

### **Buell Lake**

Genesee, T9N R7E Section 2, 11  
Cass River Watershed

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### **Environment**

Buell Lake is located in Genesee County approximately 10 miles northeast of Flint. It is a small glacial lake consisting of two basins artificially divided by Genesee Road with a culvert connection. The larger basin, east of Genesee Road, occupies approximately 50 acres and the smaller basin to the west occupies approximately 3 acres (Figure 1).

Buell Lake lies in the headwater reaches of Dead Creek of the Cass River watershed. Buell Drain flows indiscernibly through marsh habitat and enters the lake on the south shore, then exits at the northeast shore back into Buell Drain which flows to Dead Creek and the Cass River. The surrounding topography is described as gently rolling hills of poor to moderately well drained ground moraines and glacial outwash. Upland soils consist of loamy sands while soils in the low areas immediately surrounding Buell Lake are classified as Lupton muck and are high in organic content (Holcomb 1972). The fringe shore of Buell Lake is dominated by protruding marsh, some bog, and emergent wetland habitat. Vegetation in the upland areas is dominated by deciduous trees (maple, oak, hickory) and open lands. Surrounding marsh areas contain an abundance of cattail, rush, and arrowhead vegetation with some occurrence of tamarack.

The east basin reaches a maximum depth of 47 feet and is characterized by abrupt contour changes (Figure 1). Shoal area occupies approximately 20% of the total lake surface area. Submerged vegetation in the shoal area is abundant with chara and has common occurrence of eurasian milfoil, later lily, and broadleaf pondweed. Native milfoil and bladderwort occur in lesser quantity. Buell Lake bottom substrate consists mainly of organic matter and some marl creating what is commonly known as a "false bottom". The west basin reaches a maximum depth of 27 feet and retains similar characteristics as the east basin.

In general, water quality of Buell Lake is good. Water color has a light brown stain due to the organic substrate and surrounding soils. Secchi disk visibility ranges from 7 feet to 15 feet year round. Alkalinity ranges from 175 parts per million (ppm) to 225 ppm with pH ranging between 8.5 and 9.0. During mid-summer months, a thermocline typically develops between water depths of 15 feet and 25 feet. Water temperatures above the thermocline are generally between 70F and 85F depending on ambient summer air temperatures. Oxygen concentrations below the thermocline are typically less than 3 ppm and can be fish limiting. In terms of lake classification, present conditions indicate Buell Lake is mesotrophic transitioning to a eutrophic state.

Early history indicates Chippewa natives originally inhabited the area around Buell Lake. Its proximity to the Saginaw Trail, which connected Pontiac to Saginaw, made it a well traveled area. The lake is named after Richard Buell II of Genesee County, New York, who, in 1839, purchased the surrounding land for timber interests. It is unknown when Buell Lake was transferred to public

ownership but presently, the Genesee County Parks and Recreation Commission administers the land surrounding Buell Lake.

Two public boat launches are available to recreational users. A small launch located on the south shore off Genesee Road has portable bathrooms and a small floating fishing pier. In 2003, the Michigan Natural Resources Trust Fund awarded Genesee County a \$153,000 grant for improvements to Buell Lake. Improvements on the north shore, off Genesee Road, include a picnic area with pavillion, a paved boat launch with parking for 15-20 trailers, and an extensive floating fishing pier. All facilities and structures have barrier-free access. Future plans include further development of the upland for recreational activities. No other development occurs on Buell Lake, making it aesthetically pleasing for fishing recreation. No-wake watercraft regulations are enforced.

### **History**

Buell Lake fish community assessments have been conducted in 1977, 1986, 1993, and 2004. These assessments document the presence of 12 native species and 4 introduced species (Table 1). It is likely other species are present but have not been documented due to collection bias. Brown trout are believed extirpated from Buell Lake. Of the fish species present, each would be considered common to the region with the exception of redear sunfish which were introduced by the Michigan Department of Natural Resources (MDNR), Fisheries Division.

Early fisheries management on Buell Lake experimented with establishing a trout fishery. Yearling brown trout averaging 5-6 inches were stocked at a rate of 20/acre in 1975 and 1976. The experiment was abandoned when a 1977 assessment found poor trout survival. In 1998, walleye were introduced into Buell Lake in an experiment to evaluate fall fingerling walleye management. A total of 869 fall fingerling walleye 5-9 inches were stocked at a rate of 20/acre. This experiment was also abandoned when fall fingerling walleye production ceased. In addition to the walleye stocking in 1998, redear sunfish were introduced into Buell Lake in an attempt to provide a "trophy" recreational fisheries. Other than these stockings, no specific fisheries management has occurred on Buell Lake and the lake has supported its fishery through natural reproduction and self-sustainment.

### **Current Status**

In June, 2004, Fisheries Division conducted a fisheries assessment using trap and gill nets. Three inland trap nets were fished for two nights at three locations. Experimental mesh gill nets were fished for one night at two locations. On the evening of July 1, 2004, fisheries personnel conducted three ten minute electro-fishing stations targeting largemouth bass.

A total of 916 fish representing 12 species were collected with combined efforts. Bluegill and largemouth bass were the most abundant species collected comprising 95% of the total catch by number and 74% by weight (Table 2). Other species collected included black crappie, brown and yellow bullhead, carp, green sunfish, northern pike, pumpkinseed sunfish, redear sunfish, walleye, and yellow perch.

A total of 869 bluegill averaging 5.8 inches comprised 91% of the total catch in the 2004 assessment (Table 2). Thirty-seven percent of these fish met or exceeded the acceptable harvest size of six inches. Age-growth data indicates bluegill are growing near State average having a mean growth index of -0.1 (Table 3). Estimated age frequency of the bluegill collected indicates sufficient recruitment is occurring with good representation of fish aged 2 through 5 (Table 4). Age 1 fish were not collected due to gear bias. Bluegill longevity appears to peak at age 5 and older fish appear to experience high mortality.

A total of 37 largemouth bass averaging 9.7 inches comprised 4% of the total catch in the 2004 assessment (Table 2). Eleven percent of these fish met or exceeded the legal harvest size of 14 inches. Age-growth data indicates largemouth bass are growing below State average, having a mean growth index of -1.3 (Table 3). Estimated age frequency of the largemouth bass collected shows fair representation of fish at ages 2, 4, and 5 (Table 4). An absence of age 3 largemouth bass suggests a weak 2001 year class. Few fish beyond age 5 were collected suggesting high mortality.

Black crappie, pumpkinseed, redear sunfish, walleye, northern pike and yellow perch appeared in low abundance in the 2004 assessment and detailed analysis of their status cannot be made. Their low abundance suggests marginal populations exist with limited recreational opportunity for them. Other non-sportfish including brown and yellow bullhead, carp, and green sunfish were also collected in low abundance.

### **Analysis and Discussion**

In southern Michigan warmwater lakes, bluegill are typically the most abundant fish species present and play a key role in community structure and overall sportfishing quality (Schneider 1981). Schneider (1990) suggests indices of bluegill characteristics can be used to classify populations. The "Schneider Index" uses size scores of length frequency and growth data and relates them to an adjective ranking system ranging from "very poor" to "superior". Using the Schneider Index for classifying bluegill populations, Buell Lake scored 3.75 for an "acceptable" rank (Table 5). Comparatively, this is a slight decline from historical bluegill catches using the same classifying system.

The declining trend in bluegill size structure observed in 2004 may be attributed to increased abundance and competition for a limited food source, low longevity, or it may be a response to increased harvest. Trap net catch per unit effort (number/lift) has steadily increased from 39 in 1986 and 96 in 1992, to 138 in 2004 suggesting a larger population of bluegill exists. In the State's top bluegill fisheries (e.g. Wakeley Lake, Crawford County), longevity typically extends beyond 5-6 years resulting in larger fish. On State average, an 8 inch bluegill is generally near 8 years of age. In Buell Lake, few fish appear to live beyond 5 years enabling them to obtain greater size. Mortality is likely of natural causes, but harvest can also play a role. Angling pressure is believed to have increased over the years and harvest often results in a cropping of larger fish resulting in smaller sized fish populations. Despite the declined size structure, Buell Lake continues to support one of the better bluegill fisheries in this area of the State.

The black crappie fishery of Buell Lake is more difficult to assess based on the few specimens collected in 2004. Historically, black crappie have sustained themselves through natural reproduction

and provided a good fishery. The low abundance observed in 2004 may indicate a declining population which could be attributed to displacement from the increased bluegill population or from increased harvest. However, previous assessments were conducted during cooler water temperatures when black crappie are more vulnerable to capture and the 2004 assessment may not have adequately represented the fishery.

Predator fish help control panfish populations from becoming over abundant. In Buell Lake, largemouth bass are the primary predator fish and they occur in acceptable abundance and size structure. Although bass growth is well below State average, this slow growth is a common phenomenon in southern Michigan lakes. It is unlikely largemouth bass alone will control bluegill populations, but they play an important biological role in maintaining balanced fisheries. The Buell Lake largemouth bass fishery continues to provide good opportunities for anglers.

Walleye and northern pike, also important predator fish, occur in low abundance in Buell Lake. Initially, walleye stocked into Buell Lake were an experiment to evaluate stocking larger fall fingerling fish at reduced rates. It was hoped that by establishing a viable walleye population another predator species would be available for bluegill control and a highly desired sportfish would increase angling opportunities. It is apparent the single stocking effort was insufficient to produce this fishery and, without a continued stocking program, walleye will eventually extirpate from the system. Potential exists for enhancing the northern pike population using a stocking program. Spawning habitat is available and once a population is established, a self-sustaining fishery could be achieved.

The few redear sunfish collected in 2004 indicates only marginal survival of the initial stock. Fisheries management efforts have attempted to expand the northern range of redear sunfish in Michigan. It appears, Buell Lake may not be suitable for redear sunfish and they will likely extirpate from the system.

Other fish species found in Buell Lake appear in satisfactory abundance. Brown and yellow bullheads function as bottom feeders and play an important role in the fish community. Anecdotal angler reports of abundant carp were not documented but a viable population is present. Pumpkinseed and yellow perch occur in small numbers. One peculiarity observed in the 2004 assessment was the presence of some large green sunfish, or perhaps a green sunfish-bluegill hybrid (J. Leonardi, MDNR Fisheries, personal observation). One specimen measured 10.5 inches and, if a pure green sunfish, would have been a contender for a State record size.

### **Management Direction**

Fisheries management of Buell Lake should continue to concentrate on warmwater species with emphasis on bluegill, black crappie, and largemouth bass. Although the bluegill size structure has shown signs of decline, no immediate management actions are warranted nor are any recommended. Management goals should strive to maintain a bluegill fishery with an acceptable (or better) rating using Schneider Index methodology. Future assessments should be scheduled to closely monitor these fisheries.

It is believed the northern pike fishery could be enhanced with a stocking program. Management recommendations are to stock 530-795 (10-15/acre) spring fingerling northern pike on an alternate

year schedule beginning in 2005. Stocking should continue until 2009 and an assessment should be scheduled to evaluate success. Management goals should strive to achieve a northern pike population of 3-5 adult fish per acre.

### **References**

Holcomb, S. 1972. Soil survey of Genesee county, Michigan. United States Department of Agriculture, Soil Conservation Service, Washington D.C.

Schneider, J.C. 1981. Fish communities in warmwater lakes. Michigan Department of Natural Resources, Fisheries Research Report 1890, Ann Arbor.

Schneider, J.C. 1999. Classifying bluegill populations from lake survey data. Michigan Department of Natural Resources, Fisheries Division, Fisheries Technical Report No. 90-10, Ann Arbor, Michigan.

Figure 1.-Hydrographic map of Buell Lake, Genesee County. Map from Michigan Department of Natural Resources, Fisheries Division records.

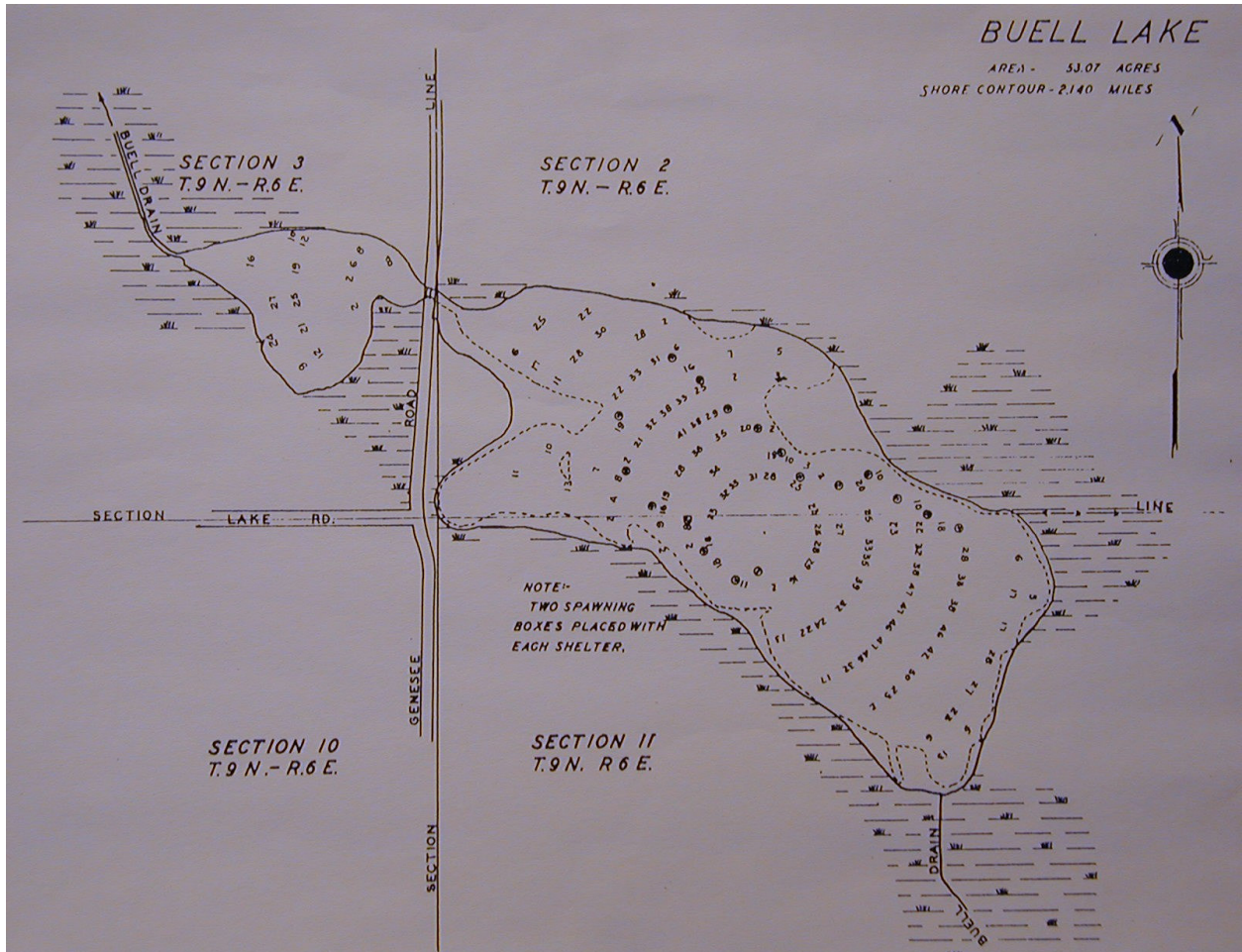


Table 1.–List of fishes in Buell Lake, Genesee County. Origin: N= native, I= introduced. Status: O= extirpated, P= recent observations. Data from: Michigan Department of Natural Resources, Fisheries Division records.

| Common name        | Scientific name               | Origin | Status |
|--------------------|-------------------------------|--------|--------|
| Carps and minnows  |                               |        |        |
| Common carp        | <i>Cyprinus carpio</i>        | I      | P      |
| Suckers            |                               |        |        |
| White sucker       | <i>Catostomus commersoni</i>  | N      | P      |
| Lake chubsucker    | <i>Erimyzon sucetta</i>       | N      | P      |
| Bullhead catfishes |                               |        |        |
| Yellow bullhead    | <i>Ameiurus natalis</i>       | N      | P      |
| Brown bullhead     | <i>Ameiurus nebulosus</i>     | N      | P      |
| Pikes              |                               |        |        |
| Northern pike      | <i>Esox lucius</i>            | N      | P      |
| Trouts             |                               |        |        |
| Brown trout        | <i>Salmo trutta</i>           | I      | O      |
| Sunfishes          |                               |        |        |
| Green sunfish      | <i>Lepomis cyanellus</i>      | N      | P      |
| Pumpkinseed        | <i>Lepomis gibbosus</i>       | N      | P      |
| Warmouth           | <i>Lepomis gulosus</i>        | N      | P      |
| Bluegill           | <i>Lepomis macrochirus</i>    | N      | P      |
| Redear sunfish     | <i>Lepomis microlophus</i>    | I      | P      |
| Largemouth bass    | <i>Micropterus salmoides</i>  | N      | P      |
| Black crappie      | <i>Pomoxis nigromaculatus</i> | N      | P      |
| Perches            |                               |        |        |
| Yellow perch       | <i>Perca flavescens</i>       | N      | P      |
| Walleye            | <i>Stizostedion vitreum</i>   | I      | P      |

Table 2.-Number, weight, and length range of fishes collected with trap net, gill net, and electro-fishing gear from Buell Lake, Genesee County, June and July, 2004. Data from Michigan Department of Natural Resources, Fisheries Division records.

| Common name     | Number | Percent by number | Length range (inches) | Weight (lbs.) | Percent by weight | Percent legal size | Average size (inches) |
|-----------------|--------|-------------------|-----------------------|---------------|-------------------|--------------------|-----------------------|
| Black crappie   | 11     | 1.2               | 5-11                  | 2.3           | 1.2               | 18                 | 6.9                   |
| Bluegill        | 829    | 90.5              | 3-8                   | 119.3         | 61.4              | 37                 | 5.8                   |
| Brown bullhead  | 2      | 0.2               | 11-12                 | 1.6           | 0.8               | 100                | 12.0                  |
| Common carp     | 3      | 0.3               | 17-28                 | 16.1          | 8.3               | 100                | 21.5                  |
| Green sunfish   | 5      | 0.5               | 5-10                  | 1.9           | 1.0               | 80                 | 7.5                   |
| Hybrid sunfish  | 2      | 0.2               | 4-5                   | 0.18          | 0.1               | 0                  | 5.0                   |
| Largemouth bass | 37     | 4.0               | 4-15                  | 23.7          | 12.2              | 11                 | 9.7                   |
| Northern pike   | 3      | 0.3               | 23-32                 | 14.9          | 7.7               | 67                 | 27.5                  |
| Pumpkinseed     | 6      | 0.7               | 4-6                   | 0.9           | 0.5               | 33                 | 5.7                   |
| Redear sunfish  | 4      | 0.4               | 7-9                   | 1.9           | 0.5               | 100                | 8.5                   |
| Walleye         | 2      | 0.2               | 19-23                 | 6.7           | 3.4               | 100                | 21.5                  |
| Yellow bullhead | 11     | 1.2               | 8-11                  | 4.9           | 2.5               | 100                | 9.7                   |
| Yellow perch    | 1      | 0.1               | 7                     | 0.2           | 0.1               | 100                | 7.5                   |



Table 3.-Average total length (inches) at age, and growth relative to the State average, for fish sampled from Buell Lake with trap nets, gill nets, and electro-fishing gear, June and July, 2004. Number of fish aged is given in parentheses. Data from Michigan Department of Natural Resources, Fisheries Division records.

| Species         | Age        |             |             |             |             |             |             | Mean growth index <sup>1</sup> |
|-----------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------------|
|                 | 1          | 2           | 3           | 4           | 5           | 6           | 7           |                                |
| Black crappie   | ...        | 6.0<br>(9)  | 8.1<br>(1)  | ...         | ...         | 11.7<br>(1) | ...         | -0.5                           |
| Bluegill        | ...        | 4.0<br>(5)  | 4.9<br>(12) | 5.9<br>(11) | 6.8<br>(11) | 7.9<br>(10) | 8.1<br>(4)  | -0.1                           |
| Largemouth bass | 4.7<br>(2) | 6.5<br>(15) | 9.3<br>(1)  | 11.5<br>(7) | 12.5<br>(8) | 14.6<br>(2) | 16.7<br>(2) | -1.3                           |
| Pumpkinseed     | ...        | ...         | 4.9<br>(2)  | 5.8<br>(4)  | ...         | ...         | ...         |                                |
| Redear sunfish  | ...        | ...         | 8.6<br>(1)  | 8.0<br>(4)  | ...         | ...         | ...         |                                |
| Walleye         | ...        | ...         | ...         | ...         | 19.3<br>(1) | 23.3<br>(1) | ...         |                                |

<sup>1</sup>Mean growth index is the average deviation from the state average.

Table 4.-Estimated weighted age frequency (percent) of fish caught from Buell Lake with trap nets, gill nets, and electro-fishing gear, June and July, 2004. Data from Michigan Department of Natural Resources, Fisheries Division records.

| Species         | Age |     |     |     |     |     |     | Number caught |
|-----------------|-----|-----|-----|-----|-----|-----|-----|---------------|
|                 | 1   | 2   | 3   | 4   | 5   | 6   | 7   |               |
| Black crappie   | ... | 82  | 9   | ... | ... | 9   | ... | 11            |
| Bluegill        | ... | 19  | 43  | 26  | 10  | 2   | 1   | 829           |
| Largemouth bass | 5   | 41  | 3   | 20  | 22  | 5   | 5   | 37            |
| Pumpkinseed     | ... | 33  | 67  | ... | ... | ... | ... | 6             |
| Redear sunfish  | ... | ... | 20  | 80  | ... | ... | ... | 5             |
| Walleye         | ... | ... | ... | ... | 50  | 50  | ... | 2             |

Table 5.-Buell Lake bluegill classification using trap net data and the Schneider Index (Schneider 1990). Size score is given in parenthesis. Data from: Michigan Department of Natural Resources, Fisheries Division records.

| Sample date             | 4/25/86      | 9/29/92      | 6/3/04     |
|-------------------------|--------------|--------------|------------|
| Sample size             | 231          | 382          | 825        |
| Average length (inches) | 6.2<br>(4)   | 6.1<br>(4)   | 5.8<br>(3) |
| % $\geq$ 6 inches       | 45<br>(3)    | 49<br>(3)    | 37<br>(3)  |
| % $\geq$ 7 inches       | 25<br>(4)    | 19<br>(4)    | 11<br>(4)  |
| % $\geq$ 8 inches       | 11<br>(6)    | 3<br>(5)     | 2<br>(5)   |
| Schneider Index         | 4.25         | 4.00         | 3.75       |
| Rank <sup>1</sup>       | Satisfactory | Satisfactory | Acceptable |

<sup>1</sup>Rank: 1 = Very poor, 2 = Poor, 3 = Acceptable, 4 = Satisfactory, 5 = Good, 6 = Excellent, 7 = Superior