

Vital Sign: Amphibians
[Shortened name: Amphibians]

Parks Where Vital Sign will be Implemented:
BICY, EVER, VIIS – SFCN implements monitoring
BISC, SARI - Deferred

Justification/Issues being addressed: Amphibians ranked 25th among the 44 SFCN vital signs. Amphibians comprise a large amount of the resident vertebrate biomass and generally are a strong intermediate link in the food web. Amphibians have been used as a biological indicator for many environmental variables and are sensitive to changes in breeding habitat quality, invasive species, and contaminants. At VIIS, the native frog species are strongly tied to water resources for reproduction. The white-lipped frog (*Leptodactylus albilabris*) has a tadpole stage and the other two species, Antillean frog (*Eleutherodactylus antillensis*) and whistling frog (*Eleutherodactylus cochranae*), utilizing moist vegetation for egg laying with direct development to the froglet stage. Additionally, these frogs typically exploit the numerous tank bromeliads for daytime refugia. There are a number of exotic species that may be out competing and preying upon native fauna such as the Cuban treefrog (*Osteopilus septentrionalis*). In EVER and BICY, the pig frog, *Rana grylio*, is a dominant anuran within the freshwater marsh lands and makes up a large amount of the vertebrate biomass. It is both a prey source and a major predator. The pig frog life cycle (eggs-tadpoles-adults) is strongly related to marsh hydrology. Shifts in pig frog population structure have been shown to be related to water management. Additionally, pig frogs bioaccumulate mercury and currently are being monitored by the State of Florida (FWRI) for mercury levels. Previous amphibian monitoring within these parks has documented exotic species immigration and shifts in population structures of native species due to exotic species. Community composition of the amphibian species community has been related to habitat type within these park units. Presumably, amphibian community composition and proportion of area occupied (PAO) will have a quick reaction to management actions.

Note: A SFCN funded herpetofauna inventory found no amphibians at BUIS so this vital sign is assumed to not be relevant for that park unit. Monitoring at BISC and SARI is deferred due to lack of funds.

General Monitoring Questions to be Addressed by the Vital Sign:

- What are the status and trends in the distribution, abundance (or occupancy), and community composition of native and non-native amphibian species?
- What are the status and trends in pig frog demographic structure, especially in relation to water levels and CERP/MOD Waters Everglades restoration?
- What are the status and trends in mercury accumulation in pig frogs?

Measures:

Proportion of area occupied, distribution, community composition, population structure, total mercury content

Basic Approach:

SFCN will develop an “Amphibians” protocol to monitor amphibians at BICY, EVER, and VIIS. BISC and SARI are deferred. The protocol will build on the inventory work already completed. The protocol is further detailed in Appendix P. The primary parts of the protocol include:

- 1) At VIIS, EVER and BICY amphibians will be monitored in areas near roads and trails with Visual Encounter Surveys (VES), call surveys and tree pipes by developing a proportion of area occupied (PAO) methodology similar to the ARMI inventory protocol methods used in these parks (Rice *et al.*, 2004, 2005a, 2005b) . Current funding levels are insufficient to attempt monitoring away from roads and trails, especially in areas accessible only by helicopter
- 2) In EVER and BICY SFCN will collect grab samples of pig frogs to determine size structure of populations, sex ratios, and juvenile to adult ratios. This sampling will build upon previously existing research.
- 3) SFCN will coordinate with the State of Florida mercury monitoring program. SFCN goal is to include pig frogs from EVER and BICY in the states regional assessments.

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Development Schedule, Budget, and Expected Interim Products:

The Community Ecologist and the two wildlife technicians will conduct sampling about 9 weeks of the year and 2 weeks of data entry and reporting. Additional costs are minimal: mostly for travel and some beginning equipment. However SFCN will need to evaluate the feasibility of the mercury analyses if the State of Florida does not cover the costs as these are generally expensive samples (\$100.00 each). The protocol development should be completed by 2012 and begun 2013. Table indicates proposed SFCN workload upon full monitoring implementation.

Expected SFCN staff time requirements once program is fully implemented in 5 years:

SFCN Staff	Full Time Equivalent (FTE)
Coordinator	
Marine Ecologist	
Fisheries Biologist	
Marine Biologist Technician (So FL)	
Marine Biologist Technician (VI)	
Community Ecologist	0.15
Wildlife Technician (Wildlife)	0.15
Wildlife Technician (Vegetation)	0.15
Quantitative Ecologist	0.04
Data Manager	0.04
GIS/Data Tech	0.02
Interns	
SFCN Total	0.55

References:

Rice, K. G., J.H. Waddle, M.E. Crocket, B. M. Jeffrey, and H. F. Percival. 2004. Herpetofaunal Inventories of the National parks of South Florida and the Caribbean: Volume I. Everglades National Park. U.S. Geological Survey, open-File Report 2004-1065, Fort Lauderdale, Florida.

Rice, K. G., J.H. Waddle, M.E. Crocket, B. R. R. Carthy, and H. F. Percival. 2005a. Herpetofaunal Inventories of the National parks of South Florida and the Caribbean: Volume II. Virgin Islands National Park. U.S. Geological Survey, open-File Report 2005-1301, Fort Lauderdale, Florida.

Rice, K. G., J.H. Waddle, B. M. Jeffrey, A.N. Rice, and H. F. Percival. 2005b. Herpetofaunal Inventories of the National parks of South Florida and the Caribbean: Volume III. Big Cypress National Preserve. U.S. Geological Survey, open-File Report 2005-1300, Fort Lauderdale, Florida.