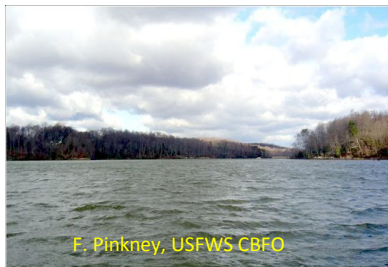
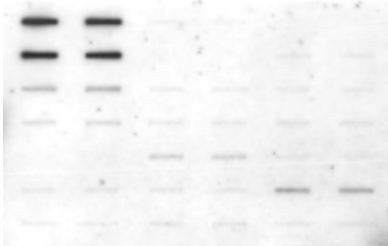


## Patuxent Wildlife Research Center

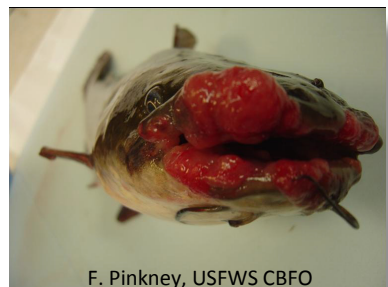
# Tumors in Brown Bullheads from Chesapeake Bay Rivers: Searching for the Cause



- **The Challenge:** Surveys of tumor prevalence in brown bullhead (*Ameiurus nebulosus*) conducted by the US Fish and Wildlife Service Chesapeake Bay Field Office (CBFO) in the Anacostia River in Washington, DC and in the South River, near Annapolis, MD, have revealed high prevalence of skin and liver tumors. The tumors in bullheads from the highly degraded Anacostia River have been linked to polycyclic aromatic hydrocarbon (PAH) exposure. However, the South River does not have large concentrations of heavy industry or conspicuous point sources in its watershed, so the causes of the tumors there remain a mystery.



- **The Science:** The interaction of a chemical pollutant with DNA results in the formation of a covalent bond, known as a DNA adduct. DNA adducts are crucial and early indicators of carcinogenesis. In aquatic habitats, PAHs and alkylating agents such as nitrogen compounds (N-nitrosamines, nitrite) tend to be the predominant adduct-forming compounds. To understand the cause of the tumors observed in brown bullheads, we investigated the presence DNA adducts that are formed in response to alkylating agents in liver and skin tissue from fish collected from the South, Anacostia, and Choptank Rivers.



- **The Future:** We detected alkyl DNA adducts in bullhead livers from the South and Anacostia rivers, but not the Choptank River. However, no alkyl adducts were detected in skin samples from any fish. Although the results suggest that fish in the Anacostia and the South Rivers are exposed to alkylating agents, the DNA adduct data suggested that liver and skin tumor prevalence was not correlated with exposure to these compounds. Because tumor prevalence is used as an environmental indicator, identification of tumorigenic agents in these fish is important for defining areas of concern and focusing cleanup work. Efforts to further clarify the causes of the elevated tumor rates are continuing.