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Three Rivers Blue Catfish Restoration Plan

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Pennsylvania Fish and Boat Commission, Division of Fisheries Management

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Background

The Ohio River basin in western Pennsylvania, including the Allegheny and Monongahela rivers (Three Rivers), is a large watershed draining an area of over 13,500 mi^2 and portions of five states. Beginning in the mid-1800's, the Ohio River and its major tributaries were impacted by prolonged pollution from various sources including coal mine discharges, sewage, and industrial effluent (Ortmann 1909). This legacy of pollution substantially impacted the fauna of the Three Rivers. Fish kills were common, abundance of pollution-intolerant species was reduced, and some species were extirpated from Pennsylvania's portion of the Three Rivers.

Beginning with the Clean Water Act of 1972, the pollution load into the Three Rivers has gradually been reduced to where the rivers now support over 100 species of fish and provide popular sport fisheries for Smallmouth Bass *Micropterus dolomieu*, Walleye *Sander vitreus*, Sauger *S. canadensis*, Muskellunge *Esox masquinongy*, Channel Catfish *Ictalurus punctatus*, and Flathead Catfish *Pylodictis olivaris*. These popular sport fisheries located around the urban center of Pittsburgh provide countless hours of recreation for anglers throughout the year and are likely a significant factor as to why Allegheny County leads all Pennsylvania counties in fishing license sales annually.

Unfortunately, not all the species historically present in the Three Rivers have returned following the reduction of pollution in the rivers. Species such as the Blue Sucker *Cycleptus elongatus* and Goldeye *Hiodon alosoides* have not returned and are lower priority candidates for reintroduction due to the lack of economic and recreational value attributed to these species. In contrast, Blue Catfish *Ictalurus furcatus*, a large, economically valuable, and popular sportfish native to Pennsylvania's portion of the Three Rivers (Stauffer et al. 2016) is a prime candidate for reintroduction.

Native to the Mississippi River basin as well as Gulf Coast drainages from Alabama to Northern Mexico, Blue Catfish were first reported from the Ohio River (Rafinesque 1820). In Pennsylvania, Blue Catfish were documented to reside in the Ohio River basin (Cope 1881, Bean 1892) and were collected near the Pennsylvania/West Virginia border in the Monongahela River (Evermann and Bollman 1886). Historically, Blue Catfish abundance in the region was sufficient to support their sales in Pittsburgh area fish markets (Cope 1881). Their distribution in Pennsylvania likely included the entire Ohio and Monongahela rivers, as well as lower portions of the Allegheny River. It is likely that Blue Catfish were extirpated from the Three Rivers in Pennsylvania around the turn of the 20th century.

The pollution that extirpated Blue Catfish in Pennsylvania also led to their extirpation throughout much of the Ohio River, particularly in the portions of the river bordering Ohio and West Virginia. As water quality improved throughout the river, Blue Catfish numbers in the lower Ohio River (Markland Pool to Mississippi River) increased and a popular sport fishery developed. The West Virginia Division of Natural Resources (WVDNR) began an effort in 2005 to reintroduce Blue Catfish and establish a sport fishery in portions of the Ohio River bordering West Virginia and Ohio. Stocking of Blue Catfish advanced fingerlings (5-6 in total length) was initiated in some Ohio River pools in West Virginia (R.C. Byrd, Racine, and Belleville pools)

(Figure 1). Stocking rates were variable, but most pools received around 15,000 to 20,000 fish annually. The WVDNR indicated that stocking on the lower river has been successful with Blue Catfish now being captured regularly in assessment surveys in the R.C. Byrd Pool, as well as the Belleville and Hannibal pools farther upstream. The WVDNR expanded stocking of Blue Catfish fingerlings farther upstream (Willow Island, Hannibal, and Pike Island pools) to support a fishery in that portion of the river. Additionally, natural reproduction of Blue Catfish has been documented as far upstream as Parkersburg, WV in the Belleville Pool (K. Zipfel, WVDNR, personal communication).

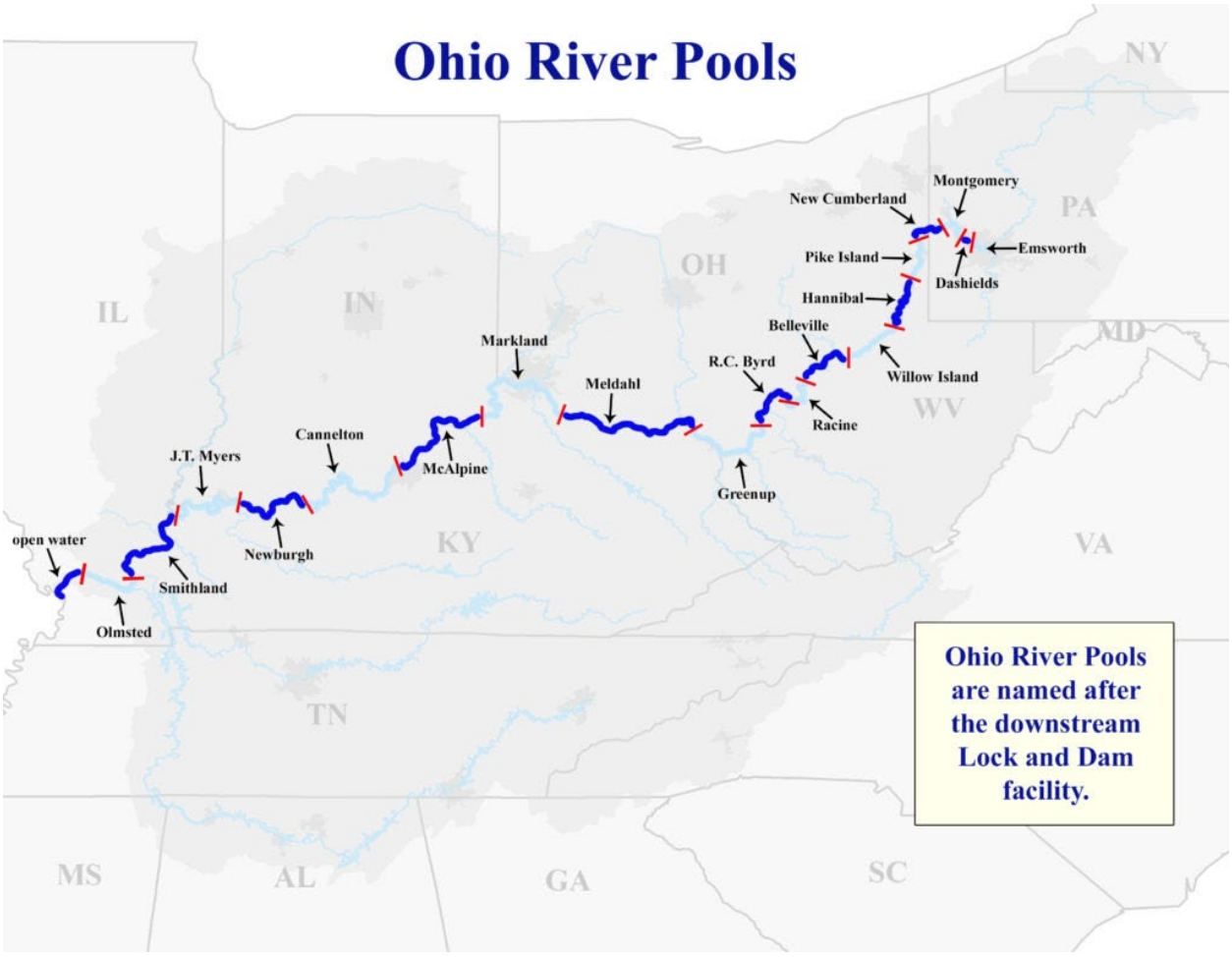

Figure 1. Locations of Ohio River navigational pools. Figure courtesy of ORSANCO.

Beginning in 2013 and continuing through 2015, the WVDNR stocked Blue Catfish fingerlings during fall on a trial basis in the New Cumberland Pool of the Ohio River, which spans the Pennsylvania/West Virginia/Ohio state lines. Approximately 46,000 Blue Catfish were stocked over the three-year period. Pennsylvania Fish and Boat Commission (PFBC) biologists surveyed the Pennsylvania portion of the Ohio River during 2017 using 1.5-in mesh baited tandem hoop nets and low frequency electrofishing (LFEF) to evaluate the efficacy of these stockings. Although Channel Catfish and Flathead Catfish were captured, no Blue Catfish were represented in the catch. Growth of Blue Catfish in the Ohio River is slow (J. Herrala, Kentucky

Department of Fish and Wildlife [KYDFW], personal communication) and it is likely they had not grown to sizes where they recruit to hoop nets (i.e., capture efficiency of small catfish is low). The limited amount (3.95 hours) of LFEF conducted in 2017 was also insufficient to adequately assess a low-density population.

Confirming suspicions that Blue Catfish may be present in Pennsylvania's portion of the Ohio River, the PFBC received an angler report and photo evidence in 2019 of a fish captured in the Montgomery Pool of the Ohio River near Baden, PA. PFBC staff identified the fish, and it was confirmed to be the first Blue Catfish captured in the Pennsylvania portion of the Ohio River basin in over 100 years. After this initial report, a second angler contacted the PFBC and reported catching multiple Blue Catfish in the Pennsylvania portion of the New Cumberland Pool of the Ohio River near Midland, PA. Although no photo evidence was provided, these reports were determined to be credible as the angler was considered proficient with Blue Catfish identification given experience angling Blue Catfish in other states. In 2020, 11 additional Blue Catfish captures were confirmed in the Three Rivers in Pennsylvania with the majority of fish captured directly below Montgomery Dam in the New Cumberland Pool of the Ohio River. Approximately six additional Blue Catfish were reported caught by anglers from the Three Rivers in 2021 and early 2022, with fish being reported as far upriver as the Emsworth Pool in the Monongahela River. It is likely these fish were the product of stocking efforts by the WVDNR from 2013-2015.

Anglers have a strong interest in the re-establishment of a Blue Catfish population in the Three Rivers. Of the public comments received on the Three Rivers Management Plan (PFBC 2011), the most frequent (47%) comment was support for the reintroduce of Blue Catfish to the Three Rivers. Multiple requests by anglers through the PFBC website and phone calls to the PFBC Southwest Regional Office also supported Blue Catfish reintroduction. Their desirable sporting qualities (i.e., ability to reach large size, fighting ability, provision of a year-round fishery) make this species a favorite among catfish anglers. Furthermore, a recreational Blue Catfish fishery in the Three Rivers would likely benefit the local economy, particularly businesses catering to anglers including sporting goods stores and bait shops, hospitality-related businesses such as hotels and restaurants, service-related businesses such as gas stations and convenience stores, among others.

The purpose of this Blue Catfish Restoration Plan for the Three Rivers is to re-establish a previously extirpated sportfish to the Pennsylvania portion of the Three Rivers at a level sufficient to support a high-quality recreational fishery. The plan addresses four major aspects of the restoration process including monitoring; stocking; regulations; and angler use, harvest, and opinions. This plan will adaptively guide restoration efforts of Blue Catfish in the Three Rivers and will be revised as warranted to optimize success potential. The goal of the plan is to re-establish a sustainable, naturally reproducing population of native Blue Catfish in the Three Rivers watershed, specifically the lower Allegheny River, Monongahela River, and Ohio Rivers, in Pennsylvania.

It is important to note that this plan pertains specifically to the PFBC-led restoration of Blue Catfish in the Three Rivers only. Blue Catfish are a large, riverine species not considered native to the numerous lakes in the Ohio River basin. As such, stocking will not be considered

for these waterbodies. Additionally, Blue Catfish are not native to the Atlantic Slope basins in Pennsylvania including the Lake Erie, Delaware River, Potomac River, and Susquehanna River and are considered highly invasive outside of their native range. Adverse impacts, including predation on threatened or endangered native species and commercially valuable species, have affected fisheries where non-native Blue Catfish have been introduced (Schloesser et al. 2011; Schmitt et al. 2019). As Blue Catfish reach large size and have a wide dietary range, it is anticipated that the introduction of Blue Catfish anywhere in Pennsylvania outside of their native range in the Three Rivers region of Pennsylvania could have major ecological impacts, including negative impacts to valuable recreational sport fisheries and imperiled molluscs. Therefore, potential introduction of Blue Catfish by anglers into basins or regions outside of their native range could significantly degrade existing sport fisheries, such as fisheries within Atlantic Slope basins. It is illegal for individuals to possess and to stock Blue Catfish into any water of this Commonwealth. This species is not included on the PFBC's Species by Watershed Approved for Open System (Flow Though) Propagation and Introductions list (https://www.fishandboat.com/Fish/PennsylvaniaFishes/Documents/speciesapp.pdf). Additionally, 58 Pa. Code § 73.1 (relating to transportation of live fish) prohibits the transfer of fish from waters in this Commonwealth into another drainage where the species being transferred is not always present. The PFBC will emphasize the potential ecological risks of Blue Catfish from illicit translocations into waters where not historically present as well as legal consequences, when appropriate, in agency messaging and outreach regarding Blue Catfish restoration.

Monitoring

Pre-restoration monitoring

Prior to any restoration stocking of Blue Catfish, Fisheries Management Area 8 conducted targeted catfish surveys in the Ohio River in 2020 and 2021 (Table 1). The primary survey method was LFEF, as this is the currently accepted standard method to sample Blue Catfish populations (Bodine et al. 2013). Secondary gears included single, unbaited 1.5-in mesh hoop nets and trot lines. No Blue Catfish were captured during the 2020 or 2021 surveys.

Additional sampling for catfish in the Ohio River is scheduled to occur from May through September 2022 as part of a collaborative effort by the Ohio River Fisheries Management Team (ORFMT) states. This effort will use a variety of gear types including LFEF; single, baited 1-in mesh hoop nets; single, unbaited 1.5-in mesh hoop nets; and trot lines. Sampling is designed to target all species of recreationally important catfish in the Ohio River basin, including Blue Catfish.

Post-restoration monitoring

Following implementation of Blue Catfish restoration stockings, monitoring to assess re-establishment efforts will be conducted in the Ohio River every three years beginning in 2025 (Table 1). Location, effort, gear type, and seasonality of assessment surveys will be determined based on results from the 2020-2022 surveys. Ohio River catfish monitoring will utilize standard ORFMT gears and protocols. Sampling will include otolith analysis from a subset of Blue

Catfish, likely during 2031, to determine population characteristics such as growth rates and to determine if natural reproduction is occurring.

The need for Blue Catfish monitoring in the Allegheny and Monongahela rivers will be determined based on the 2025 and 2028 survey results and contingent upon whether Blue Catfish restoration stocking occurs in those rivers. Protocols utilized will be identical to those used in the Ohio River and include otolith analysis as previously described.

Table 1. Monitoring schedule for Blue Catfish in the Ohio River basin. (LFEF = low frequency electrofishing, HN = single unbaited hoop net, BHN = single baited hoop net, TRL = trot line)

Water	Pools	Section(s)	Year	Gear
		Pre-restoration		
Ohio River	Emsworth to New Cumberland	01-04	2020	LFEF, HN
Ohio River	New Cumberland	04	2020	TRL
Ohio River	New Cumberland	04	2021	LFEF, TRL
Ohio River	Emsworth to New Cumberland	01-04	2022	LFEF, HN, BHN, TRL
		Post-restoration		
Ohio River	Emsworth to New Cumberland	01-04	2025	LFEF, HN, BHN, TRL
Ohio River	Emsworth to New Cumberland	01-04	2028	LFEF, HN, BHN, TRL
Allegheny River	Pool 4 to Emsworth	19-22	2029	LFEF, HN, BHN, TRL
Monongahela River	Elizabeth to Emsworth	04-06	2030	LFEF, HN, BHN, TRL
Ohio River	Emsworth to New Cumberland	01-04	2031	LFEF, HN, BHN, TRL
Allegheny River	Pool 4 to Emsworth	19-22	2032	LFEF, HN, BHN, TRL
Monongahela River	Elizabeth to Emsworth	04-06	2033	LFEF, HN, BHN, TRL
Ohio River	Emsworth to New Cumberland	01-04	2034	LFEF, HN, BHN, TRL
Allegheny River	Pool 4 to Emsworth	19-22	2035	LFEF, HN, BHN, TRL
Monongahela River	Grays Landing to Charleroi	01-03	2036	LFEF, HN, BHN, TRL
Ohio River	Emsworth to New Cumberland	01-04	2037	LFEF, HN, BHN, TRL
Allegheny River	Pool 4 to Emsworth	19-22	2038	LFEF, HN, BHN, TRL
Monongahela River	Grays Landing to Charleroi	01-03	2039	LFEF, HN, BHN, TRL
Ohio River	Emsworth to New Cumberland	01-04	2040	LFEF, HN, BHN, TRL

Stocking

Blue Catfish restoration stocking will commence in Pennsylvania's portion of the Three Rivers beginning in fall 2022. Stocking is intended to expediate re-establishment in the Pennsylvania portion of the Ohio River basin rather than relying solely on colonization from downriver. Restoration of Blue Catfish through volitional upstream movement from lower portions of the Ohio River would be a slow process with minimal chance of establishing a population sufficient to sustain a fishery in an acceptable timeframe, particularly a trophy fishery. Recent telemetry investigations by the Ohio Department of Natural Resources (ODNR) on Blue Catfish movement in the Ohio River indicated little upstream movement of Blue Catfish from pool to pool (J. Pritt, ODNR, personal communication). Furthermore, it is estimated that Blue Catfish take 17 years to reach 35 inches in length in the Kentucky portion of the Ohio River (J. Herrala, KYDFW, personal communication) and slower growth is expected in the Three

Rivers. Growing seasons for catfish in Western Pennsylvania are shorter and Flathead Catfish populations in the Three Rivers exhibit extremely slow growth as determined in research conducted by the PFBC (Depew et al. 2020). This suggests that Blue Catfish in the Pennsylvania portion of the Ohio River basin would be slow to mature, resulting in delayed natural reproduction.

Given the recent success of Blue Catfish restoration efforts in the Ohio River by the WVDNR, the PFBC intends to replicate those efforts in Pennsylvania. Annual stocking will begin in the Ohio River for a five-year period and later will be instituted in the Allegheny and Monongahela rivers. Stocking of the Allegheny River will be limited to the lower Allegheny River below Lock and Dam 5 near the mouth of the Kiskiminetas River coinciding with likely historic distribution. Stocking of the Monongahela River will proceed upriver to the Grays Landing Lock and Dam approximately 9.3 river miles downstream of the Pennsylvania/West Virginia state line (Figure 2).

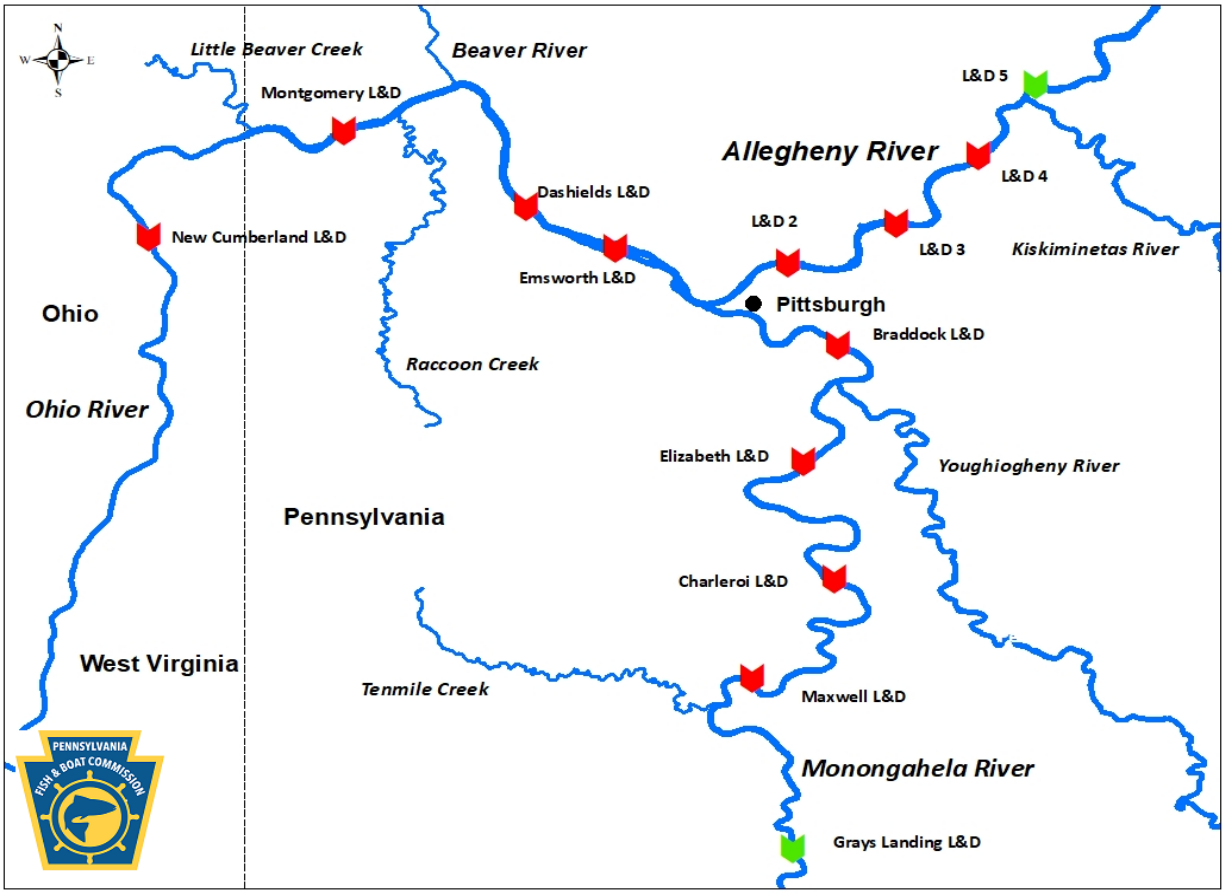

Figure 2. Map of Three Rivers pools in Pennsylvania. Pools are named after the downstream lock and dam. Stocking will occur from the New Cumberland Pool at the PA/WV/OH state line on the Ohio River upriver to Grays Landing (Monongahela River) and Lock and Dam 5 (Allegheny River).

The WVDNR has stocked approximately 15,000 to 20,000 advanced fingerlings annually in most Ohio River pools as part of their restoration effort. For the initial PFBC stocking on the Ohio River in 2022, advanced fingerlings will be planted at a rate of approximately 1,000 fish per river mile. Future stockings (2023 and beyond) will consist of yearling plants at a rate of 250 fish per river mile (Table 2). Recent evaluation of the contribution to fisheries from stocked Channel Catfish in Pennsylvania indicate superior survival of yearling catfish (8 in and larger) compared to fingerlings (Depew et al. 2020). Allocations are contingent upon source availably and agency production capabilities. However, if yearling availability is limited, alternate stocking scenarios would be initiated to reallocate stocking to different sections of each of the Three Rivers with an estimated allocation of approximately 5,000 fish annually (Table 3). Movement of fish through or around lock and dam structures would allow for volitional colonization of non-stocked sections under this alternate scenario.

Table 2. Rates and timetable for Blue Catfish restoration stocking in the Ohio River basin.

Water	Section	Years	Total stocked per year	Rate (n/acre)
Ohio River	01	2022*	6,000	6.0
Ohio River	02	2022*	7,000	5.5
Ohio River	03	2022*	19,000	7.0
Ohio River	04	2022*	8,000	8.0
Ohio River	01	2023-2026	1,500	1.5
Ohio River	02	2023-2026	1,750	1.4
Ohio River	03	2023-2026	4,750	1.8
Ohio River	04	2023-2026	2,000	2.0
Allegheny River	19	2027-2031	1,500	2.1
Allegheny River	20	2032-2036	2,375	2.1
Allegheny River	21	2032-2036	2,000	2.1
Monongahela River	03	2027-2031	5,000	3.3
Monongahela River	02	2027-2031	5,250	3.1
Monongahela River	04/05**	2032-2036	7,500	2.8

* Advanced fingerling catfish to be stocked in 2022, yearlings to be stocked in all other years.
**Monongahela River sections 04 and 05 combined into one section due to scheduled 2023 removal of Elizabeth Lock and Dam.

Table 3. Alternative stocking rates and timetable for Blue Catfish restoration stocking in the Ohio River basin.

Water	Section	Years	Total Stocked per year	Rate (n/acre)
Ohio River	01	2022*	5,000	5.0
Ohio River	03	2022*	15,000	5.5
Ohio River	01	2023-2026	1,250	1.3
Ohio River	03	2023-2026	3,750	1.4
Allegheny River	19	2027-2031	1,250	1.8
Allegheny River	21	2032-2036	1,250	1.3
Monongahela River	02	2027-2031	3,750	2.3
Monongahela River	04/05**	2032-2036	3,750	1.4

*Advanced fingerlings stocked in 2022, yearlings stocked in all other years.
**Monongahela River sections 04 and 05 combined into one section due to scheduled 2023 removal of Elizabeth Lock and Dam.

This plan is contingent upon the PFBC's ability to secure an annual source of Blue Catfish fingerlings/fry/eggs. Three options have been identified and include obtaining Blue Catfish brood stock to initiate an in-house culture program, purchasing Blue Catfish fingerlings/fry/eggs from a private hatchery, and/or trading with other states for Blue Catfish fingerlings/fry/eggs. Blue Catfish will be cultured at the Tionesta State Fish Hatchery (SFH); therefore, a secure source of fingerlings/fry/eggs from within the Ohio River basin is preferred. Uncertainty regarding genetics of Blue Catfish from hatcheries outside of the Ohio River basin, limited space, and inadequate warm-water resources at the Tionesta SFH may preclude raising and culturing brood stock. Therefore, it is recommended to acquire fingerlings/fry/eggs from an outside source from an Ohio River basin state and raise the fish to advanced fingerling/yearling size at the Tionesta SFH. However, if fingerlings/fry/eggs are not available from a partner state, establishment of a brood stock program or purchase through private facilities may be needed to implement this plan.

Regulations

To ensure optimal survival of Blue Catfish during the restoration process, catch-and-release regulations will be considered for Blue Catfish in the Ohio River basin during the restoration phase. Although it is not anticipated that harvest would have population level impacts as evidenced by PFBC research indicating low estimated annual mortality rates (> 0 to 17%) for Channel Catfish and Flathead Catfish in the Three Rivers under a 50-fish per day creel limit (Depew et al. 2020), catch-and-release regulations would minimize fishing mortality during the restoration. Based upon the results of PFBC surveys during the 2025-2032 timeframe, regulations could be adjusted to allow for some harvest in portions of the restoration area if abundance of Blue Catfish is sustainably sufficient.

Many Pennsylvania anglers are not familiar with the characteristics of Blue Catfish; therefore, outreach that illustrates the differences among Blue Catfish, Channel Catfish, and Flathead Catfish is needed. Similarly, signage illustrating the differences among the three

species will be posted at boat launches and popular fishing areas throughout the Three Rivers. Signage will also include applicable messaging on the ecological risks and legal consequences of translocation of Blue Catfish.

Angler Opinion/Creel Survey

The ORFMT is currently conducting an angler use, harvest, and opinion survey on portions of the Ohio River in 2022. This survey is based upon protocols developed by the ODNR for an Ohio River creel survey conducted in 2017. The survey is based on an access-point design in which creel clerks interview anglers who have completed fishing trips on the Ohio River. Although currently only scheduled for 2022, it is possible that it will be repeated every five years on the Ohio River. This creel survey is a vital tool for determining the success of Blue Catfish restoration in the Ohio River. Specific questions pertaining to angler catch of Blue Catfish would help determine the success of reintroduction efforts as well as the efficacy of regulations. The PFBC will consider participation in future surveys should they occur.

Summary

The PFBC has conducted pre-restoration monitoring in the Ohio River from 2020-2022. PFBC restoration stocking of Blue Catfish in the Three Rivers is anticipated to commence at a rate of 1,000 advanced fingerlings per mile in 2022 and 250 yearlings per mile in 2023 and beyond. Primary funding for the restoration effort will be through Pennsylvania's Fisheries Management Project (F-57-R), and supplemental funding may be obtained through other sources. The PFBC will monitor the recovery effort through routine fishery independent and dependent monitoring and adaptively revise this plan as needed to optimize results.

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