

Ohio Shrimp

Macrobrachium ohione

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DESCRIPTION

Taxonomy and Basic Description

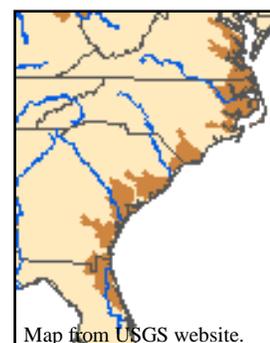
The Ohio Shrimp, *Macrobrachium ohione* (Smith), is a member of the family Palaemonidae, characterized by having the first two pairs of legs chelate, the second pair larger than the first, and the carpus of the second leg not subdivided. The Ohio Shrimp is characterized by having a hepatic spine present (as do several other *Macrobrachium* spp.) and enlarged, elongate second pereopods (though not as large as in other *Macrobrachium* spp.). The rostrum has up to 13 teeth and is upturned with a toothless, daggerlike tip. The Ohio Shrimp may grow up to 10 cm (4 in.) long. The color is pale gray flecked with small blue spots (Williams 1984; Bowles et al. 2000).

Status

The population of Ohio Shrimp in South Carolina is not listed as threatened or endangered; however, in parts of its range, the Ohio Shrimp is listed as rare and of long-term concern (Missouri Natural Heritage Program 2004). In some parts of its range, such as Louisiana, the population is abundant enough to provide a fishery. The Ohio Shrimp has a global rank of apparently stable (G4) but has no state rankings (NatureServe 2011).

POPULATION DISTRIBUTION AND SIZE

This river shrimp occurs in lower salinity and tidal freshwater areas and coastal plain rivers in South Carolina (Cooper 2011a). Its range on the Atlantic Coast extends from Virginia into Florida. The Ohio Shrimp was once common in the Mississippi River below St. Louis, and commercial fisheries for this species previously existed near Chester and Cairo, Illinois. However, Ohio Shrimp have declined dramatically in the Mississippi, most likely due to channelization of the river (Barko and Hrabik 2004). Two specimens collected in 2001 from the Ohio River of Illinois were the first records from the river in over 50 years (Poly and Wetzel 2002). The size of the population in South Carolina is unknown.



HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Ohio Shrimp apparently prefer low velocity water (Conaway and Hrabik 1997); however, open side channels, a preferred habitat of Ohio Shrimp, have flow during normal river elevations (Barko and Herzog 2003). Ohio Shrimp prefer borders of the main channel, especially when the



borders are flooded and plant and animal material are available for foraging (Truesdale and Mermilliod 1979). Ohio Shrimp have been reported to have greater abundance in areas with suspended particulate matter, which may be a predator avoidance response. Ohio Shrimp occupy low visibility physical habitats that are also occupied by predatory fishes, such as flathead catfish, a species that is not native to South Carolina (Barko and Herzog 2003). Little is known about the life history of the Ohio Shrimp in South Carolina. In other areas, it has been reported to receive reproductive cues from spring floods and uses flooded terrestrial habitat for reproduction (Hobbs 2001). Aspects of the reproductive biology of Ohio Shrimp in the lower Mississippi and Atchafalaya Rivers were studied recently (Olivier and Bauer 2011).

According to Ortmann (1902), the genus *Macrobrachium* has probably only recently evolved migratory behavior into fresh water. Biological characteristics indicative of this relatively recent adaptation include high hemolymph osmo-ionic concentrations, tolerance of high salinities, dependence on saline water for larval development with many larval stages, and migratory behavior (McNamara 1987).

CHALLENGES

Ohio Shrimp may have declined as a result of waterway channelization and habitat loss in parts of its range. Changes in river physiography that fragment main channel borders and isolate side channels during moderate to low river elevation can reduce Ohio Shrimp populations (Logsdon 1993; Hobbs 2001; Barko and Herzog 2003). In parts of its range, reduced connectivity with the floodplain—because of levees, closing structures, and wing dikes—has also contributed to Ohio Shrimp declines.

For many years, wetlands were frequently filled, drained, polluted, or used for dumping grounds. In the past two decades, 84% of wetlands losses have occurred in the Southeastern United States (SCDHEC 1998c). The losses in South Carolina do not appear to be as extensive as in other states. Officials estimate that South Carolina has lost about 27% of its wetlands since the mid-1700s (Dahl 1990). About 90% of the state's wetlands are freshwater, which is the habitat type utilized by the Ohio Shrimp. Freshwater wetlands occur throughout South Carolina, but are most abundant in the central and lower areas of the state. Freshwater marshes are most prevalent along the lower portions of the Waccamaw, Pee Dee, Santee, Cooper, Edisto and Savannah Rivers.

Despite recent legislation, national progress on improving protection for wetlands has not occurred as quickly as needed, and wetlands losses have continued. This is because the mitigation process does not require that the “taker” replace the lost wetland with a wetland of equal quality. This type of mitigation results in “replaced” wetlands that do not necessarily have the same hydrologic features or wetland functions as the lost wetland. Often, a “taken” wetland will be within a system of hydrologic flow that cleanses water and supports abundant wildlife, while the replaced wetland does not perform the same ecosystem functions (E. Ciuzio, SCDNR, pers. comm. March, 2005).

CONSERVATION ACCOMPLISHMENTS

In recent times, Americans have become aware of the importance and value of wetland

resources, which has led to legislative protection and restoration proposals across the country. The benchmark act, The North American Wetland Conservation Act of 1989 (NAWCA) established a “no net loss” policy for wetlands. That means any wetlands lost through anthropogenic activities, such as filling for development, must be matched by restoration, expansion, or replacement of an equal amount of wetlands. Despite the limitations of NAWCA, this law has helped to slow the loss of wetlands in the United States, thus protecting habitat for Ohio Shrimp.

CONSERVATION RECOMMENDATIONS

- Examine the ecological role of Ohio Shrimp in riverine systems in South Carolina.
- Establish baseline data on population size, distribution, and habitat requirements of Ohio Shrimp in South Carolina waters.
- Examine how anthropogenic river modifications and reduced floodplain connectivity may impact Ohio Shrimp as well as other riverine species.
- Protect tidal freshwater habitats in South Carolina from development and modifications to natural freshwater flow regimes by partnering with the appropriate permitting agency to provide better technical information about the potential negative effects of development on aquatic ecosystems.
- Encourage citizens to donate wetland areas to a land trust that will protect it in perpetuity.
- Partner with the United State Army Corps of Engineers to restore natural hydrologic regimes where possible and reduce further modifications.
- Consider water flow impacts on Ohio Shrimp when renewing licenses for river dams.
- Institute and implement a process of statewide or regional wetland mitigation banking with the goal of planning restoration projects such that “mitigation” wetlands function more like the ones they are meant to replace.

MEASURES OF SUCCESS

By monitoring populations of Ohio Shrimp, along with other tidal freshwater species, annual and seasonal trends in abundance can be detected. By working proactively, SCDNR will be able to manage a stable population of Ohio Shrimp as well as other species that utilize the same habitat. The measurement of success will be “no net loss” of high quality wetlands.

LITERATURE CITED

- Barko, V.A. And D.P. Herzog. 2003. Relationships among side channels, fish assemblages, and environmental gradients in the unimpounded Upper Mississippi River. *J. Freshwater Ecol.* 18(3):377–382.
- Barko, V.A. and R.A. Hrabik. 2004. Abundance of Ohio Shrimp (*Macrobrachium ohione*) and Glass Shrimp (*Palaemonetes kadiakensis*) in the Unimpounded Upper Mississippi River *American Midland Naturalist* 151:265–273.

- Bowles, D.E., K. Aziz and C.L. Knight. 2000. *Macrobrachium* (Decapoda: Caridea: Palaemonidae) in the contiguous United States: A review of the species and an assessment of threats to their survival. *Journal of Crustacean Biology*. 20(1): 158–171.
- Conaway, L.K. And R.A. Hrabik. 1997. The Ohio shrimp, *Macrobrachium ohione*, in the Upper Mississippi River. *Trans. Missouri Acad. Sci.* 31:44–46.
- Cooper, J.E. 2011a. Giant River Shrimps of the genus *Macrobrachium* (Decapoda: Palaemonidae) in North and South Carolina. *Journal of the North Carolina Academy of Science*. 127(2): 176-178.
- Dahl, T.E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 13 pp.
- Hobbs, H.H. 2001. Decapoda. In: J. H. Thorpe and A. P. Covich (eds.). *Ecology and classification of North American freshwater invertebrates*. Academic Press, San Diego, California. 911 pp.
- Logsdon, D.E. 1993. Suitability of side channel border and wing dam habitats for fishes overwintering in Pool 26 of the Mississippi River. Master's Thesis, Southern Illinois University, Carbondale, Illinois.
- McNamara, J.C. 1987. The time course of osmotic regulation in the freshwater shrimp *Macrobrachium olfersii* (Wiegmann) (Decapoda, Palaemonidae). *Journal of Experimental Marine Biology and Ecology*. 107:245-251.
- Missouri Natural Heritage Program. 2004. Missouri Species and Communities of Conservation and Concern Checklist. Missouri Department of Conservation. Jefferson City, MO. 47 pp.
- NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>.
- Olivier, T.J. and R.T. Bauer. 2011. Female downstream-hatching migration of the river shrimp *Macrobrachium ohione* in the lower Mississippi River and Atchafalaya River. *Amer. Midl. Nat.* 166(2):379–393.
- Ortman, A.E. 1902. The geographical distribution of freshwater decapods and its bearing on ancient geography. *Proc. Amer. Phil. Soc.* 41(171):267-400.
- Poly, W.J. and J.E. Wetzel. 2002. The Ohio shrimp, *Macrobrachium ohione* (Palaemonidae), in the lower Ohio River of Illinois. *Trans. Illinois State Acad. Sci.* 95(1):65–66.
- South Carolina Department of Health and Environmental Control. 1998. The facts on wetlands. ML# 017028. Columbia, South Carolina. 2 pp.

Truesdale, F.M. and W.J. Mermilliod. 1979. The river shrimp *Macrobrachium ohione* (Smith)(Decapoda, Palaemonidae): its abundance, reproduction, and growth in the Atchafalaya River basin of Louisiana, USA. *Crustaceana*. 36:61–73.

United States Geological Survey (USGS). 2013. *Macrobrachium ohione*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.
<http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=2878> Revision Date: 7/26/2012.

Williams, A.B. 1984. Shrimps, lobsters, and crabs of the Atlantic coast of the eastern United States, Maine to Florida. Smithsonian Institution Press, Washington, DC. 550 pp.