or in adverse conditions

☑ Criterion 6 : >1% waterbird population

☑ Criterion 9 : >1% non-avian animal population

3.2 - Plant species whose presence relates to the international importance of the site

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA / MAGNOLIOPSIDA	*Chrysophyllum oliviforme*	☑	☑	☐	LC	☐	Florida Status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Cyrtopodium punctatum*	☑	☑	☐		☐	Florida Status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Dendrophylax lindenii*	☑	☑	☐		☐	Florida Status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Dendrophylax porrectus*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Epidendrum anceps*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Epidendrum floridense*	☑	☑	☐		☐	Florida Status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Epidendrum nocturnum*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Epidendrum rigidum*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Ionopsis utricularioides*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Lilium catesbaei*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / POLYPODIOPSIDA	*Meniscium serratum*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / POLYPODIOPSIDA	*Nephrolepis biserrata*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / MAGNOLIOPSIDA	*Nymphaea jamesoniana*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / MAGNOLIOPSIDA	*Pinguicula caerulea*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Platanthera nivea*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Polystachya concreta*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Prosthechea cochleata*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Roystonea regia*	☑	☑	☐	LC	☐	Florida Status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Sacoila lanceolata*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Tillandsia balbisiana*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Tillandsia fasciculata*	☑	☑	☐	LC	☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Tillandsia pruinosa*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Tillandsia utriculata*	☑	☑	☐		☐	Florida status: Endangered	
TRACHEOPHYTA / LILIOPSIDA	*Tillandsia variabilis*	☑	☑	☐		☐	Florida status: Threatened	
TRACHEOPHYTA / LILIOPSIDA	*Zephyranthes simpsonii*	☑	☑	☐		☐	Florida status: Threatened	

A two-year floristic inventory of Corkscrew Swamp Sanctuary was completed 2015-2017 and published (including peer review) in 2018. Combining these data with previous surveys yielded a total of 770 species and 787 infrageneric taxa, including 16 taxa listed as Endangered in Florida, 13 taxa listed as Threatened in Florida, 3 taxa listed as Extirpated in South Florida, 5 taxa listed as Historical in South Florida, and 28 taxa listed as Critically Imperilled in South Florida (Wilder & McCollom 2018).

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
Others																	
CHORDATA / REPTILIA	*Alligator mississippiensis*	☑	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	U.S. Status: Threatened	
CHORDATA / REPTILIA	*Drymarchon couperi*	☑	☑	☐	☐	☑	☐	☐	☐				LC	☐	☐	U.S. Status: Threatened	
CHORDATA / MAMMALIA	*Eumops glaucinus floridanus*	☑	☐	☐	☐	☑	☐	☐	☐					☐	☐	Florida Status: Endangered	
CHORDATA / REPTILIA	*Gopherus polyphemus*	☑	☑	☐	☐	☑	☐	☐	☐				VU	☐	☐	Florida Status: Threatened	
CHORDATA / MAMMALIA	*Puma concolor couguar*	☑	☑	☐	☑	☐	☐	☐	☐	5	2019-2020	3		☐	☐	U.S. Status: Endangered	
CHORDATA / MAMMALIA	*Sciurus niger avicennia*	☑	☐	☐	☐	☐	☐	☐	☐					☐	☐	Florida Status: Threatened	
Birds																	
CHORDATA / AVES	*Caracara cheriway*	☑	☐	☐	☐	☑	☐	☐	☐				LC	☐	☐	U.S. Status: Threatened	
CHORDATA / AVES	*Egretta caerulea*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Florida Status: Threatened	Corkscrew Swamp Sanctuary has been used for nesting by this species.
CHORDATA / AVES	*Egretta tricolor*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Florida Status: Threatened	Corkscrew Swamp Sanctuary has been used for nesting by this species.
CHORDATA / AVES	*Falco sparverius*	☑	☐	☐	☐	☐	☐	☐	☐				LC	☐	☐	Florida Status: Threatened	
CHORDATA / AVES	*Grus canadensis*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Florida Status: Threatened	Corkscrew Swamp Sanctuary has been used for nesting by this species.
CHORDATA / AVES	*Mycteria americana*	☑	☑	☑	☐	☐	☐	☐	☐	296	2014-2018	1.34	LC	☐	☐	U.S. Status: Threatened	Corkscrew Swamp Sanctuary has been used for nesting by this species.
CHORDATA / AVES	*Picoides borealis*	☑	☑	☐	☐	☐	☐	☐	☐					☐	☐	U.S. Status: Threatened	
CHORDATA / AVES	*Platalea ajaja*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	Florida Status: Threatened	Corkscrew Swamp Sanctuary has been used for nesting by this species.
CHORDATA / AVES	*Rostrhamus sociabilis*	☑	☑	☐	☐	☐	☐	☐	☐				LC	☐	☐	U.S. Status: Endangered	Corkscrew Swamp Sanctuary has been used for nesting by this species.

1) Percentage of the total biogeographic population at the site

3.4 - Ecological communities whose presence relates to the international importance of the site

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Old-Growth Bald Cypress	☑	The largest remaining old-growth bald cypress forest in the world	Was once common throughout South Florida but have been rapidly degraded and lost to development

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

At CSS, there are approximately 13,000 acres (ca. 5261 ha) of pine flatwoods, wet prairie, cypress swamp, and marsh ecosystems. Land acquired from PIMB includes approximately 94 acres (ca. 38 ha) of hydric pine flatwoods and roughly 460 acres (ca. 186 ha) of created/restored marsh wetlands. Relatively stable communities have evolved at CSS in response to natural regimes of fire, water, soil, and climate. Benefits of CSS wetlands include ground water recharge, filtration, flood control, increased flora/fauna biodiversity, and recreation/education.

4.2 - What wetland type(s) are in the site?

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Lakes and pools >> Tp: Permanent freshwater marshes/ pools	Marsh, Flag Pond/Emergent, Pond/Low Pool	1		
Fresh water > Marshes on inorganic soils >> Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils	Wet prairie	3		
Fresh water > Marshes on inorganic soils >> Xf: Freshwater, tree-dominated wetlands	Pine Flatwoods, Cypress Forest, Pine/Oak/Cabbage Palm	2		Rare

Human-made wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type
2: Ponds	Derelict retention ponds	4	

Other non-wetland habitat

Other non-wetland habitats within the site	Area (ha) if known
Hardwood hammock, Mesic pine flatwood	

4.3 - Biological components

4.3.1 - Plant species

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/MAGNOLIOPSIDA	*Acacia auriculiformis*	Actual (minor impacts)	unknown
TRACHEOPHYTA/LILIOPSIDA	*Brachiaria mutica*	Actual (minor impacts)	unknown
TRACHEOPHYTA/LILIOPSIDA	*Colocasia esculenta*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Cupaniopsis anacardioides*	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	*Eichhornia crassipes*	Actual (minor impacts)	decrease
TRACHEOPHYTA/LILIOPSIDA	*Eulophia graminea*	Potential	No change
TRACHEOPHYTA/LILIOPSIDA	*Hemarthria altissima*	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	*Hydrilla verticillata*	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	*Hymenachne amplexicaulis*	Actual (minor impacts)	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Limnophila sessiliflora*	Potential	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	*Ludwigia peruviana*	Actual (minor impacts)	No change
TRACHEOPHYTA/POLYPODIOPSIDA	*Lygodium microphyllum*	Actual (minor impacts)	decrease
TRACHEOPHYTA/MAGNOLIOPSIDA	*Macroptilium lathyroides*	Potential	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	*Melaleuca quinquenervia*	Actual (minor impacts)	decrease
TRACHEOPHYTA/POLYPODIOPSIDA	*Nephrolepis brownii*	Potential	No change
TRACHEOPHYTA/POLYPODIOPSIDA	*Nephrolepis cordifolia*	Potential	No change
TRACHEOPHYTA/LILIOPSIDA	*Panicum maximum*	Actual (minor impacts)	unknown
TRACHEOPHYTA/LILIOPSIDA	*Panicum repens*	Actual (minor impacts)	No change
TRACHEOPHYTA/LILIOPSIDA	*Pistia stratiotes*	Actual (minor impacts)	No change
TRACHEOPHYTA/POLYPODIOPSIDA	*Salvinia minima*	Potential	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	*Schinus terebinthifolia*	Actual (minor impacts)	decrease
TRACHEOPHYTA/LILIOPSIDA	*Scleria lacustris*	Actual (major impacts)	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Senna pendula*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Sphagneticola trilobata*	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	*Spirodela punctata*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Stachytarpheta cayennensis*	Potential	unknown
TRACHEOPHYTA/LILIOPSIDA	*Syngonium podophyllum*	Potential	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Syzygium cumini*	Actual (minor impacts)	unknown
TRACHEOPHYTA/MAGNOLIOPSIDA	*Urena lobata*	Actual (minor impacts)	unknown

Optional text box to provide further information

A two-year floristic inventory of Corkscrew Swamp Sanctuary was completed 2015-2017 and published (including peer review) in 2018. Combining these data with previous surveys yielded a total of 770 species and 787 infrageneric taxa, including 16 taxa listed as Endangered in Florida, 13 taxa listed as Threatened in Florida, 3 taxa listed as Extirpated in South Florida, 5 taxa listed as Historical in South Florida, and 28 taxa listed as Critically Imperilled in South Florida (Wilder & McCollom 2018).

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/AVES	*Aramus guarauna*				
CHORDATA/AVES	*Ardea alba*				
CHORDATA/AVES	*Ardea herodias*				
CHORDATA/AVES	*Elanoides forficatus*				
CHORDATA/AVES	*Eudocimus albus*				
CHORDATA/AVES	*Haliaeetus leucocephalus*				
CHORDATA/AVES	*Pandion haliaetus*				
CHORDATA/AVES	*Plegadis falcinellus*				
CHORDATA/MAMMALIA	*Ursus americanus floridanus*				

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATA/REPTILIA	*Anolis sagrei*	Actual (major impacts)	unknown
CHORDATA/ACTINOPTERYGII	*Astronotus ocellatus*	Potential	unknown
CHORDATA/AVES	*Cairina moschata*	Potential	unknown
CHORDATA/ACTINOPTERYGII	*Cichlasoma bimaculatum*	Potential	unknown
CHORDATA/ACTINOPTERYGII	*Clarias batrachus*	Potential	unknown
CHORDATA/ACTINOPTERYGII	*Hemichromis letourneuxi*	Actual (minor impacts)	unknown
CHORDATA/REPTILIA	*Hemidactylus turcicus*	Potential	No change
CHORDATA/ACTINOPTERYGII	*Hoplosternum littorale*	Potential	unknown
CHORDATA/REPTILIA	*Iguana iguana*	Potential	unknown
CHORDATA/ACTINOPTERYGII	*Mayaheros urophthalmus*	Potential	unknown
CHORDATA/ACTINOPTERYGII	*Oreochromis aureus*	Potential	unknown
CHORDATA/AMPHIBIA	*Osteopilus septentrionalis*	Actual (major impacts)	unknown
CHORDATA/ACTINOPTERYGII	*Pelmatolapia mariae*	Potential	unknown
MOLLUSCA/GASTROPODA	*Pomacea maculata*	Potential	unknown
CHORDATA/ACTINOPTERYGII	*Pterygoplichthys scrophus*	Potential	unknown
ARTHROPODA/INSECTA	*Solenopsis invicta*	Actual (minor impacts)	No change
CHORDATA/MAMMALIA	*Sus scrofa*	Actual (major impacts)	increase

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
A: Tropical humid climate	Aw: Tropical savanna (Winter dry season)

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres): 5

a) Maximum elevation above sea level (in metres): 9

Entire river basin ☐

Upper part of river basin ☐

Middle part of river basin ☐

Lower part of river basin ☐

More than one river basin ☐

Not in river basin ☑

Coastal ☐

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

Lake Trafford Basin

4.4.3 - Soil

Mineral ☑

(Update) Changes at RIS update: No change ◉ Increase ○ Decrease ○ Unknown ○

Organic ☑

(Update) Changes at RIS update: No change ◉ Increase ○ Decrease ○ Unknown ○

No available information ☐

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes ◉ No ○

Please provide further information on the soil (optional)

Four general soil types are represented at Corkscrew Swamp Sanctuary: Boca-Riviera-Copeland, Holopaw-Malabar-Basinger-Immokalee, Immokalee-Oldsmar-Basinger, and Winder-Riviera-Chobee (Liudahl et al. 1998).

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually seasonal, ephemeral or intermittent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Water inputs from precipitation	☐	No change

Water destination

Presence?	Changes at RIS update
Feeds groundwater	No change
To downstream catchment	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology:

Audubon scientists have recognized a drying trend in the herbaceous marshes and cypress forests within the Corkscrew Swamp Sanctuary (Clem & Duever 2019). Despite no change in annual rainfall patterns, hydroperiods, periods of time when the soil is waterlogged, have been reduced by more than 40% since 2000 compared to hydrologic records going back to 1959. The impacts of this drying trend are felt far beyond the Sanctuary.

4.4.5 - Sediment regime

Significant erosion of sediments occurs on the site ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Significant accretion or deposition of sediments occurs on the site ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Significant transportation of sediments occurs on or through the site ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Sediment regime is highly variable, either seasonally or inter-annually ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Sediment regime unknown ☑

4.4.6 - Water pH

Acid (pH<5.5) ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Circumneutral (pH: 5.5-7.4) ☑

(Update) Changes at RIS update: No change ◉ Increase ○ Decrease ○ Unknown ○

Alkaline (pH>7.4) ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Unknown ☐

4.4.7 - Water salinity

Fresh (<0.5 g/l) ☑

(Update) Changes at RIS update: No change ◉ Increase ○ Decrease ○ Unknown ○

Mixohaline (brackish)/Mixosaline (0.5-30 g/l) ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Euhaline/Eusaline (30-40 g/l) ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Hyperhaline/Hypersaline (>40 g/l) ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Unknown ☐

(ECD) Dissolved gases in water

Dissolved oxygen varies widely (0 to >100%) with hydroperiod and seasonality.

4.4.8 - Dissolved or suspended nutrients in water

Eutrophic ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Mesotrophic ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Oligotrophic ☑

(Update) Changes at RIS update: No change ◉ Increase ○ Decrease ○ Unknown ○

Dystrophic ☐

(Update) Changes at RIS update: No change ○ Increase ○ Decrease ○ Unknown ◉

Unknown ☐

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ○ ii) significantly different ◉

Surrounding area has greater urbanisation or development ☑

Surrounding area has higher human population density ☑

Surrounding area has more intensive agricultural use ☑

Surrounding area has significantly different land cover or habitat types ☑

Please describe other ways in which the surrounding area is different:

It is important to note that protection of dry season water levels by restoring wetlands also protects the safety of local communities surrounding Corkscrew Swamp Sanctuary through lessening catastrophic wildfire risks.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Fresh water	Drinking water for humans and/or livestock	not relevant for site

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Groundwater recharge and discharge	Medium

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Picnics, outings, touring	High
Scientific and educational	Educational activities and opportunities	High
Scientific and educational	Major scientific study site	Medium

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part	High

Within the site: 10000s

Outside the site: 100000s

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes ○ No ○ Unknown ◉

4.5.2 - Social and cultural values

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland ☑

Description if applicable

A 2.25-mile (ca. 3.6 km) raised boardwalk takes visitors through four distinct environments: a pine upland, a wet prairie, a cypress forest, and a marsh. Interpretive signs along the boardwalk and a field guide and Children's Activity Book available at the admissions desk in the Blair Center allow each visitor to take the self-guided tour. Benches and rain shelters are along the trail. For those who do not wish to walk the full 2.25 miles, an optional trail shortens the walk to one mile. Volunteer naturalists are usually on the boardwalk to answer questions.

ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland ☐

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples ☐

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland ☐

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Provincial/region/state government	☐	☑

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Foundation/non-governmental organization/trust	☑	☐

Other

Category	Within the Ramsar Site	In the surrounding area
Unspecified mixed ownership	☐	☑

Provide further information on the land tenure / ownership regime (optional):

National Audubon Society owns Corkscrew Swamp Sanctuary. The Sanctuary includes 2,778 acres (ca. 1,124 ha) of land previously owned by Southwest Florida Joint Venture (a joint venture between Collier Mitigation Joint Venture and BC Wetlands) that was acquired in November 2005 from the Panther Island Mitigation Bank (PIMB). This land is no longer used for mitigation purposes, but is managed for conservation. Additional land transfers from PIMB likewise no longer function as mitigation.

Current PIMB property is bound to follow the PIMB Management Plan. It has been implemented and includes re-establishing historic water flows into severely stressed cypress sloughs on site, exotic species removal and maintenance, and the creation of a fire management program. Additionally, perpetual management has been funded by the creation of a Perpetual Management Trust Fund. Moneys from this fund are transferred to Audubon along with land transfers in order to manage the land for perpetuity.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site: Corkscrew Swamp Sanctuary

Provide the name and/or title of the person or people with responsibility for the wetland: Lisa Korte, Executive Director

Postal address: 375 Sanctuary Road West Naples, FL 34120

E-mail address: lisa.korte@audubon.org

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Housing and urban areas		High impact	☐	No change	☑	No change

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Canalisation and river regulation	High impact		☑	No change	☑	increase

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Non specified	Medium impact		☐	No change	☑	No change

Energy production and mining

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Mining and quarrying		Low impact	☐	decrease	☑	No change

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Gathering terrestrial plants	Low impact	Low impact	☑	No change	☐	No change

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Dams and water management/use	Medium impact	High impact	☐	unknown	☑	increase

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Invasive non-native/ alien species	High impact	High impact	☑	increase	☑	increase

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Agricultural and forestry effluents	Medium impact	High impact	☐	No change	☑	increase

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Storms and flooding	High impact	High impact	☑	No change	☑	No change

5.2.2 - Legal conservation status

Global legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Other global designation	Wetland of Distinction by the Society of Wetland Scientists	https://www.sws.org/About-SWS/overview.html	whole

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Natural National Landmarks Program		https://www.nps.gov/subjects/nnlandmarks/index.htm	whole

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area	Gateway to the Great Florida Birding and Wildlife Trail	https://floridabirdingtrail.com/	whole

5.2.3 - IUCN protected areas categories (2008)

Ia Strict Nature Reserve ☐

Ib Wilderness Area: protected area managed mainly for wilderness protection ☐

II National Park: protected area managed mainly for ecosystem protection and recreation ☑

III Natural Monument: protected area managed mainly for conservation of specific natural features ☐

IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention ☐

V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation ☐

VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems ☐

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Habitat

Measures	Status
Habitat manipulation/enhancement	Partially implemented

Species

Measures	Status
Control of invasive alien plants	Partially implemented

Human Activities

Measures	Status
Communication, education, and participation and awareness activities	Implemented
Research	Implemented

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Has a management effectiveness assessment been undertaken for the site? Yes ◉ No ○

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes ○ No ◉

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site:

There is a visitor center at this site.

URL of site-related webpage (if relevant): https://corkscrew.audubon.org/

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? Yes, there is a plan

Further information

Through this restoration project (mechanical removal of willow, follow-up herbicide treatments and reintroduction of prescribed fire) Audubon is re-establishing a diverse herbaceous wetland that supports waterfowl and wading birds, improves downstream water flow, and retains water longer in the dry season. Restored wetlands will reduce drought stress, harmful wildfires, and saltwater intrusion as they sequester nutrients that degrade water quality and provide natural water storage to reduce flooding.

After a five-year pilot study, Audubon launched a five-year, two million dollar campaign to restore 1,000 acres of marsh wetland at Corkscrew. To date, Audubon has successfully cleared about 670 acres of willow and other woody shrubs. In 2020, we successfully applied prescribed fire to 18 acres, leading to the first acreage to be considered fully restored. Audubon has become a regional leader in marsh restoration and staff are consulted by various agencies and stakeholders who want to learn about Audubon's technique and results.

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water regime monitoring	Implemented
Animal community	Implemented

Success is measured by acres of vegetation converted to a diverse, herbaceous marsh community. We are working on a hydrologic modelling study that will quantify potential water savings from vegetation removal and expect a refined metric in fall 2020. The initial treatment will be a success if 99% of the shrub layer is eliminated and the native seed bank is emerging. In six months, success will be indicated by plants with high evapotranspiration rates covering less than 5% of the plot. Within 2-5 years the successful plot will have an established herbaceous plant community that is capable of carrying prescribed fire.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

Abell, R., M. L. Thieme, C. Revenga, M. Bryer, M. Kottelat, N. Bogutskaya, B. Coad, N. Mandrak, S. Contreras Balderas, W. Bussing, M. L. J. Stiassny, P. Skelton, G. R. Allen, P. Unmack, A. Naseka, R. Ng, N. Sindorf, J. Robertson, E. Armijo, J. V. Higgins, T. J. Heibel, E. Wikramanayake, D. Olson, H. L. Lopez, R. E. Reis, J. G. Lundberg, M. H. Sabaj Perez, and P. Petry. 2008. Freshwater Ecoregions of the World: A New Map of Biogeographic Units for Freshwater Biodiversity Conservation. BioScience 58(5):403-414.

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U.S. Fish & Wildlife Service, Endangered Species Information, http://www.fws.gov/endangered/ wildlife.html (last accessed Oct. 8, 2006).

U.S. Fish & Wildlife Service, Red-Cockaded Woodpecker, http://www.fws.gov/rcwrecovery/rcw.htm (last accessed Oct. 9, 2006).

U.S. Fish & Wildlife Service, Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork at iii (1996), available at http://ecos.fws.gov/docs/recovery_plans/1997/970127.pdf.

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)
<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)
<no file available>

iii. a description of the site in a national or regional wetland inventory
<no file available>

iv. relevant Article 3.2 reports
<no file available>

v. site management plan
<no file available>

vi. other published literature
<no file available>

<no data available>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

Drone Image of Corkscrew Swamp Sanctuary (*Audubon's Corkscrew Swamp Sanctuary, 01-04-2021*)

Drone Image of Corkscrew Swamp Sanctuary (*Audubon's Corkscrew Swamp Sanctuary, 01-04-2021*)

Prescribed Wildfire Burn (*Audubon's Corkscrew Swamp Sanctuary, 04-03-2021*)

Drone Image of Corkscrew Swamp Sanctuary (*Audubon's Corkscrew Swamp Sanctuary, 01-04-2021*)

Drone Image of Corkscrew Swamp Sanctuary (*Audubon's Corkscrew Swamp Sanctuary, 01-04-2021*)

Drone Image of Corkscrew Swamp Sanctuary (*Audubon's Corkscrew Swamp Sanctuary, 01-04-2021*)

Little Blue Heron (*RJ Wiley, 01-04-2021*)

Swamp at Corkscrew Swamp Sanctuary (*RJ Wiley, 01-04-2021*)

Swamp at Corkscrew Swamp Sanctuary (*RJ Wiley, 01-04-2021*)

Swamp at Corkscrew Swamp Sanctuary (*RJ Wiley, 01-04-2021*)

Swamp at Corkscrew Swamp Sanctuary (*RJ Wiley, 01-04-2021*)

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation: 2009-03-23