

NATURAL RESOURCES MANAGEMENT PLAN: RANGER LAKE, MILL STREAM RUN RESERVATION v.1.0

Cleveland Metroparks Technical Report 2013



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Executive Summary

Ranger Lake is a 1.76 acre impoundment which was formed in 1980 by earthen dam and raised drop-tube structure on the west shore. The lake is a moderately popular year-round fishing area in Cleveland Metroparks. The overarching management goal of the waterbody is to maintain its “fishable” status per the Federal Clean Water Act (CWA) objectives, which is accomplished through active management activities focused on the fishery and habitat of the lake.

There are no known major water quality issues in Ranger Lake. The lake does receive run-off from the adjacent highway infrastructure, which likely includes some brine used for de-icing in winter. The lake serves a watershed role as a stormwater buffer between adjacent lands and the East Branch Rocky River.

The lake offers a fair recreational fishery, which would currently be considered a second tier offering in Cleveland Metroparks. There are at least 10 species of fish known to inhabit the lake. The fish community is currently dominated by smaller bluegill (*Lepomis macrochirus*) and pumpkinseed sunfish (*L. gibbosus*), with winter and spring opportunities to catch stocked rainbow trout (*Oncorhynchus mykiss*).

A sampling effort on 17 October 2012 revealed a lack of largemouth bass (*Micropterus salmoides*), which reflects a severe predator/prey imbalance which is in large part the reason for the population of relatively stunted sunfish. The reason for the lack of bass is under investigation, but is likely a combination historic overharvest by anglers in this small lake as well as possible habitat limitations, such as lack of suitable spawning areas. With this limitation noted, approximately 500 largemouth bass were stocked in the lake in November and early December 2012, and will likely continue to be

stocked over the next several years, in an attempt to re-establish a predator population. Follow-up sampling in the future, likely summer 2017, will determine the success of this effort. If future results indicate overharvest of bass is a significant issue, changes in regulations for bass will be considered in the lake. Current regulations allow the harvest of 2 largemouth bass $\geq 12''$ per angler/day. Reestablishing a healthy predator population would have a top-down effect on the prey species in Ranger Lake, namely improving growth rates of stunted sunfish by reducing competition through predation. There is also a three rainbow trout per angler/day bag limit, with no minimum size, in affect at the lake.

The lake does provide function as wildlife habitat. Although no rare species are known to inhabit the waterbody or immediate surrounding area, it does offer a typical regional assemblage of common waterfowl, wading birds, reptiles, amphibians, invertebrates, and aquatic macrophytes.

If the fishery at Ranger Lake continues to be limited despite adaptive management efforts, then the management focus should be to offer an ancillary fishing opportunity and other fisheries in the area, such as Wallace Lake and the Rocky River, will fulfill the role of offering high quality angling opportunities.

Historic Overview and Background

Ranger Lake is a 1.76 acre impoundment which was formed in 1980 by earthen dam and raised drop-tube structure on the west shore. The lake was formed by damming of a small wooded ravine, with the dam designed by the U.S. Soil Conservation Service and constructed by Cleveland Metroparks Site Construction crew (John Kilgore, Manager of Planning and Design, Cleveland Metroparks, personal communication). A lower elevation emergency spillway area is located at the south end of the dam. The namesake of the lake was a Cleveland Metroparks Ranger station formerly situated northwest of the lake on Ohio Turnpike property, with the lake being on Cleveland Metroparks property. This facility and its paved parking lot were razed in the early 2000's. The lake has a relatively small subwatershed of 0.0972 miles² per USGS StreamStats program, with drainage coming mostly from the north and east (Figure 1). Drainage off the Ohio Turnpike enters the lake at the shallower eastern end of the lake. The main lake basin has rapidly sloping shorelines which terminate at approximately 18 foot depth. Fishing access is limited to openings in cattails along the earthen dam and in shoreline brush along the south shore, as well as through the woods on the north shore. Abundant woody cover is available off the north shoreline from the standing trees that remained when the ravine was initially flooded. Ranger Lake is situated such that the south and west shores are mostly surrounded by wide forested buffers and the north and east shores exhibit medium wooded buffers between the lake and Ohio Turnpike infrastructure (Figure 2). Per USGS StreamStats, the drainage basin of the lake is 54.3% forested. A gravel parking lot is located at the northwest side of the lake. The lake is moderately popular as a fishing venue, with heaviest use during the winter ice fishing and summer seasons.

The overarching goal for management of Ranger Lake is to maintain, and improve where possible, the chemical, physical, and biological integrity of the waterbody as reflected in the national water quality objective as contained in the Federal Clean Water Act (CWA). The CWA objective is often referred to as the “fishable/swimmable goal”, and the foremost goal for the lake is its continued management as a fishing area. This is currently conducted through management activities focused on the fishery. Swimming is prohibited at this location.

Water Quality and Habitat Overview

Indications are that overall water quality is good for this lentic system, given its location in an otherwise urbanized region. Ranger Lake receives run-off from adjacent Ohio Turnpike and I-71 (Figure 2). It is suspected that saline brine, used for deicing operations on the Turnpike, does enter the lake with run-off in winter and early spring, although no known issues have been attributed to this situation. Submersed aquatic macrophyte density in the lake are at a reasonable level, although below the ideal rule of thumb of 20% surface coverage recommended for a healthy fishery. This condition is due to rapidly sloping shoreline grading to deep water, offering limited sites for aquatic vegetation colonization other than within a few meters of shore and the shallower area at the far eastern inlet to the lake. Water transparency varies, being clearer during the colder seasons, due to seasonal variation in phytoplankton and zooplankton communities in the lake (Wetzel 1983). No documentation of physical or chemical water quality issues at the lake were found in Cleveland Metroparks historic files.

Fisheries Resource Overview

In an effort to obtain current data on the fish community in Ranger Lake, electrofishing was performed on 17 October 2012 in one sampling run totaling 38 minutes. The sample run was conducted along the entire perimeter of the lake shoreline (Figure 2). Electrofishing is a well established method utilized by fisheries managers to accurately assess fish population dynamics, abundance, and structure (Neilsen and Johnson 1983, Reynolds 1983, Smith-Root 2007). A Smith Root GPP 5.0 electrofishing unit and customized Alweld commercial johnboat, including booms constructed by Ashcraft Machine and Supply, Inc., of Newark, Ohio, were used. One person maneuvered the boat and operated the electrofishing unit control box while two assistants collected stunned fish, which were retained in an aerated 90 gallon onboard livewell for later processing. Fish lengths (mm) were obtained using a custom measuring board and weights (g) were obtained using a digital scale. Data was recorded onsite and all fish were released afterwards. Datasheets from the sampling activity are available in Appendix A.

Ranger Lake offers a common assemblage of fish species for a small lake in Ohio (Austin et al. 1996). The most abundant species in the lake are bluegill (*Lepomis macrochirus*) and pumpkinseed sunfish (*Lepomis gibbosus*). Rainbow trout (*Onchorynchus mykiss*) are also stocked in winter to facilitate an ice fishing opportunity, but there is no evidence they survive through the summer, which is in-line with what is typical for a small Ohio lake. Other species present in lesser abundance and also of potential interest to anglers include white crappie (*Pomoxis annularis*), yellow bullhead (*Ameriurus natalis*), green sunfish (*L. cyanellus*) and yellow perch (*Perca flavescens*).

Yellow perch were formerly unknown from the lake prior to the fish population assessment and were most likely introduced by an angler(s) exiting the nearby highways following a Lake Erie fishing trip. Largemouth bass (*Micropterus salmoides*) have historically been present in the lake, although none were sampled during the fish population assessment, and were restocked in the lake in fall 2012 as will be outlined further into this report. Channel catfish (*Ictalurus punctatus*) were historically stocked in the lake but this has not been done in over a decade, although a small number of older channel catfish may still be present. Sterile triploid white amur (*Ctenoparyngodon idella*), commonly known as grass carp, were also present in small numbers for supplemental vegetation control.

The fish community, overall, was notable in lacking a healthy predator population. Largemouth bass should be the dominant year-round predator in Ranger Lake given the habitat available and, as such, have a marked influence over the fish community (Anderson 1976, Carlander 1977, Austin 1996). The reason for this lack of largemouth bass in the recent sampling may be due to overharvest by anglers, lack of suitable spawning areas, or a combination of these factors. Lack of prey species is not a limiting factor in this waterbody. Due to this scenario, predator proportional stock densities and predator/prey ratio could not be calculated and analyzed. Efforts are currently underway to reintroduce largemouth bass into Ranger Lake.

Bluegill and pumpkinseed sunfish are the most dominant forage fish in Ranger Lake. Sampling yielded 108 total sunfish weighing a total of 3.83 kg (8 lbs 7.1 oz) (Table 1). Based on plotting length against frequency, there appears to be approximately 5 year classes of sunfish in the sample (Figure 3). Proportional stock density (PSD) of

sunfish was on the very low side of the balanced range at 7.44% (Table 3), since a PSD range between 20-40 is indicative of balance when the population supports a substantial fishery (Anderson 1980, Gabelhouse 1984). This reflects a stunted sunfish population, which would be expected in a system void of predators like largemouth bass. Given the lack of predators in the system at the time of the sampling effort, a Total Quality (TQ) plot could not be calculated for Ranger Lake.

The fishery, overall, would be characterized as “fair” in its current state, and the venue is currently considered a second tier fishing destination within the Park District most suited to families, children, and less experienced anglers who want to catch fish regardless of size or sporting quality. Other than sunfish and seasonally stocked (in winter) rainbow trout, other species present would be characterized as incidental catches by the majority of anglers who utilize the lake. Efforts are currently underway to improve the fishery, as will be outlined later in this report.

Other Recreational Uses

Other than fishing, wildlife watching is the only other significant recreational activity suited to Ranger Lake. The waterbody is too small to make paddling sports (such as kayaking and canoeing) popular, and swimming is prohibited in this area.

Ecosystem Function Overview

Although Ranger Lake is an impoundment and not a natural lake, it does serve some general ecosystem functions in the watershed. The basin collects stormwater from the surrounding watershed (Fig. 2), functionally serving as a buffer to help mediate the

affects of direct runoff of pollutants, such as sediment and nutrients, into the East Branch of the Rocky River (Ohio Environmental Protection Agency 1999). A number of associated aquatic wildlife utilize the lake. Great blue heron (*Ardea herodias*), belted kingfisher (*Ceryle alcyon*), mallard duck (*Anas platyrhynchos*), wood duck (*Aix sponsa*) and Canada goose (*Branta canadensis*) are observed at the lake regularly. The lake hosts an assemblage of common reptiles and amphibians, including eastern painted turtle (*Chrysemys picta picta*), snapping turtle (*Chelydra serpentina*), green frog (*Rana clamitans*), and bullfrog (*R. catesbeiana*). No known threatened or endangered species, or even rare species, of flora or fauna are resident in the lake. Although common dragonfly (suborder Anisoptera) and damselfly (suborder Zygoptera) species can be observed utilizing the lake margin a regular basis, there is little information collected on specific macroinvertebrate or microbial communities within the waterbody. The vegetative/algal community of the lake is comprised mainly of unicellular algae, some filamentous algae, cattails (*Typha* spp.), pickerelweed (*Pontederia cordata*), arrowhead (*Sagittaria latifolia*), softstem bulrush (*Schoenoplectus tabernaemontani*), and floating leaf pondweed (*Potamogeton natans*). A full inventory of aquatic plants at Ranger Lake has not been undertaken so a number of other species are likely present, as well.

Current Fisheries Management

Ranger Lake has been a moderate intensity managed fishery historically, mainly because other high quality fisheries resources, including the Rocky River and Wallace Lake, are within close proximity. A bag limit of 2 largemouth bass of 12" or greater per angler per day is in affect although, as previously noted, there were no bass found in the

lake during the last fish population survey (Appendix A). A bag limit of three rainbow trout (no size limit) per angler per day is also in affect. There are no bag or size limit regulations on any other fish species in the lake. As is the case with all Cleveland Metroparks waters, a valid Ohio fishing license is required to fish Ranger Lake.

The Ranger Lake fish community is supplemented with fish stocking activities, as needed. Stocking of various fish species, such as largemouth bass, is a very common fisheries management activity which has been shown to have many benefits to the public, especially in urban areas (DesJardine 1983, Gordon 1983, Halko1983, Heidinger 1993, Manfredo et al. 1983, Norville 1961, Weithman 1993). Other than annual stockings of rainbow trout in winter, the only stocking activity conducted in the past eight years was reintroduction of largemouth bass following the October 2012 fish community assessment. On November 9 and 28 and December 6, 2012, a total of approximately 500 mostly adult largemouth bass were transferred to Ranger Lake from lakes at three private golf courses. In the short term, it is hoped that the predatory bass will begin reducing the stunted sunfish population to a more desirable level, thereby increasing sunfish growth rates. In the longer term, more largemouth bass will be stocked in the lake over the next few years with the hope that a significant bass population will become established by the time the next fish community survey is conducted, likely in 2017.

It has been noted by various fish managers that proper communication with the public and the media is a powerful, and often underutilized, fisheries management tool (Decker and Krueger 1993, Patterson 1983, Cohen et al. 2008). With this in mind, information regarding fishing at Ranger Lake is disseminated through multiple outlets, including Cleveland Metroparks fishing booklet and trifold, on the Cleveland Metroparks

website, and through direct communication with anglers. The fishery, unlike Wallace Lake or the Rocky River, is not currently considered a highlight offering so it is not promoted as heavily through the media or other outlets to a wider audience.

Current Wildlife Habitat Management

Overall, Ranger Lake requires a moderate level of management effort given its small size and mostly natural character of the immediate area. Narrow-leaf cattail (*Typha angustifolia*) on the dam berm is thinned annually by mechanical methods at several angler access points. Submersed aquatic vegetation in the lake is not an issue due to deep drop-offs from the shoreline. Natural Resource Division staff have installed, and routinely monitor, five wood duck nesting boxes at the lake, as well (John Krock, Natural Resources Area Manager, personal communication).

Management Recommendations

Ranger Lake currently falls short of offering a high quality fishery due to its stunted sunfish population and lack of predatory fish species. With this limitation noted, Natural Resource staff will continue the stocking of predatory largemouth bass with a goal of establishing a predator fish population in the lake. If it turns out that a largemouth bass population has not been established based on follow-up sampling, scheduled for approximately 2017, then bass may continue to be restocked in the lake periodically, as needed.

The fishery could also potentially benefit from more restrictive largemouth bass regulations, such as a increased minimum size (currently 12”), reduced bag limit, or slot

limit requiring the immediate release of all bass in a size range, thereby protecting both smaller fish being recruited into the population and larger fish that are capable of producing the most offspring. Anderson (1976) notes that a 15-18" minimum length on largemouth bass should improve or sustain the quality of fishing under conditions where catchability is high, annual recruitment is low, and/or there is overpopulation of stunted sunfish prey species. This idea will be revisited following the findings of the 2017 follow-up fish community survey, dependant upon whether or not a bass population can be established in the lake based on re-introduction efforts.

If future surveys reveal largemouth bass are surviving, but recruitment of younger fish through spawning is low or absent, this would indicate a lack of appropriate spawning habitat in the lake. Largemouth bass are flexible in spawning preference, but prefer firmer substrates. In this case, enhancement of spawning habitat by addition of gravel beds in shallow water around the lake margin could be an option worth exploring. If establishment of a self-sustaining bass population in the lake does not appear to be feasible based on future population surveys, their presence could be maintained by periodic stocking of bass acquired from various sources through Cleveland Metroparks sportfish collection and transfer program.

The lake could also potentially benefit from stocking of other warmwater fish species. One potential candidate species would be channel catfish (*Ictalurus punctatus*). The main goal, as already outlined, would be to re-establish largemouth bass in the lake, but large channel catfish can also serve a role as predators on sunfish in a system. This alternative can be considered whether or not a bass population can be established.

Increasing public education regarding introduction of aquatic invasive species should be a focus at Ranger Lake, as well as all other park waters. This issue needs to be addressed as part of a wide-reaching campaign to be effective. The presence of red-eared slider turtles (*Trachemys scripta elegans*) in Oxbow Lagoon and round gobies (*Neogobius melanostomus*) in other nearby waters are testaments to the fact that human-introduced species have occurred in the past in Cleveland Metroparks. Cleveland Metroparks signs advising visitors not to release pets in our waters can be installed at the lake. Continued offering of printed and online information focusing on this concern, as well as communication with the media and word of mouth with anglers and other park users, would be an effective multi-pronged approach to help combat this problem.

No known current or historic stormwater related water quality impacts have been noted in this waterbody, and in its current state Ranger Lake will continue to serve as a buffer between the surrounding landscape and the East Branch Rocky River.

The current overall assessment is that Ranger Lake could use improvement in fulfilling its primary role in the Park District which is to provide high quality fishing opportunities. The lake is currently considered a “work in progress”. Management practices currently being employed at the lake will be assessed periodically in an attempt to improve the quality of the fishery as much as can reasonably be accomplished. If the fishery continues to be limited despite these measures, then other higher quality fisheries in the area, such as Wallace Lake and the Rocky River, will fulfill this role and the management focus of Ranger Lake will be to offer an ancillary fishing opportunity.

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Table 1. Basic characteristics of the sunfish population based on 17 October 2012 assessment (sampling time = 38 minutes)

| Species | Total Number | Total Weight (kg) | Average Size (mm) | Average Relative Weight (W_r)¹ |
|--|---------------------|--------------------------|--------------------------|---|
| Bluegill, Green and Pumpkinseed sunfish | 108 | 3.83 | 110.6 | 140.4 |

¹ As outlined in Wege and Anderson 1978, Anderson and Gutreuter 1983.

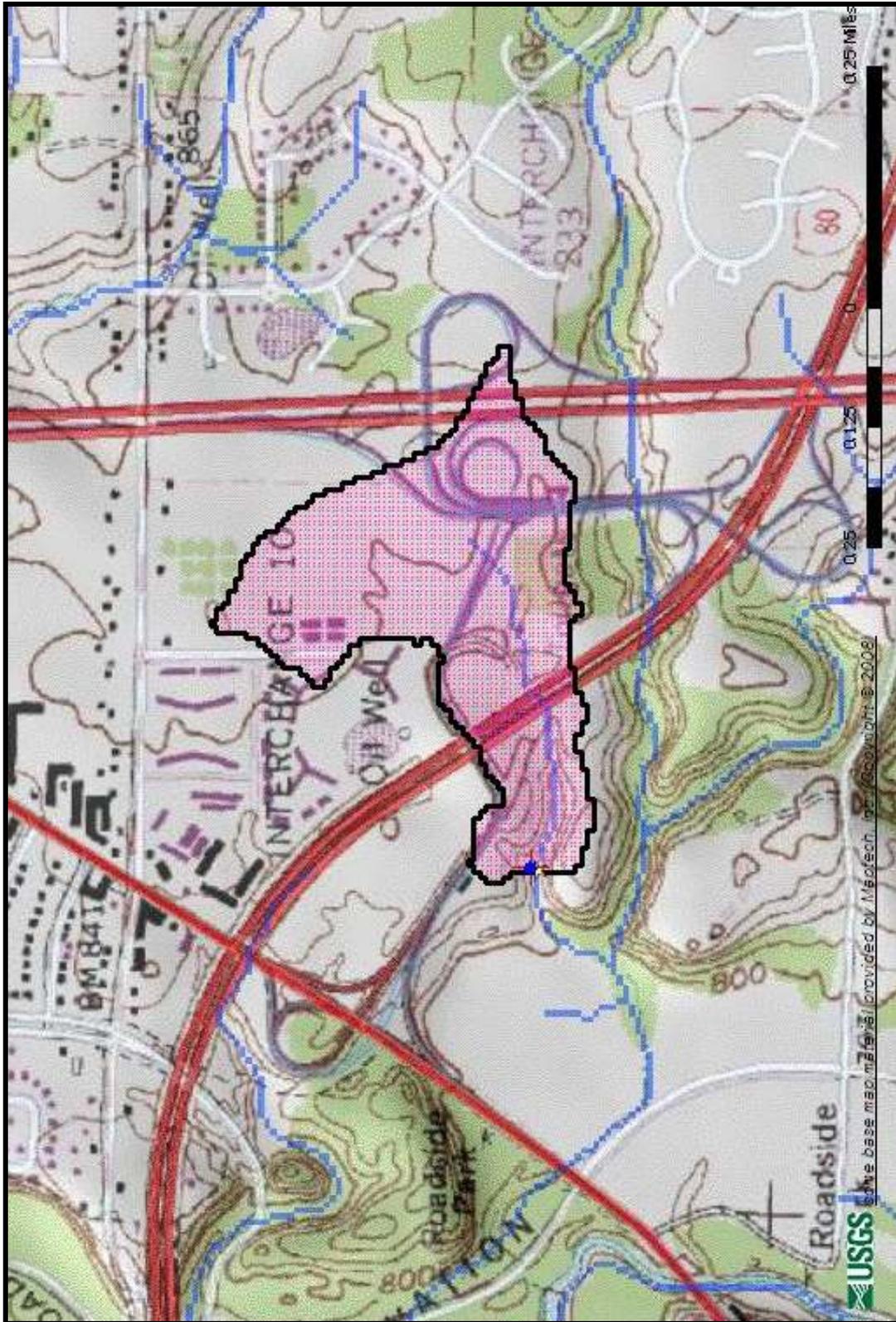
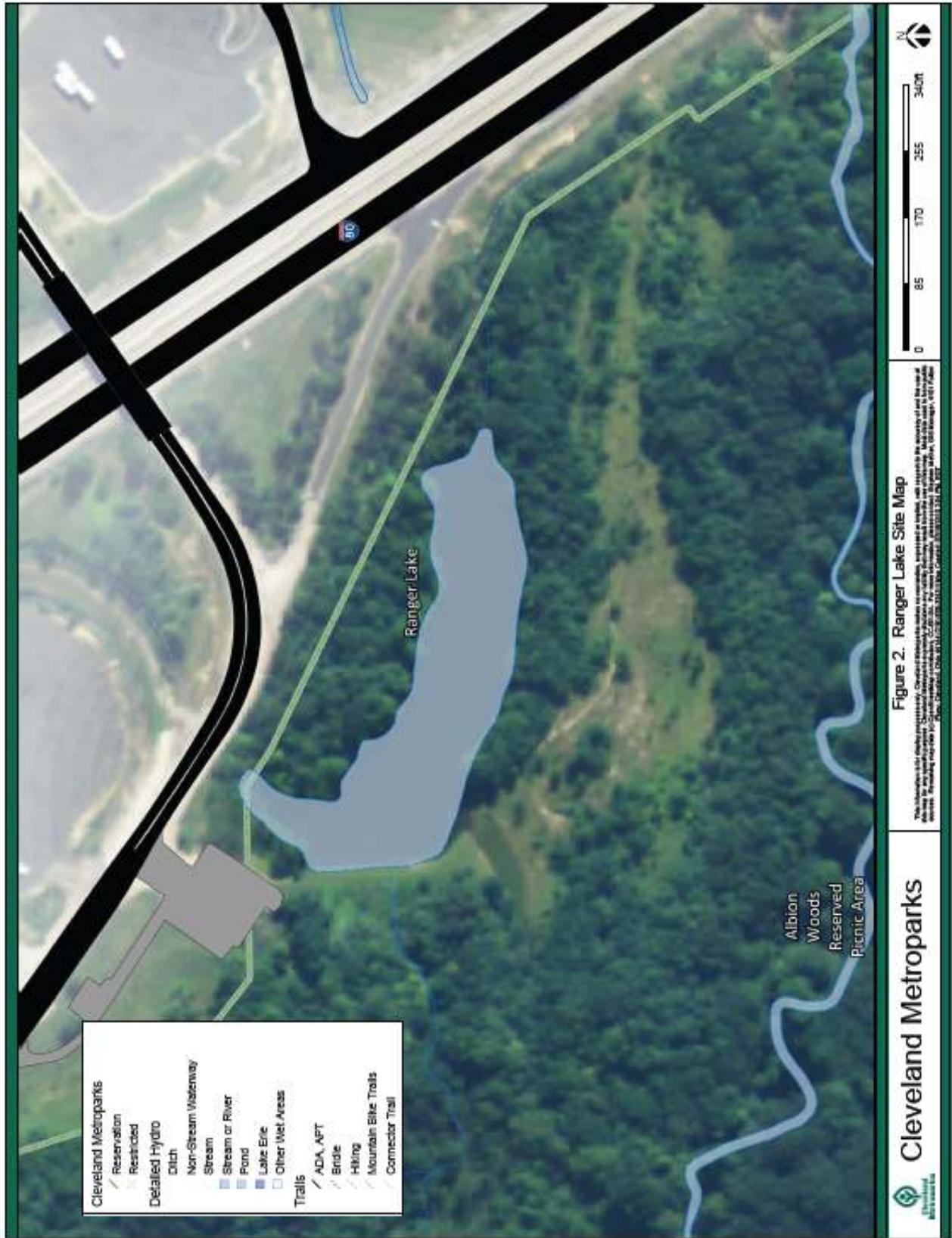
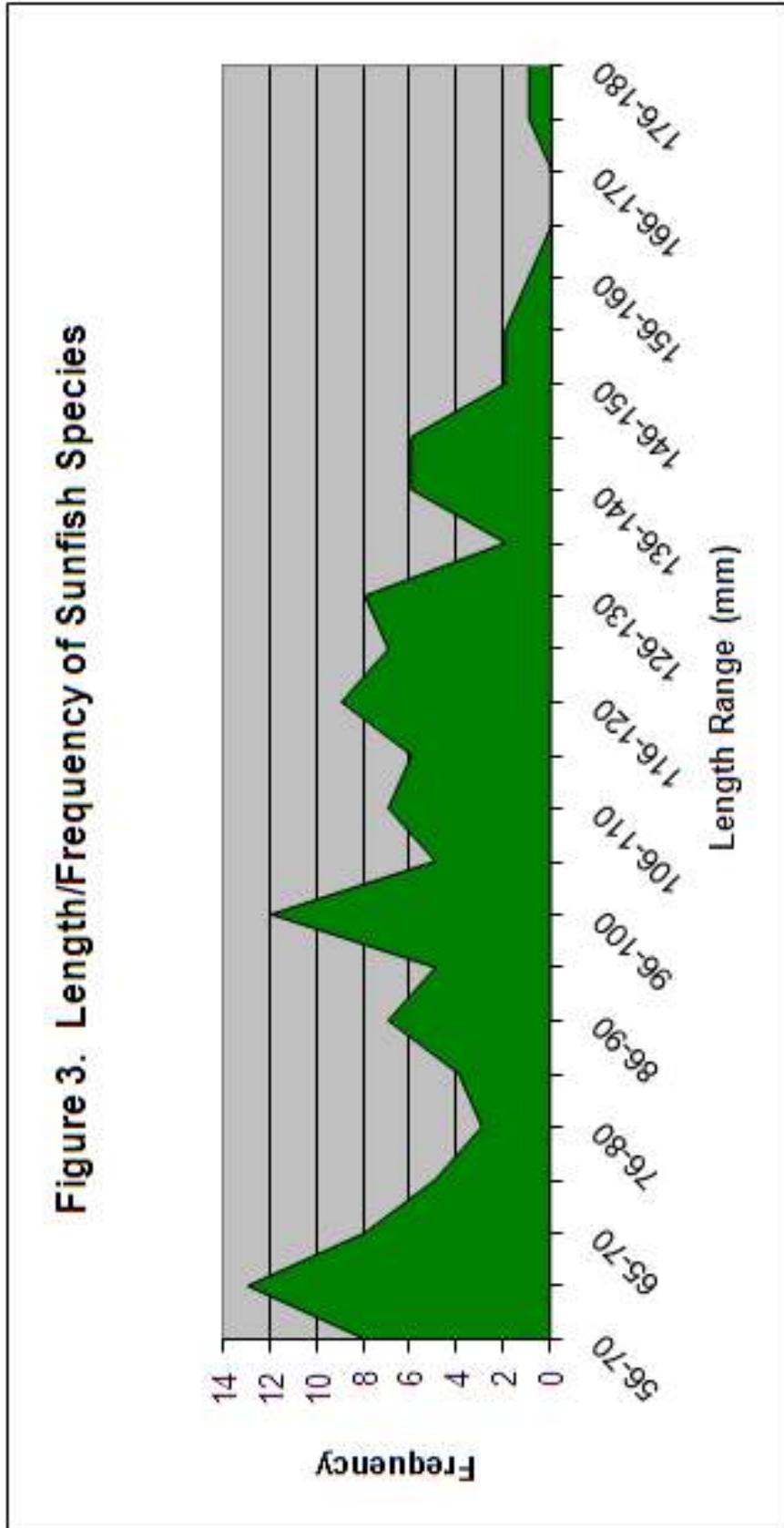


Figure 1. Ranger Lake Subwatershed Map





**APPENDIX A:
Fish Population Assessment Data Sheets
17 October 2012 (two pages)**



Fish Population Assessment Data Sheet

Date: 10/17/2012

Location: Ranger Lake - 1st Pass

Species:

Time Sampled: start: 8:07 a.m. } 38 min
end: 8:45 }
Others

| Sunfish | | Others | | | | | | | |
|-------------|------------|-------------|------------|-----|----|-----|-----|-----|-------------|
| Length (mm) | Weight (g) | Length (mm) | Weight (g) | | | | | | |
| BG 1 | 135 | 33 | BG 41 | 75 | 11 | 81 | 255 | 268 | White Crapp |
| BG 2 | 100 | 39 | PS 42 | 105 | 23 | 82 | 215 | 149 | Y. Bullhead |
| BG 3 | 100 | 14 | BG 43 | 80 | 9 | 83 | 300 | 349 | Y. Perch |
| PS 4 | 100 | 16 | BG 44 | 95 | 13 | 84 | 180 | 80 | Y. Bullhead |
| BG 5 | 75 | 8 | BG 45 | 95 | 16 | 85 | 180 | 86 | Y. Bullhead |
| BG 6 | 180 | 142 | BG 46 | 95 | 15 | 86 | 145 | 43 | Y. Bullhead |
| PS 7 | 145 | 63 | PS 47 | 85 | 12 | 87 | 155 | 50 | Y. Bullhead |
| PS 8 | 130 | 47 | Gr 48 | 105 | 37 | 88 | 125 | 162 | Y. Perch |
| BG 9 | 110 | 30 | PS 49 | 130 | 51 | 89 | 185 | 93 | Y. Bullhead |
| PS 10 | 180 | 36 | PS 50 | 145 | 64 | 90 | | | |
| PS 11 | 110 | 34 | BG 51 | 85 | 13 | 91 | | | |
| PS 12 | 130 | 53 | BG 52 | 90 | 15 | 92 | | | |
| BG 13 | 115 | 36 | BG 53 | 105 | 24 | 93 | | | |
| BG 14 | 100 | 26 | PS 54 | 156 | 70 | 94 | | | |
| BG 15 | 100 | 20 | BG 55 | 115 | 32 | 95 | | | |
| BG 16 | 90 | 12 | BG 56 | 95 | 18 | 96 | | | |
| PS 17 | 155 | 85 | PS 57 | 70 | 7 | 97 | | | |
| PS 18 | 145 | 70 | PS 58 | 75 | 11 | 98 | | | |
| PS 19 | 105 | 46 | BG 59 | 90 | 19 | 99 | | | |
| BG 20 | 115 | 31 | BG 60 | 110 | 32 | 100 | | | |
| PS 21 | 140 | 62 | BG 61 | 65 | 8 | 101 | | | |
| PS 22 | 90 | 19 | Gr 62 | 80 | 11 | 102 | | | |
| PS 23 | 125 | 41 | PS 63 | 145 | 78 | 103 | | | |
| BG 24 | 145 | 61 | PS 64 | 140 | 50 | 104 | | | |
| BG 25 | 130 | 54 | PS 65 | 120 | 34 | 105 | | | |
| BG 26 | 85 | 13 | PS 66 | 140 | 68 | 106 | | | |
| PS 27 | 140 | 59 | PS 67 | 120 | 38 | 107 | | | |
| PS 28 | 125 | 41 | BG 68 | 120 | 35 | 108 | | | |
| PS 29 | 65 | 10 | PS 69 | 140 | 66 | 109 | | | |
| PS 30 | 115 | 38 | PS 70 | 110 | 30 | 110 | | | |
| BG 31 | 70 | 9 | BG 71 | 100 | 19 | 111 | | | |
| BG 32 | 75 | 10 | PS 72 | 135 | 58 | 112 | | | |
| BG 33 | 95 | 14 | BG 73 | 120 | 33 | 113 | | | |
| BG 34 | 80 | 11 | BG 74 | 90 | 19 | 114 | | | |
| PS 35 | 130 | 39 | PS 75 | 145 | 67 | 115 | | | |
| PS 36 | 156 | 75 | PS 76 | 130 | 38 | 116 | | | |
| PS 37 | 140 | 56 | PS 77 | 100 | 28 | 117 | | | |
| PS 38 | 125 | 32 | PS 78 | 75 | 10 | 118 | | | |
| Gr 39 | 65 | 9 | BG 79 | 100 | 23 | 119 | | | |
| BG 40 | 70 | 10 | BG 80 | 85 | 16 | 120 | | | |



Fish Population Assessment Data Sheet

Date: 10/17/2012

Location: Ranger Lake - 1st Pass

Species: Sunfish

Time Sampled: 38 min

| | Length (mm) | Weight (g) | Length (mm) | Weight (g) | Length (mm) | Weight (g) |
|-------|-------------|------------|-------------|------------|-------------|------------|
| PS 1 | 70 | 121 | 41 | | 81 | |
| Gr 2 | 55 | 5 | 42 | | 82 | |
| PS 3 | 120 | 33 | 43 | | 83 | |
| BG 4 | 90 | 15 | 44 | | 84 | |
| BG 5 | 110 | 29 | 45 | | 85 | |
| BG 6 | 130 | 47 | 46 | | 86 | |
| BG 7 | 110 | 36 | 47 | | 87 | |
| PS 8 | 125 | 52 | 48 | | 88 | |
| PS 9 | 100 | 22 | 49 | | 89 | |
| PS 10 | 65 | 10 | 50 | | 90 | |
| PS 11 | 135 | 84 | 51 | | 91 | |
| BG 12 | 100 | 25 | 52 | | 92 | |
| BG 13 | 120 | 35 | 53 | | 93 | |
| PS 14 | 140 | 88 | 54 | | 94 | |
| PS 15 | 115 | 37 | 55 | | 95 | |
| BG 16 | 175 | 111 | 56 | | 96 | |
| PS 17 | 100 | 24 | 57 | | 97 | |
| BG 18 | 105 | 24 | 58 | | 98 | |
| BG 19 | 105 | 27 | 59 | | 99 | |
| BG 20 | 130 | 52 | 60 | | 100 | |
| PS 21 | 125 | 46 | 61 | | 101 | |
| BG 22 | 105 | 19 | 62 | | 102 | |
| BG 23 | 110 | 25 | 63 | | 103 | |
| BG 24 | 100 | 24 | 64 | | 104 | |
| BG 25 | 100 | 26 | 65 | | 105 | |
| OS 26 | 120 | 42 | 66 | | 106 | |
| BG 27 | 90 | 15 | 67 | | 107 | |
| BG 28 | 115 | 27 | 68 | | 108 | |
| | | | 69 | | 109 | |
| | | | 70 | | 110 | |
| | | | 71 | | 111 | |
| | | | 72 | | 112 | |
| | | | 73 | | 113 | |
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| | | | 76 | | 116 | |
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| | | | 79 | | 119 | |
| | | | 80 | | 120 | |