EDWARDS, THOMAS III[1], DENNIS HANEY[1], VICTORIA TURGEON[1], AND MICHAEL CARABALLO[2]. Furman University[1] and Universidad Metropolitana[2]- Metallothionein synthesis and physiological bio-indicators in fish exposed to zinc in the upper Enoree River, South Carolina.

While the acute effects of zinc on aquatic organisms have been well studied, comparatively little is known about the long-term effects of zinc on fish health. In 1985 an industrial retainment pond in northwestern South Carolina ruptured, spilling over 75,000 liters of spent galvanizing waste containing zinc and other contaminants into the headwaters of the Enoree River. Elevated zinc concentrations still affect animals living in the river. We first examined metallothionein production induced by relatively high zinc concentrations (0.31-1.22 ppm) in the bluehead chub *(Nocomis leptocephalus)*. Fish were collected from four sites in the upper Enoree River, and metallothionein in gills and livers was isolated using SDS-PAGE and semi-quantitative western blot analysis with the rabbit anti-cod metallothionein polyclonal antibody. Tissues were also examined histologically for metallothionein localization. Fish collected from waters with the highest zinc concentration expressed more metallothionein than the controls (0 ppm zinc). Metallothionenin granules were found throughout the gill, with the majority of the localization confined to the stratum granulosum of the epithelium. In livers, metallothionein was concentrated around the portal veins, but not the portal arteries, perhaps aiding in the removal of waste and toxins. We also examined whether red-breasted sunfish (*Lepomis auritus*) collected at low zinc levels (0.04-0.6 ppm), would have depressed physiological and immunological functions compared to control fish (0 ppm zinc). As zinc exposure increased, overall health was negatively affected, with fish at 0.6 ppm exhibiting a lower condition factor and hematocrit, along with increased visceral and liver somatic indices.