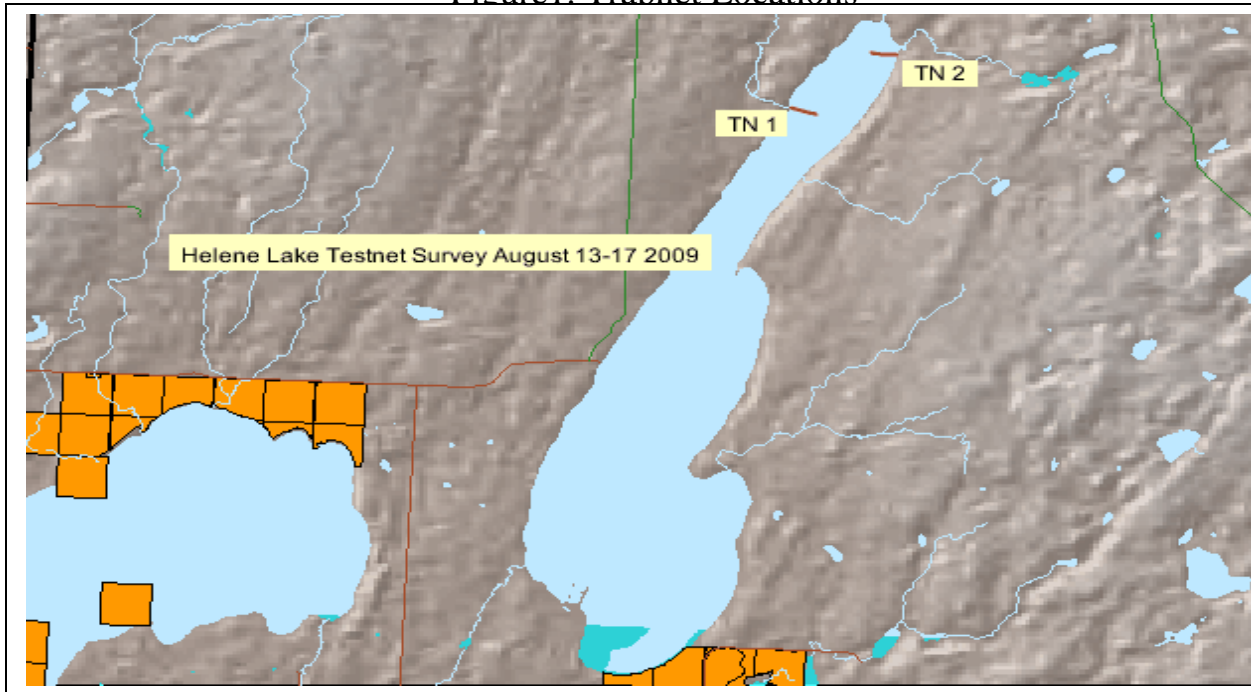


**SASKATCHEWAN MINISTRY OF ENVIRONMENT
FISHERY STOCK ASSESSMENT-HELENE LAKE-2009**

Figure 1. Trappnet Locations



Lake Name: Helene

Location: 53-33, 108-12 73 F/9

Category: 2

Monitoring Frequency: 6 Years

Survey Date: August 13-17, 2009

Gear Used: Trap Net

Study Objective: Update file

Table 1. Physical Attributes	
Surface Area (ha)	2,527
Maximum Depth (m)	6.0
Mean Depth (m)	
Volume (m ³)	
Conductivity-uS	449.5
pH	8.97
Secchi (m)	0.7
Surface Water Temperature (C)	20.3

Table 2. Fish Species	
Primary Species	Other
Main species of interest: Walleye	Secondary species of interest: White Suckers

Introduction

Helene Lake, located east of Turtle Lake on Highway #4, is unique in that pike are not present in the lake, even though 50,000 pike fry were stocked in 1962. The dominant fish species are walleye and white suckers. The lake was initially stocked with eyed walleye eggs in 1933. From 1958 to 1969 a total of 2.7 million fry were stocked, with stocking discontinued because of consistent natural reproduction (see Table 7 for complete stocking history).

Helene Lake has experienced periodic winterkills, with a partial winterkill recorded in 1972. From 1982-1986, 1.15 million fry were stocked. The 1985 test netting indicated an excellent walleye population.

The 1988 test netting indicated an excellent walleye population and good stocking success from previous plants, although the numbers indicated a significant decrease from 1985. Good natural reproduction was also indicated (10% of total captured was natural reproduction from the 1987 year class).

Records indicate the outflow creek dried up in 1991, due to drought and decreasing water levels. The 1993 test netting indicated a fair walleye population; a significant decrease from the previous study in 1988. Moderate to heavy angling activity was reported with good angling success from early spring to mid-July for walleye.

A complete winterkill of walleye occurred in 1994. The lake was stocked with 1,000,000 walleye fry; in 1995 test nets caught one-year old stocked walleye in the 14-17 cm (fork length) size range.

Another severe winterkill occurred in 1995-96; a 1996 test net caught only one sucker and no walleye.

A partial winterkill was recorded in March 1999, with oxygen levels recorded at 1.2 ppm and lower. Live and dead suckers were observed congregating in open water areas. A gill net test net in May, 1999 caught 1 and 2 year old walleye, from the fry stockings in 1997 and 1998.

Beginning in May 2000, a trapnet test netting survey was initiated, and except for 2001 and 2008, trapnets were set annually. Test nets indicated a good to excellent population of walleye during this time, except for the 2007 survey, when the population was rated as fair.

Methods

Trap Net Sets: Two 1.8 meter deep live capture trap nets, each with a 91.4 meter leader, were set in two locations in depths ranging from 3.3 to 3.5 meters-see Figure 1. TN sets #1 and TN #2 were set for 4 days.

Flesh samples were collected for mercury analysis from 10 walleye (see Table 8). Otolith ageing samples were taken from 31 walleye (Figure 3).

Trap Net	Location (WGS 84)	Depth (m)	Mesh Size (Inshore/Offshore)
1	13 289687 E 5942713 N	3.5	1.8 m trapnet-91.4 m leader
2	13 688118 E 5942905 N	3.4	1.8 m trapnet-91.4 m leader

Results and Discussion

Gill Net Catch

Table4. Total catch from two trapnets set over 4 nights, Helene Lake (August 13-17, 2009)

Species	No	*CPUE: #/ net day				Percent of Catch			*PSD	*RSD-P	*0 Wr
		2009		Historic Range	2009	%	Historic Range				
		#	80% C.I.					2009	2009	2009	
Walleye	207	52	±223			73			82	26	96
W.Sucker	74	19	±43			27			-	-	-
Total	281	71				100					

* See Appendix A *Express CPUE as #/net day*

Table5. Gill Net CPUE*: (#/100m gill net) & % of total catch for all species sampled in Helene Lake, 1973–1988

Species	1973		1977		1983		1985		1988	
	CPUE	%	CPUE	%	CPUE	%	CPUE	%	CPUE	%
Walleye	63	35	90	39	49	85	246	98	87	60
W.Sucker	156	65	139	61	9	15	98	2	57	60
Total	241	100	229	100	58	100	250	100	144	100

*Based on 3.8 to 14.0 cm gill net mesh.

Table5a. Gill Net CPUE* (#/100m gill net) & % of total catch for all species sampled in Helene Lake-1993, 1996

Species	1993		1996	
	CPUE	%	CPUE	%
Walleye	17	12	0	0
W.Sucker	127	88	<1	0
Total	144	100	0	0

*Based on 3.8 to 14.0 cm gill net mesh.

Table6. TrapNet CPUE^ (#/net day) & % of total catch for all species sampled in Helene Lake, 2000-2005

Species	2000		2002		2003		2004		2005	
	CPUE	%	CPUE	%	CPUE	%	CPUE	%	CPUE	%
Walleye	85	25	190	98	124	45	52	30	88	47
W.Sucker	249	75	4	2	149	55	123	70	99	53
Total	334	100	194	100	273	100	175	100	187	100

^Based on one or two trapnets

Table6a. TrapNet CPUE^ (#/net day) & % of total catch for all species sampled in Helene Lake, 2006-2009

Species	2006		2007		2009	
	CPUE	%	CPUE	%	CPUE	%
Walleye	20	19	5	9	52	73
W.Sucker	87	81	54	91	19	27
Total	107	100	59	100	71	100

^Based on one or two trapnets

a) Walleye

- Test nets indicate a good population, with 6 year classes present (Figure 3, 4).
- Condition factor is rated as good, with a mean relative weight of 96.
- A good percentage of the population is of quality angling size, as indicated by the PSD and RSD-P numbers of 82 and 26. For the first time since 2000, the upper size limit has exceeded the fork length of 50 cm, at 57 cm (Figure 2).
- Stomach contents comprised mainly of unidentified minnows, whiter sucker, leeches, vegetation, and one walleye.

Figure2. Fork Length histogram-Walleye-2009

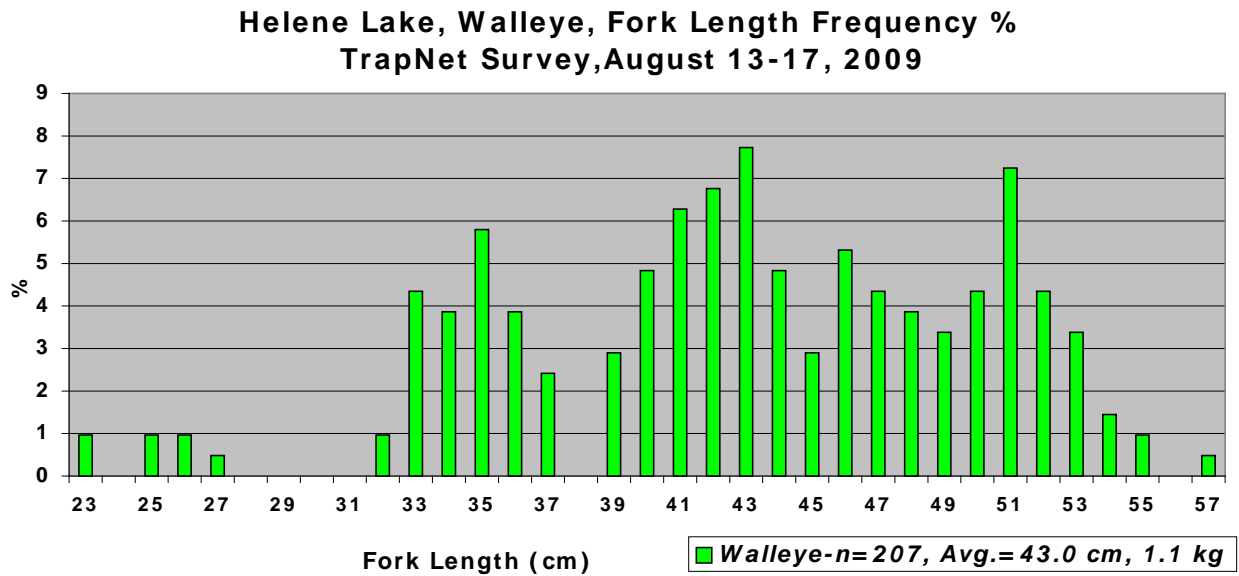


Figure3. Walleye-Age Frequency histogram-2009

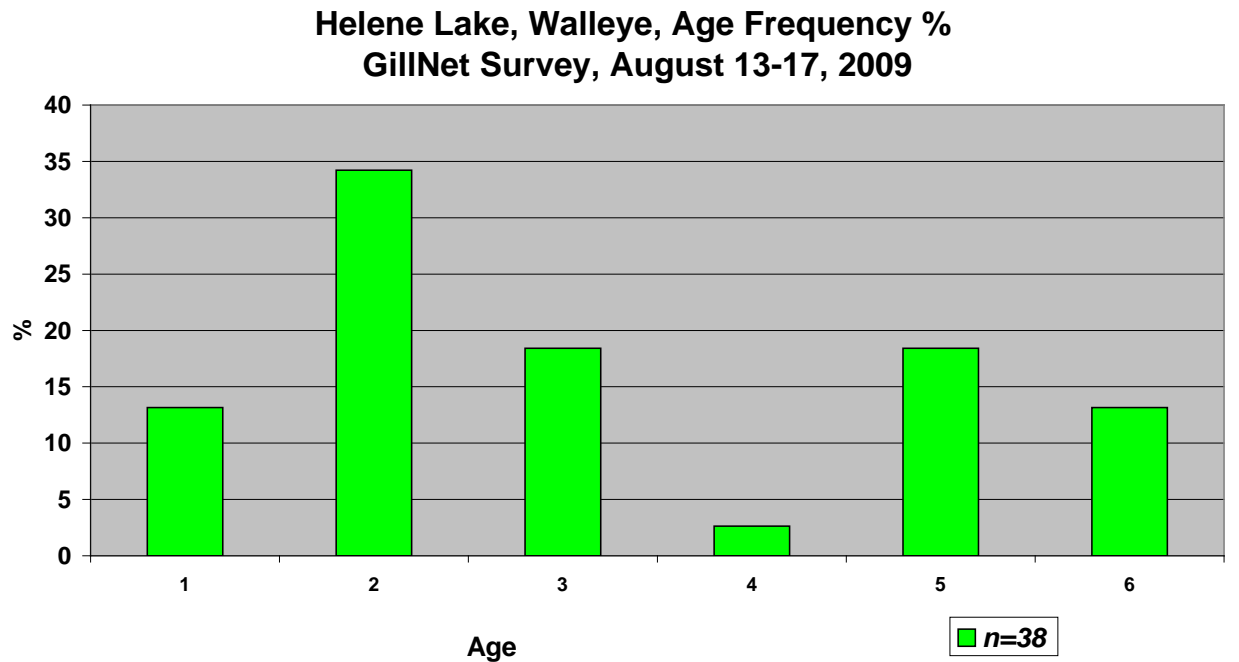


Figure4. Walleye-Mean Length at Age-2009

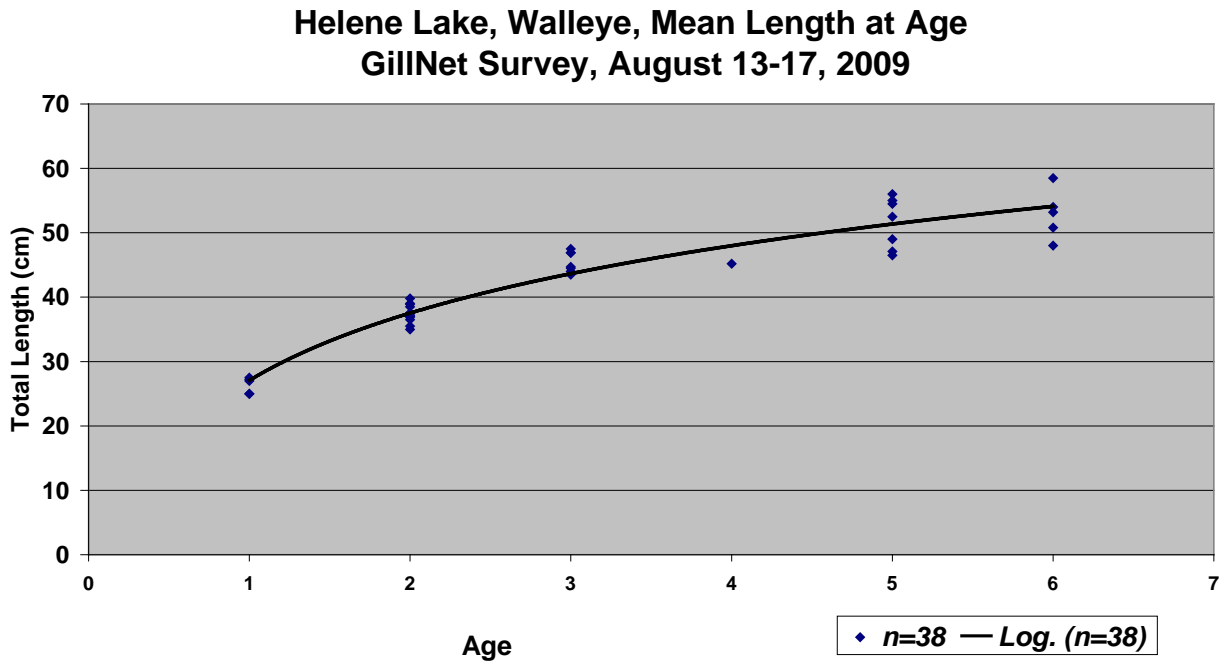


Figure5. Fork Length Frequency histogram-Walleye-2007

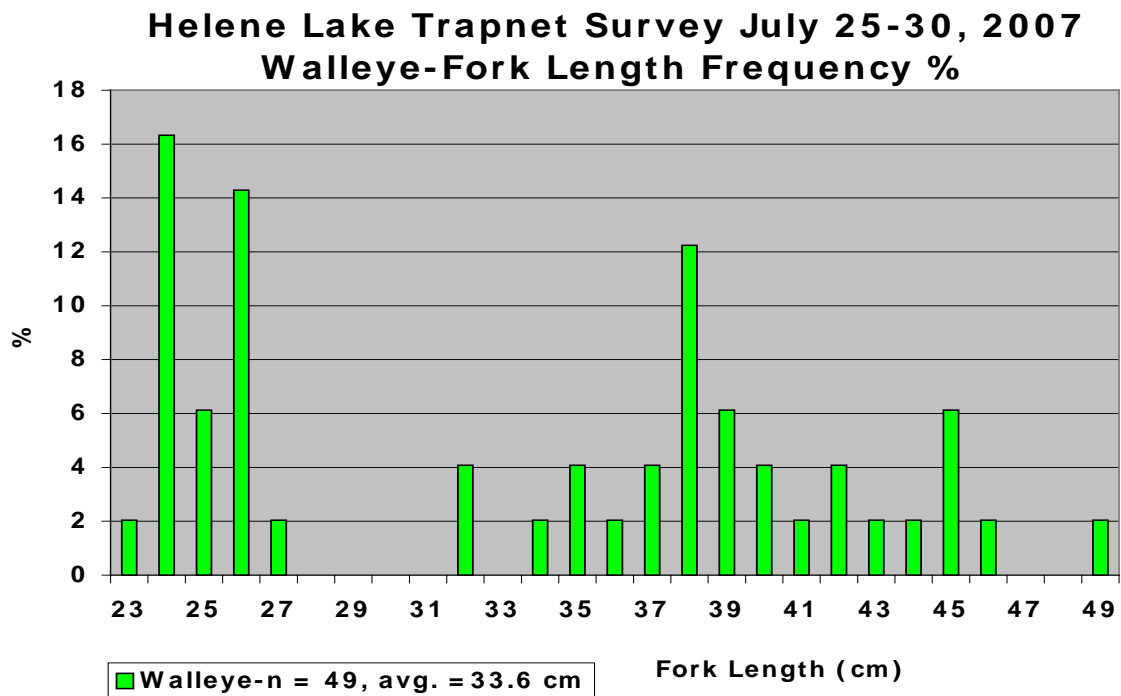


Figure6. Fork Length Frequency histograms-Walleye-2000-2006

Helene L. 2000,02-06 TrapNet Surveys Walleye-Fork Length Frequency %

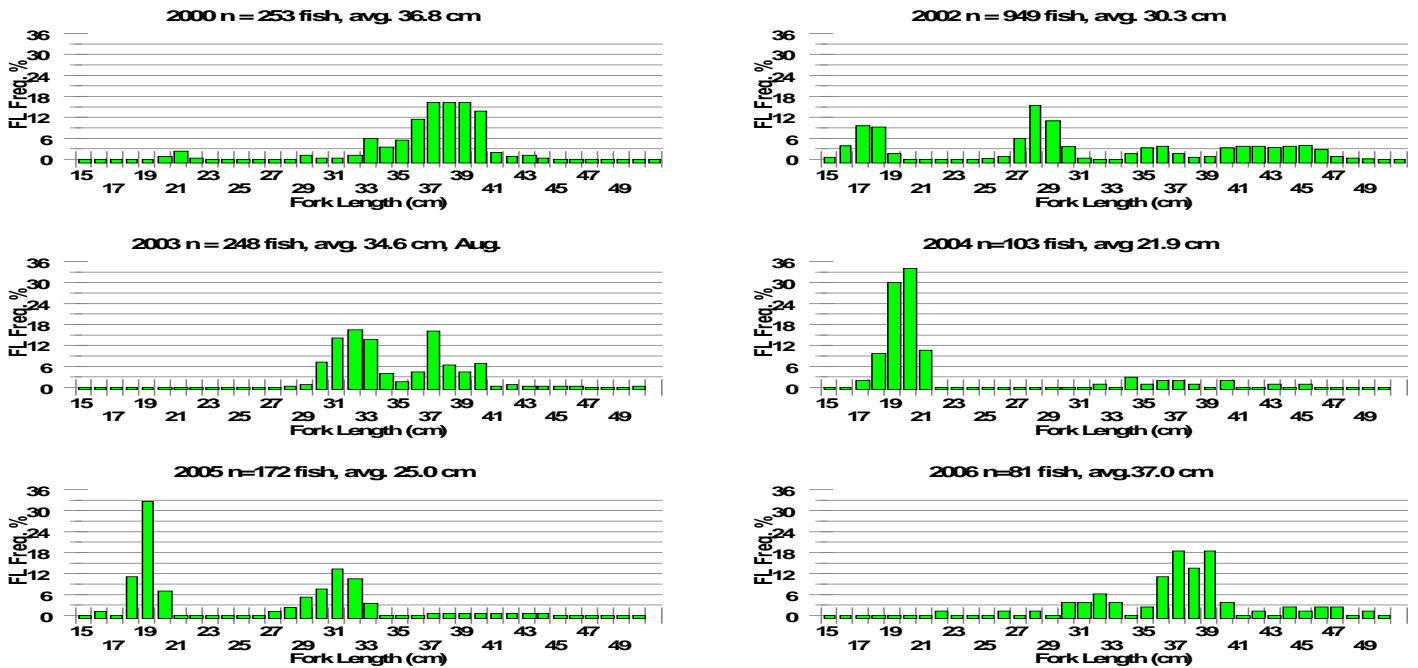
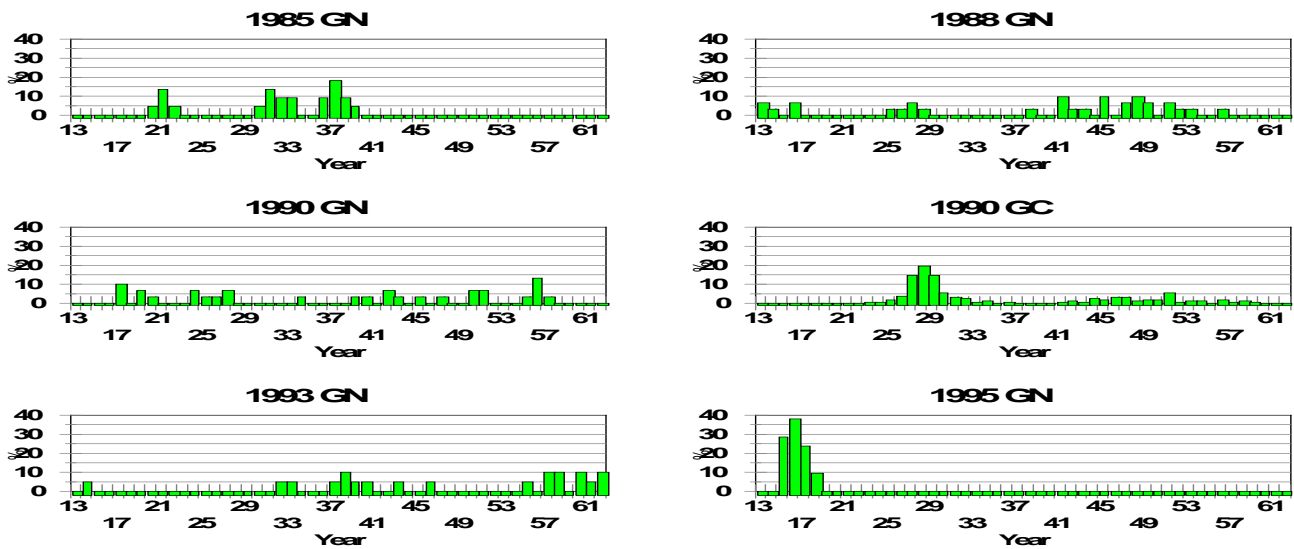


Figure7. Fork Length Frequency histograms-Walleye-1985-1995

Helene L-Walleye-G'net testnets, Gutcan Fork Length Freq. % before 2000



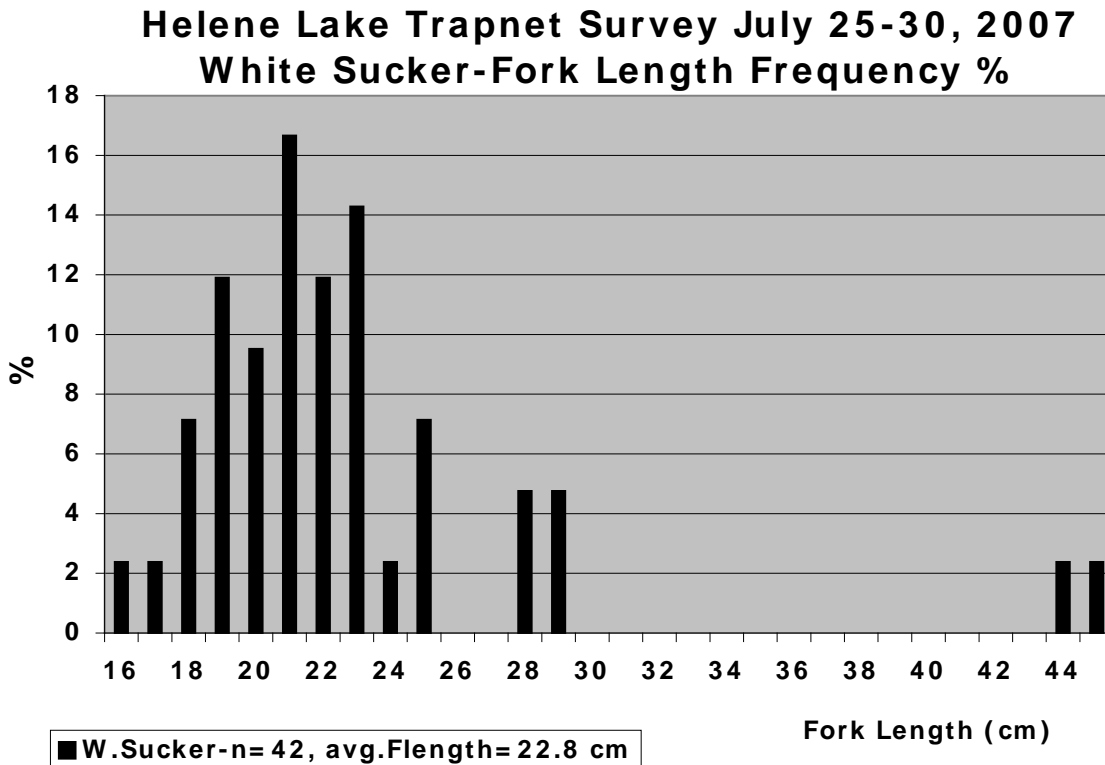
Other Species:

b) **Perch** are not present in Helene Lake

c) **White sucker**

- Historically, the CPUE, or Catch per Unit Effort is very variable.
- Fork length measurements taken in 2007 (Figure 6) are typical of the size range seen in the trapnet surveys beginning in 2000. The majority of suckers in the population are small.

Figure6. Fork Length histogram-White Sucker-2007



Comments

- Previous stocking efforts have been successful, resulting in excellent walleye populations, even following major winterkills. In 2009 the lake level was at the highest elevation since 1991.
- The quality and taste of the walleye is excellent, even during the summer months.
- 2010 ADDENDUM- From 1999-2009 sparse angling activity was reported, even though testnetting results indicated good populations of walleye were present. Those who did attempt angling reported virtually no success. The drop in angler success could not be explained, especially when compared to the angling success experienced in the 1980's and early 1990's (Estimated angler harvest in 1988-11,795 kg). However, in March 2010, anecdotal reports of anglers ice fishing having good success were reported. By the summer of 2010 the word was out, and anglers began using the lake once again, in numbers sufficient to overcrowd the launch site on weekends. Angler success during the summer of

2010 was reported as excellent to fair. In 2011, angler catch per unit effort had once again decreased. (anecdotal reports).

- pH-9.2-8.6-9.0-9.4-taken at 4 locations, from north to south, on March 22, 2006. Conductivity ranged from 633 m/s to 736 m/s (north to south). Dissolved Oxygen ranged from 4.0 ppm and 0.6 ppm in the northern section, to 2.97 ppm and 9.9 ppm in the southern section of the lake.

Management Recommendations

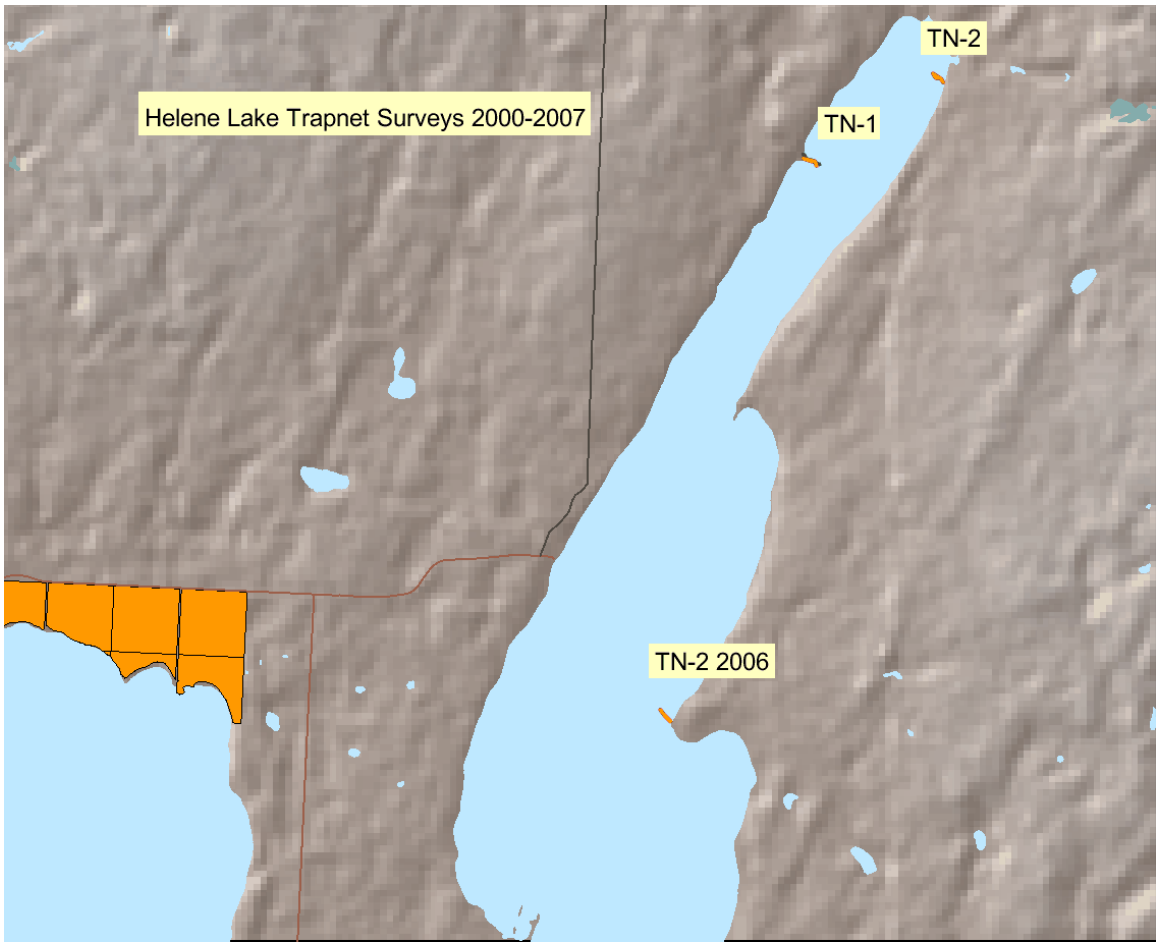
- Continue walleye fry stocking at 200,000-300,000 every second year. (Helene Lake will be stocked every two years instead of annually, as per a policy change in the provincial walleye stocking program). 2014 Note-Walleye stocking discontinued (evidence of natural reproduction occurring); in the event of another complete winterkill, fry stocking will resume, possibly every second year.
- Due to the abundance of good pike populations in nearby lakes, it is not advisable to stock pike in Helene Lake; pike may be detrimental to the walleye population.

Table 7.-Stocking History of Helene Lake

SPECIES	AMOUNT	SIZE	StockDATE	Descr_Loc	LAND_LOC	ORIGIN
Walleye	300000	Fry	11-June-2009	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	6-June-2008	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	300000	Fry	29-May-2007	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	16-May-2006	28 km NE of Glaslyn	52-15 W3	Diefenbaker Lake
Walleye	200000	Fry	03-Jun-2005	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	28-May-2004	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	29-May-2003	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	11-Jun-2002	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	31-May-2001	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	27-May-2000	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	28-May-1999	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	25-May-1998	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	28-May-1997	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	300000	Fry	05-Jun-1996	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	300000	Fry	30-May-1995	28 km NE of	52-15 W3	Fish Culture

Table 7.-Stocking History of Helene Lake

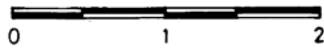
SPECIES	AMOUNT	SIZE	StockDATE	Descr_Loc	LAND_LOC	ORIGIN
				Glaslyn		Station
Walleye	1000000	Fry	27-May-1994	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	19-May-1992	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	949800	Fry	07-Jun-1990	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	300000	Fry	26-May-1988	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	29-May-1986	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	04-Jun-1985	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	28-May-1984	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	250000	Fry	10-Jun-1983	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	300000	Fry	13-Jun-1982	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	500000	Fry	02-Jun-1969	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	200000	Fry	11-Jun-1962	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Northern Pike	50000	Fry	26-May-1962	28 km NE of Glaslyn	52-15 W3	Laronge Hatchery
Walleye	400000	Fry	04-Jun-1960	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	500000	Fry	07-Jun-1959	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	1000000	Fry	30-May-1958	28 km NE of Glaslyn	52-15 W3	Fish Culture Station
Walleye	850000	Eyed Eggs	01-May-1933	28 km NE of Glaslyn	52-15 W3	Fish Culture Station



HELENE LAKE

52-16 W3

Scale: 1.25 in = 1 mi



DEPTH IN METRES TAKEN JUNE 15, 1976
BY SPORT FISH SECTION D.T.R.R.
bullrushes around perimeter

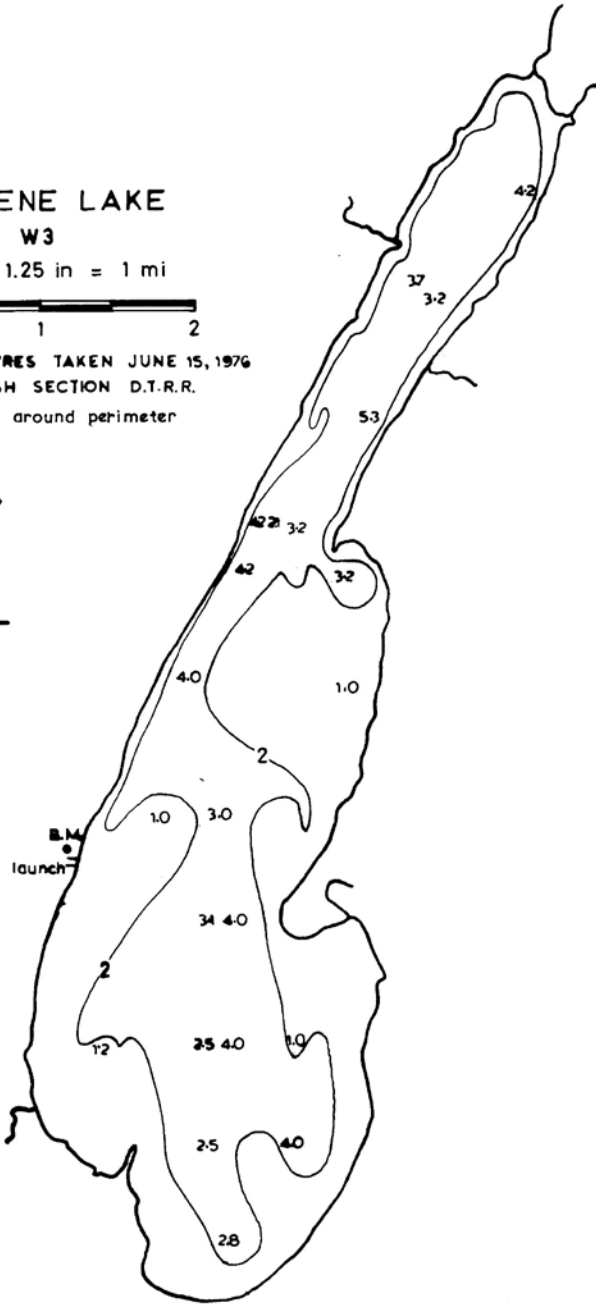


Table8. Results from the 2009 Mercury Samples taken from the Walleye in Helene Lake.

Waterbody	Location	Species	Fish Length (cm)							
			< 20 cm	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	> 80 cm
Helene Lake	5233/10812	Walleye	0	0	0	0	0	0	1	2

Please consult the Mercury in Saskatchewan Fish: Guidelines for Consumption for a complete description of consumption guidelines.

Table9. Dissolved Oxygen profile-August 13, 2009.

DEPTH(m)	DO	TEMP°C
SURFACE	9.85	20.3
1	9.92	20.2
2	9.96	20.2
3	9.3	19.5
4	8.93	19.4
5	9	19.3
6	7.85	19

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

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

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

<u>Species</u>	<u>Stock</u>	<u>Quality</u>	<u>Preferred</u>	<u>Memorable</u>	<u>Trophy</u>
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.