Buck Lake

Synoptic Trapnet Survey Report
September, 2002

Eric McIntyre
Parry Sound Area Fisheries Biologist

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Summary:

A synoptic trapnet survey was conducted on Buck Lake (Geographic Townships of McMurrich and Stisted) during September of 2002. Purpose of the survey was to assess the status of the near-shore fish community and to evaluate survival success of recent experimental walleye plantings.

We compared results with 18 other lakes similarly and recently (since 1994) surveyed in the Parry Sound Area. Relative to our comparative lakes database, Buck Lake had the lowest over-all fish productivity as measured by *Catch-Per-Unit-Effort by weight (CUE-wt)* for all species combined. Virtually all the fish caught in this survey were top-predator game fish. We interpret the complete absence of non-game and forage fish species as a negative indicator of an unusual and unbalanced fish community. (Typically unbalanced fish communities are dominated by less desirable coarse and non-game fish species.)

Relative abundance indices for smallmouth bass were 'well below average' and for northern pike 'about average'. Indices of walleye abundance were 'below average'. Considering the walleye population is the result of recent experimental plantings, we considered it inappropriate to make direct comparisons with surveyed lakes containing natural, self-sustaining walleye populations. We surmised that probably 21 out of 22 walleye we captured were from experimental plantings made between 1998 and 2001. We considered the observed abundance of planted walleye to be indicative of highly successful plantings in terms of survival, but it is premature to comment on whether or not these plantings may eventually lead to a natural, self-sustaining walleye population of any consequence.

This survey represents the first record of black crappie being present in Buck Lake. We consider this a negative development with respect to promoting a natural, self-sustaining walleye population in the lake.

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1.0 Introduction

Buck Lake is a medium size lake (265.7 hectares or 656 acres) (Reeves and Crosby, 1973) that stradles the geographic townships of McMurrich and Stisted. It is located 16 kilometers northwest of the Town of Huntsville. Outlet from the lake is via the Buck River that feeds into Lake Vernon and is part of the large Muskoka River watershed.

The lake is long and narrow on a north-south axis and is distinctly segmented into two basins (Figure 1). The southern basin is the deepest at 23.5 metres (77 feet). Mean depth of the lake is a considerable 9.9 metres (32 feet), with most of the shallow water located in the north basin. The lake is moderately developed and readily accessible to the public with good road access and boat launching facilities.

Water-colour is yellow-brown with low light transparency. We recorded a secchi reading of 2.1 metres in our survey. The 1973-lake survey recorded 1.6 metres. The littoral zone (light penetration to bottom) comprises 35% of the lake area (Reeves and Crosby, 1973). Productivity is low with a morpho-edaphic index (MEI) of 2.0 (TDS ÷ mean depth = MEI).

The Ministry file record indicates the lake has a chronic history of poor fishing quality. There have been multiple species introductions for the purposes of creating self-sustaining game-fish populations as well as short-term, artificial angling opportunities. The history of intentional and unauthorized introductions of a variety of fish species into Buck Lake is long and complex. The fish community of this lake has seemingly gone from "no game fish" reported in 1932 (Pearce and Miller, 1932) to the five game-fish species observed in this survey. There have also been several past plantings of lake trout, brook trout and rainbow trout to create short-term, artificial angling opportunities. These species are believed to be no longer present in the lake.

The earliest information about Buck Lake in the Ministry's lake file is a 1932 *Lake Card Report Form* (Pearce and Miller, 1932). It indicates the inhabiting fish species were perch, "catfish" (brown bullhead), "suckers" (common white), "horned dace" (unsure of species) and "minnows". The card stated: "Residents in this locality do a little fishing for perch, catfish and suckers – no game fish." In 1939 and 1940, speckled trout were stocked. Between 1947 and 1969, smallmouth bass fingerlings were stocked on 16 occassions – seemingly with the intention of creating a self-sustaining bass population, which has been achieved.

A *Biological Survey Report* (Walden, 1950) for work conducted in 1950 indicated smallmouth bass, cisco and white suckers were then present. Fishing was rated as "poor to fair". Lake trout plantings commenced in 1953 with 10 plantings of yearlings up to 1960. Yearling lake trout were also planted in 1970 and '71.

A 1963 *Biological Survey Report* (Morris and Davis, 1963) indicated that perch were very abundant, smallmouth bass – present but scarce and speckled trout "inhabit streams more than lake". Suckers and brown bullheads were reported present. The survey noted: "Minnows and small fish except perch conspicuously absent". This survey makes the first mention of "sunfish" (i.e. pumpkinseed) being present in the lake. Fishing was rated as "poor – very seldom catch anything but perch."

In 1969, a *Lake Survey Summary Sheet* was prepared by Davis and Curtis (1963). They recorded smallmouth bass, brook trout, yellow perch, white sucker, cisco, brown bullhead and common

shiners as being present. No mention was made of any previously reported pumpkinseed, planted lake trout, or rainbow trout that were planted in 1963, 1964 and 1965. Also, this is the first mention of cisco being present in the lake – undoubtedly a native population. A 1969 letter from M.A. Adamson, then District Forester of the Department of Lands and Forests to Mary McKanday, again recognized the poor fishing quality on Buck Lake.

In 1973 a standardized *Aquatic Habitat Inventory* (lake survey) was conducted by the Ministry of Natural Resources (Reeves & Crosby, 1973). In this survey, inhabiting species included: lake trout (stocked), smallmouth bass, yellow perch, white sucker, cisco, brown bullhead and the first record of common shiner.

In 1977 a gillnet survey consisting of 5 overnight sets was conducted to assess plantings of 13,000 yearling lake trout made in 1970 and '71. The catch was comprised of 12 white suckers, 36 cisco and 4 perch (Greer, et. al. 1977). No planted lake trout were recovered and no additional plantings of lake trout have been made since.

In 1986, gillnets, trapnets and angling were used to capture fish as part of the *Contaminants in Sport Fish* program. Sample submission included 5 smallmouth bass, 12 largemouth bass and 20 northern pike. This is the first documented record of largemouth bass and northern pike being present in the lake. Presumably they were introduced between the 1986 contaminant netting project and the previous 1973 lake survey. Mode of introduction of largemouth bass and pike is unknown but probably by unauthorized plantings by member(s) of the public. The 1986 survey also recorded perch and pumpkinseed as being present.

The only documented mention of walleye ever being present in Buck Lake comes in a 1985 letter from Burt Barker, then President of the Buck Lake/Ilfracombe Association to the Ministry of Natural Resources. In promoting the notion of stocking Buck Lake with walleye, Mr. Barker states: "… two years ago a large walleye (4 – 5 lbs.) was caught in Buck Lake which makes one wonder if perhaps they would survive and thrive in these waters." The Ministry turned down Mr. Barker's walleye stocking overtures, saying there were no spawning facilities available for walleye nor was there public access to the lake.

In 1998, Mr. Russ Coulas approached the Ministry of Natural Resources with another proposal to stock Buck Lake with walleye. The fish were to be purchased from a private hatchery (Leonard's Hatchery – Harrington, Ont.) using funding from the Buck Lake Cottage Association. With a relaxed policy on private fish stocking of public waters, the Ministry agreed to the stocking on an experimental management basis. Between 1998 and 2001, 5000 summer fingerling and 3625 fall fingerling walleye were planted by Mr. Coulas.

The purpose of this survey was:

- To assess the status of the near-shore fish community with a focus on game-fish species present.
- And to assess the survival success of experimental walleye plantings made by Mr. Coulas.

2.0 Methods:

Synoptic trapnet surveys (STNS) are intended to provide a 'snapshot in time' of the status of the near-shore fish community and individual populations that comprise it. We used 8' trapnets due to the non-lethal nature of the gear and it's proven effectiveness at capturing walleye, smallmouth bass and northern pike – which were particular species of interest in this survey. We emphasize that catch results are not directly representative of the fish community and must be viewed with an understanding of 'species selectivity' of the gear.

Comment re *Species Selectivity* of 8' trapnets:

We intend that our nets will act like "random predators", being set throughout the lake in all types of fish habitat such that the catch gives an over-all, generalized representation of the fish community. In actuality – this seldom if ever happens. Invariably there are biases in gear that favours a particular species or size of species being captured.

Relative to smaller size trapnets, 8' nets fish in deeper water and result in a higher catches of walleye and smallmouth bass. Conversely, they grossly under-represent species such as rock bass, pumpkinseed and yellow perch that occupy shallow-water. Also, species such as largemouth bass, black crappie and brown bullhead are usually very abundant in localized habitats and "random searching" for them reflects this – a series of 'nil' catches followed by the occasional set in the right habitat that catches a large number. There seems to be little difference in the number of pike caught in various size trapnets, but considerable differences in the size range of pike caught. These biases need to be considered when interpreting catch data.

A good measure of *species selectivity* of our 8' trapnet gear is a statistic called the '*probability of capture'* – or the likelihood of a particular species being caught. In our comparative lakes data base consisting of 19 synoptic trapnet surveys, the *probability of capture* is 69.1% for smallmouth bass, 66.5% for common white sucker, 65.9% for walleye, 57.1% for pike, 55.1% for brown bullhead, 48.4% for rock bass, 42.0% for pumpkinseed and 6.7% for yellow perch. (These figures are 'averages' presented for illustrative purposes only. The *probability of capture* for any particular species can vary greatly between individual lakes.)

Not only is there *species selectivity* with respect to which fish are vulnerable to 8' trapnets, but there is also *size selectivity* within species. Walleye, smallmouth bass and northern pike young-of-the-year, yearling and two-year olds are seldom caught in the net, yet we know they are the most abundant age classes in the population.

Notwithstanding the fact that these biases exist, we account for them by trying to remain consistent in how we assess individual populations and fish communities. We use the same nets on comparison lakes such that the netting biases are consistently applied to all lakes. In actuality, we are not truly comparing the **fish communities** of lakes, but rather the **catch results** – acknowledging that those results are not directly representative of the abundance of individual species within the fish community. Consequently, our survey design is intended to give a measure of species abundance in the catch – "relative" to what has been observed on a number of similarly surveyed lakes.

The field crew selected net-set locations in accordance with the following guidelines:

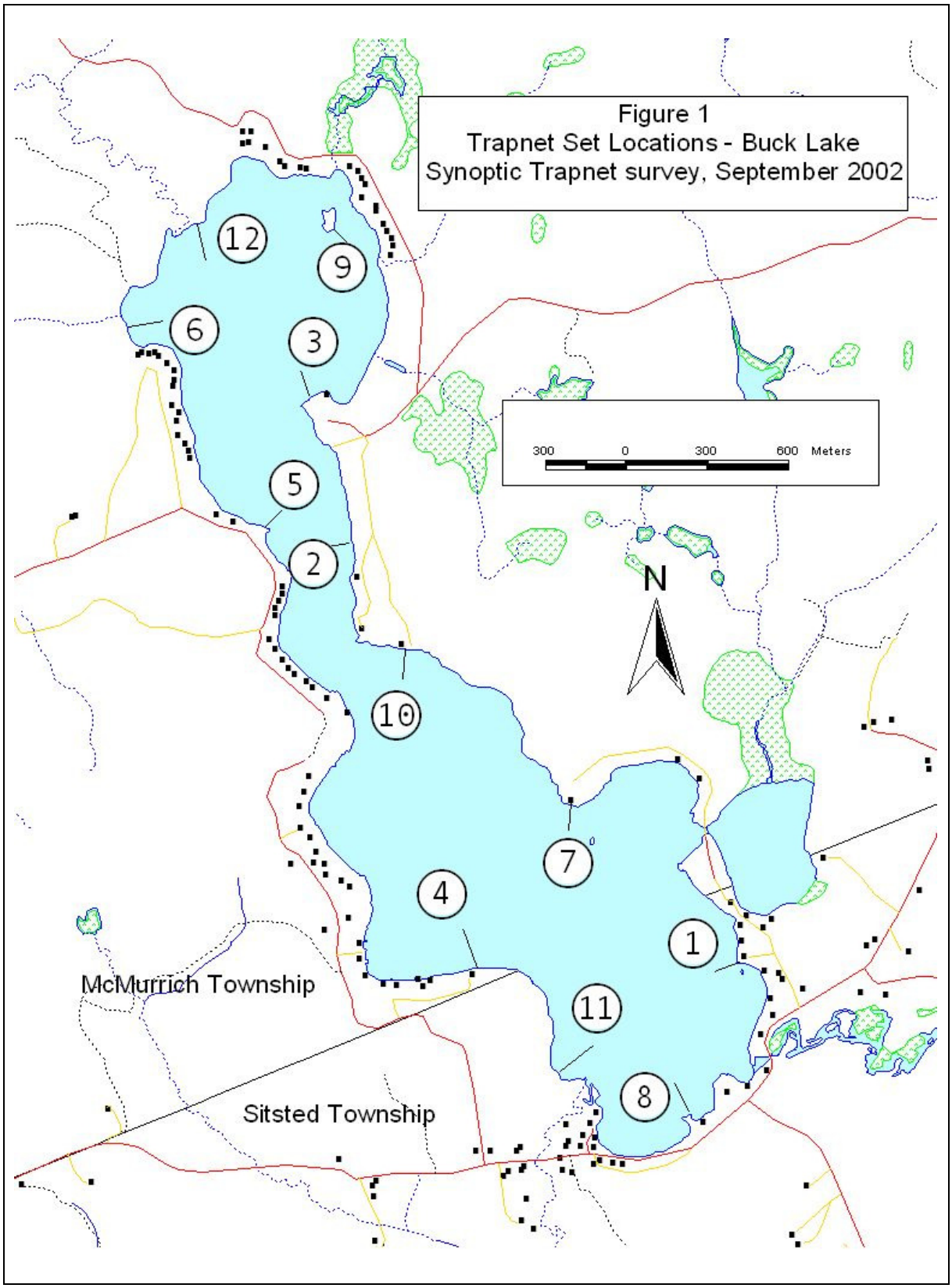
- Nets were to be approximately evenly dispersed throughout the lake in an effort to fish various fish habitats in the proportion of which they occurred in the lake. The intention here is that the catch would reflect the 'whole lake' as accurately as possible.
- The site had to be suitable for the net to fish effectively. (Consequently – factors such as: contour of the lake bottom, absence of obstructions, depth, sufficient lead length, etc. were considered.)
- Nets were to be set far enough apart such that they were not competing with each other.
- Avoid areas of potential conflict where there is human habitation.
- Avoid areas where nets could act as a navigational hazard.

Nets set locations are indicated in Figure 1.

Field operations were conducted from September 23 - 27, 2002. In this report the unit of effort is recorded as a "net set" – and approximates a set of 24 hours duration. Nets were relocated daily. Complete catch enumeration was conducted for all sets (Appendix A).

Biosampling data consisting of total length, fork length and round weight determination was conducted for all game fish (Appendix B – E). Scale samples were also collected for age determination of walleye (Appendix B).

Age determination for walleye was by the scale reading method. As there were no *known-age* walleye in Buck Lake – we had no method of validating the accuracy of our scale aging. Campbell and Babaluk (1979) concluded that scale aging consistently underestimate the true age of walleye – particularly in older age classes. The reader should bear in mind, that our mean age determination (Appendix B) may underestimate the true mean age of walleye that we sampled.


Figure 1
Trapnet Set Locations - Buck Lake
Synoptic Trapnet survey, September 2002
300 0 300 600 Meters
N
12
9
6
3
5
2
10
7
4
1
11
8
McMurrich Township
Sitsted Township

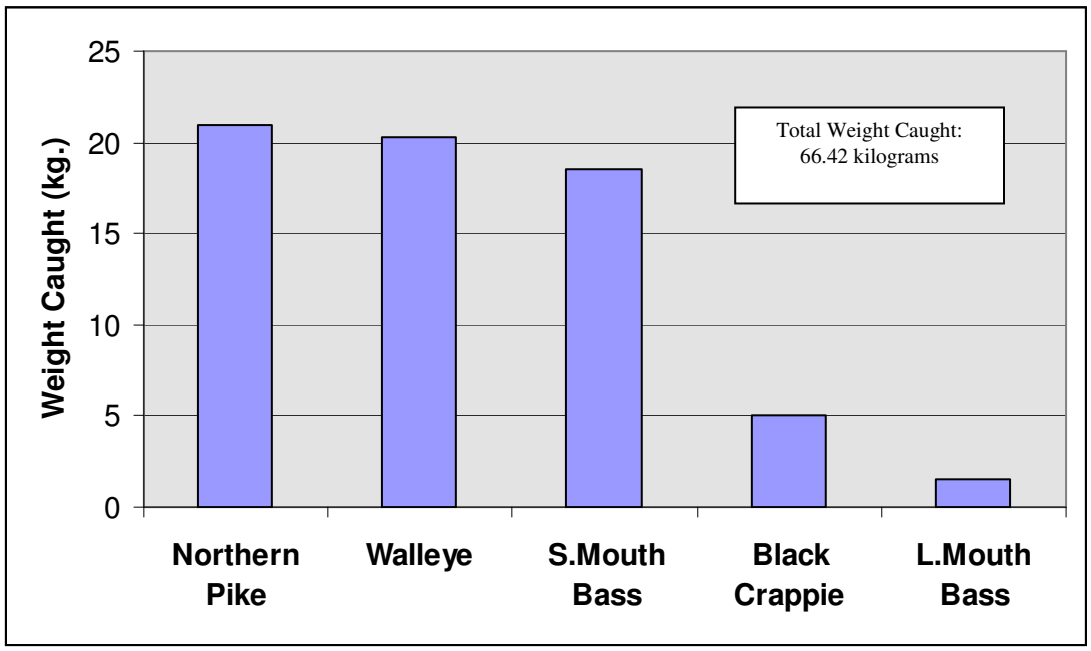
3.0 Results & Discussion

3.1 Catch Composition and Productivity:

The catch from 12 overnight trapnet sets was comprised of 22 walleye, 16 smallmouth bass, 11 northern pike, 10 black crappie and 1 largemouth bass (Appendix A).

The total catch weight for all species captured was 66.420 kilograms. By weight, the catch was composed of 31.4% northern pike, 30.6% walleye, 28.8% smallmouth bass, 7.5% black crappie and 2.2% largemouth bass (Appendix A and Figure 2)

Figure 2. Catch composition by weight from the Buck Lake synoptic trapnet survey conducted in September, 2002.

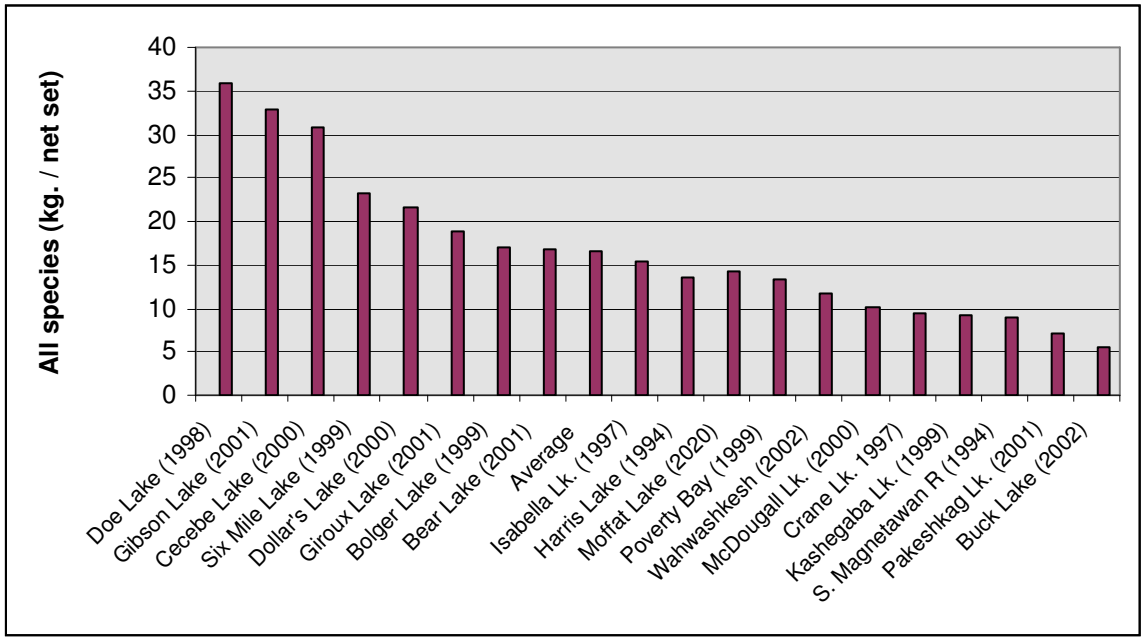


Virtually 100% of fish caught were game fish. In our comparative lakes database consisting of 19 synoptic trapnet surveys conducted since 1994, the average percentage of game fish in the catch is 63.5% (Appendix H). Normally we consider a high percentage of game fish in the catch to be a positive indicator of a well balanced fish community dominated by predatory game species, but the total absence of any forage fish in the catch is of concern. Even acknowledging the species selectivity of our 8' trapnet gear (discussed in "Methods") that highly selects for game fish, in a well-balanced fish community there should be some non-game fish in the catch. It appears the fish community of Buck Lake is completely dominated by predatory and highly competitive game fish species with a very small forage base to support them.

The seemingly negligible abundance of forage fish in the fish community is undoubtedly related to the low productivity of this lake. (Note: Low forage fish abundance is probably an "effect" of low productivity, not a "cause" of it.) We captured a meagre 66.420 kilograms of fish in 12 trapnet sets for a *Catch-Per-Unit-Effort by weight (CUE-wt)* of only 5.535 kilograms per net set (Appendix A).

In our comparative lakes database, this index of productivity ranks last out of 19 lakes and far below the average of 16.613 kilograms of fish per net set (Figure 3 and Appendix H).

Figure 3. Overall index of fish productivity (all species CUE-wt) for 19 lakes in the Parry Sound Area comparative lakes, synoptic trapnet survey database.



3.2 Walleye

3.2.1 Abundance Indices:

We captured a total of 22 walleye in 18 trapnet sets for a *Catch-Per-Unit-Effort by number (CUE-no)* of 1.8 walleye per set (standard error 0.81) (Appendix A). In our comparative lakes database, this index of walleye abundance ranks 12th out of 19 surveys and well below the average of 3.8 walleye per net set (Appendix F). Walleye *CUE-wt* was 1.694 kilograms per net set (Appendix A). This ranks 13th out of 19 in our comparative lakes data base and again well below the average of 4.252 kilograms per net set (Appendix G).

Another index of walleye abundance is *probability of capture* (i.e. the percentage of nets that caught at least one walleye). Our walleye probability of capture was 50.0% (Appendix A), below the average 65.9% in our comparative lakes database (Appendix I).

Cumulatively, these indices indicate walleye abundance is "below average" on Buck Lake relative to our comparative lakes database. We seriously question however if it is legitimate to make direct comparisons between indices of walleye abundance on natural self-sustaining lakes in our comparative lakes database with Buck Lake. As will subsequently be discussed, we believe that almost all the walleye caught on Buck Lake during this survey originated from plantings conducted between 1998 and 2001. One would not expect walleye abundance after four years of experimental plantings to be comparable to lakes with natural, self-sustaining populations.

Figure 4. Walleye indices of abundance (*CUE-no v. CUE-wt*) for 19 lakes surveyed (since 1994) in the Parry Sound Area.

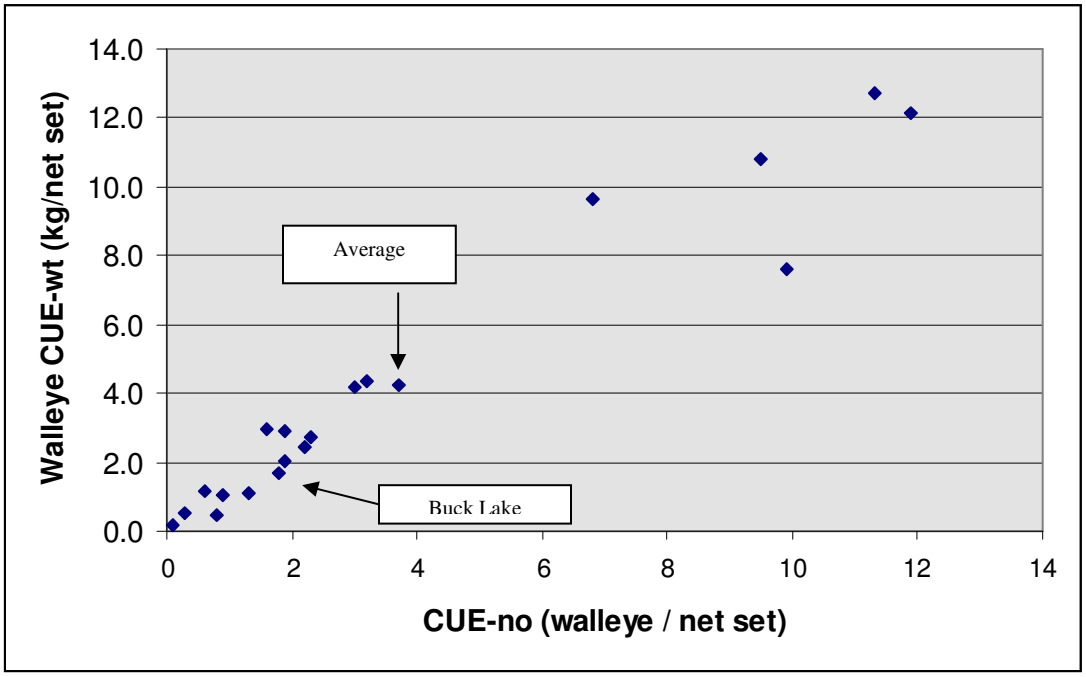
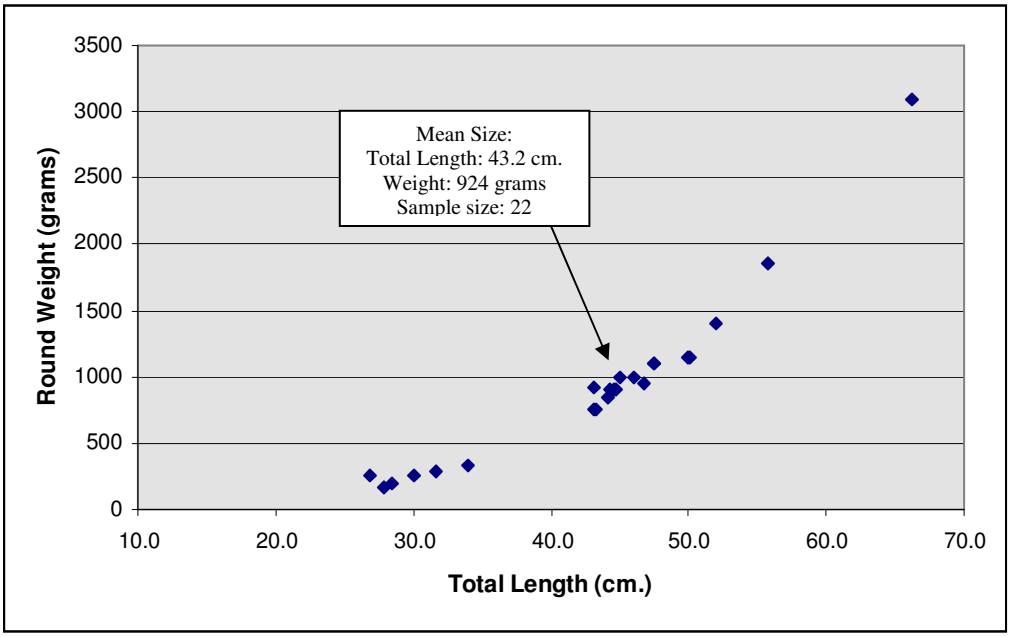


Figure 5. Walleye size distribution, Buck Lake synoptic trapnet survey, September 2002



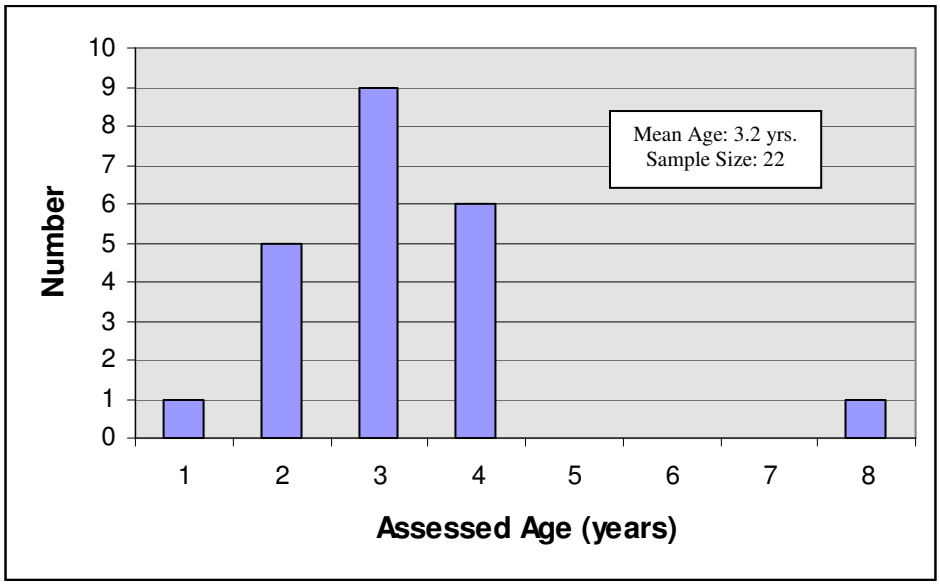
3.2.2 Biosampling Data:

Our sample of 22 walleye had a mean total length of 43.2 cm (17") and a mean weight of 924 grams (2 lb.) (Appendix B and Figure 5). We found it peculiar that there was a 'gap' in walleye samples between 35 and 42 centimetres in total length (Figure 5). There was not an age class missing in the age class structure (Fig. 6) so we attribute this anomaly to "chance" related to our small sample size.

Assessed mean age of walleye sample was 3.2 years (Appendix B and Figure 6).

It is necessary to interpret biosampling data for walleye in light of the plantings that have recently taken place. By assumption, we attribute the good recruitment of the 1998, 1999 and 2000 year classes (age 4, 3 and 2) wholly to the fact that these are planted fish (Figure 6). The 2001 year-class and to a lesser extent the 2000 year-class, are not fully vulnerable to the gear and are probably under-represented in Figure 6. It appears one natural, age 8 walleye was present in the catch.

Figure 6. Age class structure of walleye sampled from Buck Lake during the September 2002 synoptic trapnet survey.



3.2.3 Walleye Stocking Assessment

Buck Lake has recently been stocked with walleye through the efforts of Mr. Russ Coulas and the Buck Lake Cottage Association. Reported plantings include:

- 1998: July planting of 5000 summer fingerlings 3" in length
- 1998: October planting of 500 fall fingerlings 6 – 10" in length
- 1999: September planting of 1100 fall fingerlings 6 – 11" in length
- 2000: September planting of 1025 fall fingerlings 7" in length
- 2001: September planting of 1000 fall fingerlings (no size reported).

Unfortunately we have no "before treatment" assessment data to indicate the status of the walleye population prior to these plantings. However, a search of Ministry files does provide some compelling anedcotal evidence that walleye were indeed very scarce or almost non-existent prior to the recent plantings. The 1969 and 1973 lake surveys failed to capture any walleye. Likewise, trap and gillnets set in 1986 to capture fish for contaminant analysis failed to capture any walleye. The only mention of walleye ever being present in the lake comes in a 1985 letter "… two years ago a large walleye (4 to 5 lbs.) was caught in Buck Lake which makes one wonder if perhaps they would survive and thrive in these waters." When Mr. Coulas applied for a permit to stock walleye in 1998 he stated that 'the odd walleye' was historically reported caught in the lake, but their present numbers were neglibible.

Based on the above file record, we believe it is reasonable to assume that a very small remnant walleye population may have existed in Buck Lake prior to the recent plantings. In light of this, it is most probable that all of the aged 1-4 walleye that we captured were from plantings made by Mr. Coulas. The above hypothesis fits with our observation that 21 of the 22 walleye captured come from year classes in which plantings were made. In terms of survival, we consider these 'experimental plantings' of walleye to be highly successful. At this point in time however, we cannot comment on the success of these plantings at creating a natural, self-sustaining walleye population of any consequence in Buck Lake. (*We do congratulate Mr. Coulas and the Buck Lake Cottage Association on the early success of this initiative however.*)

3.3 Smallmouth Bass

3.3.1 Abundance Indices:

We captured a total of 16 smallmouth bass in 12 trapnet set for a *CUE-no* of 1.3 bass per net set (standard error 0.620) (Appendix A). In our comparative lakes database this ranks 16th out of 18 surveys and far below the Area average of 5.3 bass per net set (Appendix F). (Note: Sample size has dropped to 18 surveys, as one survey did not capture any smallmouth bass.)

Our smallmouth bass *CUE-wt* was 1.542 kilograms of smallmouth caught per net set (Appendix A). In our comparative lakes database this ranks 12th out of 18 surveys and far below the average of 3.111 kg per net set (Appendix G).

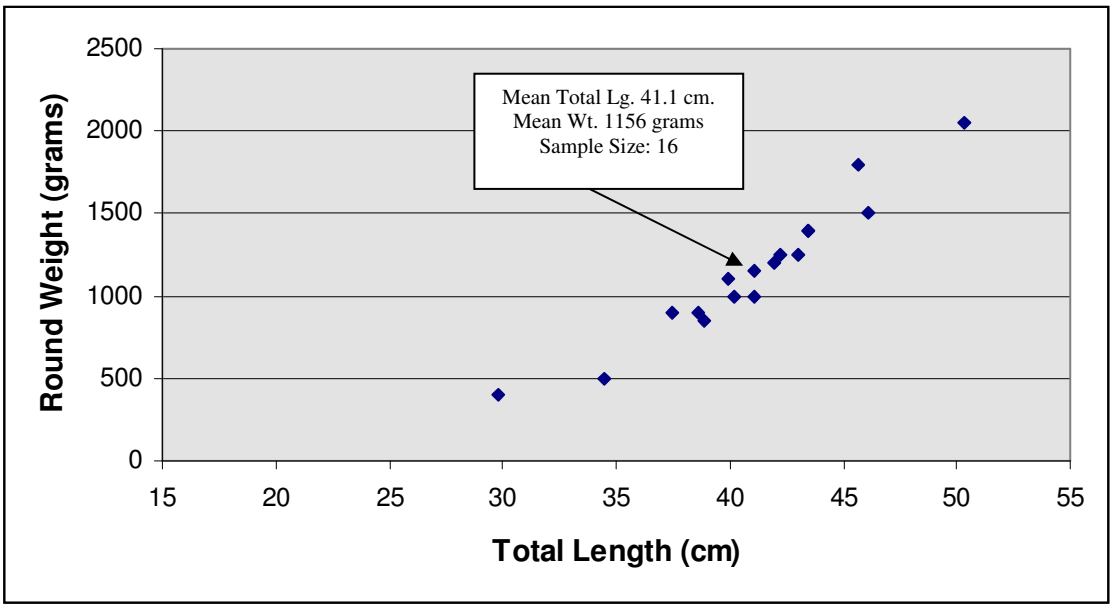
Our smallmouth bass probability of capture was 41.7%; well below the comparative lakes database average of 69.1% (Appendix I).

These above indices clearly point to "well below average" abundance of smallmouth bass on Buck Lake relative to our comparative lakes database.

3.3.2 Biosampling Data:

From our sample of 16 smallmouth bass, we determined a mean total length of 41.1 cm. (approx. 16") and a mean weight of 1156 grams (2½ pounds) (Figure 7 and Appendix C).

Figure 7. Size Distribution of Smallmouth Bass, Buck Lake STNS, September 2002.



Notwithstanding the small size of our smallmouth bass sample (16 fish), we note there is a good size range suggesting a stable population. Admittedly, recruitment of juvenile bass appears 'somewhat low'. This observation may be more related to the size selectivity of the gear than an indication of poor year-class strength for juvenile bass. Although the smallmouth bass population of Buck Lake is low in abundance, it appears to be stable.

3.4 Northern Pike

3.4.1 Abundance Indices:

We captured 11 northern pike in 12 trapnet sets for a *CUE-no* of 0.9 per net set (standard error 0.417) (Appendix A). In our comparative lakes database, this index of pike abundance ranked 10th out of 19 surveys and just slightly below the average pike *CUE-no* of 1.2 (Appendix F). Our pike *CUE-wt* was 1.746 kg per net set, ranking it 8th in the comparative lakes database and slightly below the average of 1.845 kg of pike per net set (Appendix G).

Likewise, our probability of capture for pike was 50.0%, just slightly below the average of 57.1% in our comparative lakes database (Appendix I).

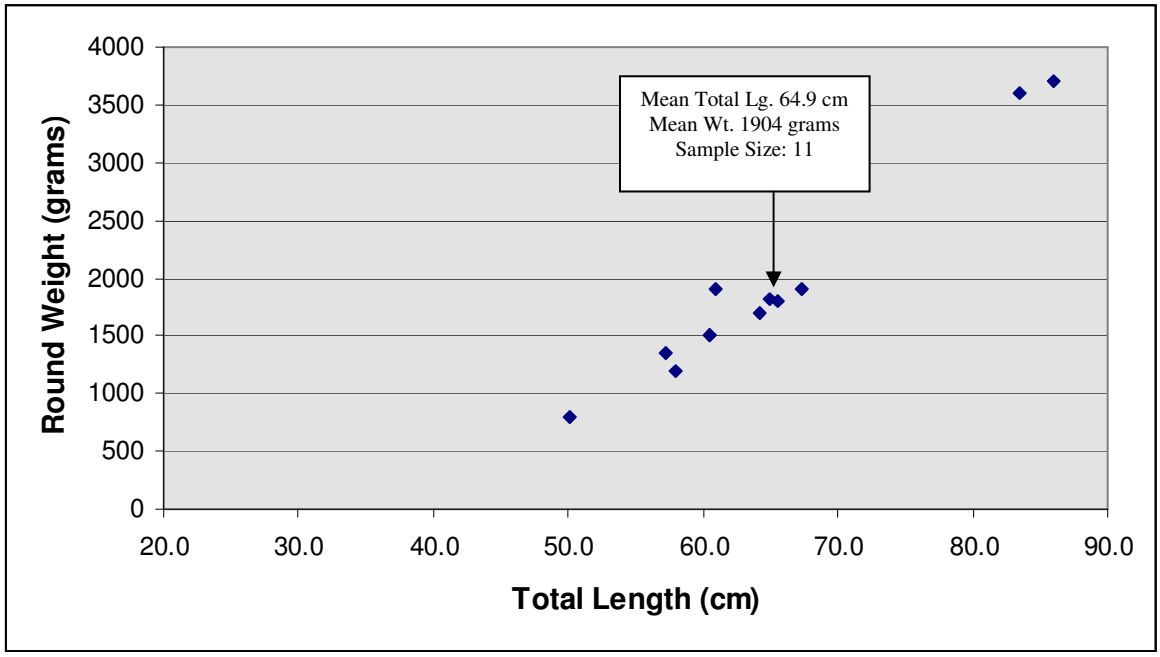
The abundance indices for northern pike in Buck Lake indicate this population is "approximately average" relative to other Area lakes in our comparative lakes database.

3.4.2 Biosampling Data

From 11 pike sampled, mean total length was 64.9 cm (25½") and a mean weight 1904 grams (4.2 lbs.) (Figure 7 and Appendix D). Acknowledging our small sample size, we are unsure to what degree the seemingly low recruitment of juvenile pike is attributable to size selectivity of the gear or perhaps several poor year-classes.

Ministry file information suggest northern pike were introduced into Buck Lake some time after 1973 (Reeves and Crosby, 1973) and had become well established by 1986 (OMNR, 1986). This survey indicates the population is still well established, stable and sustainable.

Figure 7. Size distribution of walleye, Buck Lake STNS, September 2002.



3.5 Black Crappie

We captured 10 black crappie in 12 trapnet set for a *CUE-no* of 0.8 crappie per net set (standard error 0.366) (Appendix A). There are only six lakes in our comparison lakes database that have caught crappie and the range in catch rate is highly variable – ranging from 0.5 to 9.1 crappie per net set (Appendix F). Notwithstanding a paucity of comparative data, we consider our *CUE-no* of 0.8 to be indicative of a low abundance of crappie in Buck Lake.

Our black crappie *probability of capture* was 41.7%, just slightly below the average of 50.7% for the six lakes in our comparative lakes database (Appendix I).

Black crappie is not an indigenous species to the lake. They have probably been introduced since 1986 when the last netting project was conducted (OMNR, 1986). We are unaware of how black crappie have found their way into Buck Lake but strongly suspect it was by an unauthorized introduction. Although black crappie is a desirable game fish, they are also competitors with and

predators upon the early life stages of walleye as well as a variety of other near-shore fish species (Kerr & Grant, 2000). The presence of crappie is likely to have a negative impact on the walleye population of Buck Lake.

Notwithstanding the anticipated negative impacts on walleye, black crappie will also have some beneficial impact by providing additional angling opportunities on Buck Lake. The mean weight of the 10 crappie we sampled was 509 grams (1.1 lbs.) and one 'jumbo' crappie was 800 grams (1.76 lbs.) (Appendix E).

3.6 Largemouth Bass

We captured a single largemouth bass with a total length of 45.0 cm and weight of 1550 grams. We can say little other than largemouth bass are present in Buck Lake but very scarce. The first report of largemouth bass being present in the lake was in the 1986 Contaminant Survey (OMNR, 1986).

3.7 Other inhabiting near-shore fish species

We have to admit that we were both surprised and perplexed with the catch composition in this survey (Figure 2). Ministry file records indicate that common white sucker, brown bullhead, pumpkinseed and yellow perch are present in the lake, yet we caught none during this survey. With the exception of yellow perch, these species are highly vulnerable to 8' trapnets. In our comparative lakes databases, the probability of capture for white sucker, brown bullhead, pumpkinseed and yellow perch is 66.5%, 55.1%, 42.0% and 6.7% respectively (Appendix I). The total absence of any of these species in our 12-trapnet sets is interpreted as being indicative of an exceptional low abundance of these species in the lake.

We are unable to speculate on factors contributing to the unusual and unbalanced nature of this fish community in which game fish are completely dominant and non-game fish so rare.

4.0 Summary

We present the following 'hypothetical report card' (Table 1) on the status of the near-shore fish community of Buck Lake. Reference values refer to "average values" from our comparative lakes database – an accumulation of 19 recently (since 1994) conducted synoptic trapnet surveys in the Parry Sound Area. (Note: Buck Lake is included in the data used to determine reference values.)

Table 1. Comparison of fisheries assessment indicators between Buck Lake and Parry Sound Area comparative lakes database reference values

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Indicator	Buck Lake 2002	Reference Value 'Area Average'	Grade	Comments
Overall Productivity CUE-wt (all species)	5.535 kg/set	16.613 kg/set	F-	Lowest productivity value in database
Game Fish - % of total catch weight	100%	63.5%	D	Although fish community is dominated by desirable game fish – negligible forage base
Walleye CUE-no	1.8 walleye/set	3.8 walleye/set	*	"Below average" abundance of walleye
Walleye CUE-wt	1.694 kg/set	4.252 kg/set	*	
Walleye POC	50.0%	65.9%	*	
Walleye Size and Age Class Structure	Mean Age 3.2 yrs.			Good survival of recently planted walleye.
SM.Bass CUE-no	1.3 bass/set	5.3 bass/set	D-	"Well below average" abundance of smallmouth bass
SM.Bass CUE-wt	1.542 kg/set	3.111 kg/set	D-	
SM.Bass P.O.C.	41.7%	69.1%	D-	
SM.Bass size class distribution	Good range; small sample		C	Sustainable levels of recruitment and mortality
N.Pike CUE-no	0.9 pike/set	1.2 pike/set	C	"Average" abundance of n.pike
N.Pike CUE-wt	1.746 kg/set	1.845 kg/set	C	
N.Pike POC	50.0%	57.1%	C	
B.Crappie CUE-no	0.8 crappie/set	3.0 crappie/set	D	Low abundance; negative impacts on walleye
Buck Lake has the lowest fish productivity index in our comparison lake database. The near-shore fish community is completely dominated by desirable game fish species but they are in low abundance, except for northern pike that are 'about average'. Relative to our comparative lakes database, we accord Buck Lake an overall rating of "D", or "below average".				
* Considering we believe almost all the walleye present in the catch originate from recent experimental plantings, we didn't think it was valid to make comparisons with other natural, self-sustaining walleye populations in our comparative lakes database. Recent walleye plantings have been very successful in terms of survival. Its success in terms of creating a natural self-sustainable walleye population has yet to be determined.				

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6.0 Acknowledgements

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Appendix A

Trapnet Catch Summary for the Buck Lake Synoptic Trapnet Survey, September 2002

Set Number	Walleye	Sm. Mouth Bass	Lg. Mouth Bass	Black Crappie	Northern Pike	Total
1	0	1	0	0	5	
2	0	0	0	1	1	
3	8	0	0	1	1	
4	1	0	0	0	0	
5	0	0	0	0	0	
6	7	7	1	0	1	
7	0	0	0	2	0	
8	0	0	0	0	0	
9	2	3	0	2	1	
10	1	0	0	0	2	
11	0	2	0	0	0	
12	3	3	0	4	0	
Total	22	16	1	10	11	60
CUE (no. / net set)	1.8	1.3	0.1	0.8	0.9	5.0
Standard Error	0.815	0.620	0.083	0.366	0.417	
Standard Deviation	2.823	2.146	0.289	1.267	1.443	
Confidence Level(95.0%)	1.794	1.364	0.183	0.805	0.917	
Count	12	12	12	12	12	
CUE (kg. / net set)	1.694	1.542	0.129	0.424	1.746	5.535
Total Wt. Caught (kg.)	20.330	18.500	1.550	5.090	20.950	66.420
% of total catch wt.	30.60	28.80	2.20	7.50	31.40	100.50
Mean Weight (grams)	924	1156	1550	509	1813	
sample size	22	16	1	10	11	

Appendix B.

Walleye Biosampling Data
Buck Lake Synoptic Trapnet Survey, September 2002

Set Number	Total Lg. (cm.)	Fork Lg. (cm.)	Weight (grams)	Assessed Age (yrs.)
3	28.5	26.7	200	2
3	43.1	40.3	750	3
3	52.0	49.0	1400	4
3	44.3	42.3	900	3
3	49.9	47.2	1150	4
3	44.7	42.0	900	3
3	66.2	62.5	3100	8
3	47.5	45.3	1100	4
4	31.6	30.6	280	2
6	44.6	42.2	900	3
6	44.1	41.4	850	3
6	46.7	44.0	950	4
6	55.7	52.3	1850	4
6	33.9	31.6	330	2
6	30.1	28.2	250	2
6	43.3	41.0	750	3
9	45.0	42.1	1000	3
9	46.0	43.2	1000	3
10	27.8	25.6	170	2
12	50.1	47.5	1150	5
12	26.8	25.4	250	1
12	47.5	45.5	1100	3
Mean	43.2	40.7	924.1	3.2
Standard Error	2.100	1.994	138.263	0.301
Standard Deviation	9.848	9.353	648.512	1.412
Confidence Level(95.0%)	4.366	4.147	287.534	0.626
Sum			20330	
Count	22	22	22	22

Appendix C

Smallmouth Bass Biosampling Data
Buck Lake Synoptic Trapnet Survey, September 2002

Set Number	Total Lg. (cm.)	Fork Lg. (cm.)	Weight (grams)
1	41.1	39.0	1000
6	39.9	37.7	1100
6	43.5	41.3	1400
6	43.5	41.0	1400
6	38.9	36.6	850
6	37.5	35.5	900
6	34.5	32.2	500
6	40.2	38.0	1000
9	50.3	47.5	2050
9	42.0	39.3	1200
9	43.0	40.5	1250
11	45.7	42.8	1800
11	29.8	26.0	400
12	42.2	40.0	1250
12	38.6	36.3	900
12	46.1	43.5	1500
Mean	41.1	38.6	1156.3
Standard Error	1.200	1.225	107.031
Standard Deviation	4.799	4.898	428.126
Confidence Level(95.0%)	2.557	2.610	228.132
Sum			18500
Count	16	16	16

Appendix D.

Northern Pike Biosampling Data – Buck Lake Synoptic Trapnet Survey, Sept. 2002

Set Number	Total Lg. (cm.)	Fork Lg. (cm.)	Weight (grams)
1	58.0	54.4	1200
1	60.5	57.0	1500
1	65.5	62.0	1800
1	67.3	63.5	1900
1	50.1	47.4	800
2	64.2	60.5	1700
3	86.0	80.0	3700
6	57.2	54.8	1350
9	61.0	57.5	1900
10	83.5	80.4	3600
10	60.5	57.3	1500
Mean	64.9	61.3	1904.5
Standard Error	3.272	3.093	278.017
Standard Deviation	10.852	10.259	922.078
Confidence Level(95.0%)	7.290	6.892	619.460
Sum			20950
Count	11	11	11

Appendix E.

Black Crappie Biosampling Data – Buck Lake Synoptic Trapnet Survey, Sept. 2002

Set Number	Total Lg. (cm.)	Fork Lg. (cm.)	Weight (grams)
2	31.3	30.4	550
3	28.0	26.9	350
7	27.0	26.0	400
7	25.0	24.0	290
9	27.0	26.2	500
9	32.0	31.0	700
12	34.0	32.9	800
12	25.7	24.6	350
12	26.3	25.4	350
12	34.4	32.9	800
Mean	29.1	28.0	509.0
Standard Error	1.113	1.083	61.760
Standard Deviation	3.521	3.424	195.303
Confidence Level(95.0%)	2.519	2.450	139.712
Sum			5090
Count	10	10	10

Appendix F

Comparison Lakes Database for CUE-no

Survey and year	Walleye	SM.Bass	LM.Bass	N.Pike	B.Crappie
Bear Lake (2001)	9.9	1.6		2.6	
Bolger L. (1999)	9.5	9.5	0.1	0.7	
Buck Lake (2002)	1.8	1.3	0.1	0.9	0.8
Cecebe Lk. (2000)	11.9	5.2		2.5	
Crane Lk (1997)	1.6	7.1		0.1	
Doe Lk. (1998)	11.3	13		0.7	
Dollar's Lake (2000)	1.3	3.1	2.3	0.8	1.9
Gibson Lake (2001)	3.1	6.7	0.9	1	9.1
Giroux Lake (2001)	6.8	1.8		2.1	
Harris Lk. (1994)	1.9	1.1	0.5	0.7	
Isabella Lake (1997)	0.3	7		1.2	
Kashegaba L. (1999)	0.9	10.9	0.9	0.7	
McDougall L. (2000)	2.2	1.5		1.3	0.8
Moffat Lake (2002)	0.8	0.4		1.6	
Pakeshkag Lk (2001)	0.1			2	
Poverty Bay (1999)	2.3	12.1	4.6	0.3	
S. Mag. R. (1994)	1.9	2.3	0.1	0.7	
Six-Mile L. (1999)	0.6	5.9	4.6	0.8	4.7
Wahwashkesh L. (02)	3.1	4	0.2	1.3	0.5
Mean	3.8	5.3	1.4	1.2	3.0
Standard Error	0.908	0.95	0.569	0.161	1.382
Median	1.9	4.6	0.7	0.9	1.3375
Standard Deviation	3.96	4.032	1.8	0.7	3.385
Confidence Level(95.0%)	1.908	2.005	1.288	0.337	3.552
Count	19	18	10	19	6

Appendix G

Comparison Lakes Database for CUE-wt

Survey and year	Walleye	S.M. Bass	L.M. Bass	Bl. Crappie	N.Pike	All Species Combined
Bear Lake (2001)	7.619	1.268			3.547	16.896
Bolger Lake (1999)	10.790	4.250	0.050		1.290	16.930
Buck Lk (2002)	1.694	1.542	0.129	0.424	1.746	5.535
Cecebe Lake (2000)	12.154	4.700			3.990	30.706
Crane Lk. 1997)	2.986	2.443			0.136	9.362
Doe Lake (1998)	12.727	11.115			0.954	35.756
Dollar's Lake (2000)	1.112	1.503	1.994	0.661	1.621	21.610
Harris Lake (1994)	2.909	0.722	0.485		0.752	13.460
Gibson Lake (2001)	4.265	4.866	0.738	3.255	1.097	32.966
Giroux Lake (2001)	9.670	2.010			1.600	18.820
Isabella Lk. (1997)	0.530	4.203			3.630	15.343
Kashegaba Lk. (1999)	1.060	4.880	0.480		1.340	9.210
McDougall Lk. (2000)	2.460	0.961		0.291	1.948	10.061
Moffat Lk. (2002)	0.467	0.628			3.578	14.183
Pakeshkag Lk. (2001)	0.167				3.508	7.025
Six Mile Lake (1999)	1.145	3.242	2.044	1.140	1.133	23.227
S. Magnetawan R (1994)	2.035	1.355	0.112		1.067	8.970
Poverty Bay (1999)	2.757	3.976	2.871		0.164	14.049
Wahwashkeksh (2002)	4.236	2.330	0.148	0.160	2.031	11.637
Mean	4.252	3.111	0.905	0.989	1.845	16.613
Standard Error	0.956	0.59	0.321	0.475	0.279	2.008
Median	2.757	2.387	0.483	0.543	1.6	14.183
Standard Deviation	4.167	2.501	1.015	1.163	1.216	8.753
Count	19	18	10	6	19	19
Confidence Level(95.0%)	2.009	1.244	0.726	1.22	0.586	4.219

Appendix H

Comparison Lake Data Base for overall CUE-wt (all species combined) and percent of game fish, non-game fish and walleye in the total catch weight.

	Rank	**CUE wt All Species**	N = (no. sets)	% of total catch weight		
				Game fish	Non-Game fish	Walleye
Doe Lake (1998)	1	35.756	33	69.4	30.6	35.6
Gibson Lake (2001)	2	32.966	15	43.1	56.9	12.9
Cecebe Lake (2000)	3	30.706	11	68.1	31.9	39.6
Six Mile Lake (1999)	4	23.227	29	40.7	59.3	4.9
Dollar's Lake (2000)	5	21.610	24	32.3	67.7	5.1
Giroux Lake (2001)	6	18.820	12	70.5	29.5	51.3
Bolger Lake (1999)	7	16.930	17	96.6	3.4	63.5
Bear Lake (2001)	8	16.896	17	73.4	26.6	45.1
Isabella Lk. (1997)	9	15.343	10	54.5	45.5	3.5
Moffat Lake (2020)	10	14.183	12	32.9	67.1	3.3
Poverty Bay (1999)	11	14.049	7	69.5	30.5	20.7
Harris Lake (1994)	12	13.460	31	36.1	63.9	21.6
Wahwashkesh (2002)	13	11.637	33	76.5	23.5	36.4
McDougall Lk. (2000)	14	10.061	13	56.1	43.9	24.4
Crane Lk. 1997)	15	9.362	18	100.0	0.0	31.9
Kashegaba Lk. (1999)	16	9.210	15	84.2	15.8	11.5
S. Magnetawan R (1994)	17	8.970	49	50.5	49.5	22.6
Pakeshkag Lk. (2001)	18	7.025	12	52.3	47.7	2.4
Buck Lake (2002)	19	5.553	12	100.0	0.0	31.1
Mean		16.613	19.5	63.5	36.5	24.6
Standard Error		2.008	2.489	5.021	5.021	4.091
Median		14.183	15	68.1	31.9	22.6
Count		19	19	19	19	19

Appendix I

Comparison Lake Database for Probability of Capture

Survey & year	Walleye	S.Mouth Bass	N.Pike	Black Crappie	C.White Sucker	Brown Blhd.	Pump-kinseed	Rock Bass	Yellow Perch	# sets
Bear Lake (2001)	0.765	0.470	0.705		0.529	0.647	0.059	0.529		17
Bolger Lake (1999)	0.823	0.882	0.470		0.059	0.294	0.294	0.588		17
Buck Lake (2002)	0.500	0.417	0.500	0.417						12
Cecebe Lake (2000)	1.000	0.909	0.818		0.818	0.636	0.818	0.636		11
Crane Lk. 1997)	0.611	0.888	0.111				0.111	0.500		18
Doe Lake (1998)	0.970	0.941	0.470		0.794	0.529	0.941	0.205		34
Dollar's Lake (2000)	0.666	0.833	0.583	0.500	0.708	0.458	0.375	0.416		24
Gibson Lake (2001)	0.666	0.866	0.733	0.933	0.800	0.733	0.067	0.400		15
Giroux Lake (2001)	1.000	0.333	0.666		0.750	0.333		0.166	0.083	12
Harris Lake (1994)	0.516	0.387	0.484		0.871	0.501	0.612	0.355		31
Isabella Lk. (1997)	0.333	0.800	0.600		0.900	0.400	0.200	0.900		10
Kashegaba Lk. (1999)	0.467	1.000	0.533			0.467	0.667	1.000		15
McDougall Lk. (2000)	0.846	0.538	0.692	0.461	0.615	0.307		0.154		13
Moffat Lake (2020)	0.333	0.167	0.833		0.917	0.833		0.083	0.083	12
Pakeshkag Lk. (2001)	0.083		0.750		0.417	0.833	0.250	0.416	0.083	12
Poverty Bay (1999)	0.714	0.857	0.286		1.000	0.857	0.428	0.571		7
Six Mile Lake (1999)	0.722	0.967	0.433	0.700	0.667	0.933	0.866	0.666		30
S. Magnetawan R (1994)	0.714	0.510	0.510		0.673	0.204	0.489	0.551	0.020	49
Wahwashkesh (2002)	0.788	0.667	0.670	0.030	0.121	0.394	0.121	0.575		33
Mean	0.659	0.691	0.571	0.507	0.665	0.551	0.420	0.484	0.067	19.579
Standard Error	0.056	0.061	0.042	0.123	0.067	0.054	0.078	0.057	0.016	2.517
Median	0.714	0.817	0.583	0.481	0.729	0.501	0.375	0.515	0.083	15.000
Standard Deviation	0.242	0.257	0.181	0.302	0.269	0.225	0.301	0.244	0.032	10.971
Confidence Level(95.0%)	0.117	0.128	0.087	0.317	0.143	0.116	0.167	0.121	0.050	5.288
Count	19	18	19	6	16	17	15	18	4	19