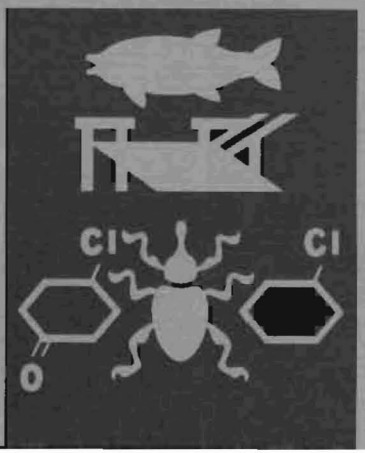

MISCELLANEOUS PAPER A-82-5

LARGE-SCALE OPERATIONS MANAGEMENT TEST OF USE OF THE WHITE AMUR FOR CONTROL OF PROBLEM AQUATIC PLANTS

SELECTED LIFE HISTORY INFORMATION OF ANIMAL SPECIES ON LAKE CONWAY, FLORIDA

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This report summarizes, in tabular form, life history information for animal species identified at Lake Conway, Orlando, Fla. A total of 180 animal species were sighted or collected on Lake Conway during the period January 1976 through September 1977. This period coincides with the baseline period of the Lake Conway Large-Scale Operations Management Test to document the effects of the introduction of the white amur fish for control of the problem aquatic plant hydrilla. Information developed in this report will

(Continued)

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20. ABSTRACT (Continued).

be used for subsequent analysis of the effects of the white amur on the Lake Conway ecosystem.

Preface

The work described in this volume was performed by the Aquatic Plant Control Research Program (APCRP) of the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss. The work was sponsored by the U. S. Army Engineer District, Jacksonville, and by the Office, Chief of Engineers, U. S. Army.

This report summarizes life history and fish and wildlife management information for animal species identified from Lake Conway, Orlando, Fla. Contractors performing field research for the Lake Conway Large-Scale Operations Management Test (LSOMT) either sampled or sighted 180 species during the period January 1976 through September 1977. This period coincides with the baseline period of the LSOMT. Information developed in this report will be used to document changes to the Lake Conway ecosystem as a result of the introduction of the white amur fish to control the nuisance aquatic plant hydrilla.

Life history and management information was collected and organized by Ms. Nancy J. Zittleman of the WES Environmental Laboratory (EL); the final report was written by Messrs. Randall R. Williams and Eugene G. Buglewicz, EL. The authors wish to acknowledge the efforts of the various scientists who were involved with the collection and identification of these organisms, and the assistance of Ms. Mary C. Landin, Environmental Resources Division, EL, who provided information on the location of avifauna nesting locations.

The work was monitored at WES in the Waterway Habitat and Monitoring Group (WHMG) by Messrs. John D. Lunz and Eugene G. Buglewicz, Principal Investigators for the LSOMT, and Dr. Thomas D. Wright, Chief, WHMG, and was under the general supervision of Mr. Bob O. Benn, Chief, Environmental Systems Division (ESD). Mr. J. Lewis Decell was Program Manager of the APCRP. The ESD and APCRP are a part of the EL, Dr. John Harrison, Chief.

Commanders and Directors of WES during the period were COL Nelson P. Conover, CE, and COL Tilford C. Creel, CE. Technical Director was Mr. F. R. Brown.

This report should be cited as follows:

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Contents

Conversion Factors, U. S. Customary to Metric (SI) Units of Measurement

U. S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	By	To Obtain
acres	4046.873	square metres
Fahrenheit degrees	5/9	Celsius degrees or Kelvins*
feet	0.3048	metres
inches	25.4	millimetres
miles (U. S. statute)	1.609347	kilometres
yards	0.9144	metres

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use $K = (5/9)(F - 32) + 273.15$.

LARGE-SCALE OPERATIONS MANAGEMENT TEST OF USE OF THE WHITE AMUR FOR CONTROL OF PROBLEM AQUATIC PLANTS

Selected Life History Information
of Animal Species on
Lake Conway, Florida

Introduction

Background

1. The Lake Conway Large-Scale Operations Management Test (LSOMT) is a 5-year field research effort to describe the ability of the white amur (*Ctenopharyngodon idella*), a herbivorous fish, to control the nuisance aquatic plant hydrilla and to document the ecological consequences introduction of this exotic species will have on the lake's ecosystem.

2. To differentiate between the effects of the white amur and other natural or man-made events that occur in the Lake Conway study area, an investigation entitled "A Characterization of Cultural Development Around Lake Conway Affecting the Large-Scale Operation Management Test," was initiated during 1979 to document those environmental alterations occurring at Lake Conway that could be attributed to the white amur but could actually be caused by human activities in the lake basin. These activities may include, for example, elimination of littoral vegetation through the construction of sand beaches or home building activities, increased urbanization in the lake watershed area, and stormwater diversion.

Purpose

3. The purpose of this report is to summarize, in tabular form, key life history and general fish and wildlife management information on animal species inhabiting the Lake Conway study area. Information herein concentrates on those aspects of habitat that are required by the organisms for normal feeding, resting, and reproduction or nesting cover.

This information will be used to summarize habitat features in the previously described investigation and to provide a data base for the final analysis of the LSOMT research results.

Methods

4. A species list of 180 mammals, birds, fish, and herpetofauna was obtained from the LSOMT baseline data contractor reports which covered the period January 1976 through September 1977. A search of applicable data bases and literature sources for selected life history information was made and tabulated for each organism.

5. Tabulation of data includes the following information: common name; legal status; commercial or recreational value; management potential; sensitivity to human disturbance; food preferences; feeding habitat; reproductive habitat; and resting habitat.

6. Appendix A lists the species into appropriate categories of fish, birds, mammals, and herpetofauna. Each species is assigned a "species number" which should be used when interpreting Appendix C.

7. Appendix B tabulates the following information for each Lake Conway species: "a" lists the common name; "b" states whether or not the species is described on Federal or State threatened or endangered species list; "c" notes whether the species has commercial or recreational value on Lake Conway; "d" is a judgment statement as to whether or not the species is amenable to population control through intensive management practices; "e" states whether or not the species is sensitive to human disturbance; "f" lists food preferences; "g" provides a summary statement of the type of habitat required for feeding; "h" summarizes reproductive habitat requirements; and "i" provides habitat information not covered in items "f" through "h," and/or describes the type of habitat required for resting. For those instances where life history or management data are not available, blanks occur after the appropriate letter.

8. Appendix C summarizes the feeding, resting, and nesting preferences or reproductive habitat requirements for each organism.

9. The Bibliography section lists pertinent literature used to obtain information for this report.

Bibliography

Bailey, R. M., et al. 1970. "A List of Common and Scientific Names of Fishes from the United States and Canada," Special Publication No. 6, American Fisheries Society, Washington, D. C.

Barbour, R. W., and Davis, W. H. 1974. Mammals of Kentucky, University Press of Kentucky, Lexington.

Bellrose, F. C. 1976. Ducks, Geese, and Swans of North America, Stackpole Books, Harrisburg.

Blaker, D. 1969. "Behavior of the Cattle Egret Ardeola Ibis," Ostrich, Vol 40, No. 3, pp 75-129.

Burt, W. H., and Grossenheider, R. P. 1964. A Field Guide to the Mammals, 2nd ed., Riverside Press, Cambridge.

Carlander, K. D. 1969. Handbook of Freshwater Fishery Biology, Vol I, Iowa State University Press, Ames.

_____. 1977. Handbook of Freshwater Fishery Biology, Vol II, Iowa State University Press, Ames.

Carr, A. 1952. Handbook of Turtles: The Turtles of the United States, Canada, and Baja California, Vail-Ballou Press, Ithaca.

Chaney, A. H., et al. 1978. "Use of Dredged Material Islands by Colonial Seabirds and Wading Birds in Texas," Technical Report D-78-8, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

Cochran, D. M., and Goin, C. J. 1970. The New Book of Reptiles and Amphibians, J. G. Putnam's Sons, New York.

Collins, H. H. 1959. Complete Field Guide to American Wildlife; East, Central and North, Harper and Row, New York.

Cook, F. A. 1959. Freshwater Fishes in Mississippi, Vol I, Hederman Brothers, Jackson, Miss.

_____. 1969. Freshwater Fishes in Mississippi, Vol II, Hederman Brothers, Jackson, Miss.

Douglas, N. H. 1974. Freshwater Fishes of Louisiana, Claitor's Publishing Division, Baton Rouge, La.

Eddy, S. 1969. How to Know the Freshwater Fishes, 2nd ed., William C. Brown, Dubuque.

Foster, N. R. 1978. Comparative Studies on the Biology of Killifish (*Pisces, Cyprinodontidae*), University of Microfilms International, Ann Arbor.

Godley, J. S., McDiarmad, R. W., Bancroft, G. T. 1981. "Large-Scale Operations Management Test of Use of the White Amur for Control of Problem Aquatic Plants; Report 1, Baseline Studies, Volume V: The Herpetofauna of Lake Conway, Florida," Technical Report A-78-2, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

Grzimek, B. 1975. Animal Life Encyclopedia, Vol 6, Van Nostrand Reinhold, New York.

Guillory, V. 1979. "Large-Scale Operations Management Test of Use of the White Amur for Control of Problem Aquatic Plants; Report 1, Baseline Studies; Volume II: The Fish, Mammals, and Waterfowl of Lake Conway, Florida," Technical Report A-78-2, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

Hilderbrand, S. F., and Schroeder, W. C. 1972. Fishes of Chesapeake Bay, TFH Publications, Neptune, N. J.

Kushlan, J. A. 1978. "Commensalism in the Little Blue Heron," The Auk, Vol 95, pp 677-681.

Landin, M. C. 1978. "Development and Management of Avian Habitat on Dredged Material Islands," Technical Report DS-78-18, U. S. Army Engineer Waterways Eperiment Station, CE, Vicksburg, Miss.

Larimore, R. W. 1957. Ecological Life History of the Warmouth (*Centrarchidae*)," Illinois Natural History Survey Bulletin, Vol 27, Art. I.

Lowery, G. H., Jr. 1974. The Mammals of Louisiana and Its Adjacent Waters, Kingsport Press, Kingsport, Tenn.

Martin, A. C., Zim, H., and Nelson, A. L. 1961. American Wildlife and Plants, A Guide to Wildlife Food Habits, Dover Publications, New York.

Morris, P. A. 1974. An Introduction to the Reptiles and Amphibians of the United States, Dover Publications, New York.

Mount, R. H. 1975. The Reptiles and Amphibians of Alabama, Auburn Printing, Auburn, Ala.

Murie, O. J. 1975. A Field Guide to Animal Tracks, Houghton Mifflin Co., Boston.

Pflieger, W. L. 1975. The Fishes of Missouri, Western Publishing Co., Jefferson City, Mo.

Pough, R. H. 1951. Audubon Waterbird Guide: Water, Game, and Large Land Birds, Doubleday, Garden City, New York.

Schreiber, R. W., and Schreiber, E. A. 1978. "Colonial Bird Use and Plant Succession on Dredged Material Islands in Florida," Technical Report D-78-14, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

Schwartz, C. W., and Schwartz, E. R. 1968. The Wild Mammals of Missouri, Smith-Grieves, Kansas City, Mo.

Schweitzer, D. L., Cushwa, C. T., and Hoekstra, T. W. 1978. "The 1979 National Assessment of Wildlife and Fish: A Progress Report," Transactions of the 43rd North American Wildlife and Natural Resources Conference, Phoenix, Arizona, March 19-22, 1978, pp 166-273.

United States Department of the Interior, U. S. Fish and Wildlife Service, Ecological Services. 1979. "Habitat Evaluation Procedures," Review Copy, Fort Collins, Colo.

United States Department of the Interior, U. S. Fish and Wildlife Service, Region 4. Periodically updated. "Endangered and Threatened Species of the Southeastern United States," Atlanta, Ga.

Weller, M. W. 1961. "Breeding Biology of the Least Bittern," The Wilson Bulletin, Vol 73, No. 1.

Wright, A. H., and Wright, A. A. 1957. Handbook of Snakes of the United States and Canada, Vol I, Cornell University, Ithaca.

_____. 1957. Handbook of Snakes of the United States and Canada, Vol II, Cornell University, Ithaca.

Appendix A: Species List, Lake Conway, Florida

Species No.	Common Name	Scientific Name
	Fish Species	
1	Longnose gar	*Lepisosteus osseus*
2	Florida gar	*Lepisosteus platyrhincus*
3	Bowfin	*Amia calva*
4	American eel	*Anguilla rostrata*
5	Gizzard shad	*Dorosoma cepedianum*
6	Threadfin shad	*Dorosoma petenense*
7	Redfin pickerel	*Esox americanus*
8	Chain pickerel	*Esox niger*
9	Golden shiner	*Notemigonus crysoleucas*
10	Coastal shiner	*Notropis petersoni*
11	Lake chubsucker	*Erimyzon sucetta*
12	White catfish	*Ictalurus catus*
13	Yellow bullhead	*Ictalurus natalis*
14	Brown bullhead	*Ictalurus nebulosus*
15	Channel catfish	*Ictalurus punctatus*
16	Tadpole madtom	*Noturus gyrinus*
17	Golden topminnow	*Fundulus chrysotus*
18	Seminole killifish	*Fundulus seminolis*
19	Flagfish	*Jordanella floridae*
20	Bluefin killifish	*Lucania goodei*
21	Mosquitofish	*Gambusia affinis*
22	Least killifish	*Heterandria formosa*
23	Sailfin molly	*Poecilia latipinna*
24	Brook silverside	*Labidesthes sicculus*
25	Everglades pygmy sunfish	*Elassoma evergladei*
26	Blue-spotted sunfish	*Enneacanthus gloriosus*
27	Redbreast sunfish	*Lepomis auritus*
28	Warmouth	*Lepomis gulosus*
29	Redear sunfish	*Lepomis microlophus*
30	Spotted sunfish	*Lepomis punctatus*

Species No.	Common Name	Scientific Name
	Fish Species (Continued)	
31	Largemouth bass	*Micropterus salmoides*
32	Black crappie	*Pomoxis nigromaculatus*
33	Dollar sunfish	*Lepomis marginatus*
34	Bluegill	*Lepomis macrochirus*
35	Swamp darter	*Etheostoma fusiforme*
	Bird Species	
1	Common loon	*Gavia immer*
2	Pied-billed grebe	*Podilymbus podiceps*
3	Horned grebe	*Podiceps auritus*
4	Double-crested cormorant	*Phalacrocorax auritus*
5	Water turkey	*Anhinga anhinga*
6	Great blue heron	*Ardea herodias*
7	Green heron	*Butorides virescens*
8	American (Great) egret	*Casmerodius albus*
9	Snowy egret	*Leucoployx thula*
10	Little blue heron	*Florida caerulea*
11	Louisiana heron	*Hydranassa tricolor*
12	Least bittern	*Ixobrychus exilis*
13	American bittern	*Botaurus lentiginosus*
14	Cattle egret	*Bubulcus ibis*
15	Black-crowned night heron	*Nycticorax nycticorax*
16	White ibis	*Eudocimus albus*
17	Wood ibis (Stork)	*Mycteria americana*
18	Wood duck	*Aix sponsa*
19	Mallard duck	*Anas platyrhynchos*
20	Lesser scaup	*Aythya affinis*
21	Redhead duck	*Aythya americana*
22	Canvasback	*Aythya valisineria*
23	Baldpate (American wigeon)	*Mareca americana*

Species No.	Common Name	Scientific Name
	Bird Species (Continued)	
24	Ruddy duck	*Oxyura jamaicensis*
25	Ring-necked duck	*Aythya collaris*
26	Blue-winged teal	*Anas discors*
27	Bald eagle	*Haliaeetus leucocephalus*
28	Osprey	*Pandion haliaetus*
29	Limpkin	*Aramus guarauna*
30	Common (American) coot	*Fulica americana*
31	Common (Florida) gallinule	*Gallinula chloropus*
32	Purple gallinule	*Porphyrula martinica*
33	Sora rail	*Porzana carolina*
34	Killdeer	*Charadrius vociferus*
35	Wilson's (Common) snipe	*Capella gallinago*
36	Lesser yellowlegs	*Totanus flavipes*
37	Least sandpiper	*Erolia minutilla*
38	Black tern	*Chilidonias niger*
39	Herring gull	*Larus argentatus*
40	Least tern	*Sterna albifrons*
41	Forster's tern	*Sterna forsteri*
42	Ring-billed gull	*Larus delawarensis*
43	Common tern	*Sterna hirundo*
44	Bonaparte's gull	*Larus philadelphia*
45	Royal tern	*Thalasseus maximus*
46	Belted kingfisher	*Megaceryle alcyon*
47	Barn swallow	*Hirundo rustica*
48	Tree shallow	*Iridoprocne bicolor*
49	Purple martin	*Progne subis*
50	Fish crow	*Corvus ossifragus*
51	Red-winged blackbird	*Agelaius phoeniceus*
52	Boat-tailed grackle	*Cassidix mexicanus*
53	Common (Purple) grackle	*Quiscalus quiscula*

Species No.	Common Name	Scientific Name
	Bird Species (Continued)	
54	Glossy ibis	*Plegadis falcinellus*
	Mammal Species	
1	Virginia opossum	*Didelphis virginiana*
2	Marsh rabbit	*Sylvilagus palustris*
3	Florida water rat	*Neofiber alleni*
4	Rice rat	*Oryzomys palustris*
5	Common (Hispid) cotton rat	*Sigmodon hispidus*
6	Northern racoon	*Procyon lotor*
7	Neartic river otter	*Lutra canadensis*
	Herpetofauna Species	
1	Florida cricket frog	*Acris gryllus*
2	American alligator	*Alligator mississippiensis*
3	Two-toed Congo eel	*Amphiuma means*
4	Southern toad	*Bufo terrestris*
5	Common snapping turtle	*Chelydra serpentina*
6	Cooter	*Chrysemys floridana*
7	Florida river turtle	*Chrysemys nelsoni*
8	Black racer	*Coluber constrictor*
9	Eastern chicken turtle	*Deirochelys reticularia*
10	Dwarf salamander	*Eurycea quadridigitata*
11	Eastern mud snake	*Farancia abacura*
12	Eastern narrow-mouthed toad	*Gastrophryne carolinensis*
13	Green tree frog	*Hyla cinerea*
14	Pine woods tree frog	*Hyla femoralis*
15	Barking tree frog	*Hyla gratiosa*
16	Squirrel tree frog	*Hyla squirella*
17	Striped mud turtle	*Kinosternon bauri*
18	Mud turtle	*Kinosternon subrubrum*

Species No.	Common Name	Scientific Name
	Herpetofauna Species (Continued)	
19	Little grass frog (Least tree frog)	*Limnaoedus ocularis*
20	Great water snake	*Nerodia cyclopion*
21	Southern water snake	*Nerodia fasciata*
22	Pig frog	*Rana grylio*
23	Striped swamp snake	*Regina alleni*
24	Greater siren	*Siren lacertina*
25	Common musk turtle	*Sternotherus odoratus*
26	Eastern ribbon snake	*Thamnophis saurita*
27	Eastern garter snake	*Thamnophis sirtalis*
28	Florida softshell	*Trionyx ferox*

Appendix B: Life History and Management Information for Species Identified from Lake Conway, Florida

Fish Species No.	Scientific Name	Management Information*
1	*Lepisosteus osseus*	a. Longnose gar
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Essentially carnivorous
		g.
		h. In Florida, spawns in shallow water March through August with the peak in April
		i. Inhabits sluggish pools, backwaters, and oxbows along large moderately clear streams. Adults are found in larger, deeper pools, while the young are found in shallow backwaters, often around thick growths of aquatic vegetation. Prefers quiet lakes and pools where they remain much of the time around logs and debris
2	*Lepisosteus platyrhincus*	a. Florida gar
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Fish, crustaceans, and insects
		g.
		h. Spawns mostly in April and May, but spawning may continue into October. Eggs are deposited at random in shallow water

* The information on commercial and recreational value applies to Lake Conway only.

Fish Species No.	Scientific Name	Management Information
2 (Continued)	*Lepisosteus platyrhincus*	i. Inhabits warm, sluggish waters. Can live in very stagnant waters
3	*Amia calva*	a. Bowfin
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Fish, crayfish, insects, molluscs, earthworms, frogs, and leeches
		g. Often feeds at night
		h. Nests in colonies in sheltered areas. Makes nest by clearing plants and removing soil to expose roots to which the eggs are attached
		i. Avoids swift current or excessive turbidity. In lowlands can be found in swamps, sloughs, borrow pits, ditches, and abandoned stream channels. Occurs in sluggish rivers and lakes, generally in clear water with abundant vegetation. *Amia calva* can survive very stagnant water due to its ability to surface and 'breathe' the air. Active at twilight and dawn
4	*Anguilla rostrata*	a. American eel
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Insects, fish, crayfish, crustaceans, mollusks, annelids, echinoderms, and eelgrass

Fish Species No.	Scientific Name	Management Information
4 (Continued)	*Anguilla rostrata*	g.
		h. Breeds in the Sargasso Sea above Cuba
		i. Males do not move far inland, but remain in fresh or brackish waters near river mouths. Females penetrate freshwater rivers almost to their sources
5	*Dorosoma cepedianum*	a. Gizzard shad
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Plankton, occasionally oligochaetes, and small shad
		g.
		h. Peak of spawning in Florida is from late March to early April
		i. Occurs in fresh and brackish waters, as well as land-locked lakes and ponds. Lives in quiet water habitats and avoids streams that lack large, permanent pools
6	*Dorosoma petenense*	a. Threadfin shad
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Plankton, *Chaoborus*, and chironomids
		g.

Fish Species No.	Scientific Name	Management Information
6 (Continued)	*Dorosoma petenense*	h. Spawns in schools under brush and floating logs, eggs clinging to the brush. May also spawn in open water
		i. Very sensitive to low temperatures; die-offs will occur below 45°F.** Permanent resident of shoal waters
7	*Esox americanus*	a. Redfin pickerel
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population would increase little if at all
		e. Not sensitive
		f. Fish, tadpoles, crustaceans, and insects
		g.
		h. Spawns in spring in shallow water; the eggs are deposited randomly
		i. Habitats are characterized by clear water, little current, and thick growths of aquatic vegetation
8	*Esox niger*	a. Chain pickerel
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population would increase little if at all
		e. Not sensitive

** A table of factors for converting U. S. customary units of measurement to metric (SI) is presented on page 4 of the main text.

Fish Species No.	Scientific Name	Management Information
8 (Continued)	*Esox niger*	f. Smaller chain pickerel (<100 mm) feed chiefly on invertebrates while the larger feed on fish, frogs, crayfish, and snakes
		g. Moves to shallow water at night and back to deeper water during the day
		h. Spawns in spring, randomly scattering eggs in shallow water. Eggs are laid in glutinous strings which tend to adhere to vegetation
		i. Inhabits clear, quiet waters where aquatic vegetation is abundant. The typical habitat is slow moving or standing water with a muddy bottom and abundant plant and forage fish supply
9	*Notemigonus crysoleucas*	a. Golden shiner
		b. Not on State or Federal threatened or endangered lists
		c.
		d.
		e.
		f. Zooplankton, insect larvae, algae, fragments of higher plants, debris, amphipods, and mollusks
		g.
		h. Greater spawning success has been recorded when spawning in largemouth bass nests. Eggs are adhesive and scattered over vegetation

Fish Species No.	Scientific Name	Management Information
9 (Continued)	*Notemigonus crysoleucas*	i. Occurs in fresh or brackish waters, usually where vegetation is present. Characteristic of quiet water habitats; rare to streams with noticeable current. Tolerant of moderate turbidity, but thrives in clear, heavily vegetated water
10	*Notropis petersoni*	a. Coastal shiner
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f.
		g.
		h.
		i.
11	*Erimyzon sucetta*	a. Lake chubsucker
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f. Young chubsuckers 30-42 mm in length feed on copepods, cladocerans, and chironomids. Adults are bottom feeding and largely herbivorous
		g.
		h. Spawns in spring, "running" up small tributary streams. Nest is a cleaned area among gravel

Fish Species No.	Scientific Name	Management Information
11 (Continued)	*Erimyzon sucetta*	i. Reported found in brackish water and freshwater streams. Ascends streams to headwaters in cold weather. Also found in clear, quiet pools having submerged vegetation and bottoms composed of sand or silt mixed with organic debris
12	*Ictalurus catus*	a. White catfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational and commercial
		d. Unknown management potential
		e. Not sensitive
		f. Fish, fish eggs, pondweeds, and aquatic insects
		g.
		h.
		i. Lives in fresh to slightly brackish waters, in areas with some current and mud bottom
13	*Ictalurus natalis*	a. Yellow bullhead
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Feeds on fish, crustaceans, and insects
		g.
		h. Nests in waters 0.5 to 2 m deep
		i. Avoids strong current. Found in quiet, heavily vegetated backwaters and overflow pools with clear water and shallow portions of ponds and lakes

Fish Species No.	Scientific Name	Management Information
14	*Ictalurus nebulosus*	a. Brown bullhead
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Fry and fingerlings up to 75 mm: zooplankton and chironomids; adults: insects, fish, fish eggs, mollusks, and plants
		g. Nocturnal bottom feeders
		h. Spawning habitats have shallow water with firm mud and muck to gravel bottoms. Spawns from March to May in Florida
		i. Prefers quiet, clear waters with moderate or large amounts of submerged aquatic vegetation. Thrives in clear, cooler water of the larger lakes. Preferred bottom substrate consists of organic muds to pebbles
15	*Ictalurus punctatus*	a. Channel catfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational and commercial
		d. Unknown management potential
		e. Not sensitive
		f. Omnivorous, including terrestrial and aquatic insects, macrocrustaceans, fish, seeds, vascular plants, and filamentous algae
		g.
		h. Spawning takes place under overhanging ledges, hollow logs, or in similarily sheltered places

Fish Species No.	Scientific Name	Management Information
15 (Continued)	*Ictalurus punctatus*	i. Occurs in a variety of habitats, especially characteristic of large streams having low to moderate gradients. Adults are found in larger pools in deep water or under cover such as logs
16	*Noturus gyrinus*	a. Tadpole madtom
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f. Cladocera, ostracods, chironomids, and debris
		g.
		h.
		i. Found in clear to moderately turbid waters with little current and an abundance of submerged plants or accumulations of organic debris for cover
17	*Fundulus chrysotus*	a. Golden topminnow
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f. Wolffia, insects, and other crustaceans
		g.
		h.

Fish Species No.	Scientific Name	Management Information	
17 (Continued)	*Fundulus chrysotus*	i.	Inhabits clear, quiet pools and backwaters where submerged aquatic plants are abundant. Characteristic of eutrophic waters, it occurs in shallow areas along lakeshores and in marshes with thick growths of aquatic vegetation
18	*Fundulus seminolis*	a.	Seminole killifish
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Unknown management potential
		e.	Not sensitive
		f.	
		g.	Benthic feeding on fine sand bottom
		h.	
		i.	Inhabits fresh to brackish waters of Florida lakes and streams. Common near the shore of large lakes in weed-filled shallow areas
19	*Jordanella floridae*	a.	Flagfish
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Unknown management potential
		e.	Not sensitive
		f.	Largely vegetarian in diet
		g.	
		h.	
		i.	Favors quiet, shallow, weedy, eutrophic areas of fresh to slightly brackish water
20	*Lucania goodei*	a.	Bluefin killifish

Fish Species No.	Scientific Name	Management Information
20 (Continued)	*Lucania goodei*	b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f.
		g. Bottom feeding
		h.
		i. Usually found in clear waters associated with submerged aquatic vegetation
21	*Gambusia affinis*	a. Mosquitofish
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f. Mosquito larvae and pupae, copepods, algae, and small fish
		g. Shore vegetation and debris
		h. Spawns from May to September
		i. Inhabits still waters and is found in great abundance among shore vegetation and debris. Occurs in shallow marginal areas where the water is warm and there is considerable aquatic vegetation or other cover
22	*Heterandria formosa*	a. Least killifish
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive

Fish Species No.	Scientific Name	Management Information	
22 (Continued)	*Heterandria formosa*	f.	Feeds on insects and other small animal life
		g.	
		h.	
		i.	Basically a brackish water fish, only occasionally invading fresh water. Usually found in shallow sloughs or ponds
23	*Poecilia latipinna*	a.	Sailfin molly
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Unknown management potential
		e.	Not sensitive
		f.	Vegetarian and mud-eating; consumes insects such as mosquitoes
		g.	
		h.	
		i.	Inhabits fresh, brackish, and salt water. Is usually found in shallow sloughs and pools
24	*Labidesthes sicculus*	a.	Brook silverside
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Unknown management potential
		e.	Not sensitive
		f.	
		g.	
		h.	
		i.	Characteristic of clear, warm waters with no current. In lakes it is most abundant in coves and along the shore

Fish Species No.	Scientific Name	Management Information
25	*Elassoma evergladei*	a. Everglades pygmy sunfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Feeds on crustaceans and insects
		g.
		h.
		i. Found in the swamps of southern Georgia and Florida
26	*Enneacanthus gloriosus*	a. Blue-spotted sunfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Small crustaceans such as copepods, amphipods, and isopods; insects, worms, and some plants
		g.
		h.
		i. Inhabits sluggish water, especially with aquatic vegetation. Also found in brackish waters near the mouths of streams
27	*Lepomis auritus*	a. Redbreast sunfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive

Fish Species No.	Scientific Name	Management Information
27 (Continued)	*Lepomis auritus*	f. Insects (Cook 1959)**
		g.
		h. In Florida spawning occurs from April to June. Nests are usually in water 15-40 cm deep and in the shelter of a log or stump in sand or fine gravel
		i. Flourishes in a wide variety of ecological conditions from headwater streams to rivers and lakes along coastal plains
28	*Lepomis gulosus*	a. Warmouth
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Fish, aquatic insects, crustaceans
		g.
		h. Nests are built near a stump, a clump of vegetation, or other cover, at depths of 0.05-1.5 m. Nests on all substrates but sand
		i. Found in oxbow lakes and other overflow waters along the floodplains of streams. Exhibits a definite affinity for clear water and thick growths of submergent vegetation. Inhabits shallow mud bottom lakes and ponds and sluggish streams. Old tree stumps are common hiding places. Tolerance of turbidity is greater than that of other sunfishes

** Reference citations are included in the Bibliography located at the end of the main text.

Fish Species No.	Scientific Name	Management Information
29	*Lepomis microlophus*	a. Redear sunfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Insect larvae, snails, small clams, and crustaceans. Snails are the preferred food item
		g.
		h. In Florida spawning is from late February to October first. Nests are in water 45-90 cm deep or as much as 2 m deep, preferably in areas of waterlilies
		i. Thrives in warm, clear waters with no noticeable current and abundant aquatic plants. Congregates around logs, stumps, and brush
30	*Lepomis punctatus*	a. Spotted sunfish
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f.
		g.
		h. In Florida spawning is from early spring into November
		i. Occurs in quiet pools with aquatic plants or submerged logs
31	*Micropterus salmoides*	a. Largemouth bass
		b. Not on State or Federal threatened or endangered lists

Fish Species No.	Scientific Name	Management Information
31 (Continued)	*Micropterus salmoides*	c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Fish, crustaceans, aquatic and terrestrial insects, frogs, and salamanders (Carlander 1977)
		g.
		h. Spawning occurs from mid-December to April in Florida. Silt bottoms are avoided in spawning. Eggs are deposited in water not more than a few feet deep
		i. Characteristic of standing rather than flowing water; intolerant of excessive turbidity and siltation. Thrives in warm, moderately clear waters. Better adapted to small, shallow, warm lakes and sluggish streams with bottoms chiefly of mud, but often is found in deeper lakes with bottoms partially of mud and partially of sand and gravel. Requires cover such as standing or fallen timber, beds of aquatic vegetation, and artificial reefs
32	*Poxomis nigromaculatus*	a. Black crappie
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Unknown management potential
		e. Not sensitive
		f. Cladocerans, copepods, chironomid larvae, other aquatic insects, fish, and flying insects
		g.

Fish Species No.	Scientific Name	Management Information	
32 (Continued)	*Poxomis nigromaculatus*	h.	Nests are built on gravel, sand, or, rarely, on softer bottoms at depths of 25 cm to 6 m. Most spawning is at the base of vegetation from April to autumn
		i.	Found in clear water absent of noticeable current with abundant cover such as submerged timber or aquatic vegetation
33	*Lepomis marginatus*	a.	Dollar sunfish
		b.	Not on State or Federal threatened or endangered lists
		c.	Recreational but not commercial
		d.	Unknown management potential
		e.	Not sensitive
		f.	Aquatic insects
		g.	
		h.	
		i.	Prefers streams to lakes; tends to avoid muddy water
34	*Lepomis macrochirus*	a.	Bluegill
		b.	Not on State or Federal threatened or endangered lists
		c.	Recreational but not commercial
		d.	Unknown management potential
		e.	Not sensitive
		f.	Terrestrial and aquatic insects, crayfish, fish, algae, rotifers, cladocerans, and copepods
		g.	
		h.	Spawning occurs from February to October in Florida. Nests are built in water 15-120 cm deep over a variety of substrates with fine gravel

Fish Species No.	Scientific Name	Management Information
34 (Continued)	*Lepomis macrochirus*	preferred, in quiet areas free of aquatic plants
		i. Found in ponds, lakes, and quiet streams. Intolerant of continuous high turbidity and siltation. Thrives in warm, clear waters where aquatic plants or other cover is present
35	*Etheostoma fusiforme*	a. Swamp darter
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f.
		g.
		h.
		i. Commonly found in slow moving streams with a mud bottom and vegetative debris

Bird Species No.	Scientific Name	Management Information
1	*Gavia immer*	a. Common loon
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could increase little if at all
		e. Not sensitive
		f. Fish, crayfish, crabs, amphibians, insects, shellfish, and vegetation
		g.
		h. Overwinters in central Florida but does not breed there
		i.
2	*Podilymbus podiceps*	a. Pied-billed grebe
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Small fish, snails, small frogs, tadpoles, aquatic worms, leeches, water insects, and crayfish
		g. Dense stands of emergents close to shore provide feeding cover
		h. A year-round resident of central Florida and breeds there. Nests are concealed in shoreline vegetation such as cattails, bulrushes, reeds, and grasses. Nesting success, however, may depend upon water depth and distance from shore rather than vegetation. Of the nests 77% are built over water 75 cm or less deep, the average for successful nests being 60 cm. Average distance to the

Bird Species No.	Scientific Name	Management Information
2 (Continued)	*Podilymbus podiceps*	shore is 92 m, and the average distance to open water is 8 m. After hatching, broods remain in open water away from dense emergent vegetation
		i. Ponds, lakes, marshes, and sluggish streams bordered by dense emergent vegetation provide adequate resting cover. Avoids ponds with 100% open water
3	*Podiceps auritus*	a. Horned grebe
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Fish, insects, crayfish, tadpoles, shrimp, and some vegetable matter
		g.
		h. Overwinters in central Florida but does not breed there
		i. Frequents small ponds, sloughs, and shallow bays of large lakes
4	*Phalacrocorax auritus*	a. Double-crested cormorant
		b. Not on state or Federal threatened or endangered lists (USDI 1979). Protected by the Federal Migratory Bird Treaty (Landin 1978)
		c. Not recreational or commercial (USDI 1979)
		d. Population could be increased (USDI 1979)
		e. Human disturbance causes eggs to be broken and knocked from nests as adults leave area, besides leaving them vulnerable

Bird Species No.	Scientific Name	Management Information
4 (Continued)	*Phalacrocorax auritus*	to predators such as gulls (USDI 1979). Highly susceptible to human disturbance as nest is left early in approach
		f. Fish (perch, bullhead, crappie, carp, and stickleback) and salamanders (Pough 1951)
		g.
		h. A year-round resident of central Florida and breeds there. Nests are frequently made in the tops of vegetation, although, traditionally, little more than 1 m above the ground. Favorite nesting site is forest, although nests are found in shrub forest and on the ground
		i. Rocky ledges and trees are needed for roosting
5	*Anhinga anhinga*	a. Water turkey
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Birds Treaty
		c. Not recreational or commercial
		d. Unknown management potential
		e. Not sensitive
		f. Feeds on fish and other aquatic life
		g. Feeding sites are small bodies of quiet or sluggishly flowing fresh water
		h. A year-round resident of central Florida and breeds there. Arboreal, nesting in shrub forests and forests, beneath the forest canopy. The nest site may be around any type of water, but quiet, sheltered

Bird Species No.	Scientific Name	Management Information
5 (Continued)	*Anhinga anhinga*	waters are preferred and nests are more abundant around fresh water
		i. This bird is often found along cypress swamps and ricefields throughout the south. It is usually seen singly although it will soar in flocks
6	*Ardea herodias*	a. Great blue heron
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Birds Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Sensitive to regular disturbances
		f. Fish, snakes, insects, mice, frogs, eels, salamanders, and an occasional rail
		g. Needs shallow water in which to feed (Landin 1978)
		h. A year-round resident of central Florida and breeds there. Nests are usually placed in the tops of tall trees above surrounding canopy which are usually selected remote from human influences. Rookeries may be abandoned if disturbed on a regular basis. Will nest on man-made structures and on the ground, though primarily arboreal
		i. Frequents small streams, upland meadows, the shores of ponds and lakes, salt and fresh marshes, mudflats, sandbars, and shallow bays. Vegetation occurring in and along shallow waters and the shores of ponds,

Bird Species No.	Scientific Name	Management Information
6 (Continued)	*Ardea herodias*	reservoirs, marshes, and streams provide cover. Favorite resting habitats are forest, shrub forest, and shrub thicket although herb shrub and dense herb are also used
7	*Butorides virescens*	a. Green heron
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Birds Treaty
		c. Not commercial or recreational
		d. Population could be increased
		e. Not sensitive
		f. Eels, small bony fish (killifish, sunfish, catfish, goldfish, carp, bass, silversides), tadpoles, crayfish, frogs, earthworms, crickets, grasshoppers, and small snakes and mammals
		g. Forages in early morning or late afternoon among emergent vegetation or along soft, muddy borders of shallow water
		h. A year-round resident of central Florida and breeds there. Nests are platforms of twigs 3-6 m up in trees, but also may be built in bushes and on the ground. Favorite nesting sites are in herb shrub although dense herb, shrub thicket, shrub forest, and forest are sometimes used. Nests are built beneath canopy
		i. Most common along vegetated edges of open water and marshy or swampy areas. Reeds, cattails, and brushy thickets provide cover. Ideal habitat is wetland interspersed with woody

Bird Species No.	Scientific Name	Management Information
7 (Continued)	*Butorides virescens*	vegetation and some open shallow water, muddy shores, and no water fluctuations
8	*Casmerodius albus*	a. American (Great) egret
		b. Not on State or Federal threatened or endangered lists but of special concern
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. All types of aquatic animal life: frogs, snakes, crayfish, shrimp, aquatic insects, fish, crabs, and snails
		g.
		h. Usually nests in swamp woods or willow thickets with other herons, cormorants, and anhingas. Where possible, nests are placed 20-40 ft up in trees, but can be lower, especially if over water
		i. Frequents borders of sluggish streams and ponds as well as saltwater and freshwater marshes
9	*Leucophoyx thula*	a. Snowy egret
		b. Not on State or Federal threatened or endangered lists but of special concern. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Crustaceans, insects, frogs, fish, and other small aquatic life

Bird Species No.	Scientific Name	Management Information
9 (Continued)	*Leucophoyx thula*	g. Needs shallow water to feed. The shallow water of marshes and ponds, wet meadows, and fields are favorite feeding grounds
		h. A year-round resident of central Florida and breeds there. Favorite nest sites are shrub thicket and shrub forest, but are also found nesting in forest, herb shrub, and dense herb. Arboreal. Nests may be built 6-12 ft up in trees but are often 1-2 ft above water in matted marsh vegetation
		i.
10	*Florida caerulea*	a. Little blue heron
		b. Not on State or Federal threatened or endangered lists but of special concern. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Feeds on a higher proportion of crayfish, frogs, and insects--and fewer fish, than most herons
		g. Needs shallow water to feed. Is commensal with the white ibis because the ibis' feeding movements stir up potential prey and thus increase the herons' food intake.
		h. A year-round resident of central Florida and breeds there. Nests are built beneath the canopy, preferably in forests, shrub forests, and shrub thicket although herb shrub is

Bird Species No.	Scientific Name		Management Information
10 (Continued)	*Florida caerulea*		also utilized. Normal nest height is 3-8 ft, but they may be found up to 40 ft above water
		i.	
11	*Hydranassa tricolor*	a.	Louisiana heron
		b.	Not on State or Federal threatened or endangered lists. Of special concern, Florida Audubon Society. Protected by the Federal Migratory Bird Treaty
		c.	Not recreational or commercial
		d.	Population could be increased
		e.	Not sensitive
		f.	Killifish, minnows, and other shallow water fish; shrimp, crayfish, and insects
		g.	Needs shallow water to feed
		h.	Nests beneath the canopy, preferably in shrub thicket and shrub forest although forest, herb shrub, and dense herb are utilized. Arboreal, but occasionally nests on the ground
		i.	Occurs inland only in areas of extensive marshland
12	*Ixobrychus exilis*	a.	Least bittern
		b.	Not on State or Federal threatened or endangered lists but of special concern, Florida Audubon Society
		c.	Not recreational or commercial
		d.	Population could be increased
		e.	Not sensitive
		f.	Small fish and crustaceans, insects, frogs, and small mammals

Bird Species No.	Scientific Name	Management Information
12 (Continued)	*Ixobrychus exilis*	g.
		h. A year-round resident of central Florida and breeds there. Nests are built in emergent vegetation several feet tall, or on a bog or drift. A natural clump of the previous year's vegetation is needed as a base for the nest, which is usually placed 6-24 in. above water 3-38 in. deep
		i. Favors freshwater marshes with stands of cattails and other reedy plants. Young least bittern are preyed upon by turtles, other birds, and snakes
13	*Botaurus lentiginosus*	a. American bittern
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Frogs are preferred, but all small marsh animals and fish are eaten
		g.
		h. A year-round resident of central Florida and breeds there. Nests are built on the ground in edge emergents, usually in a marsh in a dense growth of tall cattails, grasses, or sedges
		i. Inhabits marshes, bogs, and salt or fresh wet meadows and seldom leaves the cover of dense beds of cattails or other rank growths. Shoreline wader
14	*Bubulcus ibis*	a. Cattle egret
		b. Not on State or Federal threatened or endangered lists.

Bird Species No.	Scientific Name	Management Information
14 (Continued)	*Bubulcus ibis*	Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Arthropoda, with Orthoptera predominating. Also eats frogs and lizards
		g. Feeds near cattle; commensal. Requires shallow water to feed
		h. Is a year-round resident of central Florida and breeds there. Favorite nesting sites are shrub forest and forest but nests are also found in herb shrub and shrub thicket. Primarily arboreal. Nests are constructed of materials taken from the nests of heronry associates. Entire nests of great blue herons, Louisiana herons, great egrets, snowy egrets, and roseate spoonbills have been stolen, leaving the eggs and young to drop to the ground and perish
		i.
15	*Nycticorax nycticorax*	a. Black-crowned night heron
		b. Not on State or Federal threatened or endangered lists but of special concern. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
15 (Continued)	*Nycticorax nycticorax*	f. Fish, crayfish, aquatic insects, and frogs. Also an aerial predator of other colonial waterbirds and their eggs
		g. Requires shallow water in which to feed
		h. A year-round resident in central Florida and breeds there. Nests are built in shrub forest, shrub thicket, or forest although herb shrub and dense herb are used. Occasionally nests are found on the ground. Nests are built beneath the canopy. Will nest far from water in tall trees or practically on the ground in matted reeds; very adaptable
		i. Sleeps all day in treetop roosts. Most commonly found in areas with extensive marshes (fresh or salt) but after breeding season can be found on almost any small lake or pond
16	*Eudocimus albus*	a. White ibis
		b. Not on Federal or State threatened or endangered lists, but is of special concern. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Very sensitive to human disturbance; rookeries have been abandoned after one or two visits by bird students
		f. Fiddler crabs, snakes, crayfish, and many kinds of insects
		g. Favorite feeding grounds are shallow water of marshy areas, wet fields, and tidal flats

Bird Species No.	Scientific Name	Management Information
16 (Continued)	*Eudocimus albus*	h. A year-round resident of central Florida and breeds there. Primarily arboreal, but occasionally nests on the ground. Nest site is usually low trees or shrubs standing in water; nests are built 3-15 ft above water. Forests have been used for nesting
		i.
17	*Mycteria americana*	a. Wood ibis (Stork)
		b. On State, but not Federal, threatened and endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Feeds on every kind of animal life found in shallow water
		g.
		h. A year-round resident of central Florida and breeds there. Preferred nest site is the upper branches of a stand of giant swamp trees. Also makes use of shallow water trees such as mangrove and willow
		i. Inhabits low, wet country where vast swamps alternate with open, marshy meadows and shallow muddy ponds. After feeding likes to sit in the top of a dead tree to sun and digest
18	*Aix sponsa*	a. Wood duck
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
18 (Continued)	*Aix sponsa*	f. Aquatic plants and seeds, insects, and aquatic invertebrates. Ducklings feed almost entirely on animal life but change to a diet of plant life as they grow older including seeds of cowlily, waterlily, and watershield, and fruits and nuts of woody plants
		g. Forages on seeds and plant parts on sparsely vegetated ground or water less than 46 cm deep
		h. A year-round resident of Florida and breeds there. Optimal nesting sites are cavities in open or parklike mature timber near or over water. Preferred breeding habitats are flooded areas of shrubs and/or trees in about a 50:50 ratio of plant cover to open water, and water at a depth of 8-90 cm
		i. Found in mature mast-producing bottomland forests bordering streams or permanent lakes. Mature shrubs may provide adequate cover if they rise above the water with dense overhanging branches that allow the ducks to swim under freely. Loafing sites are necessary of sufficient size for broods to preen and sun. Must be close to water and nearby cover is required
19	*Anas platyrhynchos*	a. Mallard duck
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
19 (Continued)	*Anas platyrhnchos*	f. Seeds of numerous native food plants as well as cultivated plants, including rice. Primarily eats the seeds of sedges, grasses, and smartweeds. Also eats the leaves, stems, and seeds of pondweed, coontail, and duckweed. Forages on waste grains and mast as well as understory fruits
		g. Prefers to feed in water less than 12-16 in. deep. Will often fly 25-30 miles from water to feed
		h. A year-round resident of central Florida and breeds there. Nests are located within 100 yd of water, on the ground and formed as bowls or scrapes in old plant litter or in moist earth
		i. Any body of shallow water is suitable habitat. Roost and nest cover is open water, slow-moving wooded streams, wooded ponds, and flooded timberlands. Also uses logs, sandbars, stumps, and high points surrounded by water 1 m deep
20	*Aythya affinis*	a. Lesser scaup
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Mollusks, especially snails; dragonfly and damselfly nymphs, larval caddisflies, beetles, insects, and crustaceans

Bird Species No.	Scientific Name	Management Information
20 (Continued)	*Aythya affinis*	g. Commonly feeds in waters 10-25 ft deep, although will feed in depths from a few feet to 40 ft deep
		h. Overwinters in central Florida but does not breed there
		i. Common to small lakes, ponds, and marshes. Coastal bays or tidewater mouths of large rivers
21	*Aythya americana*	a. Redhead duck
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Grasshoppers, larvae of midges and caddisflies, mollusks, snails, widgeongrass, pondweed, waterlily, naiad, and duckweed
		g. Prevalent feeder in sloughs, ponds, and marshes. Dives for food in waters up to 12 ft deep
		h. Nests in emergent vegetation of large marshes, the larger, deeper potholes of prairies and parklands, over water, and in dense stands of plants. Sometimes on islands or dry land. A strong preference has been noted for hardstem bulrush beds, cattails, and sedges
		i.
22	*Aythya valisineria*	a. Canvasback
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
22 (Continued)	*Aythya valisineria*	f. Roots, tubers, and basal portions of underwater plants, particularly pondweed, are chief foods. Many seeds of sedges and wild rice are strained out of bottom mud. Animal food includes bivalves, gastropods, dragonflies, damselflies, small fish, annelid worms, crabs, and other crustaceans
		g. Occupies the larger, deeper, permanent ponds for feeding
		h. Uses the smaller, shallower, and less-enduring ponds for nesting. These ponds are usually less than 1 acre in size and encircled by cattails and bulrushes, including such diverse habitats as large marshes, ponds, sloughs, and potholes. Nests are built in beds of cattails or rushes growing in shallow water, generally not far from a deep water opening
		i. Occupies the larger, deeper, more permanent ponds for resting. The canvasback is susceptible to lead poisoning due to its straining of bottom muds for food
23	*Mareca americana*	a. Baldpate (American wigeon)
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Almost wholly vegetarian except for snails. Mollusks, aquatic insects, other small crustaceans. Prefers to eat the

Bird Species No.	Scientific Name	Management Information
23 (Continued)	*Mareca americana*	stems and leafy parts of aquatic plants and may steal these from coots and redheads. Easily adapts to new food types
		g.
		h. Overwinters in central Florida but does not breed there
		i. Favorite habitats are shallow fresh or brackish ponds
24	*Oxyura jamaicensis*	a. Ruddy duck
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Primarily vegetarian and secondarily a consumer of animal life. Feeds on many seeds, especially of sedges and pondweeds, as well as eating the leaves, stems, and tubers of sago and clasping-leaf pondweeds. Also feeds on aquatic insects and crustaceans such as midge and horsefly larvae, caddisfly larvae, and water boatmen
		g. Regularly dives for food in water 2-10 ft deep
		h. Overwinters in central Florida but does not breed there
		i.
25	*Aythya collaris*	a. Ring-necked duck
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
25 (Continued)	*Aythya collaris*	f. Ducklings feed on animal life during the first few days. After 2 weeks of age, vegetable matter consisting of bulrush and sedge seed is added. Adults feed on seeds of water-shield and pondweed; the leaves, stems, and rootstalks of pondweeds, and snails
		g. Feeds in shallow water, usually less than 6 ft deep
		h. Overwinters in central Florida but does not breed there
		i.
26	*Anas discors*	a. Blue-winged teal
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. One quarter of the food consumed is animal with the remainder of the diet aquatic plant vegetative parts and seeds
		g. Feeds on mud flats and in marsh habitats. Also feeds in shallow, muddy ponds overgrown with aquatic vegetation and around reedy shores of lakes and sloughs
		h. Migrates through central Florida but does not breed there
		i. Favors shallow ponds and channels of freshwater marshes
27	*Haliaeetus leucocephalus*	a. Bald eagle
		b. On Federal, but not State, threatened and endangered lists
		c. Not recreational or commercial

Bird Species No.	Scientific Name	Management Information
27 (Continued)	*Haliaeetus leucocephalus*	d. Population could be increased
		e. Not sensitive
		f. Fish are staple food. Sick or dead ducks are occasionally eaten
		g. Hunting perches required
		h. Overwinters in central Florida but does not breed there
		i. Lakes, large rivers, coastal bays, and seacoast are acceptable habitat. Perches are needed for resting and preening. Perches may be trees, fence posts, or utility poles, although trees are preferred. Eagles may travel several miles from feeding areas to find suitable roosting cover. Winter roosting areas are groups of large trees to which the eagles return nightly
28	*Pandion haliaetus*	a. Osprey
		b. On State threatened list, but not on Federal threatened or endangered lists. Considered threatened according to Florida Audubon Society
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Fish
		g. Must have clear water for fishing and ample supply of fish that swim or feed near the surface (gizzard shad and perch)
		h. A year-round resident of central Florida and breeds there. Will nest near extensive bodies of clear water with elevated nest sites, such as seacoasts,

Bird Species No.	Scientific Name	Management Information
28 (Continued)	*Pandion haliaetus*	bays, large lakes, or rivers, or groups of small ponds. Nests may be any height above the ground in trees (living or dead) and on man-made structures, rocky canyonside pinnacles, and sometimes on the ground along upper beaches
		i.
29	*Aramus guarauna*	a. Limpkin
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Favorite food is freshwater snails but many small animals are also eaten
		g. Feeds along the edges of dense clumps of marsh vegetation
		h. A year-round resident of central Florida and breeds there. Nests are made up of woven leaves and stems of emergent marsh plants, anchored just above the water on growing stalks, and are located on the open water edge of a dense clump of vegetation
		i. Occurs frequently in freshwater marshes and marshy riverbanks. Nearby trees are used as resting and lookout perches
30	*Fulica americana*	a. Common (American) coot
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
30 (Continued)	*Fulica americana*	f. Underwater plants are the staple food, with a marked preference for chara, musk grass, or other algae. Also feeds on grass and sprouting and waste grains
		g.
		h. Overwinters in central Florida but does not breed there
		i. All types of water are preferred
31	*Gallinula chloropus*	a. Common (Florida) gallinule
		b. Not on State or Federal threatened or endangered lists
		c.
		d.
		e.
		f. Snails, insects, small animals, underwater plants, duckweed, and the leaves of grass and herbs
		g.
		h. Nest is anchored to a clump of vegetation, usually over water or semifloating, close to open water
		i. Frequents freshwater marshes where cattails or other emergent vegetation grow in a foot or more of water
32	*Porphyrula martinica*	a. Purple gallinule
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive

Bird Species No.	Scientific Name	Management Information
32 (Continued)	*Porphyrula martinica*	f. Frogs, snails, aquatic insects, and seeds from lily pads, spatterdock, water lettuce, rice, windmillgrass, paspulum, knotgrass, duckweed, and other grasses
		g. Feeds in the deeper areas of marsh or along roadside ditches between floating plants
		h. A year-round resident of central Florida and breeds there. Nests are made in islandlike clumps of tall, dense marsh vegetation surrounded by open waterlily marsh
		i.
33	*Porzana carolina*	a. Sora rail
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Insects, spiders, snails, and crustaceans. In fall it becomes seed-eating
		g. Feeds along marsh edges and out on lily pads and other floating vegetation picking up insects, mollusks, and other small animals. In fall the rail concentrates heavily wherever there are beds of wild rice. Forages on land and in water, particularly where plant stem debris allows movement without having to swim
		h. Overwinters in central Florida but does not breed there

Bird Species No.	Scientific Name	Management Information
33 (Continued)	*Porzana carolina*	i. Usually found in wetlands with dense stands of emergent herbaceous vegetation
34	*Charadrius vociferus*	a. Killdeer
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Insects, earthworms, snails, spiders, and weed seeds
		g.
		h. A year-round resident of central Florida and breeds there. Common sites for nests are barren, open spots; plowed cropland; closely grazed pastures; and gravel bars. Nests are located on substrate with many light/dark contrasts in color for concealment. Proper nesting habitat in Florida is grassy, open, sandy areas
		i. Common to open habitats adjacent to wetlands; generally on bare, exposed ground or ground with little vegetative cover, such as bare or cultivated fields, stubble fields, heavily grazed prairie, domestic pastures, exposed gravel or sand, road shoulders, and bare shorelines. Occupies beaches in Florida
35	*Capella gallinago*	a. Wilson's (Common) snipe
		b. Not on State or Federal threatened or endangered lists
		c. Recreational but not commercial

Bird Species No.	Scientific Name	Management Information
35 (Continued)	*Capella gallinago*	d. Population would increase little if any
		e. Not sensitive
		f. Insects, small crustaceans, earthworms, snails, and small fish
		g. Feeds in closely grazed wet pastures with shallow, temporary rain pools, or burnt-over, mowed, or plowed wetlands. Also feeds in grass edges of lakes, ponds, and ditches
		h. Overwinters in central Florida but does not breed there
		i. Prefers tussock-filled wet meadows, grassy marshes, and bogs. Winter habitat is marshes where vegetation is battered or dead exposing alkaline, organic soils to foraging. Heavy cover may preclude snipe utilization of otherwise excellent cover
36	*Totanus flavipes*	a. Lesser yellowlegs
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Crustaceans and insects
		g. Shallow water, rain pools, wet grassy areas, and brackish salt marsh ponds
		h. Overwinters in central Florida but does not breed there
		i.
37	*Erolia minutilla*	a. Least sandpiper

Bird Species No.	Scientific Name	Management Information
37 (Continued)	*Erolia minutilla*	b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Insects, crustaceans, worms, and small mollusks
		g. Feeds from the surface or probes mud or shallow water
		h. Breeds in subarctic forest
		i. Prefers wet or muddy areas, sparsely grown up in grass, or recently cut over
38	*Chlidonias niger*	a. Black tern
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d.
		e.
		f. Insects, grasshoppers, locusts, dragonflies, frogs, tadpoles, fish, and crayfish
		g. Often feeds on grasslands
		h. Migrates through central Florida but does not breed there
		i. Typical of inland lakes
39	*Larus argentatus*	a. Herring gull
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population would increase little if any

Bird Species No.	Scientific Name	Management Information
39 (Continued)	*Larus argentatus*	e. Not sensitive
		f. Fish, crustaceans, marine worms, shellfish, sea urchins, insects, eggs, and garbage
		g.
		h. Overwinters in central Florida but does not breed there
		i. Utilizes small bodies of fresh water for drinking, bathing, and resting
40	*Sterna albifrons*	a. Least tern
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Dives for fish and crustaceans
		g.
		h. Favorite nesting site is on the ground on bare substrate. Has been found nesting on flat, gravel-covered rooftops. Nests in Florida are primarily in open sandy to rocky areas, usually elevated less than 1 m above water. When grasses become prominent, terns stop nesting. Will nest on mainland beaches or inland river sandbars
		i. Adapts well to civilization
41	*Sterna forsteri*	a. Forster's tern
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty

Bird Species No.	Scientific Name	Management Information
41 (Continued)	*Sterna forsteri*	c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Insects and fish
		g.
		h. Overwinters in central Florida but does not breed there
		i. Common along the coast marshes and inland waters
42	*Larus delawarensis*	a. Ring-billed gull
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive but intolerant of disturbance
		f. Aerial predator of other colonial waterbirds and their eggs and young. Feeds on fish (like carp), crayfish, and other aquatic animals of shallow water, insects, and sometimes mice and ground squirrels, as well as garbage
		g. Feeds near or in marshes and lakes when inland
		h. Overwinters in central Florida but does not breed there
		i.
43	*Sterna hirundo*	a. Common tern
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty

Bird Species No.	Scientific Name	Management Information
43 (Continued)	*Sterna hirundo*	c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Small fish, insects, and other aquatic life
		g. May feed in open bays, marshes, or tidal pools, traveling considerable distances from the colony
		h. Overwinters in central Florida but does not breed there
		i.
44	*Larus philadelphia*	a. Bonaparte's gull
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Staple foods in winter are small fish, crustaceans, snails, and marine worms. Otherwise insectivorous
		g. Prefers lakes for feeding
		h. A year-round resident of central Florida and breeds there. Nests are built in spruce-fir forests about lakes and marshes. They are usually saddled on a horizontal branch from 3-20 ft up
		i. Inland it migrates along river valleys
45	*Thalasseus maximus*	a. Royal tern
		b. Not on State or Federal threatened or endangered lists but of special concern. Protected

Bird Species No.	Scientific Name	Management Information
45 (Continued)	*Thalasseus maximus*	by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population would increase little if any
		e. Not sensitive
		f. Feeds almost wholly on fish up to 4 in. in length
		g. Travels far to feed in open bays or offshore
		h. Favorite nesting site is bare substrate or sparse herbaceous vegetation, on the ground. Nests on low sandy islands along the coast
		i.
46	*Megaceryle alcyon*	a. Belted kingfisher
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Fish, insects, crayfish, amphibians, small snakes, and lizards
		g. Prefers fishing in shallow waters of lakes and streams; is most successful in a moderate to slow current. Choppy water surface and turbidity reduce foraging success. Requires open conditions to be able to hunt from perch sites adjacent to or overhanging a water body. Portions of streams covered with brush one to a few feet above the water are unsuitable
		h. A year-round resident of central Florida and breeds there.

Bird Species No.	Scientific Name		Management Information
46 (Continued)	*Megaceryle alcyon*		Nest burrows are dug into steep banks of bare ground, preferably along a watercourse. Low shorelines and streambanks covered with dense vegetation are unsuitable. Man-made banks along road cuts or gravel pits are suitable. Sandy clay is best for nest tunnels; rocky soil is unsuitable
		i.	Diurnal; roosts at night 6-8 m above the ground in trees 30-610 m from water
47	*Hirundo rustica*	a.	Barn swallow
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Population could be increased
		e.	Not sensitive
		f.	Insectivorous
		g.	Most prey captured on the wing
		h.	Migrates through, but does not breed in, central Florida
		i.	
48	*Iridoprocne bicolor*	a.	Tree swallow
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Population could be increased
		e.	Not sensitive
		f.	Flies, beetles, ants, bees, wasps, moths, grasshoppers, spiders, and other insects. Occasionally waxmyrtle or bayberry
		g.	
		h.	Overwinters in central Florida but does not breed there

Bird Species No.	Scientific Name	Management Information
48 (Continued)	*Iridoprocne bicolor*	i.
49	*Progne subis*	a. Purple martin
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Insectivorous
		g. Practically all prey captured on the wing
		h. A year-round resident of central Florida and breeds there
		i. Frequently found near the seashore, in meadows, and along wide river valleys
50	*Corvus ossifragus*	a. Fish crow
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Aerial predator of colonial waterbirds and their eggs, and young weevils, carrion, and fish
		g.
		h. A year-round resident of central Florida and breeds there
		i.
51	*Agelaius phoeniceus*	a. Red-winged blackbird
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased

Bird Species No.	Scientific Name	Management Information
51 (Continued)	*Agelaius phoeniceus*	e. Not sensitive
		f. Weed seeds, corn, oats, wheat, fruits, beetles, spiders, caterpillars, and other insects. Young are fed on insects
		g. Trees provide feeding cover
		h. A year-round resident of central Florida and breeds there. Nests are built in marshes, swamps, wet meadows, and, occasionally, at roadsides. Cattails are a favored nesting site
		i. Inhabits swamps, marshes, and wet meadows. Marsh vegetation is used for escape cover. Cattails and trees are perching sites
52	*Cassidix mexicanus*	a. Boat-tailed grackle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Aerial predator of colonial waterbirds, their young and eggs, lizards, toads, frogs, small mammals, corn, and rice
		g.
		h. A year-round resident of central Florida and breeds there
		i. Partial to tidal mud flats, brackish marshes, and lowland ponds
53	*Quiscalus quiscula*	a. Common (Purple) grackle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial

Bird Species No.	Scientific Name	Management Information
53 (Continued)	*Quiscalus quiscula*	d. Population could be increased
		e. Not sensitive
		f. Insects, spiders, crustaceans, earthworms, snails, toads, salamanders, corn, sorghum, blackberry, oak
		g.
		h. Commonly nests in conifers in cities and towns
		i.
54	*Plegadis falcinellus*	a. Glossy ibis
		b. Not on State or Federal threatened or endangered lists. Protected by the Federal Migratory Bird Treaty
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Crayfish, grasshoppers, small snakes, insect grubs, and leeches
		g. Requires shallow water to feed
		h. A year-round resident of central Florida and breeds there. Nests beneath canopy on dense herb, shrub herb, shrub thicket, shrub forest, and forest. Arboreal, but occasionally nests on the ground. Nests may be placed from a few to 10 ft above water
		i. Found on mud flats, wet or inundated fields, and marshes, usually in the vicinity of a lake or river

Mammal Species No.	Scientific Name	Management Information
1	*Didelphis virginiana*	a. Virginia opossum
		b. Not on State or Federal threatened or endangered lists
		c. Recreational and commercial
		d. Population could be increased
		e. Not sensitive
		f. Insects, cottontails, cats, dead opossums, skunks, squirrels, moles, racoons, mice, reptiles, amphibians, birds and eggs, land snails, earthworms, fruit, and corn
		g. Nocturnal, foraging along creeks and gullies
		h. Den sites are other animals' dens, cavities in rock, brush piles, trash heaps, and hollow trees
		i. Prefers to live in wooded areas, mostly near streams. Densely forested areas are not as good as farmland interspersed with small, wooded streams
2	*Sylvilagus palustris*	a. Marsh rabbit
		b. Not on State or Federal threatened or endangered list
		c. Recreational but not commercial
		d. Population could be increased
		e. Not sensitive
		f. Marsh vegetation, including rhizomes and bulbs
		g. Marsh, wet bottomland
		h.

Mammal Species No.	Scientific Name	Management Information
2 (Continued)	*Sylvilagus palustris*	i. Occurs in wet bottomlands, swamps, and hammocks. Rests in thickets, tall grass, and cattails, or in floating vegetation
3	*Neofiber alleni*	a. Florida water rat
		b. Not on State or Federal threatened or endangered lists but of special concern, Florida Audubon Society (Guillory 1979)
		c. Not recreational or commercial
		d.
		e.
		f. Water plants and crayfish
		g. Uses floating platforms of vegetation augmented by food remains for feeding
		h. Constructs houses, 1-2 ft in diameter, using vegetation. Commonly found in shallow water but also on boggy or peaty ground
		i. Inhabits bogs, marshes, weedy borders of lakes, and savannahs bordering streams
4	*Oryzomys palustris*	a. Rice rat
		b. Not on State or Federal threatened or endangered list
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Planted rice before fields are flooded, takes the grain in the milky stage, and eats scattered seeds of rice after harvest. Also feeds on seeds of grasses, the tender portions of green plants, fruits, nuts, insects, crustaceans, and snails

Mammal Species No.	Scientific Name	Management Information
4 (Continued)	*Oryzomys palustris*	g.
		h. In marshy areas the nest is usually suspended from vegetation, such as cattails, above high water level. Even muskrat houses will serve for nests. In dry localities nests may be built on the ground under a tangled mass of weeds, brush, or a fallen log. Less frequently the nest is built underground and reached by a short tunnel. Nest sites are found along the edges of cultivated fields, under boards or logs, or woven in grass
		i. Lives in a variety of habitats--all have dense ground cover. Marshes and wet meadows are preferred but upland slopes with tall grass, weeds, or brush are also inhabited. Habitat is always wet or soil is at least damp
5	*Sigmodon hispidus*	a. Common (Hispid) cotton rat
		b. Not on State or Federal threatened or endangered lists
		c. Not commercial or recreational
		d. Population could be increased
		e. Not sensitive
		f. Stems, leaves, roots, and seeds of grasses and sedges, alfalfa, and cotton. Also eats crayfish, insects, ground nesting birds' eggs and chicks, and dead carcasses
		g. Cultivated fields
		h. Nests are usually built under logs or rocks, or in the ground at the end of a long, twisting tunnel. Abandoned spotted

Mammal Species No.	Scientific Name	Management Information
5 (Continued)	*Sigmodon hispidus*	skunk or ground squirrel nests serve occasionally
		i. Inhabits dense, grassy fields and roadsides overgrown with broomsedge and weeds, and the waste borders of cultivated fields
6	*Procyon lotor*	a. Northern racoon
		b. Not on State or Federal threatened or endangered lists
		c. Recreational and commercial
		d. Population could be increased
		e. Not sensitive
		f. Omnivorous, feeding on persimmons, mulberries, grapes, insects, mice, earthworms, clams, corn, frogs, crayfish, and salamanders
		g. Most food is found along free water
		h. Trees are preferred denning sites, but caves, rock crevices, squirrel nests, hollow logs, and woodchuck burrows will do. Most dens in trees are 6-12 m aboveground and within 0.4 km of permanent water (USDI 1979). Tree dens are preferred for initial rearing of young, which are moved to ground nests, usually in wetlands, 50-60 days after birth. Wetlands are important in rearing the young. Old snags are also important denning sites (USDI 1979)

Mammal Species No.	Scientific Name	Management Information
6 (Continued)	*Procyon lotor*	i. Inhabits mature bottomland and upland forests with streams, marshes, and, often, agricultural fields. Ground or tree dens are used for shelter and escape cover, and scattered conifers also provide escape cover (USDI 1979)
7	*Lutra canadensis*	a. Neartic river otter
		b. Not on State or Federal threatened or endangered lists. Status currently under review in Region 4, Fish and Wildlife Service
		c. Commercial but not recreational
		d. Population could be increased
		e. Not sensitive; however, its numbers may be limited near inhabited areas
		f. Fish, crayfish, frogs, salamanders, snails, clams, snakes, turtles, muskrats, birds, larvae of aquatic insects, and earthworms
		g.
		h. Dens are burrows in banks, under roots of large trees, beneath rocky ledges, and under fallen trees or thickets of vegetation. These are rarely built by the otter; more likely to be former muskrat, beaver, or woodchuck dens (Schwartz and Schwartz 1968)
		i. Occurs around streams, rivers, and lakes frequently bordered with timber (Schwartz and Schwartz 1968)

Herpetofauna Species No.	Scientific Name	Management Information
1	*Acris gryllus*	a. Florida cricket frog
		b. Not on Federal or State threatened or endangered lists
		c. Not commercial or recreational
		d. Population could be increased
		e. Not sensitive
		f. Small insects
		g. Hides in vegetation of meadows near ponds or creeks
		h. Attaches eggs to plants or stones on the bottom of ponds
		i. Occurs around most kinds of permanently aquatic habitats as well as temporary accumulations of water. Likes sandy soil with dense vegetation; little or no exposed substrate
2	*Alligator mississippiensis*	a. American alligator
		b. On Federal, but not State, threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Insects, crustaceans, birds, fish, mammals, turtles, and snakes
		g. Feeding occurs only in water
		h. Nest is made of leaves and mud and located close to water
		i. Occurs in swamps, sloughs, and sluggish streams
3	*Amphiuma means*	a. Two-toed Congo eel
		b. Not on State or Federal threatened or endangered lists
		c. Not commercial or recreational
		d. Population could be increased

Herpetofauna Species No.	Scientific Name	Management Information
3 (Continued)	*Amphiuma means*	e. Not sensitive
		f. Earthworms, crustaceans, fish, frogs, small snakes, and other small animal life
		g. Forages in shallow, weedy ponds
		h. Lays eggs in shallow depressions above water level but damp, beside fallen trees, or in otherwise protected places
		i. Appears in a wide variety of aquatic and semiaquatic habitats where the substrate permits burrowing, for they stay in definite lairs or retreats to which they return after feeding. An abundance of aquatic vegetation or debris, such as can be found in shallow, weedy ponds and lakes, floodplain pools, or swamps, provides adequate protective cover. *Amphiuma* has the ability to burrow to wait out a drought
4	*Bufo terrestris*	a. Southern toad
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Insects, worms, slugs, and crop pests
		g.
		h. Breeding occurs in shallow puddles
		i. Especially abundant in areas of friable soil suitable for burrowing

Herpetofauna Species No.	Scientific Name	Management Information
5	*Chelydra serpentina*	a. Common snapping turtle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Omnivorous; feeds on fish, carrion, and vegetable matter
		g. Young feed on and among aquatic plants
		h. Seldom leaves water except to lay eggs. Nests are made in loose, well-drained soil, usually within 38-141 m of water in Florida
		i. Occurs in aquatic habitats ranging from small farm ponds and creeks to large lakes and rivers. Found with notable frequency in bodies of water with soft, muddy banks or bottom to burrow in. Seldom basks, but hides in dense aquatic vegetation, masses of roots, holes, or submerged objects in water. Aquatic vegetation is extremely important to young for support because swimming ability in individuals younger than 4 or 5 months is limited and without support drowning occurs. Hibernation takes place on the bottom of waterways under mud or vegetable debris
6	*Chrysemys floridana*	a. Cooter
		b. Not on State or Federal threatened or endangered lists (USDA 1979)
		c. Not recreational or commercial
		d. Population could be increased

Herpetofauna Species No.	Scientific Name	Management Information	
6 (Continued)	*Chrysemys floridana*	e.	Not sensitive
		f.	
		g.	
		h.	
		i.	
7	*Chrysemys nelsoni*	a.	Florida river turtle
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Population could be increased
		e.	Not sensitive
		f.	
		g.	
		h.	
		i.	
8	*Coluber constrictor*	a.	Black racer
		b.	Not on State or Federal threatened or endangered lists
		c.	Not recreational or commercial
		d.	Population could be increased
		e.	Not sensitive
		f.	Snakes, small mammals, lizards, birds, bird's eggs, frogs, toads, and insects
		g.	
		h.	Eggs are deposited 5-8 cm below the surface of loose soil, sawdust, or in hollow logs or decaying wood. Eggs laid in cultivated fields are often destroyed by plowing

Herpetofauna Species No.	Scientific Name	Management Information
8 (Continued)	*Coluber constrictor*	i. Prefers open woods, forest edges, and brushy margins of streams, swamps, and lakes. Also occurs in seasonal herb lands and agricultural areas around farms. May climb bushes or low vines and trees for escape cover. Hibernation occurs in mammal burrows or similar crevices below the frostline
9	*Deirochelys reticularia*	a. Eastern chicken turtle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial; however, is consumed in some parts of the country
		d. Population could be increased
		e. Not sensitive
		f. Wide variety of animal life, buds of waterlilies, dead fish, and worms
		g.
		h.
		i. Inhabits shallow, weedy ponds, swamps, or borrow pits with standing water. Basks on logs over water; is not strongly aquatic; moves about on land; inhabits quiet water
10	*Eurycea quadridigitata*	a. Dwarf salamander
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g.

Herpetofauna Species No.	Scientific Name	Management Information
10 (Continued)	*Eurycea quadridigitata*	h. Eggs are laid during late fall or winter and are usually attached to a single pine needle in or near water
		i. Found most frequently under logs, boards, and debris in low, damp places
11	*Farancia abacura*	a. Eastern mud snake
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Feeds chiefly on *Amphiuma* or *Siren*, the presence of which may be required to support *Farancia*. Other foods include tadpoles, frogs, small salamanders, and fish
		g.
		h. Eggs laid in moist sand or under vegetative debris or logs
		i. Found in swamps, ponds, and lakes with swampy margins and abundant aquatic vegetation, floodplains, and sluggish, mud-bottomed creeks. Likes to burrow in aquatic situations
12	*Gastrophryne carolinensis*	a. Eastern narrow-mouthed toad
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Ants and other insects
		g.

Herpetofauna Species No.	Scientific Name	Management Information
12 (Continued)	*Gastrophryne carolinensis*	h. Breeding sites include lakes, ponds, sloughs, and flooded roadside ditches
		i. Likes to hide in subterranean burrows, in decaying logs and stumps, and under rocks
13	*Hyla cinerea*	a. Green tree frog
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Insects
		g.
		h. Eggs are deposited in water in small, surface-floating packages which it attaches to emergent floating vegetation
		i. Found in permanently aquatic situations: lakes, ponds, swamps, and some streams. Abundant vegetation is favored. May be found climbing on stalks of cattails and other vegetation near water. Winters on bushes some distance from water and may hibernate in woods at the bases of stumps or under logs
14	*Hyla femoralis*	a. Pine woods tree frog
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Insects
		g. Prefers pine trees, but not required

Herpetofauna Species No.	Scientific Name	Management Information
14 (Continued)	*Hyla femoralis*	h. Eggs are laid in small pools of water, attached to vegetation or roots just below the surface, or may form a surface film
		i. Will sit high in pine trees in warm weather; likes sandy soil and frequents flatwoods ponds
15	*Hyla gratiosa*	a. Barking tree frog
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g.
		h.
		i. Likes shallow, semipermanent ponds with at least some open water. Permanent lakes and ponds are used occasionally but the presence of fish may make these unsuitable. May stay in tall trees in its native haunts but descends in drought to burrow in soil beneath grass clumps or other moist vegetation. Frequents flatwoods ponds
16	*Hyla squirella*	a. Squirrel tree frog
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g.

Herpetofauna Species No.	Scientific Name	Management Information
16 (Continued)	*Hyla squirella*	h. Breeds in flooded roadside ditches, flatwoods ponds, and small, semipermanent stock-watering ponds. Eggs are deposited in the water and sink to the bottom
		i. Common in high and low vegetation along watercourses, vines, trees, and shrubs in gardens and orchards. Commonly concealed under loose bark
17	*Kinosternon bauri*	a. Striped mud turtle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g. Forages on land
		h.
		i. Least aquatic of the mud turtles. Commonly found on land, particularily in wet meadows or under moist debris. Characteristic of small, shallow, quiet bodies of water
18	*Kinosternon subrubrum*	a. Mud turtle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Wide variety of animal foods
		g.
		h. Nest is dug in ground or piles of organic matter

Herpetofauna Species No.	Scientific Name	Management Information
18 (Continued)	*Kinosternon subrubrum*	i. Occurs in ponds, lakes, swamps, marshes, and flooded roadside ditches. Shuns free-flowing creeks and rivers and seldom basks. Optimum habitat is represented by a well-established, although fluctuating, shallow-water ditch with considerable aquatic vegetation
19	*Limnaoedus ocularis*	a. Little grass frog (Least tree frog)
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g.
		h. Favored breeding sites are grassy, rain-filled depressions and semipermanent ponds
		i. Prefers low pine flatwoods. During the day it frequents damp, grassy swales and edges of cypress ponds
20	*Nerodia cyclopion*	a. Great water snake
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Fish, frogs, toads, and salamanders
		g. Generally forages at night
		h.

Herpetofauna Species No.	Scientific Name	Management Information
20 (Continued)	*Nerodia cyclopion*	i. Sloughs, pools, streams, marshes, and, occasionally, rice fields. Frequently observed on rafts of maiden-cane or among branches of low shrubs at water's edge
21	*Nerodia fasciata*	a. Southern water snake
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Frogs, smaller reptiles, newts, fish, toads, worms, and tree frogs
		g. Forages at night
		h.
		i. Found along rivers, ditches, ponds, creeks, and swamps and observed resting on branches over hanging water
22	*Rana grylio*	a. Pig frog
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g.
		h. Eggs are laid in shallow water as a surface film and attached to vegetation
		i. Occurs in permanent, open bodies of water with emergent herbaceous vegetation
23	*Regina alleni*	a. Striped swamp snake

Herpetofauna Species No.	Scientific Name	Management Information
23 (Continued)	*Regina alleni*	b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f.
		g.
		h.
		i. Totally aquatic and is commonly found among roots of waterhyacinths in shallow water
24	*Siren lacertina*	a. Greater siren
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Crayfish, worms, insect adults and larvae, and sometimes fish. Also consumes large quantities of vegetable matter
		g.
		h. Eggs are laid in shallow water
		i. Permanently aquatic and found in ponds, lakes, sloughs, oxbows, and sluggish streams. Often found in considerable numbers in large, open bodies of water. Burrows into bottom during times of drought
25	*Sternotherus odoratus*	a. Common musk turtle
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased

Herpetofauna Species No.	Scientific Name	Management Information
25 (Continued)	*Sternotherus odoratus*	e. Not sensitive
		f. Wide variety of animal life and a small amount of vegetation
		g.
		h. Nest is a mound of loose soil, organic debris, a decaying log, or a stump
		i. Found in still or sluggish-water habitats, is extremely aquatic, and seldom basks. Shuns temporary puddles and pools
26	*Thamnophis saurita*	a. Eastern ribbon snake
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Fish and amphibians, insects, small mammals, amd spiders
		g. Forages in the vicinity of ponds and marshes where frogs are abundant
		h.
		i. Semiaquatic. Prefers open, damp habitat such as marshes, swamps, weedy lakeshores, stream margins, and low, wet meadows
27	*Thamnophis sirtalis*	a. Eastern garter snake
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive

Herpetofauna Species No.	Scientific Name	Management Information
27 (Continued)	*Thamnophis sirtalis*	f. Young garter snakes depend on earthworms and newly metamorphosed frogs and toads for food. Adults feed on frogs, toads, salamanders, fish, earthworms, small mammals, birds, and insects
		g.
		h. Observed mating in warm, sunny places and in trees
		i. Inhabits cover types ranging from grassland to woodland but shows a definite preference for moist to marshy habitats. Dense herbaceous growth and shrubbery provide cover but open areas are needed as sunning sites. Tree stumps and rocky outcrops with deep crevices are used as hibernation sites
28	*Trionyx ferox*	a. Florida softshell
		b. Not on State or Federal threatened or endangered lists
		c. Not recreational or commercial
		d. Population could be increased
		e. Not sensitive
		f. Crayfish, insects, mollusks, frogs, and fish
		g.
		h. Leaves water to lay eggs in sand or sandy soil
		i. Occurs in sluggish streams, lakes, and ponds. Leaves the water only to bask or lay eggs

Appendix C: Feeding, Resting, and Reproduction Nesting Habitat Requirements for Animal Species from Lake Conway, Florida

Fish

Food Preferences	Species
Fish or fish eggs	1,2,3,4,7,8,12,13,14,15,21,28,31, 32,34
Crayfish	3,4,8,28,34
Crustaceans	2,3,4,7,9,11,13,15,17,21,25,26,28, 29,31,34
Aquatic insects and larvae	4,7,12,13,14,15,17,22,25,26,27,28, 29,31,32,33,34
Mollusks	3,4,9,14
Annelids	4
Echinoderms	4
Eelgrass	4
Worms	3,26
Insects and larvae	2,3,4,7,9,13,14,15,17,22,23,25,26, 27,29,31,32,34
Small organisms from mud	5,11,15,18,20,23
Plankton	5,6
Carnivorous	1
Algae	9,14,15,19,21,34
Plants	9,11,14,15,17,19,23,26
Minnows	7,31
Tadpoles	7
Invertebrates	8,14
Mosquito larvae and pupae	21,23
Pondweeds	12
Zooplankton	9,14,16,21,32,34
Snails	29
Small clams	29
Feed exclusively in backwater and quiet pools	28
Frogs	3,8,31
Leeches	3
Snakes	8

Fish (Continued)

Food Preferences	Species
Chironomids	11,14,16,32
Salamanders	31

Resting Habitat	Species
Avoids swift current and excessive turbidity	1,2,3,7,8,9,13,14,16,19,21,24,26, 29,31,32,34
Swamps, sloughs	3,17,21,22,23,25,35
Ditches, abandoned stream channels	3,28
Clear water	1,3,7,8,9,11,13,14,16,17,20,24,28, 29,31,32,34
Abundant submerged vegetation	1,3,7,8,9,11,13,14,16,17,18,19,20, 21,26,27,28,29,30,31,32,34
Can survive stagnant water	2,3
Females penetrate freshwater rivers almost to sources	4
Bottomland lakes, overflow ponds	1,3,5,9,13,14,15,28,31,32,34
Quiet pools and backwaters	1,3,5,8,9,11,13,15,17,19,21,28,30, 32,34
Fresh and brackish waters	5,9,11,12,18,19,22,23,26,31
Avoids streams without large, permanent pools	5
Die-offs below 45°F	6
Shoal waters	6,21
Lowland streams	11,18,28,34,40,46
Sand or silt with organic debris	11,14,16,35
Mud bottom	8,12,14,16,28,31,35
Abundant forage fish	8
Shallow areas of lakes or marshes	13,15,17,18,19,21,22,23,28,31
Emergent vegetation	7,18,21
Fine sand	18
Mud and muck to pebbles	14,31
Abundant rooted aquatic vegetation or shade from trees and tall terrestrial vegetation for cover	1,7,8,13,14,17,18,19,20,21,28,29, 31,34

Fish (Continued)

Resting Habitat	Species
Large streams with a low to medium gradient	1,3,9,15,31
Under cover of logs	1,15,28,30,31,32,24
Lake coves and shore	17,18,21,24
Shallow backwaters	1,13,17,19,21,28
Everything from headwater streams to coastal plains rivers and lakes	27
Overflow waters on floodplains	28
Old tree stumps	1,16,28,29,32
Tolerant of turbidity	9,16,28
Intolerant of continuous turbidity	33,34
Congregates - logs, stumps, brush	21,29
Prefers streams to lakes	15,33
Marine, ascends freshwater rivers	4

Reproduction Habitat	Species
Makes nest by clearing plants and soil to attach eggs to roots	3
Salt water - Sargasso Sea	4
Open-water spawning	6
Nests on cleaned area of gravel	11
Tributary streams	11
Shallow water - eggs	1,2,7,8,13,14,31
Flooded areas with abundant vegetation	8
Nests in water 0.5-2 m deep	13,29,31
Clear water with profuse vegetation	13
Firm mud and muck to gravel	14
Overhanging ledges, in or under hollow logs, brush, similar shelters	6,15,27,28
Nests in water 15-40 cm deep	27
Sand or fine gravel	27,32,34

Fish (Concluded)

Reproduction Habitat	Species
Nests in water 5-150 cm	28,34
Quiet waters	34
Nests on areas free of plants	34
Waterlilies	29
Will not nest in silt	31
Spawns in largemouth bass nests	9
Eggs scattered	8,9,29,31
In water 0.25-6 m deep at the base of vegetation	32
Will not nest on sand	28

Birds

Feeding Habitat	Species
Trees - feeding cover	51
Forage in water greater than 45 cm	6,18,19,21
Forage on sparsely vegetated ground	18
Mud flats	26,37
Shallow marshes or temporarily flooded agricultural lands	9,10,16,19,21,26,36,42,43
Shallow water	6,9,10,11,14,15,16,17,18,19,25,30, 36,37,42,54
Deep water - surface plankton	30,37
Deep water - diving	20,21,22,24,40
Ponds with abundant aquatic plants	26
Small bodies of quiet fresh water	5
Edges of denser marsh vegetation	2,7,26,29,33
Sloughs, ponds	21,22,26
Dense beds of cattails, etc.	13
Feeds near cattle; commensal	14
Soft, muddy borders of shallow water	7,37
Closely grazed wet pastures with shallow, temporary pools	9,14,16,35,36
Grass edges of lakes, ponds	2,35
Grainfields, grasslands	19,33,38,51
Tidal flats	16,43
Commensal with white ibis	10
Perching sites for hunting (trees, fence posts, utility poles)	27,46
Lakes	22,42,44
Cannot use turbid water	28,46
Shallow waters of lakes and streams, slow current best	42,46
Deeper areas of marsh or along roadside ditches between floating plants	32,35,36,42,43

Birds (Continued)

Feeding Habitat	Species
On floating vegetation: lily pads	33
Open bays	43,45

Food Preferences	Species
Insects	2,3,6,7,8,9,10,11,12,14,15,16,18, 20,21,22,23,24,31,32,33,34,35, 36,37,38,39,41,42,43,44,46,47, 48,49,51,53,54
Crustaceans	9,12,20,22,24,26,35,36,37,39,40, 44,53
Crayfish	1,2,3,7,8,10,11,15,16,38,42,46,54
Snails	2,8,20,21,23,25,29,31,32,34,35, 44,53
Weed seeds (delta duck potato, milo, spike rush, pondweeds, millet)	18,19,24,25,26,33,34,51
Grains (corn, oats, wheat, barley)	19,30,51,52,53
Fruits	18,19,51
Plant parts (herbaceous)	18,24
Mast	18,19
Aquatic plants	1,3,18,21,22,23,26,51,52
Aquatic invertebrates	8,18,20,21,22,23,24
Rice	19,22,33,52
Mollusks	20,21,22,23,33,37
Macroscopic animal life	20,21,25,29,33,56
Fish	1,2,3,4,5,6,7,8,9,10,11,12,13,15, 22,27,28,35,38,39,40,41,42,43, 44,45,46,50
Weed stems and leaves	18,19,25,30
Filamentous algae	30
Aquatic life	5,9,42,43
Snakes	6,7,8,16,46,54
Mice	6,42,52
Frogs or tadpoles	2,3,6,7,8,9,10,12,13,14,15,32,52, 53

Birds (Continued)

Food Preferences	Species
Eels	6,7
Salamanders	4,6,53
Birds, their eggs, and young	6,15,27,39,42,50,52
Seeds strained from bottom mud	22
Small marsh animals	7,12,13,15,17,31,52
Lizards	14,46,52
Crabs	1,8,16,22
Worms	2,7,34,35,37,39,44,53
Aquatic animals	8
Green grass	30
Amphibians	1,46,52,53
Shellfish	1,39
Shrimp	3,8,11
Garbage	39,42
Leeches	2,54
Seeds from lily pads, spatterdock, and water lettuce	18,32

Resting Habitat	Species
Treetop roost	15,17,27,29,46
Extensive marshes	11,15
Small lake or pond	2,3,6,7,8,9,15,20,21,22,28,39
Seacoasts, bays	20,27,28,41,49,52
Large lake and shallow bays	1,3,6,7,22,27,28
Rocky ledges and trees for roost	4,27,29,46,51
Mud flats	6,37,52,54
Wet fields	6,13,17,33,34,35,37,51,54
Marshes, sloughs, bogs	2,3,6,7,8,9,11,12,13,20,21,26,29, 30,31,35,38,41,51,52,54
Dense emergent vegetation	2,6,7,12,13,21,22,31,33,51
Shallows of ponds and sluggish streams	8,19,23,26
Marshy meadows	6,13,17,33,35,37,51

Birds (Continued)

Resting Habitat	Species
Shallow, muddy ponds	7,17,19,23,26
Bare ground or little cover (cultivated fields, sand, grazed prairie)	34,37
Small streams	6,7
Sandbar	6
Marshy riverbanks	29,44,54
Any fresh shallow water	19,23,30,39
Open water, slow wooded streams, wooded ponds, and flooded timber lands	7,19
Logs, sandbars surrounded by water 0.9 m deep for roost	19
Bottomland forests bordering streams or lakes	18
Mature shrubs overhanging water to swim under	18
Open sunning sites near water	18

Nesting Habitat	Species
Shrub forest	4,5,6,7,9,10,11,14,15,16,54
Forest	4,5,6,7,10,11,14,15,16,53,54
Shrub thicket	6,7,9,10,11,14,15,16,54
Arboreal	4,5,6,7,9,10,11,14,15,16,28,54
Ground nesting	4,13,19,21,28,40,45
Under canopy	5,7,10,11,15,54
Far from water	15
Within 500 ft of water	2,10,15,19,28
On matted vegetation	9,15
Any elevated nest site	28
3-6 m up in trees	7,44
Dense herb	6,7,9,11,15,54
Shrub herb	6,7,9,10,11,14,15,54

Birds (Concluded)

Nesting Habitat	Species
Nests up to 10 ft above water in low shrubs, trees, or reeds	9,22
Ponds, lakes, marshes bordered by dense emergents	2,13,21,22,28,29
In water 60 cm deep, 92 m from shore, 8 m from open water	2
Nests in islandlike clumps of tall, dense emergents surrounded by waterlily marsh	32
Upper branches of giant swamp trees	8,17
Shallow water trees - mangrove and willow	8,17
Burrows nest in steep, bare banks of sandy clay, preferably along watercourses. Man-made roadcuts, gravel pits suitable	46
Tree cavities in swamp, ponds, along streams and lakes	18
Spruce-fir forest about lakes and marshes	44
Seems to prefer emergents several feet high; builds nests above water	2,9,12,14,21,29,31,54
Marsh vegetation in open, moist country	19
Low shrubs and trees in water	16,18
Substrate with light/dark contrast	34
Grassy, open, or barren areas	34,40,45
Steals nest materials from heronry associates	14
Tops of tall trees, above canopy	6
Around quiet, sheltered waters	5
Marshes, swamps, wet meadows; cattails favorite	12,13,21,22,51

Mammals

Feeding Habitat	Species
Cultivated fields	1,4,5
Lake edges, marshes	1,2,3,7
Along free water	1,6,7
Floating vegetation	3

Food Preferences	Species
Marsh vegetation, including rhizomes and bulbs	2
Stems, leaves, roots, and seeds of grasses and sedges	4,5
Alfalfa	5
Cotton	5
Crayfish	3,5,6,7
Insects	1,4,5,6,7
Eggs and chicks of ground-nesting birds	1,5,7
Nuts	4
Fish	7
Small animals	1,6,7
Fruits	1,4,6
Reptiles and amphibians	1,7
Earthworms	1,6,7
Corn	1,6
Water plants	3
Rice seeds and plants	4
Crustaceans	4
Snails	1,4,7
Clams	6,7

Resting Habitat	Species
Wooded areas near streams	1,6,7
Farmland interspersed with small, wooded streams	1,6
Bogs, marshes	2,3,4,6

Mammals (Concluded)

Resting Habitat	Species
Weedy borders of lakes	2,3,7
Savannahs bordering streams	3
Dense, grassy fields and roadsides overgrown with broomsedge and weeds	5
Waste borders of cultivated fields	5
Wet bottomlands	2,4,6
Upland slopes with tall grass, weeds, or brush	4

Reproduction Habitat	Species
Other animal dens	1,4,5,6,7
Cavities in rocks	1,6
Brush piles	1
Trash heaps	1
Hollow trees	1
Wetlands for rearing young	6
Old snags - denning sites	6
Trees for denning (cavities)	6
Under logs or rocks	4,5,7
Tunnel in ground	4,5
Above water suspended from vegetation such as cattails	4
Under tangled weeds	4
Shrub thicket	7

Herpetofauna

Food Preferences	Species
Insects and larvae	1,2,4,8,12,13,14,24,26,27,28
Fish	2,3,5,11,20,21,24,26,27,28,35,37, 38a,39
Lizards	8
Frogs and tadpoles	3,8,11,20,21,27,28,38b,39
Turtles	2
Birds and eggs	2,3,8,10,27,38a
Small mammals	2,8,26,27
Snakes	2,3,8,21
Crustaceans	2,3
Worms	3,4,21,24,27
Crayfish	3,24,28
Small animal life	3,9,18,25
Vegetable matter	5,9,24,25
Carrion	5
Toads	8,21,27
Amphiuma and *Siren*	11
Salamanders	11,20,27
Amphibians and eggs	26
Mollusks	28
Invertebrates	3,4

Resting Habitat	Species
Permanent aquatic habitats	1,3,5,13,18,21,22,24,25
Temporary pools	1,3,11,15,21
Dense vegetation	1,13,15,27
Sandy soil	1,14
Swamps, sloughs	2,3,9,11,13,20,21,24,26
Lakes	2,3,11,13,21,24,28
Sluggish streams	2,11,21,24,25,28
Substrate permits burrowing (friable)	3,4,12,15

Herpetofauna (Continued)

Resting Habitat	Species
Aquatic vegetation	3,5b,7b,9,11,13,15,18,20
Organic debris	3,5,17
Soft, muddy bottoms of pools or banks to burrow in	5,11,18,24
Open woods	8
Forest edges	8
Brushy margins of streams, swamps, and lakes	8,11,13,16,21,26
Seasonal herb lands and farmlands	8,20
Mammal burrows	8
Crevices below frostline	8,27
Bushes, low vines, and trees	8,16,21
Shallow ponds	3,5,9,11,14,15,17,20,21,28
Basks on logs over water	9
Quiet water	9,17,21,25
Under logs, boards, and debris in low, damp places	10,13,17
Decaying logs and stumps	12,27
Under rocks	12,27
Flatwoods ponds	14,22
Pine trees	14
Tall trees	15
Wet meadows	17,19,26,27
Shallow water ditch	18
Moist woods and shady places	16,27
Pine flatwoods	19
Edges of cypress ponds	19
Dense emergents	13,22
Roots of waterhyacinths in shallow water	23
Large, open water	5,15,22,24
Open areas - sunning	27

Herpetofauna (Concluded)

Reproduction Habitat	Species
Nests in loose soil, sawdust	5,8,25
Organic debris	18,25
Decaying log or stump	8,25
Sand, sandy soil	28
Shallow water	4,22,24
Mud and leaves for nest	2
Temporary ponds, rain pools	4,5,19
Aquatic plants	1,14,22
Emergents	13,14,22,23
Ditches	12,16
Flatwoods ponds	16
Ponds	1,12,13,14,16
Semipermanent ponds	16,19
Ground	18
Lakes, sloughs	12
Pine needles in or near water	10
Above water level beside fallen trees or protected places	3
Close to water	2,5

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Large-scale operations management test of use of the white amur for control of problem aquatic plants : selected life history information of animal species on Lake Conway, Florida / by Nancy J. Zittleman, Randall R. Williams, Eugene G. Buglewicz (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, 1982.
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1. Aquatic biology. 2. Aquatic weeds. 3. Conway, Lake (Fla.) 4. Weed control--Biological control.

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