

DUGGER UNIT  
Sullivan County  
2008 Fish Management Report

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## EXECUTIVE SUMMARY

- The Dugger Unit of the Greene-Sullivan State Forest is 2,150 acres of reclaimed coal mine land in Sullivan County. The Unit has 15 ponds and excavated lakes. A fish community survey was conducted at the six largest lakes (Bass, Black Cat, Duck, Goose, Long and West Lakes) from May 21 to June 11, 2008.
- Four of these lakes are currently in the DNR's muskie stocking program. A spring muskie trap net survey was conducted at Bass Lake to assess the 10 year old stocking program. A total of 68 muskie was collected. Muskie ranged from 30.0 to 43.8 in. Total weight of the muskie collected was 992 pounds. Age and year class strength assessments indicated that the state's forage finished muskie program is successful.
- West and Black Cat Lake's direct connection to Buttermilk Creek makes management difficult because of the influx of riverine species. Bass and Duck Lakes also have a diverse community of rough fish. Muskie stockings began in 1997 at Bass Lake, 2003 at West and Black Cat Lakes, and 2008 at Duck Lake.
- Goose and Long Lakes are not connected to the other four lakes. The numbers of riverine species (gizzard shad, carp etc.) are not found in numbers that negatively impact the bluegill and redear fishery.
- The Dugger Unit Lakes of the Greene-Sullivan State Forest offer fishing opportunities for all types of anglers. The success of muskie at Bass Lake will hopefully expand to the other three lakes in the stocking program and further provide unique fishing opportunities in Sullivan County.

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## INTRODUCTION

The Dugger Unit is a 2,150-acre tract of reclaimed mine land in Sullivan County and is owned by the Department of Natural Resources, Division of Forestry. The 1,300-acre East Dugger Unit was acquired in 1995, while the 900-acre West Unit was acquired in 2001. These parcels were given to the Division of Forestry after the DNR allowed the re-mining of coal from 140 acres of land in Greene-Sullivan State Forest in 1985. Acquired from Peabody Coal Company, the Dugger Unit was specifically reclaimed for recreation and natural resource management.

Peabody Coal Company opened three Dugger Unit lakes to public fishing in 1987. The remaining lakes on the property were opened to fishing in 1995 (East) and 2001 (West) when the area was acquired by the Department of Natural Resources. The East Dugger Unit remains closed to hunting, while limited hunting is allowed on the West Unit. Fishing access is comprised of one or more boat ramps at ten of the lakes. Several smaller lakes will remain “walk-in only” lakes. All lakes within the Dugger Unit are restricted to the use of electric motors. In addition, anglers may fish from shore at most of the lakes (Sapp 2004).

## METHODS

Fish community surveys were conducted on Bass, Black Cat, Duck, Goose, Long, and West Lakes from May 19 through June 12, 2008 (Figure 1). Sampling effort for each lake consisted of DC night electrofishing in conjunction with trap and gill nets. The number of nets to be used and the length of time electrofished were determined using standard fish community sampling guidelines. Water chemistry was completed to evaluate levels of dissolved oxygen (DO) and temperature throughout the water column. Surface pH, conductivity, and alkalinity were also collected. Fish data collection consisted of total length and number of each species. Scale samples were taken from a sub-sample of game species for age and growth. An aquatic vegetation survey was conducted following standard protocol from July 21st through the 29<sup>th</sup>, 2008. An angler creel survey was also conducted from March through November 2008. Findings of the creel survey are reported separately. This report presents the results of the fish community surveys.

## RESULTS

### Bass Lake

Bass Lake is the largest of the water bodies in the Dugger Unit. It covers 220 acres with an average depth of 18 ft and a maximum depth of 50 ft. Bass Lake was the first lake in the Dugger Unit to be stocked with muskie. The initial stocking was 2,200 fingerlings in 1997 (Table 1). Following the initial stocking, Bass Lake was stocked with pellet reared muskie at the rate of 8/acre with the exception of 2001 when 16 fingerlings/acre were stocked. Beginning in 2002, pellet reared muskie were replaced with 30 day forage finished fingerlings. Since 2004, forage finished muskie fingerlings are stocked at a rate of 5/acre.

A spring muskie survey was conducted March 17 to 20, 2008. The fish community survey was conducted June 10 to 12, 2008 followed by an aquatic vegetation survey on July 23, 2008. The results of the water chemistry conducted on June 10, 2008 showed a surface pH of 8.9, sufficient oxygen for fish survival ( $\geq 5$  ppm) to a depth of 22 ft, a Secchi disk reading of 7 ft 11 in, and conductivity at 740 $\mu$ S (Appendix 1). On July 23, 2008, a summer DO and temperature profile was conducted. DO was less than 5 ppm at 14 ft.

### Bass Lake Muskie Sampling

In the past, there have been numerous spring and fall/winter muskie stocking evaluations, all of which demonstrated fingerling survival. Electrofishing has not proven to be effective at catching adult muskie other than a few sporadic catches of larger fish. In 2008, early spring trap netting, using the larger Lake Michigan style trap nets, proved to be much more successful at capturing adult muskie.

The spring muskie survey effort consisted of three lifts of a Lake Michigan style trap net and a modified (smaller) version of the Lake Michigan net for a total of six lifts. The nets were set on large shallow flats in hopes of collecting muskie migrating to and from spawning locations. All muskie were measured, weighed and the right pectoral fin was removed to document catch and for age and growth calculation. Sex and ripeness of the male and female muskie were documented two of the three days.

Surface water temperature at the time of the muskie survey ranged from 44°F to 54°F. Of the two traps, the larger Lake Michigan style net caught all but one of the muskie. In the six

lifts there were 69 muskie collected, including one recapture. Muskie ranged from 30.0 to 43.8 in TL. Total weight of the catch was 992 lbs. Muskie ages 4 through 8 were represented.

The community survey sampling effort consisted of 0.75 h of DC electrofishing, 8 overnight gill net sets, and 4 overnight trap net sets. A total of 703 fish was collected with an estimated weight of 335 lbs. There were 13 species and one hybrid represented. Bluegill were the most abundant species collected and made up 40% of the sample by number. Redear were second by number and comprised 19% of the sample. Largemouth bass were third in number, totaling 17% of the sample. Gizzard shad (10%), channel catfish (9%), and warmouth (5%) were the three remaining species caught in significant numbers. The remaining 5% of the sample consisted of alewife, hybrid sunfish, longear sunfish, black crappie, brook silverside, carp, muskie, and yellow bullhead.

The bluegill sample contained 279 fish ranging from 1.7 to 8.4 in TL, and weighed an estimated 36 lbs. The PSD was 48 and RSD-8 was 3. Bluegill age 1 through 8 were collected. Growth was average to slightly below average to age 5 and at or above average for older fish when compared to the other lakes in the Dugger Unit.

There were 130 redear collected ranging from 2.2 to 9.3 in TL with an estimated weight of 23 lbs. Redear PSD was 25. Fish ages 2 through 8 were represented and overall growth was good.

There were 119 largemouth bass collected ranging in length from 5.5 to 14.2 in TL that weighed an estimated 63 lbs. One legal size bass was collected and only 11 fish over 12.0 in were collected. Bass ranging from 9.5 to 11.5 in TL accounted for 65% of the bass captured. Bass age 1 through 8 were represented in the sample. Bass grew well the first two years but growth declined to below average after age 3.

Channel catfish were the number one biomass contributor to the fish sample. Thirty-eight fish weighing an estimated 96 lbs (29%), and ranging in length from 16.2 to 22.0 in TL were collected. The majority of the fish collected (63%) ranged from 18.5 to 20.5 in TL.

The aquatic vegetation survey was conducted on July 23, 2008. Eurasian watermilfoil and coontail were found throughout the lake. Based on dominance indices, coontail was the most abundant species followed by Eurasian watermilfoil. Six other species were found including; chara, brittle naiad, sago pondweed, American pondweed, small pondweed, and curlyleaf pondweed.

### Bass Lake Summary

In 2002, East Fork State Fish Hatchery began transferring intensively cultured muskie fingerlings to earthen ponds stocked with forage minnows for the final 30 days of rearing. The majority of the muskie collected in the Bass Lake survey were from forage finished year classes. There were 22 muskie collected from the 2001 year class of pellet reared fish. That year, Bass Lake received a double stocking (16/acre) of muskie fingerlings. Only one fish was collected from the previous year class when the stocking rate was 8/acre of pellet reared fish and there were no muskie collected older than age 8. The forage finished muskie program appears to be successful at the 5 fish/acre stocking rate.

The abundant forage at Bass Lake appears to be more than adequate to produce healthy fish. The primary forage species at Bass Lake are gizzard shad and alewife. In 2002, gizzard shad ranked 2<sup>nd</sup> in abundance with 245 collected (22% of survey) (Schoenung 2004). In 2008, shad ranked 4<sup>th</sup> and made up 10% of the survey.

Relative weights values (Wr) were calculated and averaged by stock indices for the muskie collected in March. Scores near 100% indicate the fish are in good condition and are not forage limited. Wr values for Bass Lake muskie, by stock indices, were 97% at Quality size (>32"), 100% at Preferred size (> 38") and 96% at Memorable size (>42") (Table 2) (Anderson and Neumann 1996).

Bass Lake can provide some great fishing opportunities. Eight of the 13 fish species collected are commonly sought by anglers. Reclaimed coal mine lakes commonly have very clear water and high conductivity as is the case at the Dugger Unit lakes. As in previous surveys, it has been difficult to collect fish using traditional electrofishing gear. Electrofishing is often responsible for the majority of the largemouth bass collection. During the 2008 angler creel survey, an estimated 3,749 bass were caught and released with 16% (n=530) greater than 14 in TL (King 2008). Combined with angler reports, this indicates that the electrofishing did not effectively represent the bass population at Bass Lake. Targeted sampling for bass earlier in the spring may produce better results as larger bass are in shallow water at this time of year. A different boom configuration or change to a unit that can effectively electrofish in high conductivity water may be required to effectively estimate bass populations at these lakes.

## Goose Lake

Goose Lake covers 72 acres with an estimated average depth of 25 ft and a maximum depth of 53 ft. The Goose Lake fish community survey and water chemistry were conducted on May 19, 2008 followed by an aquatic vegetation survey on July 28, 2008 (Appendix 2). The water chemistry results showed a surface pH of 8.7 and sufficient oxygen for fish survival to the bottom of the lake as thermal stratification had not yet taken place. Alkalinity measured 51.3 ppm, the conductivity was 1680  $\mu$ S, and the Secchi disk reading was 12.5 ft. A summer DO and temperature profile was conducted July 29, 2008. DO sufficient for fish survival was found to a depth of 40 ft.

Fish sampling effort for Goose Lake consisted of 0.75 h of DC electrofishing, 4 overnight trap net sets, and 4 overnight gill net sets. There were 354 fish collected with an estimated weight of 165 lbs. Redear was the dominant species, comprising 46% of the sample by number, and 24% by weight. Largemouth bass were second in abundance (31%), followed by bluegill (12%), and warmouth (3%). Other species collected during the survey were brown, black, and yellow bullheads, brook silverside, gizzard shad, channel catfish, common carp, green sunfish, and hybrid sunfish.

The redear sample consisted of 164 fish that weighed an estimated 40 lbs and ranged in length from 2.8 to 9.3 in TL. The PSD for redear was 61. Fish ages 2 through 8 were represented. Growth is slightly below average when compared to other excavated lakes.

A total of 109 largemouth bass was collected ranging from 7.4 to 22.2 in TL. The bass PSD was 55. The majority (81%) of the bass captured ranged from 10.5 to 13.5 in TL. Only one harvestable bass was captured and measured 22.0 in TL. Bass ages 2 through 6 and age 8 were represented in the sample. Largemouth bass growth was slightly above average when compared to other lakes at the Dugger Unit.

There were 43 bluegill collected weighing an estimated 9 lbs and ranging from 1.7 to 9.0 in TL. The bluegill PSD was 67. Fish 8.0 in TL and greater comprised 50% of the bluegill sampled. Bluegill ages 1 through 7 were represented in the sample. Growth was slightly below average up to age 4 when compared to other Dugger Unit lakes, but increased considerably for older fish.

The aquatic vegetation survey was conducted on July 28, 2008. There were five native and one invasive species of aquatic plants collected. Chara was the dominant plant collected,

followed by Eurasian watermilfoil, coontail, small pondweed, sago pondweed, and southern naiad. The lake appears to have a diverse and balanced community of plants, even though the exotic Eurasian watermilfoil is a major component of the aquatic vegetation present.

### Goose Lake Summary

Creel data confirmed Goose Lake as a popular lake for panfish anglers. The PSD for bass was 55 and bluegill was 67 indicating a balanced bluegill/bass population. Anglers also targeted and harvested crappie. An estimated 487 crappie were harvested at an average length of 10.7 in even though no crappie were collected during the general survey. Water quality at Goose Lake is exceptional with summer conditions allowing fish to inhabit depths of over 40 ft throughout the lake.

### Long Lake

Long Lake is a 38-acre body of water with an estimated average depth of 36 ft and a maximum depth of 72 ft. A fish community survey was conducted on May 19 and 20, 2008 followed by an aquatic vegetation survey on July 21, 2008 (Appendix 3). The water chemistry results showed a surface pH of 8.8, conductivity of 510  $\mu$ S, and Secchi disk reading of 12 ft. The lake had not thermally stratified and oxygen was sufficient for fish throughout the entire water column. The summer DO and temperature profile was conducted June 21, 2008. DO was sufficient for fish to a depth of approximately 46 ft.

Sampling effort at Long Lake consisted of 0.5 h of DC electrofishing, 4 overnight trap net sets, and 3 overnight gill net sets. Six species totaling 318 fish and weighing an estimated 135 lbs was collected at Long Lake. Largemouth bass were first by number (34%) and by weight (53%). Redear sunfish were second by number (28%) and by weight (25%) followed by bluegill which was third by number (23%) and fourth by weight (6%). Other species collected were warmouth, yellow bullhead, and channel catfish.

The largemouth bass sample consisted of 108 fish ranging from 5.6 to 16.2 in TL. PSD for bass was 15. Largemouth bass ranging from 10.0 to 12.0 in TL accounted for 68% of the sample. Only two harvestable size largemouth bass ( $\geq 14$  in TL) were collected at Long Lake. Ages 1 through 6 and age 9 were represented in the sample. Largemouth bass growth was average up to age 4. After age 4, bass growth was below average.

The redear sunfish sample consisted of 87 fish ranging from 4.7 to 10.5 in TL. PSD for redear was 93 and RSD-9 was 14. Fish ages 3 through 9 were collected. Redear growth was above average compared to redear growth at similar lakes.

The 74 bluegill collected at Long Lake ranged from 1.8 to 9.0 in TL. The bluegill PSD was 58 and the RSD-8 was 11. Bluegill ages 1 through 5 and age 7 were represented in the sample, and growth was average to slightly above average when compared to bluegill growth at other Dugger Unit lakes.

The warmouth sample consisted of 40 fish ranging from 2.8 to 7.3 in TL. Warmouth  $\geq 6$  in TL accounted for 66% of the sample.

Seven yellow bullhead were collected which ranged from 9.0 to 10.5 in TL. Two channel catfish were caught measuring 24.9 and 26.6 in TL and both weighed over 5 lbs each.

The aquatic vegetation survey conducted on July 21, 2008 showed five native and two invasive species of aquatic plants. Chara was the dominant plant, followed in order by: Eurasian watermilfoil, sago pondweed, curlyleaf pondweed, water stargrass, American pondweed, and slender naiad.

#### Long Lake Summary

Long Lake continues to offer some of the best bluegill and redear fishing that the Dugger Unit has to offer. The panfish growth is very good compared to other lakes in the unit. This could be attributable to the large amount of chara present in the lake. This species of algae forms dense stands along the bottom of clear lakes, and provides excellent habitat for aquatic invertebrates as well as small fish. Chara is known to improve water quality by consolidating bottom sediments and also increases food availability for small fish, and this could be why the panfish grow faster. Chara was present at 11 of the 15 sampling sites and is the dominant plant in the lake.

#### Duck Lake

Duck Lake is 59 acres with an estimated average depth of 15 ft and a maximum depth of 38 ft. The fish community survey and water chemistry were conducted on June 2 to 3, 2008, followed by an aquatic vegetation survey on July 29, 2008 (Appendix 4). The water chemistry results showed a surface pH of 9.2, conductivity of 680  $\mu$ S and Secchi disk reading of 15 ft.

Dissolved oxygen was sufficient for fish survival to a depth of 24 ft. A summer DO and temperature profile was conducted July 29, 2008 and DO was sufficient for fish survival to 22 feet.

Sampling effort at Duck Lake consisted of 1 h of DC electrofishing, 4 overnight trap net sets, and 4 overnight gill net sets. A total of 613 fish weighing an estimated 234 lbs was collected from Duck Lake. Bluegill dominated the sample by number representing 42% of the fish captured but only 15% by weight. Largemouth bass were second by number (17%), followed by redear sunfish (16%), gizzard shad (6%), alewife (6%), and warmouth (4%). Other fish sampled included spotted bass, channel catfish, common carp, longear sunfish, yellow bullhead, brook silverside, green sunfish, black bullhead, and black crappie.

The bluegill sample consisted of 254 fish ranging from 1.9 to 8.1 in TL. Bluegill 6.0 in and greater accounted for 47% of the sample. Bluegill PSD for all gear types was 49. Bluegill ages 1 through 6 were represented in the sample. Growth appears to be good.

The 110 largemouth bass collected at Duck Lake ranged from 5.6 to 12.9 in TL. Bass PSD was 6. Bass ages 1 through 5 were represented in the sample. Largemouth bass growth for the first two years was average when compared to the previous survey data and below average for older fish.

A total of 104 redear sunfish was collected. Nearly 56% of the redear sunfish were above 6.0 in TL with the entire sample ranging from 3.9 to 7.6 in TL. Redear PSD was 6. Redear ages 2 through 7 were represented in the sample. Growth appears to be below average.

Eight channel catfish were collected that ranged from 17.4 to 22.9 in TL. All of the fish collected were of harvestable size ( $\geq 12$  in TL).

Two species of forage fish were collected during the survey. The gizzard shad sample consisted of 38 fish ranging from 12.3 to 15.3 in TL. The 36 alewife collected ranged from 8.1 to 10.9 in TL.

The aquatic vegetation survey conducted on July 29, 2008 showed eight native and two invasive species of plant, along with filamentous algae. Coontail was the dominant species, followed in order by: Eurasian watermilfoil, southern naiad, chara, brittle naiad, American pondweed, sago pondweed, water stargrass, bushy naiad, and curlyleaf pondweed.

## Duck Lake Summary

Bass Lake drains into Duck Lake. During high water events, fish can move between the two lakes. The species composition of both lakes is similar and muskie appear to be doing well at Bass Lake. In 2008, muskie were stocked for the first time at Duck Lake at a rate of 5 fall fingerlings/acre. Duck Lake has excellent water quality and tremendous submersed plant habitat. Of all the Dugger Unit lakes surveyed, Duck Lake has the most diverse plant community.

## West Lake

West Lake is a 97-acre body of water with an estimated average depth of 40 ft and a maximum depth of 80 ft. The fish community and water chemistry surveys were conducted on May 27 to 28, 2008 followed by an aquatic vegetation survey on July 25, 2008 (Appendix 5). The water chemistry results showed a surface pH of 8.5, conductivity of 870  $\mu$ S and a Secchi disk reading of 5 ft. Dissolved oxygen was sufficient for fish survival to a depth of 60 ft. During the summer DO and temperature profile, the Secchi disk reading was 3 ft and DO sufficient for fish survival was only found to 8 ft.

Sampling effort at West Lake consisted of 1 h of DC electrofishing, 4 overnight trap net sets, and 4 overnight gill net sets. A total of 445 fish, representing 28 species with an estimated weight of 305 lbs, was collected at West Lake. Bluegill were the dominant species by number, making up nearly 25% of the sample. Gizzard shad were the second most abundant by number (19%), followed by longear sunfish (16%), spotted bass (9%), and largemouth bass (6%). Other species collected included brook silverside, common carp, alewife, black buffalo, channel catfish, spotted gar, white crappie, bowfin, redear sunfish, highfin carpsucker, shortnose gar, smallmouth buffalo, black crappie, freshwater drum, logperch, white bass, bigmouth buffalo, flathead catfish, green sunfish, longnose gar, quillback, striped bass, and white sucker.

The bluegill sample consisted of 111 fish ranging from 1.9 to 8.2 in TL. Bluegill PSD was 44. There were eight year classes of fish collected. Growth was similar to other lakes in the Dugger Unit.

Gizzard shad was second in abundance with 84 collected. Gizzard shad ranged from 6.3 to 13.9 in TL.

Largemouth and spotted bass accounted for 16% of the total sample by number and weight. The 42 spotted bass were the more abundant of the two species by number and ranged

from 5.3 to 12.9 in TL. The 28 largemouth bass ranged in size from 6.0 to 15.9 in TL. Only one legal bass was captured. Largemouth bass ages 2 through 5 were represented in the sample. Spotted bass ages 1 through 7 were represented in the sample.

Both channel and flathead catfish were collected. The 10 channel catfish collected weighed an estimated 13 lbs and ranged in length from 12.0 to 19.5 in TL. The one flathead catfish collected weighed 13.0 lbs and measured 28.8 in TL. All catfish collected were of harvestable size.

The aquatic vegetation survey showed West Lake to be void of rooted plants. Out of 42 collection sites, chara and filamentous algae were the only aquatic vegetation present.

### West Lake Summary

Buttermilk Creek runs through West Lake and the outlet flows back to Buttermilk Creek which drains to Busseron Creek and eventually to the Wabash River. The species diversity reflects the riverine influence of this drainage. It is because of the diversity and the marginal quality of the other game fish that muskie stockings were initiated in 2003. No muskie were collected during this survey. At Bass Lake, adult muskie were not successfully sampled consistently until ten years after the initial stocking.

### Black Cat Lake

Black Cat Lake is a 31-acre pit with a maximum depth of 74 ft, and is located on the far west portion of the Dugger Unit. The fish community survey and water chemistry were conducted on June 2 to 3, 2008 followed by an aquatic vegetation survey on July 22, 2008 (Appendix 6). The surface pH was 8.7 and DO was sufficient for fish survival to a depth of 26 ft. The Secchi disk reading was 9 ft. 2 in and conductivity measured 1080  $\mu$ S. The summer profile was conducted on July 22, 2008. Adequate DO was found to a depth of 22 ft and the Secchi disk reading was 8 ft 3in.

Sampling effort at Black Cat Lake consisted of 0.75 h of DC electrofishing, 2 overnight trap net sets, and 2 overnight gill net sets. There were a total of 469 fish collected representing 15 species and one hybrid. The estimated weight of fish collected was 213 lbs. Bluegill were the most abundant species captured, making up 29% of the sample by number, followed by redear sunfish (27%), alewife (16%), largemouth bass (10%), and gizzard shad (8%). The

remaining 11 species accounted for 10% of the sample by number. These species included spotted gar, common carp, longear sunfish, spotted sucker, channel catfish, brook silverside, hybrid sunfish, warmouth, bowfin, grass carp, and smallmouth buffalo.

A total of 135 bluegill was collected. Bluegill weighed an estimated 23 lbs and ranged from 1.9 to 8.0 in TL. The PSD for all gear types was 67 and RSD-8 was 14. Fish ages 1 through 8 were represented in the sample. Growth up to age 6 was average to slightly above average when compared to similar lakes.

The redear sample totaled 127 fish with an estimated weight of 21 lbs and length range from 2.8 to 7.9 in TL. Redear PSD was 23. Fish ages 2 through 7 were collected. The redear appear to grow well up to age 4.

There were 46 largemouth bass collected weighing an estimated 35 lbs and ranging from 7.6 to 16.8 in TL. Bass PSD was 34 and RSD-15 was 5. Fish ages 2 through 5 were represented in the sample. Growth was good from ages 2 through 4.

Four channel catfish were collected. These fish ranged in length from 17.7 to 20.2 in TL and had an estimated weight of 9 lbs.

Alewife and gizzard shad were collected. The alewife sample totaled 76 fish at 5 lbs and ranged from 6.1 to 6.9 in TL. The 38 gizzard shad collected had an estimated weight of 25 lbs and ranged from 7.3 to 15.2 in TL. Nine common carp were collected that ranged from 16.8 to 20.0 in TL and weighed an estimated 32 lbs. There was also a single 26.9 in TL grass carp collected. Grass carp are becoming more common in the Wabash River and it is believed that this is most likely the source of this exotic species.

The aquatic vegetation survey was completed on July 22, 2008, and showed Eurasian watermilfoil to be the dominant plant. It was present at 78% of the sampling sites and was primarily found in dense monoculture stands. Three other plant species were collected, but only in one location each and in very low densities. These plants were sago pondweed, waterthread pondweed, and chara.

#### Black Cat Lake Summary

Black Cat Lake drains directly into West Lake via culvert. Muskie stockings began in 2003. No muskie were collected during this survey. Unlike West Lake, Black Cat Lake is very clear. The majority of the lake has steep banks and good fish habitat, consisting of a band of aquatic vegetation, surrounding the lake to a depth of 12ft.

## CONCLUSION

West and Black Cat Lake's direct connection to Buttermilk Creek makes management difficult because of the influx of riverine species. The current muskie stocking at West and Black Cat will be evaluated in the near future as the population matures in age and number. The addition of Duck Lake will increase the muskie program at the Dugger Unit to four lakes. Muskie have been stocked for over ten years at Bass Lake. During the 2008 angler creel survey, muskie were the second most popular species targeted by anglers, accounting for 12% of fishing trips to Bass Lake. The population has reached a size and quality that attracts muskie anglers from all over the state as well as Illinois (King 2008).

Alewife is an invasive species that is common in the Great Lakes. Alewife were first collected at Bass Lake in 1999 (Schoenung 2004). Origin of this species is unknown although there are confirmed collections in the Ohio River. West and Black Cat Lakes possess many riverine species due to their direct connection to the Wabash River via Buttermilk Creek and Busseron Creek. In 2008, alewives were collected at all the Dugger Unit lakes connected to Bass Lake (Black Cat, Duck, and West). The alewife length range was 4.4 to 10.9 in at these lakes. The explosive population and the subsequent die-offs that are well known for this species in the Great Lakes has not emerged with this population to date (Becker 1983). The water quality of the Dugger Unit lakes is marginally suited for alewives and their population may be controlled by the warm summer water conditions.

Goose and Long Lakes are not connected to the other four lakes. Riverine species (gizzard shad, carp etc.) are not found in numbers that negatively impact the bluegill and redear fishery at these two lakes. The number collected and the growth of bluegill and redear at these two lakes are similar in that early growth is slow but increases as they reach harvestable size. The quality of this sunfish fishery was also evident in the creel survey.

Long Lake has excellent water quality. The summer DO and temperature profile indicate trout quality water (<60°F with DO >5 ppm) in a 13 ft band approximately 30 ft deep. Long Lake is isolated from other lakes and the inlet and outlet to this lake is restrictive to fish movement. If rainbow or brown trout were to become available, Long Lake would be a good option for a trout stocking program.

The Dugger Unit lakes of the Greene-Sullivan State Forest offer fishing opportunities for all types of anglers. The Dugger Unit has 15 lakes ranging in size from one acre farm ponds to

220-acre Bass Lake. The six lakes surveyed in 2008 are a representation of what these lakes have to offer. The success of muskie at Bass Lake will hopefully expand to the other three lakes in the stocking program and further provide unique fishing opportunities in Sullivan County.

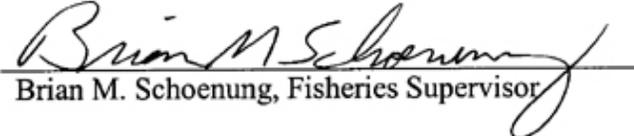
#### RECOMMENDATIONS

- Continue stocking 30 day forage finished muskie at a rate of 5/acre at Bass, West, Black Cat and Duck Lakes.
- If rainbow or brown trout are available as a result of a reduced stocking or a terminated program, it is recommended that Long Lake be considered as an alternative location.

#### LITERATURE CITED

- Anderson, R.O. and R.M. Neumann. 1996. Length, weight, and structural indices. 457-458pp in B.R. Murphy and D. W. Willis, editor. Fisheries techniques, 2<sup>nd</sup> edition. American Fisheries Society, Bethesda, Maryland.
- Becker G.C. 1983. Fishes of Wisconsin, The University of Wisconsin Press 114 North Murry Street, Madison, WI 266-267 pp.
- King D.A. 2008 Dugger Unit Angler Creel Survey, Indiana Department of Natural Resources, Indianapolis, IN unpublished 2009.
- Sapp S.A. 2004. Dugger Unit, 2002 Fish Management Report, Indiana Department of Natural Resources, Indianapolis, IN 1pp.
- Schoenung B.M. 2004. Bass Lake, 2002 Fish Management Report, Indiana Department of Natural Resources, Indianapolis, IN 3pp.

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Table 1. Muskie stocking history, by lake, at the Dugger Unit of Greene-Sullivan State Forest

**Bass Lake**

<u>Year</u>	<u>Total number of MUE stocked by year</u>	<u>Rate</u>	
1997	2,200	10/ac	Pellet Reared
1998	1,760	8/ac	Pellet Reared
1999	1,760	8/ac	Pellet Reared
2000	1,760	8/ac	Pellet Reared
2001	3,520	16/ac	Pellet Reared
2002	1,760	8/ac	30 Day Forage Finished
2003	1,759	8/ac	30 Day Forage Finished
2004	1,100	5/ac	30 Day Forage Finished
2005	1,100	5/ac	30 Day Forage Finished
2006	1,110	5/ac	30 Day Forage Finished
2007	446	2/ac	30 Day Forage Finished
2008	1,100	5/ac	30 Day Forage Finished

**West and Black Cat Lakes**

<u>Year</u>	<u>Total number of MUE stocked by year</u>	<u>Rate</u>	
2003	1024	8/ac	30 day forage finished
2004	640	5/ac	30 day forage finished
2005	640	5/ac	30 day forage finished
2006	640	5/ac	30 day forage finished
2007	no fish		
2008	640	5/ac	30 day forage finished

**Duck lake**

<u>Year</u>	<u>Total number of MUE stocked by year</u>	<u>Rate</u>	
2008	295	5/ac	30 Day forage finished

Table 2. Relative weights for muskie collected by stock indices, Bass Lake, March 2008.

Fish Collected	Length	Actual Weight	Standard Weight* (Ws)	Relative weight (Wr)	Average by stock indices	
2	32	8.10	8.97	90		
1	32.5	0.00	9.44			
1	33	9.35	9.93	94		
5	33.5	9.60	10.44	92		
1	34	9.75	10.97	89		
5	34.5	10.76	11.51	93	97	Quality 32" +
6	35	12.26	12.08	102		
6	35.5	12.45	12.66	98		
4	36	13.48	13.26	102		
4	36.5	14.28	13.89	103		
6	37	14.37	14.53	99		
6	37.5	16.17	15.19	106		
2	38	14.85	15.88	94		
3	38.5	17.60	16.58	106		
4	40	19.90	18.83	106	100	Preferred 38"+
5	40.5	19.37	19.62	99		
1	41.5	20.90	21.28	98		
2	42	21.00	22.15	95		
1	42.5	22.00	23.04	96	96	Memorable 42"+
2	43	21.00	23.95	88		
1	43.5	26.40	24.89	106		

\*Murphy et al. 1996

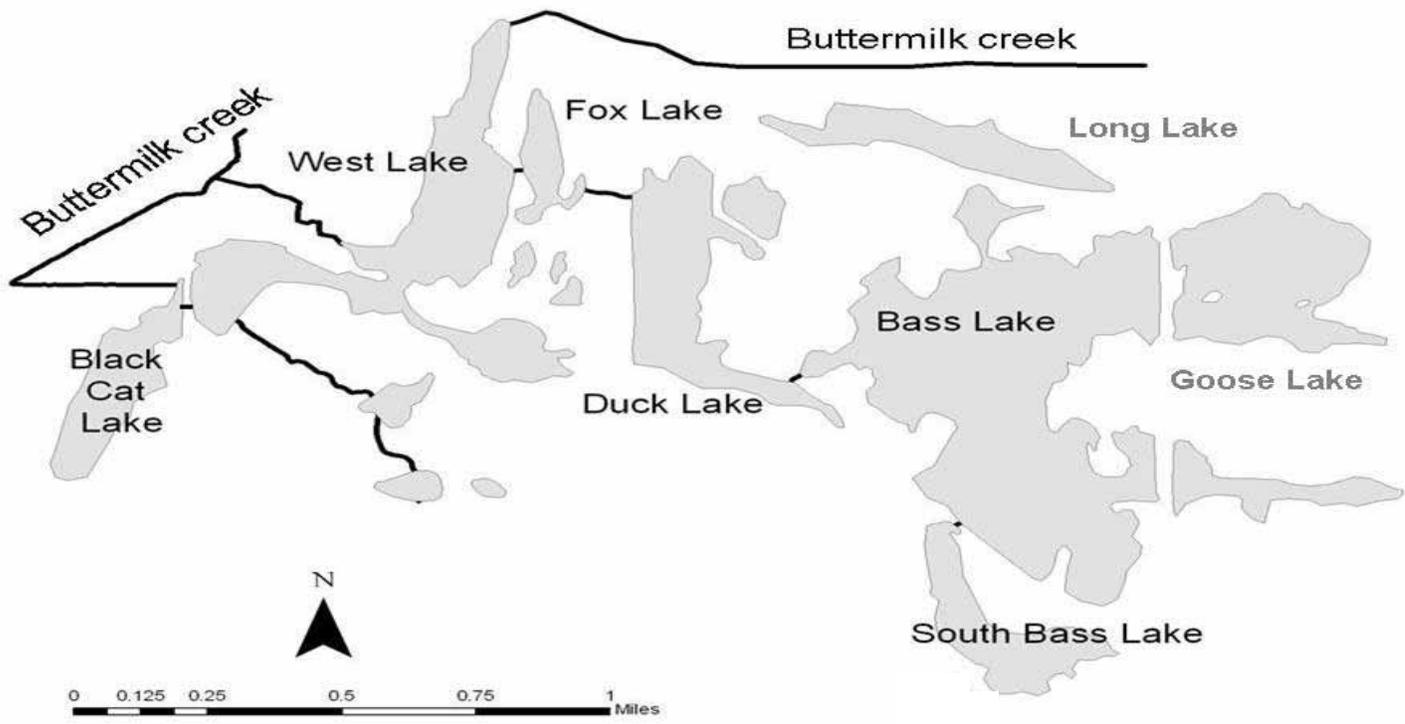


Figure 1. Map of Dugger Unit lakes at the Greene-Sullivan State Forest.

## **Bass Lake Appendix**

Lake description  
Sampling effort and water chemistry  
Summer DO and temperature profile  
Relative abundance of species collected  
Game fish length frequency pages  
Latitude and longitude of sampling locations  
Game fish age length keys and growth summaries  
Aquatic vegetation summary

# LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name <b>Bass Lake</b>	County <b>Sullivan</b>	Date of survey (Month, day, year) <b>6/10-12/08</b>
Biologist's name <b>Brian Schoenung and Debbie King</b>		Date of approval (Month, day, year) <b>6/18/2009</b>

LOCATION		
Quadrangle Name <b>Dugger</b>	Range <b>8W</b>	Section <b>7, 8, 17</b>
Township Name <b>7N</b>	Nearest Town <b>Dugger, Indiana</b>	

ACCESSIBILITY					
State owned public access site <b>Four gravel boat ramps</b>		Privately owned public access site		Other access site	
Surface acres <b>220</b>	Maximum depth <b>53 ft.</b>	Average depth <b>18 ft.*</b>	Acre feet <b>3,960*</b>	Water level <b>MSL</b>	Extreme fluctuations
Location of benchmark					

INLETS		
Name <b>Flowing stream</b>	Location <b>Southeast side</b>	Origin <b>Pond on private property</b>
<b>Overflow</b>	<b>South side</b>	<b>Unnamed pit</b>
<b>Ditch</b>	<b>North side</b>	<b>Turtle Lake</b>

OUTLETS	
Name <b>Unnamed stream</b>	Location <b>West side (Flows into Duck Lake)</b>
Water level control	

POOL	ELEVATION (Feet MSL)	ACRES	<b>Bottom type</b> <input checked="" type="checkbox"/> Boulder <input checked="" type="checkbox"/> Gravel <input checked="" type="checkbox"/> Sand <input checked="" type="checkbox"/> Muck <input checked="" type="checkbox"/> Clay <input type="checkbox"/> Marl
TOP OF DAM			
TOP OF FLOOD CONTROL POOL			
TOP OF CONSERVATION POOL			
TOP OF MINIMUM POOL			
STREAMBED			

Watershed use <b>Reclaimed mine land</b>
Development of shoreline <b>Four gravel boat ramps</b>

Previous surveys and investigations
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Fish Management Report, 1996, MUE stocking evaluation 2005, MUE stocking evaluation 2006.

\* Estimated

**SAMPLING EFFORT AT BASS LAKE, June 10, 2008**

ELECTROFISHING	Day hours		Night hours		Total hours
	N/A		0.75		0.75
TRAP NETS	Number of traps		Number of Lifts		Total effort
	2		2		4
GILL NETS	Number of nets		Number of Lifts		Total effort
	4		2		8
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**PHYSICAL AND CHEMICAL CHARACTERISTICS**

Color		Turbidity	
Green Clear		7 Feet	11 Inches (SECCHI DISK)
Alkalinity (ppm)*		pH	
Surface: N/A      Bottom:		Surface: 8.9	Bottom:
Conductivity: 740 µS		Air temperature:	83 °F
Water chemistry GPS coordinates:      N 39.06191      W -87.3273394			

**TEMPERATURE AND DISSOLVED OXYGEN (D.O.)**

DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	82.2	9.10	36	50.7	1.90	72		
2	82.0	9.40	38	49.6	1.90	74		
4	82.0	9.90	40	49.1	1.80	76		
6	81.1	9.90	42	48.7	1.80	78		
8	80.1	10.20	44	48.6	1.80	80		
10	79.2	9.50	46	48.2	1.80	82		
12	76.1	9.40	48	48.0	1.80	84		
14	71.6	9.00	50	48.0	1.70	86		
16	68.0	8.70	52	48.0	1.70	88		
18	65.5	7.90	54			90		
20	63.5	6.80	56			92		
22	61.7	5.50	58			94		
24	60.1	4.10	60			96		
26	59.4	3.40	62			98		
28	58.5	2.90	64			100		
30	55.9	2.10	66					
32	54.3	2.10	68					
34	52.3	2.00	69					

**COMMENTS**

\*ppm-parts per million

SAMPLING EFFORT AT BASS LAKE, 7/23/2008					
ELECTROFISHING	Day hours		Night hours		Total hours
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color Green Clear			Turbidity Feet                      Inches (SECCHI DISK)		
Alkalinity (ppm)* Surface: N/A      Bottom:			pH Surface:                      Bottom:		
Conductivity: $\mu$ S			Air temperature:                      °F		
Water chemistry GPS coordinates:                      N 39.06191                      W -87.3273394					

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	84.3	7.25	36			72		
2	84.2	7.33	38	52.2	0.03	74		
4	84.4	7.36	40			76		
6	84.4	7.36	42			78		
8	84.4	7.37	44	50.2	0.02	80		
10	84.2	7.27	46			82		
12	84.1	7.21	48			84		
14	82.6	5.18	50			86		
16	79.3	3.78	52			88		
18	76.5	2.65	54			90		
20	72.3	1.50	56			92		
22	68.4	1.35	58			94		
24	65.1	1.72	60			96		
26	62.2	0.48	62			98		
28			64			100		
30			66					
32	55.9	0.06	68					
34			69					

COMMENTS

\*ppm-parts per million



**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL, Bass Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	10	3.6	0.01	1	19.5				
2.0	20	7.2	0.01	1	20.0				
2.5	26	9.3	0.01	2	20.5				
3.0	24	8.6	0.02	2	21.0				
3.5	13	4.7	0.03	2,3	21.5				
4.0	17	6.1	0.04	3	22.0				
4.5	26	9.3	0.06	3	22.5				
5.0	19	6.8	0.09	3,4	23.0				
5.5	13	4.7	0.12	3,4	23.5				
6.0	12	4.3	0.16	4,5,6	24.0				
6.5	23	8.2	0.21	4,5,6,8	24.5				
7.0	53	19.0	0.27	5,6,7,8	25.0				
7.5	17	6.1	0.34	6,7	25.5				
8.0	6	2.2	0.42	5,6,7	26.0				
8.5					TOTAL	279			
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	317/hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	10/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH, Bass Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0	1	0.8	<0.01	1	20.0				
2.5					20.5				
3.0					21.0				
3.5	1	0.8	0.03	2	21.5				
4.0					22.0				
4.5	2	1.5	0.06	2	22.5				
5.0	7	5.4	0.08	3,4	23.0				
5.5	11	8.5	0.11	4	23.5				
6.0	28	21.5	0.15	4,5	24.0				
6.5	48	36.9	0.19	4,5,6	24.5				
7.0	23	17.7	0.24	5,6,7	25.0				
7.5	6	4.6	0.29	5,6,7	25.5				
8.0	2	1.5	0.36	6	26.0				
8.5					TOTAL	130	100		
9.0	1	0.8	0.52	8					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	109/hr	GILL NET CATCH	0/lift	TRAP NET CATCH	10/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS, Bass Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5	2	1.7	0.07	1	23.5				
6.0					24.0				
6.5	2	1.7	0.13	2	24.5				
7.0					25.0				
7.5	5	4.2	0.20	1,2	25.5				
8.0	7	5.9	0.25	2,3	26.0				
8.5	8	6.7	0.30	2	TOTAL	119	100		
9.0	7	5.9	0.36	2,3					
9.5	21	17.6	0.43	2,3					
10.0	15	12.6	0.50	2,3,4					
10.5	18	15.1	0.59	3,4,5					
11.0	14	11.8	0.68	3,4					
11.5	9	7.6	0.78	3,4,5					
12.0	4	3.4	0.90	4,5,6					
12.5	4	3.4	1.02	4,6					
13.0	1	0.8	1.16	5					
13.5	1	0.8	1.31	7					
14.0	1	0.8	1.47	8					
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	153/hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	1/lift
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\* Average weights derived from district averages



**GPS LOCATIONS OF SAMPLING EQUIPMENT, Bass Lake, 2008**

GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	39.06322	W -87.32542	1	N	39.05939	W -87.33470	1	N	39.06326	W -87.33259
	N		W	2	N	39.05995	W -87.33013		N		W
2	N	39.06573	W -87.33128	3	N	39.05466	W -87.33302	2	N	39.05883	W -87.33486
	N		W	4	N	39.05312	W -87.32845		N		W
3	N	39.06271	W -87.33474	5	N		W	3	N	39.05550	W 87.33356
	N		W	6	N		W		N		W
4	N	39.05859	W -87.33326	7	N		W	4	N		W
	N		W	8	N		W		N		W
5	N	39.05624	W -87.32571	9	N		W	5	N		W
	N	39.05552	W -87.32564	10	N		W		N		W
6	N	39.05095	W -87.32771	11	N		W	6	N		W
	N	39.05160	W -87.32728	12	N		W		N		W
7	N	39.05212	W -87.32987	13	N		W	7	N		W
	N	39.05281	W -87.33043	14	N		W		N		W
8	N	39.05655	W -87.32984	15	N		W	8	N		W
	N	39.05586	W -87.33007	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Lake: Bass Lake  
 Date: 3/17/2008 to 3/20/2008  
 Species: Muskellunge

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7	8
32.0	2	2				2				
32.5	1	1					1			
33.0	1	1						1		
33.5	5	5				1	4			
34.0	1	1					1			
34.5	5	5					4	1		
35.0	6	6					4	2		
35.5	6	6					2	3	1	
36.0	4	4					1	3		
36.5	4	4					2	1	1	
37.0	6	6					1	5		
37.5	6	6						3	3	
38.0	2	2						1	1	
38.5	3	3						2	1	
39.0										
39.5										
40.0	4	4							4	
40.5	5	5							5	
41.0										
41.5	1	1							1	
42.0	2	2							2	
42.5	1	1							1	
43.0	2	2							2	
43.5	1	1								1
Total	68	68	0	0	0	3	20	22	22	1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
4	3	32.8	0.75	0.50	31.8	33.8
5	20	35.0	1.38	0.26	34.5	35.6
6	22	36.7	1.85	0.29	36.1	37.2
7	22	40.1	4.43	0.45	39.2	41.0
8	1	43.8				
	68					

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7	8
1.0										
1.5	10	6	10							
2.0	20	5	20							
2.5	26	5		26						
3.0	24	6		24						
3.5	13	5		5	8					
4.0	17	5			17					
4.5	26	6			26					
5.0	19	6			13	6				
5.5	13	6			4	9				
6.0	12	5				7	2	2		
6.5	23	5				5	5	5		9
7.0	53	5					11	21	11	11
7.5	17	5						10	7	
8.0	6	5					2	2	1	
Total	279	75	30	55	68	27	20	41	19	20

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	30	2.1	0.06	0.04	2.0	2.2
2	55	3.1	0.11	0.04	3.0	3.1
3	68	4.7	0.29	0.06	4.5	4.8
4	27	5.9	0.27	0.10	5.7	6.1
5	20	7.1	0.30	0.12	6.9	7.4
6	41	7.3	0.21	0.07	7.2	7.5
7	19	7.5	0.10	0.07	7.4	7.6
8	20	7.0	0.07	0.06	6.9	7.1
	279					

Lake: Bass Lake  
 Date: 6/10/2008 to 6/12/2008  
 Species: Largemouth bass

Length group (in)	Total #	Sub-sample	Age									
			1	2	3	4	5	6	7	8	9	
5.5	2	2	2									
6.0												
6.5	2	1		2								
7.0												
7.5	5	5	4	1								
8.0	7	5		3	4							
8.5	8	6		8								
9.0	7	3		5	2							
9.5	21	6		7	14							
10.0	15	6		10	3	3						
10.5	18	5			7	7	4					
11.0	14	4			7	7						
11.5	9	5			2	4	4					
12.0	4	4				1	1	2				
12.5	4	3				3		1				
13.0	1	1					1					
13.5	1	1							1			
14.0	1	1									1	
Total	119	58	6	35	39	24	9	3	1	1	1	0

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	6	7.1	1.07	0.42	6.2	7.9
2	35	9.3	0.91	0.16	8.9	9.6
3	39	10.1	0.92	0.15	9.8	10.4
4	24	11.3	0.53	0.15	11.0	11.6
5	9	11.6	0.71	0.28	11.0	12.1
6	3	12.5	0.09	0.16	12.1	12.8
7	1	13.8	NA			
8	1	14.3	NA			
	119					

Lake: Bass Lake  
 Date: 6/10/2008 to 6/12/2008  
 Species: Redear sunfish

Length group (in)	Total # number	Sub-sample	Age								
			1	2	3	4	5	6	7	8	
2.0	1	1	1								
2.5											
3.0											
3.5	1	1		1							
4.0											
4.5	2	2		2							
5.0	7	6			5	2					
5.5	11	4				11					
6.0	28	5				11	17				
6.5	49	6				8	33	8			
7.0	23	5					5	14	5		
7.5	6	4					2	3	2		
8.0	2	2						2			
8.5											
9.0	1	1									1
Total	131	37	1	3	5	33	56	27	6		1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	1	2.3				
2	3	4.4	0.33	0.33	3.8	5.1
3	5	5.3	0.00	0.00	5.3	5.3
4	33	6.1	0.21	0.08	6.0	6.3
5	56	6.7	0.12	0.05	6.6	6.8
6	27	7.2	0.18	0.08	7.1	7.4
7	6	7.4	0.06	0.10	7.2	7.6
8	1	9.3				
	131					

## Occurrence and Abundance of Submersed Aquatic Plants - Overall

Lake: Bass Lake	Secchi (ft): 11.5	SE Mean Species / Site: 0.13
Date: 7/23/2008	Littoral Sites w/Plants: 57	Mean Natives / Site: 1.22
Littoral Depth (ft): 24.5	Number of Species: 8	SE Mean Natives / Site: 0.10
Littoral Sites: 61	Max. Species / Site: 6	Species Diversity: 0.69
Total Sites: 61	Mean Species / Site: 1.92	Native Diversity: 0.55

Species	Frequency of Occurrence	Score Frequency				Dominance
		0	1	3	5	
Coontail	75.4	24.6	6.6	14.8	54.1	64.3
Chara	24.6	75.4	13.1	1.6	9.8	13.4
Brittle naiad	4.9	95.1	4.9	0.0	0.0	1.0
Sago pondweed	3.3	96.7	3.3	0.0	0.0	0.7
American pondweed	6.6	93.4	4.9	0.0	1.6	2.6
Small pondweed	4.9	95.1	4.9	0.0	0.0	1.0

Eurasian watermilfoil	67.2	32.8	23.0	6.6	37.7	46.2
Curlyleaf pondweed	1.6	98.4	1.6	0.0	0.0	0.3

Filamentous algae                      8.2

Other species noted:            Water stargrass  
    Spikerush

## **Goose Lake Appendix**

Lake description  
Sampling effort and water chemistry  
Summer DO and temperature profile  
Relative abundance of species collected  
Game fish length frequency pages  
Latitude and longitude of sampling locations  
Game fish age length keys and growth summaries  
Aquatic vegetation summary

# LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Goose Lake	County Sullivan	Date of survey (Month, day, year) 5/19-21/2008
Biologist's name Dave Kittaka and Debbie King		Date of approval (Month, day, year) 6/18/2009

LOCATION		
Quadrangle Name Dugger	Range 8W	Section 8
Township Name 7N	Nearest Town Dugger, Indiana	

ACCESSIBILITY					
State owned public access site Gravel ramp - NE side		Privately owned public access site		Other access site	
Surface acres 72	Maximum depth 50 ft.	Average depth 25 ft. *	Acre feet 1,800*	Water level MSL	Extreme fluctuations
Location of benchmark					

INLETS		
Name Unnamed stream	Location South side	Origin Pump lake

OUTLETS			
Name None	Location		
Water level control			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type <input checked="" type="checkbox"/> Boulder <input checked="" type="checkbox"/> Gravel <input checked="" type="checkbox"/> Sand <input checked="" type="checkbox"/> Muck <input checked="" type="checkbox"/> Clay <input type="checkbox"/> Marl
TOP OF DAM			
TOP OF FLOOD CONTROL POOL			
TOP OF CONSERVATION POOL			
TOP OF MINIMUM POOL			
STREAMBED			

Watershed use Reclaimed mining site
Development of shoreline Paved boat ramp - NE side

Previous surveys and investigations Fish Management Report, 1996
* Estimated

SAMPLING EFFORT AT GOOSE LAKE, 2008					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A		0.75		0.75
TRAP NETS	Number of traps		Number of Lifts		Total effort
	2		2		4
GILL NETS	Number of nets		Number of Lifts		Total effort
	2		2		4
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
Green Clear			12 Feet		6 Inches (SECCHI DISK)
Alkalinity (ppm)*			pH		
Surface: 51.3		Bottom:	8.7	Surface:	Bottom:
Conductivity: 1680 $\mu$ S		Air temperature: 60's °F			
Water chemistry GPS coordinates: N 39.06194 W -87.3233595					

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	63.1	9.90	36	44.6	10.90	72		
2	63.0	10.20	38	44.1	10.80	74		
4	63.0	10.30	40	43.5	10.50	76		
6	63.0	10.40	42	43.2	10.20	78		
8	63.0	10.50	44	42.8	9.80	80		
10	63.0	10.50	46	42.6	8.70	82		
12	63.0	10.50	48	42.4	7.40	84		
14	62.8	10.50	50	42.4	6.30	86		
16	62.6	10.50	52	42.4	5.30	88		
18	62.1	10.30	53= bottom	42.4	4.70	90		
20	61.0	10.20	56			92		
22	60.4	10.10	58			94		
24	59.9	9.70	60			96		
26	56.7	9.20	62			98		
28	52.0	10.10	64			100		
30	48.7	10.60	66					
32	46.8	10.80	68					
34	45.7	11.00	69					

COMMENTS

SAMPLING EFFORT AT GOOSE LAKE, July 29,2008					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A				
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**Summer Temperature and DO profile**

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
Green Clear			Feet	Inches (SECCHI DISK)	
Alkalinity (ppm)*			pH		
Surface:		Bottom:	Surface:		Bottom:
Conductivity:		µS	Air temperature:		°F
Water chemistry GPS coordinates:					
			N 39.06194	W -87.3233595	

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	85.8	7.74	36	51.4	7.67	72		
2	84.4	8.09	38	50.0	6.30	74		
4	82.8	7.73	40	48.7	5.39	76		
6	83.3	7.42	42	47.8	4.40	78		
8	83.1	7.30	44	46.9	3.75	80		
10	83.1	7.50	46	46.8	2.67	82		
12	83.1	7.46	48	46.2	1.72	84		
14	82.9	7.38	50-bottom	46.0	1.07	86		
16	82.9	7.43				88		
18	82.8	6.95	54			90		
20	81.9	6.86	56			92		
22	79.2	9.14	58			94		
24	75.4	10.23	60			96		
26	71.4	11.22	62			98		
28	64.6	11.55	64			100		
30	60.4	11.63	66					
32	57.2	10.90	68					
34	53.4	9.50	69					

COMMENTS								

\*ppm-parts per million



**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH, Goose Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5	1	0.6	0.01	2	20.5				
3.0					21.0				
3.5					21.5				
4.0	1	0.6	0.04	3	22.0				
4.5	1	0.6	0.06	3	22.5				
5.0	4	2.4	0.08	3, 4	23.0				
5.5	10	6.1	0.11	3, 5	23.5				
6.0	12	7.3	0.15	6	24.0				
6.5	27	16.5	0.19	5, 6, 7	24.5				
7.0	39	23.8	0.24	5, 6	25.0				
7.5	45	27.4	0.29	6, 7, 8	25.5				
8.0	14	8.5	0.36	6, 7, 8	26.0				
8.5	7	4.3	0.43	6, 7, 9	TOTAL	164	100		
9.0	3	1.8	0.52	6					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	101 /hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	22 /lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS, Goose Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0	1	#REF!	6.22	8
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0	1	0.9	0.16		25.0				
7.5	1	0.9	0.20	2	25.5				
8.0	1	0.9	0.25	2	26.0				
8.5	4	3.7	0.30	2	TOTAL	109			
9.0	5	4.6	0.36	2, 3					
9.5	3	2.8	0.43	2, 3					
10.0	4	3.7	0.50	3, 4					
10.5	11	10.1	0.59	3, 4					
11.0	11	10.1	0.68	4, 5					
11.5	11	10.1	0.78	3, 4					
12.0	12	11.0	0.90	3, 4, 5					
12.5	17	15.6	1.02	4, 5					
13.0	17	15.6	1.16	5, 6					
13.5	9	8.3	1.31	5, 6					
14.0	1	0.9	1.47	6					
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	140 /hr	GILL NET CATCH	1/lift	TRAP NET CATCH	0/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL, Goose Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	1	2.3	0.01	1	19.5				
2.0	3	7.0	0.01	1, 2	20.0				
2.5	3	7.0	0.01	2	20.5				
3.0	6	14.0	0.02	2, 3	21.0				
3.5	6	14.0	0.03	2, 3, 4	21.5				
4.0	1	2.3	0.04	3	22.0				
4.5					22.5				
5.0	2	4.7	0.09	4, 5	23.0				
5.5					23.5				
6.0	1	2.3	0.16	4	24.0				
6.5	1	2.3	0.21	4	24.5				
7.0	1	2.3	0.27	4	25.0				
7.5	2	4.7	0.34	4, 6	25.5				
8.0	6	14.0	0.42	5, 6, 7	26.0				
8.5	9	20.9	0.51	5, 6	TOTAL	43	100		
9.0	1	2.3	0.62	6					
9.5		0.0							
10.0		0.0							
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	47 /hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	2 /lift
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\* Average weights derived from district averages

**GPS LOCATIONS OF SAMPLING EQUIPMENT, Goose Lake, 2008**

GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	39.06268	W -87.32317	1	N	39.06070	W -87.32297	1	N	39.06110	W -87.32187
	N		W	2	N	39.06364	W -87.32410		N		W
2	N	39.06186	W -87.31985	3	N	39.06062	W -87.31696	2	N	39.06307	W -87.32430
	N		W	4	N	39.06538	W -87.31915		N		W
3	N	39.06028	W -87.32038	5	N		W	3	N	39.06289	W -87.31859
	N		W	6	N		W		N		W
4	N	39.06631	W -87.32130	7	N		W	4	N		W
	N		W	8	N		W		N		W
5	N		W	9	N		W	5	N		W
	N		W	10	N		W		N		W
6	N		W	11	N		W	6	N		W
	N		W	12	N		W		N		W
7	N		W	13	N		W	7	N		W
	N		W	14	N		W		N		W
8	N		W	15	N		W	8	N		W
	N		W	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Lake: Goose Lake  
 Date: 5/19/2008 to 5/21/2008  
 Species: Redear sunfish

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7	8
1.0										
1.5										
2.0										
2.5	1	1		1						
3.0										
3.5										
4.0	1	2			1					
4.5	1	1			1					
5.0	4	4			2	2				
5.5	10	5			2		8			
6.0	12	5						12		
6.5	27	5					5	16	5	
7.0	39	5					8	31		
7.5	45	5						18	18	9
8.0	14	7						4	6	4
8.5	7	5						4	1	1
9.0	3	3						3		
Total	164	48	0	1	6	2	21	89	31	14

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	1	2.8				
3	6	5.2	0.34	0.24	4.7	5.6
4	2	5.3	0.00	0.00	5.3	5.3
5	21	6.6	0.45	0.15	6.3	6.8
6	89	7.3	0.52	0.08	7.2	7.5
7	31	7.7	0.28	0.09	7.5	7.9
8	14	8.0	0.12	0.09	7.8	8.2
Total	164					

Lake: Goose Lake  
 Date: 5/19/2008 to 5/21/2008  
 Species: Largemouth bass

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7	8
7.0	1									
7.5	1	1		1						
8.0	1	1		1						
8.5	4	3		4						
9.0	5	5		3	2					
9.5	3	3		1	2					
10.0	4	3			3	1				
10.5	11	7			6	5				
11.0	11	5				9	2			
11.5	11	5			2	9				
12.0	12	6			2	8	2			
12.5	17	5				3	14			
13.0	17	5					10	7		
13.5	9	4					7	2		
14.0	1	1						1		
14.5										
15.0										
15.5										
16.0										
16.5										
17.0										
17.5										
18.0										
18.5										
19.0										
19.5										
20.0										
20.5										
21.0										
21.5										
22.0	1	1								1
Total	109	55	0	10	17	35	35	10	0	1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	10	8.9	0.32	0.18	8.5	9.2
3	17	10.7	0.85	0.22	10.2	11.1
4	35	11.6	0.44	0.11	11.4	11.9
5	35	13.0	0.39	0.11	12.8	13.2
6	10	13.5	0.12	0.11	13.2	13.7
7						
8	1	22.3	NA			

Lake: Goose  
 Date: 5/19/2008 to 5/21/2008

Species: Bluegill

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7
1.0									
1.5	1	1	1						
2.0	3	3	1	2					
2.5	3	3		3					
3.0	6	6		5	1				
3.5	6	6		1	3	2			
4.0	1	1			1				
4.5									
5.0	2	2				1	1		
5.5									
6.0	1	1				1			
6.5	1	1				1			
7.0	1	1				1			
7.5	2	2				1		1	
8.0	6	4					3	2	2
8.5	9	5					5	4	
9.0	1	1						1	
Total	43	37	2	11	5	7	9	7	2

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	2	2.0	0.13	0.25	1.5	2.5
2	11	3.0	0.22	0.14	2.7	3.3
3	5	3.8	0.13	0.16	3.4	4.1
4	7	5.8	2.62	0.61	4.6	7.0
5	9	8.2	1.23	0.36	7.5	8.9
6	7	8.6	0.23	0.18	8.2	8.9
7	2	8.3	0.00	0.00	8.3	8.3
Total	43					

## Occurrence and Abundance of Submersed Aquatic Plants - Overall

<b>Lake:</b> Goose Lake	<b>Secchi (ft):</b> 20	<b>SE Mean Species / Site:</b> 0.15
<b>Date:</b> 7/28/2008	<b>Littoral Sites w/Plants:</b> 39	<b>Mean Natives / Site:</b> 1.20
<b>Littoral Depth (ft):</b> 24.0	<b>Number of Species:</b> 6	<b>SE Mean Natives / Site:</b> 0.11
<b>Littoral Sites:</b> 41	<b>Max. Species / Site:</b> 4	<b>Species Diversity:</b> 0.70
<b>Total Sites:</b> 41	<b>Mean Species / Site:</b> 1.83	<b>Native Diversity:</b> 0.58

Species	Frequency of	Score Frequency				Dominance
	Occurrence	0	1	3	5	
Sago pondweed	12.2	87.8	9.8	0.0	2.4	4.4
Chara	73.2	26.8	9.8	4.9	58.5	63.4
Coontail	19.5	80.5	9.8	0.0	9.8	11.7
Southern naiad	2.4	97.6	0.0	2.4	0.0	1.5
Small pondweed	12.2	87.8	9.8	2.4	0.0	3.4

Eurasian watermilfoil	63.4	36.6	29.3	4.9	29.3	38.0
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## **Long Lake Appendix**

Lake description  
Sampling effort and water chemistry  
Summer DO and temperature profile  
Relative abundance of species collected  
Game fish length frequency pages  
Latitude and longitude of sampling locations  
Game fish age length keys and growth summaries  
Aquatic vegetation summary

# LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Long Lake	County Sullivan	Date of survey (Month, day, year) 5/19-20/2008
Biologist's name Dave Kittaka and Debbie King		Date of approval (Month, day, year) 6/18/2009

LOCATION		
Quadrangle Name Dugger	Range 8W	Section 6, 5, 8
Township Name 7N	Nearest Town Dugger, Indiana	

ACCESSIBILITY					
State owned public access site Two gravel boat ramps		Privately owned public access site		Other access site	
Surface acres 38	Maximum depth 72 Ft.*	Average depth 36 Ft.*	Acre feet 1396*	Water level MSL	Extreme fluctuations
Location of benchmark					

INLETS		
Name surface runoff	Location Northeast side	Origin

OUTLETS			
Name Culvert to Bass Lake	Location Souh side		
Water level control			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			<input checked="" type="checkbox"/> Boulder
TOP OF FLOOD CONTROL POOL			<input checked="" type="checkbox"/> Gravel
TOP OF CONSERVATION POOL			<input checked="" type="checkbox"/> Sand
TOP OF MINIMUM POOL			<input checked="" type="checkbox"/> Muck
STREAMBED			<input checked="" type="checkbox"/> Clay
			<input type="checkbox"/> Marl

Watershed use Reclaimed mine land
Development of shoreline Two gravel boat ramps - south side.

Previous surveys and investigations Fish Management Report, 1996

\* Estimated

**SAMPLING EFFORT AT LONG LAKE, May 19-20, 2008**

ELECTROFISHING	Day hours		Night hours		Total hours
	N/A		1		0.5
TRAP NETS	Number of traps		Number of Lifts		Total effort
	2		2		4
GILL NETS	Number of nets		Number of Lifts		Total effort
	2,1		2		3
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**PHYSICAL AND CHEMICAL CHARACTERISTICS**

Color		Turbidity	
clear green		12 Feet	0 Inches (SECCHI DISK)
Alkalinity (ppm)*		pH	
Surface:	Bottom:	8.8	Surface: Bottom:
Conductivity:	510 $\mu$ S	Air temperature: 60 °F	
Water chemistry GPS coordinates: N 39.06756 W -87.329747			

**TEMPERATURE AND DISSOLVED OXYGEN (D.O.)**

DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	63.3	10.40	36	47.1	12.30	72		
2	63.3	10.80	38	46.2	12.50	74		
4	63.3	10.60	40	45.5	12.30	76		
6	63.3	10.60	42	45.0	12.10	78		
8	63.1	10.60	44	44.8	11.80	80		
10	63.0	10.70	46	44.6	11.80	82		
12	62.8	10.70	48	44.6	11.70	84		
14	62.8	10.70	50	44.4	11.60	86		
16	62.1	10.70	52	44.2	11.40	88		
18	61.7	10.70	54	44.2	11.40	90		
20	61.2	10.60	56	44.2	11.20	92		
22	60.4	10.50	58	44.2	11.20	94		
24	59.7	10.30	60	44.1	11.10	96		
26	54.7	10.60	62	44.1	10.80	98		
28	52.5	11.30	64	44.1	10.30	100		
30	50.2	11.90	66	44.1	10.00			
32	49.1	12.90	68	43.9	9.90			
34	48.2	12.10	69	43.9	8.20			

**COMMENTS**

\*ppm-parts per million

SAMPLING EFFORT AT LONG LAKE, June 21, 2008					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A				
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**Summer Profile**

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
clear green			13 Feet	9 Inches (SECCHI DISK)	
Alkalinity (ppm)*			pH		
Surface:		Bottom:	Surface:		Bottom:
Conductivity:		µS	Air temperature:		°F
Water chemistry GPS coordinates: N 39.06756 W -87.329747					

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (Meters)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	85.8	6.98						
1	85.8	7.02						
2	85.8	7.05						
3	85.8	7.04						
4	84.0	5.86						
5	80.8	6.71						
6	74.3	9.72						
7	67.6	9.92						
8	61.2	8.57						
9	55.8	6.53						
10	52.3	5.20						
11	50.0	4.50						
12	48.0	5.03						
13	47.1	4.88						
14	46.6	4.64						

**COMMENTS**

Used S. research DO meter, profile conducted in meters  
 Too windy and not enough probe cord to find the bottom readings

\*ppm-parts per million



NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS, Long Lake, 2008									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5	2	1.9	0.07	1	23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5					25.5				
8.0	1	0.9	0.25	3	26.0				
8.5	2	1.9	0.30	2,3	TOTAL	108			
9.0	4	3.7	0.36	3,4					
9.5	10	9.3	0.43	3,4					
10.0	15	13.9	0.50	3,4					
10.5	25	23.1	0.59	3,4					
11.0	15	13.9	0.68	4,5					
11.5	16	14.8	0.78	4,5					
12.0	8	7.4	0.90	4,6					
12.5	5	4.6	1.02	5,6					
13.0	3	2.8	1.16	5,6					
13.5									
14.0	1	0.9	1.47	6					
14.5									
15.0									
15.5									
16.0	1	0.9	2.25	9					
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		204 /hr		GILL NET CATCH	2 /lift		TRAP NET CATCH	0 /lift	

\* Average weights derived from district averages

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH, Long Lake, 2008									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5	1	1.1	0.06	3	22.5				
5.0					23.0				
5.5	1	1.1	0.11	3	23.5				
6.0	2	2.3	0.15	3	24.0				
6.5	4	4.6	0.19	3,4	24.5				
7.0	2	2.3	0.24	3	25.0				
7.5	12	13.8	0.29	3,4,5	25.5				
8.0	28	32.2	0.36	4,5	26.0				
8.5	26	29.9	0.43	5,6,7	TOTAL	87	100		
9.0	5	5.7	0.52	6,7					
9.5	1	1.1	0.61	7					
10.0	4	4.6	0.72	7,9					
10.5	1	1.1	0.84	8					
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		138/hr		GILL NET CATCH	0 /lift		TRAP NET CATCH	4/lift	

\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL, Long Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	1	1.4	0.01	1	19.5				
2.0	2	2.7	0.01	1	20.0				
2.5	13	17.6	0.01	2	20.5				
3.0	6	8.1	0.02	2	21.0				
3.5	1	1.4	0.03	2	21.5				
4.0	1	1.4	0.04	3	22.0				
4.5	1	1.4	0.06	3	22.5				
5.0	8	10.8	0.09	3	23.0				
5.5	6	8.1	0.12	3,4	23.5				
6.0	9	12.2	0.16	3,4	24.0				
6.5	6	8.1	0.21	4	24.5				
7.0	3	4.1	0.27	3,4	25.0				
7.5	9	12.2	0.34	4,5	25.5				
8.0	3	4.1	0.42	4,5	26.0				
8.5	4	5.4	0.51	4,5,7	TOTAL	74	100		
9.0	1	1.4	0.62	7					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	136/hr	GILL NET CATCH	1 /lift	TRAP NET CATCH	1 /lift
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\* Average weights derived from district averages

**GPS LOCATIONS OF SAMPLING EQUIPMENT Long Lake 2008**

GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	39.06897	W -87.33184	1	N	39.06797	W -87.33318	1	N	39.06676	W -87.32909
	N		W	2	N	39.06919	W -87.33703		N		W
2	N	39.06928	W -87.33916	3	N	39.06949	W -87.33300	2	N	39.06936	W -87.33314
	N		W	4	N	39.06712	W -87.33120		N		W
3	N	39.06670	W -87.32652	5	N		W	3	N		W
	N		W	6	N		W		N		W
4	N		W	7	N		W	4	N		W
	N		W	8	N		W		N		W
5	N		W	9	N		W	5	N		W
	N		W	10	N		W		N		W
6	N		W	11	N		W	6	N		W
	N		W	12	N		W		N		W
7	N		W	13	N		W	7	N		W
	N		W	14	N		W		N		W
8	N		W	15	N		W	8	N		W
	N		W	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Lake: Long Lake  
 Date: 5/19/2008 to 5/20/2008  
 Species: Largemouth bass

Length group (in)	Total #	Sub-sample	Age									
			1	2	3	4	5	6	7	8	9	
5.5	2	2	2									
6.0												
6.5												
7.0												
7.5												
8.0	1	1			1							
8.5	2	2		1	1							
9.0	4	4			3	1						
9.5	10	6			7	3						
10.0	15	5			12	3						
10.5	25	6			13	13						
11.0	15	5				9		6				
11.5	16	5				3		13				
12.0	8	3				3			5			
12.5	5	4						4	1			
13.0	3	3						1	2			
13.5												
14.0	1	1							1			
14.5												
15.0												
15.5												
16.0	1	1										1
Total	108	48	2	1	36	35	24	10	0	0		1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	2	5.8	0.00	0.00	5.8	5.8
2	1	8.8	NA			
3	36	10.2	0.39	0.10	9.9	10.4
4	35	10.9	0.50	0.12	10.7	11.1
5	24	11.8	0.32	0.12	11.6	12.1
6	10	12.7	0.48	0.22	12.3	13.2
7						
8						
9	1	16.3	NA			
	108					

Lake: Long Lake  
 Date: 5/19/2008 to 5/20/2008  
 Species: Redear sunfish

Length group (in)	Total #	Sub-sample	Age									
			1	2	3	4	5	6	7	8	9	
4.5	1	1			1							
5.0												
5.5	1	1			1							
6.0	2	2			2							
6.5	4	4			2	2						
7.0	2	2			2							
7.5	12	7			2	9	2					
8.0	28	5				22	6					
8.5	26	5					16	5	5			
9.0	5	5						1	4			
9.5	1	1							1			
10.0	4	4							3			1
10.5	1	1									1	
Total	87	38	0	0	10	33	23	6	13	1	1	

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2						
3	10	6.6	0.87	0.30	6.0	7.2
4	33	8.0	0.16	0.07	7.9	8.2
5	23	8.6	0.10	0.07	8.4	8.7
6	6	8.8	0.04	0.08	8.7	9.0
7	13	9.3	0.37	0.17	9.0	9.7
8	1	10.8	NA			
9	1	10.3	NA			
	87					

Lake: Long Lake  
 Date: 5/19/2008 to 5/20/2008

Species: Bluegill

Length group (in)	Total #	Sub-sample	Age							
			1	2	3	4	5	6	7	
1.0										
1.5	1	1	1							
2.0	2	2	2							
2.5	13	5		13						
3.0	6	5		6						
3.5	1	1		1						
4.0	1	1			1					
4.5	1	1			1					
5.0	8	6			8					
5.5	6	6			4	2				
6.0	9	5			7	2				
6.5	6	5				6				
7.0	3	3			2	1				
7.5	9	4				7	2			
8.0	3	3				2	1			
8.5	4	4				1	2			1
9.0	1	1								1
Total	74	53	3	20	23	21	5	0		2

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	3	2.1	0.08	0.17	1.8	2.4
2	20	3.0	0.09	0.07	2.8	3.1
3	23	5.8	0.52	0.15	5.5	6.1
4	21	7.2	0.70	0.18	6.8	7.6
5	5	8.2	0.25	0.22	7.8	8.7
6						
7	2	9.0	0.13	0.25	8.5	9.5
Total	74					

## Occurrence and Abundance of Submersed Aquatic Plants - Overall

Lake: Long Lake	Secchi (ft): 13.9	SE Mean Species / Site: 0.16
Date: 7/21/2008	Littoral Sites w/Plants: 38	Mean Natives / Site: 1.33
Littoral Depth (ft): 39.0	Number of Species: 7	SE Mean Natives / Site: 0.13
Littoral Sites: 39	Max. Species / Site: 4	Species Diversity: 0.77
Total Sites: 40	Mean Species / Site: 2.05	Native Diversity: 0.62

Species	Frequency of	Score Frequency				Dominance
	Occurrence	0	1	3	5	
Sago pondweed	42.5	57.5	32.5	5	5	14.5
Slender naiad	2.5	97.5	2.5	0	0	0.5
American pondweed	5	95	5	0	0	1
Water stargrass	15	85	10	5	0	5
Chara	67.5	32.5	15	7.5	45	52.5

Eurasian watermilfoil	47.5	52.5	40	0	7.5	15.5
Curlyleaf pondweed	25	75	25	0	0	5

Filamentous Algae 7.5

Other species noted: Small pondweed

## **Duck Lake Appendix**

Lake description  
Sampling effort and water chemistry  
Summer DO and temperature profile  
Relative abundance of species collected  
Game fish length frequency pages  
Latitude and longitude of sampling locations  
Game fish age length keys and growth summaries  
Aquatic vegetation summary

# LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Duck Lake	County Sullivan	Date of survey (Month, day, year) 6/2-3/2008
Biologist's name Dave Kittaka and Debbie King		Date of approval (Month, day, year) 6/18/2009

LOCATION		
Quadrangle Name Dugger	Range 8W	Section 7
Township Name 7N	Nearest Town Dugger, Indiana	

ACCESSIBILITY					
State owned public access site Partially paved and gravel ramp		Privately owned public access site		Other access site	
Surface acres 59	Maximum depth 38 Ft.	Average depth 15 Ft.*	Acre feet 885*	Water level MSL	Extreme fluctuations
Location of benchmark					

INLETS		
Name Unnamed stream	Location East side	Origin Bass Lake

OUTLETS			
Name: Culvert to unnamed stream and West Pit		Location West side	
Water level control			
POOL	ELEVATION (Feet MSL)	ACRES	<b>Bottom type</b> <input checked="" type="checkbox"/> Boulder <input checked="" type="checkbox"/> Gravel <input checked="" type="checkbox"/> Sand <input type="checkbox"/> Muck <input checked="" type="checkbox"/> Clay <input type="checkbox"/> Marl
TOP OF DAM			
TOP OF FLOOD CONTROL POOL			
TOP OF CONSERVATION POOL			
TOP OF MINIMUM POOL			
STREAMBED			

Watershed use Reclaimed mine land
Development of shoreline Gravel access area west side. Country road west side. Partially paved/ gravel boat ramp in SW corner.

Previous surveys and investigations Fish Management Report, 1996

SAMPLING EFFORT AT DUCK LAKE, 2008					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A		1		1
TRAP NETS	Number of traps		Number of Lifts		Total effort
	2		2		4
GILL NETS	Number of nets		Number of Lifts		Total effort
	1 standard, 1 striper		2		2 standard, 2 striper
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
Green blue			15 Feet 0 Inches (SECCHI DISK)		
Alkalinity (ppm)*			pH		
Surface:		Bottom:	9.2		Surface: Bottom:
Conductivity: 680 $\mu$ S			Air temperature: 80+ °F		
Water chemistry GPS coordinates: N 39.05987 W 87.3417685					

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	78.4	10.20	36	47.3	2.70	72		
2	77.0	11.30	38	46.6	2.10	74		
4	75.5	9.80	40	44.4	1.90	76		
6	74.8	10.00	42= bottom	46.0	1.80	78		
8	74.1	10.10	44			80		
10	72.3	10.50	46			82		
12	69.6	10.60	48			84		
14	66.4	10.00	50			86		
16	64.9	9.00	52			88		
18	63.3	7.80	53			90		
20	61.7	7.30	56			92		
22	60.1	6.70	58			94		
24	57.6	5.60	60			96		
26	55.8	4.70	62			98		
28	53.6	4.10	64			100		
30	50.9	3.90	66					
32	49.6	4.00	68					
34	48.2	3.80	69					

COMMENTS								

\*ppm-parts per million

SAMPLING EFFORT AT DUCK LAKE, 7/21/2008					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A				
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**Summer Profile**

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
Green blue			10 Feet	6 Inches (SECCHI DISK)	
Alkalinity (ppm)*			pH		
Surface:		Bottom:	Surface: 10.6		Bottom:
Conductivity:		600 $\mu$ S	Air temperature:		$^{\circ}$ F
Water chemistry GPS coordinates:					
			N 39.05987	W 87.3417685	

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees ( $^{\circ}$ F)	D.O. (ppm)	DEPTH (FEET)	DEGREES ( $^{\circ}$ C)	D.O. (ppm)	DEPTH (FEET)	DEGREES ( $^{\circ}$ C)	D.O. (ppm)
SURFACE	84.2	7.29	36			72		
2	84.2	7.29	38			74		
4	84.0	7.44	40			76		
6	83.8	7.39	42			78		
8	83.7	6.83	44			80		
10	83.3	7.03	46			82		
12	82.6	6.80	48			84		
14	81.1	3.90	50			86		
16	77.7	3.53	52			88		
18	72.3	5.01	53			90		
20	67.1	5.13	56			92		
22	63.3	3.71	58			94		
24	59.9	1.77	60			96		
26	57.4	0.43	62			98		
28	55.2	0.07	64			100		
30			66					
32			68					
34			69					

**COMMENTS**

\*ppm-parts per million



**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL, Duck Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	1	0.4	0.01	1	19.5				
2.0	9	3.5	0.01	1	20.0				
2.5	4	1.6	0.01	2	20.5				
3.0	4	1.6	0.02	2	21.0				
3.5	7	2.8	0.21	2, 3	21.5				
4.0	13	5.1	0.62	3, 4	22.0				
4.5	28	11.0	1.98	3	22.5				
5.0	39	15.4	3.91	3, 4	23.0				
5.5	31	12.2	4.26	3, 4	23.5				
6.0	37	14.6	6.79	4, 5	24.0				
6.5	50	19.7	11.96	4, 5, 6	24.5				
7.0	23	9.1	7.03	4, 6	25.0				
7.5	7	2.8	2.69	5, 6	25.5				
8.0	1	0.4	0.48	5	26.0				
8.5					TOTAL	254	100		
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	186/hr	GILL NET CATCH	0/lift	TRAP NET CATCH	22/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS, Duck Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5	2	1.8	0.07	1	23.5				
6.0	4	3.6	0.08	1	24.0				
6.5	1	0.9	0.13	1	24.5				
7.0					25.0				
7.5	3	2.7	0.20	2	25.5				
8.0	4	3.6	0.25	2, 3	26.0				
8.5	11	10.0	0.30	2, 3	TOTAL	110	100		
9.0	22	20.0	0.36	2, 3					
9.5	14	12.7	0.43	2, 3, 4					
10.0	14	12.7	0.50	3, 4					
10.5	7	6.4	0.59	3, 4					
11.0	12	10.9	0.68	3, 4, 5					
11.5	10	9.1	0.78	4					
12.0	3	2.7	0.90	4					
12.5	3	2.7	1.02	4, 5					
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	101/hr	GILL NET CATCH	4/lift	TRAP NET CATCH	0/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH, Duck Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5	1	1.0	0.03	2	21.5				
4.0	1	1.0	0.04	3	22.0				
4.5	4	3.8	0.06	3	22.5				
5.0	13	12.5	0.08	3, 4	23.0				
5.5	27	26.0	0.11	3, 4, 5	23.5				
6.0	24	23.1	0.15	4, 5, 6	24.0				
6.5	27	26.0	0.19	5, 6, 7	24.5				
7.0	6	5.8	0.24	5, 6	25.0				
7.5	1	1.0	0.29	5	25.5				
8.0					26.0				
8.5					TOTAL	104	100		
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	56 /hr	GILL NET CATCH	24/lift	TRAP NET CATCH	1 /lift
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\* Average weights derived from district averages

**GPS LOCATIONS OF SAMPLING EQUIPMENT AT Duck Lake 2008**

GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	39.05825	W -87.33685	1	N	39.06063	W -87.34142	1	N	39.05926	W -87.34129
	N		W	2	N	39.05748	W -87.33603		N		W
2	N	39.06146	W -87.34130	3	N	39.06455	W -87.33925	2	N	39.06230	W -87.34125
	N		W	4	N	39.06631	W -87.34341		N		W
3	N	39.06342	W -87.34087	5	N		W	3	N	39.06758	W -87.34162
	N		W	6	N		W		N		W
4	N	39.06722	W -87.34205	7	N		W	4	N	39.06572	W -87.34354
	N		W	8	N		W		N		W
5	N		W	9	N		W	5	N		W
	N		W	10	N		W		N		W
6	N		W	11	N		W	6	N		W
	N		W	12	N		W		N		W
7	N		W	13	N		W	7	N		W
	N		W	14	N		W		N		W
8	N		W	15	N		W	8	N		W
	N		W	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Length group (in)	Total #	Sub-sample	1	2	3	4	5	6
1.0								
1.5	1	1	1					
2.0	9	5	9					
2.5	4	3		4				
3.0	4	4		4				
3.5	7	5		3	4			
4.0	13	5			10	3		
4.5	28	6			28			
5.0	39	5			23	16		
5.5	31	6			26	5		
6.0	37	5				7	30	
6.5	50	6				8	25	17
7.0	23	6				4		19
7.5	7	5					6	1
8.0	1	1					1	
Total	254	63	10	11	92	43	61	37

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	10	2.2	0.03	0.05	2.1	2.3
2	11	3.2	0.17	0.13	2.9	3.4
3	92	5.1	0.33	0.06	4.9	5.2
4	43	5.9	0.66	0.12	5.6	6.1
5	61	6.6	0.24	0.06	6.5	6.7
6	37	7.0	0.08	0.05	7.0	7.1
	254					

Lake: Duck Lake  
 Date: 6/2/2008 to 6/3/2008  
 Species: Largemouth bass

Length group (in)	Total #	Sub-sample	Age					
			1	2	3	4	5	
5.5	2	2	1					
6.0	4	4	4					
6.5	1	1	1					
7.0								
7.5	3	3		2				
8.0	4	3		3	1			
8.5	11	6		6	6			
9.0	22	7		6	16			
9.5	14	5		3	8	3		
10.0	14	5			11	3		
10.5	7	4			5	2		
11.0	12	5			2	7		2
11.5	10	4				10		
12.0	3	1				3		
12.5	3	2				2		2
Total	110	52	6	19	50	29		4

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	7	6.2	0.12	0.13	5.9	6.4
2	20	8.8	0.41	0.14	8.5	9.1
3	50	9.7	0.53	0.10	9.5	9.9
4	29	11.3	0.65	0.15	11.0	11.6
5	4	11.8	0.72	0.43	11.0	12.7
	110					

Lake: Duck Lake  
 Date: 6/2/2008 to 6/3/2008  
 Species: Redear sunfish

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7
3.5	1	1		1					
4.0	1	1			1				
4.5	4	3			4				
5.0	13	3			9	4			
5.5	27	6			5	14	9		
6.0	24	6				4	16	4	
6.5	27	7					19	4	4
7.0	6	4					2	5	
7.5	1	1					1		
Total	104	32	0	1	18	22	47	12	4

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	1	3.8	NA			
3	18	5.2	0.18	0.10	5.0	5.4
4	22	5.7	0.10	0.07	5.6	5.9
5	47	6.4	0.21	0.07	6.3	6.6
6	12	6.8	0.19	0.12	6.5	7.0
7	4	6.8	0.00	0.00	6.8	6.8
	104					

## Occurrence and Abundance of Submersed Aquatic Plants - Overall

Lake: Duck Lake	Secchi (ft): 10.5	SE Mean Species / Site: 0.25
Date: 7/29/2008	Littoral Sites w/Plants: 29	Mean Natives / Site: 1.21
Littoral Depth (ft): 19.5	Number of Species: 10	SE Mean Natives / Site: 0.21
Littoral Sites: 35	Max. Species / Site: 6	Species Diversity: 0.77
Total Sites: 38	Mean Species / Site: 1.79	Native Diversity: 0.71

Species	Frequency of Occurrence	Score Frequency				Dominance
		0	1	3	5	
Coontail	57.9	42.1	7.9	15.8	34.2	45.3
Brittle naiad	10.5	89.5	7.9	0.0	2.6	4.2
Southern naiad	21.1	78.9	13.2	2.6	5.3	9.5
Chara	15.8	84.2	5.3	5.3	5.3	9.5
American pondweed	5.3	94.7	0.0	2.6	2.6	4.2
Water stargrass	2.6	97.4	2.6	0.0	0.0	0.5
Sago pondweed	5.3	94.7	5.3	0.0	0.0	1.1
Bushy naiad	2.6	97.4	2.6	0.0	0.0	0.5

Eurasian watermilfoil	55.3	44.7	13.2	2.6	39.5	43.7
Curlyleaf pondweed	2.6	97.4	2.6	0.0	0.0	0.5

Filamentous Algae	7.9					
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## **West Lake Appendix**

Lake description  
Sampling effort and water chemistry  
Summer DO and temperature profile  
Relative abundance of species collected  
Game fish length frequency pages  
Latitude and longitude of sampling locations  
Game fish age length keys and growth summaries  
Aquatic vegetation summary

# LAKE SURVEY REPORT

Type of Survey	
<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey

Lake Name West Lake	County Sullivan	Date of survey (Month, day, year) 5/27-28/2008
Biologist's name Dave Kittaka and Debbie King		Date of approval (Month, day, year) 6/18/2009

LOCATION		
Quadrangle Name Dugger	Range 8W, 9W	Section 6, 7, 12
Township Name 7N	Nearest Town Dugger	

ACCESSIBILITY					
State owned public access site Gravel boat ramp- east shore		Privately owned public access site		Other access site	
Surface acres 97	Maximum depth 80 Ft.	Average depth 40 Ft.*	Acre feet 3,880	Water level	Extreme fluctuations 3 feet
Location of benchmark					

INLETS		
Name Buttermilk Creek	Location Northeast end	Origin

OUTLETS	
Name Ditch	Location Unknown
Water level control	

POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			<input type="checkbox"/> Boulder
TOP OF FLOOD CONTROL POOL			<input checked="" type="checkbox"/> Gravel
TOP OF CONSERVATION POOL			<input checked="" type="checkbox"/> Sand
TOP OF MINIMUM POOL			<input checked="" type="checkbox"/> Muck
STREAMBED			<input checked="" type="checkbox"/> Clay
			<input type="checkbox"/> Marl

Watershed use Reclaimed mine land
Development of shoreline Gravel boat ramp- East shore
Previous surveys and investigations Fish Management Report, 2002
* Estimated

SAMPLING EFFORT AT WEST LAKE ON 5-27-08					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A		1		1
TRAP NETS	Number of traps		Number of Lifts		Total effort
	4		1		4
GILL NETS	Number of nets		Number of Lifts		Total effort
	4		1		4
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS			
Color		Turbidity	
brownish green		5 Feet 0 Inches (SECCHI DISK)	
Alkalinity (ppm)*		pH	
Surface: NA Bottom:		Surface: 8.5 Bottom:	
Conductivity: 870 $\mu$ S		Air temperature: 60 °F	
Water chemistry GPS coordinates: N 39.06644 W -87.3495349			

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	68.2	9.60	36	48.2	6.70	72	40.5	2.80
2	69.3	9.70	38	46.9	6.80	74	40.5	2.50
4	69.1	9.80	40	46.2	6.80	76	40.5	2.70
6	69.3	9.60	42	45.5	6.40	78	too windy	too windy
8	67.6	9.60	44	45.0	6.40	80	too windy	too windy
10	65.1	9.40	46	44.6	6.40	82	too windy	too windy
12	63.1	8.80	48	43.9	6.90	83 botm	too windy	too windy
14	61.5	7.90	50	43.7	7.00	86		
16	15.5	7.10	52	43.0	6.90	88		
18	59.0	7.00	54	42.3	6.30	90		
20	58.5	6.90	56	41.7	5.90	92		
22	57.7	6.80	58	41.4	5.30	94		
24	57.4	6.80	60	41.0	4.90	96		
26	56.8	6.70	62	40.6	4.60	98		
28	55.9	6.60	64	40.5	4.00	100		
30	54.3	6.60	66	40.5	3.70			
32	53.2	6.60	68	40.5	3.50			
34	51.4	6.70	70	40.5	3.20			

No alkalinity-

\*ppm-parts per million

**SAMPLING EFFORT AT WEST LAKE ON 7/25/2008**

ELECTROFISHING	Day hours		Night hours		Total hours
	N/A				
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**Summer Profile**

**PHYSICAL AND CHEMICAL CHARACTERISTICS**

Color	brownish green		Turbidity	3 Feet 0 Inches (SECCHI DISK)	
Alkalinity (ppm)*	Surface: NA	Bottom:	pH	Surface: 7.8	Bottom:
Conductivity:	810 $\mu$ S		Air temperature:	°F	
Water chemistry GPS coordinates: N 39.06644 W -87.3495349					

**TEMPERATURE AND DISSOLVED OXYGEN (D.O.)**

DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	80.8	5.70	36			72		
2	80.8	6.06	38			74		
4	80.8	6.06	40			76		
6	80.8	5.63	42			78		
8	80.6	4.10	44			80		
10	79.9	3.41	46			82		
12	79.3	1.67	48			84		
14	78.3	0.56	50			86		
16	24.9	0.08	52			88		
18			54			90		
20			56			92		
22			58			94		
24			60			96		
26			62			98		
28			64			100		
30			66					
32			68					
34			70					

No alkalinity-

\*ppm-parts per million

**Species and Relative Abundance of Fishes Collected by Number and Weight, West Lake 5/27-28/08**

*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
Bluegill	111	24.9	1.9- 8.2	16.33	5.4
Gizzard shad	84	18.9	6.3- 13.9	32.52	10.7
Longear sunfish	73	16.4	2.3- 6.1	7.95	2.6
Spotted bass	42	9.4	5.3- 12.9	16.36	5.4
Largemouth bass	27	6.1	6.0- 15.9	29.46	9.7
Brook silverside	12	2.7	3.0- 3.9	0.11	<0.1
Common carp	12	2.7	17.6- 25.7	61.99	20.3
Alewife	11	2.5	5.1- 7.0	0.67	0.2
Black buffalo	10	2.2	13.4- 21.7	27.66	9.1
Channel catfish	10	2.2	12.0- 19.5	12.94	4.2
Spotted gar	8	1.8	18.1- 28.7	13.11	4.3
White crappie	7	1.6	7.8- 11.5	4.1	1.3
Bowfin	6	1.3	23.2- 26.7	24.96	8.2
Redear sunfish	6	1.3	6.1- 8.3	1.59	0.5
Highfin carpsucker	4	0.9	7.5- 14.4	1.99	0.7
Shortnose gar	4	0.9	18.5- 22.2	4.46	1.5
Smallmouth buffalo	3	0.7	17.4- 21.2	13.10	4.3
Black crappie	2	0.4	6.7- 9.2	0.55	0.2
Freshwater drum	2	0.4	8.7- 9.7	0.61	0.2
Log perch	2	0.4	4.5- 6	0.08	<0.1
White bass	2	0.4	8.6- 8.5	0.59	0.2
Bigmouth buffalo	1	0.2	22.2	6.91	2.3
Flathead catfish	1	0.2	28.8	13.00	4.3
Green sunfish	1	0.2	5.3	0.09	<0.1
Longnose gar	1	0.2	44.6	11.54	3.8
Quillback	1	0.2	13.4	1.09	0.4
Striped bass	1	0.2	11.9	0.68	0.2
White sucker	1	0.2	9.9	0.50	0.2
<b>TOTAL</b>	<b>445</b>	<b>0.0</b>		<b>304.95</b>	<b>99.9</b>

\*Common names of fishes recognized by the American Fisheries Society.

Estimated weights from standard weight regression

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL, West Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	2	1.8	0.01	1	19.5				
2.0	1	0.9	0.01	1	20.0				
2.5					20.5				
3.0	1	0.9	0.02	2	21.0				
3.5					21.5				
4.0	6	5.4	0.04	2,3	22.0				
4.5	12	10.8	0.06	3	22.5				
5.0	22	19.8	0.09	3,4	23.0				
5.5	18	16.2	0.12	2,3,4,5,6	23.5				
6.0	10	9.0	0.16	4,5	24.0				
6.5	18	16.2	0.21	4,5,6	24.5				
7.0	13	11.7	0.27	4,5	25.0				
7.5	6	5.4	0.34	3,4,5,7	25.5				
8.0	2	1.8	0.42	4,8	26.0				
8.5					TOTAL	111	100		
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	107 /hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	1 /lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS, West Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0	1	3.6	0.16	2	24.0				
6.5	2	7.1	0.20	2	24.5				
7.0	1	3.6	0.25	2	25.0				
7.5					25.5				
8.0	1	3.6	0.38	2	26.0				
8.5					TOTAL	28	100		
9.0									
9.5	1	3.6	0.65	2					
10.0	3	10.7	0.77	3,4					
10.5	2	7.1	0.89	3					
11.0	3	10.7	1.03	3,5					
11.5	5	17.9	1.18	2,3,4,5					
12.0	3	10.7	1.35	3,4					
12.5	3	10.7	1.53	3,4					
13.0	1	3.6	1.73	5					
13.5	1	3.6	1.95	4					
14.0									
14.5									
15.0									
15.5	1	3.6	2.99	regen.					
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	28/hr	GILL NET CATCH	0/lift	TRAP NET CATCH	0 /lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF SPOTTED BASS, West Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0	2	4.8	0.05	1,2	23.0				
5.5					23.5				
6.0	1	2.4	0.09	2	24.0				
6.5					24.5				
7.0	3	7.1	0.15	2	25.0				
7.5	4	9.5	0.19	2,3	25.5				
8.0	3	7.1	0.23	2,5	26.0				
8.5	5	11.9	0.29	2,3	TOTAL	42	100		
9.0	3	7.1	0.34	2,3					
9.5	5	11.9	0.41	3,4,5					
10.0	3	7.1	0.48	4,5					
10.5	8	19.0	0.56	2,3,4					
11.0	2	4.8	0.65	4					
11.5	1	2.4	0.75	Regen.					
12.0									
12.5	2	4.8	0.99	6,7					
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	27/hr	GILL NET CATCH	2 /lift	TRAP NET CATCH	2 /lift
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\* Average weights derived from district averages

**GPS LOCATIONS OF SAMPLING EQUIPMENT West Lake 5/27-28/08**

GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	39.05948	W -87.34861	1	N	39.06014	W -87.34635	1	N	39.06025	W -87.34648
	N		W	2	N	39.06411	W -87.35214		N		W
2	N	39.06987	W -87.34939	3	N	39.07287	W -87.34826	2	N	39.06905	W -87.35008
	N		W	4	N	39.06438	W -87.35777		N		W
3	N	39.06577	W -87.34795	5	N		W	3	N		W
	N		W	6	N		W		N		W
4	N	39.06112	W -87.35798	7	N		W	4	N		W
	N		W	8	N		W		N		W
5	N		W	9	N		W	5	N		W
	N		W	10	N		W		N		W
6	N		W	11	N		W	6	N		W
	N		W	12	N		W		N		W
7	N		W	13	N		W	7	N		W
	N		W	14	N		W		N		W
8	N		W	15	N		W	8	N		W
	N		W	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Lake:	West Lake									
Date:	5/27/2008	to	5/28/2008							
Species:	Bluegill									
Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7	8
1.0										
1.5	2	2	2							
2.0	1	1	1							
2.5										
3.0	1	1		1						
3.5										
4.0	6	5		2	4					
4.5	12	5			12					
5.0	22	5			9	13				
5.5	18	9		2	2	8	4	2		
6.0	10	5				2	8			
6.5	18	6				9	6	3		
7.0	13	5				3	10			
7.5	6	6			2	2	1		1	
8.0	2	2				1				1
Total	111	52	3	5	28	38	29	5	1	1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	3	1.9	0.08	0.17	1.6	2.3
2	5	4.6	1.08	0.45	3.7	5.5
3	28	5.1	0.70	0.16	4.8	5.4
4	38	6.1	0.76	0.14	5.8	6.4
5	29	6.7	0.33	0.11	6.5	6.9
6	5	6.4	0.30	0.24	5.9	6.8
7	1	7.8	NA			
8	1	8.3	NA			
	111					

Lake: West Lake  
 Date: 5/27/2008 to 5/28/2008  
 Species: Largemouth bass

Length group (in)	Total #	Sub-sample	Age				
			1	2	3	4	5
6.0	1	1		1			
6.5	2	2		2			
7.0	1	1		1			
7.5							
8.0	1	1		1			
8.5							
9.0							
9.5	1	1		1			
10.0	3	3			2	1	
10.5	2	2			2		
11.0	3	3			2		1
11.5	5	5		1	2	1	1
12.0	3	3			2	1	
12.5	3	3			1	2	
13.0	1	1					1
13.5	1	1				1	
14.0							
14.5							
15.0							
15.5	1	regen					
Total	28	27	0	7	11	6	3

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	7	8.1	3.98	0.75	6.6	9.6
3	11	11.4	0.70	0.25	10.9	11.9
4	6	12.3	1.40	0.48	11.3	13.2
5	3	12.1	1.08	0.60	10.9	13.3

Lake: West Lake  
 Date: 5/27/2008 to 5/28/2008  
 Species: Spotted bass

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7
5.0	2	2	1	1					
5.5									
6.0	1	1		1					
6.5									
7.0	5	2		5					
7.5	4	4		2	2				
8.0	3	2		2			2		
8.5	5	5		4	1				
9.0	3	3		2	1				
9.5	5	4			1	3	1		
10.0	3	3				2	1		
10.5	8	7		1	2	5			
11.0	2	2				2			
11.5	1	Regen							
12.0									
12.5	2	2						1	1
Total	44	37	1	18	8	11	4	1	1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	1	5.3	NA			
2	18	8.0	1.66	0.31	7.4	8.6
3	8	9.3	1.56	0.45	8.4	10.2
4	11	10.5	0.29	0.16	10.2	10.8
5	4	9.3	1.02	0.52	8.2	10.3
6	1	12.8	NA			
7	1	12.8	NA			
	43					



## **Black Cat Lake Appendix**

Lake description  
Sampling effort and water chemistry  
Summer DO and temperature profile  
Relative abundance of species collected  
Game fish length frequency pages  
Latitude and longitude of sampling locations  
Game fish age length keys and growth summaries  
Aquatic vegetation summary

# LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Black Cat Lake	County Sullivan	Date of survey (Month, day, year) 6/2-3/2008
Biologist's name Dave Kittaka and Debbie King		Date of approval (Month, day, year) 6/18/2009

LOCATION		
Quadrangle Name Dugger	Range 9W	Section 12
Township Name 7N	Nearest Town Dugger, Indiana	

ACCESSIBILITY					
State owned public access site Gravel boat ramp east shore		Privately owned public access site		Other access site	
Surface acres 31	Maximum depth 74	Average depth	Acre feet	Water level	Extreme fluctuations
Location of benchmark					

INLETS		
Name Buttermilk Creek	Location North end	Origin

OUTLETS			
Name Culvert at West Lake		Location Northeast shore	
Water level control			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type <input type="checkbox"/> Boulder <input checked="" type="checkbox"/> Gravel <input checked="" type="checkbox"/> Sand <input checked="" type="checkbox"/> Muck <input type="checkbox"/> Clay <input type="checkbox"/> Marl
TOP OF DAM			
TOP OF FLOOD CONTROL POOL			
TOP OF CONSERVATION POOL			
TOP OF MINIMUM POOL			
STREAMBED			

Watershed use Reclaimed mine land
Development of shoreline Gravel boat ramp on East shore
Previous surveys and investigations Fish Management Report, 2002

SAMPLING EFFORT AT BLACK CAT LAKE, 6-2-08					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A		0.75		0.75
TRAP NETS	Number of traps		Number of Lifts		Total effort
	1		2		2
GILL NETS	Number of nets		Number of Lifts		
	1		2		2
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
Brown/ Green			9 Feet 2 Inches (SECCHI DISK)		
Alkalinity (ppm)* NA			pH		
Surface:		Bottom:	8.7		Surface: Bottom:
Conductivity:		1080 µS		Air temperature: 80+ °F	
Water chemistry GPS coordinates:					
			N 39.05813		W -87.3621698

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	77.7	7.80	36	48.0	2.00	72	48.2	1.50
2	77.4	7.90	38	48.0	1.90	74	48.2	1.50
4	76.1	7.90	40	48.2	1.80	76		
6	75.0	8.10	42	48.2	1.80	78		
8	73.4	8.40	44	48.2	1.90	80		
10	72.0	8.60	46	48.2	1.90	82		
12	65.8	8.60	48	48.2	1.90	84		
14	61.6	8.60	50	48.2	1.60	86		
16	57.0	8.50	52	48.2	1.60	88		
18	51.8	8.60	53	48.2	1.60	90		
20	49.3	8.10	56	48.2	1.60	92		
22	48.0	7.60	58	48.2	1.60	94		
24	46.4	6.00	60	48.2	1.50	96		
26	46.4	3.20	62	48.2	1.50	98		
28	47.1	2.50	64	48.2	1.50	100		
30	48.2	2.10	66	48.2	1.50			
32	48.2	2.00	68	48.2	1.50			
34	48.2	2.10	69	48.2	1.50			

COMMENTS
One gill net vandalized, anchors stolen.

\*ppm-parts per million

SAMPLING EFFORT AT BLACK CAT LAKE ON 7/22/08					
ELECTROFISHING	Day hours		Night hours		Total hours
	N/A				
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

**Summer Profile**

PHYSICAL AND CHEMICAL CHARACTERISTICS					
Color			Turbidity		
Brown/ Green			8 Feet	3 Inches (SECCHI DISK)	
Alkalinity (ppm)* NA			pH		
Surface:		Bottom:	8.1	Surface: Bottom:	
Conductivity: 830 $\mu$ S			Air temperature: °F		
Water chemistry GPS coordinates: N 39.05813 W -87.3621698					

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°C)	D.O. (ppm)
SURFACE	85.8	6.57	36	48.9	0.00	72		
2			38			74		
4	85.8	6.65	40	48.9	0.00	76		
6			42			78		
8	84.9	6.70	44			80		
10			46			82		
12	76.8	6.36	48			84		
14			50			86		
16	65.3	6.28	52			88		
18			53			90		
20	55.4	5.56	56			92		
22	52.9	4.33	58			94		
24	50.7	2.30	60			96		
26	49.8	0.92	62			98		
28	49.6	0.38	64			100		
30			66					
32	49.3	0.00	68					
34			69					

COMMENTS

\*ppm-parts per million



**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL, Black Cat Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	1	0.7	0.01	1	19.5				
2.0	17	12.6	0.01	1	20.0				
2.5	4	3.0	0.01	2	20.5				
3.0	7	5.2	0.02	2	21.0				
3.5	5	3.7	0.03	2	21.5				
4.0	8	5.9	0.04	3	22.0				
4.5	6	4.4	0.06	3,4	22.5				
5.0	7	5.2	0.09	3,4	23.0				
5.5	4	3.0	0.12	3,4	23.5				
6.0	15	11.1	0.16	5	24.0				
6.5	25	18.5	0.21	4,5,6	24.5				
7.0	10	7.4	0.27	5,6,7	25.0				
7.5	10	7.4	0.34	4,5,6,8	25.5				
8.0	13	9.6	0.42	5,6	26.0				
8.5	3	2.2	0.51	6	TOTAL	135	100		
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	108/hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	27/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH, Black Cat Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5	1	0.8	0.01	2	20.5				
3.0	1	0.8	0.02	2	21.0				
3.5	2	1.6	0.03	2	21.5				
4.0					22.0				
4.5	2	1.6	0.06	3	22.5				
5.0	5	3.9	0.08	3,4	23.0				
5.5	19	15.0	0.11	4,5,6	23.5				
6.0	35	27.6	0.15	4,5,6	24.0				
6.5	34	26.8	0.19	5,6,7	24.5				
7.0	23	18.1	0.24	4,5,6,7	25.0				
7.5	5	3.9	0.29	5,6,7	25.5				
8.0					26.0				
8.5					TOTAL	127	100		
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	21 /hr	GILL NET CATCH	0 /lift	TRAP NET CATCH	56/lift
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\* Average weights derived from district averages

**NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS, Black Cat Lake, 2008**

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5	3	6.5	0.20	2	25.5				
8.0					26.0				
8.5					TOTAL	46	100		
9.0	1	2.2	0.36	2					
9.5	2	4.3	0.43	2,3					
10.0	7	15.2	0.50	2,3					
10.5	9	19.6	0.59	2,3					
11.0	3	6.5	0.68	2,3,4					
11.5	7	15.2	0.78	3,4					
12.0	5	10.9	0.90	3,4					
12.5	6	13.0	1.02	3,4,5					
13.0									
13.5									
14.0	1	2.2	1.47	5					
14.5									
15.0	1	2.2	1.83	6					
15.5									
16.0									
16.5	1	2.2	2.48	7					
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	59/hr	GILL NET CATCH	1 /lift	TRAP NET CATCH	0 /lift
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\* Average weights derived from district averages

**GPS LOCATIONS OF SAMPLING EQUIPMENT, Black Cat Lake, 2008**

GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	39.05580	W -87.36358	1	N	39.06116	W -87.36090	1	N	39.05965	W -87.36005
	N		W	2	N	39.06203	W -87.35940		N		W
2	N	39.05942	W -87.36244	3	N		W	2	N	39.06162	W -87.35971
	N		W	4	N		W		N		W
3	N		W	5	N		W	3	N	39.05798	W -87.36300
	N		W	6	N		W		N		W
4	N		W	7	N		W	4	N		W
	N		W	8	N		W		N		W
5	N		W	9	N		W	5	N		W
	N		W	10	N		W		N		W
6	N		W	11	N		W	6	N		W
	N		W	12	N		W		N		W
7	N		W	13	N		W	7	N		W
	N		W	14	N		W		N		W
8	N		W	15	N		W	8	N		W
	N		W	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Lake:	Black Cat Lake									
Date:	6/2/2008	to	6/3/2008							
Species:	Bluegill									
Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7	8
1.0										
1.5	1	1	1							
2.0	17	5	17							
2.5	4	4		4						
3.0	7	5		7						
3.5	5	5		5						
4.0	8	6			8					
4.5	6	5			5	1				
5.0	7	5			4	3				
5.5	4	4			2	2				
6.0	15	3					15			
6.5	25	6				17	4	4		
7.0	10	6					7	2	2	
7.5	10	5				2	2	4		2
8.0	13	7					4	9		
8.5	3	3						3		
Total	135	70	18	16	19	25	32	22	2	2

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1	18	2.2	0.01	0.03	2.2	2.3
2	16	3.3	0.15	0.10	3.1	3.5
3	19	4.8	0.28	0.12	4.5	5.0
4	25	6.5	0.56	0.15	6.2	6.8
5	32	6.9	0.50	0.13	6.6	7.1
6	22	7.9	0.45	0.14	7.6	8.2
7	2	7.3	0.00	0.00	7.3	7.3
8	2	7.8	0.00	0.00	7.8	7.8
Total	135					

Lake: Black Cat Lake  
 Date: 6/2/2008 to 6/3/2008  
 Species: Redear sunfish

Length group (in)	Total #	Sub-sample	Age							
			1	2	3	4	5	6	7	
2.5	1	1		1						
3.0	1	1		1						
3.5	2	2		2						
4.0										
4.5	2	2			2					
5.0	5	5			2	3				
5.5	19	5				11	4	4		
6.0	35	6				6	23	6		
6.5	34	5					7	20	7	
7.0	23	7				3	3	13	3	
7.5	5	5					1	2	2	
Total	127	39	0	4	4	24	38	45	12	

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	4	3.4	0.23	0.24	2.9	3.9
3	4	5.0	0.08	0.14	4.7	5.3
4	24	6.0	0.35	0.12	5.8	6.3
5	38	6.4	0.19	0.07	6.3	6.6
6	45	6.8	0.24	0.07	6.6	6.9
7	12	7.1	0.16	0.11	6.8	7.3
	127					

Lake: Black Cat Lake  
 Date: 6/2/2008 to 6/3/2008  
 Species: Largemouth bass

Length group (in)	Total #	Sub-sample	1	2	3	Age 4	5	6	7
7.5	3	3		3					
8.0									
8.5									
9.0	1	1		1					
9.5	2	2		1	1				
10.0	7	5		4	3				
10.5	9	5		5	4				
11.0	3	3		1	1	1			
11.5	7	5			6	1			
12.0	5	5			3	2			
12.5	6	6			1	4	1		
13.0									
13.5									
14.0	1	1					1		
14.5									
15.0	1	1						1	
15.5									
16.0									
16.5	1	1							1
Total	46	38	0	16	18	8	2	1	1

Age	Number	Mean TL	Var	SE	Lo 95%CI	Up 95%CI
1						
2	16	9.9	1.41	0.30	9.3	10.5
3	18	11.3	0.74	0.20	10.9	11.7
4	8	12.3	0.32	0.19	11.9	12.7
5	2	13.5	1.13	0.75	12.0	15.0
6	1	15.3	NA			
7	1	16.8	NA			
Total	46					

### Occurrence and Abundance of Submersed Aquatic Plants - Overall

Lake: Black Cat	Secchi (ft): 8.25	SE Mean Species / Site: 0.12
Date: 7/22/2008	Littoral Sites w/Plants: 23	Mean Natives / Site: 0.13
Littoral Depth (ft): 12.0	Number of Species: 4	SE Mean Natives / Site: 0.07
Littoral Sites: 30	Max. Species / Site: 3	Species Diversity: 0.21
Total Sites: 32	Mean Species / Site: 0.84	Native Diversity: 0.67

Species	Frequency of	Score Frequency				Dominance
	Occurrence	0	1	3	5	
Sago pondweed	3.1	96.9	3.1	0.0	0.0	0.6
Waterthread pondweed	3.1	96.9	3.1	0.0	0.0	0.6
Chara	3.1	96.9	3.1	0.0	0.0	0.6

Eurasian watermilfoil	71.9	28.1	15.6	12.5	43.8	54.4
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