

Metallothionein Production and Mortality Rate in Bluehead Chubs (*Nocomis leptocephalus*) as a Result of Natural Zinc Exposure in the Upper Enoree River, South Carolina

Trey Edwards, Dennis C. Haney, and Victoria L. Turgeon, Department of Biology, Furman University, Greenville SC 29613

We studied the effects of zinc on mortality and metallothionein protein production in the bluehead chub, *Nocomis leptocephalus*, through the collection and introduction of these fish into a zinc contaminated stream. Fish were collected from the Upper Enoree River, SC, at two locations downstream from the site of a ruptured retention pond that spilled 20,000 gallons of spent galvanizing waste in 1985. Detection of metallothionein in gills and livers was determined by separating the total proteins extracted by SDS-PAGE followed by Western blotting with the rabbit anti-cod metallothionein polyclonal antibody. Localization of metallothionein within specific regions of the gills and livers was determined by immunostaining with the rabbit anti-cod metallothionein polyclonal antibody, counterstained with eosin. While granules of metallothionein were found throughout the gill, it was localized in the stratum granulosum of the gill epithelium. Metallothionein is concentrated around the portal veins in the liver, but not around the portal arteries, therefore possibly aiding in removal of waste and toxins. *Nocomis leptocephalus* were then collected from a nearby uncontaminated site to study the protective qualities of metallothionein production. Collected fish were placed into the stream in minnow traps at either a site with no zinc, or one with a sublethal zinc concentration of 0.15 g/mL. After one week, all surviving fish were transplanted to a site with a lethal zinc concentration of 0.50 g/mL. Fish which were initially exposed to the sublethal concentration of zinc had decreased mortality compared to controls, supporting the hypothesis of a protective role for metallothionein.