

UTAH DEPARTMENT OF NATURAL RESOURCES

Fish Use of the Willard Spur

A literature review

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Fish community

No reports of fishery investigations of the Willard Spur were found prior to Moore 2011, yet observations from studies of migratory birds utilizing the area as well as reports from anglers lend support to Moore's findings that suggest the fishery is dominated by common carp (Paul and Manning 2002; Neill et al. 2009). The other fish species which appear to comprise a significant portion of the Spur's biomass include gizzard shad, black bullhead, and Utah chub (Penne 2012; Moore 2011). Each of these species are ecological generalists, capable of thriving in a variety of conditions and feeding on a diverse array of food items (Sigler and Sigler 1996).

The two fisheries which provide water directly to the Willard Spur have been extensively studied, and provide indirect information about what species are likely to be members of the local fish community. These two fisheries are the Bear River and Willard Bay Reservoir and a review of reports from these two waters confirm and support the species documented by Moore 2011 and Penne 2012 in their fishery investigations of the Willard Spur. The primary fish species found in the Bear River and Willard Bay Reservoir are common carp, gizzard shad, channel catfish, black bullhead, hybrid striped bass (a.k.a. wiper), walleye, and Utah chub (Mellon 2006; Sorenson and Pettengill 1991). Among these species only carp, shad, black bullhead, and Utah chub are capable of spawning in the shallow wetland areas characterizing the Spur. Walleye require rock and cobble to spawn, catfish require cavities, and wipers are effectively sterile as a result of hybridization.

While the Willard Spur is gaining popularity as a popular bowfishing destination for carp, the primary value of the carp fishery in the Willard Spur is as a food source for migratory birds such as white pelicans (Paul and Manning 2002; Neill et al. 2009).

Factors affecting fish abundance

The size and quality of the fish habitat offered by the Willard Spur varies considerably from year to year and is heavily dependent upon annual precipitation. In wet years, the

Spur offers a vast expanse of shallow water habitat for a variety of fish species to use (Paul and Manning 2002). In drier years, the amount of habitable water for fish decreases considerably and will even dry up completely during intense drought. Drying events resulting in a near total loss of the fishery have been observed in 2000-2001, and 2007 (Neill et al. 2006; Neill et al 2009), suggesting annual precipitation may have the strongest environmental influence on the fishery.

Winter use of the Spur by fish is likely heavily influenced by water levels and may change considerably from year to year. Common carp have been documented surviving winters under ice in water as shallow as 28 cm deep (Verrill and Berry 1995), however; studies in lakes have observed carp often aggregate in deep water areas adjacent to littoral habitat (Penne and Pierce 2008; Johnsen and Hasler 1977) and suggest carp in the Spur may migrate to available deep water habitat such as mouth of the Bear River. The other species of fish inhabiting the Willard Spur will likely be found inhabiting deeper water as well, as it provides thermal refuge from coldest temperatures found near the water surface.

Food items of fish community

The dominant species found in the Spur (carp, shad, bullhead, and chub) are all generalist feeders; capable of eating detritus, benthic invertebrates, plant material, and plankton which the Spur appears to have in abundance (Sigler and Sigler 1996). Because of the dynamic nature of the Willard Spur, the broad range of items these fish are capable of eating, gives them an advantage over fish with more specialized diets. Of particular note, common carp are primarily benthic foragers and their feeding activity suspends large amounts of sediment in the water column and often uproots aquatic plants (Panek 1987). In systems with high densities of common carp, the collective feeding activity of these fish can degrade water quality and reduce habitat for other fish species (Schrage and Downing 2004). For this reason, high common carp densities are viewed not only as a sign of degraded water quality, but also as a roadblock to improvement.

Literature Cited

- Johnsen, P.B. and A.D. Hasler. 1977. Winter aggregations of carp (*Cyprinus carpio*) as revealed by ultrasonic tracking. *Transactions of the American Fisheries Society* 106:556-559.
- Mellon, C.D. 2006. Three species monitoring summary: statewide 2006. Utah Department of Natural Resources, Division of Wildlife Resources. Salt Lake City, Utah.
- Moore, H. 2011. Fish diversity of Willard Spur, Great Salt Lake. Watershed Sciences Department. College of Natural Resources. Utah State University. Logan, Utah.
- Neil, J., W.C. Perschon, and J. Luft. 2006. 2006 Gunnison Island American White Pelican census and ground truthing. Utah Department of Natural Resources, Division of Wildlife Resources.
- Neill, J.N., J. Luft, E. Bankhead, B. Bartosz, M. Dalton, C. Juran, and B. Rackham. 2009. 2009 Gunnison Island American white pelican census. Utah Department of Natural Resources, Division of Wildlife Resources.
- Panek, F.M. 1987. Biology and ecology of carp. Pages 1-15 in E.L. Cooper, editor. *Carp in North America*. American Fisheries Society, Bethesda, Maryland.
- Paul, D.S. and A.E. Manning. 2002. Great Salt Lake waterbird survey – five year report (1997-2001). Utah Department of Natural Resources, Division of Wildlife Resources. Salt Lake City, Utah.
- Penne, C.R. 2012. Willard Spur fishery investigation. Utah Department of Natural Resources, Division of Wildlife Resources. Salt Lake City, Utah.
- Penne, C.R. and C.L. Pierce. 2008. Seasonal distribution, aggregation, and habitat selection of common carp in Clear Lake, Iowa. *Transactions of the American Fisheries Society* 137:1050-1062.
- Schrage, L.J. and J.A. Downing. 2004. Pathways to increased water clarity after fish removal from Ventura Marsh; a shallow, eutrophic wetland. *Hydrobiologia* 511:215-231.
- Sigler, W. F. and J. W. Sigler. 1996. *Fishes of Utah: a natural history*. University of Utah Press. Salt Lake City,
- Sorenson, K. and T. Pettengill. 1991. Introduction of gizzard shad to Willard Bay Reservoir as a forage supplement: preliminary result. Utah Department of Natural Resources, Division of Wildlife Resources.

Verrill, D.D. and C.R. Berry. 1995. Effectiveness of an electrical barrier and lake drawdown for reducing common carp and bigmouth buffalo abundances. *North American Journal of Fisheries Management* 15:137-141.