WHITEFISH LAKE FISHERIES SURVEY & CREEL SURVEY 2010

PROJECT 09-055

Submitted by:

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February 2011

Swan Valley Sport Fishing Enhancement

Swan River, MB

Partners:

Water Stewardship

fisheriesenhancement fund

Abstract

Swan Valley Sport Fishing Enhancement Inc. (SVSFE) has been actively involved in enhancing fishing opportunities at Whitefish Lake. Working closely with partners, SVSFE is taking a pro-active approach in monitoring fish populations and behaviour. This includes participating in past radio telemetry studies (2005), Whitefish Lake dam re-construction, and improving fishing access to the lake. The group has also initiated; habitat and fish community inventory surveys on tributaries, improvement to tributaries and recent radio telemetry walleye tracking (2009). The Whitefish Lake Creel and Fisheries Survey is an additional asset required to obtain a full perspective of Whitefish Lake's fishery.

Creel Surveys indicate an increase in walleye and northern pike being harvested since the size and limit reduction in 2005. Fishing pressure is the highest of all recreational lakes in this area and increases 3.5 times during the months of June and July. Fishing quality was calculated as 1.65 fish/hour with an average fishing effort of 3.1 hours/day. Walleye harvested in 2010 during the four month study period is estimated to be 659 kg which is slightly below the maximum sustainable yield of the lake at 675 kg annually.

End of Spring Trap Netting (ESTN) indicated a current species composition of; walleye 23%, northern pike 32%, yellow perch 1%, lake whitefish 3%, burbot 1%, white sucker 40%. Walleye sampled were an average of 532 mm (21 inches) and 1817 g (4 lbs), with an average catch per unit effort (CPUE) of 0.6 fish/hour. Northern pike sampled were an average of 641.8 mm (25 inches) and 2496.8 g (5.5 lbs), with an average CPUE of 0.9 fish/hour. Through subsequent ESTN sampling, fish populations can be estimated through mark and recapture efforts. Monitoring and comparing the effects of fishing pressure and harvest rates to the future ESTN data will indicate the sustainability of the Whitefish Lake fishery.

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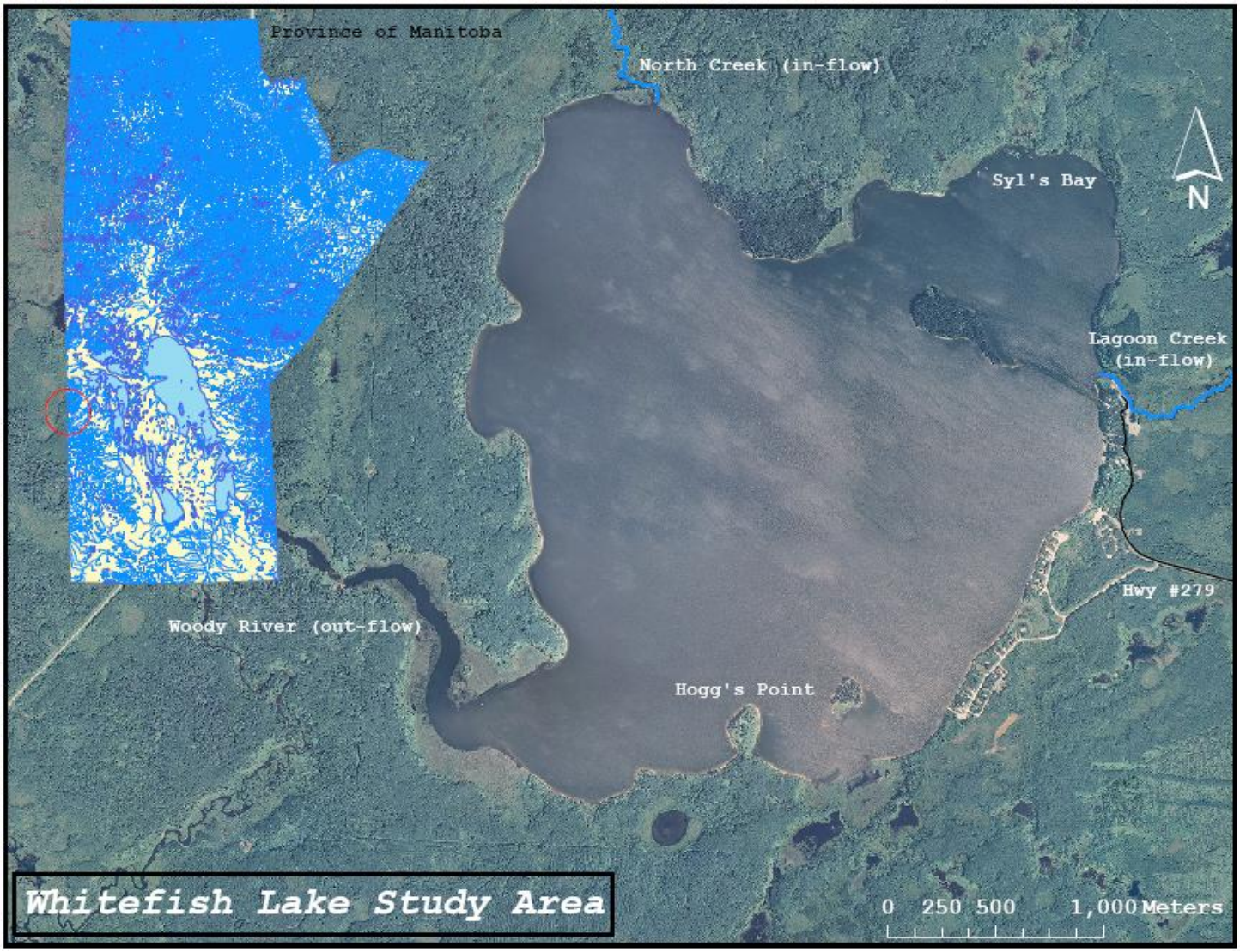
Introduction

There are several objectives to the Whitefish Lake Fisheries Survey and Creel Survey. The creel survey was utilized to obtain information such as angling pressure, total catch as well as the harvest and biology of walleye. The Fisheries Survey consists of End of Spring Trap Netting (ESTN) which is a component of the Nearshore Community Index Netting (NSCIN). This protocol is designed to evaluate abundance and biologic characteristics. Seining, minnow trapping, invertebrate sampling and depth mapping were conducted to obtain more data to understand the lakes health and the condition of the fishery. This data is also useful for educating anglers on the conservation and management of the lake.

Study Area

Whitefish Lake is one of the most popular lakes in the Porcupine Provincial Forest located North West of the Swan River Valley on HWY 279. The lake is 675 hectares and reaches a maximum depth of 18.9 meters (62 ft) just north of Hogg's Point.



Creel Survey

Creel Census

Collection of angler surveys started on May 15th 2010 and continued to August 31th 2010. SVSFE fisheries technician worked in shifts and Parks Green Team assisted during week days to collect consistent data throughout the timeline. The Creel Census interviews included information on; number of anglers fishing, total catch (species, number caught, number retained, and any additional comments), hours fished, method of fishing (boat, shore), who the form was submitted by, and the date. Additional information collected and noted by technicians included type of license, gender, age, and residence. As an incentive, draws were made every month and one main draw at the end of the season for anglers who participated in the creel survey and the mark – recapture surveys of tagged fish from the Fisheries Assessment (ESTN).

Parameter	Minimum	Maximum	Average
Air Temperature °C	2	29	18
Water Temperature °C	7	21	16
Water Level (m)	0.43	0.63	0.51

Interviews were conducted 73 days out of a possible 108 days. Out of these days 22 were weekend days and 51 were weekdays. Barrel counts were collected during this timeline by, SVSFE technicians and parks staff to compare with creel data. Information collected from the barrels was species, length and observations. Throughout the project timeline temperature and the water level of the lake were collected each day staff was present.

Local Towns	
Benito	10
Birch River	2
Bowsman	40
Minitonas	5
Swan River	255
Other Towns/Non-Resident	
Arborg	1
Brandon	1
Winnipeg	4
Cartwright	1
Langruth	1
Petersfield	1
Roblin	6
Selkirk	2
Saskatchewan	7
Whitebeech	2
British Columbia	1
Non – Resident	3

Fisheries Technicians collected 384 interviews for groups totalling 853 anglers. 91% of anglers interviewed at Whitefish Lake reside locally. Regular licenses consisted of 49% of anglers surveyed.

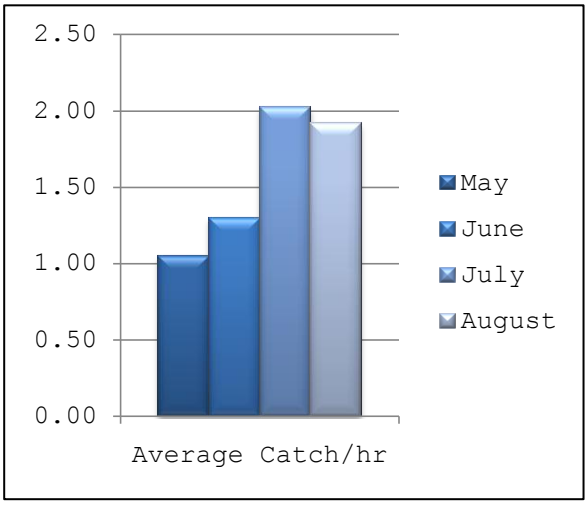
Type of License	
Regular	49%
Conservation	29%
Non-Resident	4%
Treaty	3%
Youth Anglers	14%
Unknown	1%

Angling opportunities at Whitefish Lake are unique to other lakes in the area for it has a large walking dock to fish from. Anglers frequently use the large wheelchair accessible walking dock at the mouth of the lagoon creek which was built by Swan Valley Sport Fishing Enhancement Group. The lagoon creek is known as one of the spawning locations used by walleye which increases fishing pressure during the spring season.

Fishing quality can be assessed or defined in a variety of methods. Fishing quality at Whitefish Lake was defined by using;

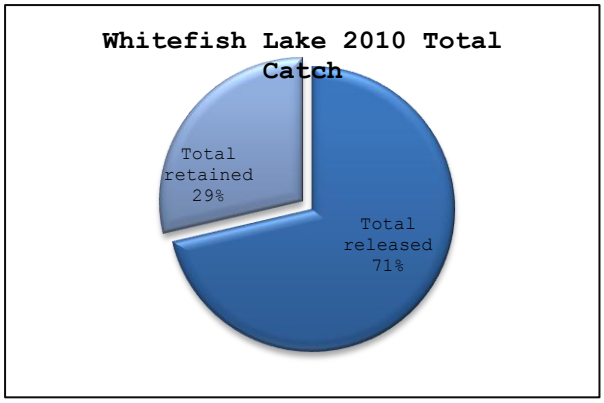
# of fish caught/hours fished

In the time frame of the creel survey the average fishing quality was calculated at 1.65 fish/hour. In terms of fishing quality per season; May had a value of 1.05 fish/hour, while June was 1.30 fish/hour, July 2.02 fish/hour and August with 1.91 fish/hour. Number of anglers for each month were 86, 318, 352, and 93 respectively. Fishing Pressure evidently increases by 3.5 times in June and July.



Recreational pressure on Whitefish Lake is one of the highest of all lakes within the Swan Valley Area. Fishing pressure is defined as total effort within a specific time period. Within the four month period angler groups fished for a total of 1162.7 hrs. The average hours fished was 3.1 hrs/day. When compiled with total number of anglers interviewed the pressure tallies up to 2644 hours (110 days) of fishing effort.

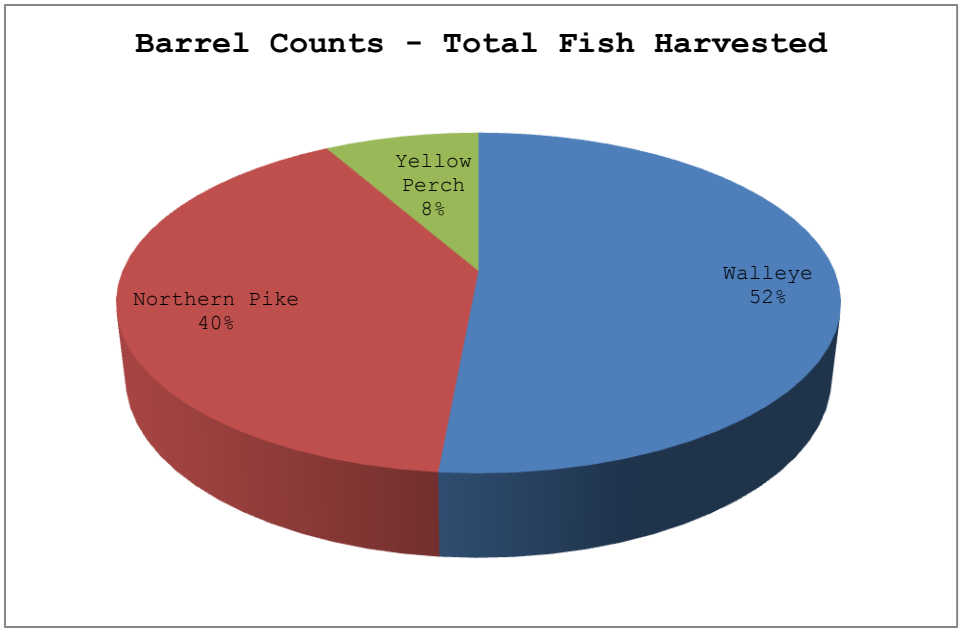
Whitefish Lake angling appeared to be most popular during evenings on the weekend with most anglers preferring to fish by boat.



Creel Statistics	
Average Hours Fished	3.1
Weekdays Fished	30%
Weekend Day Fished	70%
Evening Effort	59%
Morning Effort	12%
All Day Effort	29%
Effort fr. Boat	88%
Effort fr. Shore	11%
Women Anglers	28%
Men Anglers	72%
Youth Anglers	16%
Adult Anglers	67%
Senior Anglers	17%

During the sampling period, a total of 1754 fish were reported angled; 53% walleye, 40% pike and 6% yellow perch. Of the angled fish 703 were harvested; 45% were walleye, 46% were northern pike, 9% were yellow perch.

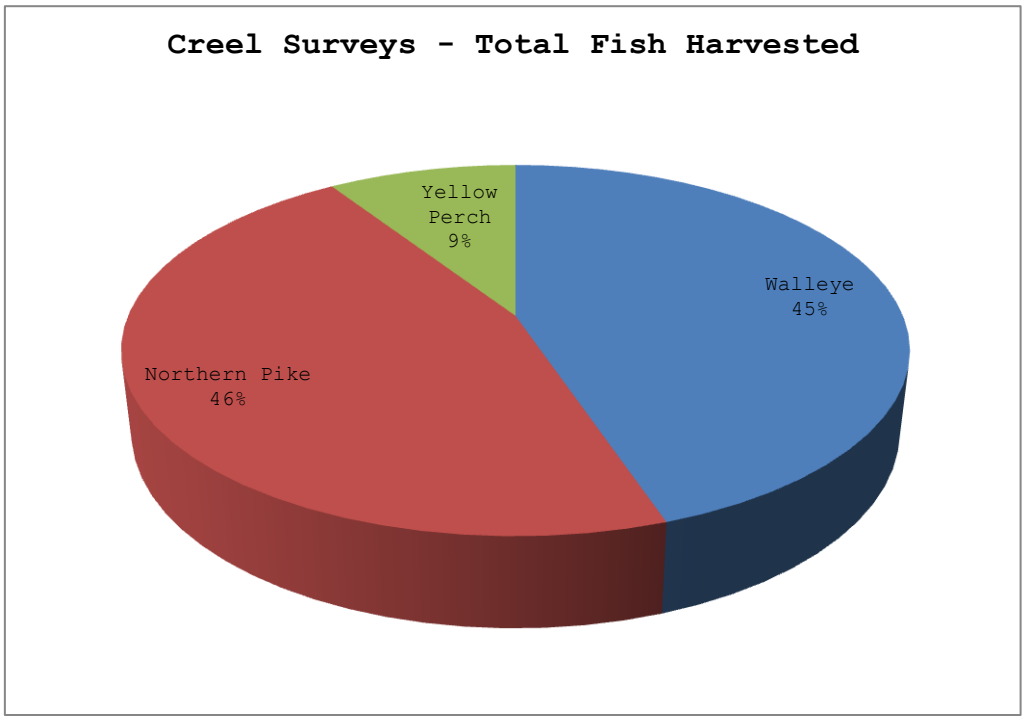
Barrel Counts

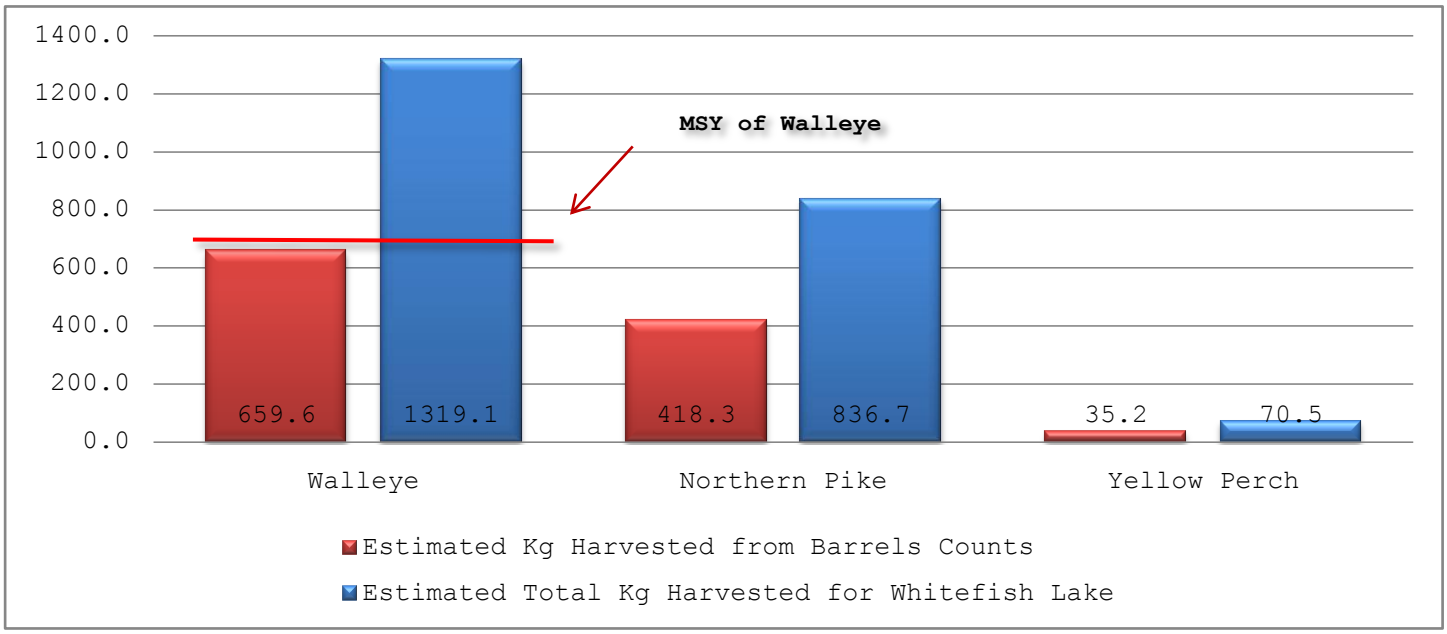


Barrel counts provided additional confidence to the recreational catch (creel database) and assisted in understanding the relation of total fish harvested to maximum sustainable yield of the lake. Maximum Sustainable Yield (MSY) is, theoretically, the largest yield/catch that can be taken from a species' stock over an indefinite period. Under the assumption of logistic growth, the MSY will be exactly half of the carrying capacity and is usually higher than the optimum sustainable yield (3, 2010). Managers use a general MSY for walleye at 1 kg/ha annually. Barrel counts are estimated to represent approximately 50% of total fish harvested.

Barrel counts from May 16th to September 9th produced a total number of 2116 fish harvested. Of this total 1089 were walleye, 852 northern pike and 175 yellow perch. When comparing the creel database to barrel counts, creel surveys indicated 83% of the total sampled from barrels.

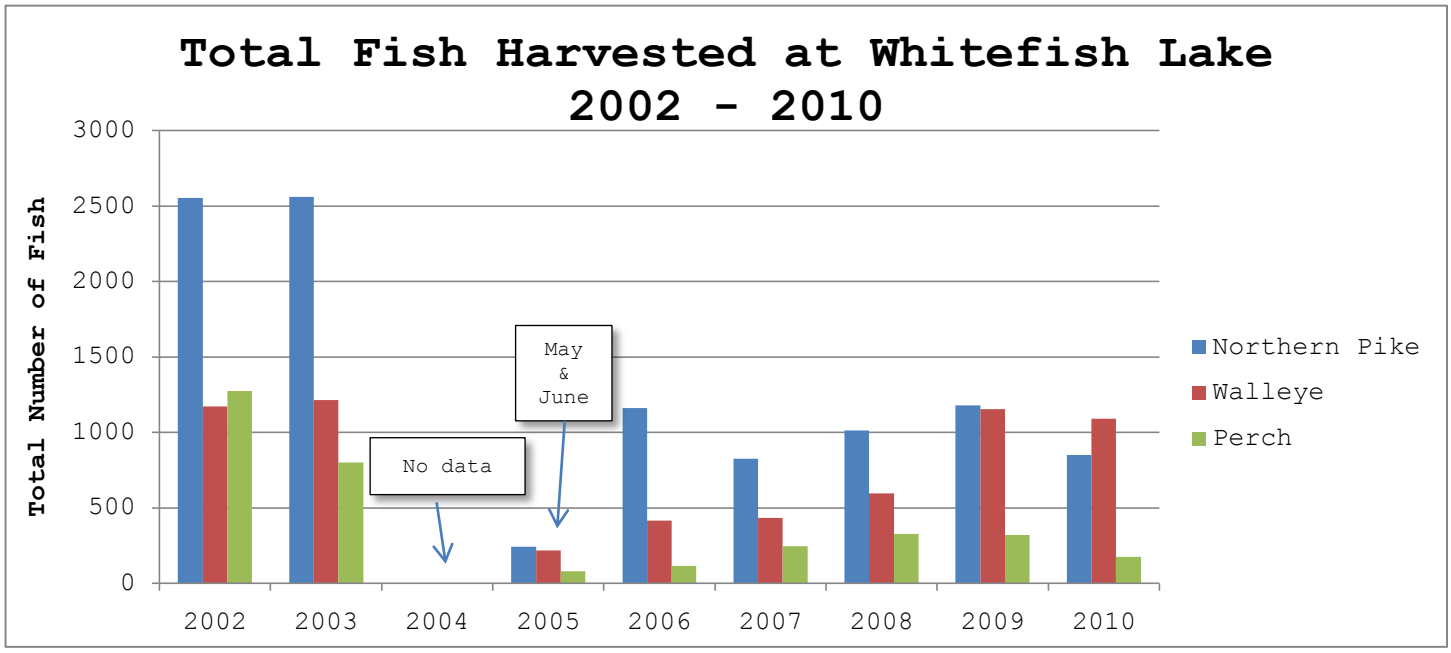
A total of 659 kg of walleye, 418 kg northern pike and 32 kg of yellow perch were estimated to be removed from Whitefish Lake. Note; these values are *only* total weights of harvested fish from barrel counts and do not represent fish which were processed in other locations.





When compared to the MSY of walleye for Whitefish Lake (675 kg/ha), the four month study period had reached near the maximum value. This is not considering the winter recreational fishing pressure. Further data collection is required to understand the true maximum sustainable yield for Whitefish Lake, as 1 kg/ha is a general guideline.

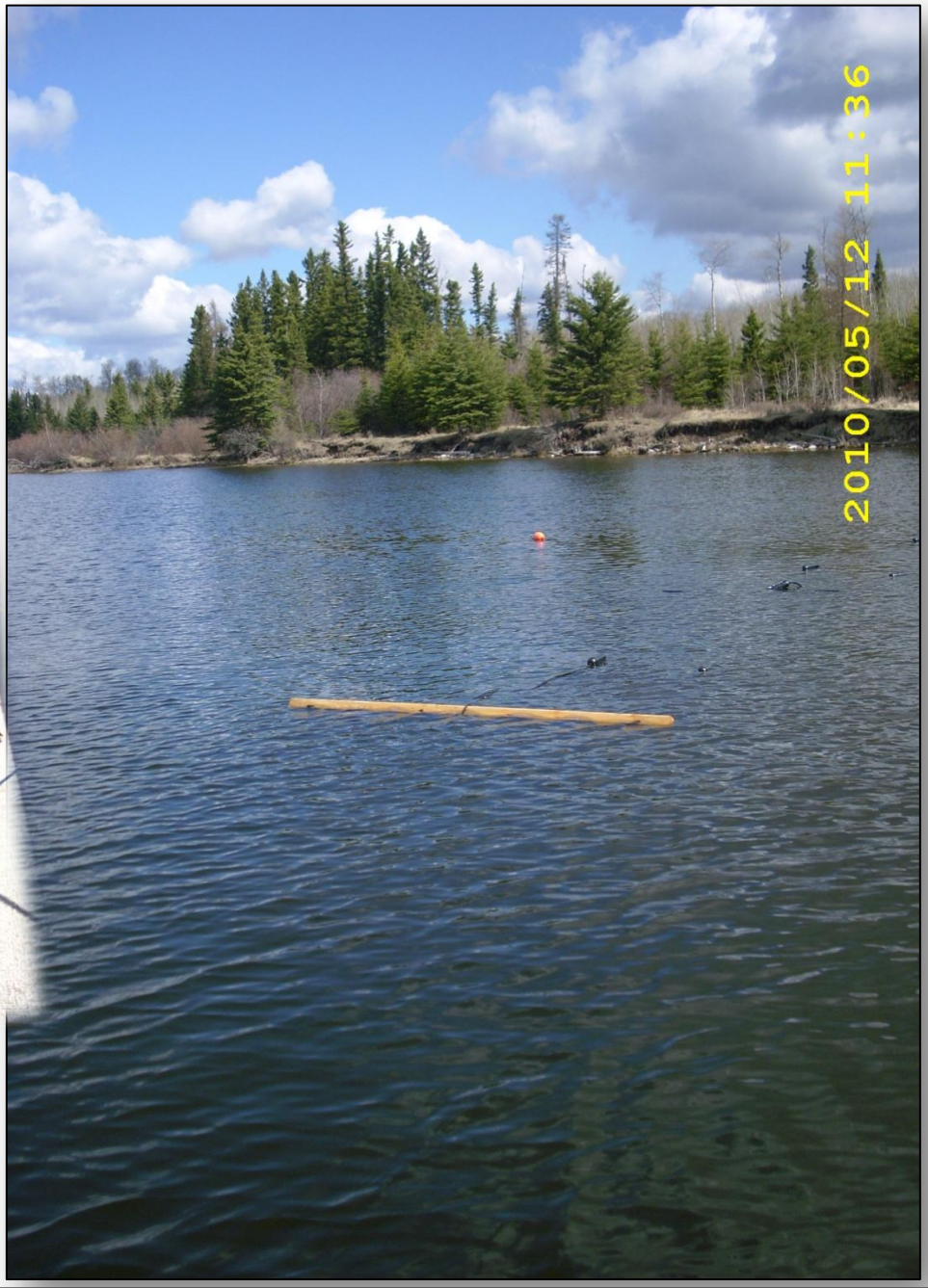
Past trends illustrate an increase since 2006 in walleye being harvested. Initially in 1990 a slot length limit for walleye of 45 cm to 75 cm was introduced for the lake as well as a reduction in creel limits from 6 to 4 (Yake, 1996). This was followed by an additional reduction in 2005 from 4 to 2. Only once, in 1980, was the lake stocked with walleye (300,000 fry) (Yake, 1996). Evidently, natural reproduction within the lake and its' tributaries have been able to sustain the walleye population.



End of Spring Trap Netting

Objectives & Interpretation

End of Spring Trap Netting (ESTN) is a live release trap netting program. The survey is designed to estimate abundance of fish species that inhabit near shore zones and acquire baseline information on the biology of all fish species present. The 2010 ESTN is the first of this kind for Whitefish Lake and it is recommended that the ESTN be conducted for two consecutive years. Additional years are required to obtain a relative abundance or species population. With future ESTN studies, managers will have the ability to assess and monitor the impacts of fishing pressure on the lake.

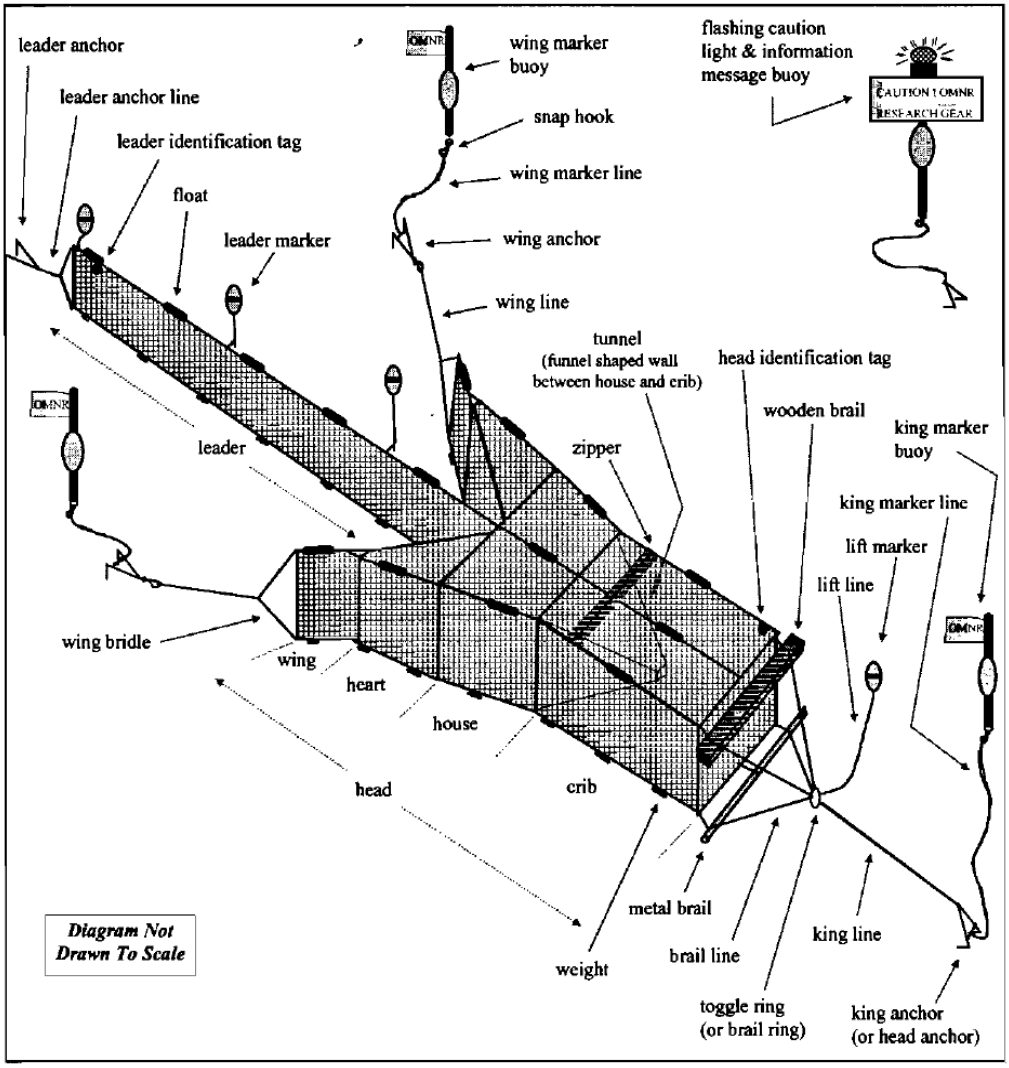


Methodology

Pre-field activities were required; which included site selection for trap net locations. Sites had to be selected with a random selection design. A Universe Transverse Mercator (UTM) grid overlay was utilized and 16 random sites were chosen. Ground truthing was required to ensure trap net locations were placed within target criteria. Once sites were considered acceptable a schedule was developed considering all criteria and the setting of two trap nets per 24 hour period.

Criteria	Target	Acceptable
Trap Net Separation Distance	500.0 m	500.0 m
Reuse of Trap Net Sites	No reuse	After 2 nights set free
Trap Net Set Duration	24 hrs	Overnight (≈22 hrs)
Lead Length in Water	46.0 m	30.0 – 46.0 m
Lead to Shore Distance	0.0 m	0.0 – 20.0 m
Lead Angle fr. Shore	90°	70° – 90°
Lead Start Depth	0.0 to 0.3 m	0.0 – 1.0 m
Water Depth at Gap	2.0 to 2.5 m	1.7 – 3.5 m

The ESTN protocol has a strict guideline for gear selection to reduce sampling variability. SVSFE utilized the standardized "Lake Superior Trap Nets" which consist of a 6′x 6′ x 11′4″ crib and 150′ lead (Figure). It is believed fish moving in the littoral zone often travel parallel to shore and the lake bottom contours where fish encounter the trap net lead that is set perpendicular to shore (Skinner, 2004).



Depending of the size of fish, they will either

swim through the lead or follow it to the gap of the trap where fish are eventually funnelled into the crib.

Fishing commenced on May 10th 2010 and continued until May 26th 2010. Field surveys were to occur when water temperature reached 12°C through to 18°C. Water temperatures throughout the sampling period ranged from 8.5°C - 13.7°C, late afternoon temperatures did rise to close or above recommended level.

Trap nets were set in early morning to ensure adequate sampling and resetting time was available the following day. All nets were marked with several buoys and identification flags. Information recorded at set time included; project code, water-body, UTM coordinates of set location, sample number, site number, site type (general substrate, fish cover) bottom type (substrate, fish cover), net set crew, set date, set time, lead length, distance off shore, angle to shore, start depth, mid depth, gap depth, and any comments.

Average set time for traps were 22 hours with a maximum set time of 24.6 hours and a minimum of 21.2 hours. Net gap depths average 2.6 meters with lead depth average of 1.8 meters. Only on one occasion was the lead start point 20 meters from shore due to shallow set location. Therefore the net was not fishing the entire littoral zone between trap and shore. Information recorded at net pull consisted of; net lift crew, lift date, lift time, effort status, duration of set, water temperature, total suspended solids (TSS), cloud cover, precipitation type, wind direction & speed, general weather for set duration and surface conditions through set. Once trap was pulled all fish, excluding white suckers, were removed and placed in a holding pen. White suckers were assessed by count only.

All fish caught were identified by species, and sampled for fork length, weight, age and a numbered floy tag was applied. Age structures taken included spines from walleye, and yellow perch and scales from northern pike, and lake whitefish. Once all fish were sampled, tagged and released traps were relocated and reset at the next assigned fishing location.

Results

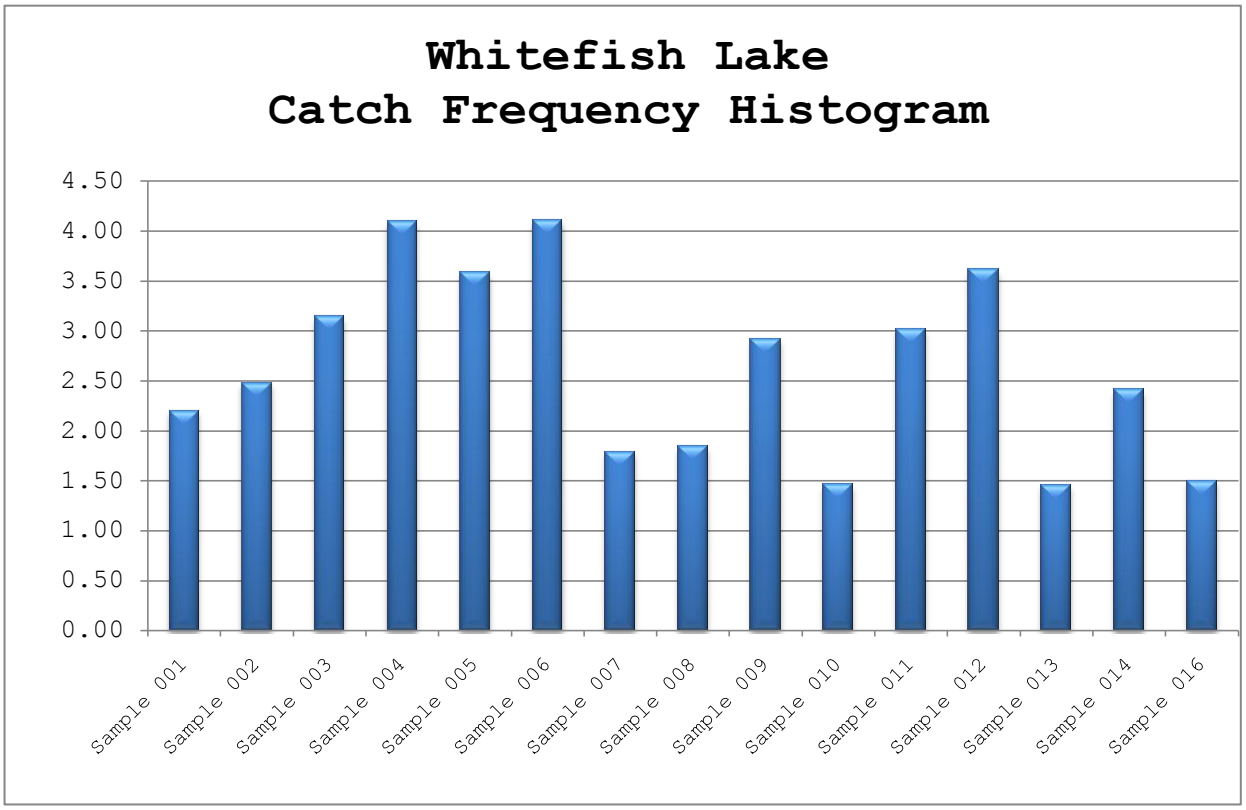
End of Spring Trap Netting Overview

When analyzing ESTN data, selectivity must always be considered. Selectivity is affected by gear construction and operation, as well as schooling, feeding or spawning migrations of targets species; such activities vary with time and location and render the fish more or less susceptible to capture (Hightower, 1984). Trap nets used were selective by sampling larger bodied fish, as fish generally less than 200 mm were less likely to remain in trap.

A total of 987 fish were caught during the three week sampling period. Out of total fish caught 605 were sampled and tagged. Sixteen samples quantified to 366 hours of fishing time. The Catch-per-unit-effort (CPUE) was calculated to create a standard measure of catch by time effort by gear. Gear was identical for all samples therefore the following formula was used to calculate CPUE:

$$\mathbf{CPUE = \sum(n)/t}$$

n = the # of fish caught
t = fishing time of trap nets



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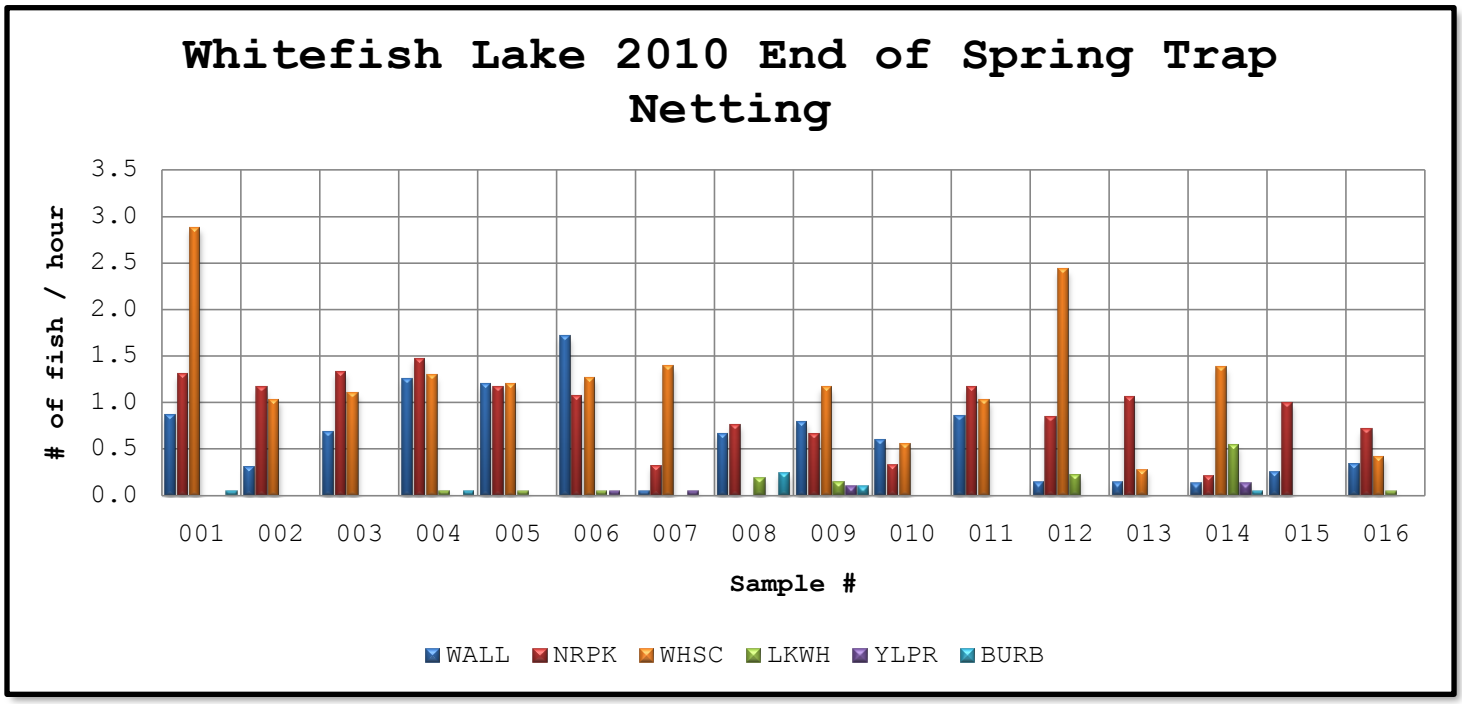
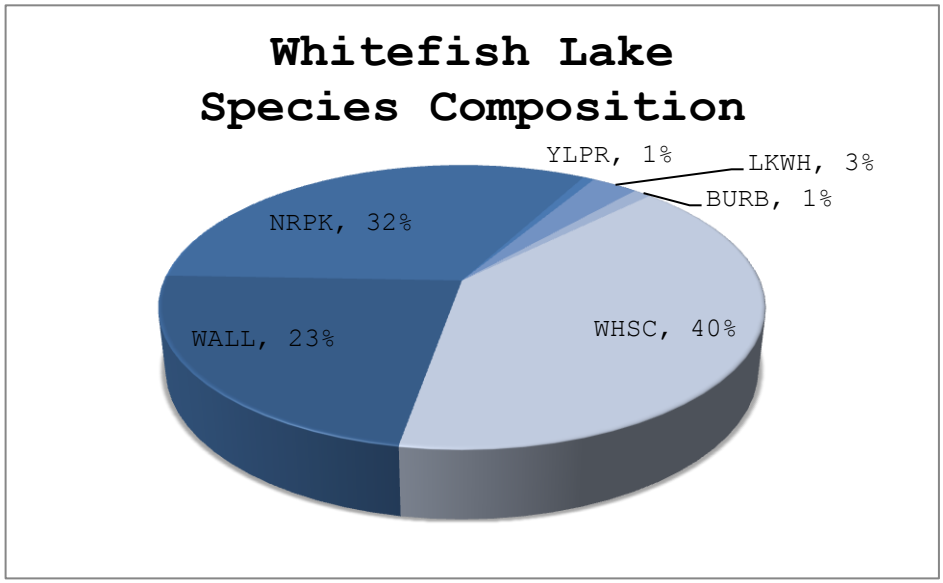
result CPUE is described as: # of fish/hour. The total CPUE is 0.38 fish/per hour. The average CPUE for the total of 16 sets was 2.66 fish/hr.

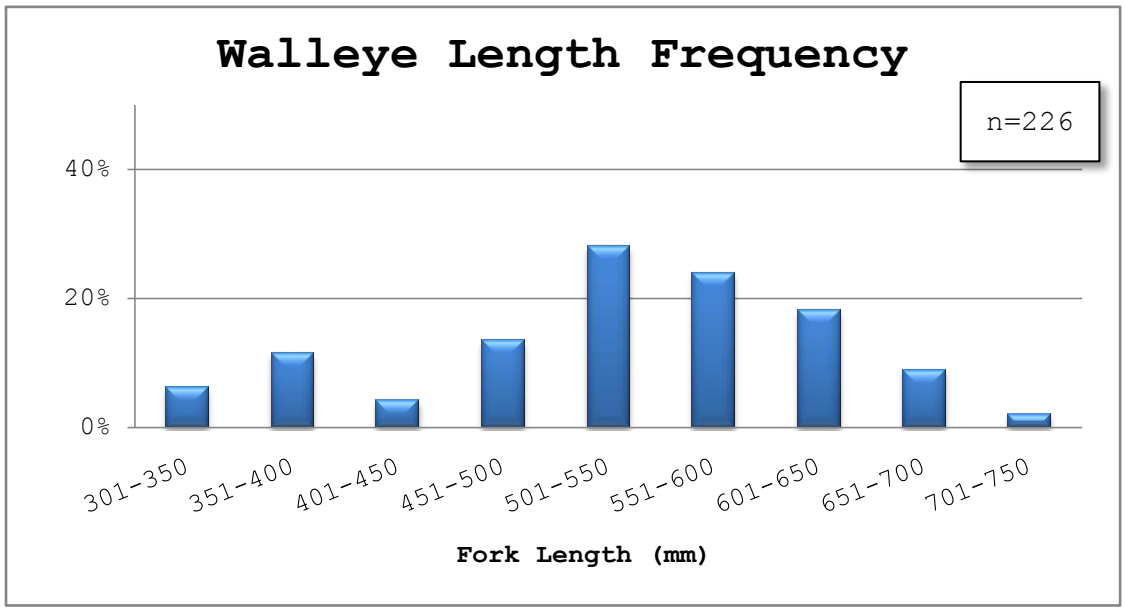


Species Composition

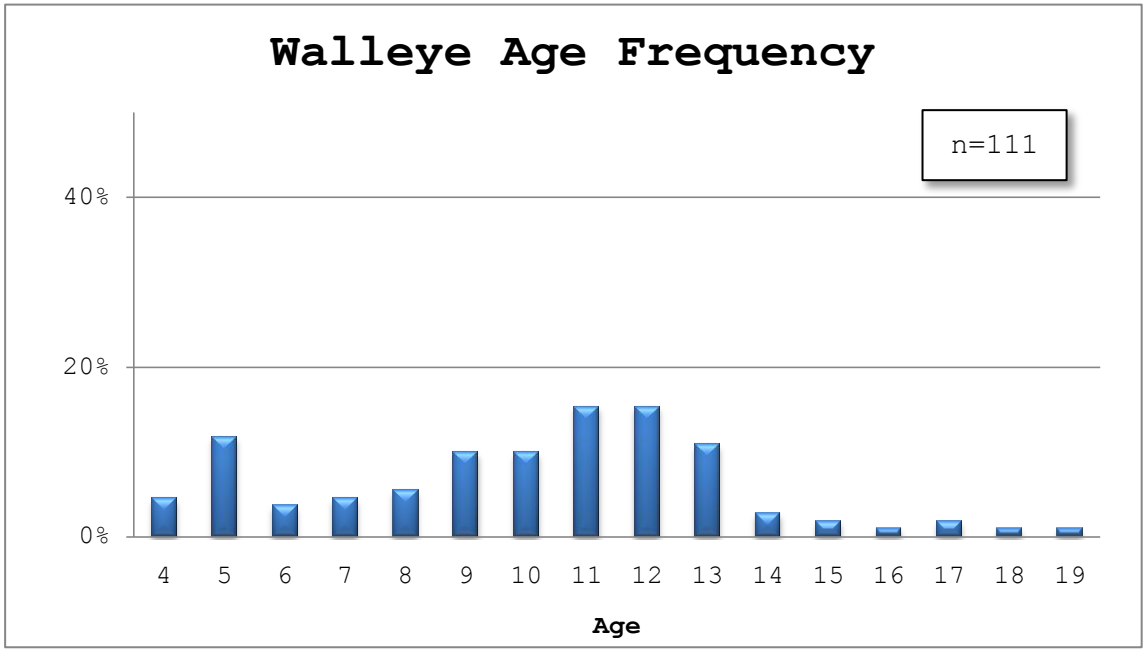


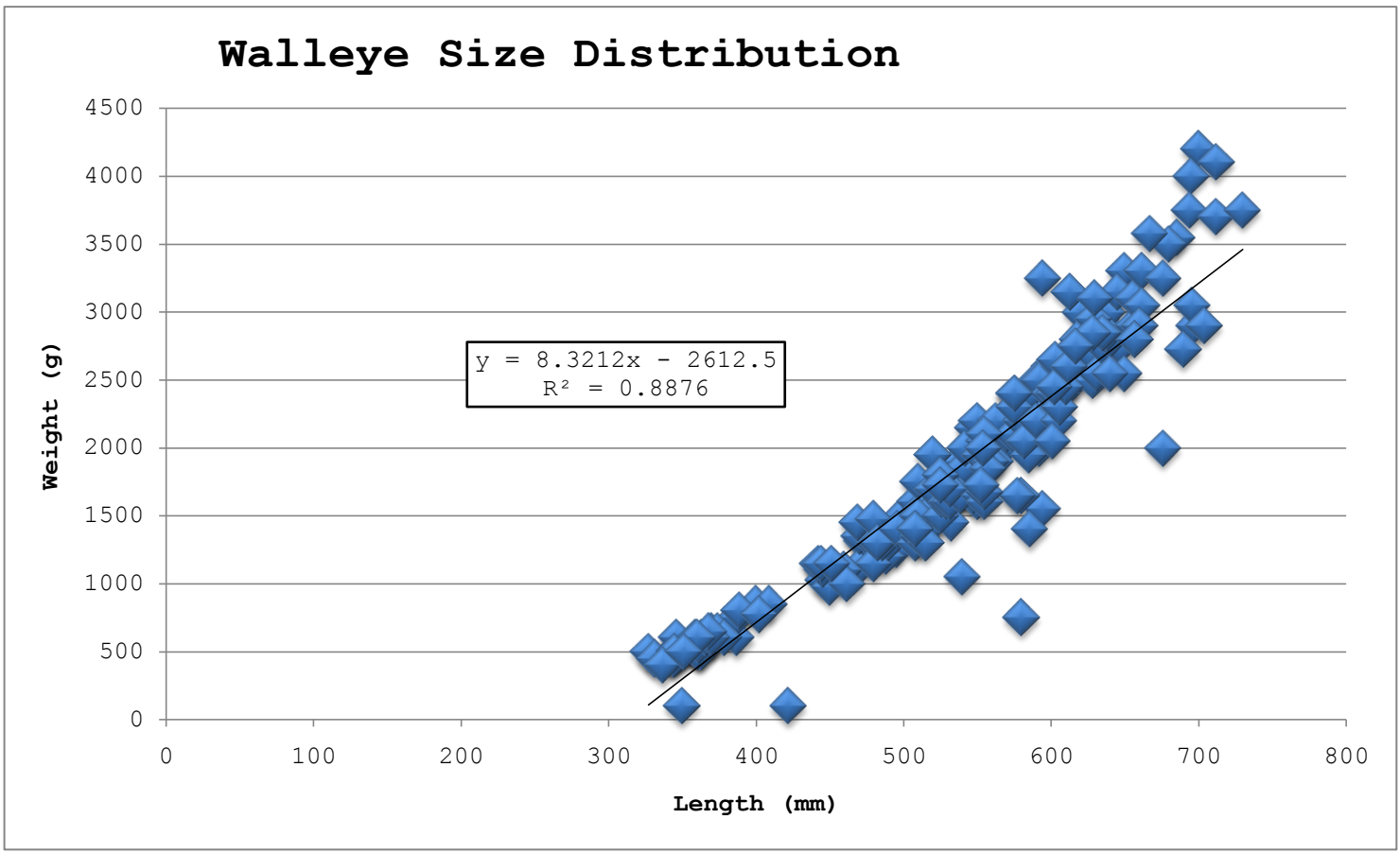
Walleye

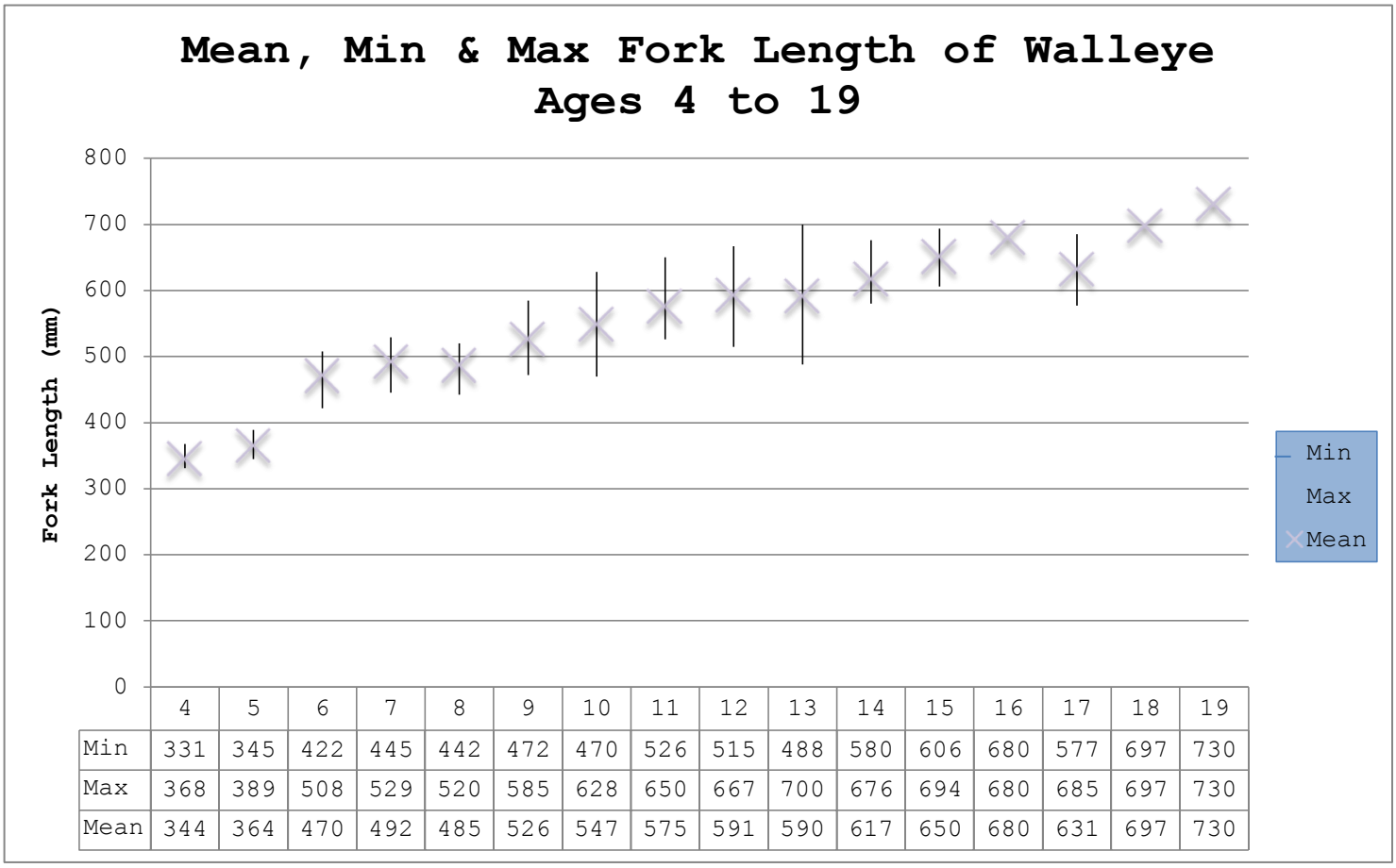
Walleye were caught in 15 out of 16 samples ranging between 0 – 1.7 fish/hour, with an average CPUE of 0.6 fish/hour. Whitefish Lake walleye regulations state a limit of two fish and all fish within the slot of 45 cm – 70 cm must be released and only one over 70 cm may be retained. 81% of walleye caught during the trap netting were in the slot size. In total 226 walleye were sampled. Walleye ranged from 327 mm – 730 mm in fork length and 100 g – 4200 g in weight. Average size fish was 532 mm (21 inches)and 1817 g (4 lbs).



111 representative walleye age structure samples were analyzed by Aqua Tech Services. Walleye ages ranged from 4 to 19 years old. The nine to thirteen year age classes were the most predominant, followed by 12% of the five year age class. Remaining samples have been sent for analysis which will be received at a later date.



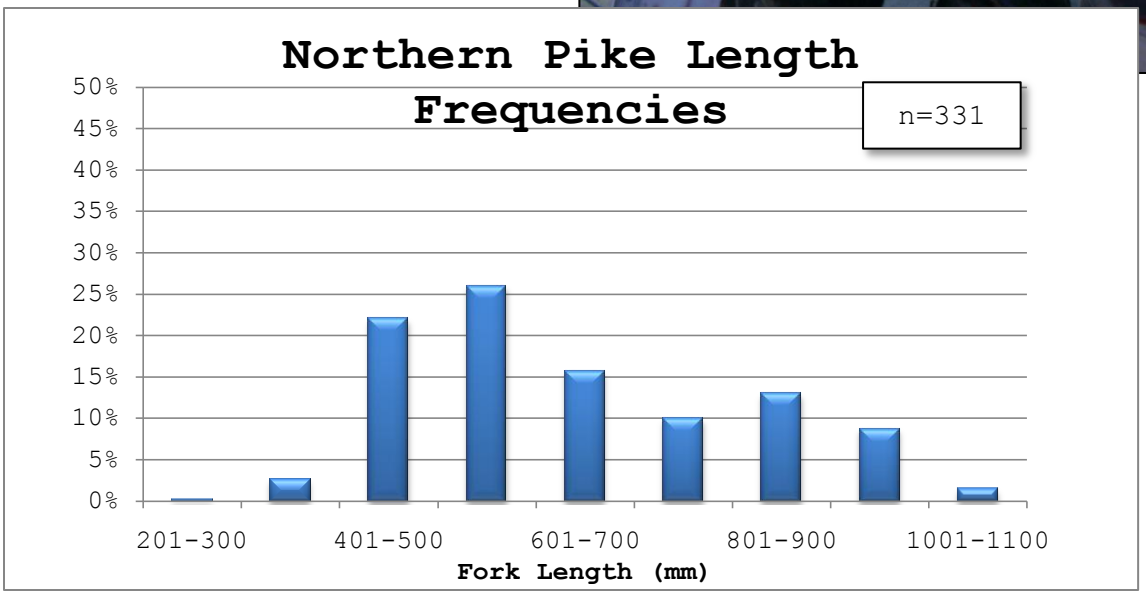


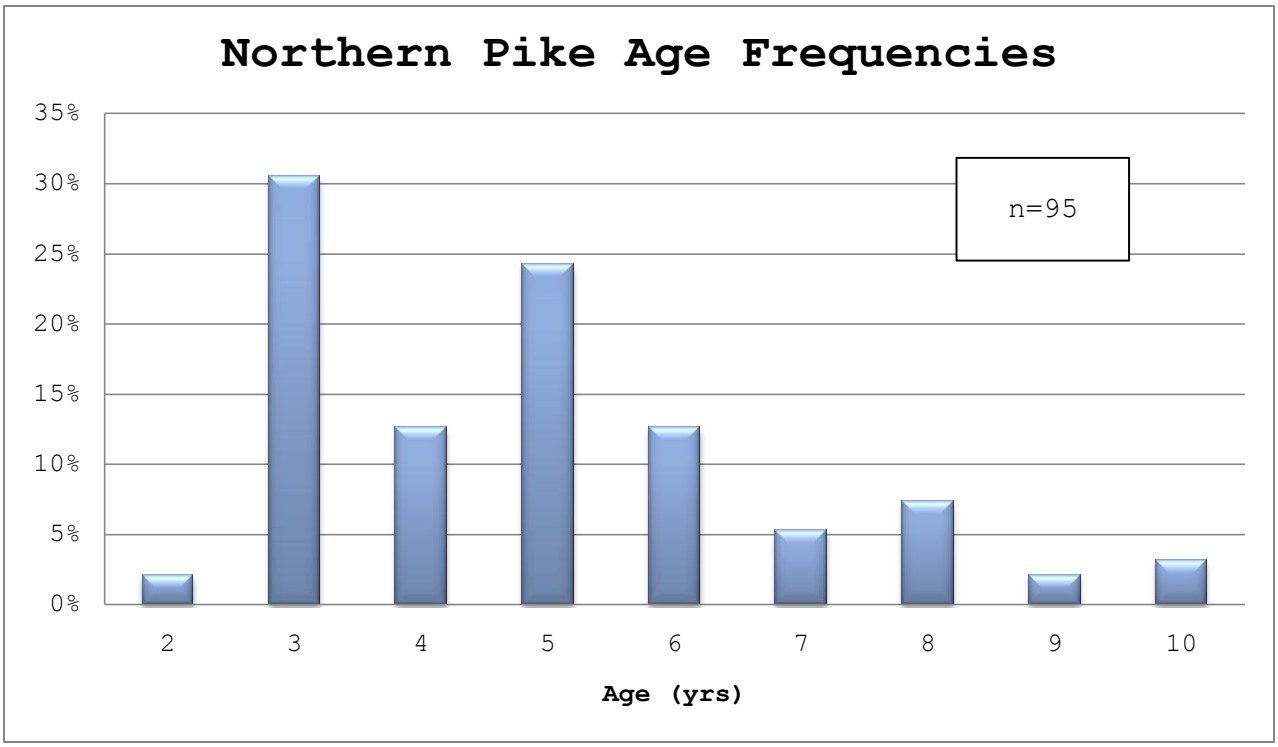


	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Min	331	345	422	445	442	472	470	526	515	488	580	606	680	577	697	730
Max	368	389	508	529	520	585	628	650	667	700	676	694	680	685	697	730
Mean	344	364	470	492	485	526	547	575	591	590	617	650	680	631	697	730

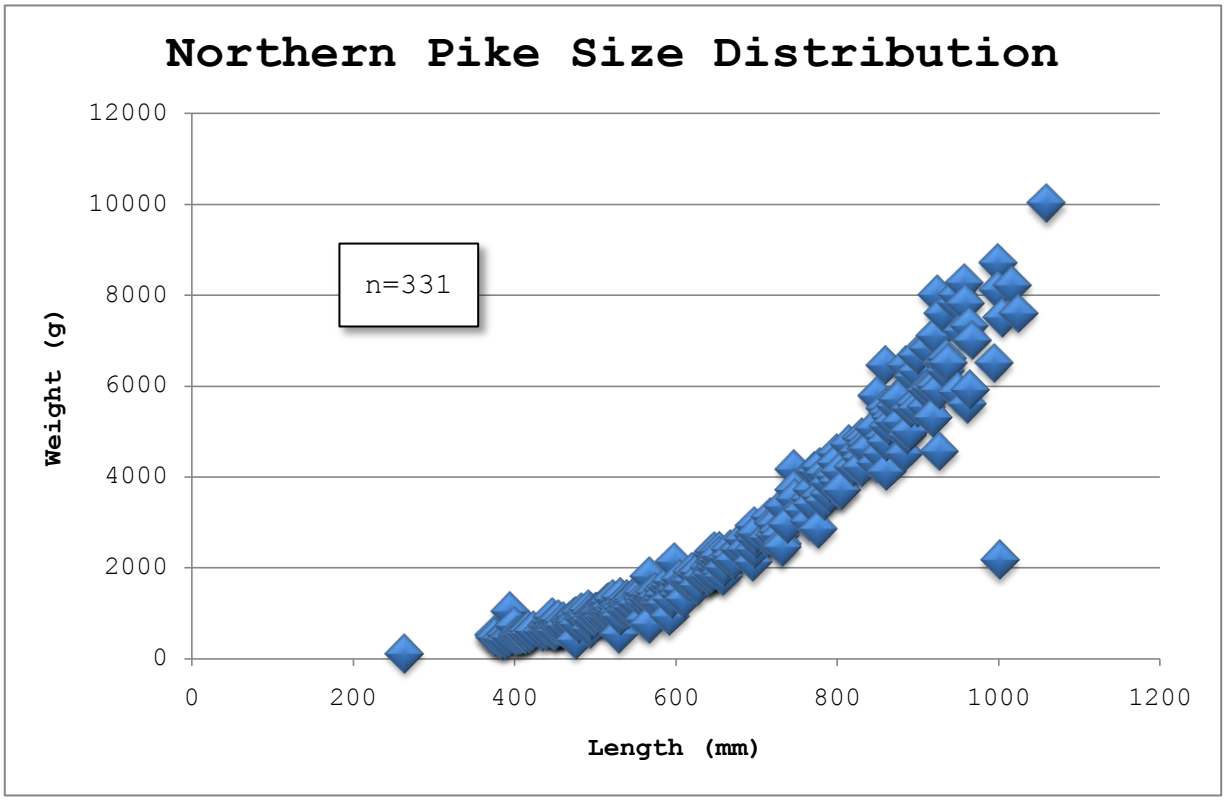
Northern Pike

Northern pike were the most frequent fish sampled in all trap netting samples with CPUE ranging 0.21 – 1.47 fish/hour and an average of 0.90 fish/hour. In total 331 northern pike were caught and sampled. Pike ranged from 264 mm - 1060 mm in fork length and 100 g to 10,000 g in weight. Fisheries regulation state all pike over 75 cm must be released. Approximately 31% of northern pike sampled were above this value. Average sized northern pike was 641.8 mm (25 inches) and 2496.8 g (5.5 lbs).



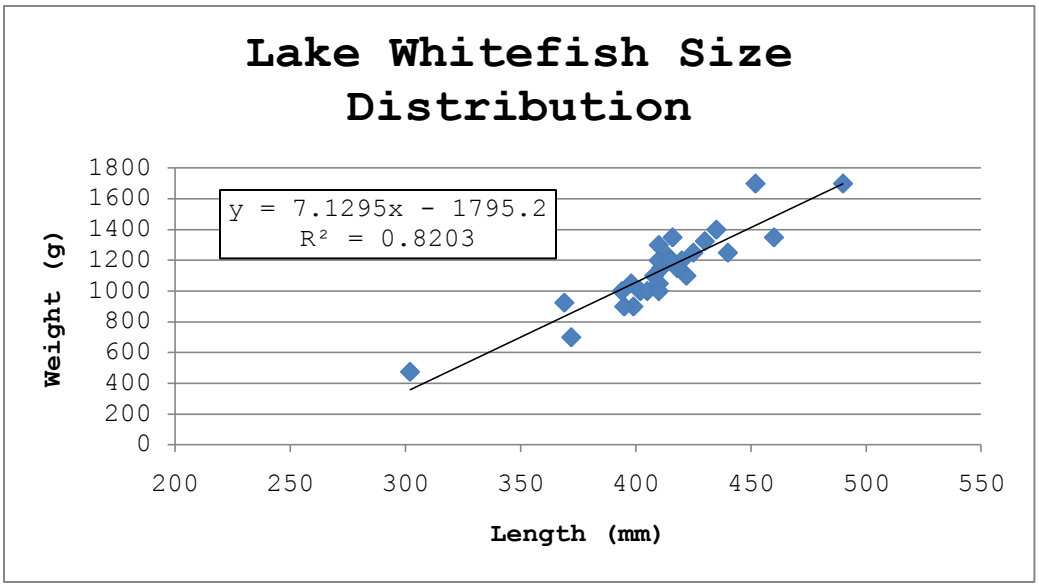


95 Northern pike scale samples were analyzed. Of these pike age classes ranged from 2 to 10 years. 3 and 5 year age classes were most common.



Lake Whitefish

Lake Whitefish caught at Whitefish Lake were found in 50% of samples with CPUE ranging from 0 – 0.54 fish/hour and an average 0.08 fish/hour. Fork length ranged from 302 mm – 490 mm with weights ranged from 475 g to 1700 g Results of age classes are still being analyzed. Average sized lake whitefish were 412 mm (16 inches) and 1141 g (2.5 lbs).

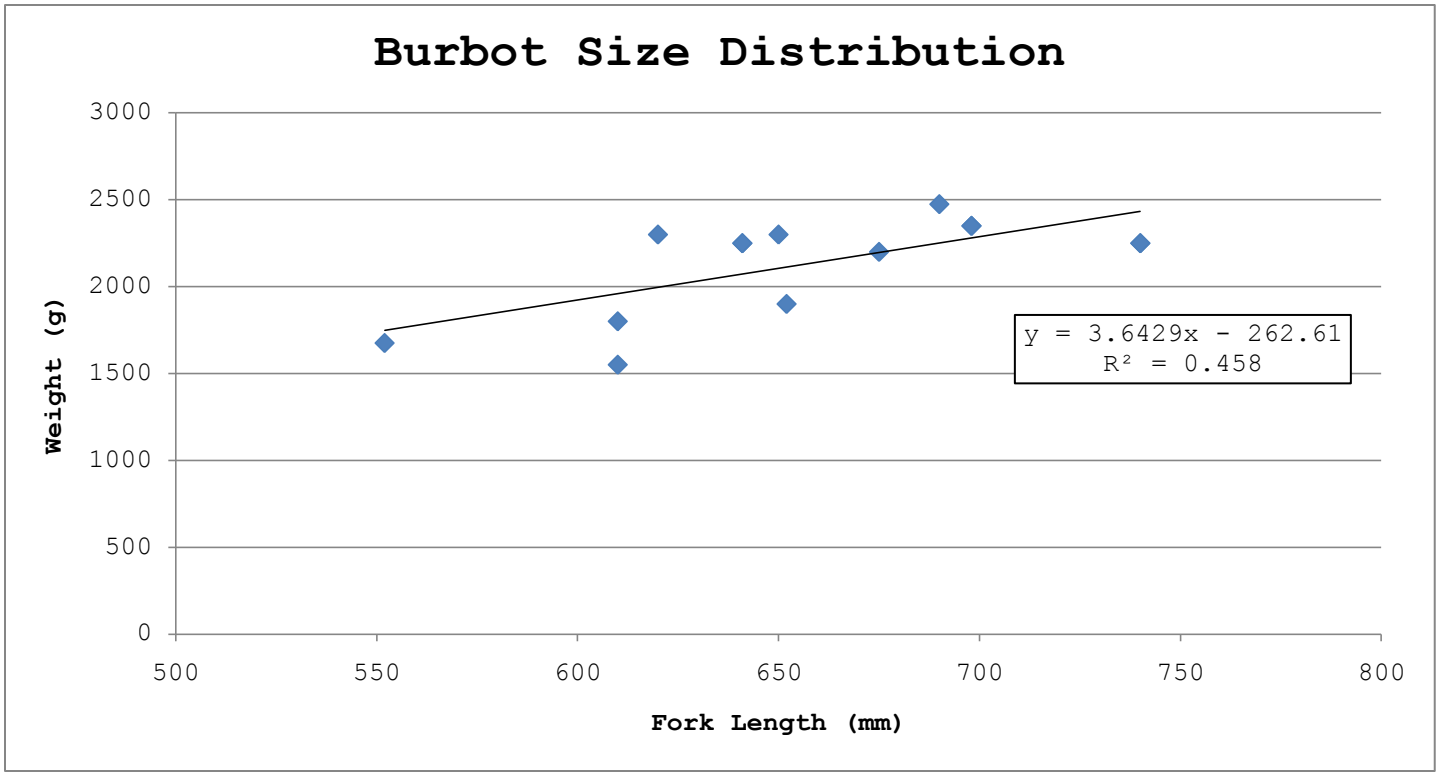


Yellow Perch

Perch were caught in 4 out of 16 samples but only 6 in total within entire survey. CPUE ranged from 0 – 0.12 fish/hour and an average of 0.02 fish/hour. Yellow Perch sampled ranged from 195 mm – 279 mm with a mean fork length of 251 mm (10 inches). Weights of YLPR sampled ranged from 250 g to 350 g with a mean weight of 295 g (0.6 lbs). Because gear was selective to size of fish caught, many perch were able to pass through mesh of trap.

Burbot

Burbot were caught in 6 out of the 16 samples with CPUE ranging from 0 – 0.24 fish/hour and an average of 0.03 fish/hour. Burbot ranged from 652 mm to 740 mm in total length with a mean length of 658.4 mm (30 inches). Weights of burbot ranged from 1550 g to 2475 g with a mean weight of 2135.7 g (4.8 lbs). No age structure was collected from burbot.



White Sucker

White Sucker was the most abundant fish throughout the survey with a total of 396 fish and found in 14 out of 16 samples. In 6 out of 16 samples white suckers were also the highest catch with CPUE ranging from 0 – 2.87 fish/hour and an average of 1.08 fish/hour.

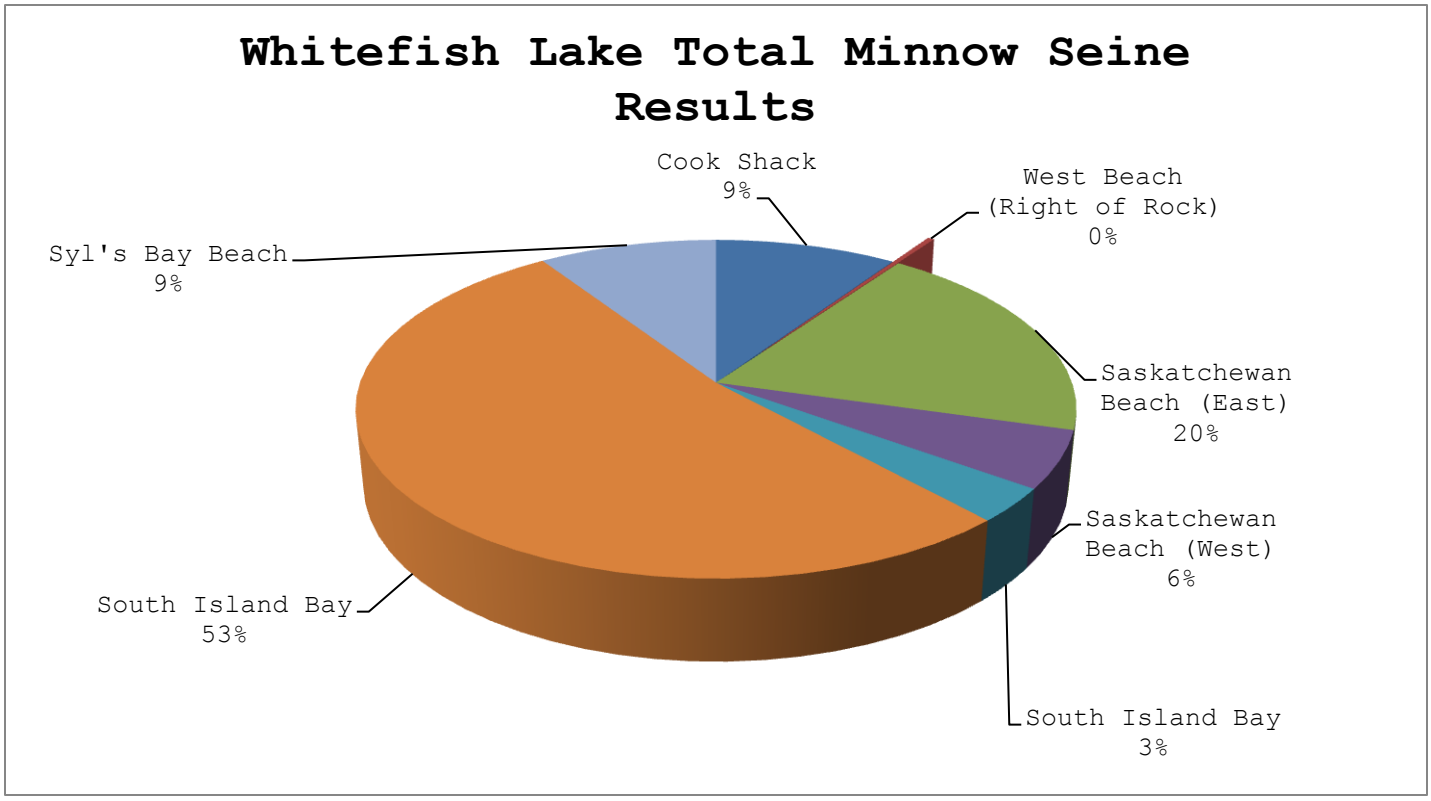
Minnow & Invertebrate Species

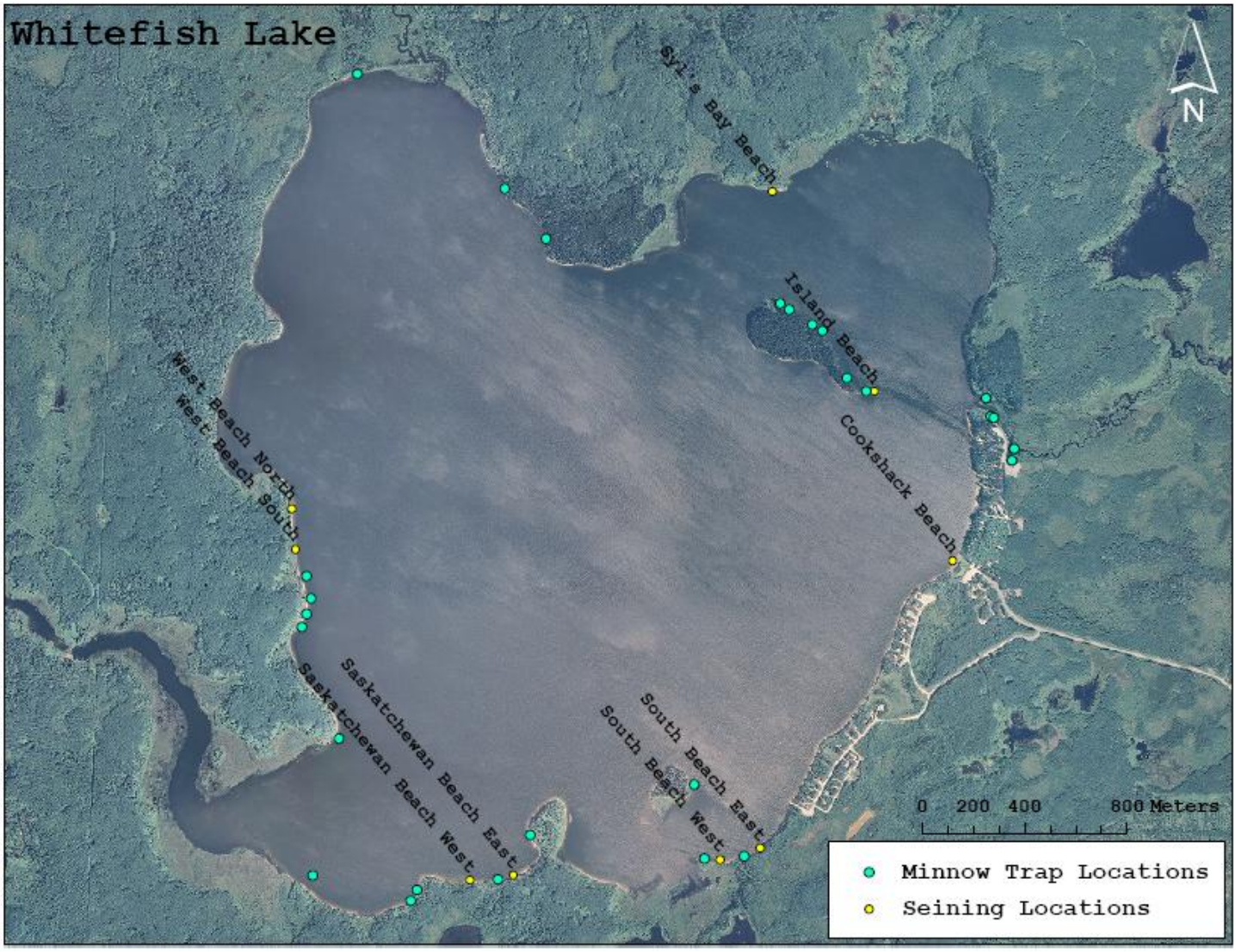
Minnow traps were set throughout the four month period to collect and identify species and composition of forage fish that inhabit Whitefish Lake. Also midsummer seining was conducted at multiple locations & habitat types (PIC of Sample SITES). Seining was proven to be a more effective sampling method. A total of 535 forage fish were caught throughout nine 50 meter long seining sites. Yellow perch and spottail shiners were the most abundant species with total catch of 426 and 123 respectively. At two sites noted several small minnow species (spottail shiners) observed, but the mesh was too large to catch those fish.

Species observed or caught between both sampling methods included;

Cyprinidae	***Percidae***	***Gasterosteidae***
Common Shiners (Luxilus cornutus)	Johnny Darters (Etheostoma nigrum)	Brook Stickleback (Culaea inconstans)
Spottail Shiners (Notropis hudsonius)	Yellow Perch (Perca flavescens)	
Western Blacknose Dace (rhinichthys obtusus)	Log Perch (percina caprodes)	
Catostomidae	***Gadidae***	
White Sucker(Catostomus commersoni)	Burbot (Lota lota)	

Invertebrate species observed included caddisflies, dragonfly nymphs, leeches, snails, water beetles and crayfish. Several of these species indicate good water quality





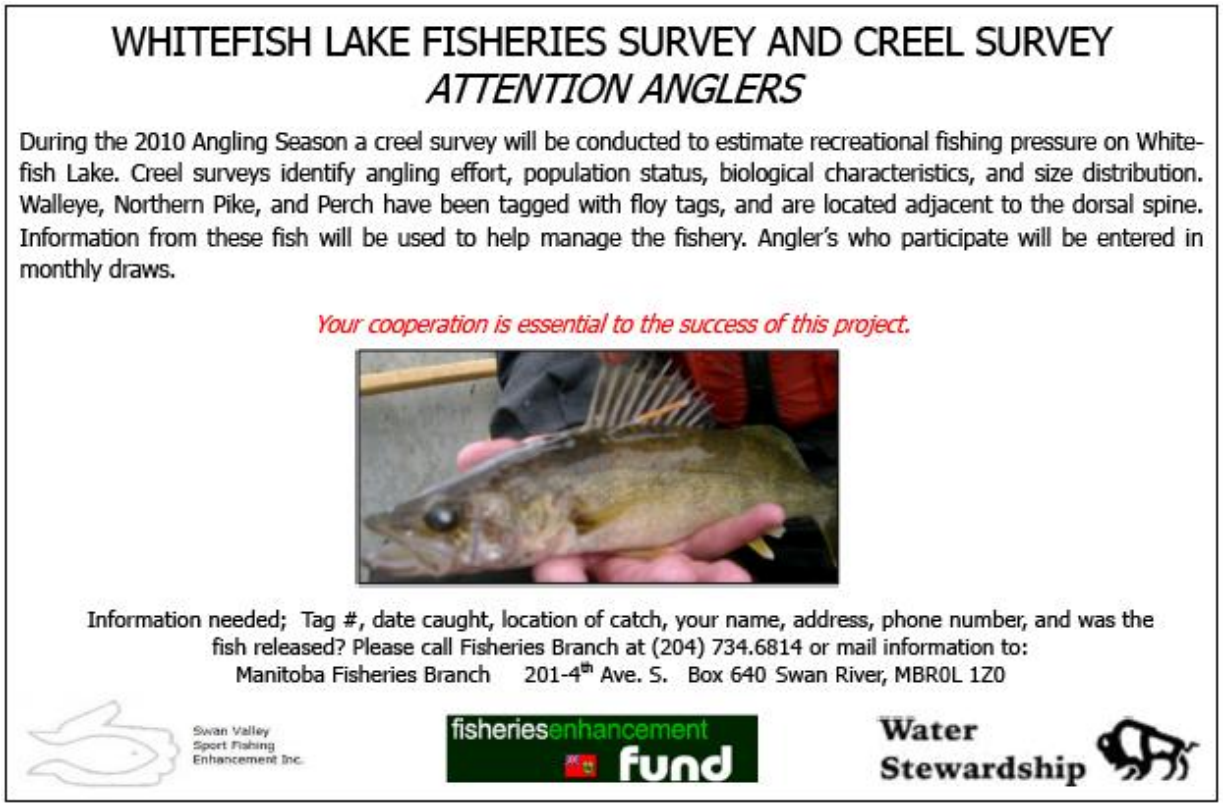
Bathymetric Mapping

Bathymetric data was collected on Whitefish Lake with a Garmin GPSMap 420S w/ sonar transducer. A route was created with fifty meter intervals running north and south to map depths. The Garmin GPSMap collected track points every ten meters and speed was limited to a maximum of 10 km/hr. Development of the bathymetric map data collected on the lake will be done by Natural Resource Management Technology (NRMT) students at the University College of the North. With the spatial data collected, a 3-D map along with a contour map will be created. Visualizing depths on a map can help understand different types of habitat under the water's surface. Maps will also be available for the public to use for angling references.

Publications and Project Awareness

With Whitefish Lake being one of the more popular lakes within the valley, there was no shortage of informing the public of the importance and purpose of the project. Various venues were utilized;

1- Signage was posted at the launching area (lagoon).
2- Also technicians notified anglers of work being conducted through creel interviews.



WHITEFISH LAKE FISHERIES SURVEY AND CREEL SURVEY

ATTENTION ANGLERS

During the 2010 Angling Season a creel survey will be conducted to estimate recreational fishing pressure on Whitefish Lake. Creel surveys identify angling effort, population status, biological characteristics, and size distribution. Walleye, Northern Pike, and Perch have been tagged with floy tags, and are located adjacent to the dorsal spine. Information from these fish will be used to help manage the fishery. Angler's who participate will be entered in monthly draws.

Your cooperation is essential to the success of this project.

Information needed; Tag #, date caught, location of catch, your name, address, phone number, and was the fish released? Please call Fisheries Branch at (204) 734.6814 or mail information to:
Manitoba Fisheries Branch 201-4th Ave. S. Box 640 Swan River, MBR0L 1Z0

Swan Valley Sport Fishing Enhancement Inc.

fisheriesenhancement fund

Water Stewardship

3- Got directors and interested volunteers involved in trap netting program

Look out for tagged fish

Submitted Story

Swan Valley Sport Fishing Enhancement (SVSFE) has initiated three main projects this season with the support of Fisheries Enhancement Fund (FEF). The group has become active in the past year with projects to assist with local fisheries management. The group is looking for co-operation from the anglers to help make these projects a success. The following are active projects which SVSFE would like everyone to be aware of:

Swan River and Whitefish Lake Walleye: The main objective for both water bodies is to monitor the seasonal movements of walleye using radio telemetry tags. The focus of the monitoring will be on spring spawning and habitat requirements. Data collected will be used for future fisheries management on both systems. Habitat improvements, migration and movement patterns and seasonal habitat requirements information will be a consideration in future management of the species with the data gathered.

Whitefish Lake Fisheries and Creel Survey: The first objective of this project will be to utilize a standard live release trap netting program designed to evaluate abundance and other attributes of fish species that inhabit the littoral zone of lakes. Fish will be tagged with a small external plastic tag with individual numbering to assist in assessing fish health in the future. The second objective is to conduct a Creel survey. Creel surveys are a common tool fishery managers use to obtain the total pressure or "effort" that anglers exert on a fishery, angler catch rates, and fish harvest rates.

Stocked Trout Waters Assessment: The main objective of this project is to provide an unbiased index of stocked trout abundance, as well as to provide biological information on the target species. The secondary objective of this assessment will be to assist fisheries managers with a better understanding of these water bodies to assist in future trout stocking rates. Lakes being assessed include Glad Lake, Gull Lake, Black Beaver Lake, Beaver Lake, Vini Lake, Shilliday Lake, Olsen Lake and Two Mile Lake.

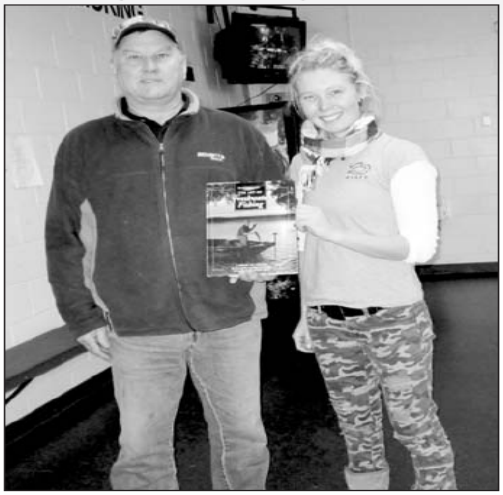
Voluntary Angler Diaries: The objective of this project is to involve anglers in the collection of data on catch and harvest rates. In addition, biological data (length and weight) will be collected from anglers to help managers evaluate the fishery. This type of program also involves anglers in fisheries monitoring which encourages them to be better stewards of the resources. Angler diaries are available anywhere you buy angling licenses.

What we need from the public is cooperation. Please submit any information regarding tagged fish captures, respect equipment and net sets in the various locations, and partake in the creel and angler surveys. SVSFE and Water Stewardship-Fisheries Branch staff will be working closely together on projects and look forward to improving angling opportunities for the future. Please contact 734-6814 with any information you may have or if you have any questions. Thanks for your cooperation.

– Swan Valley Sportfishing Enhancement

SWAN VALLEY SPORT FISHING ENHANCEMENT INC

It may be a little late in the year to be thinking about fishing on open waters, but Swan Valley Sport Fishing Enhancement Inc. would like to thank everyone who participated in the angler surveys conducted at Whitefish Lake this past season. In the below picture, John Rooks with SVSFE technician Melissa Johnson is just one of the winners from the draws conducted throughout the project. Winners from previous draws include; in May - Filuk Family, June - Rod & Rita Lawrence, July - Keith Sparkman, and August - Jim Baker. The draw was an incentive to get the public involved in the surveys collected. These surveys provided an up-dated and accurate picture of the recreational fishing pressure on Whitefish Lake and included interviewing anglers on their effort of fishing, total catch and economical demographics. This information is key to ensuring the lakes sustainability. Swan Valley Sport Fish would also like to thank the Whitefish Lake Cottage Association, MB Water Stewardship-Fisheries and Conservation-Green Team for their involvement & support during the project. Thank you to Helen Prieston (campground hostess) who contributed many hours of her time and effort to helping us collect angling surveys. We also appreciate the reports of tagged fish from anglers the past few seasons. There are several lakes in the area which numbered tags have been applied on fish, and the reports are beneficial to our studies. Reports can be submitted to the local Fisheries Branch and soon to the group's upcoming website!



The Whitefish Lake Fisheries Assessment is not the first fisheries study which SVSFE has conducted. In the past three years the group has applied or partnered in projects which were funded through Fisheries Enhancement Fund (FEF). Within this short time frame the group has received $186,762 through FEF, and contributed an additional $24,000 in-kind cash to support these local projects. Swan Valley Sport Fishing Enhancement has also partnered with the Swan Lake Watershed Conservation District on local FEF projects bringing an extra $160,855 to the area.

FEF revenue is received from the stamp on angler licences. The stamp should be a reminder that a portion of the licence fee helps fund projects that ensure adequate fish stock for future generations. The group is enthusiastic about taking a pro-active approach in conserving and managing recreational fisheries and hopes to continue with similar projects in the Swan River Valley area in the near future.

48-11c

5- Displays at SVSFE Annual Banquet

6- Public presentation during swimming week at Whitefish Lake. This included a hands-on look for children and parents explaining the what, how and whys of the project. The group got to see how technicians track walleye, and the types of sampling done to catch, measure, weigh and tag fish.

The presentation was followed with a fun relay game and the identification & release of game and forage fish used for presentation.

Acknowledgements

Swan Valley Sport Fishing Enhancement Inc. would like to thank everyone who participated in the Whitefish Lake 2010 Creel Surveys and we appreciate the strong interest and cooperation from the public with our past and present studies. Who also appreciate the consistent reports of tagged fish from anglers for all information is valuable for our studies. A special thank you to Ian Kitch - Regional Fisheries Biologist, and Lloyd Rowe - Fisheries Biologist(Dauphin), Water Stewardship Fisheries Branch, for their ongoing support and dedication to the project. Thank you to Helen Prieston (campground hostess) who contributed many hours of her time and effort to helping collect angling surveys. We would also like to thank the Whitefish Lake Cottage Association, Parks – Green Team, all volunteers for their involvement and support during the project.

We would like to acknowledge the importance and benefits the Fisheries Enhancement Fund (FEF) brings to our recreational fishery. The stamp should be a reminder that a portion of the license fee helps fund projects, like the Whitefish Lake Fisheries & Creel Survey, that ensure adequate fish stock for future generations.

Works Cited

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Appendices

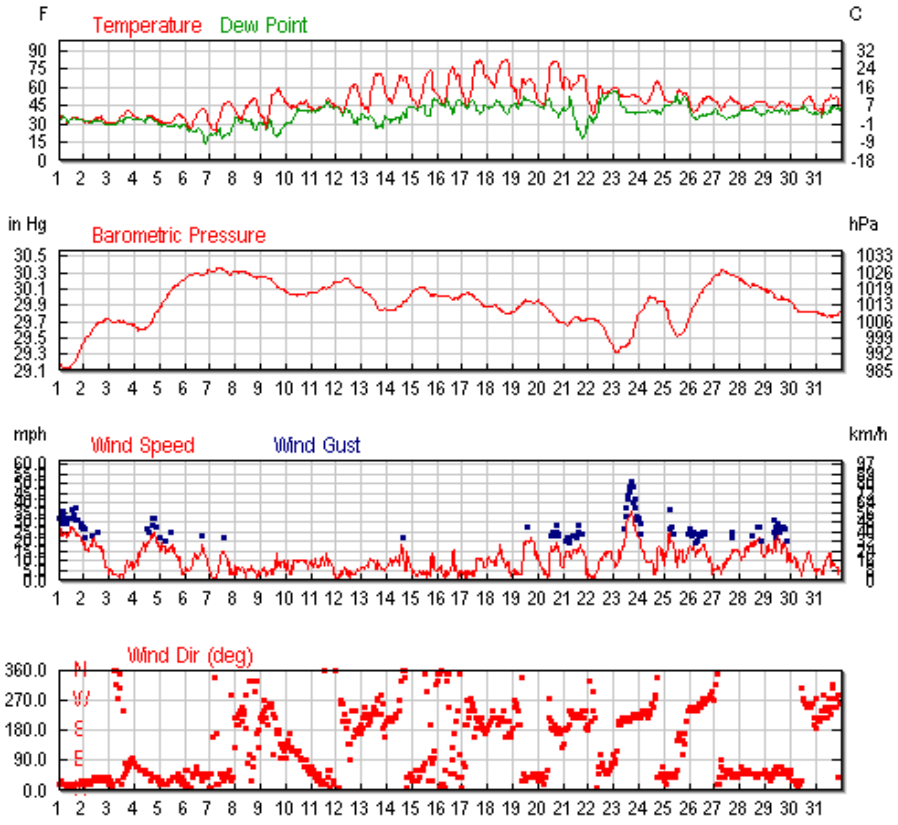
Appendix A - Site Types

Bottom Type		
Sample	*Bottom Type*	*Fish Cover Type*
Sample 001	Gravel/Pebble, Silt, Muck	Logs/Trees, Organic Debris
Sample 002	Rubble/Cobble, Gravel/Pebble, Sand	Logs/Trees, Organic Debris
Sample 003	Rubble/Cobble, Silt, Clay	Organic Debris
Sample 004	Boulder, Rubble/Cobble, Silt, Clay	Logs/Trees, Organic Debris
Sample 005	Boulder, Rubble/Cobble, Silt, Clay	Boulders
Sample 006	Rubble/Cobble, Gravel/Pebble, Sand	Boulders, Logs/Trees
Sample 007	Gravel/Pebble, Silt, Muck	Logs/Trees, Macrophytes
Sample 008	Silt, Boulder, Rubble/Cobble	Boulders
Sample 009	Boulder, Sand, Rubble/Cobble	Boulders
Sample 010	Boulder, Rubble/Cobble, Silt, Clay	Boulders
Sample 011	Rubble/Cobble, Gravel/Pebble	Boulders
Sample 012	Sand, Muck	Macrophytes
Sample 013	Gravel/Pebble, Sand, Silt, Muck	Logs/Trees
Sample 014	Rubble/Cobble, Gravel/Pebble, Sand, Silt, Clay	Logs/Trees
Sample 015	Rubble/Cobble, Clay	Logs/Trees
Sample 016	Gravel/Pebble, Silt	Macrophytes

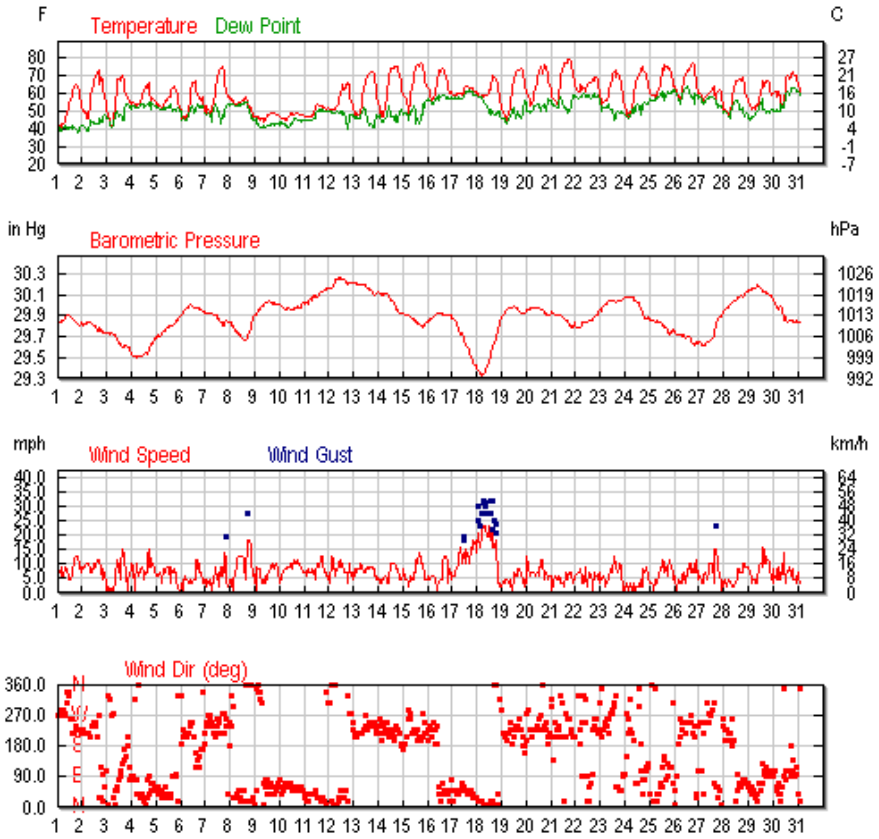
Site Type		
Sample	*Substrate*	*Fish Cover*
Sample 001	Gravel/Pebble/Sand Mix	Moderate
Sample 002	Gravel/Pebble/Sand Mix, Boulder/Rubble Cobble	Moderate
Sample 003	Soft Mix	No Cover
Sample 004	Soft Mix	No Cover
Sample 005	Gravel/Pebble/Sand Mix, Soft Mix	No Cover
Sample 006	Soft Mix	No Cover
Sample 007	Soft Mix	Moderate
Sample 008	Boulder/Rubble/Cobble Mix	No Cover
Sample 009	Sand, Other	No Cover
Sample 010	Boulder/Rubble/Cobble Mix	Low
Sample 011	Boulder/Rubble/Cobble Mix	Low
Sample 012	Soft Mix	Low
Sample 013	Gravel/Pebble/Sand Mix	Low
Sample 014	Soft Mix	Low
Sample 015	Gravel/Pebble/Sand Mix	No Cover
Sample 016	Gravel/Pebble/Sand Mix	Low

Appendix B – Weather

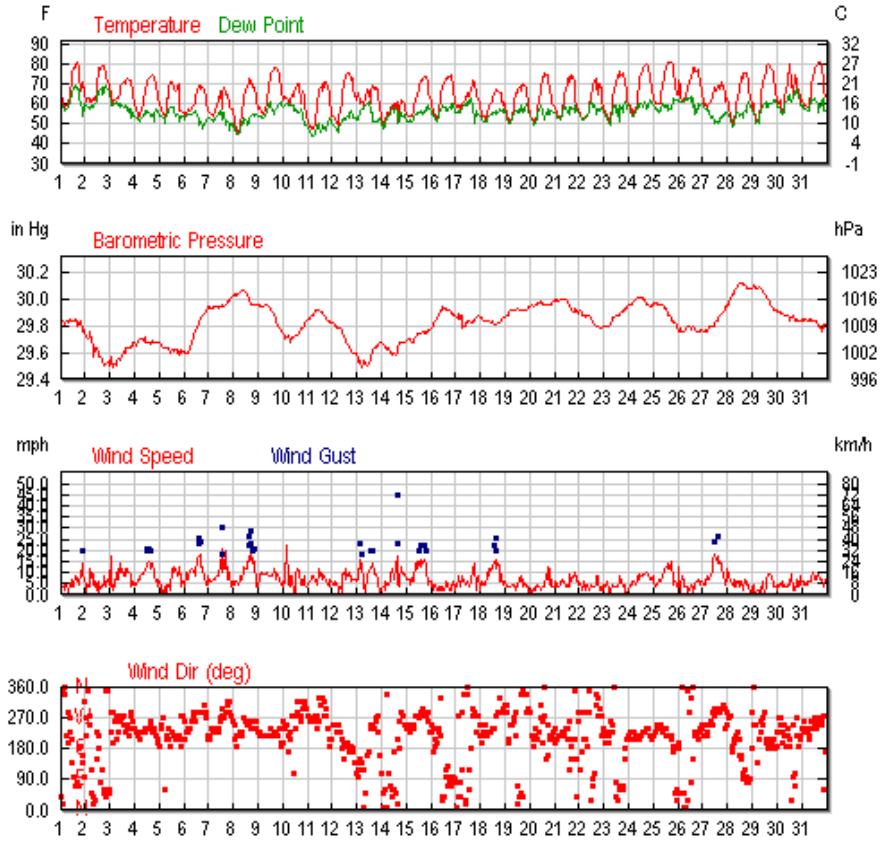
May



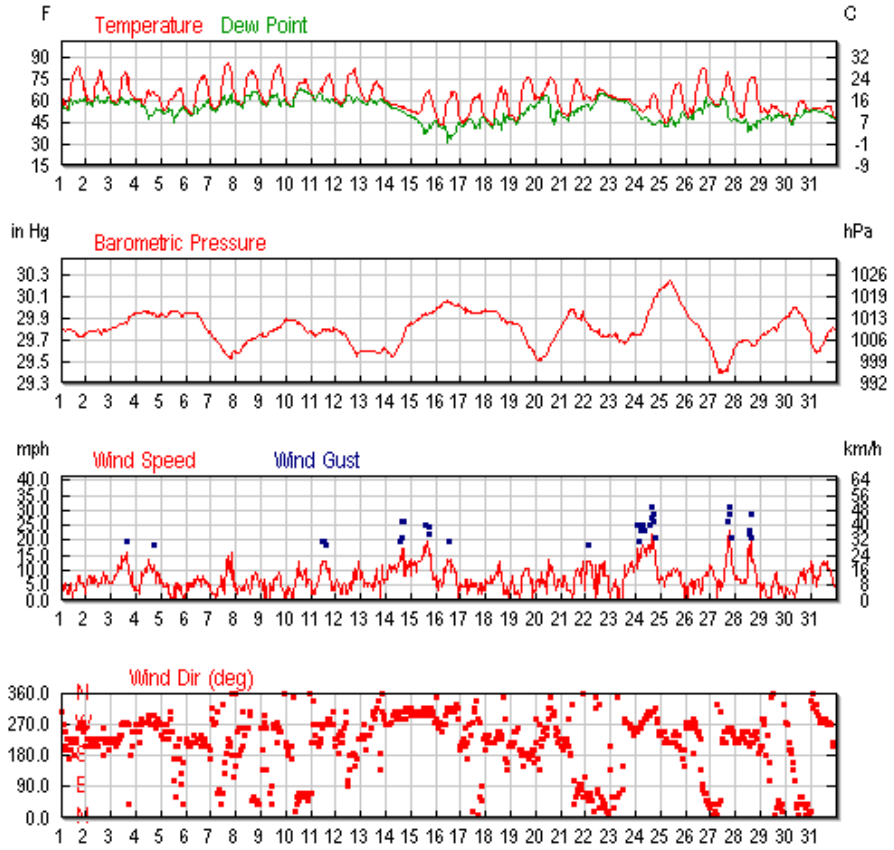
June

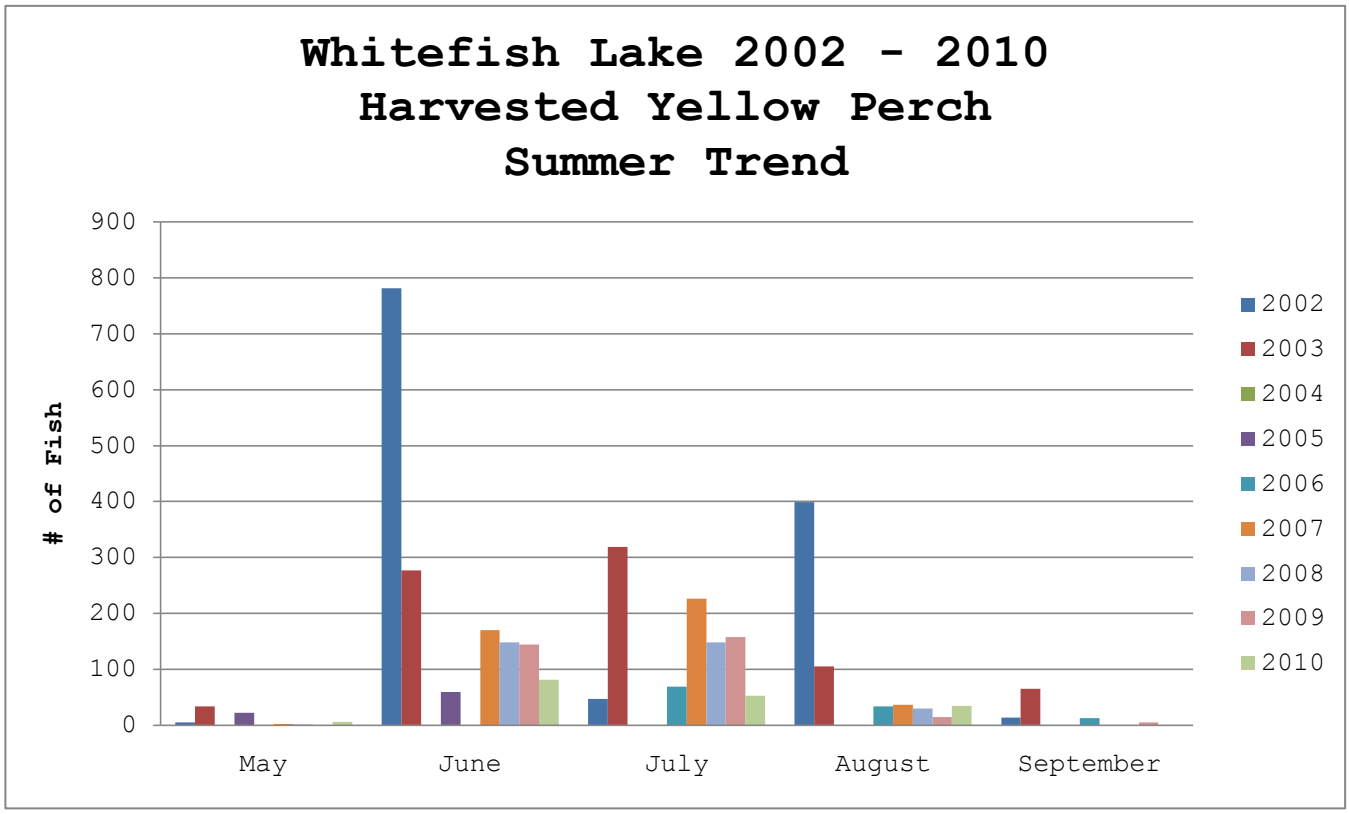


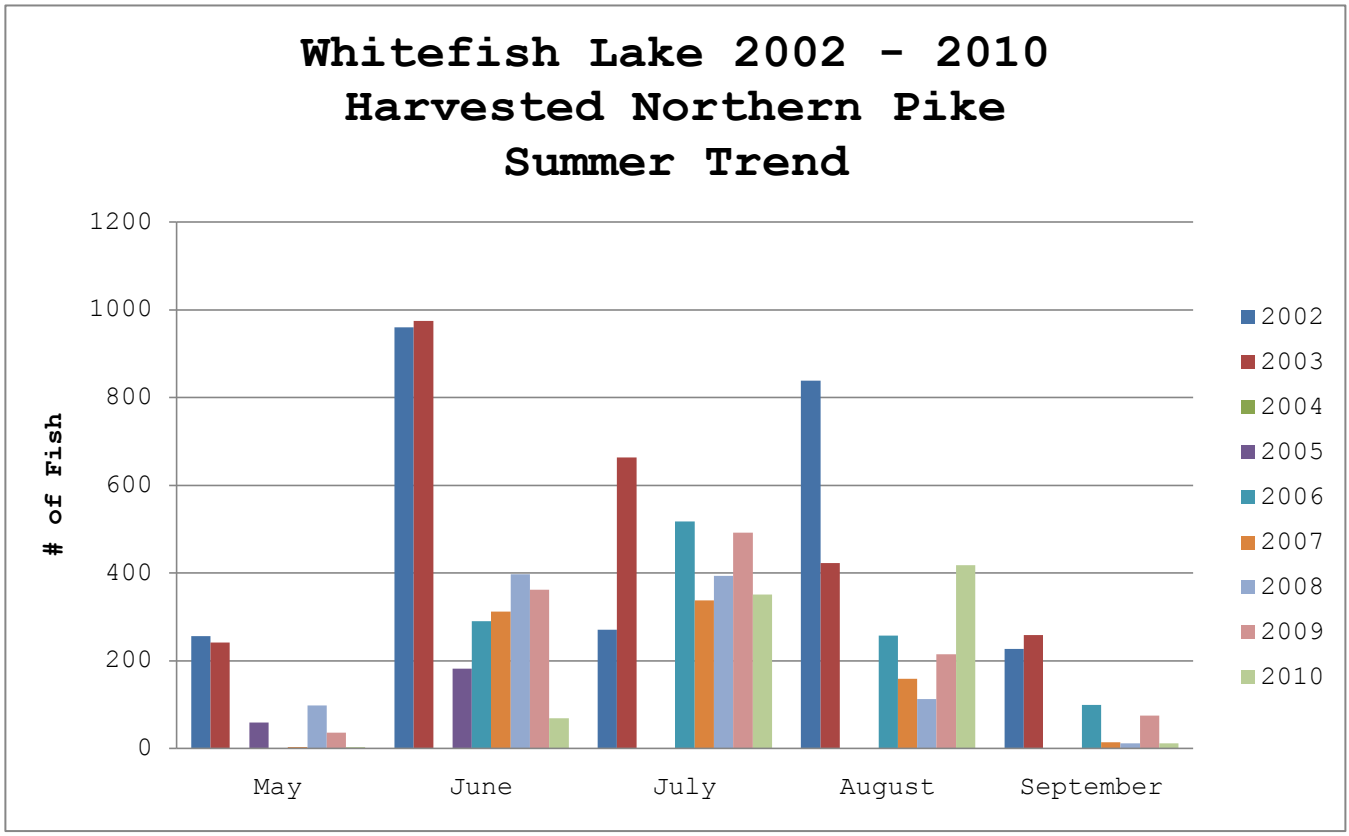
July

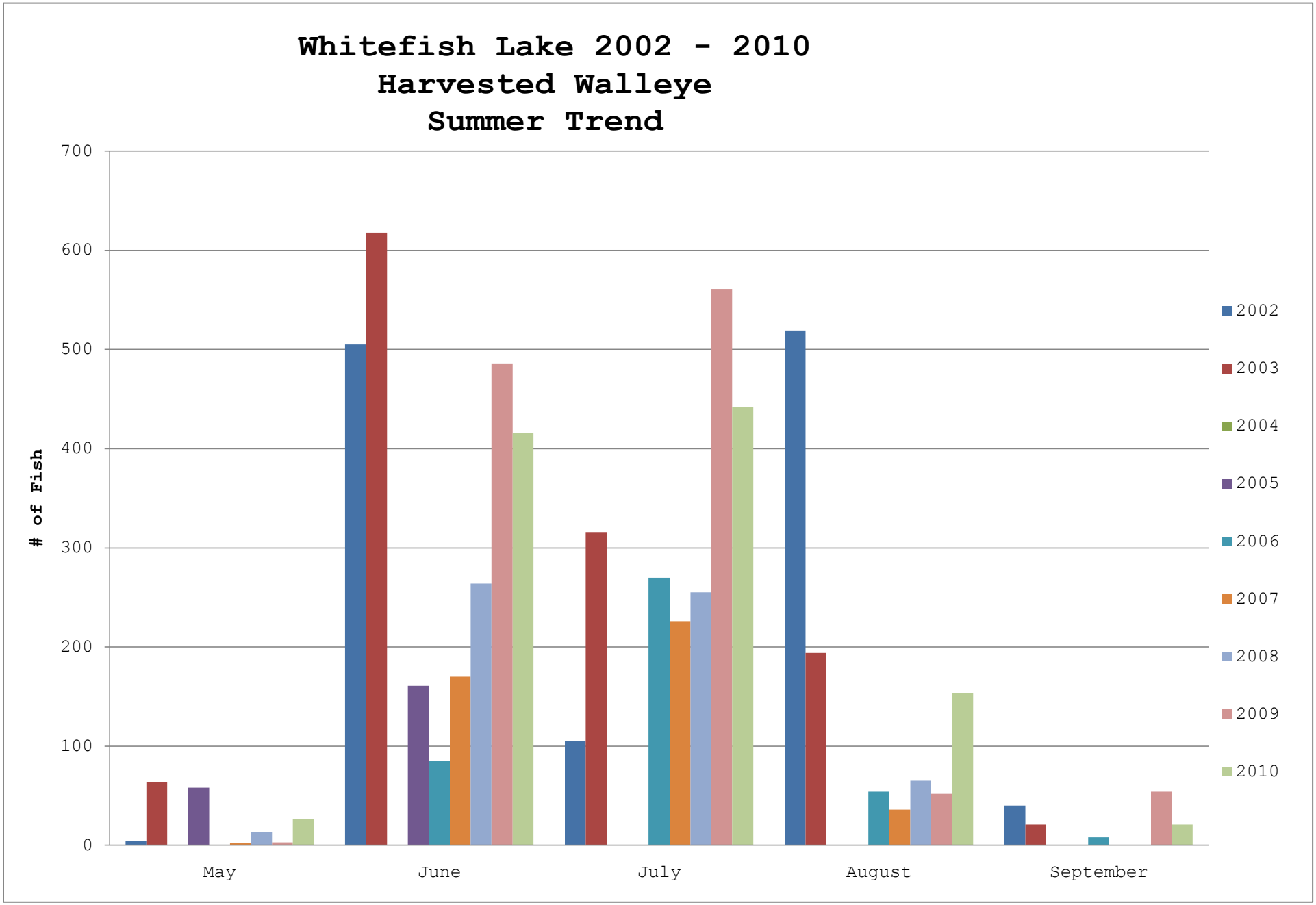

F
Temperature
Dew Point
C
in Hg
Barometric Pressure
hPa
mph
Wind Speed
Wind Gust
km/h
Wind Dir (deg)

August


F
Temperature
Dew Point
C
in Hg
Barometric Pressure
hPa
mph
Wind Speed
Wind Gust
km/h
Wind Dir (deg)


Whitefish Lake 2002 - 2010
Harvested Yellow Perch
Summer Trend
# of Fish
900
800
700
600
500
400
300
200
100
0
May
June
July
August
September
2002
2003
2004
2005
2006
2007
2008
2009
2010


Whitefish Lake 2002 - 2010
Harvested Northern Pike
Summer Trend
# of Fish
1200
1000
800
600
400
200
0
May
June
July
August
September
2002
2003
2004
2005
2006
2007
2008
2009
2010


Whitefish Lake 2002 - 2010
Harvested Walleye
Summer Trend
# of Fish
700
600
500
400
300
200
100
0
May
June
July
August
September
2002
2003
2004
2005
2006
2007
2008
2009
2010