Department of Planning, Design and Natural Resources
Division of Natural Resources

Department of Park Operations
Division of Outdoor Education

NATURAL RESOURCES MANAGEMENT PLAN: HINCKLEY LAKE, HINCKLEY RESERVATION

Cleveland Metroparks Technical Report 2011/NR-06

A pair of trophy Hinckley Lake largemouth bass collected during fish population sampling (photo M. Durkalec).

Dan T. Moore, David W. Whitehead, Bruce Rinker
Board of Park Commissioners

Brian M. Zimmerman
Executive Director

Cleveland Metroparks
4101 Fulton Parkway, Cleveland, Ohio 44114

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Executive Summary

Hinckley Lake was initially an 87 acre impoundment created from a dam constructed on the East Branch Rocky River in 1923, although the surface acreage of the lake has been reduced by approximately 25% since that time due to sedimentation. The lake and surrounding area has been an important recreation area in Cleveland Metroparks for fishing, picnicking, swimming, boating, and hiking. The overarching management goal of the lake is to maintain its "fishable/swimmable" status in accordance with Federal Clean Water Act (CWA) objectives, which is accomplished through active management activities focused on the fishery and swimming area of the lake.

Sedimentation and nutrient enrichment from the East Branch of the Rocky River are the main issues in the lake. Fecal coliform monitoring is performed five times per summer during the swimming season by the Medina County Health Department, and in a typical year, such as 2010, bacteria levels are within Bathing Beach Water Quality Regulation limits during all sampling events. No consumption advisories have been issued by the Ohio Department of Natural Resources Division of Wildlife (DOW) based on fish tissue sampling conducted in 2008.

The lake offers one of the most popular recreational fisheries in Cleveland Metroparks, and is jointly managed resource through an agreement with DOW. The fishery exhibits a typical warmwater impoundment assemblage consisting of largemouth bass predators and a sunfish and gizzard shad forage (prey) base, supplemented by annual stocking of adult rainbow trout in late spring. There are at least 25 species of fish known in East Branch of the Rocky River around the lake, most of which are not of primary interest to anglers. Data collected in summer 2010 revealed that the lake has a healthy

population of predatory largemouth bass (*Micropterus salmoides*) and a stunted population of bluegill and pumpkinseed sunfish (*Lepomis macrochirus* and *L. gibbosus*) forage base, reflective of "good" and "poor to fair" quality fisheries, respectively. Gizzard shad also appear to play an important forage role in the lake, and are also responsible for the healthy largemouth bass population in this impoundment. The spring rainbow trout (*Oncorynchus mykiss*) fishery of the lake would be characterized as "very good", due to annual stocking of this species in the lake by DOW. Given the unique role of the lake as the best quality largemouth bass fishery in Cleveland Metroparks, enhanced by the seasonal trout fishery, changes in fisheries regulations are not being proposed. No other fish species in the lake are managed through bag or size regulations.

Although the lake is manmade, it does provide a secondary function as wildlife habitat. The lake is home to the state listed "species of concern" queen snake (*Regina septemvittata*) and occasionally used by the state "threatened" osprey (*Pandion haliaetus*), as well as offering an assemblage of common waterfowl, wading birds, reptiles, amphibians, invertebrates, and aquatic macrophytes. Overall, the lake has historically been a largely self-sustaining and low management intensity aquatic resource which fulfills its varied roles in Cleveland Metroparks well, although long term viability of the lake needs to be addressed in the future given the sedimentation issue.

Historic Overview and Background

Hinckley Lake is contained within the 2,878 acre Hinckley Reservation in Hinckley Township, Ohio. The land on which the lake resides was donated to Cleveland Metroparks in 1923 by local entrepreneur John F. Johnson when his plans to develop a resort around a manmade lake fell through due to economic difficulties during the Great Depression era (Miller 1992). In 1926, the 87 acre impoundment was created through construction of a dam, utilizing 6,000 tons of concrete and steel, situated at river mile 23.16 of the East Branch of the Rocky River. To date, this is the largest lake fully contained within Cleveland Metroparks, although its surface acreage has been reduced by approximately 25% since its creation due to sedimentation. The watershed drainage area of the lake is 21.7 mi^2 (56.2 km^2) as computed by USGS StreamStats program, using the dam as the downstream point (Figure 1). The lake is bounded by Bellus Road (County Highway 140) to the north, State Road to the south, and is situated in the river valley between East and West drives (Figure 2). The northwest basin, adjacent to the dam, is the deepest point in the lake (historic maximum depth of just over 20 feet). The eastern third of the lake, where the East Branch Rocky River enters, is the shallowest basin (historically less than 5 feet depth). According to Cleveland Metroparks records the lake was dredged in 1968, but over the past three decades, a large portion of the lake has filled in with sediment to the point that much of the former eastern basin is now marsh and scrub/shrub wetland. There is a boat house facility operated by a lessee off West Drive on the south shore of the central basin of the lake. The lake retains a mostly scenic quality and is largely surrounded by tree canopy, with the exceptions of the stretch along the face of the dam and in front of the boat house.

Ever since its creation, the lake and adjacent areas have been part of an active recreation area which features fishing, picnicking, swimming (at the dam spillway), boating, and hiking. Recreational use is greatest during the late spring through summer months.

The overarching goal for management of Hinckley Lake is to maintain, and improve where possible, the chemical, physical, and biological integrity of the lake 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 and swimming area. The lake has historically served these purposes adequately with only minimal management activity required, although long term viability is threatened by increasing sedimentation. Cleveland Metroparks will need to make decisions in the coming decades about whether to let the lake's conversion to wetland continue such that eventually the "lake" will disappear.

Furthermore, the Hinckley Natural Resource Management Plan 2002-2012 (Natural Resource Division, Cleveland Metroparks, 2002) identifies one additional site specific goal for the lake, which is to *"conduct a hydrologic study of Hinckley Lake to determine alternative dredging and lake maintenance"*. At that time, the status of achieving this goal was designated as "waiting", and still has not been completed.

Water Quality Overview

Overall water quality is good for this lentic system given its location in a 21.7 mi^2 drainage area (Figure 1), although some sources of impairment, discussed below, are

present. The lake would be best characterized as moderately eutrophic and receives nutrient enrichment from the waters of the East Branch Rocky River which feed the lake on a continuous flow-through basis. Aquatic vegetation and algal levels are below nuisance levels in the lake and no chemical algaecide and herbicide treatment is conducted. Overall, the lake is moderately turbid due to suspended solids (clay and sediment particles) from the East Branch Rocky River watershed resulting in reduced light penetration and, consequently, reduced photosynthesis, which may explain why nuisance algae and macrophyte growth is not an issue despite relatively high nutrient load. Still, seasonal water transparency does vary, being clearer during the colder seasons likely due to seasonal variation in phytoplankton and zooplankton communities in the lake (Wetzel 1983).

Fecal coliform bacteria in the swimming area have, historically, been within primary public contact standards except following heavy rainfall inputs. In the past, Cleveland Metroparks staff conducted this testing and culturing, but current testing is administered on a contract basis by the Environmental Division of the Medina County Health Department. Hinckley Lake is sampled 5 times during the swimming season (Memorial Day through Labor Day). In 2010, none of the samples exceeded Bathing Beach Water Quality Regulations. Sampling results and advisories, when administered, are posted on a sign at the swimming beach, as well as on Cleveland Metroparks website, although the public is still allowed to swim during these instances at their own discretion.

The East Branch Rocky River upstream and immediately downstream of the lake are in full attainment of warm water habitat (WWH) physical, chemical, and biological criteria (Ohio EPA 1999). Yet, the lake is listed as impaired per 303(d) list segment (ID#

OH87 4-246) for siltation, organic enrichment/DO, and thermal modificaition caused by land development/suburbanization (construction), urban runoff/storm sewers, non-point source, and natural source causes (Ohio EPA 1999). The total maximum daily load (TMDL) study status for these items is listed as "postpone" with the comment that additional data is needed. As already outlined, there is currently a system in place to monitor fecal coliform counts in the lake. The bacteria TMDL study for the Rocky River basin completed in 2005 notes that, although bacteria do not exceed Ohio EPA standards in the East Branch Rocky River, repeated samplings indicate a steady increase in fecal coliform levels as one travels downstream from the Cuyahoga-Medina county line to the city of Strongsville (Parsons 2005). The Cuyahoga-Medina county line is situated approximately 3 miles north (downstream) of Hinckley Lake. No further documentation of physical or chemical water quality issues at the lake were found in Cleveland Metroparks historic files.

Fisheries Resource Overview

Hinckley Lake offers a typical fish assemblage for a moderate size reservoir in Ohio. Fish species of importance (albeit to varying degrees) to anglers include largemouth bass (*Micropterus salmoides*), white crappie (*Pomoxis annularis*), black crappie (*P. nigromaculatus*), bluegill (*Lepomis machrochirus*), pumpkinseed sunfish (*L. gibbosus*), green sunfish (*L. cyanellus*), channel catfish (*Ictalurus punctatus*), bullhead catfishes (*Ameriurus* spp.), common carp (*Cyprinus carpio*), and seasonally stocked rainbow trout (*Onchorynchus mykiss*). Other fish species known to be present, but of lesser immediate interest to anglers, include the white sucker (*Catostomus*

commersoni), gizzard shad (*Dorosoma cepedianum*), and probably other cyprinid (minnow) species entering the lake from upstream areas of the East Branch Rocky River. At least 25 species of fish have been documented in the East Branch Rocky River by Cleveland Metroparks and OEPA, all of which have likely been present in the connected lake at some point (Halko 1993, OEPA 1999).

The fish community composition, overall, is typical for a moderate size Ohio impoundment. Overall, the sport fisheries would be rated as "good" for largemouth bass and seasonally stocked rainbow trout and "fair to poor" for panfish species, which are fairly abundant but tend to be stunted (Table 1, Table 2, Figure 5). Other species would be characterized as incidental catches by the majority of anglers who utilize the lake.

Up until the 1980's, adult channel catfish and northern pike were stocked regularly in Hinckley Lake by Cleveland Metroparks to enhance the sport fishery. Approximately 1,500 pounds of catfish were stocked in early summer and (in odd numbered years) approximately 1,000 pounds of predator northern pike were stocked. Although these stocking efforts offered a "fair to good' fishery for northern pike (Halko, undated document), it was determined that the benefits did not outweigh the high maintenance costs given the flow-though nature of Hinckley Lake, which allowed fish to migrate upstream and downstream of the lake and dilute those fishing opportunities.

The predominant year-round predator in Hinckley Lake is largemouth bass, and the predominant forage species are bluegill sunfish and gizzard shad. Properly managed ponds and small lakes can harbor self-sustaining largemouth bass and bluegill populations (Austin el al.1996, Carlander 1977). However, to be self-sustaining, regular data collection is required on the populations of these two species. Electrofishing is a

well established method utilized by fisheries managers to assess fish population dynamics, abundance, and structure (Neilsen and Johnson 1983, Reynolds 1993). In an effort to obtain more current data on largemouth bass and bluegill dynamics in Hinckley Lake, electrofishing was performed on 22 July 2010 in two sampling runs totaling 90 minutes. Sample run 1 was conducted for 54 minutes along the west shoreline and sample run 2 was conducted for 36 minutes along the east shoreline of the lake (Figure 2). 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 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 event are available in Appendix A.

Largemouth bass are the dominant year-round predator in Hinckley Lake and, as such, have a marked influence over the fish community. Sampling yielded 119 largemouth bass weighing a total of 41.69 kg (91.9 lbs) (Table 1). Based on plotting length against frequency, there appears to be between 7 and 9 year classes of largemouth bass present in the sample (Figure 3). According to Hall (1986), density of largemouth bass over 199 mm (stock size) in Ohio impoundments can be correlated to electrofishing catch per hour, and the relationship is as follows:

$$\text{Log}_{10} Y = 1.2274 \text{Log}_{10} X - 0.5489$$

Where X = electrofishing catch of largemouth bass over 199 mm (7.83 inches) per hour (CPH) and Y = number of largemouth bass over 199 mm per hectare. Hinckley Lake, at 35.2 hectares (87.0 acres), yielded a CPH of 44.7 largemouth bass over 199 mm (67 bass over 199 mm in 1.50 hours) which would indicate a largemouth bass density of 29.97 $\geq$ stock size bass per hectare (12.12 $\geq$ stock size bass/acre) when Hall's relationship is applied. This would suggest a largemouth bass abundance of 1,054.9 $\geq$ stock size fish (29.97 $\geq$ stock size bass per hectare x 35.2 hectares) weighing a total of 595.0 kg (1,054.9 fish x 0.564 kg average weight of stock size bass), or 1,311.7 lbs, in Hinckley Lake. This is a very low bass density for an Ohio lake, considering that 50-75 stock size bass per acre is recommended (William Lynch, Aquatic Ecosystem Management Program Specialist, Ohio State University Extension, personal communication).

Proportional stock density (PSD) of largemouth bass in the lake was calculated using the following formula (Anderson 1976):

$$PSD(\%)=(\text{number} \geq \text{quality size}/\text{number} \geq \text{stock size})x100$$

Where "quality" and "stock" designations are as outlined in Gabelhouse 1984. PSD of largemouth bass in the lake was good at 44.1% (Table 2), as a PSD range between 40-70 is indicative of balance when the population supports a substantial fishery (Anderson 1980).

Relative weight (W_r) of individual fish was used as the metric to determine fish condition and was calculated using the following formula:

$$W_r=(W/W_s)x100$$

Where W is the weight of a given fish and W_s for largemouth bass is calculated as such (Wege and Anderson 1978, Anderson and Gutreuter 1983):

$$Log_{10}W_s=-5.316+3.191Log_{10}L$$

Where L = the length of the specimen in mm. Largemouth bass sampled from Hinckley Lake exhibited a mean W_r of 96.6 (Table 2) compared against the ideal W_r of 100. This is good for an Ohio lake and reflects a bass population with specimens in healthy condition (Phil Hillman and Andy Burt, Ohio Division of Wildlife, personal communications). This observation reflects particularly well on bass in the lake, since relative weight of largemouth bass in Ohio ponds was noted to be lower than normal during summer 2010 due to high water temperatures that may have affected fish metabolism adversely (William Lynch, Aquatic Ecosystem Management Program Specialist, Ohio State University Extension, personal communication).

It is noteworthy that approximately a quarter of the bass sampled (26.9%) were of quality size or better, and two fish in the sample were of "memorable" designation. Over half of the bass (58.8%) in the sample were of stock size or better. This would indicate that Hinckley Lake offers a "quality over quantity" largemouth bass fishery.

Bluegill and pumpkinseed sunfish are the among the dominant forage fish in Hinckley Lake, although gizzard shad are also a substantial prey species in the lake (the latter of which were not processed during the sampling event, as is typical during lake sampling in Ohio). Sampling yielded 45 bluegill and pumpkinseed sunfish weighing a total of 1.53 kg (3.37 lbs) (Table 1). Based on plotting length against frequency, there appears to be five year classes of bluegill/pumpkinseed sunfish in the sample (Figure 4). Note that the smallest size classes of sunfish are less susceptible to electrofishing than larger specimens due to less surface area exposed to the electric field, hence their lower frequency in the sample. Proportional stock density (PSD) of bluegill was low at 9.30%

(Table 3), since a PSD range between 20-40 is indicative of balance when the population supports a substantial fishery (Anderson 1980).

Relative weight (W_r) of individual fish was used as the metric to determine fish condition, and was calculated using the following formula, as outlined earlier, where W_s specific for bluegill is calculated as (Wege and Anderson 1978, Anderson and Gutreuter 1983):

$$Log_{10}W_s=-5.374+3.316Log_{10}L$$

Where L = the length of the specimen in mm. Compared against the ideal W_r of 100, bluegill sampled from Hinckley Lake were in very good condition for an Ohio lake, exhibiting a mean W_r of 98.9 (Table 2) .

Balance within the fish community of Hinckley Lake was assessed by analyzing prey-predator ratios. To determine overall status of largemouth bass and bluegill dynamics in Hinckley Lake a Total Quality (TQ) plot was constructed by plotting a point that aligned with predator (largemouth bass) PSD on the X axis and prey (bluegill) PSD on the Y axis (Figure 5). Gabelhouse (1984) determined that the PSD ranges indicative of balance in a prey population is 20-40% and the PSD range indicative of balance in a predator population is 40-60%, which are represented by dashed lines on the TQ plot. The square formed by the intersection of the desired PSD ranges on the plot is therefore representative of a state of mutual balance for predator and prey. The point of intersection of the bass and bluegill PSDs for Hinckley Lake is not within this range of mutual balance, but instead lies below the transect that indicates a balanced predator/prey community. Given the relatively healthy condition of largemouth bass in the lake, based on relative weight and overall size, it is likely this is a situation in which the lag in

sunfish prey community is being balanced adequately by gizzard shad (not factored into the PSD this time as is typical) from a predator standpoint. In other words, the predator and prey ratio may be more balanced than the current data suggests. In light of this hypothesis, in a follow-up sample event in the future I would recommend also collecting data to compute PSD for gizzard shad to factor into the TQ plot.

It should be noted that the July 2010 fish sampling was performed during daylight hours, albeit at the end of the day. Even more quality size bass, in particular, would likely have turned up in the sample if sampling was conducted after dark. Several studies have shown that night sampling can be up to 5-10 times more effective than daytime fishing in lakes, especially for larger predatory specimens such as largemouth bass (Loeb 1958, Witt and Campbell 1959, Kirkland 1962, Smith-Root 2007). This would suggest that there are even more large bass predators in the lake than were revealed, although the quantity of larger specimens collected was good, as already outlined.

Data collected on 1 July 2008 on largemouth bass and sunfish in Hinckley Lake by the Ohio Division of Wildlife during a statewide fish tissue sampling survey revealed similar length/frequency results for these species, although the largemouth bass PSD at 39% was about 4% lower than in the 2010 Cleveland Metroparks survey (Appendix B). This is a reasonable amount of variation between two years in a fish population, since predator and prey balance can be variable based on a number of conditions. Fsh tissue samples collected during the 2008 survey did not lead to recommendation of consumption advisory for the lake (Appendix B).

Other Recreational Uses

Hinckley Lake is a popular summer location for swimmers (below the dam spillway) and boat rentals within a designated area. The lake is also utilized by small electric motor and hand-powered watercraft such as rowboats, kayaks, and canoes, mostly by anglers. Boat rentals are offered by the lessee who manages the boat house and store facility. Due to silting in of the historic public small boat launch area on the upstream end of the lake on the East Branch Rocky River at State Road, an additional asphalt and concrete boat ramp was installed in a small bay with water of adequate depth adjacent to (southeast of) the boat house in 2008. This new launch has served the small boaters of Hinckley Lake well.

Cleveland Metroparks Water Safety Program, which manages the swimming facililities on the lake, reported an average of 54,275 per year program attendees at Hinckley Lake in 2007, 2008, and 2009, illustrating the popularity of swimming at this venue (Bixler 2009).

Ecosystem Function Overview

Although Hinckley Lake is not a natural lake, it does serve some general ecosystem functions in the watershed. A number of associated aquatic wildlife, notably birds, utilize the lake (Appendix C). Great blue heron (*Ardea herodias*), belted kingfisher (*Ceryle alcyon*), mallard duck (*Anas platyrhynchos*), and Canada goose (*Branta canadensis*) are observed at the lake regularly by wildlife watchers. On occasion, the state threatened osprey (*Pandion haliaetus*) may be observed hunting the lake for fish (S. Hosko, Brecksville Nature Center Manager, personal communication). Also noteworthy,

the queen snake (*Regina septemvittata*), a state listed reptile species of concern, has been found along the east end of the lake at least four times over the past decade (personal observation; S. Hosko, Brecksville Nature Center Manager, personal communication). The lake is also host to an assemblage of common reptiles and amphibians, including eastern painted turtle (*Chrysemys picta picta*), snapping turtle (*Chelydra serpentina*), eastern spiny softshell turtle (*Apalone spinifera*), green frog (*Rana clamitans*), bullfrog (*R. catesbeiana*), American toad (*Anaxyrus americanus*), and spring peeper (*Pseudacris crucifer*). A number of common macroinvertebrates groups have been documented in the lake (Appendix C), although specific inventories of macroinvertebrate or microbial communities within the lake have not been performed. The vegetative/algal community of the lake is comprised mainly of unicellular algaes, white water lily (*Nymphaea odorata*), Eurasian watermilfoil (*Myriophyllum spicatum*) and floating leaf pondweed (*Potamogeton natans*). A full inventory of aquatic plants at Hinckley Lake has not been undertaken, so a number of other species are likely present. Other than seasonal use by the osprey and queen snake, as already noted, no other known state listed species of flora or fauna are known to be present in the lake.

It has been observed that there has been a slow, but steady, decline in beds of aquatic macrophytes in the lake over the past 30 years. Although not easily quantifiable, this decline has been noted by those familiar with the lake. Most notably, formerly abundant beds of water white water lily have been reduced to one modest colony along the central portion of the northeastern shore of the lake. The formerly more extensive beds of macrophytes offered prime spawning habitat for a number of fish species, such as crappie, as well as feeding areas for various waterfowl species. The most likely culprit

in this decline of macrophytes is the robust common carp population of the lake, as have been documented as having negative affects by increasing turbidity and decreasing macrophyte communities in Lake Erie coastal marshes and estuaries (Kleber and Johnson 2006).

Current Fisheries Management

The Hinckley Lake fishery is actively managed through a joint agreement between DOW and Cleveland Metroparks. The urban nature of the waters of Cleveland Metroparks, in general, require intensive management efforts which go beyond traditional management approaches (Halko 1983). A bag limit of 5 rainbow trout per angler per day (no size limit) and 2 largemouth bass of 12" or greater per angler per day are 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 Hinckley Lake.

The resident Hinckley Lake fish community is supplemented with an annual spring trout stocking. Stocking fish is a very common fisheries management activity which has been shown to have a many of benefits to the public (DesJardine 1983, Gordon 1983, Heidinger 1993, Manfredo et al. 1983, Norville 1961, Weithman 1993). Approximately 2,400 catchable size rainbow trout raised at London State Fish Hatchery are stocked annually by DOW in approximately mid-April. The rainbow trout are offered as a seasonal cold-water fishery which lasts until about mid-May most years, supplementing the resident warmwater fishery present in the lake year-round.

Hinckley Lake is not stocked with native warmwater species, unlike many other smaller lakes and ponds in the Park District, due to two main factors: the large size of the lake (relative to other lakes) and the impoundment nature of the lake, which would allow fish migration out of the lake on both the upstream and downstream ends. Both of these factors would make stocking efforts of fish such as largemouth bass and bluegills less apparent than on smaller, more contained waters in the Park District. Additionally, the Hinckley Lake bass fishery currently offers the best chance at a "trophy" bass of any lake in the Park District and stocking of bass is deemed less appropriate due to this observation.

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 Hinckley Lake is disseminated through a number of outlets, including the following: Cleveland Metroparks fishing booklet and trifold; in the popular online fishing report on the Cleveland Metroparks website; through Cleveland Metroparks Facebook page; in the Plain Dealer newspaper (typically in the Outdoors area of the Sports section); and via a two panel informational kiosk about the Hinckley Lake fishery and its place in the watershed installed near the boathouse in 2008. Additionally, a number of fishing docks and platforms have been constructed around the lake perimeter to facilitate fishing opportunities.

Current Swimming Area Management

Nuisance vegetation and filamentous algae management has not been needed at Hinckley Lake, in the swimming area at the spillway or in the main lake, due in part to the perpetual moderate to high turbidity exhibited in the lake which reduces sunlight penetration. As noted earlier, a system is in place to monitor bacteria levels by the Medina County Health Department and signs are posted at the lake to notify the public on occasions when threshold levels are exceeded.

Current Wildlife Habitat Management

No active wildlife habitat management is currently conducted at Hinckley Lake on a routine basis. On occasion, domestic ducks and nuisance Canada geese are removed from the lake on an as needed basis (Ed Kuilder, Natural Resources Area Manager, personal communication).

Management Recommendations

The main management concern that needs to be addressed at Hinckley Lake is the sedimentation issue, which has caused the eastern third of the lake, in particular, to fill in to the point of largely becoming wetland habitat over the past 30 years. Although it has been discussed regularly, no action has been taken in the past 40 years to address the siltation. At this point, a decision needs to be made to either let the situation run its course and continue to fill in the lake, or to take action and dredge the lake to maintain its historic character as an 87 acre impoundment.

Sediment inputs to the Hinckley Lake subwatershed are not well quantified, but are likely increasing due to urban sprawl associated development of the area outside the Park District within its subwatershed (Figure 1). Unfortunately, a watershed Balanced Growth Plan has not been completed, or is even currently anticipated, for the East Branch of the Rocky River as has been done for the West Branch Rocky River. Promoting the need for and supporting future efforts of partners in this endeavor would be highly recommended to help strategically identify and address the root sources of sedimentation in the Hinckley Lake subwatershed.

Based on fish community data analysis, it appears the lake is serving as the best quality largemouth bass fishery in the Park District under current regulations. The lake fulfills a valued role among local anglers for this reason. In spring, the rainbow trout fishery is very good for the month of April due to the annual stocking by DOW. Sunfish populations in the lake are on the stunted side, and any other fisheries in the lake, such as carp or catfish, are ancillary. Given the largely self-sustaining warmwater fishery of the lake, as well as the dynamic nature of this riverine impoundment which facilitates fish migration upstream and downstream, additional stocking of other fish species in the lake is not recommended at this time. Furthermore, it is recommended to leave the current fisheries regulations as they are for two reasons: 1) the lake is fulfilling a valuable role as the best largemouth bass fishery in the Park District and is a very good seasonal trout fishery and 2) because as long as we have a joint management agreement with the Ohio Division of Wildlife we need to default to adopting the State's fisheries bag and size limits. A big advantage of Hinckley Lake is that it does not require a high level of active management effort to adequately fulfill its role as an overall good quality fishery, which

allows Cleveland Metroparks to allocate more time to other more intensive management locations. A follow-up fish population survey will need to take place at the lake in the future, likely on a five year cycle, dependant upon Natural Resources division resources.

Increasing public education regarding introduction of aquatic invasive species should also be a focus at Hinckley Lake, as well as all other park waters. This issue is noted in a bold red box on the onsite fishing kiosk, but needs to be part of a wider-reaching campaign to be effective. Presence of round gobies and zebra mussels in the lake are testaments to the fact that human-introduced species have occurred in the past at Hinckley Lake and, although these have proven to have minimal impact on the system thus far, another species could have more devastating affects.

The current overall assessment of Hinckley Lake is that it fulfills its various roles within the Park District adequately and, therefore, does not require any drastic change in management strategy, although a decision needs to be made about the course of action, if any, that will be taken in the coming decades to address the siltation issue. In the meantime, the lake continues to be a popular fishing and swimming destination in the Park District. The low intensity management practices currently employed at the lake will therefore continue to be utilized and assessed periodically in an adaptive approach to management of the Hinckley Lake system.

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Table 1. Basic characteristics of largemouth bass and bluegill populations based on 22 July 2010 assessment (sampling time = 90 minutes)

Species	Total Number	Total Weight (kg)	Average Size (mm)	Average Relative Weight (W_r)[1]
Largemouth bass	119	41.69	246.6	96.6
Bluegill	45	1.53	120.7	98.9

[1] As outlined in Wege and Anderson 1978 and Anderson and Gutreuter 1983.

Table 2. Predator (largemouth bass) and prey (bluegill) proportional stock density information

Species	≥ Stock Size[1]	≥ Quality Size[1]	Proportional Stock Density (%)
Largemouth bass	68	30	44.11
Bluegill	43	4	9.30

[1] Designations per Gablehouse 1983.

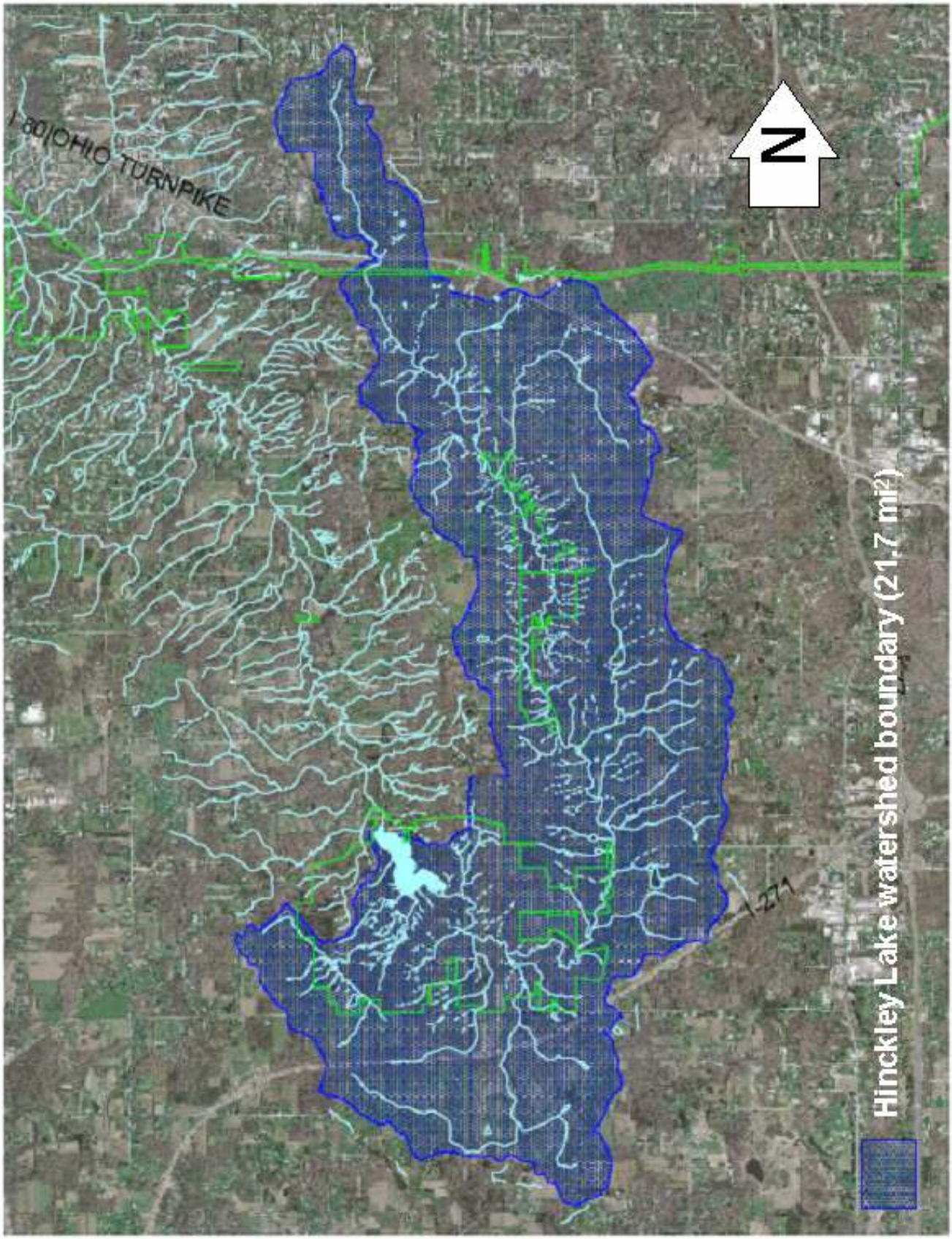


Figure 1. Hinckley Lake watershed.

Figure 2. Hinckley Lake sample site map.

Figure 3. Length/Frequency of Largemouth Bass

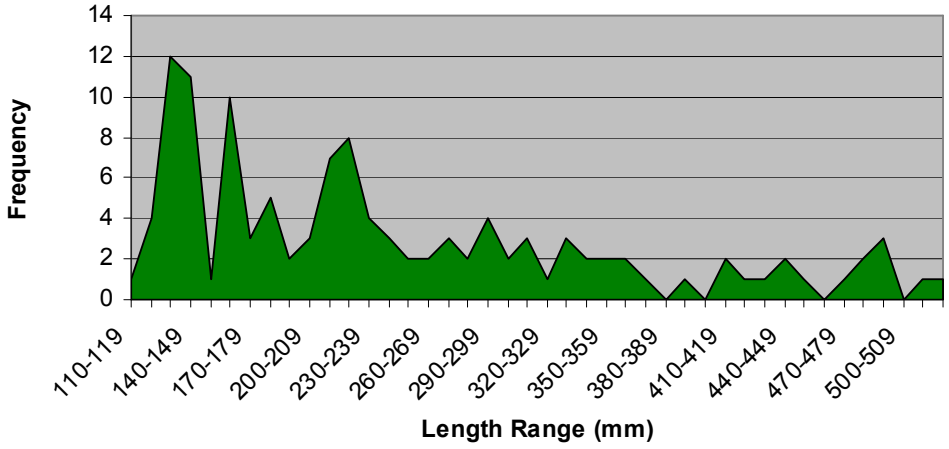


Figure 4. Length/Frequency of Bluegill

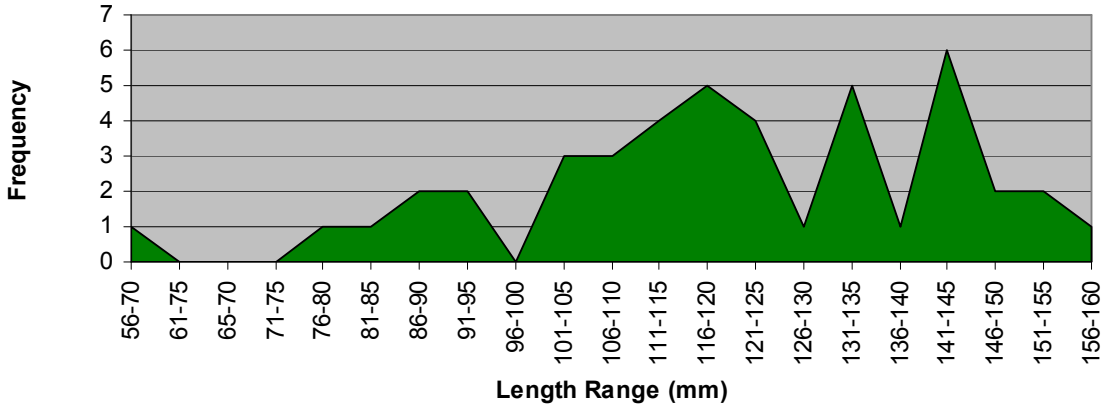
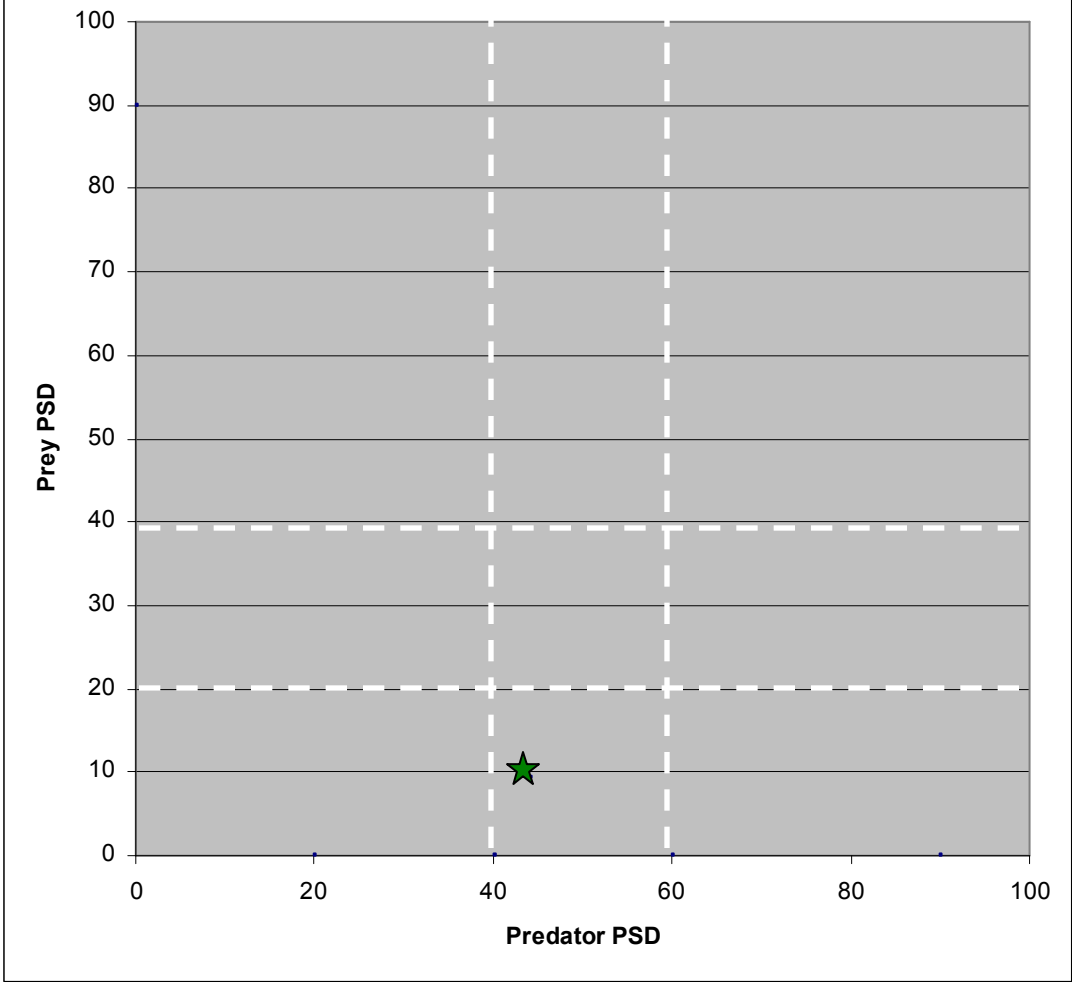


Figure 5. Total Quality (TQ) Plot for Largemouth Bass (Predator) and Bluegill (Prey)



★ = Intersection of observed Predator and Prey

APPENDIX A:
Fish Population Assessment Data Sheets
22 July 2010 (four pages)

Cleveland Metroparks Fish Population Assessment Data Sheet

Date: 7/22/10 **Location:** Hinckley Lake W Shore 6:13 p.m.

Species: LMB **Time Sampled:** 54 min

	Length (mm)	Weight (g)		Length (mm)	Weight (g)		Length (mm)	Weight (g)
1	510	2001	41	300	353	81		
2	499	1648	42	214	133	82		
3	305	331	43	194	77	83		
4	481	1585	44	151	46	84		
5	470	1685	45	134	28	85		
6	315	483	46	171	52	86		
7	414	1020	47	181	85	87		
8	374	743	48	135	33	88		
9	341	506	49	161	51	89		
10	307	422	50	141	34	90		
11	397	963	51	145	40	91		
12	208	99	52	138	34	92		
13	180	65	53			93		
14	223	139	54			94		
15	277	296	55			95		
16	394	364	56			96		
17	163	56	57			97		
18	169	64	58			98		
19	455	1570	59			99		
20	121	24	60			100		
21	485	1774	61			101		
22	415	1102	62			102		
23	190	88	63			103		
24	499	1902	64			104		
25	369	720	65			105		
26	222	141	66			106		
27	362	624	67			107		
28	278	361	68			108		
29	446	1421	69			109		
30	435	1092	70			110		
31	240	185	71			111		
32	160	50	72			112		
33	355	523	73			113		
34	259	231	74			114		
35	220	144	75			115		
36	219	120	76			116		
37	126	25	77			117		
38	214	125	78			118		
39	188	83	79			119		
40	222	145	80			120		

Fish Population Assessment Data Sheet

Date: 7/22/10 **Location:** Hinckley Lake w Shore 6:13 pm

Species: BG **Time Sampled:** 54 min

	Length (mm)	Weight (g)		Length (mm)	Weight (g)		Length (mm)	Weight (g)
1	125	39 65	41			81		
2	137	45	42			82		
3	116	32	43			83		
4	103	23	44			84		
5	103	19	45			85		
6	150	50	46			86		
7	142	58	47			87		
8	116	26	48			88		
9			49			89		
10			50			90		
11			51			91		
12			52			92		
13			53			93		
14			54			94		
15			55			95		
16			56			96		
17			57			97		
18			58			98		
19			59			99		
20			60			100		
21			61			101		
22			62			102		
23			63			103		
24			64			104		
25			65			105		
26			66			106		
27			67			107		
28			68			108		
29			69			109		
30			70			110		
31			71			111		
32			72			112		
33			73			113		
34			74			114		
35			75			115		
36			76			116		
37			77			117		
38			78			118		
39			79			119		
40			80			120		

Fish Population Assessment Data Sheet

Date: 7/22/10 **Location:** Hinckley Lab E Shore

Species: LMB **Time Sampled:** 36 min

	Length (mm)	Weight (g)
1	334	406
2	240	176
3	335	356
4	350	617
5	315	423
6	279	296
7	265	263
8	177	83
9	161	56
10	295	131
11	141	34
12	492	1743
13	131	39
14	115	18
15	234	146
16	189	74
17	292	362
18	235	167
19	441	1384
20	342	512
21	283	279
22	180	66
23	141	37
24	161	54
25	293	339
26	167	61
27	133	34
28	145	35
29	160	50
30	225	146
31	282	272
32	315	390
33	233	168
34	212	122
35	144	37
36	296	359
37	209	134
38	332	410
39	135	28
40	210	118

	Length (mm)	Weight (g)
41	143	37
42	217	144
43	257	237
44	133	29
45	130	27
46	160	52
47	238	176
48	122	22
49	220	127
50	146	38
51	175	76
52	146	38
53	207	111
54	129	28
55	427	1147
56	520	2212
57	269	256
58	244	185
59	135	27
60	224	137
61	136	31
62	142	37
63	137	35
64	165	57
65	213	124
66	132	26
67	145	35
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		

	Length (mm)	Weight (g)
81		
82		
83		
84		
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120		

Fish Population Assessment Data Sheet

Date: 7/22/10 **Location:** Hinckley Lake E Shore

Species: BG **Time Sampled:** 36 min

		Length (mm)	Weight (g)
WM	1	134	66
	2	145	54
	3	116	24
PS	4	95	16
	5	81	12
	6	117	31
	7	141	35
	8	133	49
	9	113	22
	10	130	36
	11	117	26
	12	122	29
	13	122	30
	14	117	26
PS	15	76	9
	16	153	67
PS	17	141	35
	18	144	53
	19	113	26
SS	20	135	46
	21	134	40
	22	105	22
	23	93	15
	24	88	13
	25	149	52
	26	145	52
	27	133	36
	28	58	10
	29	115	27
	30	155	63
	31	157	73
	32	116	25
	33	89	14
	34	111	24
	35	124	30
	36	125	34
	37	110	24
	38		
	39		
	40		

	Length (mm)	Weight (g)
41		
42		
43		
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	Length (mm)	Weight (g)
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APPENDIX B:
ODNR Fish Population Assessment Data from 1 July 2008 and Tissue Analysis Results (five pages)

Mike Durkalec

From: Wagner, Curt [Curt.Wagner@dnr.state.oh.us]
Sent: Wednesday, July 09, 2008 3:19 PM
To: md@clevelandmetroparks.com
Subject: Hinckley fisheries data

Mike,

Attached are two pdf files of length frequency distributions (inches) for largemouth bass and bluegill sunfish in Hinckley.

Also, here are some other data:

Species	Number	Mean Length	Max Length	Mean Relative Weight
Warmouth	1	93	93	
Bluegill	74	104	157	96
Redear	1	78	78	
Pumpkinseed	2	112	119	
Hybrid Sunfish	6	100	124	
L. Bass	45	270	474	99

Largemouth Bass

Total N	Stock-sized	Quality-sized	Preferred-sized
45	36	14	8

PSD: 39
RSD-P: 22

Let me know if you want to talk about this data further and dig deeper into some specific comparisons, etc...
Overall, your report on the website was accurate. Decent largemouth bass population and a pretty crummy bluegill fishery. Gear not adequate for the crappie population survey.

Later!
Curt

Curtis P. Wagner
Fisheries Biologist
Ohio Department of Natural Resources
Division of Wildlife - District Three
912 Portage Lakes Drive
Akron, OH 44319
330-245-3018
curt.wagner@dnr.state.oh.us

1/26/2011

Mike Durkalec

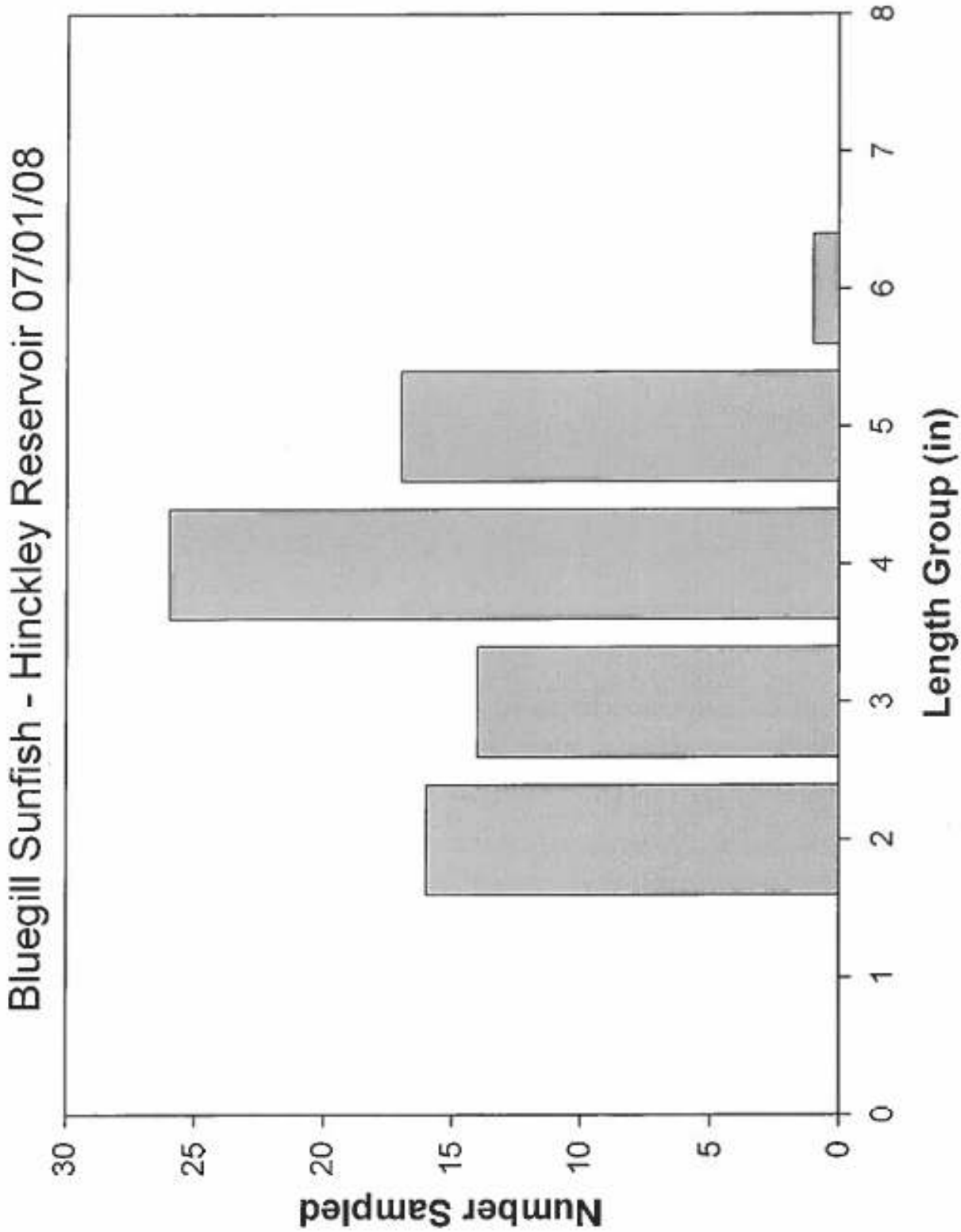
From: Wagner, Curt [Curt.Wagner@dnr.state.oh.us]
Sent: Wednesday, July 09, 2008 3:21 PM
To: md@clevelandmetroparks.com
Subject: bass scales

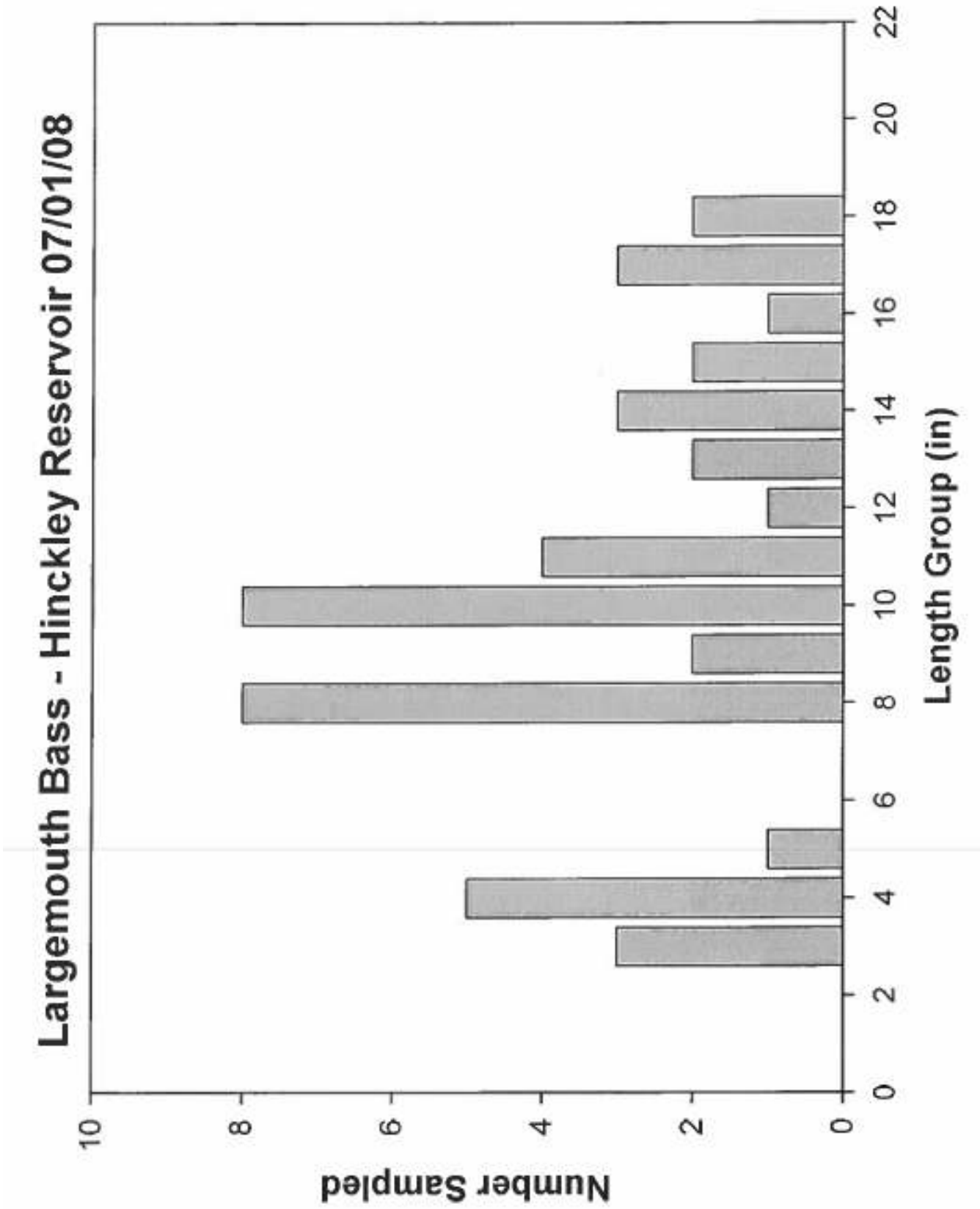
It will be awhile (fall) before I can get around to aging the bass scales. It looks like there are 4 distinct size/age groups on the figure: age-0 (this years fish), age-1 (8-10 inches), age-2 (11-15 inches), and age-3+ fish (16+ inches).

cpw

Curtis P. Wagner
Fisheries Biologist
Ohio Department of Natural Resources
Division of Wildlife - District Three
912 Portage Lakes Drive
Akron, OH 44319
330-245-3018
curt.wagner@dnr.state.oh.us

1/26/2011


Bluegill Sunfish - Hinckley Reservoir 07/01/08
Number Sampled
0
5
10
15
20
25
30
Length Group (in)
0
1
2
3
4
5
6
7
8


Largemouth Bass - Hinckley Reservoir 07/01/08
Number Sampled
0
2
4
6
8
10
Length Group (in)
0
2
4
6
8
10
12
14
16
18
20
22

October 26, 2009

Hinckley Lake Advisory Data

Years of data: 2008

Species	Inches	# Samples	Arsenic (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)
Bluegill Sunfish	5	1	0.118	0.092	0.508
Common Carp	17	1	0.1	0.2	0.537
Largemouth Bass	11	1	0.168	0.143	0.564

Previous Advisories

No previous advisories.

Advisory Recommendations

No advisories are recommended.

Future Sampling

No future sampling is recommended.

APPENDIX C:
Hinckley Lake Bird and Macroinvertebrate Lists from Sharon Hosko, Brecksville Nature Center Manager, Outdoor Education

Hinckley Lake Birds

The following is a list of birds observed around Hinckley Lake by Sharon Hosko, Outdoor Education:

Great Blue Heron
Green Heron
Great Egret
Canada Goose
Mallard
Pie-billed Grebe
American Coot
Tundra Swans (a flock of about 40 this winter)
Cormorant
Osprey
Bald Eagle
Turkey Vulture
Red-tailed Hawk
Cooper's Hawk
Red-shouldered Hawk
Barred Owl
Screech Owl
Great Horned Owl
Ring-billed Gull
Wild Turkey
Mourning Dove
Belted Kingfisher
Carolina Wren (nest along the lake)
Hooded Warblers (nest along the lake)
Yellow Warbler (nest along the river before it gets to the lake)
Black-throated Blue Warbler
Black-throated Green Warbler
Yellow-rumped Warbler
Prothonotary Warbler (used to nest along river by State Road – don't know if they still do)
Common Yellowthroat (nests along the river before it gets to the lake)
Killdeer (nest on the mudflat islands)
Spotted Sandpiper
Solitary Sandpiper
Tree Swallow
Barn Swallow
Chimney Swift
American Crow
Blue Jay

American Robin
Northern Cardinal
Black-capped Chickadee
Tufted Titmouse
Brown Creeper
White-breasted Nuthatch
Great-crested Flycatcher
Pileated Woodpecker
Downy Woodpecker
Hairy Woodpecker
Red-bellied Woodpecker
Common Flicker
Eastern Phoebe
Blue-gray Gnatcatcher
Gray Catbird
Eastern Bluebird
Wood Thrush
Cedar Waxwing
Red-eyed Vireo
Indigo Bunting
Red-winged Blackbirds
Common Grackle
Baltimore Oriole
Scarlet Tanager
House Sparrow (nest in Gary Hack's bird boxes on the Boathouse --- Boo Hisssss)
Junco
American Goldfinch
Red-breasted Grosbeak
Rufous-sided Towhee
White-throated Sparrow
American Tree Sparrow
Song Sparrow

Hinckley Lake Macroinvertebrates

The following is a list of macroinvertebrates observed around Hinckley Lake by Sharon Hosko, Outdoor Education, during sampling with staff and volunteers:

Water Scorpion
Dragonfly Nymphs
Damselfly Nymphs
Mayfly Nymphs
Stonefly Nymphs
Crayfish
Zebra Mussels
Fingernail Clams
Isopods
Amphipods (scuds)
Pouch Snails
Orb Snails
Viviparid Snails
Beetle larvae
Diving Beetles (a few different species)
Red Midge Larvae
Phantom Midge Larvae
Mosquito Larvae
Fly Larvae (on occasion)
Daphnia
Copepods
Water Boatmen
Backswimmers
Water striders
Planaria
Leeches
Aquatic worms
Water mites
Giant Water Bugs (on occasion)
Water Scavenger Beetles
Caddisfly Larvae
Black Fly Larvae