

Potential Impacts to Fish Populations with Restoration of the Ocklawaha River

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FREQUENTLY ASKED QUESTIONS ABOUT FISH IMPACTS

Two related questions have been raised about the potential impacts to various fish populations that would occur from breaching of the Rodman/Kirkpatrick Dam and restoring the free-flowing Ocklawaha River, as follows:

- Will breaching the Rodman/Kirkpatrick Dam destroy the fishery there?
- What about the migratory species that used to populate the Silver and Ocklawaha Rivers?

Summary Response

It is recognized that the Largemouth Bass fishery following breaching of the dam would not support the current angler effort and catch experienced in the large intensively managed pool; however, viable fisheries would still exist in the river without requiring the ongoing costly maintenance and management activities. Similarly, fish currently attempting to move up the river are blocked by the dam and congregate in large numbers in the dam's tailwaters where they are easily targeted by bank fisherman. Breaching of the dam would impact this tailwater fishery, but it would not have a negative effect on overall fish abundance as these fish would continue to move upstream and disperse throughout the river and springs. In addition, the abundance of many sought-after species would likely increase upstream of the current dam, resulting in an enhanced fishing experience.

Breaching of Rodman/Kirkpatrick Dam would cause a fish species shift in the current reservoir from species that prefer lake habitats to those that prefer flowing habitats. Fish species diversity and abundance in the river upstream of the current dam and reservoir, including Silver Springs, would increase. Removing the dam as a barrier to fish movement would allow several migratory fish species (e.g., Striped Bass, American Shad, Atlantic and Shortnose Sturgeon, American Eel and others) access to potential historical spawning grounds and nursery habitats. Removal of the dam would also result in increased populations of fishes such as Striped Mullet and Channel Catfish that have declined significantly in Silver Springs, and provide them with greater access to the springs and upper reaches of the river.

Extended Discussion

Will breaching the Rodman/Kirkpatrick Dam destroy the fishery there?

Rodman Reservoir proper and the tailwaters below the dam support popular recreational sport fisheries. Because the lake is intensively managed using drawdowns and extensive aquatic herbicide treatments,

quality fisheries for Largemouth Bass and Black Crappie are maintained.¹ Prior to the initiation of these intensive and costly management activities the lake frequently became overgrown with nuisance aquatic vegetation, summer dissolved oxygen fell to levels below state water quality standards, extensive fish kills were common, and fishing declined.^{2,3,4} Under a natural restored river condition there would be less water to fish in the lake area, but the need for herbicide treatments would be dramatically reduced, and natural river water level fluctuations and flows would replace the need for managed drawdowns to enhance habitat and stimulate fish production. While the riverine Largemouth Bass and Black Crappie fisheries that would persist following breaching of Rodman/Kirkpatrick Dam would not support the annual angler boating effort and catch currently supported by the 8,500-acre managed lake, viable fisheries for both species in the restored river would still exist. In addition, the abundance of other sought-after species such as Striped Bass, Redbreast Sunfish, Spotted Sunfish, Channel Catfish, White Catfish, and Brown Bullhead would likely increase upstream of the current dam, resulting in enhanced fishing for these species throughout the middle and upper river.⁴

Rodman/Kirkpatrick Dam serves as a barrier to prevent the upstream movement of fish from the lower river. As a result, large numbers of fishes congregate in the tailwaters immediately below the dam where sport fish are intensively targeted by bank fisherman.⁵ Fishing in the tailwater is especially good during the spring.⁵ Fish passing downstream through the gated structure in the dam, particularly Largemouth Bass, also contribute to the tailwater fishery.⁵ Breaching the dam would eliminate the existing tailwater fishery; however, it would not have a negative effect on overall fish abundance as fish that now congregate below the dam would disperse throughout the river. Bank fishing access would still be available at the current location after dam removal and additional bank fishing opportunities would open near the Orange Springs, Kenwood and Paynes Landing boat ramps, as well as other sites along the river.

What about the migratory species that used to populate the Silver and Ocklawaha Rivers?

The American Fisheries Society has identified restoring riverine corridors that allow native and migratory species access to historic native channel and floodplain habitats as one of the most pressing needs for protecting the future of the nation's fisheries.⁶ One commercially important catadromous species whose juveniles ascend the Ocklawaha River to access important nursery habitat is the American Eel.⁷ American Eel have suffered significant population declines along the entire east coast⁸ and are currently under

¹ Nagid, et al. 2015. Effects of reservoir drawdowns and the expansion of hydrilla coverage on year-class strength of largemouth bass. *North American Journal of Fisheries Management* 35(1);54-61.

² Ketelle, M. J. and Uttermork, P.D. 1971. *Problem Lakes in the United States*. University of Wisconsin Water Resources Center Technical Report 16010 HER, Madison, WI.

³ Livingston, R. J. 1990. The Ocklawaha River Pages 86-95 in R. J. Livingston, editor. *The Rivers of Florida*. Springer-Verlag. New York, NY.

⁴ Continental Shelf Associates. 1994. *An analysis of fish populations in Rodman Reservoir and the lower Ocklawaha River*. Volume 15. Environmental Studies Concerning Four Alternatives for Rodman Reservoir and the Lower Ocklawaha River. St. Johns River Water Management District, Palatka, Florida.

⁵ FGFWFC 1976. *Cross Florida Barge Canal Restudy Report*. Volumes I-V, Tallahassee, Florida.

⁶ Pool, T. 2017. Future of the nation's fisheries and aquatic resources: challenges we face in 2017 and beyond. *Fisheries* 42(1):4:66.

⁷ McLane, W. M. 1955. *The fishes of the St. Johns River system*. Doctoral dissertation. University of Florida, Gainesville, Florida.

⁸ Haro, A. W. et al. 2000. Population decline of the American Eel: implications for research and management. *Fisheries* 25(9):7-16

consideration for potential listing as a threatened species.⁹ American Eel were extremely abundant in the Ocklawaha River prior to the construction of Rodman Dam.⁷ Swarms of thousands of juveniles were even observed as far upstream as Moss Bluff Dam.⁷ Juvenile American Eels still congregate below Rodman Dam but only a few make it farther upstream.^{5,10} Breaching of Rodman Dam could have important implications for the potential recovery of this species, as it would allow juveniles to once again access the important nursery habitats that the middle and upper reaches of the Ocklawaha River historically provided.^{10,11}

There are three important anadromous shads, American Shad, Hickory Shad, and Blueback Herring, that ascend the St. Johns River in the spring to spawn.^{10,12} All three may have utilized the pre-dam Ocklawaha River for spawning but data documenting reproduction is mostly anecdotal, and all three species were reportedly rare in the river before the dam was built.^{7,10} Intensive population and reproduction surveys of the entire St. Johns River basin conducted by the U. S. Fish and Wildlife Service in the 1950's did not list the Ocklawaha River as providing important American Shad spawning habitat.¹³ The major spawning grounds of American Shad in the St. Johns River were found to occur in the main river channel between Lake Monroe and Lake Poinsett.^{12,13} Similarly, primary Hickory Shad and Blueback Herring spawning grounds are also located upstream of Lake Monroe.¹² However, Blueback Herring in breeding condition have been captured in the St. Johns River as far downstream as Lake George and Welaka.⁵ In 1971, 1975, and 1994 there were anecdotal reports of a few schools of migratory shad congregated below the dam, but individual species were not identified.^{5,10} Currently, an occasional unidentified migratory shad is also encountered downstream of the Rodman/Kirkpatrick Dam or in the lower Ocklawaha River during spring electrofishing collections of other fishes.¹⁴ Thus, with the breaching of Rodman/Kirkpatrick Dam, it's likely there may be an attempt by at least one or more of the migratory shads to access the upper river for spawning. However, it's unlikely that numbers of shad of any of these three species that attempt to spawn will comprise a significant proportion of the overall St. Johns River spawning population.¹⁰

Prior to the construction of Rodman Dam, the St. Johns River supported a naturally reproducing Striped Bass population¹⁵ but abundance of Striped Bass in the river appeared to be low.⁵ Successful Striped Bass reproduction likely only occurred in the Ocklawaha River because natural reproduction of Striped Bass ceased immediately following completion of Rodman Dam.¹⁶ In addition, there has been no documented natural reproduction of Striped Bass in the St. Johns River in the past 50 years.^{14, 16} In 1972, state and federal agencies began stocking pure-bred Striped Bass from the Santee-Cooper system in South Carolina

⁹ USFWS. 2011. Endangered and threatened wildlife and plants: 90-day finding on a petition to list the American Eel as threatened. Federal Register 76:189:60431-60444.

¹⁰ Jordan, F. 1994. Ocklawaha River migratory fish assessment. Volume 14. Environmental Studies Concerning Four Alternatives for Rodman Reservoir and the Lower Ocklawaha River. St. Johns River Water Management District, Palatka, Florida.

¹¹ Hitt, N. P. et al. 2012. Dam removal increases American Eel abundance in distant headwater streams. Transactions of the American Fisheries Society 141:1171-1179.

¹² McBride, R. S. 2000. Florida shad and river herrings (*Alosa* species); a review of population and fishery characteristics. Florida Marine Research Institute Technical Report TR-5. St. Petersburg FL.

¹³ Walburg, C. H. 1960. Abundance and life history of shad St. Johns River, Florida. U. S. Fish and Wildlife Service Fishery Bulletin 60: 486-501.

¹⁴ Holder, J. FFWCC. Personal Communication.

¹⁵ Barkuloo, J. M. 1967. Florida Striped Bass. Florida Game and Fresh Water Fish Commission Fishery Bulletin 4. Tallahassee FL.

¹⁶ FFWCC. [Striped Bass Stockings in the St. Johns River | FWC \(myfwc.com\)](http://myfwc.com).

in the St. Johns River to attempt to restore the stock and increase angling opportunities. Eventually pure-bred Striped Bass from several other watersheds were also stocked in the river and in 1981, the state also began stocking Striped Bass/White Bass hybrids. Stocking of both pure-bred and hybrid Striped Bass has continued to the present and the current robust population in the St. Johns River consists exclusively of stocked fish.^{14,16} However, there is a possibility that an occasional migrant Striped Bass from another watershed may enter the St. Johns.

Pure-bred Striped Bass stocked in the St. Johns River do become sexually mature and may attempt to spawn (although unsuccessfully). Ripe male and female pure-bred Striped Bass were routinely collected from the river in the past for use as hatchery brood fish. Most brood fish used for spawning were collected from Lake George, around bridge pilings from Palatka to Jacksonville, and from below Rodman/Kirkpatrick Dam.¹⁴ Many hybrid Striped Bass were also observed below the dam although these fish are thought to be mostly sterile. The occurrence of ripe pure-bred Striped Bass as well as hybrids congregated below the dam strongly suggests that with dam removal these fish will attempt to spawn in a restored river. Whether or not spawning will be successful is uncertain. Regardless, if the Rodman/Kirkpatrick Dam were removed as a barrier, abundance of Striped Bass and hybrid Striped Bass in the upstream reaches of the Ocklawaha River all the way to Silver Springs would likely greatly increase and their presence would be maintained year-round, as fish would be able to access the many spring-fed thermal refugia that exist upstream of the dam. In addition, abundance of Striped Bass/hybrid Striped Bass in the Ocklawaha River will likely remain high given the on-going stocking program.

Two species of sturgeon, Atlantic and Shortnose, are native to the St. Johns River although as far back as the 1940's both species were extremely rare⁷ and remain so today.^{10, 17} It has been hypothesized that sturgeons entering the St. Johns River may have spawned in the upper reaches of the Ocklawaha River but definitive data supporting historical spawning in the river are lacking.¹⁷ However, because of their strong bottom-dwelling nature, sturgeon early life stages are rarely collected even in areas where spawning is known to occur. With the breaching of Rodman/Kirkpatrick Dam, it is possible that sturgeon will ascend the Ocklawaha River where conditions appear ideal for spawning.¹⁸ Unfortunately, both Atlantic and Shortnose Sturgeon populations are currently so depleted that stocking and other active management may be necessary to support the re-establishment of reproducing populations.¹⁹

Effects on Species Diversity

Scientific research supports the notion that fish species diversity throughout the Ocklawaha River upstream of Rodman/Kirkpatrick Dam would likely increase following restoration of the river.²⁰ In Florida, for example, removal of the Dead Lake Dam on the Chipola River resulted in an increase in the total number of fish species collected upstream of the dam from 31 to 64.²¹ Similar results for a variety of fish species are reported by numerous other dam removal studies conducted throughout the country.²⁰ Fish

¹⁷ McBride, R. S. and R. E. Matheson. 2011. Florida's diadromous fishes: biology, ecology, conservation and management. *Florida Scientist* 74(3):187-213.

¹⁸ Sulak, K. USGS (emeritus). Personal Communication

¹⁹ Walsh, S. USGS. Personal Communication

²⁰ Bellmore, R. J. et al. 2019. Conceptualizing ecological response to dam removal; if you remove it, what's to come? *Bioscience* 69(1); 26-39.

²¹ Hill, M. J. et al. 1996. Effects of a dam removal on Dead Lake, Chipola River, Florida. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 48(1994):512-523.

surveys conducted by the Florida Game and Fresh Water Fish Commission in 1976 reported 49 freshwater fish species in the Ocklawaha River but only 33 species in Rodman Reservoir.⁵ Species still present in the river or its tributaries also include several rare or threatened species that were adversely impacted by the dam because the lake eliminated preferred habitats and flowing migratory and connective pathways.²² These include Southern Tessellated Darter, Bluenose Shiner, Black-banded Darter, and Snail Bullhead. In general, removal of Rodman/Kirkpatrick Dam would also likely result in an increase in species that prefer flowing habitats (e.g., Ironcolor Shiner, Dusky Shiner, Metallic Shiner, Brown Darter, and others).⁵ Breaching of Rodman Dam would also allow many other marine and/or euryhaline fish species to access the upper reaches of the Ocklawaha River including Silver Springs where several were once commonly encountered. These species include: Hogchoker, Atlantic Needlefish, Sailfin Molly, White Mullet, Striped Mullet,^{5,7} Ladyfish, Clown Goby, Tidewater Silverside, Southern Flounder,^{5,7} and potentially Grey Snapper and Tarpon.²³

²² Jordan F. 1994. Current status of the southern tessellated darter (*Etheostoma olmstedi maculaticeps*) and the bluenose shiner (*Pteronotropis welaka*) in the Ocklawaha River system. Volume 13. Environmental Studies Concerning Four Alternatives for Rodman Reservoir and the Lower Ocklawaha River. St. Johns River Water Management District, Palatka, Florida.