



## Patterns of Mercury Bioaccumulation in Fish in the Greater Everglades

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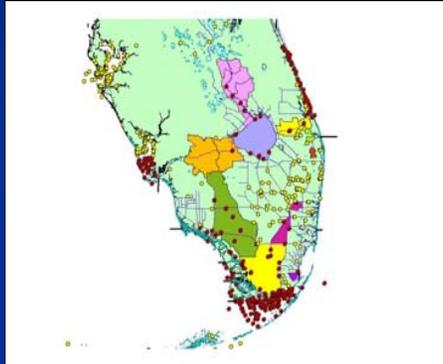
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### BACKGROUND

Mercury is a persistent, bioaccumulative toxicant of concern in south Florida which can build up in aquatic food webs to levels that are harmful to human and ecosystem health. Fish consumption advisories are now widespread in both freshwater and coastal marine environments. As the Comprehensive Everglades Restoration Plan (CERP) moves forward, monitoring of mercury in sentinel fish species has been implemented to establish a baseline against which to gauge the impacts of hydrological and ecological changes accompanying restoration activities. The goal is to ensure that CERP does not inadvertently worsen the existing mercury problem in South Florida to the point that risks to humans or wildlife outweigh restoration benefits.

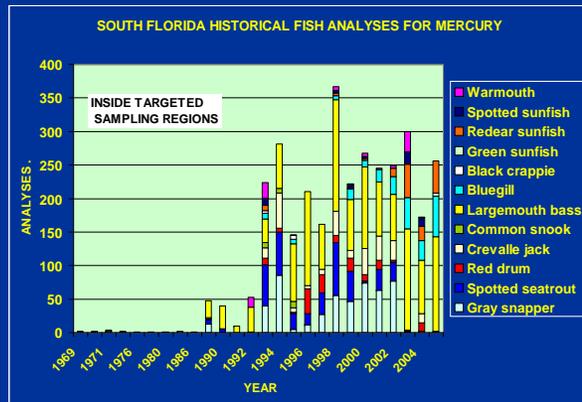
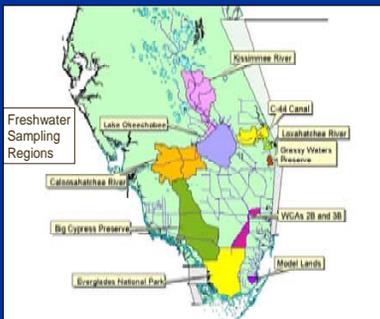
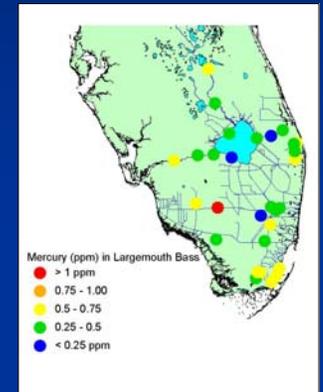
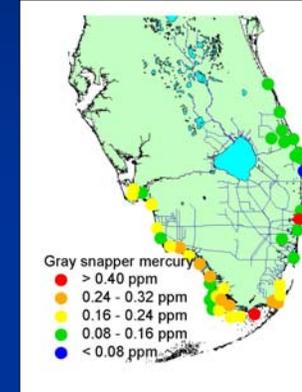
### HISTORICAL DATA



Historical sites where target fish species have been sampled and analyzed for mercury. Red dots are within the boundaries of our sampling regions. Yellow dots are sites in the historical database that are outside of our sampling regions.



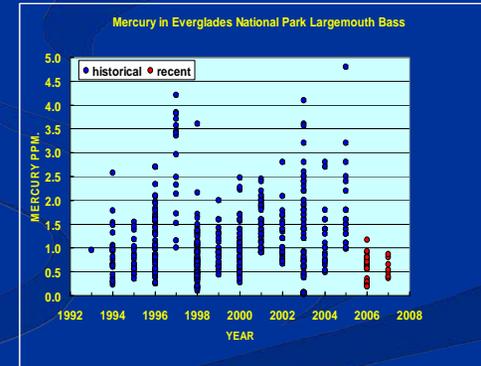
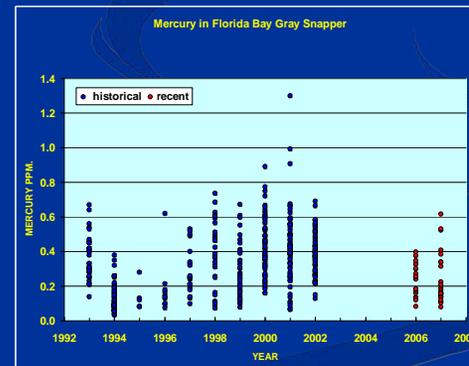
### CURRENT RESULTS



Numbers of sentinel fish species from south Florida analyzed for mercury between 1969 and 2005. Shows fish from within our 23 targeted sampling regions.

Highest mercury concentrations in marine regions were found along the extreme southeast tip of Florida, from Florida Bay through Biscayne Bay, as well as through Whitewater Bay to Ten Thousand Islands. These sites seemed to be associated with restricted flushing.

Higher mercury concentrations in freshwater regions were observed in Big Cypress National Preserve, Model Lands, Everglades National Park, and Grassy Waters Preserve. These regions are dominated by shallow wetlands. Those with lower mercury concentrations were either rivers, canals, or Lake Okeechobee.



### Sampling Design

- 23 regions - 13 coastal marine regions and 10 freshwater regions
- 2 target species per region: gray snapper and crevalle jack for coastal marine regions and largemouth bass and bluegill for freshwater regions
- 20 fish of each species per region



### Conclusions:

Our results suggest the following implications of Everglades restoration on mercury bioaccumulation:

- Prior to the implementation of most CERP projects, mercury concentrations in the sentinel fish already, exist in some regions of the Greater Everglades, at levels exceeding criteria to protect human and wildlife health.
- Mercury concentrations vary substantially across and within regions, with areas of restricted water flushing seeming to have highest concentrations.
- Altered water flow accompanying CERP is likely to change mercury bioaccumulation. Hotspots, with limited water flushing, are likely to experience reduced mercury bioaccumulation if increased water input accompanies CERP. Diversion of water from well flushed areas (e.g. St. Lucie estuary) may increase mercury bioaccumulation through increased water residence time.
- Our ability to detect changes in mercury concentrations over time will improve with additional years of data and incorporation of size and sub-regional (station) adjustments for these sources of controllable variability.