**Lake Management Plan - Draft**

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| **Period:** August 10, 2019 | **Fisheries Manager:** Michael Mounce | **District No.:** 14 |
| **Lake Name:** Lake Shelbyville | County: Shelby & Moultrie | **Water No.:** 272 |
| **Ownership (State, PUBC, PUBO):** PUBC – U.S. Army Corps of Enginners | **Acreage:** 11,100 acres |
| **Lake Management Plans Will Include The Following Sections:**1. **Introduction or Brief Historical Perspective**
2. **Lake Physical and Chemical Characteristics**
3. **Identification of Problems Limiting Management with Potential Solutions**
4. **Overall Long-term Management Goals**
5. **Recommended Lake Management Activities and Rational for Implementation**
6. **Recommended Angling Regulations with Rational for Implementation**
7. **Managed or Stocked Fish Species Population Objectives**
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1. **Introduction or Brief Historical Perspective**

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| **SIGNATURES:** |
| Michael J. Mounce 1/10/18 |  |
| District Fisheries Manager Date | Regional Fisheries Administrator Date |
| **SIGNATURES:** |
|  |  |
| Impoundment Program Manager Date | Management Section Head Date |

Lake Shelbyville is a U.S Army Corps of Engineers (USACE) reservoir, located in Shelby and Moultrie counties in east-central Illinois. The dam was completed and the lake opened in 1970 when the Kaskaskia and West Okaw rivers were impounded. The USACE’s Master Plan states that the lake is managed and operated for the authorized purposes of flood-risk management, recreation, water supply, navigation, and fish and wildlife conservation. Fishing is the most popular activity on the lake. The lake is surrounded by numerous communities, with Shelbyville, Sullivan, Windsor, Findlay, Allenville, and Bethany being in very close proximity to the lake.

The USACE Master Plan for Lake Shelbyville can be viewed at the flowing link: <https://drive.google.com/file/d/0B6tJHoZe03KgUHFjaTVNcFlkYm8/view>

The Illinois Department of Natural Resources’ (IDNR), *Lake Shelbyville Fishing Guide*, can be viewed at the flowing link: https://www.ifishillinois.org/publications/00272\_fishing\_guide.pdf

1. **Lake Physical and Chemical Characteristics**

 Lake Shelbyville is 11,100 surface acres and 20 miles long at “normal recreational” pool at 599.7 feet above sea level. The watershed area is 1,030 square miles. At normal pool the lake has 172 miles of shoreline, with a very high shoreline index of 11.6, and maintains a volume of 210,000 acre feet. At summer pool, the average depth at impoundment was 18.9 feet, with a maximum depth of 53 feet. Water chemistry varies from the upper lake to the dam, with the lower parts of the lake having significantly greater clarity and light penetration. This affects primary productivity, lake stratification, and fish production, species composition, and distribution throughout the lake.

Lake Shelbyville is drawn down 6.5 feet in the winter to increase storage capacity for spring rains. At maximum Flood Control Pool (elevation 626.5) the lake has the potential to reach 25,300 surface acres. Summer floods of 8-14 feet above normal pool are not uncommon.

1. **Identification of Problems Limiting Management with Potential Solutions**

Long-term summer flooding has a significant impact on fish production and habitat in the lake. These effects can have both positive and negative results. Floods and appropriately-timed spring flood pulses can increase fish production significantly! This can result in high densities of forage for existing fish populations and boost growth. This can also result in excessively high recruitment rates for gamefish. This can be both beneficial and detrimental, as excessive recruitment of crappie can result in high density, slow-growing populations that are not desirable for angling quality. Increased recruitment of largemouth bass is usually highly desirable on this lake.

Long-term summer floods are deleterious to aquatic habitat. Deep and turbid water prevents the establishment and long term survival of most aquatic macropytes. In addition, woody debris, including large trees, are “pushed” into the uplands by wave action. There these trees and logs are stranded and no longer provide a habitat benefit for the fishery. This results in a significant lack of natural and vital habitat for many species of fish. This also contributes to shoreline erosion due to a lack of terrestrial vegetation stabilizing the shoreline. Increased erosion, increases water turbidity and decreases productivity.

More stable water regimes could result in stabilized fish recruitment and better habitat within the lake. Both could result in greater angling quality through a greater stabilization of angling quality. Development of habitat through aquatic plant introductions and placement of significant numbers of long-lasting physical structure can offset habitat losses and boost fish production and angling results. Georgia cubes have been determined to attract more fish than many other fish attractors, including Porcupine balls and evergreen trees (Baumann, et. al., 2016).

Habitat losses and general lack can be addressed by installing long lasting fish attractors. Annual fish attractor projects have been implemented for 30+ years utilizing discarded Christmas trees, felling large trees, placing porcupine balls, and fashioning structures out of PVC plumbers testing structures. Recently, the original version of the Georgia cube and modified version, called the Shelbyville cube, have been introduced for fisheries habitat and to serve as fish attractors. More are planned to be built and deployed in the near future. The Lake Shelbyville Fish Habitat Alliance has been formed to secure funding for artificial habitat.

In addition desirable aquatic plants can be established through purposeful introductions. The U.S. Army Corps of Engineers aquatic plant nursery will aid in this effort. Pioneering species endemic to this area and those that have done well in the lake will be included in our first efforts to establish natural habitat. Spatterdock, American pondweed, coontail, three-square bulrush, American lotus, and fragrant water lily are all being considered for introduction. These plants will provide habitat, control soil erosion, and improve water quality which are having significant negative effects on what little habitat remains. Reduced connectivity of many coves with the main lake is a factor with loose sand deposits completely blocking the mouths of these coves.

Largemouth bass, muskellunge, and white bass populations have recently been affected by diseases causing a great reduction in the quality of these fisheries. Largemouth bass have tested positive for largemouth bass virus (LBV) and size structure has been affected negatively. The greatest effect was observed in summer/fall 2012, after which catch rates of bass dropped significantly for anglers and in IDNR surveys. A significant disease related kill of the muskellunge population occurred in 2009 and this fishery has decreased in density ever since. No muskie have been collected in the past two fall standardized surveys. A significant white bass kill occurred in 2013 and this population has recovered slowly but is presently looking good. Channel catfish and flathead catfish recruitment have been poor for many years due to unknown causes. Flood events resulting in turbid water have helped very little with recruitment of these two catfish. Little can be done to deal with diseases in wild fish populations, except reduce environmental and human-induced stress as much as possible.

Fish recruitment is highly variable for native species. The maintenance of fisheries for muskellunge, walleye, and sauger have been maintained by frequent or annual stockings. Largemouth bass were stocked over many years, but Illinois Natural History Survey research results indicated that these stockings did not contribute significantly to the fishery and were discontinued. Smallmouth bass were historically present in the currently impounded portions of the Kaskaskia River prior to the lake being built. A population is now found immediately downstream of the spillway. Due to the isolation of this population of smallmouth bass from native populations in other watersheds, this population is being treated as a genetically unique strain. Efforts have been made over numerous years to introduce this unique strain into the lake, with no evidence of natural recruitment yet. The addition of striped bass into this system is highly desirable. They would diversify the fishery, potentially produce a trophy fishery, and this species can utilize an abundant population of gizzard shad. Continue stocking successful species, diversify the fishery, and attempt to improve survival of smallmouth bass stocked in the lake to establish a self-sustaining population.

1. **Overall Long-term Management Goals**

The overall long-term management goal is to increase the quality of this fishery and manage the fishery and anglers for increased stability of the fishery to benefit fish, anglers, and local communities. This can be achieved through many routes, including; encourage practices to produce more stable water control regimes, increase and diversify stocking efforts of species proven to recruit well, improved culture methods in nursery ponds, expand the number of available nursery ponds, explore alternative fishing regulations for increased stability of angling quality, develop habitat to benefit both fishes and anglers, and engage constituents to assist with all of the above.

Stocking walleye and sauger have proven to provide excellent results for anglers and attract a sought-after fishery. Efforts should include increasing the stocking and production of both of these species. Consideration of utilizing waterfowl management areas as occasional nursery ponds has been explored with site managers. This could be accomplished through installing rock filters for pumping during non-flood years/periods and stocking fry in the following spring. Harvest may not be monitored as with the Fin & Feathers Nursery Pond, as the fry may be too small to handle when it is necessary to drain the management unit for waterfowl food production.

The introduction of “pure” striped bass has been considered to diversify this fishery. Hybrid striped bass are not being considered due to the difficulty in being able to manage them separately from white bass due to the difficulty in identifying them by anglers. Diversifying this fishery could lead to greater angler satisfaction. This lake should be well suited to producing trophy striped bass.

Mortality of largemouth bass and muskellunge from diseases has been and is a significant issue. Habitat improvements could benefit both species. Largemouth bass recruitment is highly linked to aquatic plant densities. Adults of both species orient to physical structure. Current habitat projects address both of these issues with these species. Expansion of these projects can only help.

Recruitment of large catfish has been less than it was historically. Although unlikely, projects that enhance opportunities to find suitable nesting locations could improve catfish recruitment. Rip-rap projects and the introduction of artificial logs could provide increased nesting opportunities for these catfish.

1. **Recommended Lake Management Activities and Rational for Implementation**

Continue annual fish population surveys as manpower allows, to measure the dynamics of important fisheries and the effects of management activities. Explore new areas for the walleye/sauger stocking success survey in an attempt to make sure the area historically surveyed yields representative catch rate and size structure.

Continue stocking of successful species, such as walleye and sauger, and explore alternative species, striped bass ( two stocking to date), to diversify and increase the quality of this fishery. Monitor the results of the Fin & Feathers Nursery Pond and seek improvements to improve production. Consider new species as a second crop after walleye or sauger are harvested. Muskellunge, channel or flathead catfish are appropriate and muskie and flathead have been attempted.

Continue developing and investigating new ways to effectively introduce habitat in the lake. The loss of woody debris/habitat to normal reservoir aging is a significant problem that needs to be dealt with. Erosion on main lake areas has resulted in a reduction of woody habitat, as trees often do not make it to the water at normal pool and then are lost during floods to stranding in upland areas. Evaluate the effectiveness of fish attractor models and placement through Illinois Natural History Survey research sponsored by the IDNR Division of Fisheries. Enable user groups to assist with this program, like Lake Shelbyville Fish Habitat Alliance.

Continue developing the aquatic plant nursery and evaluate a variety of species of plants for their ability to be cultured survive the flood regimes of Lake Shelbyville to expand suitable habitat in the lake. Determine the most-appropriate “pioneering” species that can survive floods and expand on their own. Evaluate planting methods and the methods used to protect plants from depredation.

1. **Recommended Angling Regulations with Rational for Implementation**

**Current regulations:**

Largemouth or smallmouth bass - 14" min. length limit

Largemouth or smallmouth bass - 6 fish daily creel limit

Walleye, sauger, or hybrid walleye - 14" min. length limit

Walleye, sauger, or hybrid walleye - 6 fish daily creel limit

White, & hybrid striped bass - no creel limit less than 17”, only 3 fish 17" and over daily limit

Striped bass - 32” min. length limit

Striped bass - 2 fish daily limit

White, black, or hybrid crappie - 5 fish daily limit under 10” and 10 fish daily limit 10” and longer permitted (implemented 2007)

Muskelluge - 48” min. length limit

- 1 fish daily creel limit

 **Regulations for consideration:**

Two pole and line only: to reduce harvest of channel and flathead catfish. This would affect a few local fishermen who continue to fish for catfish with trot-lines. This would also affect a few crappie fishermen who fish using “spider-rig” methods and significantly affect bow fishing anglers. An alternative regulation would be to ban trot-lines and bank poles, with the idea that reduced harvest might increase recruitment, but this may be unlikely. Usually, recruitment issues are due to environmental issues that are not readily addressed by fishing regulations.

Largemouth bass daily limit 3: to reduce catch and release mortality of largemouth bass from tournaments. Creel surveys indicate that angler harvest rates of largemouth bass are negligible. Although largemouth bass virus may be having a greater effect on large bass mortality than tournaments, the only way to address stress is to reduce the effects of human activities that contribute to stress and mortality.

Only 2 crappie greater than 12”: to reduce harvest of large (memorable-size) crappie and maintain greater angling quality. This would focus harvest on crappie less than 12” and protect quality fish. This would have an effect on the number of large crappie that tournament anglers could bring to the weigh-in, which would not be popular. Education to get anglers to voluntarily release these fish would be a better alternative.

Print and distribute single-fold, pocket-sized, identification cards of striped bass, white bass, and yellow bass to local bait shops and sporting good outlets to facilitate the specific management of this species.

1. **Managed or Stocked Fish Species Population Objectives**

Based on 12 survey stations of 45 minutes with D.C. electrofishing or 1 hour of A.C. electrofishing.

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| Managed Species | Largemouth Bass | White Crappie | Black Crappie | White Bass | Yellow Bass | Channel Catfish | Flathead Catfish | Bluegill |
| No. Collected | >720 | >180 | >180 | >180 | >180 | >36 | >12 | >800 |
| PSD | 40-60 | 40-60 | 40-60 | 40-60 | 40-60 | 40-60 | 40-60 | 40-60 |
| RSD-P | 10-20 | 20-40 | 20-40 | 20-40 | 20-40 | 5-20 | 5-20 | 0-5 |
| Wr | 95-105 | 90-100 | 90-100 | 90-110 | 90-100 | 90-110 | 90-110 | 90-100 |
| YAR | 0.8+ |  |  |  |  |  |  |  |
| Angler CPUE/Hr. | 0.25 | 0.5 | 0.5 | 0.5 | 1 | 0.25 | 0.1 | 2 |

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| StockedSpecies | Muskellunge | Walleye(night survey) | Sauger(night survey) | SmallmouthBass | StripedBass? |  |  |
| No. Collected | >12 | >30 | >30 | >12 | >12 |  |  |
| PSD | 40-60 | 40-60 | 40-60 | 40-60 | 40-60 |  |  |
| RSD-P | 5-20 | 10-20 | 10-20 | 5-20 | 10-20 |  |  |
| Wr | 90-110 | 95-110 | 95-105 | 90-110 | 90-110 |  |  |
| YAR |  |  |  |  |  |  |  |
| AnglerCPUE/Hr. | 0.1 | 0.25 | 0.25 | 0.1 | >0.1 |  |  |

**Literature cited:**

Baumann, J. R., N. C. Oakley, and B. J. McRae. 2016. Evaluating the Effectiveness of Artificial Fish Habitat designs in Turbid Reservoirs Using Sonar Imagery, N.A.J.F.M. 36: 1437-1444.