Mercury contamination is a significant problem for aquatic organisms and predators as well as a potential health risk for humans. Many lakes in the northern United States, southern Canada, and Scandinavia are affected by mercury contamination (Mierle, 1990; Hurley and others, 1991; Lindqvist, 1991). Florida and 27 other states have issued health advisories that restrict consumption of fish because of high levels of mercury (Tom Atkeson, Florida Department of Environmental Regulation, written commun., 1992). The problems with mercury relate to two factors—mercury biomagnifies in the food chain to toxic concentrations, even though it is found at very low (subnanogram-per-liter) concentrations in water; and mercury is transported and deposited through atmospheric processes and is, thus, widely distributed. Methylmercury is the more toxic bioaccumulative species. As a
result of environmental changes, increased rates of methylation may be contributing to toxic mercury problems. For example, a change from an aerobic to an anaerobic environment would favor increased mercury methylation (Winfrey and Rudd, 1990; Gilmour and Henry, 1991) and mercury uptake in the biota. Because of the existing burden of mercury in the environment, recycling of mercury between demethylated and methylated forms can provide a source of methylmercury even if atmospheric deposition ceased. However, estimates indicate that atmospheric mercury concentrations have nearly doubled over the last 50 years (Fitzgerald and others, 1991; Slemr and Langer, 1992). Increasingly evident is the fact that even modest increases in atmospheric deposition can translate into mercury levels in organisms that are of ecological and, perhaps, toxicological concern.

High levels of mercury have been measured in fish (fig. 37) and wildlife in south Florida, particularly in the Everglades. Roughly 1 million acres of the Everglades are under a health advisory that recommends that anglers and others completely avoid consuming large mouth bass and several other species of fish (Lambou and others, 1991). Mercury body burdens of large mouth bass collected in the Everglades were higher than those taken at Superfund sites noted for mercury contamination (Dan Scheidt, U.S. Environmental Protection Agency, personal commun., 1992). Alligators harvested

Figure 37. Areas in south Florida where mercury concentrations in large mouth bass tissue equaled or exceeded one-half parts per million. (Lambou and others, 1991.) Click on image to open larger picture (29.7k).
from the Everglades cannot be sold for human consumption because of elevated mercury levels in their tissue. In 1989, a Florida panther died from mercury toxicosis (Lambou and others, 1991), and mercury is suspected as the causative agent in the deaths of two other panthers. Analysis of raccoons, a major prey of panthers, from certain areas of south Florida revealed very high concentrations of mercury in liver and muscle tissues (Lambou and others, 1991).

The result of a recently completed study in which 50 sediment cores were taken across the Everglades indicate that mercury accumulation rates increased about sixfold between 1900 and 1992 (Delfino and others, 1993). The greatest increases in mercury concentrations were in the northern Everglades, and the timing of the increases corresponded fairly well with alterations of Everglades hydrology and with agricultural and urban development in south Florida.

The severity of the mercury problem in the Everglades may be the result of a combination of factors. Concerns are focused on two potential sources of the problem--local effects of municipal incinerators and other emission sources on the southeastern coast of Florida, and possible increased release of mercury or increased methylation of mercury from soils in the Everglades as a result of drainage and soil disturbance (Tom Atkeson, Florida Department of Environmental Regulation, written commun., 1992).

Additional research on mercury in south Florida continues. The Electric Power Research Institute, Florida Power and Light, and the Florida Department of Environmental Protection are currently funding a project to determine atmospheric deposition patterns and rates of mercury deposition in the region. The U.S. Environmental Protection Agency has initiated a study of mercury in the Everglades with the goal of establishing spatial trends of mercury concentrations in water, sediment, and biota. The USGS is planning research in the Everglades on processes that control mercury transport and cycling. Research studies are being planned by the State in the northern Everglades where a nutrient-removal project is underway as a result of concern that the effects of nutrient removal will promote the release of sediment-bound mercury or an increase
in the methylation of mercury.