Appendix 11-1: Supplemental Baseline and Reference Data for the Kissimmee River Restoration

Table 1. Potential indicator species for assessing restoration of amphibian and reptile community structure in reestablished broadleaf marsh habitats (Carr, 1940; Conant and Collins, 1991; Tennant, 1997; Bartlett and Bartlett, 1999; Franz et al., 2000). Indicator species are common and ubiquitously distributed in permanent freshwater marshes of Avon Park Bombing Range, Highlands and Polk counties, Florida. "Additional" species indicate taxa that may be present in low numbers, or are likely to be overlooked due to their cryptic or secretive nature.

Indicator Species

Acris gryllus dorsalis (Florida cricket frog)
Hyla cinerea (green tree frog)
Pseudacris nigrita verrucosa (Florida chorus frog)
Pseudacris ocularis (little grass frog)
Rana grylio (pig frog)
Rana sphenocephala utricularia (southern leopard frog)
Notopthalmus viridescens piaropicola (peninsular newt)
Amphiuma means (two-toed amphiuma)
Siren intermedia (lesser siren)
Siren lacertina (greater siren)
Alligator mississippiensis (American alligator)
Anolis carolinensis (green anole)
Agkistrodon piscivorous (eastern cottonmouth)
Farancia abacura (eastern mud snake)
Nerodia fasciata pictiventris (Florida water snake)
Nerodia floridana (Florida green water snake)
Sistrurus miliarius barbouri (dusky pigmy rattlesnake)
Storeria dekayi victa (Florida brown snake)
Apalone ferox (Florida soft-shelled turtle)
Pseudemys floridana peninsularis (peninsular cooter)
Pseudemys nelsoni (Florida redbelly turtle)
Stenotherus odoratus (common musk turtle)

Additional Species

Gastrophryne carolinensis (narrow-mouthed toad)
Hyla femoralis (pine woods tree frog)
Hyla gratiosa (barking tree frog)
Hyla squirella (squirrel tree frog)
Rana catesbeiana (bullfrog)
Eurycea quadridigitata (dwarf salamander)
Pseudobranchus axanthus axanthus (narrow-striped dwarf siren)
Nerodia taxispilota (brown water snake)
Regina alleni (striped crayfish snake)
Seminatrix pygaea cyclas (South Florida swamp snake)
Thamnophis sauritus sackeni (eastern ribbon snake)
Chelydra serpentina osceola (Florida snapping turtle)
Kinosternon baurii (striped mud turtle)
Kinosternon subrubrum steindachneri (Florida mud turtle)

Table 2. Fish collected from Kissimmee River floodplain habitats in a 1957 survey (FGFWFC, 1957) and during 1996–1999. Individual species are identified as large-bodied (γ), small-bodied (ϕ), or exotic (*).

Species	Number collected						
		1996–1999					
	1957	BLM		WS		Pasture	
		Control	Impact	Control	Impact	Control	Impact
Esocidae							
γ Redfin pickerel *Esox americanus*	5						
Cyprinidae							
ϕ Golden shiner *Notemigonus crysoleucas*	363						
ϕ Tailight shiner *Notropis maculatus*	96						
ϕ Coastal shiner *Notropis petersoni*	2						
Catostomidae							
γ Lake chubsucker *Erimyzon sucetta*	13						
Ictaluridae							
γ White catfish *Ameiurus catus*	2						
γ Brown bullhead *Ameiurus nebulosus*	1						
γ Channel catfish *Ictalurus punctatus*	1						
ϕ Tadpole madtom *Noturus gyrinus*	18						
Clariidae							
* Walking catfish *Clarias batrachus*			2				
Aphredoderidae							
ϕ Pirate perch *Aphredoderus sayanus*	1						
Fundulidae							
ϕ Golden topminnow *Fundulus chrysotus*	6			12	13		
ϕ Bluefin killifish *Lucania goodei*	15	1					
Poeciliidae	14	50	120	123	263	3	5
ϕ Eastern mosquitofish *Gambusia holbrooki*	3	83	47	468	712	13	1
ϕ Least killifish *Heterandria formosa*	12			1	29		
Atherinidae							
ϕ Brook silverside *Labidesthes sicculus*	7	304	226	361	94	16	16
Elassomatidae							
ϕ Everglades pygmy sunfish *Elassoma evergladei*		64	12	70	44	3	
ϕ Okefenokee pygmy sunfish *Elassoma okefenokee*	28	1	1				
Centrarchidae	298						
ϕ Bluespotted sunfish *Enneacanthus gloriosus*	7						
γ Redbreast sunfish *Lepomis auritus*	1				1		
γ Warmouth *Lepomis gulosus*	9						
γ Bluegill *Lepomis machrochirus*	8						
γ Redear sunfish *Lepomis microlophus*	1						
γ Largemouth bass *Micropterus salmoides*	11						
γ Black crappie *Pomoxis nigromaculatus*							
Percidae							
ϕ Swamp darter *Etheostoma fusiforme*	922	503	408	1035	1156	35	22
Total							

Table 3. Mean ± SE annual relative abundance (percentage of total numbers) of fishes collected by electrofishing during baseline conditions (1992–1994) in remnant river channels in Pools A (KR-A) and C (KR-C) of the Kissimmee River and between 1983 and 1990 in the St. Johns (STJ), Oklawaha (OKL), and Withlacoochee (WIT) rivers. All data were collected by the Florida Game and Fresh Water Fish Commission (currently known as the Florida Fish and Wildlife Conservation Commission, or FWC).

Species	KR-A	KR-C	STJ	OKL	WIT
Alosa sapidissima	--	--	0.02 ±0.01	0.3 ±0.04	--
Ameiurus catus	--	--	0.3 ±0.2	0.1 ±0.04	0.1 ±0.01
Ameiurus natalis	--	0.5 ±0.2	0.1 ±0.01	0.5 ±0.2	0.1 ±.06
Ameiurus nebulosus	0.07 ±0.07	0.3 ±0.1	0.3 ±0.1	0.1 ±0.03	0.04 ±0.02
Amia calva	8.3 ±2.5	4.4 ±0.7	0.6 ±0.2	0.8 ±0.1	1.3 ±0.4
Anguilla rostrata	--	--	0.2 ±0.1	--	0.1 ±0.05
Aphredoderus sayanus	--	--	0.03 ±0.01	2.0 ±0.4	0.9 ±0.4
Clarias batrachus	0.4 ±0.4	1.4 ±0.4			
Centrarchus macropterus	--	--	0.01 ±0.01	--	--
Dorosoma cepedianum	0.2 ±0.2	--	0.9 ±0.4	0.3 ±0.2	0.03 ±0.02
Dorosoma petenense	0.06 ±0.06	--	0.3 ±0.2	0.05 ±0.02	0.04 ±0.03
Elassoma evergladei	--	0.1 ±0.1	--	0.01 ±0.01	0.07 ±0.02
Elassoma zonatum	--	--	--	0.01±0.01	--
Ennecanthus gloriosus	0.1 ±0.1	0.5 ±0.2	0.03 ±0.02	0.02 ±0.01	0.5 ±0.2
Erimyzon sucetta	1.4 ±0.5	3.9 ±1.2	0.6 ±0.1	2.5 ±0.3	1.6 ±0.4
Esox americanus	--	--	--	0.03 ±0.01	0.2 ±0.1
Esox niger	0.3 ±0.1	0.3 ±0.1	0.08 ±0.01	0.6 ±0.1	0.1 ±0.03
Etheostoma fusiforme	--	0.1 ±0.05	--	0.6 ±0.2	0.2 ±0.08
Fundulus chrysotus	0.3 ±0.2	0.4 ±0.3	--	0.01 ±0.01	0.1 ±0.06
Fundulus seminolis	--	--	6.0 ±1.8	0.1 ±0.07	0.1 ±0.04
Gambusia holbrooki	4.5 ±2.4	16.9 ±9.0	0.3 ±0.2	0.5 ±0.1	6.4 ±2.3
Heterandria formosa	0.2 ±0.2	0.7 ±0.6	0.03 ±0.03	--	0.1 ±0.04
Ictalurus punctatus	--	--	0.1 ±0.06	0.02 ±0.01	0.03 ±0.02
Jordanella floridae	--	0.2 ±0.2	0.03 ±0.03	--	0.01 ±0.01
Labidesthes sicculus	0.2 ±0.2	0.1 ±0.1	0.4 ±0.1	1.5 ±0.3	2.7 ±1.2

Lacania goodei	--	0.2 ±0.2	0.1 ±0.05	0.03 ±0.01	0.2 ±0.1
Lepisosteus osseus	--	0.1 ±0.05	0.1 ±0.03	0.2 ±0.04	0.2 ±0.03
Lepisosteus platyrhincus	36.8 ±2.9	19.6 ±3.0	2.4 ±0.4	1.3 ±0.2	2.9 ±0.9
Lepomis auritus	--	--	18.7 ±1.2	23.2 ±1.6	19.2 ±2.9
Lepomis gulosus	1.6 ±0.4	4.8 ±1.6	1.3 ±0.2	4.9 ±0.5	6.1 ±0.4
Lepomis macrochirus	19.1 ±4.8	16.5 ±4.0	35.0 ±1.1	27.7 ±2.4	14.8 ±2.8
Lepomis marginatus	--	0.3 ±0.1	0.03 ±0.03	0.1 ±0.04	2.5 ±0.7
Lepomis microlophus	2.6 ±1.0	4.4 ±0.9	8.1 ±1.1	9.3 ±0.6	6.7 ±1.8
Lepomis punctatus	0.1 ±0.1	1.5 ±0.7	3.4 ±0.3	10.7 ±1.5	18.5 ±2.1
Lucania parva	--	--	0.05 ±0.03	--	--
Menidia beryllina	--	--	0.7 ±0.3	0.01 ±0.01	--
Menidia peninsulae	--	--	0.5 ±0.4	--	--
Micropterus salmoides	7.9 ±3.5	9.4 ±0.7	4.8 ±0.2	5.3 ±0.4	5.8 ±2.3
Morone saxatilis	--	--	0.02 ±0.02	--	--
Morone sp.	--	--	0.1 ±0.1	--	--
Mugil cephalus	--	--	2.7 ±0.3	0.1 ±0.04	0.1 ±0.07
Myrophis punctatus	--	--	--	--	0.01 ±0.01
Mugil curema	--	--	0.03 ±0.03	--	--
Notemigonus crysoleucas	14.4 ±5.5	11.7 ±4.3	6.3 ±0.8	1.7 ±0.3	0.5 ±0.1
Notropis maculatus	--	--	1.5 ±2.4	0.8 ±0.2	0.6 ±0.1
Notropis petersoni	--	--	0.01 ±0.01	2.0 ±0.6	5.6 ±2.3
Noturus gyrinus	--	--	--	0.04 ±0.01	0.3 ±0.1
Noturus leptacanthus	--	--	--	0.06 ±0.01	--
Opsopoedus emilidae	--	--	0.1 ±0.1	0.01 ±0.01	--
Oreochromis aureus	--	--	0.05 ±0.02	0.01 ±0.01	--
Percine nigofasciata	--	--	--	1.3 ±0.4	--
Poecilia latipinna	0.1 ±0.1	0.2 ±0.1	0.03 ±0.03	0.1 ±0.05	0.5 ±0.1
Pomoxis nigromaculatus	0.3 ±0.1	0.9 ±0.02	2.1 ±0.3	0.5 ±0.1	0.3 ±0.2
Strongylura marina	--	--	0.8 ±0.3	0.05 ±0.01	0.08 ±0.04
Trinectes maculatus	--	--	0.03 ±0.02	0.02 ±0.01	0.2 ±0.1