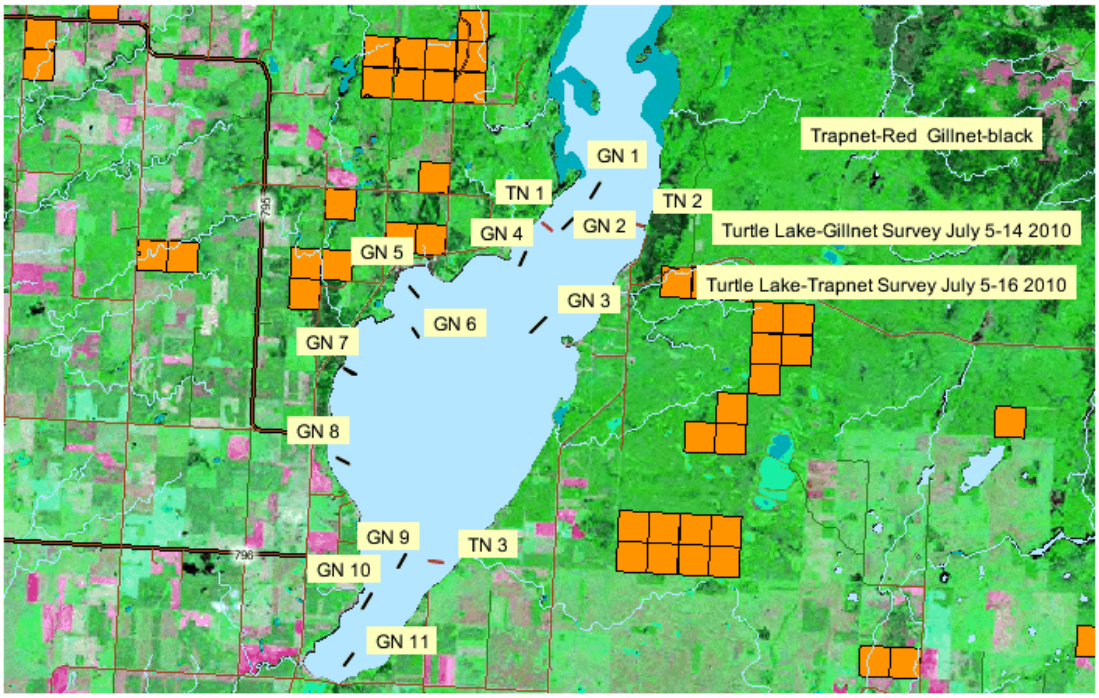
# SASKATCHEWAN MINISTRY OF ENVIRONMENT
# FISHERY STOCK ASSESSMENT-TURTLE LAKE-2010
# FIGURE1. GILLNET & TRAPNET LOCATIONS




**Lake Name**: Turtle

**Location: 53-36, 108-38**

**Category: 2**

**Monitoring Frequency: 6 years**

**Survey Date**: July 5-14, 2010-Gillnet Survey, July 5-16, 2010-Trapnet Survey

**Gear Used**: Gill Net, Trap Net

**Study Objective:** Update file

| Table 1. Physical Attributes | |
|---|---|
| Surface Area (ha) | 6,421 |
| Maximum Depth (m) | 6.3 |
| Mean Depth (m) | 14.3 |
| Volume ($m^3$) | 403,690,000 |
| Conductivity-uS | 580 |
| pH | 8.91 |
| Secchi (m) | 4.0 |
| Surface Water Temperature (°C) | 20.8 |

| Table 2. Fish Species | |
|---|---|
| Primary Species | Other |
| Walleye, Pike, Whitefish | Burbot, Cisco, White Sucker, Perch |

## *Introduction*

Turtle Lake is a popular destination for angling and recreational activities. In 1992 it was estimated that over 1000 cottages were located on this lake. While an estimate for 2010 is not available, with the creation of new recreational subdivisions (within the last 10 years) as well as additional lots being added to existing subdivisions, the number of individual lots has likely increased significantly.

Commercial fishing dates back to the early 1900's, with whitefish the predominant species caught (Figure 24). The whitefish population fluctuated significantly at least 3 times. The population declined from 1907 to 1910, recovered in the 1920's but declined again in the 1930's. The population was considered excellent from the mid 1940's to the early 1960's, and collapsed once again, after 1963. Over harvest and intermittent spawning success were the reasons given for the population decline (1967-1 Fisheries Technical Report-W.W. Sawchyn). An extensive whitefish stocking program was conducted between 1969 and 1984, with poor success (Table 6). The commercial fishery was terminated in 1978.

Between 1944 and 1962, over 14 million walleye eggs and fry were stocked (Table 6). The 1964-65 test net survey indicated poor walleye stocking success. The study concluded that " The apparent lack of success in the program of walleye stocking suggests an abandonment of this management approach in favour of more careful supervision and careful control of the now flourishing pike fishery" (1967-1 Fisheries Technical Report-W.W. Sawchyn). Walleye stocking was terminated.

The test net survey in 1973 (D. E. Snell) once again indicated a sparse population of walleye, however, there was a significant change in the fish populations since the 1964-65 survey (Table 5, 5a); specifically, a 50% decline in the pike population. As a result, one of the survey recommendations was to restart the walleye fry stocking program at Turtle Lake; it was reasoned that a decrease in pike should substantially increase the probability of a successful walleye stocking program. Also, there was a high angler demand for walleye. Walleye fry stocking resumed in 1974 and 1975, and from the early 1980's until 2009 walleye fry (and fingerlings) were stocked almost annually (Table 6). Due to logistical problems at the Diefenbaker Lake walleye spawn camp, a lack of walleye fry production resulted in the decision not to stock walleye in Turtle Lake in 2010.

In 1976, test netting indicated a poor walleye population, however, in 1979 test netting indicated a significant increase in the walleye population, which was attributed to good natural reproduction and stocking success.

The 1985 survey indicated a sparse walleye population, with fair pike and whitefish populations.

Beginning in 1986, a walleye fingerling stocking program was introduced between 1986 and 1991 (Table 6). Test netting was conducted in 1990 by the Saskatchewan Fisheries Laboratory (Saskatoon) to assess the fingerling stocking program (Evaluation of Walleye Fingerling Stocking Programs in Three Saskatchewan Lakes, Technical Report 91-4, W. K. Liaw). According to the 91-4 Technical Report, there was an "eight fold increase in the standing crop of walleye in Turtle Lake due to recent stocking of fry and fingerlings". "The present data suggest that unlike Greig Lake, fry and fingerling stockings may be equally successful in Turtle Lake, provided that large numbers (in the order of millions) of fry are used. This is probably because

Turtle Lake is more fertile than Greig Lake and provides more suitable zooplankton as food for the newly stocked walleye fry." The report recommended a stocking rate of 1.3 million fry or 128,000 fingerlings every other year until natural reproduction is capable of establishing a healthy self sustaining stock. Based on historic stocking rates, the recommended fry stocking rate was met or exceeded from 1983 to 2002; after 2002 the rate was often dependant on the annual availability of walleye fry produced at the Fort Qu'Appelle Fish Culture Station for all lakes on the provincial stocking list.

The 1992 and 1997 test net surveys indicated a moderate population of walleye had been established, with catch rates at an all time high. By 1997, the pike population had declined, although within the historic range (Table 5, 5a).

An exploratory 2 day live catch trap net survey in 2000 caught 91 walleye and 13 pike (99 white suckers and 3 burbot). Most of the walleye were caught in the Indian Point set, as compared to a trap net set on the west side of the lake.

A trap net survey in 2003 confirmed that the walleye population had become established, as indicated by the numerous year classes (Figure 9), while the pike population (Figure 17) had remained stable compared to the 1997 survey (Table 4b, 5a).

The recent 2010 trapnet (Table 4a) and gillnet survey (Table 4) indicate an increasing walleye population. The pike population is stable, albeit the population has declined from the population highs that occurred in the 1970's (Table 5, 5a).

## *Methods*

**Gill Net Sets**: 1320 meters of gill net consisting of 11-120 meter standard gangs were set and picked up at 11 locations, from July 5-14, 2010, in depths ranging from 3.4 to 13.5 meters. The 120 m nets are 1.8 m deep and consist of 20 m panels each of 3.8, 5.1, 7.6, 10.2, 12.7 and 14.0 cm stretched 210/3 multifilament mesh. The sites chosen were at or near locations used in the 1985 testnet survey (Figure 1). Sixteen locations were chosen in the 1985 survey, but due to the large number of walleye caught in the 2010 gillnet sets, in addition to three live trapnet sets in 2010, the number of gillnet locations were scaled back. All nets were left in overnight and picked up the next day, the duration of sets ranging from 18-22 hours.

Flesh samples were collected for mercury analysis from 10 walleye and 10 pike; otolith ageing samples were taken for walleye and whitefish, cleithrum bone ageing samples were taken from pike.

**Trap Net Set:** Three 1.8 meter deep live capture trap nets with 137 m leaders were set perpendicular to shore in three locations (Figure 1), from July 5-16, 2010, for a total of 29 net days. The sites chosen were at the same locations used in the 2003 trapnet survey (5 locations were used in 2003). Similar to the 2003 survey, TN sets #1, and #3 were set with the leader not to shore ("open ended leader"), to facilitate setting the trap net in water of sufficient depth. TN set #2 was set with the leader starting at the edge of a large scirpus weed bed.

| Table 3. Gill Net & Trap Net locations and depths | | | |
|---|---|---|---|
| Gill Net | Location (WGS 84) | Depth (m) | Mesh Size (Inshore/Offshore) |
| 1 | 12 658541E 5944872N | 3.4 - 5.2 | 3.8-14.0 cm |
| 2 | 12 657987E 5944134N | 6.9 - 5.4 | 3.8-14.0 cm |
| 3 | 12 657415E 5941346N | 11.7 – 11.6 | 3.8-14.0 cm |
| 4 | 12 656853E 5943153N | 6.1- 4.7 | 3.8-14.0 cm |
| 5 | 12 653991E 5942034N | 5.4 - 4.6 | 3.8-14.0 cm |
| 6 | 12 654256E 5940876N | 11.1 – 11.0 | 3.8-14.0 cm |
| 7 | 12 652421E 5939661N | 5.3 - 3.5 | 3.8-14.0 cm |
| 8 | 12 652678E 5937320N | 3.5 - 3.0 | 3.8-14.0 cm |
| 9 | 12 654306E 5934790N | 13.5-12.4 | 3.8-14.0 cm |
| 10 | 12 653446E 5933802N | 6.2 - 7.0 | 3.8-14.0 cm |
| 11 | 12 653139E 5932192N | 4.0 - 5.0 | 3.8-14.0 cm |
| Trap Net | | | Leader Length (m) |
| 1 | 12 657349E 5943916N | 3.5 | 137 |
| 2 | 12 659755E 5944224N | 3.3 | 137 |
| 3 | 12 655432E 655432N | 3.3 | 137 |

## *Results and Discussion*

### Gill Net Catch

Table4. Total catch from 11 overnight **Gill Net** sets at Turtle Lake (July 5-14, 2010)

| **Species** | **No** | ***CPUE: #/100m gill net** | | | | | **Percent of Catch** | | | ***PSD** | ***RSD-P** | ***0 Wr** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **2010** | | | | | **2010** | | | | | |
| | | **#** | **80% C.I.** | | | **Historic Range** | **%** | | **Historic Range** | **2010** | **2010** | **2010** |
| **Walleye** | 395 | 30 | ±13.4 | | | 1-30 | 40 | | 1-40 | 68 | 26 | 93 |
| **N.Pike** | 67 | 5 | ±2.0 | | | 3-12 | 7 | | 7-16 | 64 | 7 | 93 |
| **Perch** | 66 | 5 | ±2.6 | | | 1-5 | 7 | | 1-7 | 2 | 0 | 80 |
| **Whitefish** | 54 | 4 | ±2.3 | | | 1-7 | 5 | | 1-35 | | | |
| **W.Sucker** | 185 | 14 | ±3.7 | | | 12-20 | 19 | | 13-35 | | | |
| **Cisco** | 204 | 16 | ±14.4 | | | 1-55 | 21 | | 4-7 | | | |
| **Burbot** | 5 | ≤1 | ±1.1 | | | 0-1 | ≤1 | | 0-1 | | | |
| **Total** | 976 | 75 | | | | | 100 | | | | | |

***** See Appendix A

## Trap Net Catch

Table4a. Total catch from 3 T**rap Net** sets at Turtle Lake **(July 5-16, 2010)**

| Species | No | *CPUE: #/ net night | | | | | Percent of Catch | | | *PSD | *RSD-P | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2010 | | | | | 2010 | | | | | |
| | | # | 80% C.I. | | | | % | | | 2010 | 2010 | |
| **Walleye** | 372 | 13 | ±3 | | | | 69 | | | 93 | 66 | |
| **N.Pike** | 52 | 2 | ±≤1 | | | | 11 | | | 50 | 14 | |
| **Perch** | 8 | ≤1 | ±≤1 | | | | 5 | | | - | - | |
| **Whitefish** | 2 | ≤1 | ±≤1 | | | | 5 | | | | | |
| **W.Sucker** | 18 | ≤1 | ±≤1 | | | | 5 | | | | | |
| **Cisco** | 0 | 0 | | | | | 0 | | | | | |
| **Burbot** | 10 | ≤1 | ±≤1 | | | | 5 | | | | | |
| **Total** | 462 | 19 | | | | | 100 | | | | | |

***** See Appendix A

**29 net nights**

## Trap Net Catch

Table4b. Total catch from 3 **Trap Net** sets at Turtle Lake **(July 3-13, 2003)**

| Species | No | *CPUE: #/ net night | | | | | Percent of Catch | | | *PSD | *RSD-P | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2003 | | | | | 2003 | | | | | |
| | | # | 80% C.I. | | | | % | | | 2003 | 2003 | |
| **Walleye** | 384 | 12 | ±2.3 | | | | 39 | | | 87 | 17 | |
| **N.Pike** | 125 | 4 | ±≤1 | | | | 13 | | | 33 | 20 | |
| **Perch** | 0 | 0 | | | | | 0 | | | - | - | |
| **Whitefish** | 118 | 4 | ±1.4 | | | | 13 | | | | | |
| **W.Sucker** | 280 | 9 | ±1.1 | | | | 29 | | | | | |
| **Cisco** | 0 | 0 | | | | | 0 | | | | | |
| **Burbot** | 66 | 2 | ±≤1 | | | | 6 | | | | | |
| **Total** | 973 | 31 | | | | | 100 | | | | | |

***** See Appendix A

**32 net nights**

Table5. Gill Net **CPUE** & % of total catch for all species sampled in Turtle Lake, 1973 – 1992

| Species | 1973 | | 1976 | | 1979 | | 1985 | | 1992 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CPUE | % | CPUE | % | CPUE | % | CPUE | % | CPUE | % |
| **Walleye** | **<0.5** | **1** | **1** | **1** | **3** | **6** | **<0.5** | **<0.5** | **11** | **15** |
| **N.Pike** | **3** | **7** | **11** | **12** | **8** | **16** | **4** | **9** | **12** | **16** |
| **Perch** | **1** | **1** | **5** | **6** | **<0.5** | **1** | **1** | **3** | **<0.5** | **<0.5** |
| **Whitefish** | **4** | **8** | **<0.5** | **1** | **1** | **2** | **4** | **9** | **7** | **9** |
| **W.Sucker** | **11** | **19** | **11** | **13** | **17** | **35** | **12** | **24** | **20** | **27** |
| **Cisco** | **33** | **64** | **55** | **67** | **19** | **40** | **28** | **55** | **24** | **32** |
| **Burbot** | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **1** | **(<1.0)** |
| **Total** | **52** | **100** | **83** | **100** | **48** | **100** | **49** | **100** | **75** | **100** |

Table5a. Gill Net **CPUE** & % of total catch for all species sampled in Turtle Lake, 1964 & 1997

| **Species** | 1964-65 | | | | | | | | 1997 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CPUE | **%** | | | | | | | CPUE | **%** |
| **Walleye** | **1** | **2** | | | | | | | **13** | **27** |
| **N.Pike** | **6** | **9** | | | | | | | **4** | **8** |
| **Perch** | **2** | **3** | | | | | | | **0** | **0** |
| **Whitefish** | **3** | **4** | | | | | | | **13** | **27** |
| **W.Sucker** | **16** | **24** | | | | | | | **18** | **36** |
| **Cisco** | **38** | **58** | | | | | | | **1** | **2** |
| **Burbot** | **<0.5** | **<0.5** | | | | | | | **0** | **0** |
| **Total** | **64** | **100** | | | | | | | **49** | **100** |

**Primary Species:**

**a) Walleye**

- Gill net test nets indicate a good population, with a Catch Per Unit Effort (CPUE) value of 30 (measured as number of fish/100 m of gillnet) (Table 4). With the exception of the 1985 survey, catch rates have been increasing steadily; more than double the rate from the previous 1997 gillnet survey (Table 5, 5a). The CPUE for the 2003 and 2010 trapnet surveys (measured as number of fish/net night) has remained steady, at 12 and 13 walleye caught/net night (Table 4a, 4b).
- Condition factor is rated as good, with a mean relative weight **(0 Wr)** of 93 (Table 4), compared to 90 in 1990 survey and 101 in the 1964-65 survey-see Appendix A for definitions.
- A good percentage of the population is of quality angling size, as indicated by the PSD and RSD-P numbers of 68 and 26 (Table 4) for the 2010 gillnet survey, and the corresponding numbers of 93 and 66 for the 2010 trapnet survey. The upper size lengths continue to increase, from a maximum fork length of 59.9 cm in the 1964-65 gillnet survey, to 65.1 cm in the 1990 gillnet survey, 66 cm in the 2003 trapnet survey (71 cm, if data from all 5 trapnet sets included), and 78 cm in the 2010 trapnet survey.
- Thirteen year classes present (Figure 7).
- Natural reproduction is occurring, as indicated by the young of year walleye caught in beamish traps set in the Moonlight Bay area by a local bait fisher and submitted to the ministry for measurement (Figure 6). Walleye fry were not stocked into Turtle Lake in 2010.
- Stomach contents included insect remains, stickleback, spot tail shiners, perch, cisco, and possibly whitefish.

Figure2. Fork Length frequency histogram-Walleye-2010 Gillnet Survey

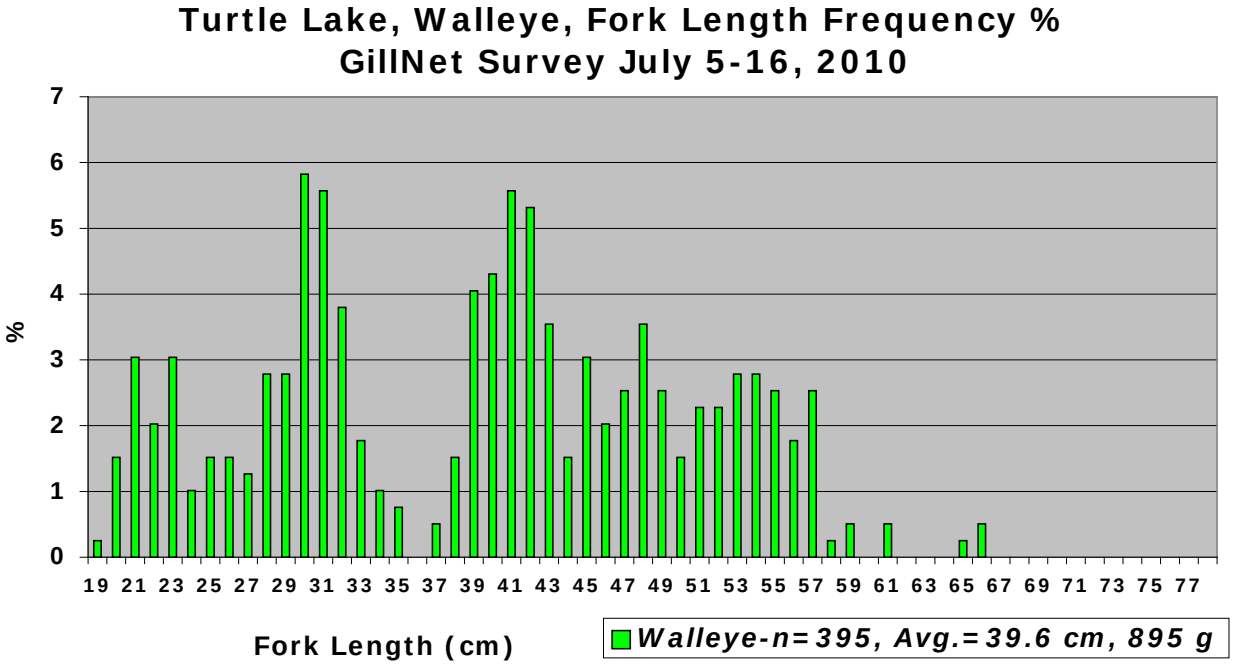



Figure3. Fork Length frequency histogram-Walleye-2010 Trapnet Survey

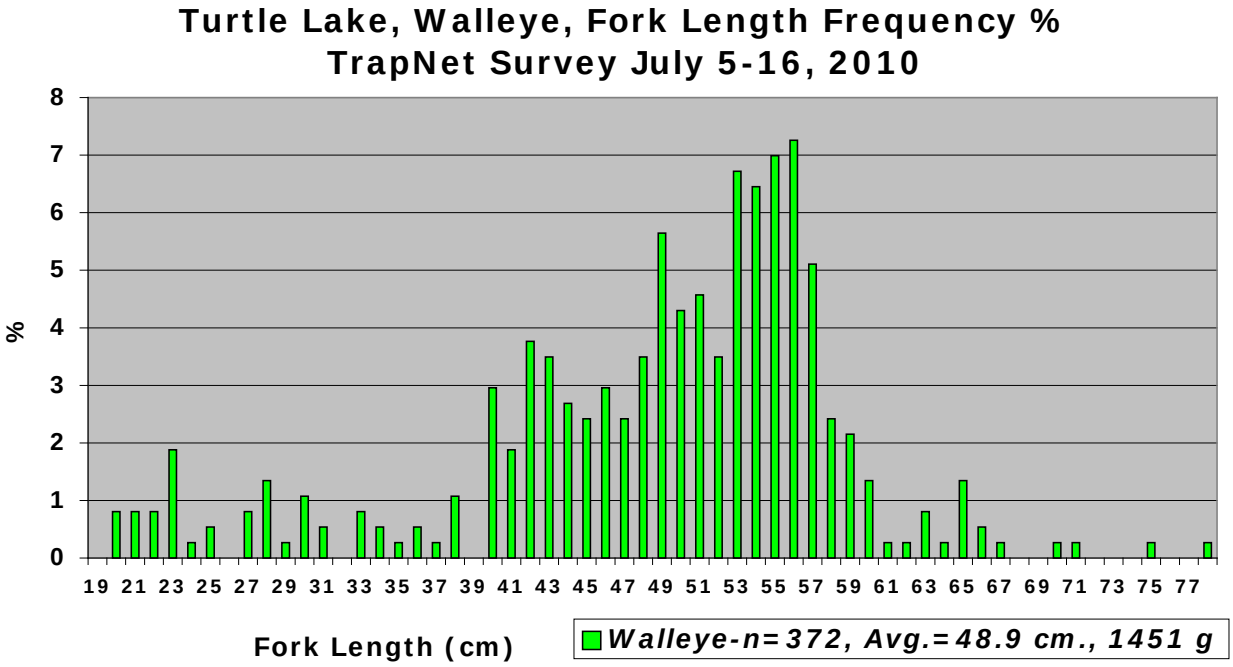


Figure4. Fork Length frequency histogram-Walleye-2010 Gillnet & Trapnet Survey

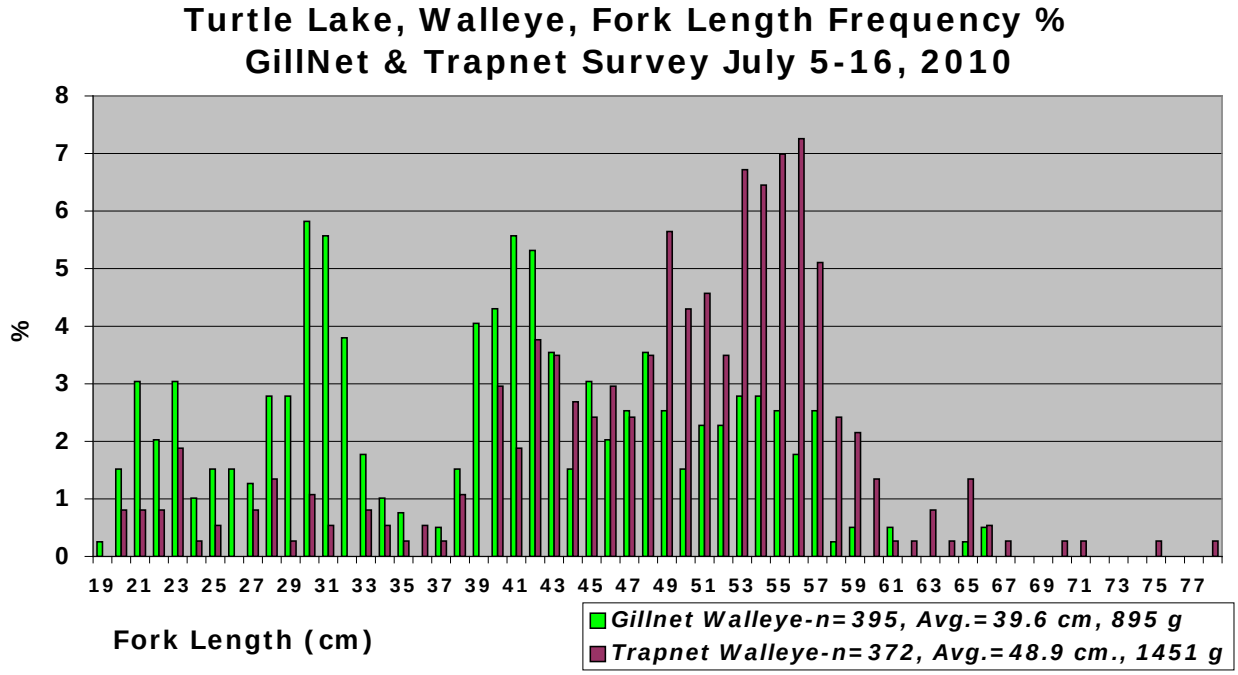



Figure5. Fork Length frequency histogram-Walleye-2010 Gillnet & Trapnet Survey-Combined

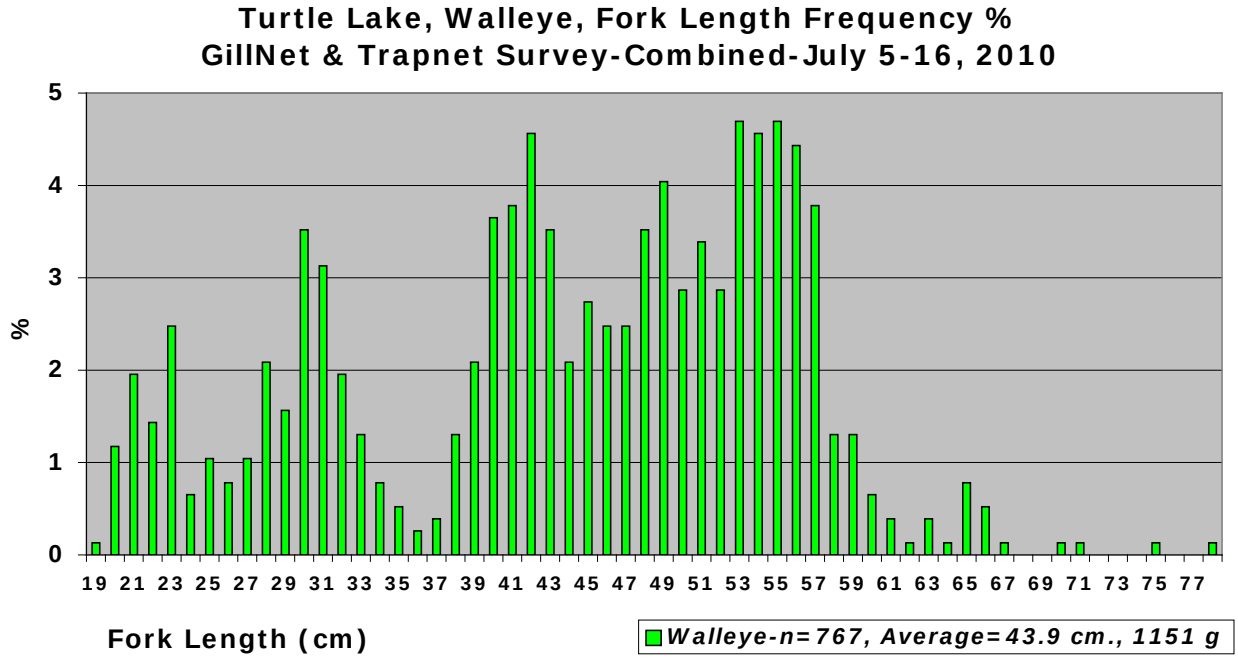


Figure6. Fork Length frequency histogram-Walleye-2010 Gillnet, Trapnet, Beamish Trap Survey-Combined

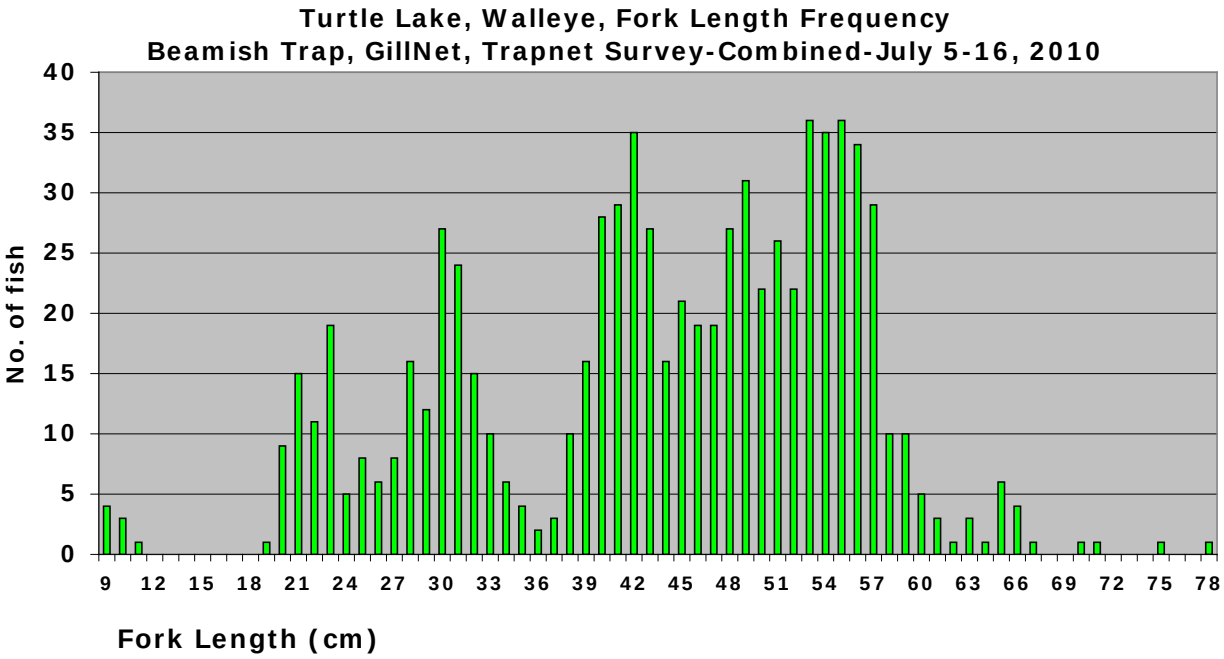



Figure7. Walleye-Age Frequency histogram-2010

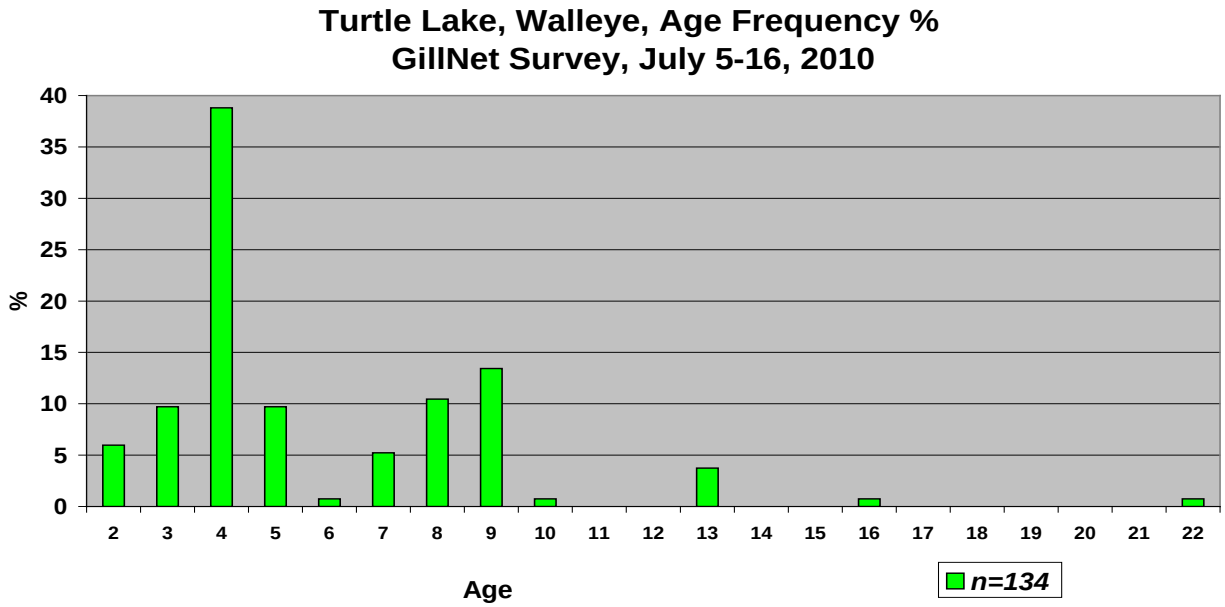


Figure8. Walleye-Mean Length at Age-2010

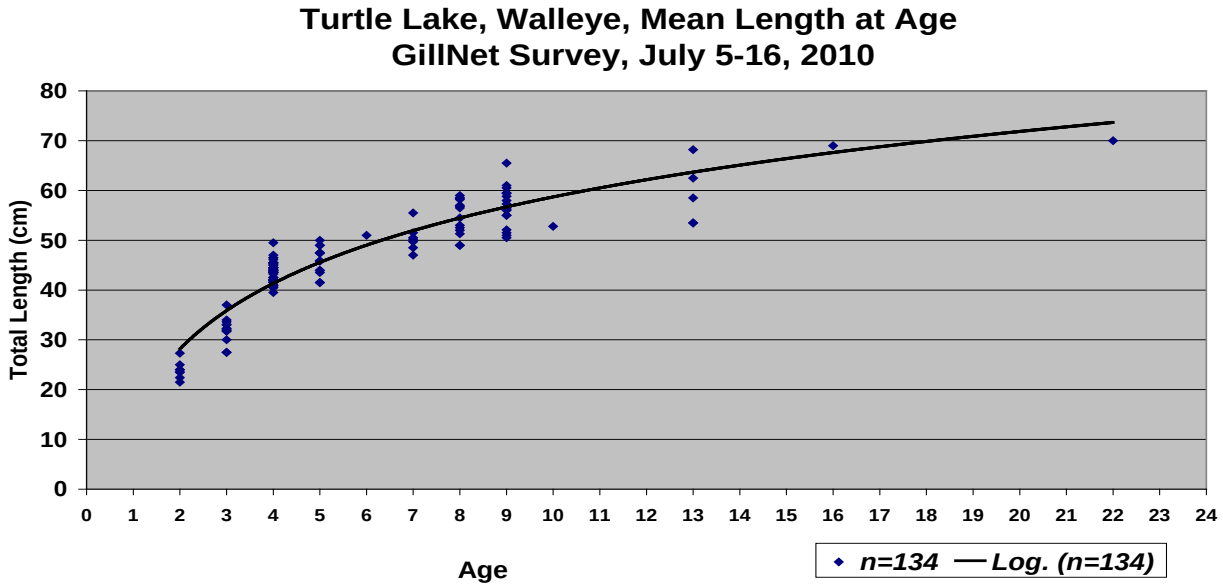



Figure9. Fork Length frequency histogram-Walleye-**2003 Trapnet Survey**

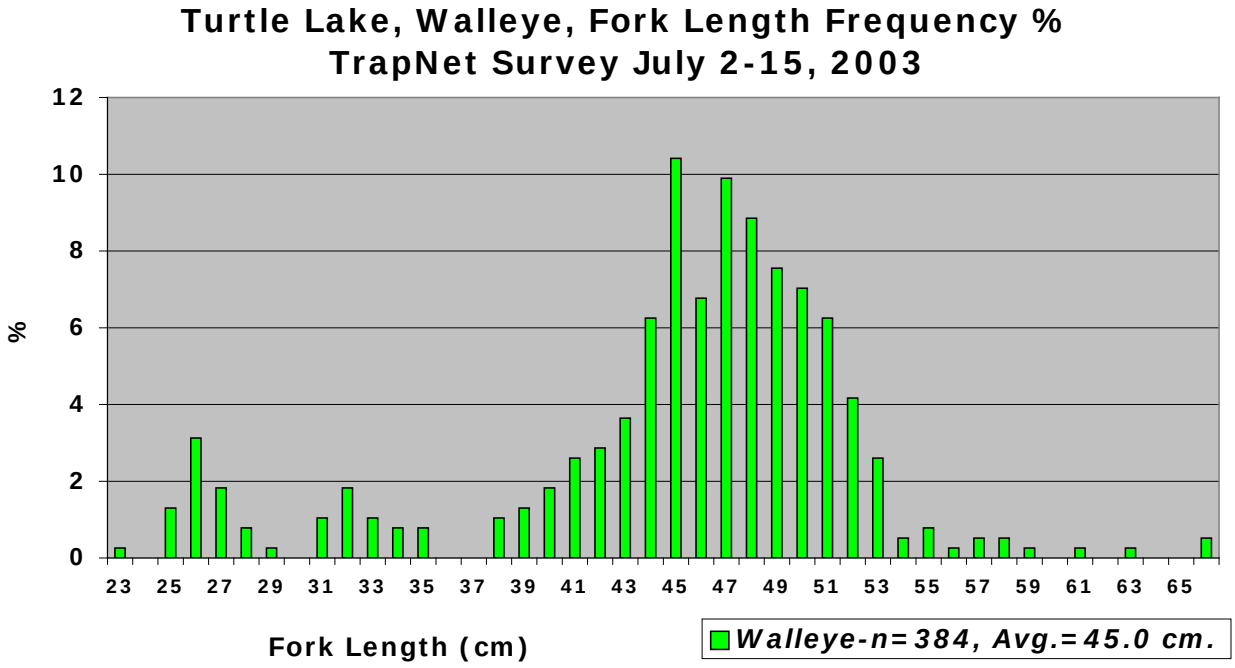
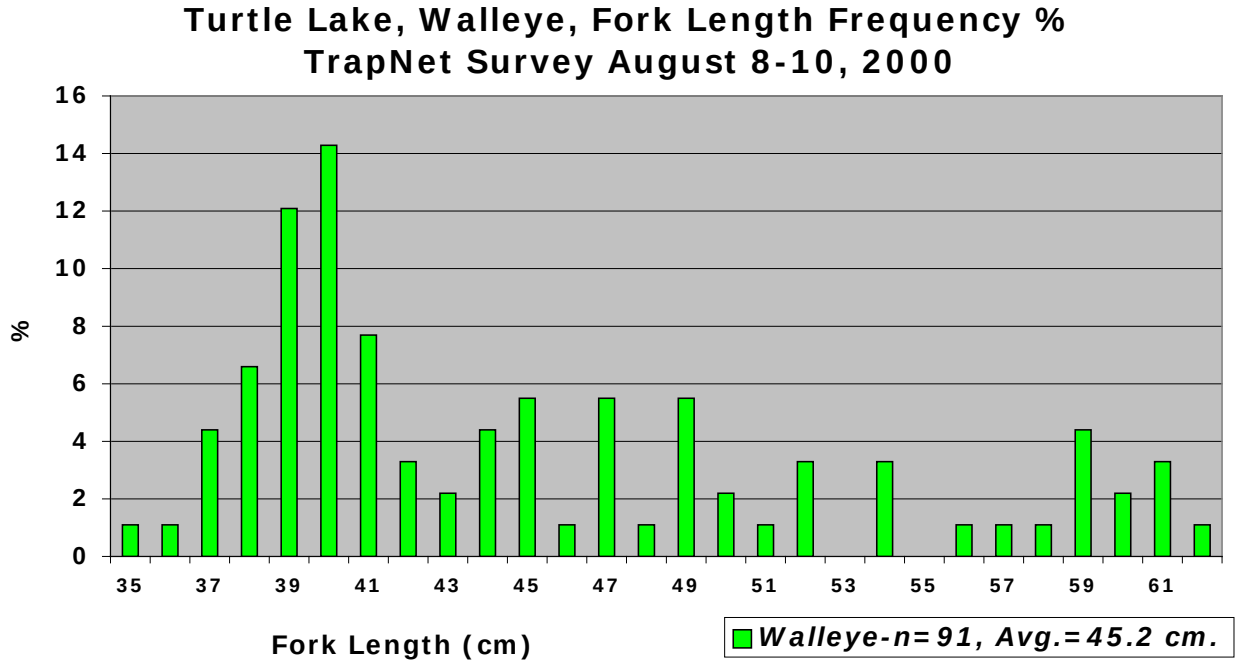


Figure10. Fork Length frequency histogram-Walleye-**2000 Trapnet Survey**




**b) Pike**

- Gill net test nets indicate a fair but declining population, with a Catch Per Unit Effort (CPUE) value of 5 (measured as number of fish/100 m of gillnet) (Table 4). Catch rates have been variable, with the highest values of 11 and 12 recorded in the 1976 and 1992 surveys. (Table 5, 5a). The CPUE for the 2003 and 2010 trapnet surveys (measured as number of fish/net night) also indicate a decline, at 4 and 2 pike caught/net night (Table 4a, 4b).
- Condition factor is rated as good, with a mean relative weight **(0 Wr)** of 93 in 2010 (Table 4), compared to 96 in 1997, 95 in 1992, 91 in 1990, and 97 in 1985 - see Appendix A for definitions.
- A fair percentage of the population is of quality angling size, as indicated by the PSD and RSD-P numbers of 64 and 7 (Table 4) for the 2010 gillnet survey, and the corresponding numbers of 50 and 14 for the 2010 trapnet survey.
- Eleven year classes present, indicating good natural reproduction (Figure 15).
- Stomach contents included stickleback, perch, cisco, whitefish, white sucker and walleye.

Figure11. Fork Length frequency histogram-Pike-2010 Gillnet Survey

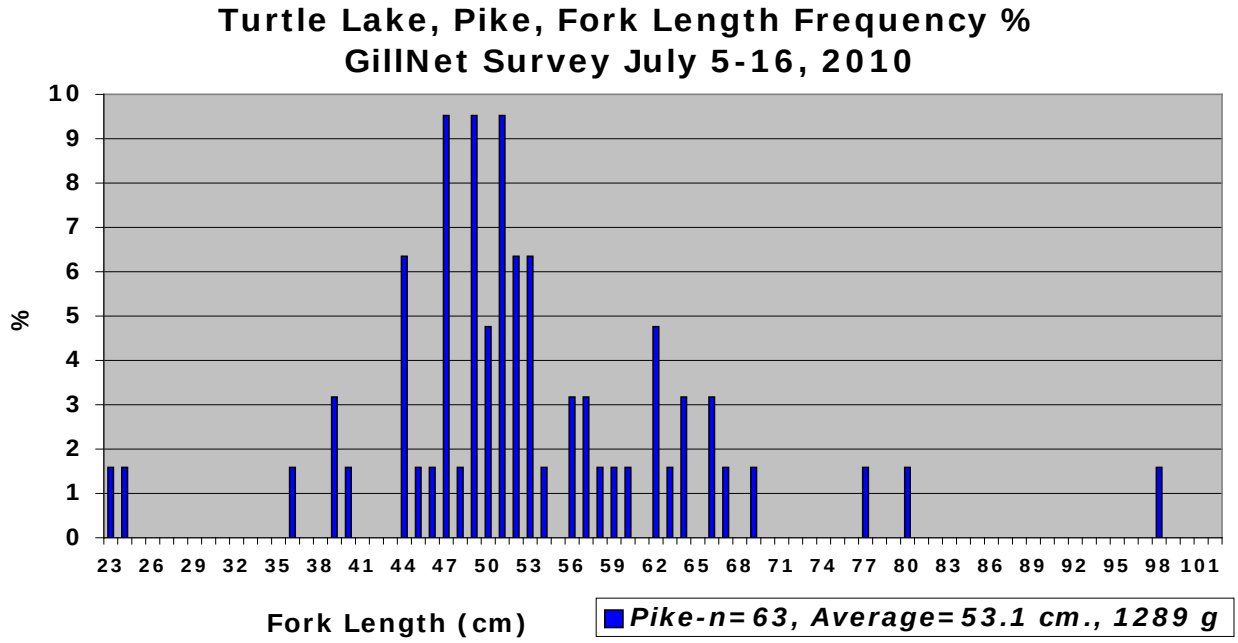



Figure12. Fork Length frequency histogram-Pike-2010 Trapnet Survey

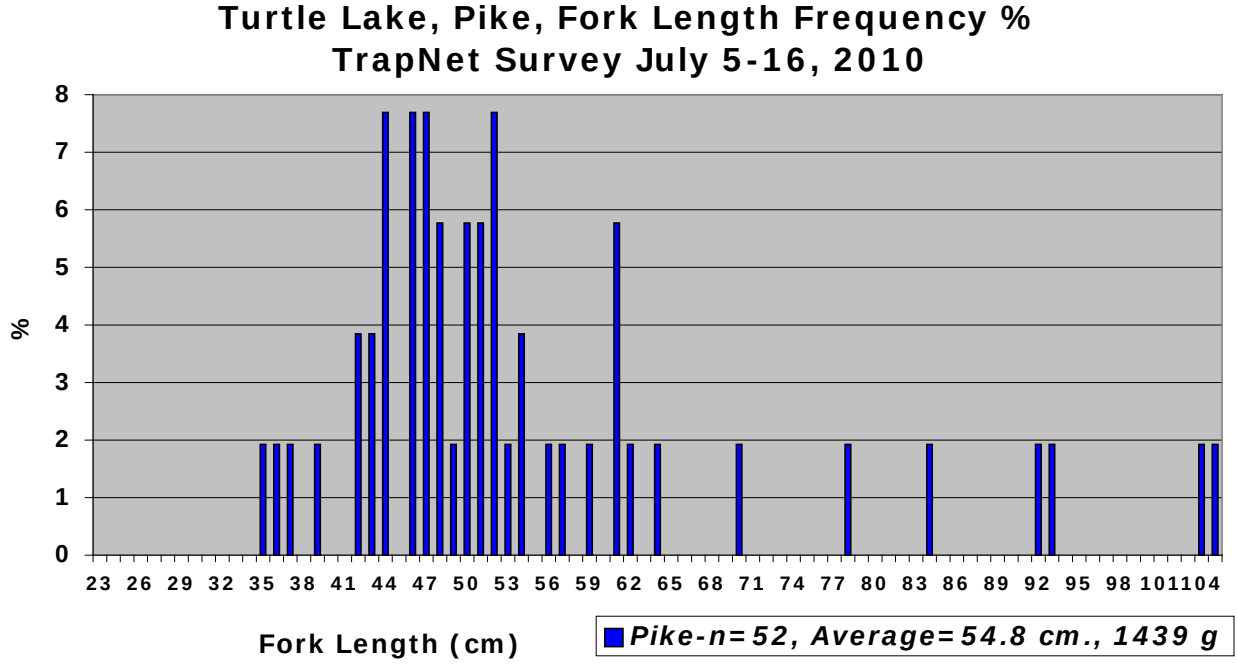


Figure13. Fork Length frequency histogram-Pike-2010 Gillnet & Trapnet Survey

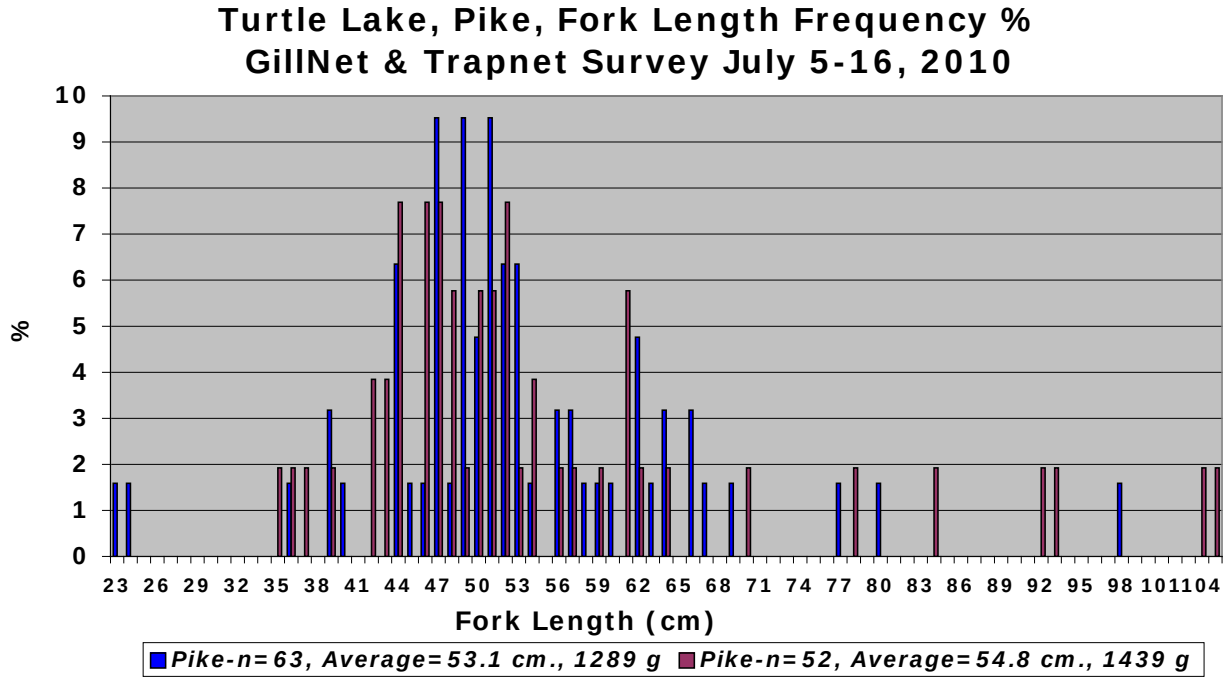



Figure14. Fork Length frequency histogram-Pike-2010 Gillnet & Trapnet Survey-Combined

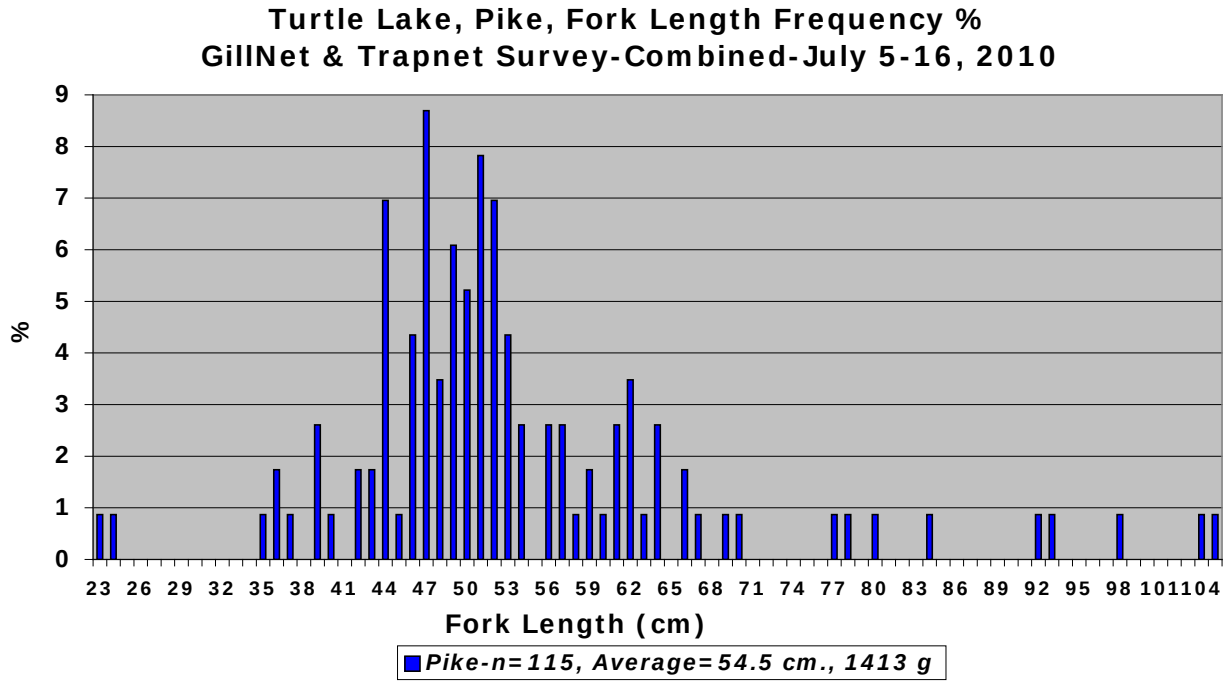


Figure15. Pike-Age Frequency histogram-2010

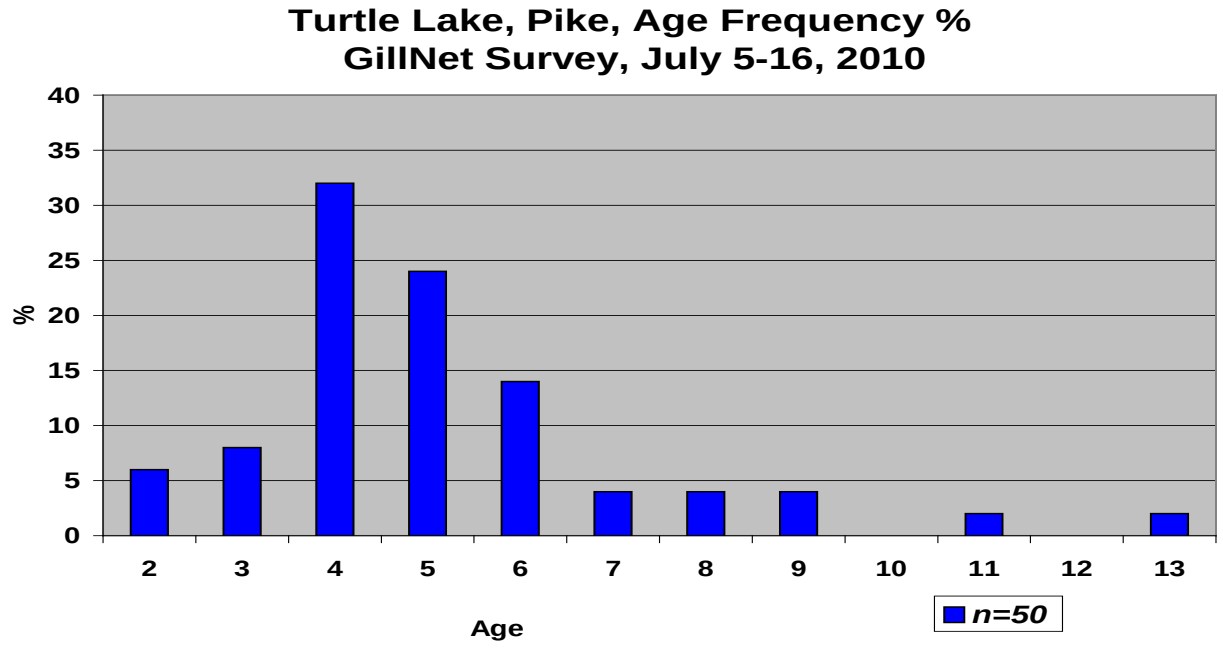



Figure16. Pike-Mean Length at Age-2010

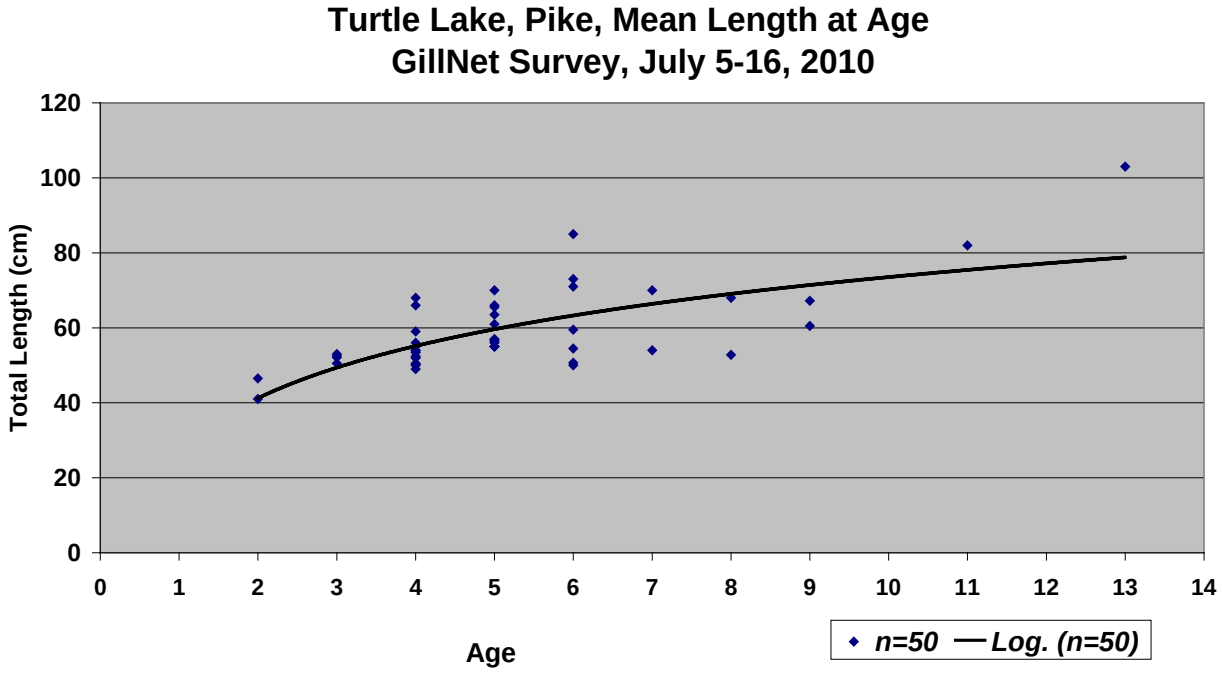
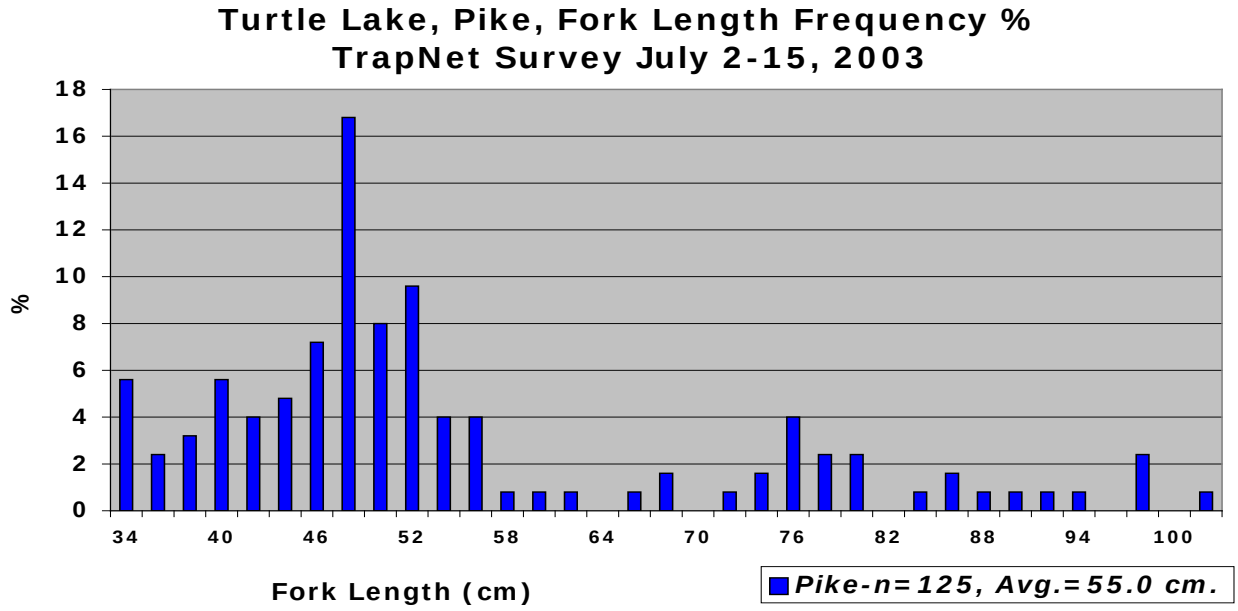


Figure17. Fork Length frequency histogram-Pike-**2003 Trapnet Survey**




**c) Yellow perch**

- Test nets indicate an increased population of perch, with a CPUE number of 5, the highest value recorded for this species (also recorded in the 1976 survey). As indicated by the PSD and RSD-P values of 2 and 0, only a small percentage of the population is of angling size (Table 4). The size of fish ranged from 14.5 cm (34 g) to 20.5 cm (90 g).

**d)** Whitefish

- Test nets indicate a fair population, with a CPUE number of 4.
- Two to 5 year old year classes indicate recent natural recruitment success (Figure 19). Intermittent spawning success for this species was noted in the 1967-1 Fisheries Technical Report-W.W. Sawchyn.

Figure18. Fork Length frequency histogram-Whitefish-2010 Gillnet Survey

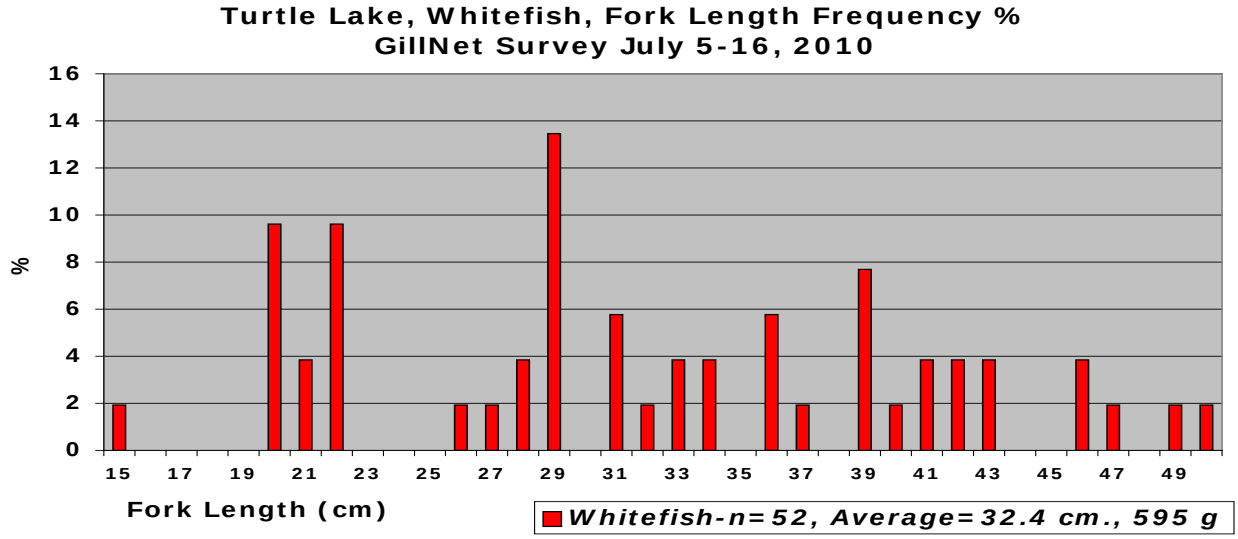


Figure19. Whitefish-Age Frequency histogram-2010

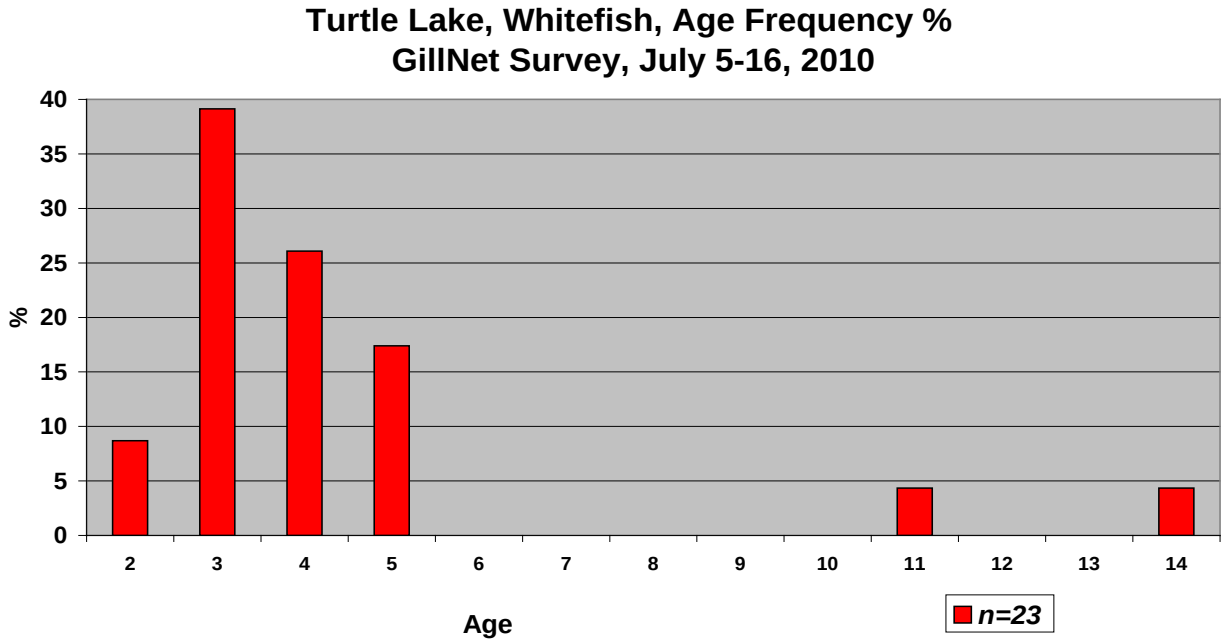



Figure20. Whitefish-Mean Length at Age-2010

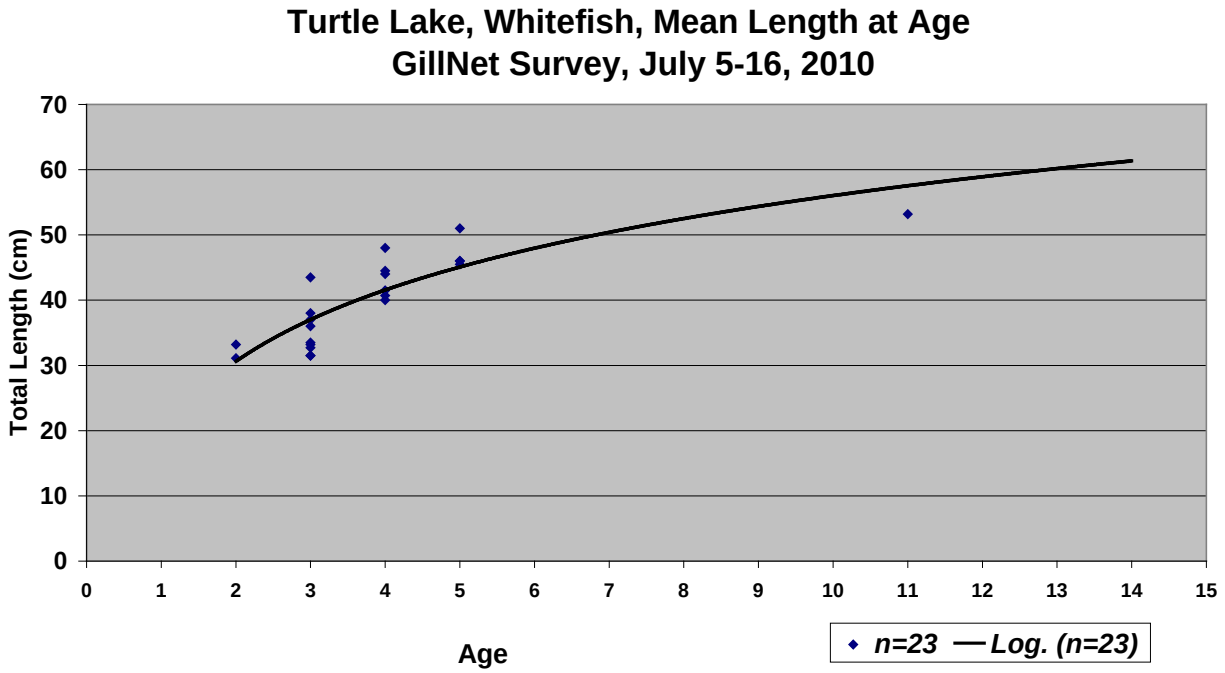
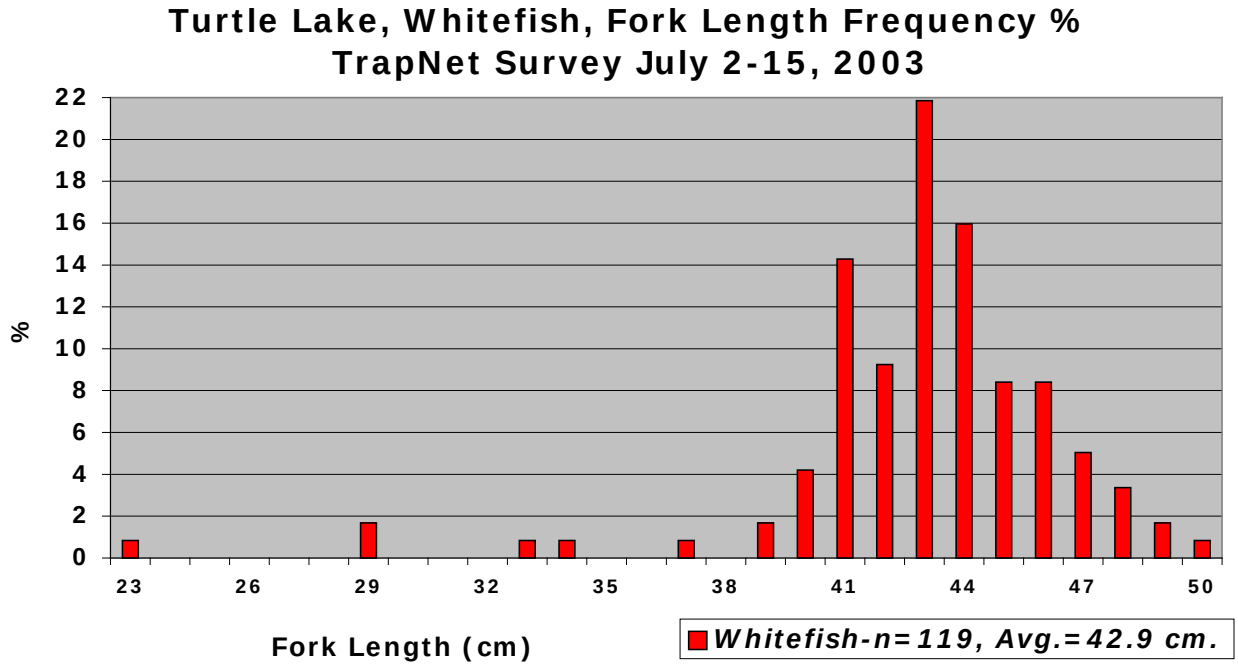


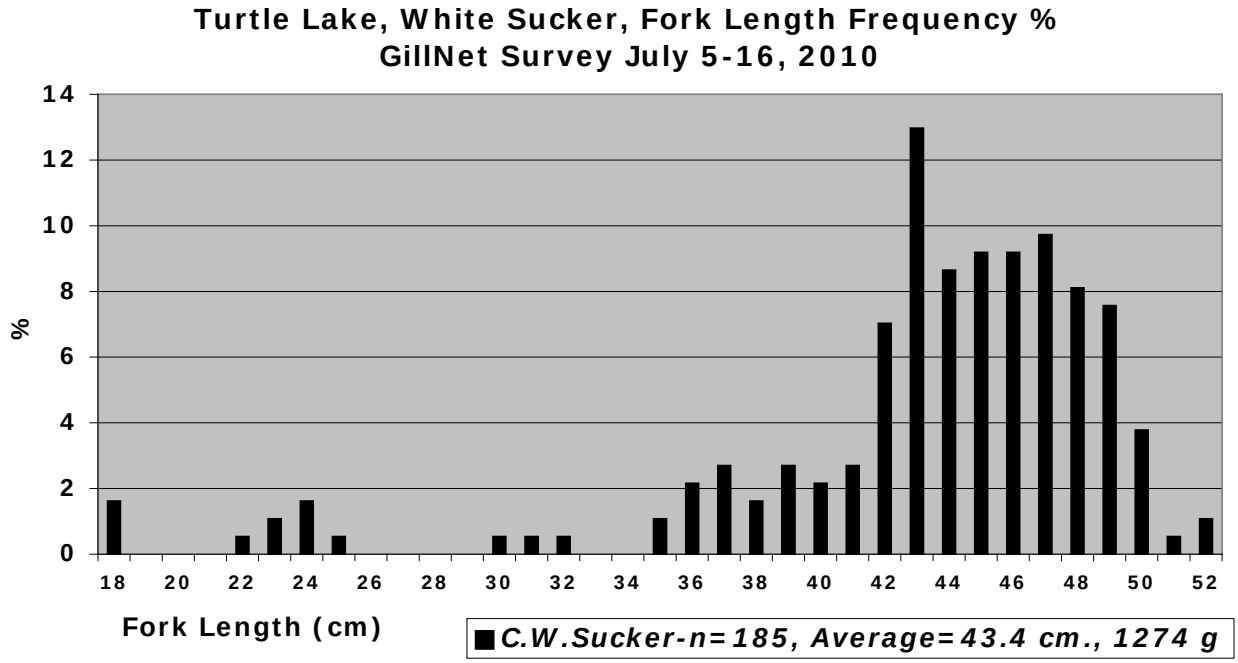
Figure21. Fork Length frequency histogram-Whitefish-**2003 Trapnet Survey**




**e) White sucker**

- Test nets indicate, as usual, an abundance of white suckers, with a CPUE of 14.

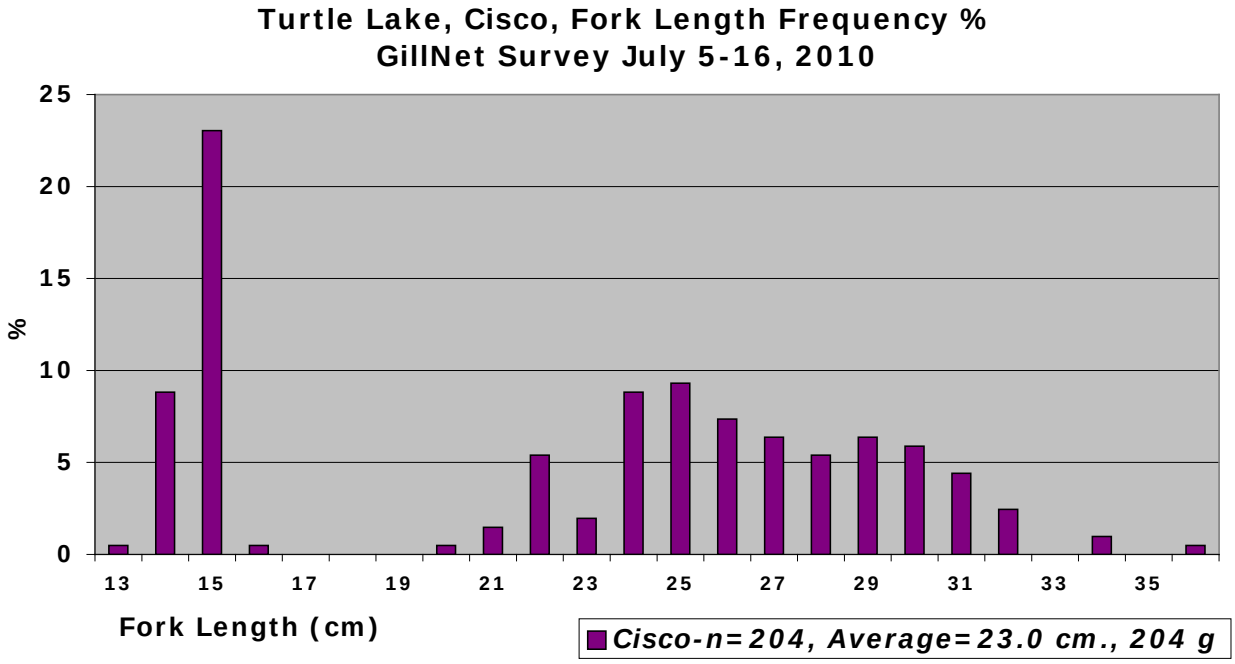
Figure22. Fork Length frequency histogram-White Sucker-2010 Gillnet Survey



**f) Cisco**

- Although abundant with a CPUE of 14, the population has declined, relative to historic numbers (Table 4, 4a).

Figure23. Fork Length frequency histogram-Cisco-2010 Gillnet Survey




**g) Burbot**

- Test nets once again indicate a sparse population, with 5 burbot caught in the gillnets, and 10 in the trapnets. Those fish caught ranged in size from 45.5 cm to 70.5 cm. One female burbot measuring 57.4 cm was determined to be 6 years of age (otolith).

## *Management Recommendations*

- Discontinue walleye stocking. As indicated by the high catch rate, numerous year classes and evidence of natural reproduction, the walleye population has become established.
- Monitor the baitfish catch for presence of young of year walleye fingerlings to confirm that natural reproduction for walleye is occurring on an annual basis.

**Table 6. Stocking history of Turtle Lake**

| | | | | |
|---|---|---|---|---|
| Walleye | 1000000 | Fry | 11-Jun-2009 | Fish Culture Station |
| Walleye | 500000 | Fry | 05-Jun-2008 | Fish Culture Station |
| Walleye | 500000 | Fry | 29-May-2007 | Fish Culture Station |
| Walleye | 500000 | Fry | 16-May-2006 | Diefenbaker Lake |
| Walleye | 600000 | Fry | 03-Jun-2005 | Fish Culture Station |
| Walleye | 500000 | Fry | 28-May-2004 | Fish Culture Station |
| Walleye | 500000 | Fry | 29-May-2003 | Fish Culture Station |
| Walleye | 500000 | Fry | 11-Jun-2002 | Fish Culture Station |
| Walleye | 1000000 | Fry | 31-May-2001 | Fish Culture Station |
| Walleye | 1000000 | Fry | 27-May-2000 | Fish Culture Station |

| | | | | |
|---|---|---|---|---|
| Walleye | 1000000 | Fry | 28-May-1999 | Fish Culture Station |
| Walleye | 1000000 | Fry | 25-May-1998 | Fish Culture Station |
| Walleye | 1000000 | Fry | 28-May-1997 | Fish Culture Station |
| Walleye | 600000 | Fry | 05-Jun-1996 | Fish Culture Station |
| Walleye | 500000 | Fry | 30-May-1995 | Fish Culture Station |
| Walleye | 1000000 | Fry | 27-May-1994 | Fish Culture Station |
| Walleye | 2000000 | Fry | 25-May-1993 | Fish Culture Station |
| Walleye | 58959 | Fingerlings | 07-Aug-1991 | Meadow Lake Rearing Ponds |
| Walleye | 157295 | Fingerlings | 14-Aug-1990 | Meadow Lake Rearing Ponds |
| Walleye | 82400 | Fingerlings | 14-Aug-1990 | Meadow Lake Rearing Ponds |
| Walleye | 28640 | Fingerlings | 18-Jul-1989 | Glaslyn Dugout |
| Walleye | 88000 | Fingerlings | 24-Jul-1988 | Meadow Lake Rearing Ponds |
| Walleye | 1292 | Fingerlings | 21-Jul-1988 | Glaslyn Dugout |
| Walleye | 4674 | Fingerlings | 04-Sep-1986 | Glaslyn Dugout |
| Walleye | 5800000 | Fry | 29-May-1986 | Fish Culture Station |
| Walleye | 2000000 | Fry | 22-May-1986 | Fish Culture Station |
| Walleye | 1800000 | Fry | 04-Jun-1985 | Fish Culture Station |
| Walleye | 800000 | Fry | 28-May-1984 | Fish Culture Station |
| Walleye | 400000 | Fry | 10-Jun-1983 | Fish Culture Station |
| Walleye | 500000 | Fry | 13-Jun-1982 | Fish Culture Station |
| Walleye | 500000 | Fry | 09-Jun-1975 | Fish Culture Station |
| Walleye | 1000000 | Fry | 05-Jun-1975 | Fish Culture Station |
| Walleye | 500000 | Fry | 12-Jun-1974 | Fish Culture Station |
| Walleye | 500000 | Fry | 08-Jun-1974 | Fish Culture Station |
| Walleye | 200000 | Fry | 11-Jun-1962 | Fish Culture Station |
| Walleye | 300000 | Fry | 04-Jun-1960 | Fish Culture Station |
| Walleye | 400000 | Fry | 02-Jun-1960 | Fish Culture Station |
| Walleye | 800000 | Fry | 01-May-1957 | Laronge Hatchery |
| Walleye | 1064000 | Fry | 01-Jun-1956 | Laronge Hatchery |
| Walleye | 300000 | Fry | 01-May-1952 | Fish Culture Station |
| Walleye | 800000 | Fry | 02-Jun-1951 | Fish Culture Station |
| Walleye | 500000 | Fry | 28-May-1949 | Fish Culture Station |
| Walleye | 500000 | Fry | 01-May-1946 | Fish Culture Station |
| Walleye | 1000000 | Fry | 04-Jun-1945 | Fish Culture Station |
| Walleye | 6100000 | Eyed Eggs | 04-Jun-1945 | Fish Culture Station |
| Walleye | 800000 | Fry | 01-May-1944 | Fish Culture Station |
| Walleye | 700000 | Fry | 04-Jun-1943 | Fish Culture Station |
| Walleye | 900000 | Fry | 01-May-1941 | Fish Culture Station |
| Lake Whitefish | 800000 | Fry | 01-May-1984 | Fish Culture Station |
| Lake Whitefish | 6046 | Fingerlings | 01-Sep-1981 | Turtle L. Rearing Pond |
| Lake Whitefish | 375000 | Fry | 04-May-1980 | Fish Culture Station |
| Lake Whitefish | 875000 | Fry | 03-May-1980 | Fish Culture Station |
| Lake Whitefish | 875000 | Fry | 01-May-1980 | Fish Culture Station |
| Lake Whitefish | 875000 | Fry | 01-May-1980 | Fish Culture Station |
| Lake Whitefish | 1950000 | Fry | 27-Apr-1976 | Fish Culture Station |
| Lake Whitefish | 1050000 | Fry | 25-Apr-1976 | Fish Culture Station |

| | | | | |
|---|---|---|---|---|
| Lake Whitefish | 1050000 | Fry | 23-Apr-1976 | Fish Culture Station |
| Lake Whitefish | 780000 | Fry | 07-May-1974 | Fish Culture Station |
| Lake Whitefish | 1120000 | Fry | 30-Apr-1974 | Fish Culture Station |
| Lake Whitefish | 1500000 | Fry | 23-Apr-1969 | Fish Culture Station |
| Lake Whitefish | 600000 | Fry | 11-May-1947 | Fish Culture Station |
| Lake Whitefish | 950000 | Fry | 17-Apr-1944 | Fish Culture Station |

Table7. Oxygen / Temperature profile of Turtle Lake-July 9, 2010

| Depth (m) | Water Temp °C | DO (ppm) |
|---|---|---|
| Surface | 20.8 | 12.1 |
| 1 | 20 | 12 |
| 2 | 18.7 | 12.3 |
| 3 | 18.5 | 12.3 |
| 4 | 18.4 | 12.3 |
| 5 | 18.3 | 12.3 |
| 6 | 18.3 | 12.2 |
| 7 | 18.3 | 12.1 |
| 8 | 18.2 | 11.8 |
| 9 | 18 | 11.1 |
| 10 | 17.6 | 9.4 |
| 11 | 17.1 | 7 |
| 12 | 14.6 | 0.32 |

Figure24. Commercial Production History-Whitefish

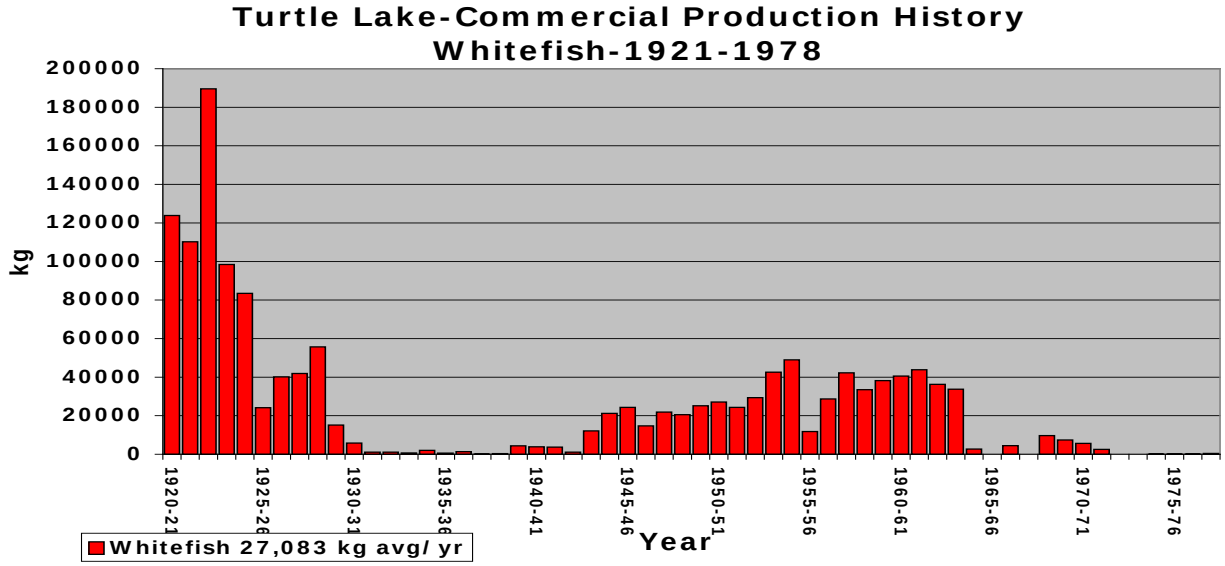


Figure25. Commercial Production History-Walleye

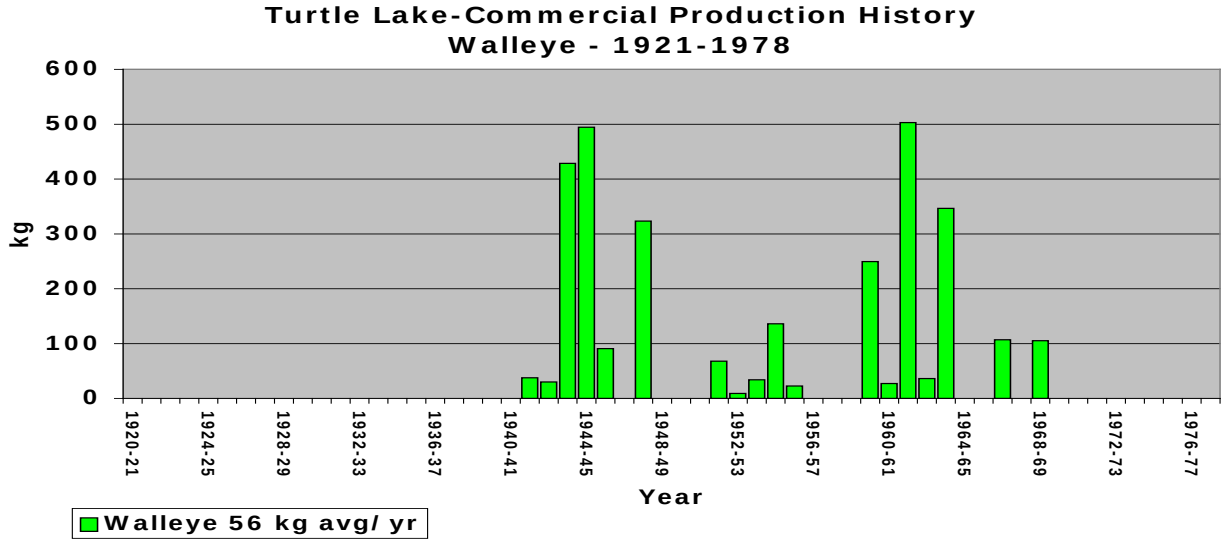
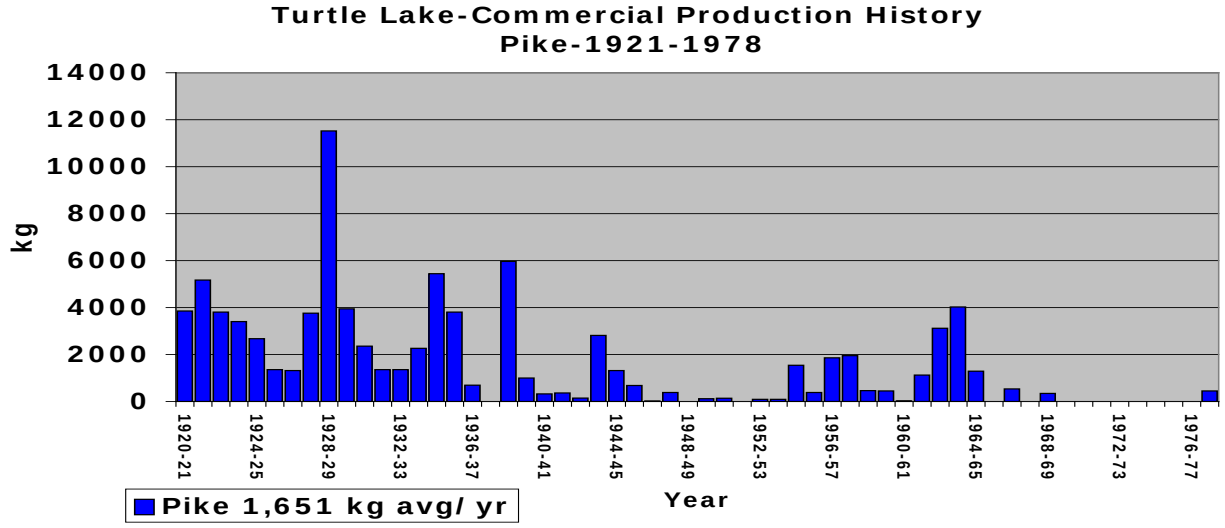
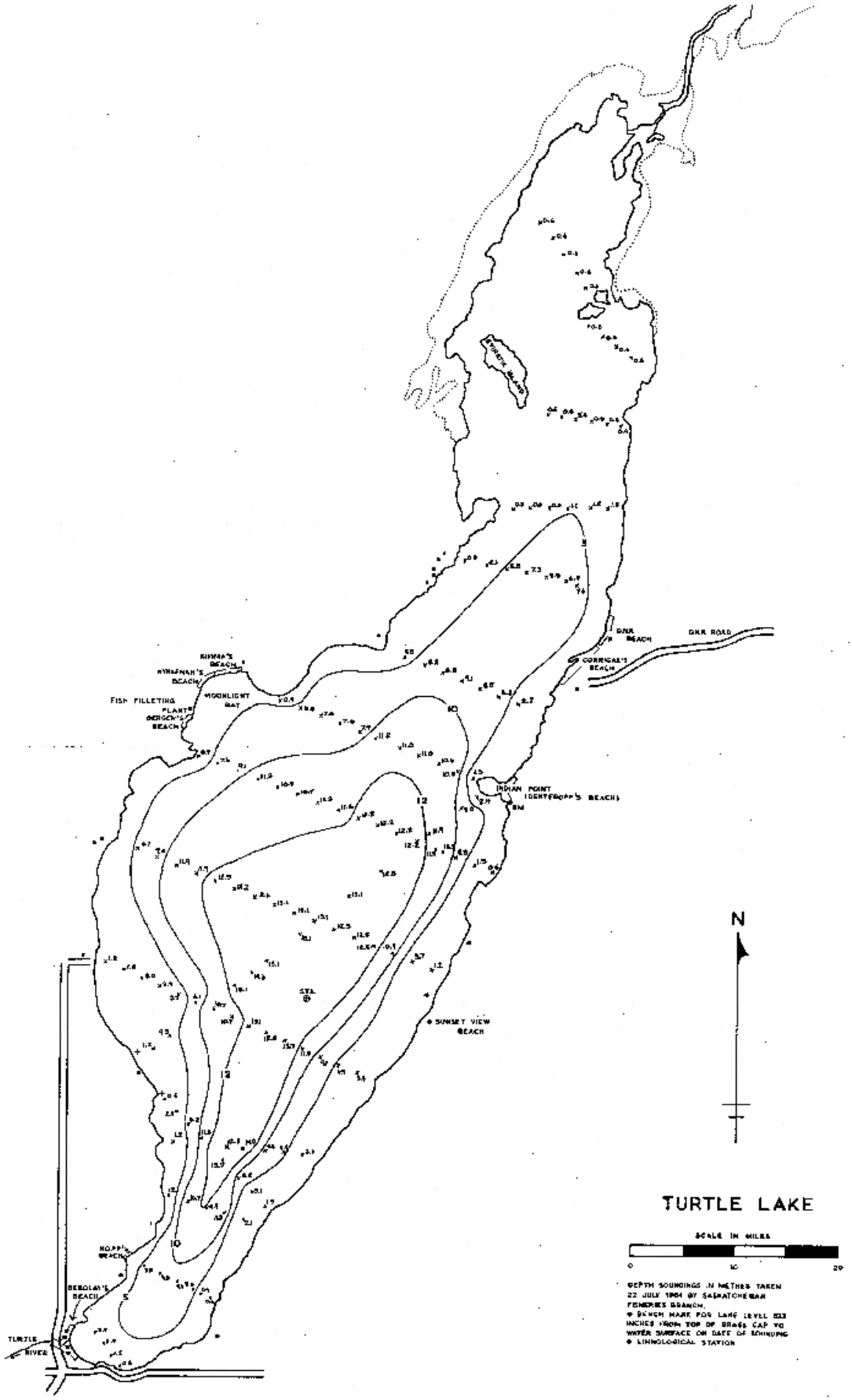



Figure26. Commercial Production History-Pike




N
TURTLE LAKE
SCALE IN MILES
0
10
20
DEPTH SOUNDINGS IN METRES TAKEN
22 JULY 1964 BY SASKATCHEWAN
FISHERIES BRANCH.
BENCH MARK FOR LAKE LEVEL 833
INCHES FROM TOP OF BRASS CAP TO
WATER SURFACE ON DATE OF SOUNDING
LIMNOLOGICAL STATION
INDIAN POINT
IDENTYPOFF'S BEACH
SUNSET VIEW
BEACH
TURTLE
RIVER

***Appendix A.*** A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD), relative weight (Wr) and length class designations.

**Catch Per Unit Effort (CPUE)** is the catch of fish in numbers or in weight taken by a defined period of effort. Defined as the number of fish caught per 100m gill net per net night, or as the number of fish caught in each trap net per night.

**Confidence Interval (CI)**. A measure of sampling error. An 80 per cent confidence interval for an estimate is the range which will contain the 'true' figure on average 80 times out of 100.

**Proportional Stock Density (PSD)**: Percentage of stock-length fish that are also quality length

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} > \text{stock length}} \times 100$$

**Relative Stock Density (RSD-P)**: Percentage of stock-length fish that are also preferred length

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} > \text{stock length}} \times 100$$

PSD and RSD-P are unitless, numerical descriptors of length-frequency data and usually calculated to the nearest whole digit.

**Relative weight (Wr)** is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.

**Length class designations (cm) for walleye, northern pike and yellow perch**

| Species | Stock | Quality | Preferred | Memorable | Trophy |
|---|---|---|---|---|---|
| Walleye | 25 | 38 | 51 | 63 | 76 |
| Northern pike | 35 | 53 | 71 | 86 | 112 |
| Yellow perch | 13 | 20 | 25 | 30 | 38 |

**Stock Length**:

- Defined as the minimum length fish of recreational value. Designation is based on 20 – 26% of the world record length for the species.

**Quality Length**:

- Defined as the minimum length that anglers would like to catch. Designation is based on 36 – 41% of the world record length for the species.

**Preferred Length**:

- Defined as the length of fish that anglers would prefer to catch. Designation is based on 45 – 55% of the world record length for the species.

**Memorable Length**:

- Defined as the minimum length of fish that anglers would remember catching. Designation is based on 59 – 64% of the world record length for the species.

**Trophy Length**: Defined as the minimum length of fish worthy of acknowledgement. Designation is based on 74 – 80% of the world record length for the species.