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Report on the Rare and Endemic Species of the St John's River Water Management District Wetlands

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Executive Summary

Water supply withdrawals have the potential to alter the hydrology of wetlands, resulting in the possible loss of rare and endemic species. As part of the ongoing effort to avoid such impacts, the St. John's River Water Management District's (SJRWMD) Division of Water Supply Management contracted the Florida Natural Areas Inventory (FNAI) to identify rare and endemic species at risk within District wetlands. FNAI maintains comprehensive, statewide data on Florida rare and endemic species and natural communities. This information will be of value to the Minimum Flow and Levels Program because preservation of aquatic resources also involves protection of rare and endemic species.

The FNAI estimates that 128 rare wetland species (35 being globally imperiled) potentially occur within the 30 different natural wetland community types present in the District. Twenty-seven of these species are rare endemics. Thirty-eight species are particularly sensitive to actions taken within the District because their ranges are wholly or mostly encompassed within the District. In addition to the 128 rare species, another 35 non-rare endemics species also potentially occur within District wetlands. Survival of these rare and endemic species is largely dependent on the preservation of their wetland habitats.

Rare species lists by natural wetland community type were prepared for the SJRWMD as a whole and for the 19 counties wholly or partially within the District. The report also includes a list of non-rare endemics by natural wetland community type; FNAI, state, and federal endangerment status for species and natural wetland community types where appropriate; and existing FNAI natural wetland community, species habitat, and species seasonal distribution information.

Acknowledgements

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Objective. Water supply withdrawals have the potential to alter the hydrology of wetlands, resulting in the possible loss of rare and endemic species. As part of the ongoing effort to avoid such impacts, this report provides lists of rare species and non-rare endemic species potentially occurring in the St. Johns River Water Management District (SJRWMD) wetlands, along with descriptions of natural communities in which they occur; habitat notes; season when found and endangerment status assigned by the Florida Natural Areas Inventory (FNAI), the state of Florida, and the federal government. The information is derived from the FNAI database. This report was contracted by the SJRWMD's Division of Water Supply Management. These listings will be of value to the Minimum Flow and Levels Program because preservation of aquatic resources also involves protection of rare and endemic species.

Specifically this report includes: 1) a table of rare species by natural wetland communities in which they are found for each of the 19 counties wholly or partly within SJRWMD; 2) a District-wide table of rare species by natural wetland community; 3) a table listing descriptive information (status, seasonal distribution, habitat comments) for all rare species within the District; 4) a District-wide table of non-rare endemic species by natural wetland community and 5) a table listing descriptions and FNAI status of all natural wetland communities within the District.

FNAI is a private, non-profit organization dedicated to gathering, interpreting, and disseminating information critical to the conservation of Florida's biological diversity. The Inventory was founded in 1981 as a member of The Nature Conservancy's international network of natural heritage programs. The Inventory maintains and continually updates a comprehensive database of rare plant and animal species and exemplary natural communities of Florida. Data records maintained by the Inventory are a compilation of information from published and unpublished literature, museums and herbaria, field surveys, personal communications from natural resource professionals, and other sources. The Inventory database currently includes information on approximately 470 plant species, 500 animal species (vertebrates and invertebrates), and 82 natural community types. It includes more than 27,000 occurrences of rare plant and animal species and high-quality natural communities throughout the state, more than 1,000 conservation lands managed by public and private agencies, as well as the state Conservation and Recreation Lands and Save Our Rivers acquisition projects, and other lands with potential natural habitat on site.

Methods. Ranking. FNAI ranks the endangerment status of plant and animal species on a scale of 1 to 5 with 1 being the most imperiled and 5 the most secure, according to the criteria listed in Appendix 1. In general FNAI tracks information only on species ranked 1, 2, or 3 at either the global or state level. The criteria the Inventory uses to rank species are identical to criteria used by natural heritage programs in all fifty states. This network of natural heritage programs, now independent of The Nature Conservancy and known as the Association for Biodiversity Information, shares information and ranking of species that range across several states. Thus, for example, if most of the range of a rare species is in Alabama, the Alabama heritage program would assign the global rank of the species and FNAI would assign only the state rank for

Florida. The Inventory also ranks natural communities in Florida (FNAI 1990) based on acreage covered and degree of threat.

The state of Florida ranks species based on the endangerment of a species in Florida only, not on the status of the species throughout its range; thus, its ranks would be comparable to FNAI's state ranks. Differences between species ranks assigned by FNAI and those assigned by the state are due to differences in emphasis. For animals, the state considers primarily the degree of threat to the populations in deciding whether or not to list a species, whereas FNAI takes into account along with threat, the number and size of populations in the state and the area of the state over which the populations are distributed. For plants, the criteria for ranking are similar, but the state ranks only full species, whereas FNAI also ranks subspecies.

The federal status of rare species is assigned by the U.S. Fish and Wildlife Service based on the endangered status of the species throughout its range and thus is comparable to FNAI's global ranks. One of the main reasons FNAI's global ranks differ from those assigned by the federal government is the length of time it takes to rank a species. Since FNAI listings do not have legal force, species rankings can be modified as soon as information becomes available, rather than going through a detailed review process such as is required for ranking by the U.S. Fish and Wildlife Service.

Generating the tables. Four types of tables were generated for this report - three from the FNAI database and one (non-rare endemics X natural wetland communities) from a report produced by FNAI on endemic species in Florida (Muller et al. 1989).

Species are considered to potentially occur within a county if they are listed as present in any of several sources (Peterson 1997), including the FNAI database, guidebooks, scientific articles, reference works, and herbarium or museum collections. These same sources are also used to determine in which wetland communities rare species potentially occur, as well as to obtain information on seasonal distribution and habitat. The FNAI database is continually updated as new information becomes available.

From this database a list of all rare species occurring in the counties of SJRWMD and also occurring in wetland communities, i.e., those communities defined as palustrine, lacustrine or riverine (Florida Natural Areas Inventory and Department of Environmental Protection 1990), was generated. FNAI scientists reviewed the species lists thus generated to determine: 1) for counties only partially included within SJRWMD, whether the species was likely to be found in that portion of a county that is within the District's boundaries and 2) whether the species was primarily a wetland species or primarily an upland species that only occurred in borderline wetland communities, such as Hydric Hammock. The community list was also reviewed by scientists to remove wetland communities judged not to occur within the boundaries of the SJRWMD. Following these determinations, the list of potential species and wetland communities was modified and tables of rare species by natural wetland community were produced, both on an county by county and on a District-wide basis. In these tables, those rare species which were also endemic to Florida were listed in bold type and those natural wetland

communities that had no county record in the FNAI database, but that were expected to be present, were listed in italics.

A separate table was generated listing the FNAI, federal, and state endangerment ranks for each rare wetland species within the District, along with their seasonal distribution and, in some cases, habitat notes to supplement the natural wetland community information. Seasonal distribution is given by the first (A) or second (B) half of the months when the species is present (animals) or most easily identified (plants). Likewise, a table was generated listing descriptions and FNAI ranks of all natural wetland communities found within the District. Riverine and lacustrine communities are differentiated primarily by physical features; for palustrine communities, dominant plant species, along with physical features, are included in the descriptions. Eleven of the communities are ranked S1 or S2 based on their low total acreage in the state.

A list of non-rare species that are strictly endemic to Florida and are found in natural wetland communities within the SJRWMD was compiled from information in a report published by FNAI (Muller et al. 1989). In addition to the latter, other published and Internet references were consulted by FNAI scientists in assigning these species to the District and to natural wetland communities (Conant 1975, Hall 1981, Lee at al. 1980, Whitaker 1996, Wunderlin 1998, Wunderlin and Hansen 2000). The information derived from these sources was used to generate a table of non-rare endemic species by natural wetland community for the SJRWMD.

Results. Specific county and District tables produced for this report can be referenced in the "List of Tables" (see page ix).

A total of 128 rare wetland species potentially occur within the SJRWMD, including 18 species of fish, 6 amphibians, 7 reptiles, 30 birds, 10 mammals and 57 plants. The number of these rare species that are endemic to Florida totaled 27, including 1 species of fish, 1 reptile, 2 birds, 3 mammals, and 20 plants.

Endemic species not considered rare enough to be listed by FNAI that are found in natural wetland communities within the SJRWMD totaled 35, including 4 species of fish, 3 amphibians, 4 reptiles, 5 mammals, and 19 plants. The total number of Florida endemic species both rare and non-rare in natural wetland communities in the District was 62.

These rare and endemic species occurred in 30 different wetland communities, as defined by FNAI (Florida Natural Areas Inventory and Florida Department of Environmental Protection 1990), found within the SJRWMD. Wetland communities favored by many rare species included Blackwater Streams for fish; isolated Depression Marshes and Dome Swamps for amphibians; all marshes and swamps along with Hydric Hammocks and Wet Prairies for birds; and Depression Marshes, Hydric Hammocks, Seepage Slopes, Wet Flatwoods and Wet Prairies for plants.

A comparison of the number of rare species in SJRWMD wetlands that fall into different categories of endangerment as defined by FNAI, the State of Florida and the U.S. Fish and Wildlife Service is given below (Table 1).

Table 1. Number of rare species in wetland habitats in SJRWMD in different status categories as determined by FNAI, the state of Florida, and the U.S. Fish and Wildlife Service.

	Florida Natural Areas Inventory	State of Florida	U. S. Fish and Wildlife Service
Total number of rare species listed for wetland habitats in SJRWMD	128	76	32
Number of species with **highest global** endangerment rank	14[1]	NA	9[2]
Number of species with **second highest global** endangerment rank	21[3]	NA	4[4]
Total number of species with **two highest global** endangerment ranks	35	NA	13
Number of species with **highest state-wide** endangerment rank	27[5]	42[2]	NA
Number of species with **second highest state-wide** endangerment rank	33[6]	14[4]	NA
Total number of species with **two highest state-wide** endangerment ranks	60	56	NA

1 - ranked as G1, G1G2, T1 or T1T2; *2* - ranked as endangered; *3* - ranked as G2, G2G3, T2 or T2T3; *4* - ranked as threatened; *5* - ranked as S1 or S1S2; *6* - ranked as S2 or S2S3; NA – not applicable

While FNAI and the state of Florida agree fairly well on the total number of endangered and threatened species on a state-wide basis in SJRWMD wetlands (60 and 56 respectively), the larger difference is between FNAI and the U.S. Fish and Wildlife Service on the total number of endangered and threatened species considered on a global basis in SJRWMD wetlands (35 and 13 respectively). As mentioned above, this difference is due in part to the time required for a species to go through the federal listing process.

Discussion. Although the 128 species listed are all of concern and their endangerment rankings give an idea of the priority to be accorded to preserving their populations, we wish to highlight those species all or most of whose ranges are encompassed within the SJRWMD as being particularly sensitive to actions taken within the District. In addition, we will indicate those species in need of further surveys to elucidate their occurrence within the District.

Among rare fish species, the SJRWMD includes the entire range of the endemic Lake Eustis pupfish (*Cyprinodon variegatus hubbsi*) and the peninsular range (middle St. Johns River drainage) of the bluenose shiner (*Pteronotropis welaka*), which also has a disjunct population in the Florida panhandle. The St. Johns River also encompasses much or all of the Florida ranges of the three anadromous fish, shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and sea lamprey (*Petromyzon marinus*). Records of the two

sturgeon species in the St Johns River system are spotty and their populations need to be systematically monitored to determine their status in Florida (particularly if the Rodman Dam on the Oklawaha River is removed).

Among the amphibians and reptiles, the SJRWMD encompasses the peninsular range of the striped newt (*Notophthalmus perstriatus*), which also has a disjunct population in the Florida panhandle, and is an important part of the range of the gopher frog (*Rana capito*). It also is an important part of the Florida range of three northern species, the carpenter frog (*Rana virgatipes*), the many-lined salamander (*Sterochillus marginatus*) and the timber rattlesnake (*Crotalus horridus*). Species needing surveys within the District include the striped newt, the flatwoods salamander (*Ambystoma cingulatum*) and the tiger salamander (*Ambystoma tigrinum*).

Among birds, the marshes of the upper St. Johns River provide important habitat for the Florida sandhill crane (*Grus canadensis floridanus*), the woodstork (*Mycteria americana*), the black rail (*Laterallus jamaicensis*), and the snail kite (*Rostrhamus socialbilis plumbeus*), the latter especially during droughts. The District also encompasses major populations of bald eagles (*Haliaeetus leucocephalus*) and nesting areas for the swallow-tailed kite (*Elanoides forficatus*). The Econlockhatchee and Ocklawaha drainages are important for limpkins (*Aramus guarauna*). Especially in need of a survey within the District is the black rail.

Among mammals, the District encompasses major populations of Florida black bears (*Ursus americanus floridanus*) in Osceola and Ocala National Forests and manatees (*Trichechus manatus*) in Brevard and Indian River counties. The marshes of the upper St. Johns River provide extensive habitat for the round-tailed muskrat (*Neofiber allenii*). In need of survey in the District is the big-eared bat (*Corynorhinus rafinesquii*), which is uncommon, and has a spotty distribution, throughout the state.

Among plants, the SJRWMD encompasses all, or a major part, of the entire range of Bartram's ixia (*Calydorea coelestina*), Okeechobee gourd (*Curcubita okeechobeensis* ssp. *okeechobeensis*), lake-side sunflower (*Helianthus carnosus*), star anise (*Illicium parviflorum*), celestial lily (*Nemastylis floridana*), Florida willow (*Salix floridana*), and Ocala vetch (*Vicia ocalensis*). The District also encompasses the peninsular distribution of a number of species which also have disjunct populations in the Florida panhandle, including variable-leaved Indian plantain (*Arnoglossum diversifolium*), southern milkweed (*Asclepias viridula*), Chipola dye-flower (*Coreopsis integrifolia*), Chapman's rhododendron (*Rhododendron chapmanii*), West's flax (*Linum westii*) large-flowered grass-of- parnassus (*Parnassia grandiflora*), Thorne's beakrush (*Rhynchospora thornei*), and white-flowered wild petunia (*Ruellia noctiflora*). The District also contains the Florida portion of the range of the northward-ranging Florida toothache grass (*Ctenium floridanum*), purple balduina (*Balduina atropurpurea*) and pineland beakrush (*Rhynchospora punctata*).

Plant species most in need of a survey within SJRWMD are southern milkweed, purple balduina, Chipola dye-flower, Okeechobee gourd, Florida hasteola, lake-side sunflower, West's flax, pondspice (*Litsea aestivalis*), Thorne's beakrush, pineland beakrush, pinkroot (*Spigelia loganioides*), Ocala vetch, and rain lily (*Zephyranthes simpsonii*).

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APPENDIX 1
EXPLANATION OF FNAI GLOBAL AND STATE CONSERVATION RANKS

Florida Natural Areas Inventory (FNAI) defines an element as any rare or exemplary component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. FNAI assigns two ranks to each element found in Florida: the global rank, which is based on an element's worldwide status, and the state rank, which is based on the status of the element within Florida. Element ranks are based on many factors, including estimated number of occurrences, estimated abundance (for species and populations) or area (for natural communities), estimated number of adequately protected occurrences, range, threats, and ecological fragility.

GLOBAL RANK DEFINITIONS

G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or human factor.
G2	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or human factor.
G3	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals), or found locally in a restricted range, or vulnerable to extinction from other factors.
G4	Apparently secure globally (may be rare in parts of range).
G5	Demonstrably secure globally.
GH	Occurred historically throughout its range, but has not been observed for many years.
GX	Believed to be extinct throughout range.
GXC	Extirpated from the wild but still known from captivity or cultivation.
G#?	Rank uncertain (e.g., G2?).
G#G#	Range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species, and the T portion refers to the subgroup; T# has same definition as G#.
G#Q	Ranked as species but there is some question as to whether it is a valid species.
G#T#Q	Same as above, but validity as subspecies or variety is questioned.
GU	Global rank unknown; due to lack of information, no rank or range can be assigned.
G?	Temporarily not ranked.

STATE RANK DEFINITIONS

State ranks (S#) follow the same system and have the same definitions as global ranks, except they apply only to Florida, with the following additions:

SA	Accidental in Florida and not part of the established biota.
SE	Exotic species established in Florida (may be native elsewhere in North America).
SX	Believed to be extirpated from state.

APPENDIX 2

EXPLANATION OF FEDERAL AND STATE LEGAL STATUSES

Provided by FNAI for information only.

For official definitions and lists of protected species, consult the relevant state or federal agency.

FEDERAL LEGAL STATUSES

Definitions derived from U.S. Endangered Species Act of 1973, Sec. 3. Note that the federal status given by FNAI refers only to Florida populations and that federal status may differ elsewhere.

- LE Endangered: species in danger of extinction throughout all or a significant portion of its range.
- LT Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range.
- E(S/A) Endangered due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
- T(S/A) Threatened due to similarity of appearance (see above).
- PE Proposed for listing as Endangered species.
- PT Proposed for listing as Threatened species.
- C Candidate species for which federal listing agencies have sufficient information on biological vulnerability and threats to support proposing to list the species as Endangered or Threatened.
- XN Non-essential experimental population.
- MC Not currently listed, but of management concern to USFWS.
- N Not currently listed, nor currently being considered for listing as Endangered or Threatened.

FLORIDA LEGAL STATUSES

Animals: Definitions derived from "Florida's Endangered Species and Species of Special Concern, Official Lists" published by Florida Fish and Wildlife Conservation Commission, 1 August 1997, and subsequent updates.

- LE Endangered: species, subspecies, or isolated population so few or depleted in number or so restricted in range that it is in imminent danger of extinction.
- LT Threatened: species, subspecies, or isolated population facing a very high risk of extinction in the future.
- LS Species of Special Concern is a species, subspecies, or isolated population that is facing a moderate risk of extinction in the future.
- PE Proposed for listing as Endangered.
- PT Proposed for listing as Threatened.
- PS Proposed for listing as Species of Special Concern.

N Not currently listed, nor currently being considered for listing.

Plants: Definitions derived from Sections 581.011 and 581.185(2), Florida Statutes, and the Preservation of Native Flora of Florida Act, 5B-40.001. FNAI does not track all state-regulated plant species; for a complete list of state-regulated plant species, call Florida Division of Plant Industry, 352-372-3505 or see http://doacs.state.fl.us/~pi/5b-40.htm#.0055.

LE Endangered: species of plants native to Florida that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue; includes all species determined to be endangered or threatened pursuant to the U.S. Endangered Species Act.

LT Threatened: species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in number as to cause them to be Endangered.

PE Proposed for listing as Endangered.

PT Proposed for listing as Threatened.

N Not currently listed, nor currently being considered for listing.