Winter Stocked Trout Assessment

Swan Valley Sport Fishing Enhancement Inc.

Holly Urban & Melissa Johnson

2010/2011

Introduction

The “Winter Stocked Trout Assessment” is phase two of project 10-011 (Stocked Trout Water Assessment). The main objective of phase one was to provide an unbiased index of stocked trout abundance, as well to provide biological information on the target species. Assessments included collecting biological data, basic water chemistry, minnow sampling and habitat utilization. The "Brook Trout Assessment: Ontario Ministry of Natural Resources" (BTIN) protocol was utilized as a guideline.

The winter trout assessment included comparisons of summer-winter trout habitat, identifying predator-prey behaviour, assessing growth rates and collecting basic water quality parameters. Results will provide information for a proactive management approach for our stocked trout waters.

Lakes chosen for winter sampling included Glad, Two Mile, Beaver and Black Beaver Lake. Sampling was conducted from December 21st, 2010 to March 14th, 2011 with a total of 236 fish sampled and 126 tagged. A total of five different species were caught including rainbow trout, brook trout, lake trout, arctic char and splake. Total catch per unit effort ranged between 0.23 fish/hour to 8.73 fish/hour.

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1. Methodology

The Stocked Trout Waters Winter Assessment utilized the BTIN protocol as a guideline for winter sampling. The assessment involved setting small mesh gillnets for a short duration of time. The locations sampled fell within two stratums; shallow (2-5.9m) and deep (6-10m). Two different gillnet gangs were utilized; each gang consisted of three panels (15m in length). All three panels within a gang were either 2” (51mm) or 2.5” (64mm) mesh size.

Site Selection

Replicating summer sampling (30 sites/per lake) was not practical, therefore a sub sample was designed to achieve a representative CPUE for comparison. A total of eight of the thirty 2010 summer trout assessment sites per lake were randomly chosen. The winter assessments differed from open water sampling with time and effort constraints in net setting, therefore each site was sampled with both mesh sizes to maximize efforts. Consideration of time, ice conditions and weather were also factors in scheduling site sampling.

Field Procedures

Figure 2: Basin hole

At each site, test holes were drilled to ensure adequate depth for net and proper operation of jigger. In locations where depths were known to rapidly decrease, the first panel was placed closer to shore to make certain that at least the first two panels were within the selected strata depth. Once proper depth was located, basin holes were created by drilling 4 – 8 holes and chiselled free of jagged edges (Figure 1). An eight foot jigger was used to set ice gillnets under the ice (Figure 2).

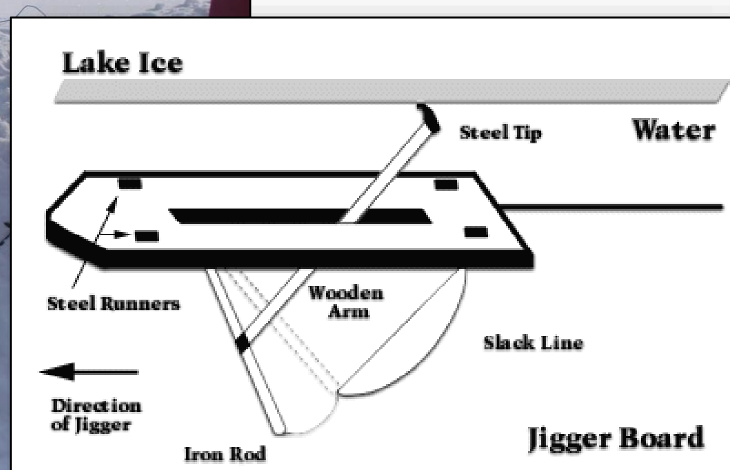


Figure 1: Jigger

The jigger was positioned in the desired direction and with the steel-tipped arm against the underside of the ice. The jigger operates by pulling on the rope which is attached to the metal rod (the lever) on the jigger. When pulled, the rope applies force to the wooden arm, pushing it upwards and causing the steel tip to dig into the ice and propel the jigger forward. When the rope is released, the steel tip drops away and returns to its former position. This process is repeated until the jigger has moved the distance from the first hole equal to the length of the net. One person follows the jigger through this process by listening for the tapping noise made by the steel tip under the ice. Then a second hole is drilled closely to the jigger locate, and a wire rod with a hooked end is used to retrieve rope attached to the jigger (Figure 3). The jigger rope at the first hole is tied to the bridle of the gill net. As the rope is pulled from the second hole, the net enters the water through the first hole and is pulled into position, straddling the two hole (Figure 4)

Figure 3: Retrieving jigger

Figure 4: Setting gill net under the ice

Each end of the gill net was anchored with weights to ensure the net was fishing along the bottom of lake. The targeted set time was sixty minutes to avoid trout mortality and to provide a consistent effort. Occasionally sampling would extend beyond this therefore other nets would be pulled earlier to achieve an average effort of sixty minutes. Each basin hole was fished with both mesh sizes 2.0" & 2.5" (Figure 5).

Information collected included: location, crew, weather, water temperature, effort #, start and end depths, mesh size, and start and end time. Each fish per sub-effort (panel) was sampled. Extra care was taken to quickly remove fish from nets to ensure no harm to fish during cold temperatures.

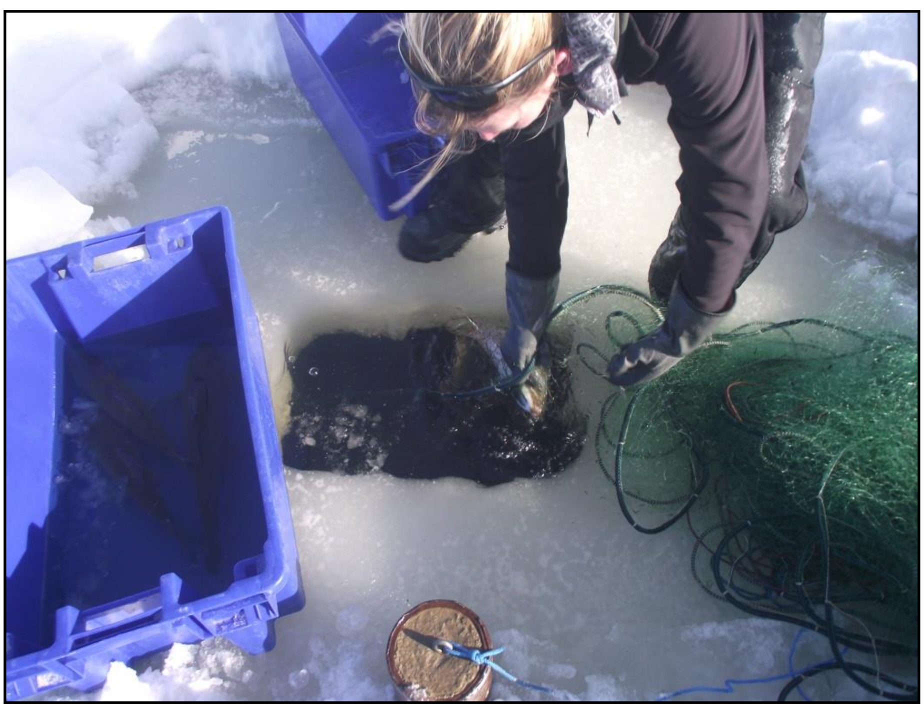


Figure 5: Pulling gill net

Other parameters collected at each site or per lake included; snow depth, total and opaque ice, turbidity and dissolved oxygen (Figure 6 & 7).

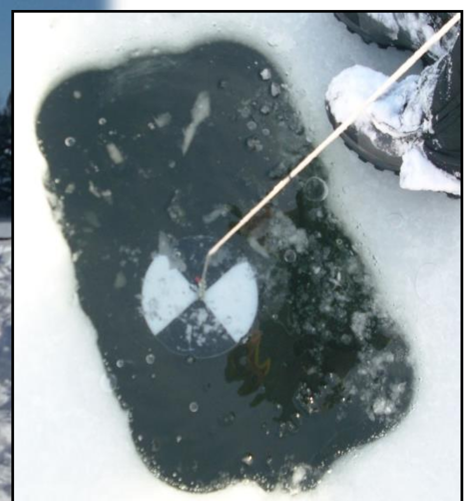


Figure 7: Secchi disk

Figure 6: Identifying habitat with underwater camera

Habitat assessments were conducted for each site. An AquaView underwater camera was used to classify substrate, vegetation, fish cover and clarity (Figure 8).

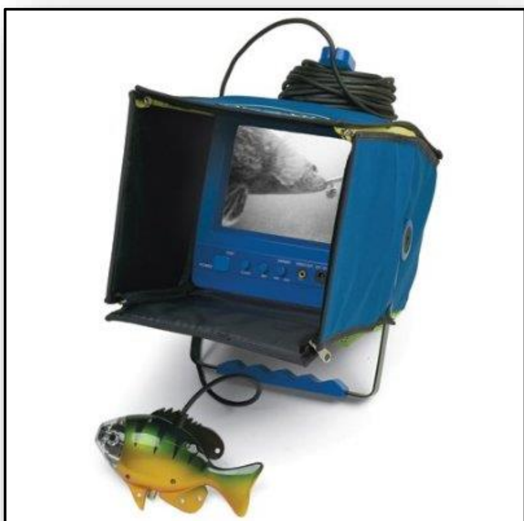


Figure 8: Aquaview Camera

Each trout was identified by species, and sampled for fork length, total length, weight, age and a numbered floy tag was applied (Figure 9 & 10). In cases of mortality; sex, maturity and stomach contents were also collected. Non-trout species were also sampled for fork length, total length and weight. Age structures were analyzed by Aqua Tech Services for aging. White suckers (*Catostomus commersoni*) were assessed by count only.

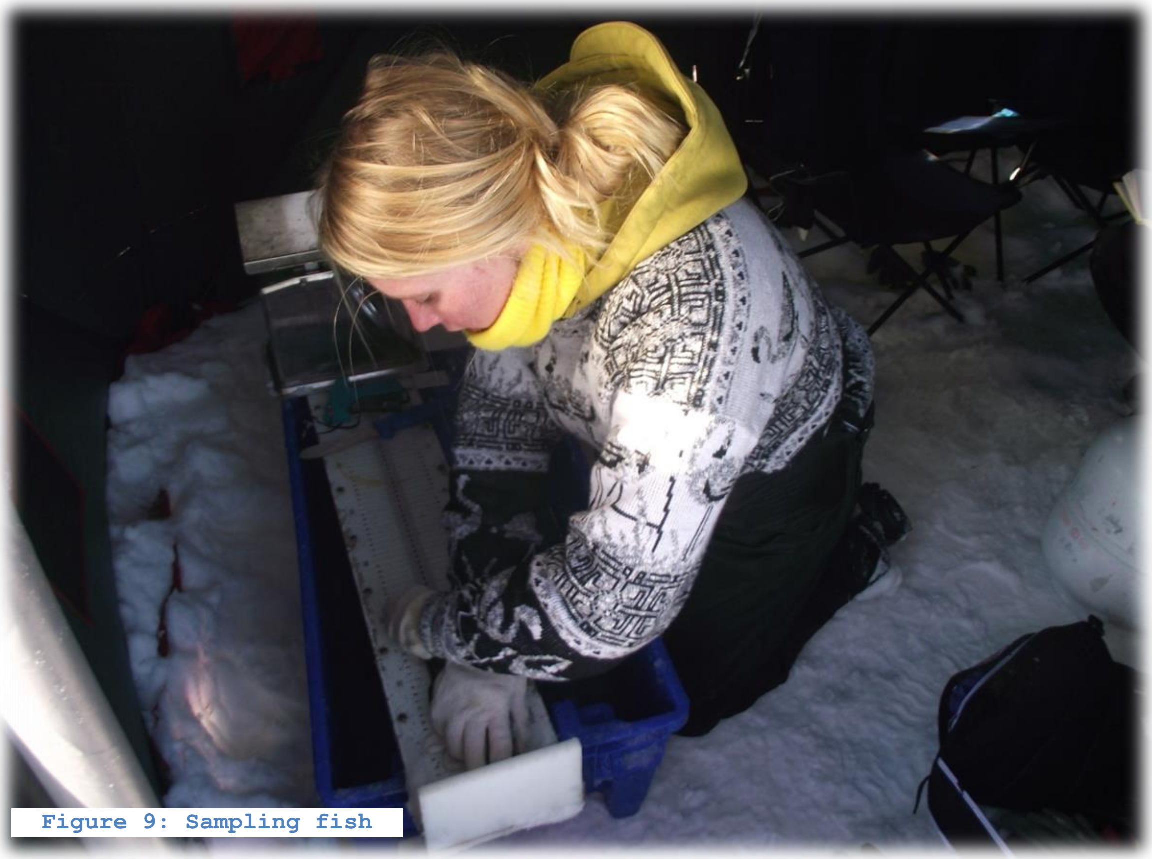


Figure 9: Sampling fish

Data from each lake was later compiled onto a "Catch Form" to summarize total catch-per-unit-effort. This information helps to compare trends of the stocked trout abundance to the summer 2010 data and over time.

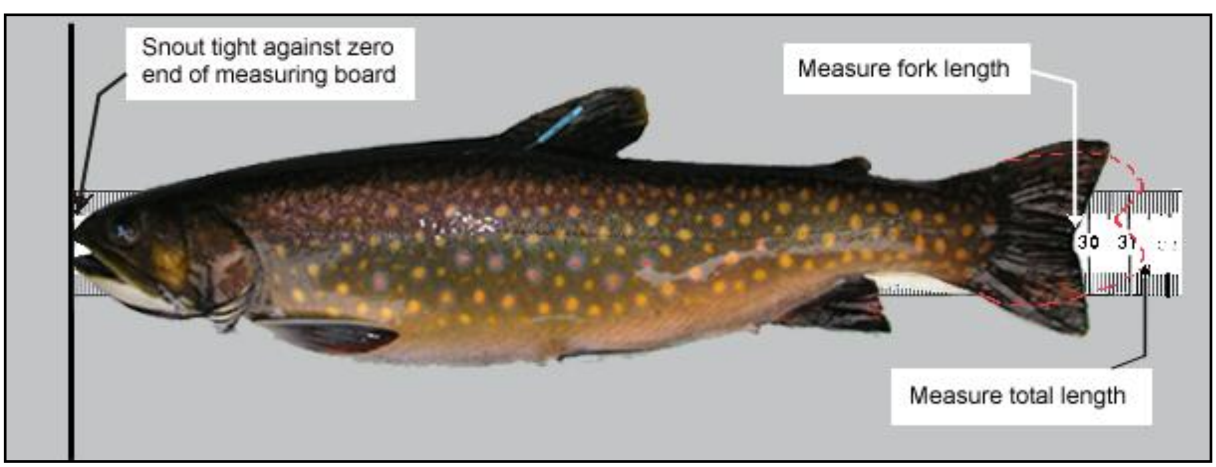


Figure 10: Method of measuring fish

Calculations and Laboratory Procedures

A total of 16 sets were achievable during the winter compared to 30 in the summer. Catch-per-unit-effort (CPUE) is expressed as total catch by effort by gear. Every effort was fished with 3 panels totalling 45 meters of gill net per sample.

The following formula was used to calculate CPUE:

CPUE = $\Sigma(n)/E$

n = the # of fish caught

E = the total time of effort

Therefore CPUE = # of fish/hour.

Stomach contents were collected to determine main diet, feeding habits in relation to other species within the same niche and to aid management of fisheries and production of fish stocking efforts. Stomachs from any mortalities were preserved to sample at a later date. Stomach contents were considered to be everything within stomach and intestines. Each stomach was weighed for a total weight and each content item was identified to the lowest practical taxonomic level. Data was recorded to obtain number of food items, total number of occurrences, frequency of occurrences, and percent composition by number. Sex and maturity were determined for each fish. An Ohaus Pro Scout digital scale was used to weigh each stomach. The scale's accuracy was insufficient to weigh each content item separately; therefore only total weight was collected. Without total wet weight of each content item absolute and relative indexes were not achievable.

Frequency of Occurrence

- Total # of occurrences divided by the total number of fish sampled multiplied by 100

Percent Composition by Number

- Total # of food items divided by the total number of all food items multiplied by 100.

2. Beaver Lake

Beaver Lake is 20.7 hectares with a maximum depth of 12 meters. It is located east of Glad Lake down Pine River Road. Species found here include rainbow trout, splake and yellow perch. Beaver Lake's first stocking efforts included walleye in 1983. All subsequent stocking starting in 1988 included only trout species; brook, rainbow and splake.

The eight sites sampled for the winter assessment included: Site numbers 004, 015, 017, 026, 021, 029, 027, and 003. Stratums within these sites were 50% deep and 50% shallow (Figure 11).

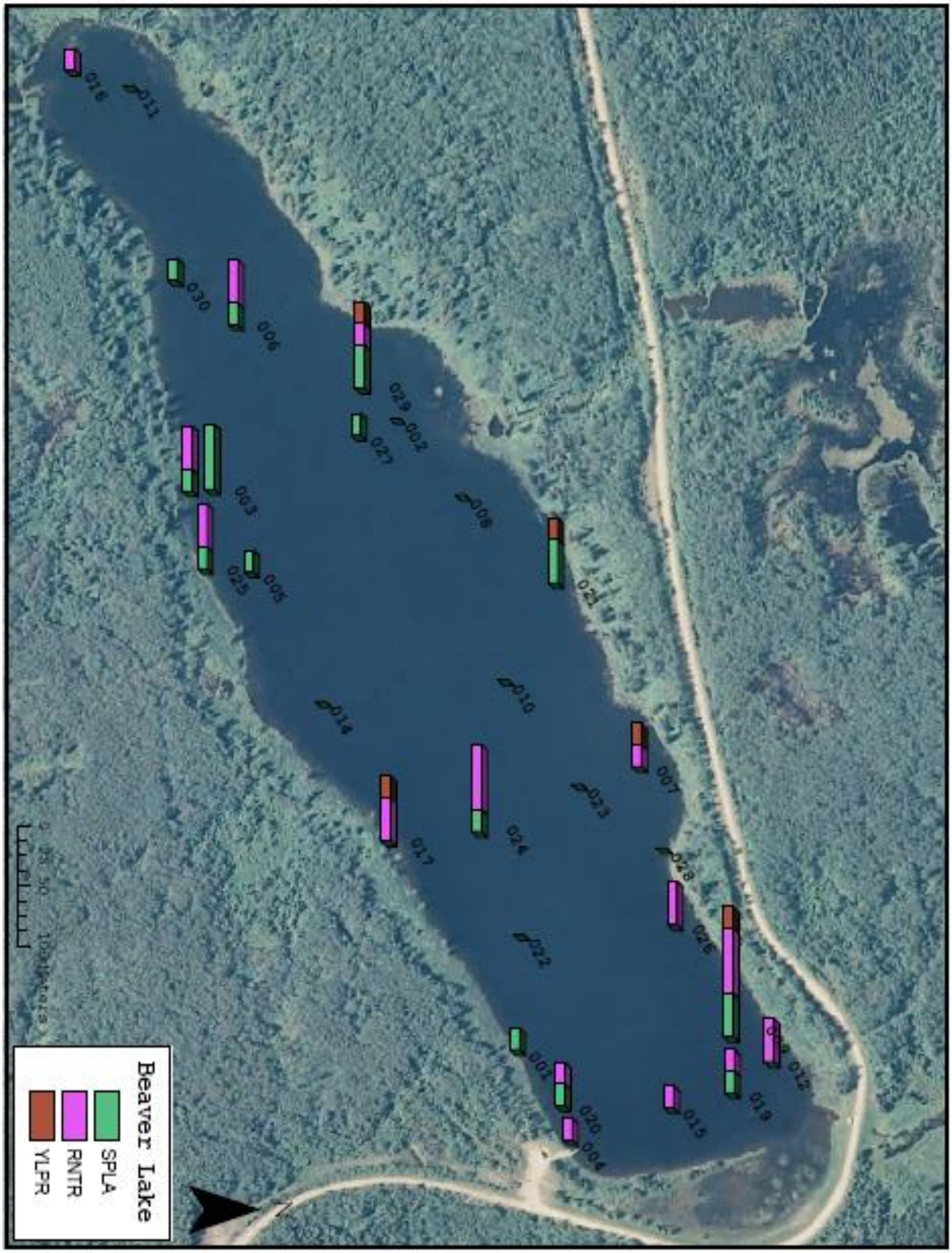
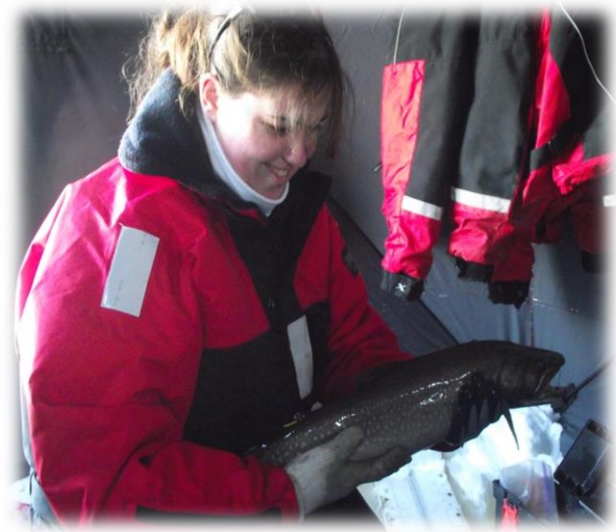


Figure 11: Summer stocked trout sites and CPUE per species. Eight sites utilized for winter sampling

Results from the **2010-11 Winter Stocked Trout Lakes Assessment** included the following:



Sampling time: January 19th - March 14th

Average air temperature: -19.3 °C

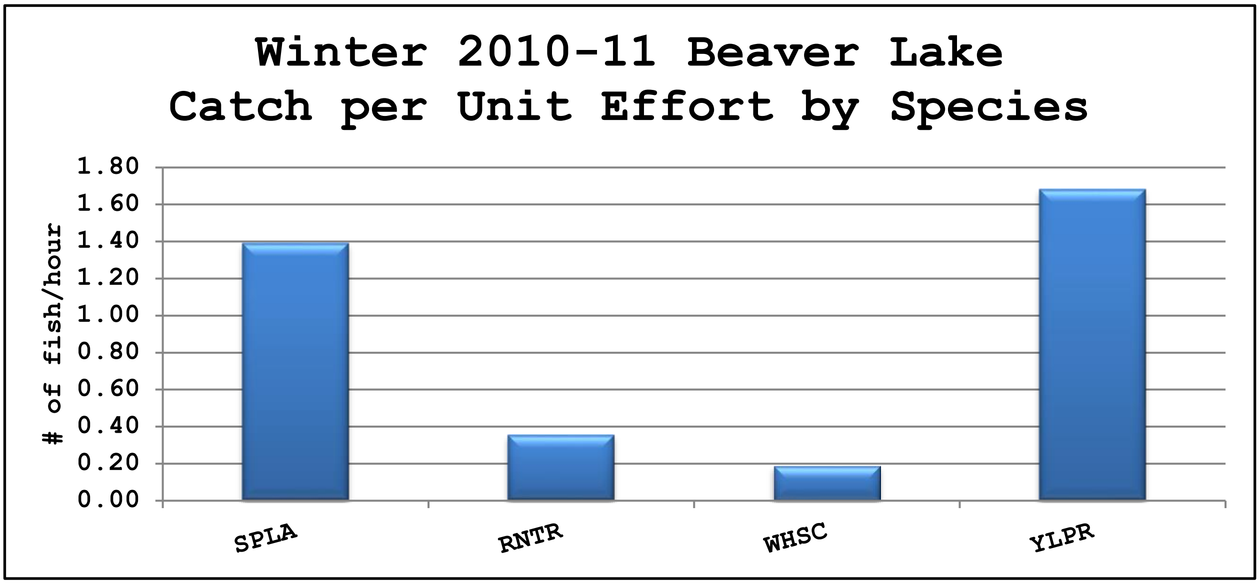
Average sample time: 62 min

Total caught: 62 fish

Total tagged: 19 fish

Total recaptures: 5 fish (SPLA Only)

Average depth sampled: Shallow 3.7 m, Deep 6.9 m



Lake CPUE: 3.61 fish/hour

Species CPUE:
SPLA 1.39
RNTR 0.35
YLPR 1.68
WHSC 0.19

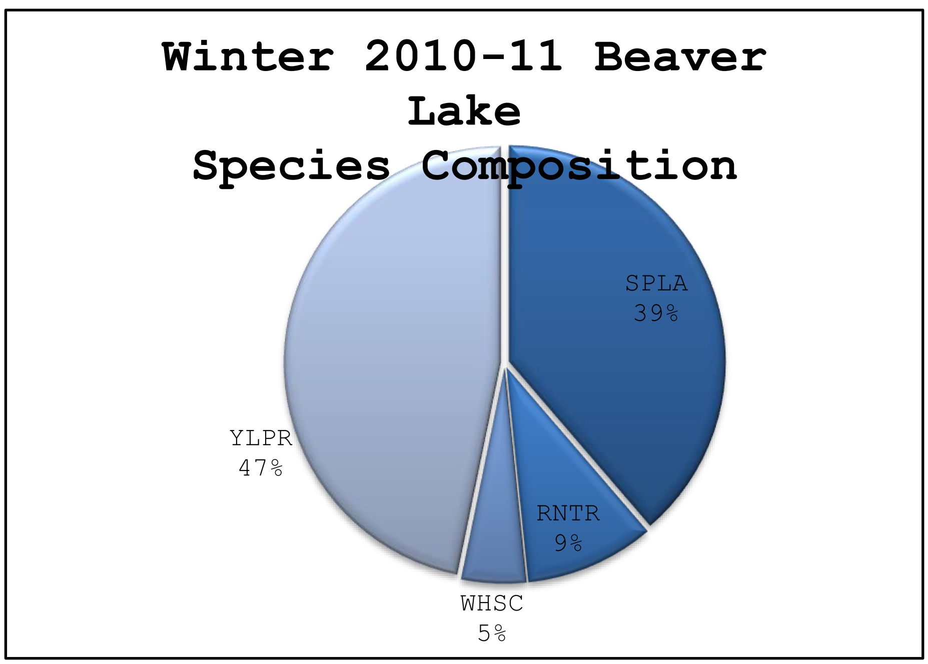
Catch %/stratum:

Shallow 63%, Deep 37%

Species Composition

(n=62):

SPLA (39%) RNTR (9%) YLPR (47%) WHSC (5%)



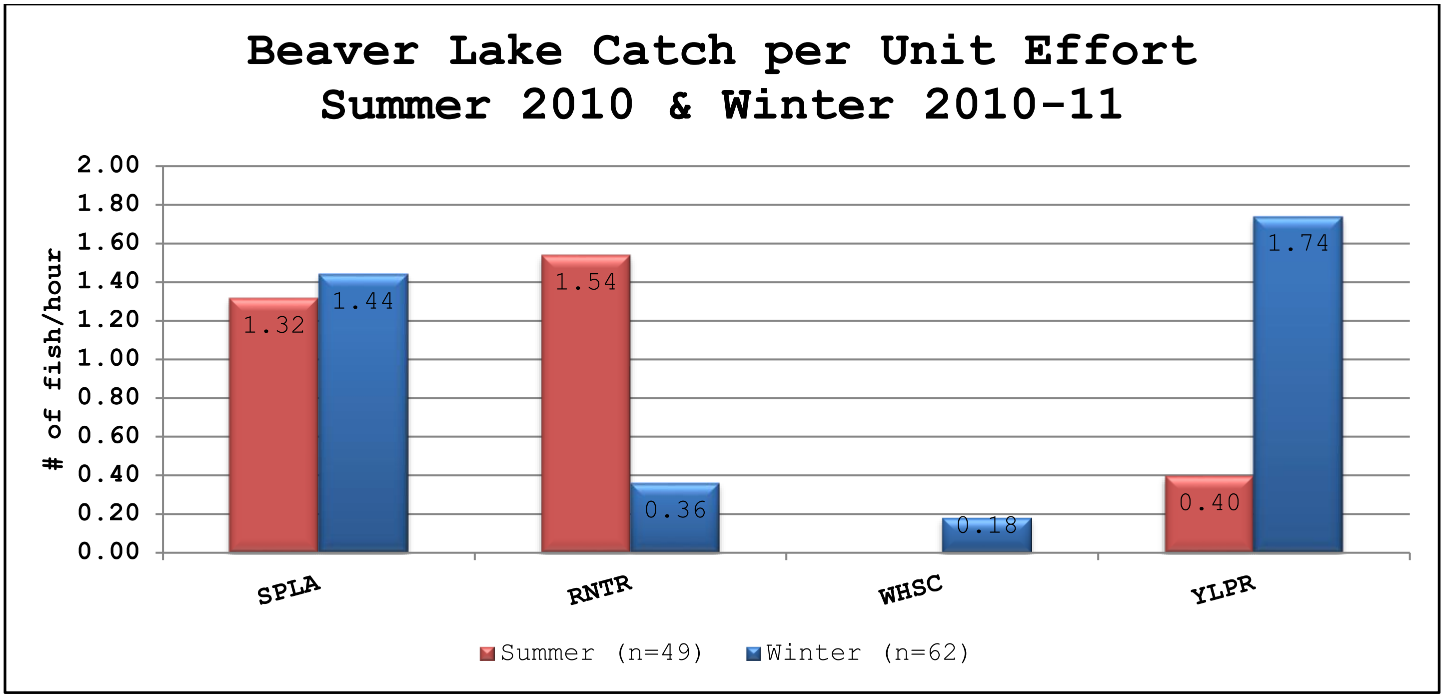


Figure 12: Comparison of CPUE between summer 2010 and winter 2010-11

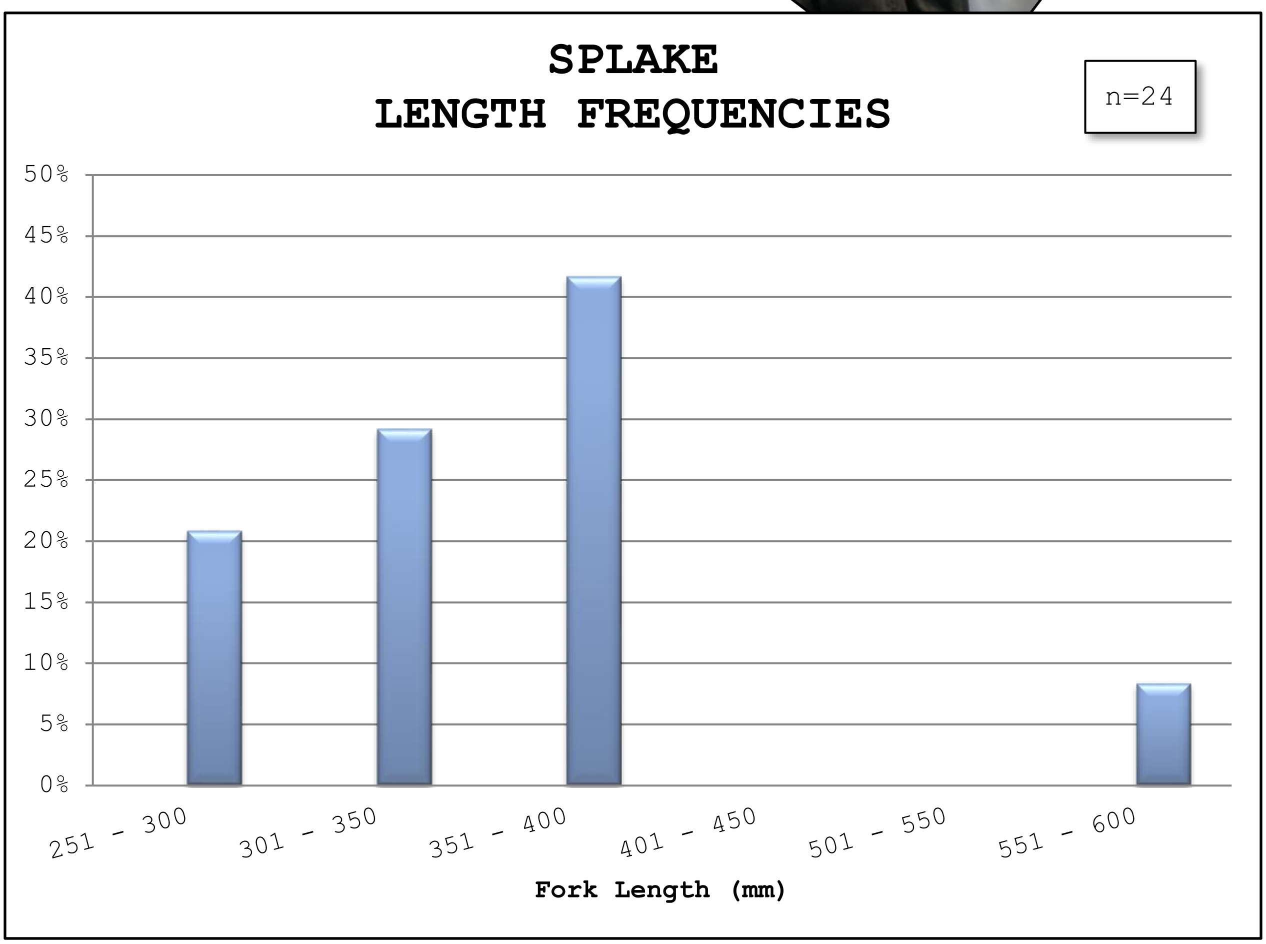
The 2010-11 CPUE increased from the summer sampling (CPUE of 3.26 fish/hour). Although the total catch for the lake has increased, so has the catch of yellow perch. Yellow perch was the highest CPUE of all species at 1.74 fish/hour. Splake catch slightly increased from summer to winter while rainbow trout catch decreased significantly during winter sampling. White suckers were the additional species sampled in the winter (Figure 12).

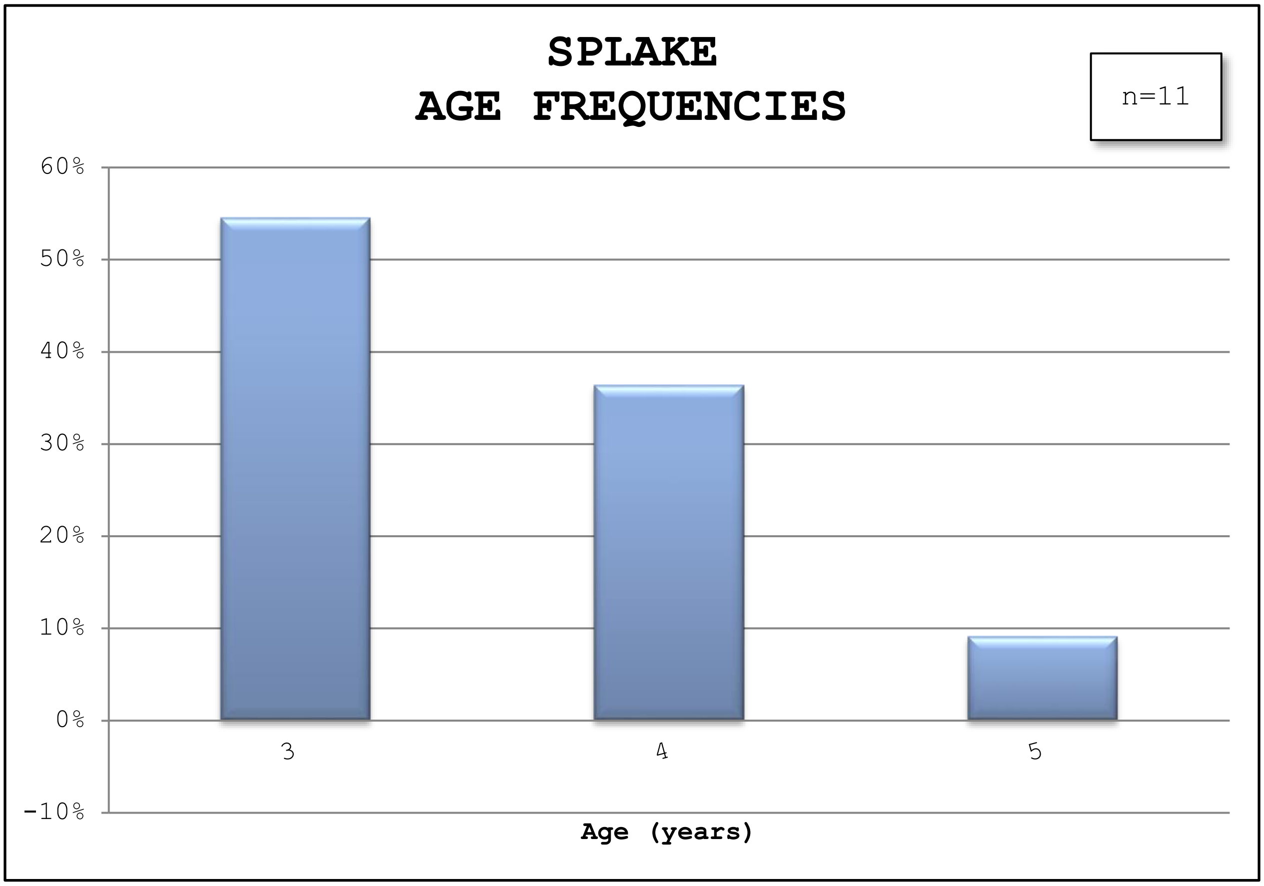
Species

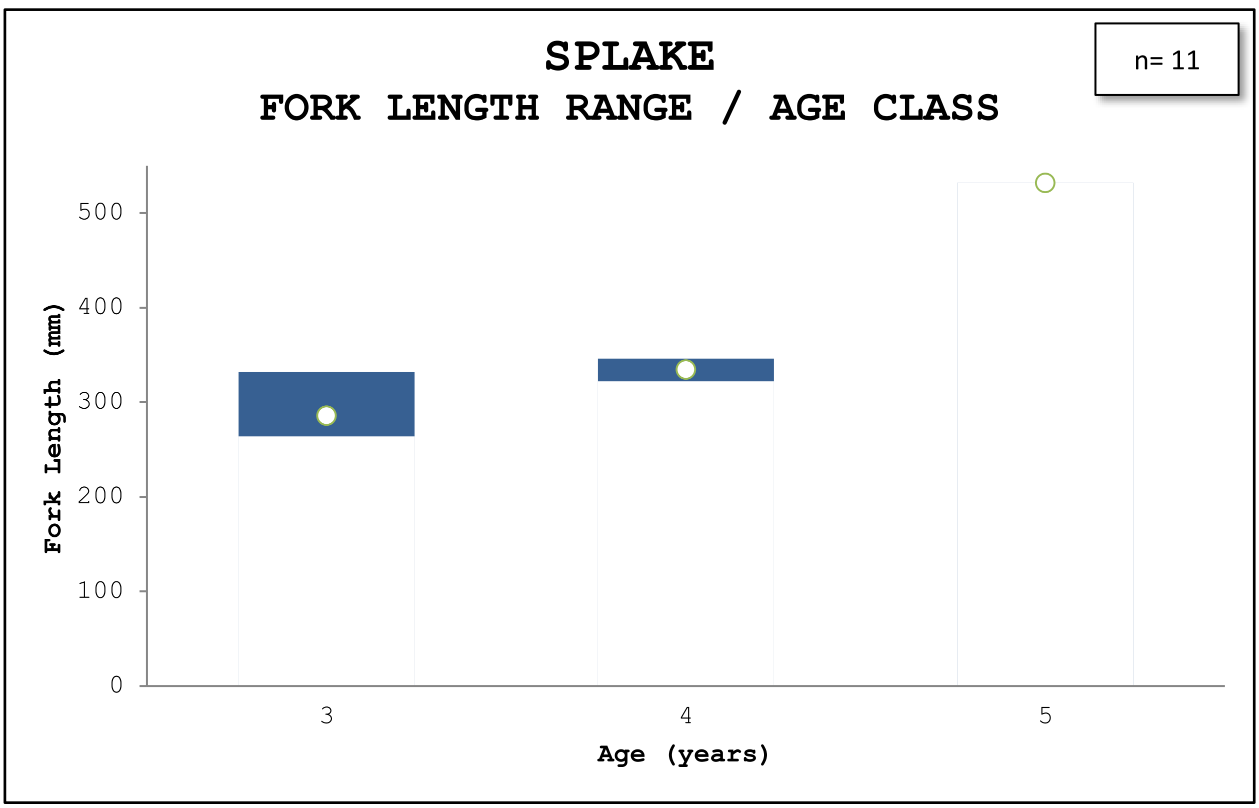
Splake

A total of 24 splake were caught. Splake sampled in the winter of 2010-11 ranged from fork length of 264 – 532 mm, total length 290 – 568 mm, and a weight 165 – 1520 g.

The average splake sampled was 332.7 mm in fork length, 358.1 mm total length and weighed 400.8 g. 11 of 24 splake were aged. Ages ranged from 3 – 5 years.




SPLAKE
AGE FREQUENCIES
n=11
60%
50%
40%
30%
20%
10%
0%
-10%
3
4
5
Age (years)


SPLAKE
FORK LENGTH RANGE / AGE CLASS
n= 11
Fork Length (mm)
500
400
300
200
100
0
3
4
5
Age (years)

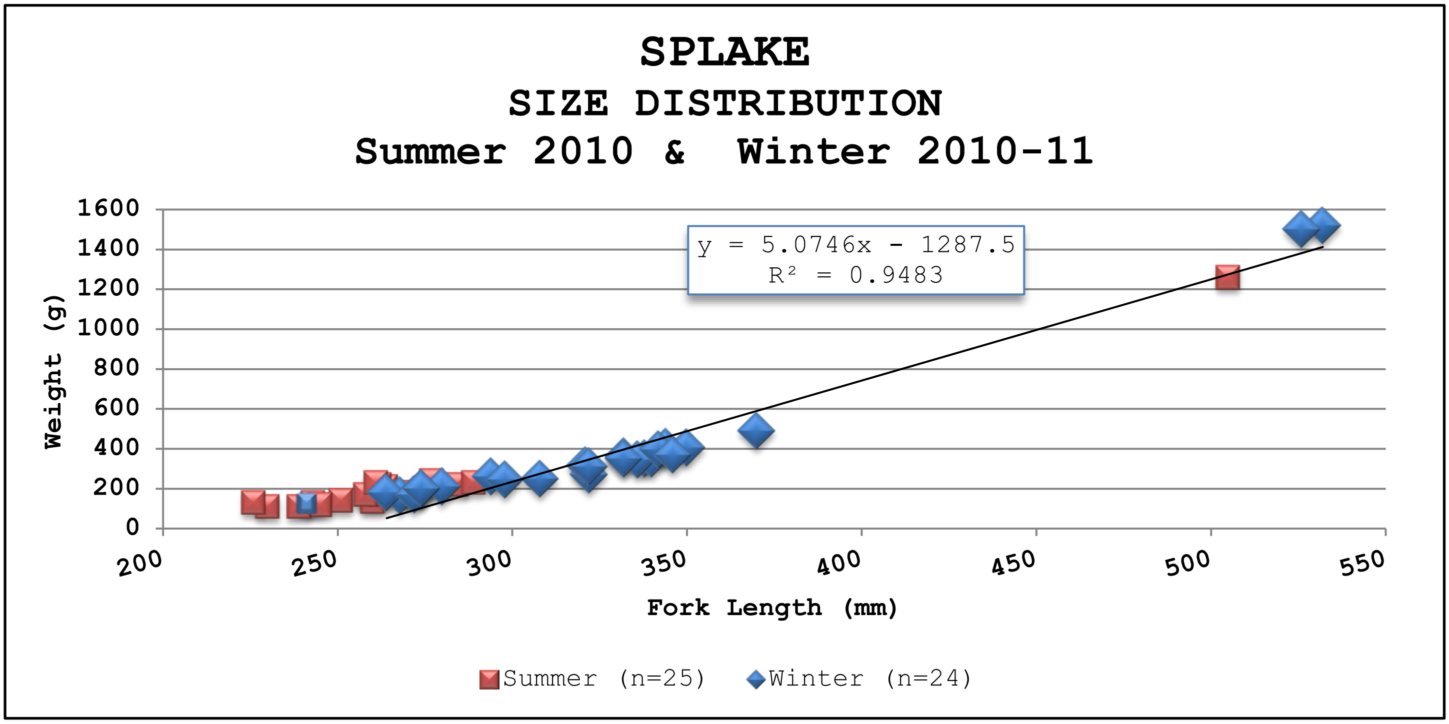


Figure 13: Beaver lake splake size distribution

One of the objectives was to assess the general condition of trout species within each waterbody between the two seasons. When comparing size and condition of splake, there was minimal difference of fish weight with length categories (Figure 13).

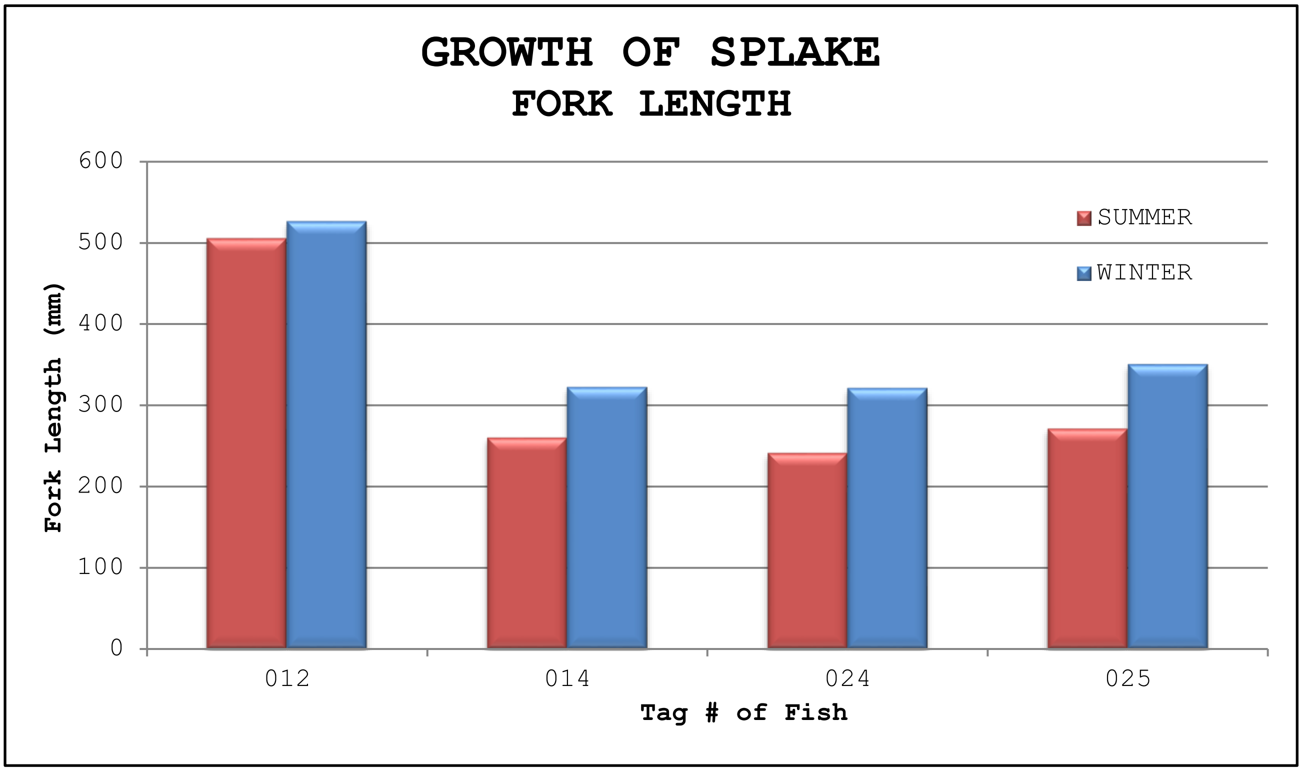
With past data on previously tagged fish, recaptures indicate growth rates. A total of four splake were recaught during the winter. Fish #12 was sampled twice at two different sites.

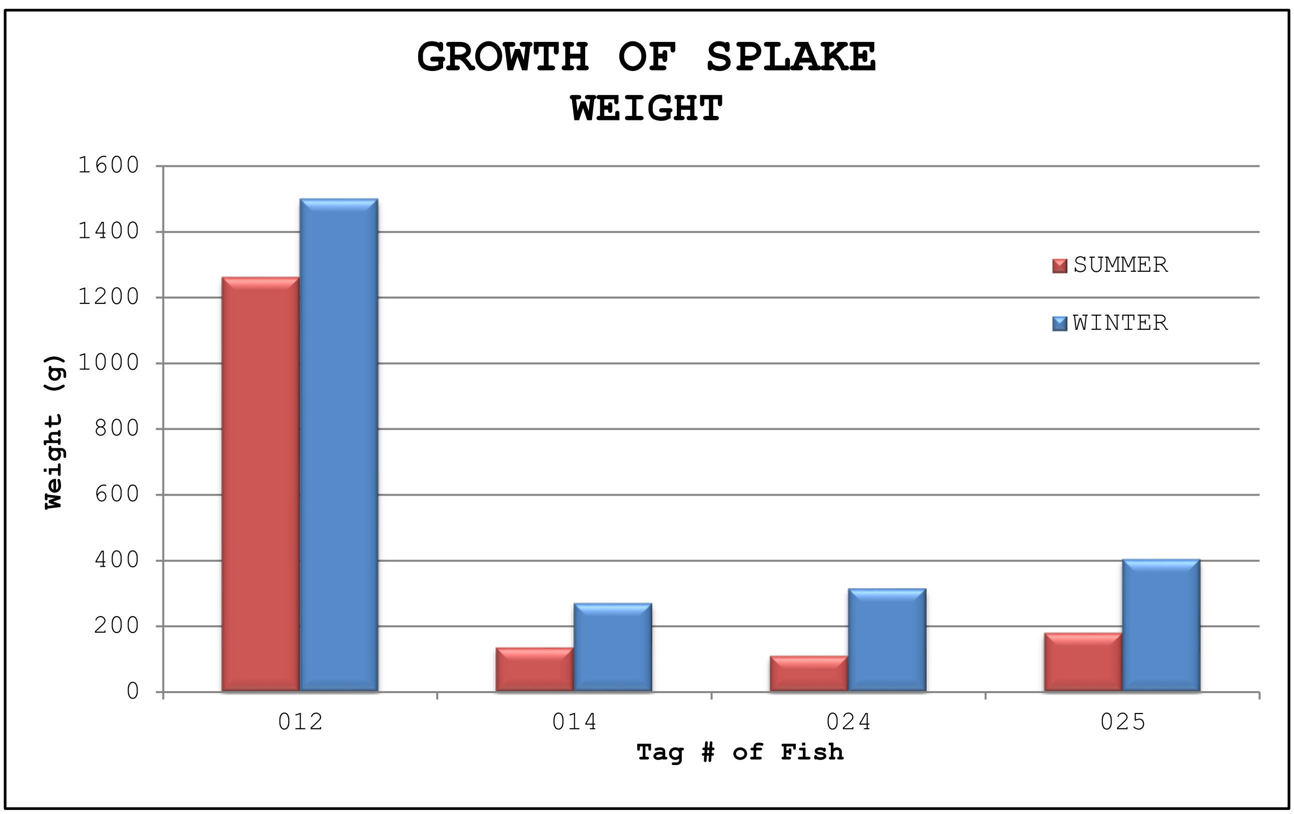
Table 1: Growth of splake recaptures

TAG #	FORK LENGTH		GROWTH (mm)	TOTAL LENGTH		GROWTH (mm)	WEIGHT		GROWTH (g)	DAYS OF GROWTH
	SUMMER	WINTER		SUMMER	WINTER		SUMMER	WINTER		
012	505	526	21	539	568	29	1260	1500	240	277
014	260	322	62	279	346	67	135	270	135	264
024	241	321	80	258	344	86	110	315	205	265
025	271	350	79	288	372	84	180	404	224	276

When comparing growth of these individual fish, there is a difference in growth between size classes. The smaller splake display a higher growth of fork and total length than larger splake, with an average growth rate of 0.275 mm/day for fork length and 0.295 mm/day for total length (Table 1). The larger splake only possessed a growth rate for fork and total length of 0.076 mm/day and 0.1 mm/day, respectively. When comparing weight increase, the larger splake had a somewhat higher rate of growth than smaller splake at a rate of 0.866 g/day compared to 0.700 g/day.

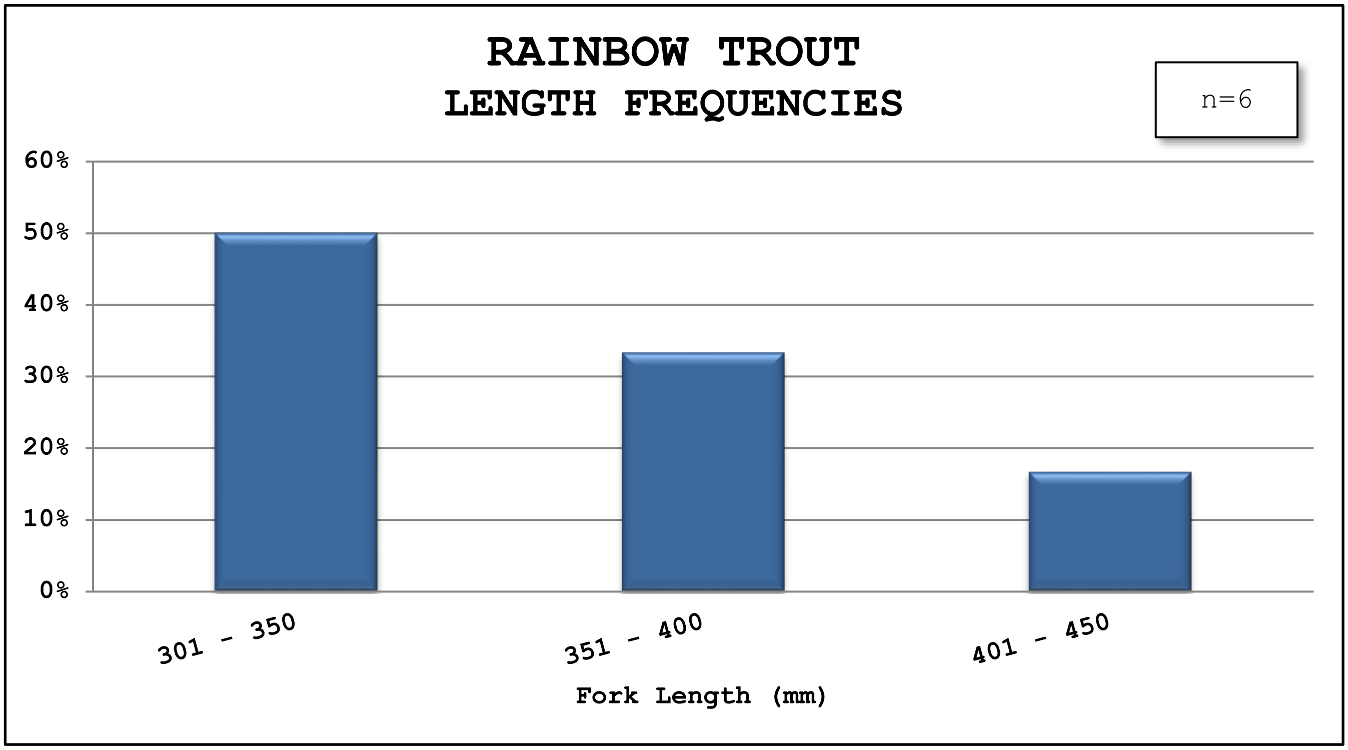
While comparing weight gain from summer to winter, both size classes were comparable with a gain of 0.87 g/day for larger splake and an average of 0.7 g/day for smaller splake.

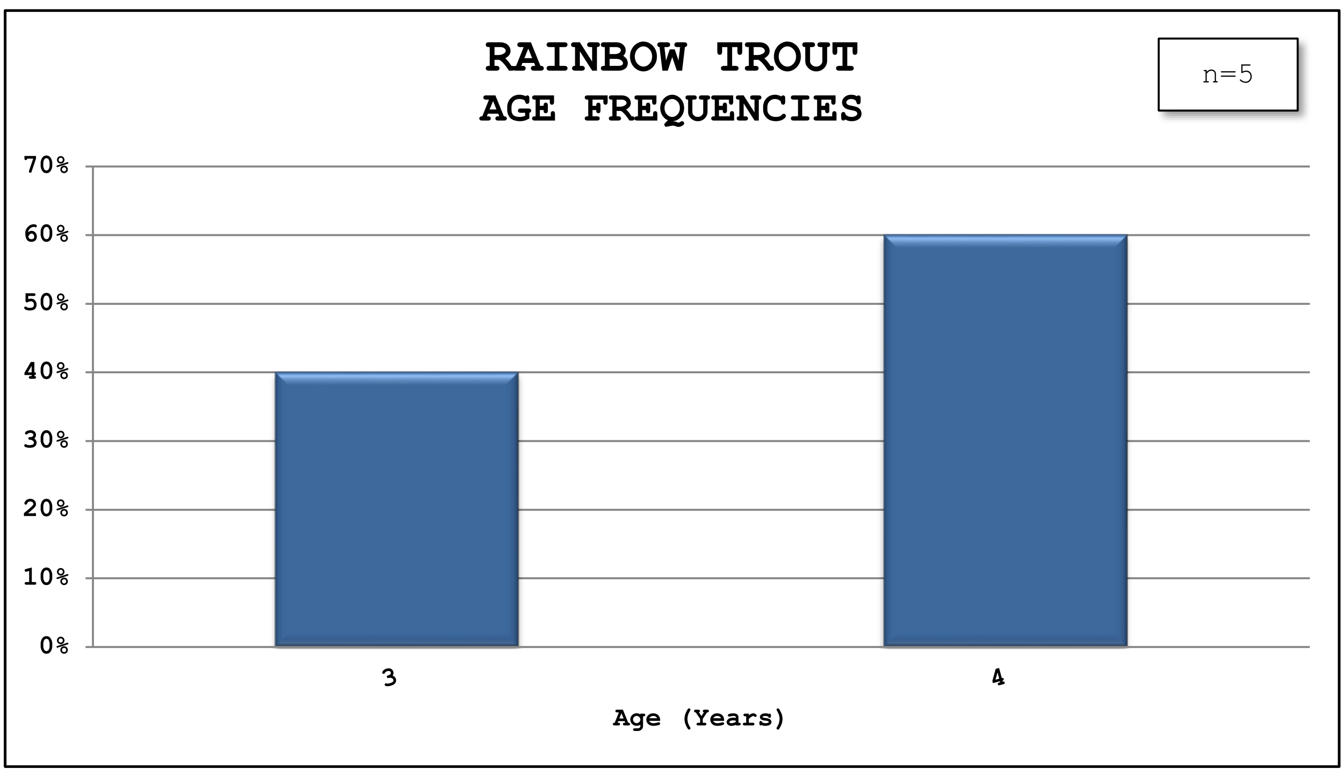




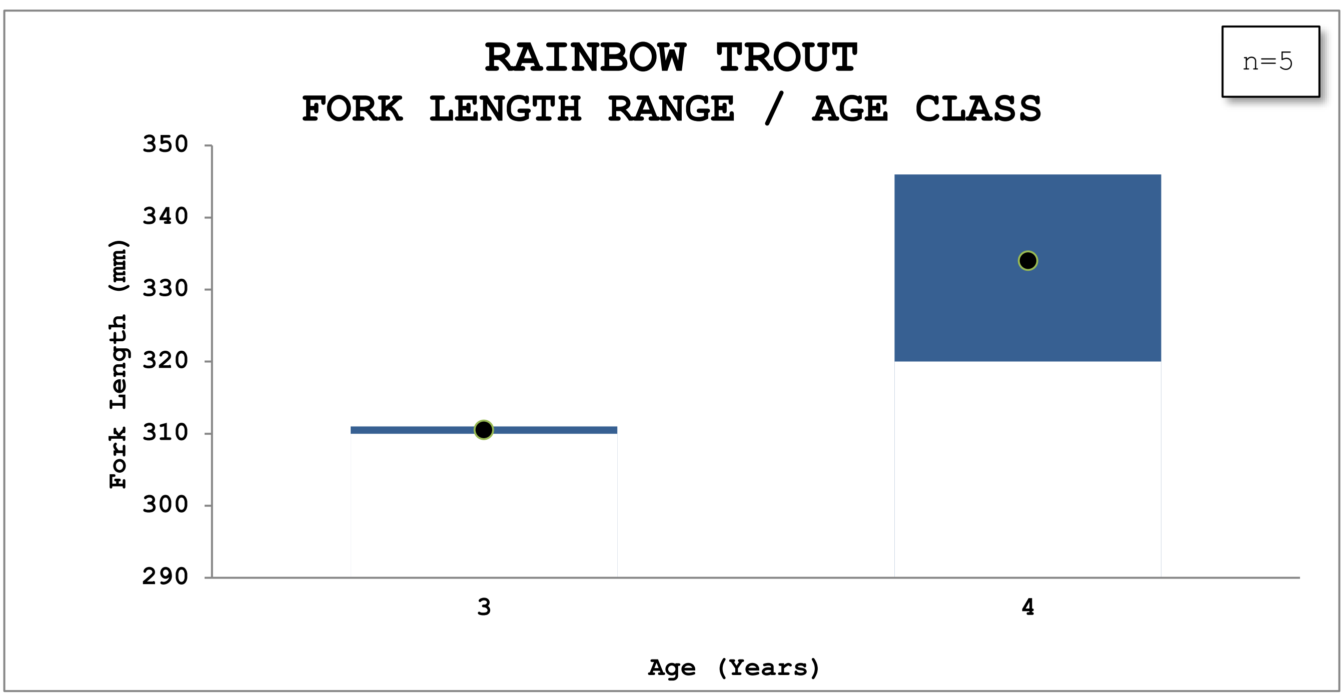
Rainbow Trout

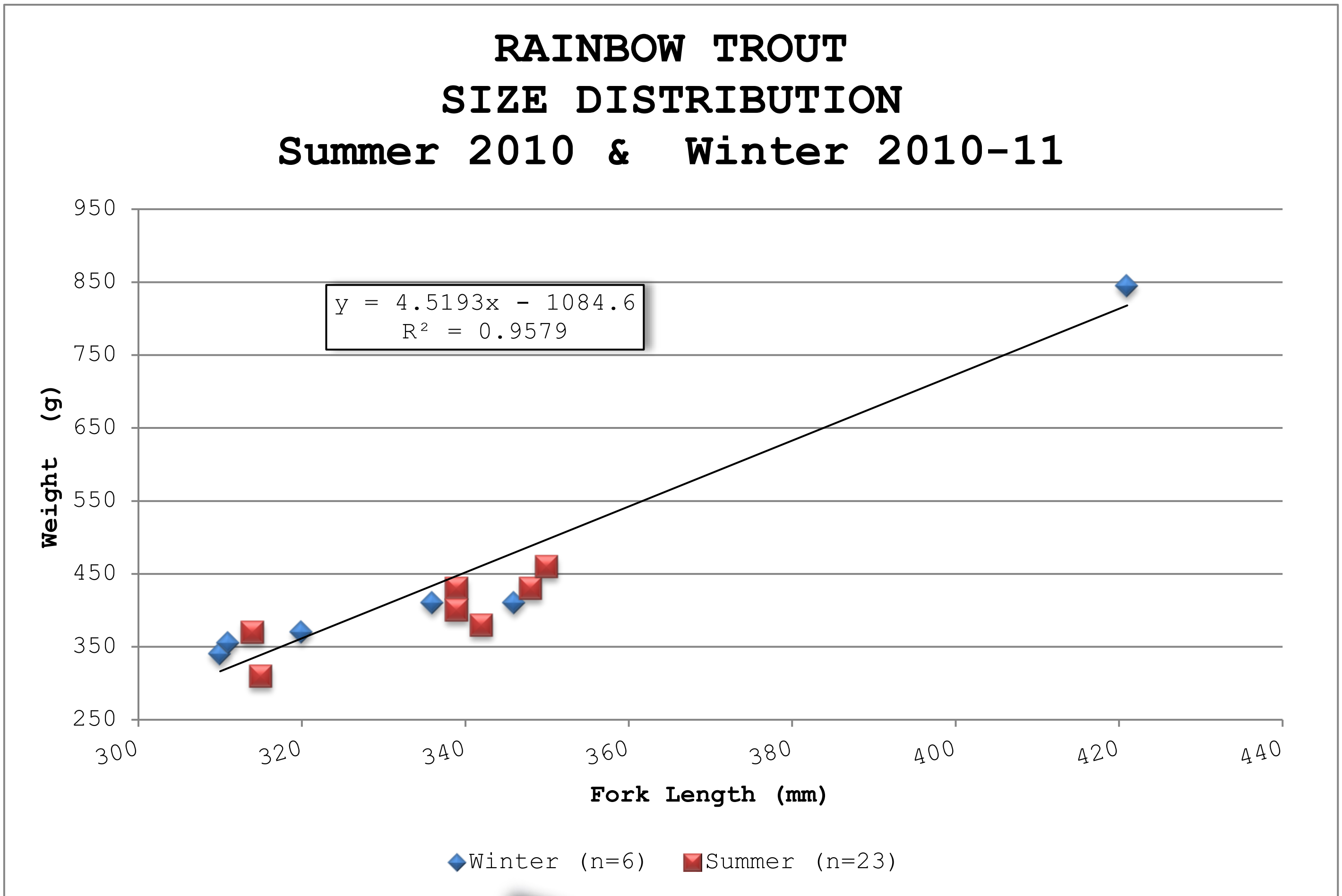
A total of six rainbow trout were caught during winter sampling. Fish sizes ranged in fork length of 310 – 421 mm, total length 328 – 444 mm, and weight 340 – 845g. The average rainbow trout sampled was 340.7 mm in fork length, 361 mm total length and weighed 455 g. Five rainbow trout were aged at 3 – 4 years.






S.F.E.

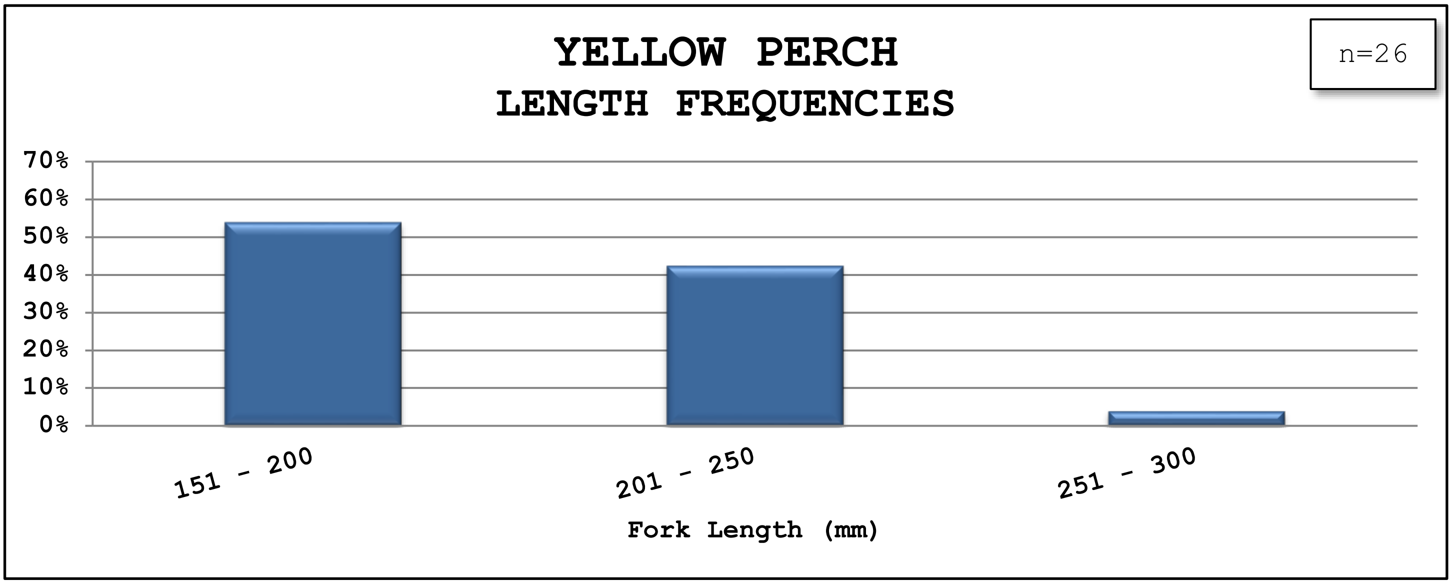

RAINBOW TROUT
FORK LENGTH RANGE / AGE CLASS
n=5
Fork Length (mm)
350
340
330
320
310
300
290
3
4
Age (Years)



There were no recaptures during the winter sampling to analyze growth rates of rainbow trout. When assessing overall health, only six rainbow trout were caught and are comparable to size distribution of summer trout. One rainbow was found to possess internal cysts and contained parasites.

Yellow Perch

A total of twenty-nine yellow perch were caught. Twenty-six yellow perch sampled during the winter of 2011 possessed fork lengths ranging from 160 – 246 mm. Total lengths ranged from 170mm – 254mm. Weight ranged from 60 – 180 g. Average perch were 197.1 mm fork length with a weight of 96.9 g. Of the twenty-six yellow perch sampled, 88% were mature female and 12% mature males. Observations of any parasites were recorded and 55% possessed black spot, 10% yellow grub and 10% possessed both.



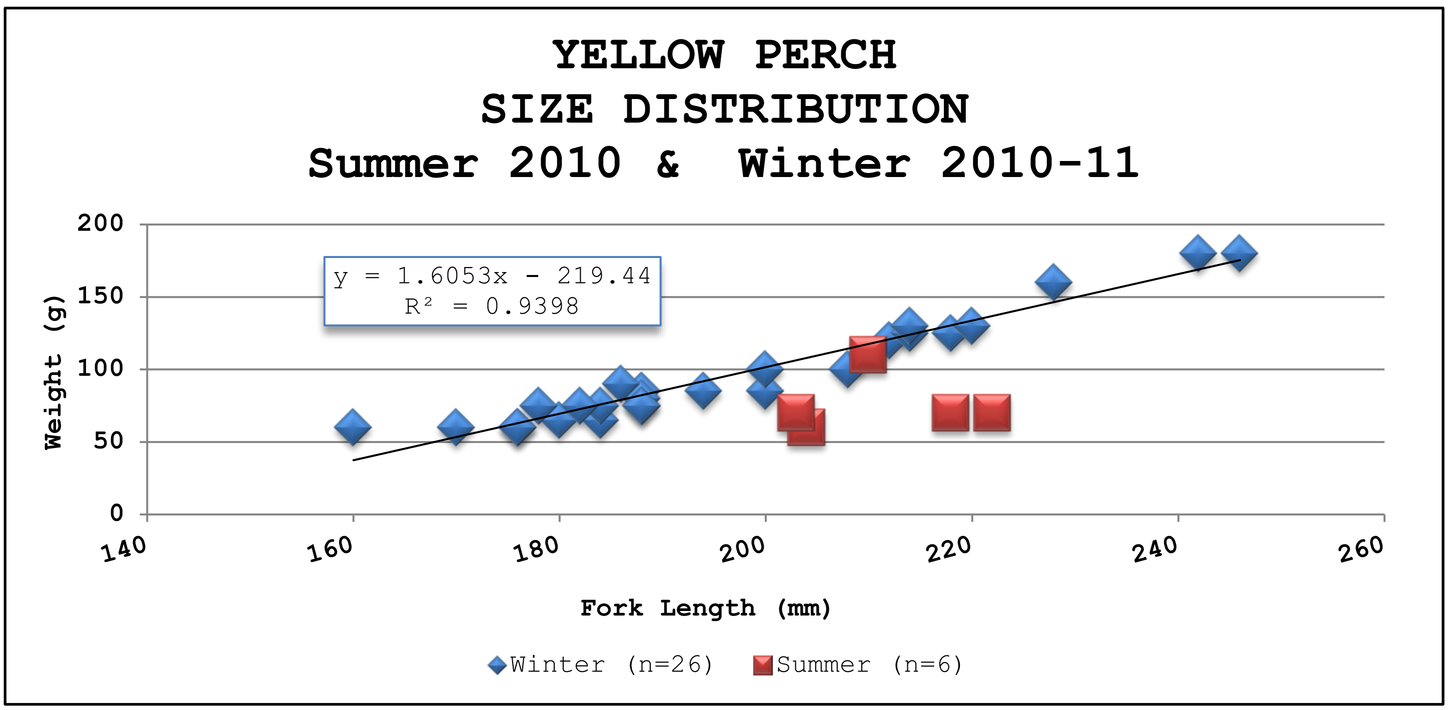


Figure 14: Comparison of yellow perch size distribution

Summer condition of yellow perch display significantly lower weights compared to the winter (Figure 14). Timing of spawn could contribute to the weight differences as mature females contained several eggs during winter sampling.

Habitat Assessments

Habitat within Beaver Lake consisted of mainly soft substrate with low vegetation and fish cover. Clarity varied between sites although all sites had high levels of suspended solids (Table 2).

Table 2: Habitat of winter sites

DATE	CLOUD COVER	BAROMETRIC PRESSURE (h/PA)	SITE	STRATA	SUBSTRATE	VEGETATION	FISH COVER	CLARITY	SPLA	RNTR	YLPR	WHSC
14/03/2011	8/8	1012 (FALLING)	3	SHALLOW	SOFT	LOW	LOW	GOOD	4	0	3	0
01/03/2011	2/8	1030 (RISING)	29	SHALLOW	SOFT	MEDIUM	LOW	GOOD	4	2	4	0
14/03/2011	8/8	1012 (FALLING)	27	SHALLOW	SOFT	LOW	LOW	POOR	1	0	1	0
01/03/2011	2/8	1030 (RISING)	21	SHALLOW	SOFT	MEDIUM	LOW	GOOD	4	1	0	0
10/02/2011	1/8	1010 (FALLING)	26	DEEP	FIRM	LOW	LOW	POOR	0	0	0	0
24/01/2011	8/8	1016 (FALLING)	15	DEEP	SOFT	LOW	LOW	POOR	0	0	3	0
03/02/2011	6/8	1009 (FALLING)	17	DEEP	FIRM	LOW	LOW	GOOD	1	1	0	3
19/01/2011	2/8	1016 (RISING)	4	SHALLOW	SOFT	HIGH	HIGH	GOOD	2	5	0	0

Highest CPUE of rainbow trout was found in site 004 where vegetation and fish cover were high. Only one rainbow trout was found to inhabit areas with low fish cover and vegetation. Yellow perch were found within all habitat types, while white suckers were found only once and within the deep strata.

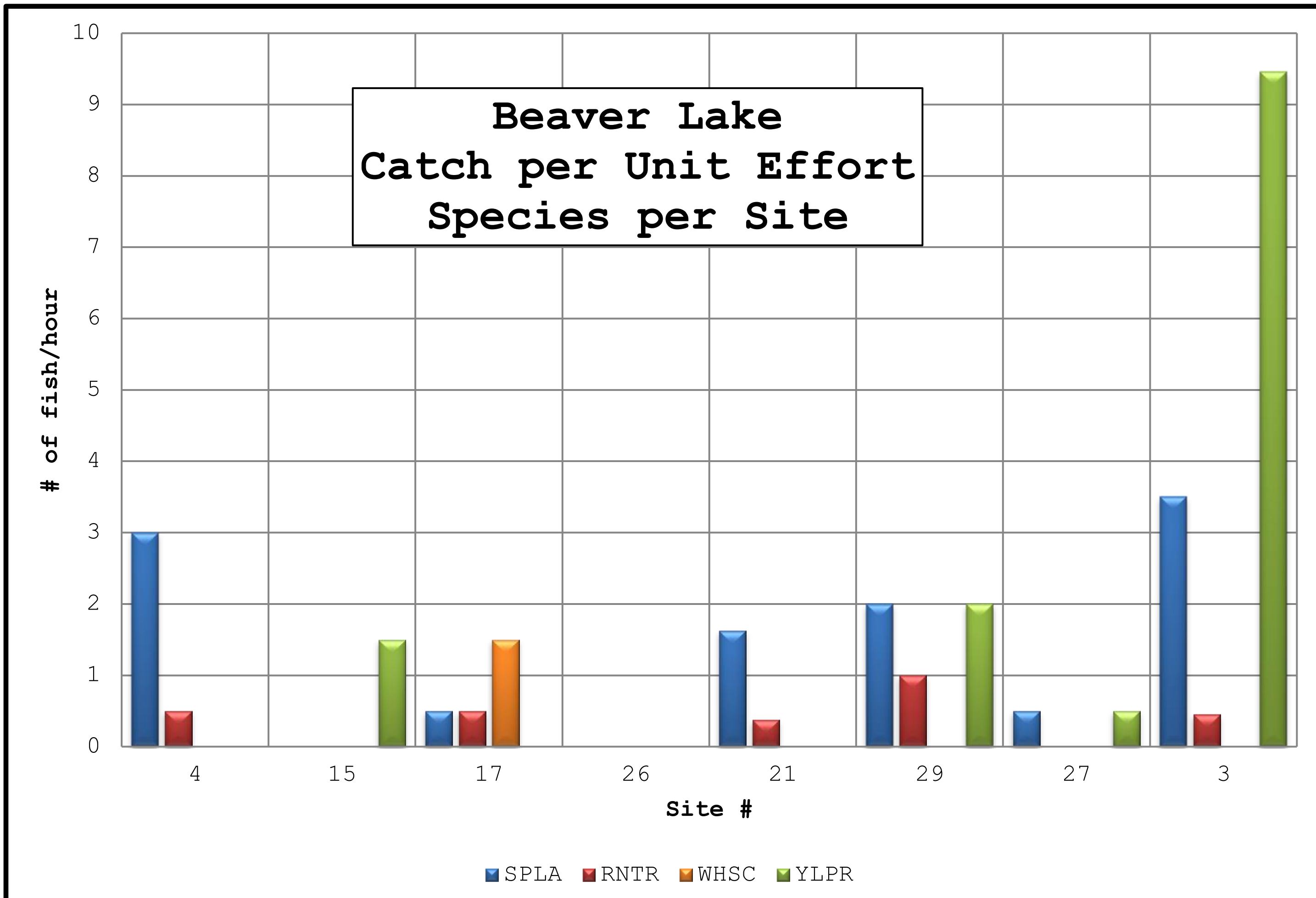
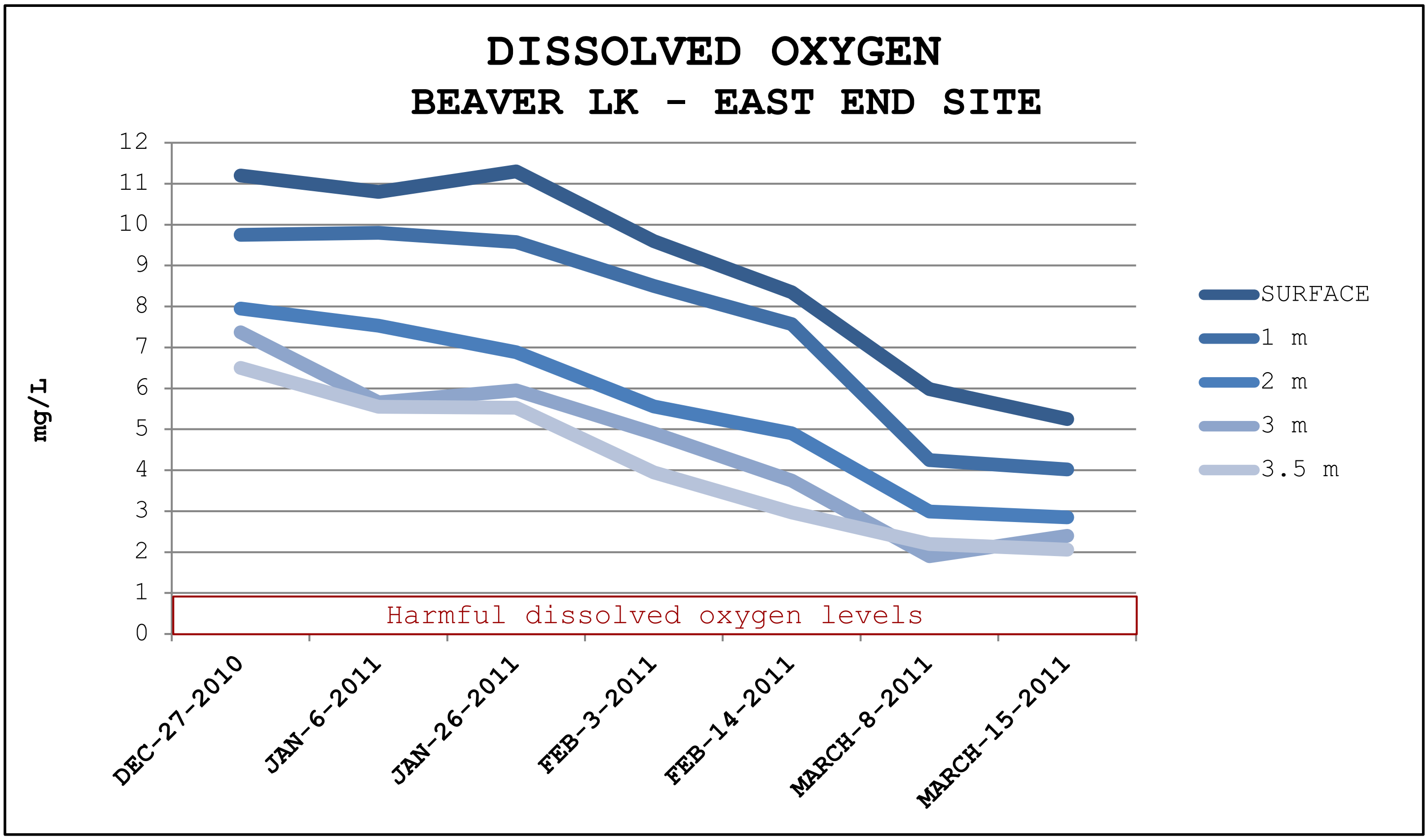


Figure 15: comparison of CPUE per species at winter sites

There was no concrete relationship between habitat parameters and CPUE of splake. Sites containing high catches of splake ranged in habitat with medium to low vegetation. Generally trout species inhabited shallower waters. Although one large splake sampled twice, was found to only frequent deeper strata. Splake 012; was the largest trout sampled with a fork length of 526 mm and weighed 1500 grams. This could indicate depth as the preferred habitat over other habitat parameters for larger splake.

Dissolved Oxygen

Beaver Lake dissolved oxygen levels were tested seven times from December 2010 to March 2011. On January 26th surface dissolved oxygen levels decreased steadily but remained fair and above harmful low D.O levels. When dissolved oxygen and temperature are known estimated percent oxygen saturation can be calculated. On December 27th, 2010 oxygen saturation was 72% at surface and 47% at 3.5 m below surface. On March 15th oxygen saturation dropped to 36% at surface and 16% at 3.5 m below surface.

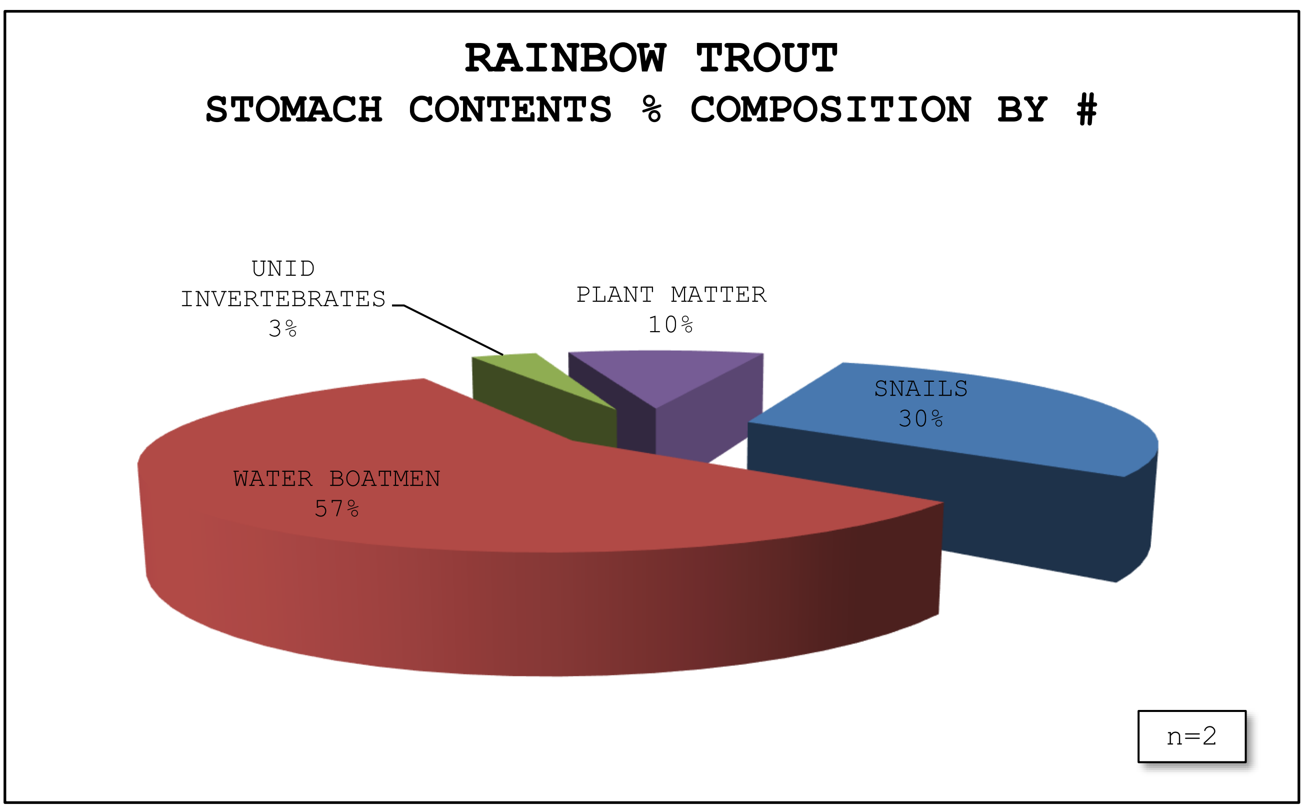


Stomach Content Analysis

Only two rainbow trout stomachs were analyzed. Trout fork lengths were 336 and 346 mm and both possessed a weight of 410 g. Total weight of each stomach for fish #102 and #189 was 34.5 g and 37.8 g, respectively. Contents within trout were similar, identifying available feed in Beaver Lake (Table 3).

Table 3: Beaver lake rainbow trout stomach contents

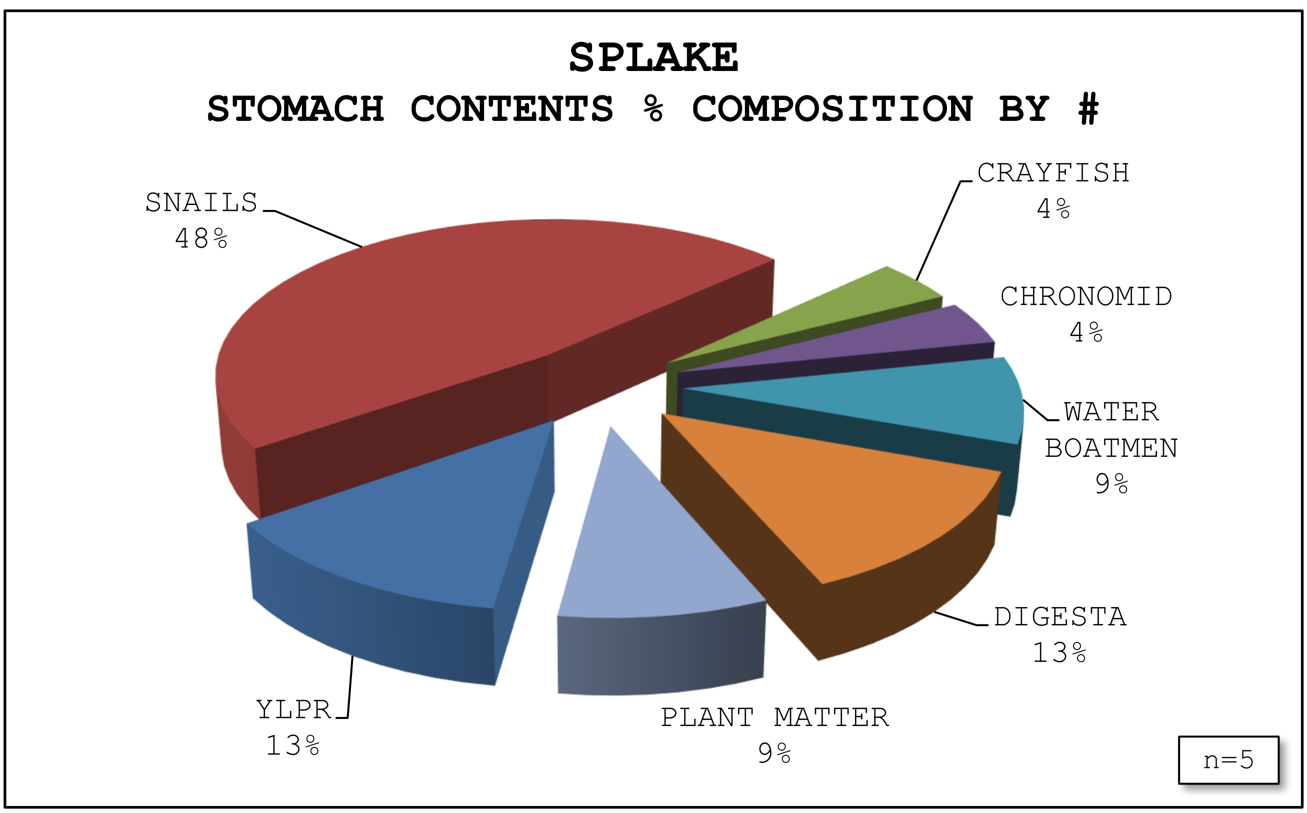
CONTENT ITEMS	CLASS/ORDER /SPECIES	TOTAL # OF CONTENT	TOTAL # OF OCCURENCES	FREQUENCY OF OCCURRENCE	% COMPOSITION BY #
YLPR	PERCA FLAVESCENS	0	0	0	0
BROOK STICKLEBACK	CULAEA INCONSTANS	0	0	0	0
SNAILS	GASTROPODA	9	2	100	30
CRAYFISH	DECAPODA	0	0	0	0
CHRONOMID	CHIRONOMIDAE	0	0	0	0
CADDISFLY	TRICHOPTERA	0	0	0	0
DRAGONFLY	ODONATA	0	0	0	0
WATER BOATMEN	COLEOPTERA	17	1	50	57
MAYFLY	EPHEMEROPTERA	0	0	0	0
UNID FISH MATTER		0	0	0	0
UNID INVERTEBRATES		1	1	50	3
DIGESTA		0	0	0	0
PLANT MATTER		3	1	50	10
TOTAL		30	5	250	100



Stomach contents of five splake were analyzed. Three of these fish were mature females, ranging from 272 - 350 mm in fork length and 170 - 405 g in weight. All mature female stomachs were found to possess snails. The remaining two splake were males; one immature and one mature. Sizes were similar with fork lengths of 338mm and 340mm respectively. Each male trout weighed 350 g. The immature male fed on merely yellow perch, while the mature male contained unidentified plant matter (Table 4).

Table 4: Beaver lake splake stomach contents

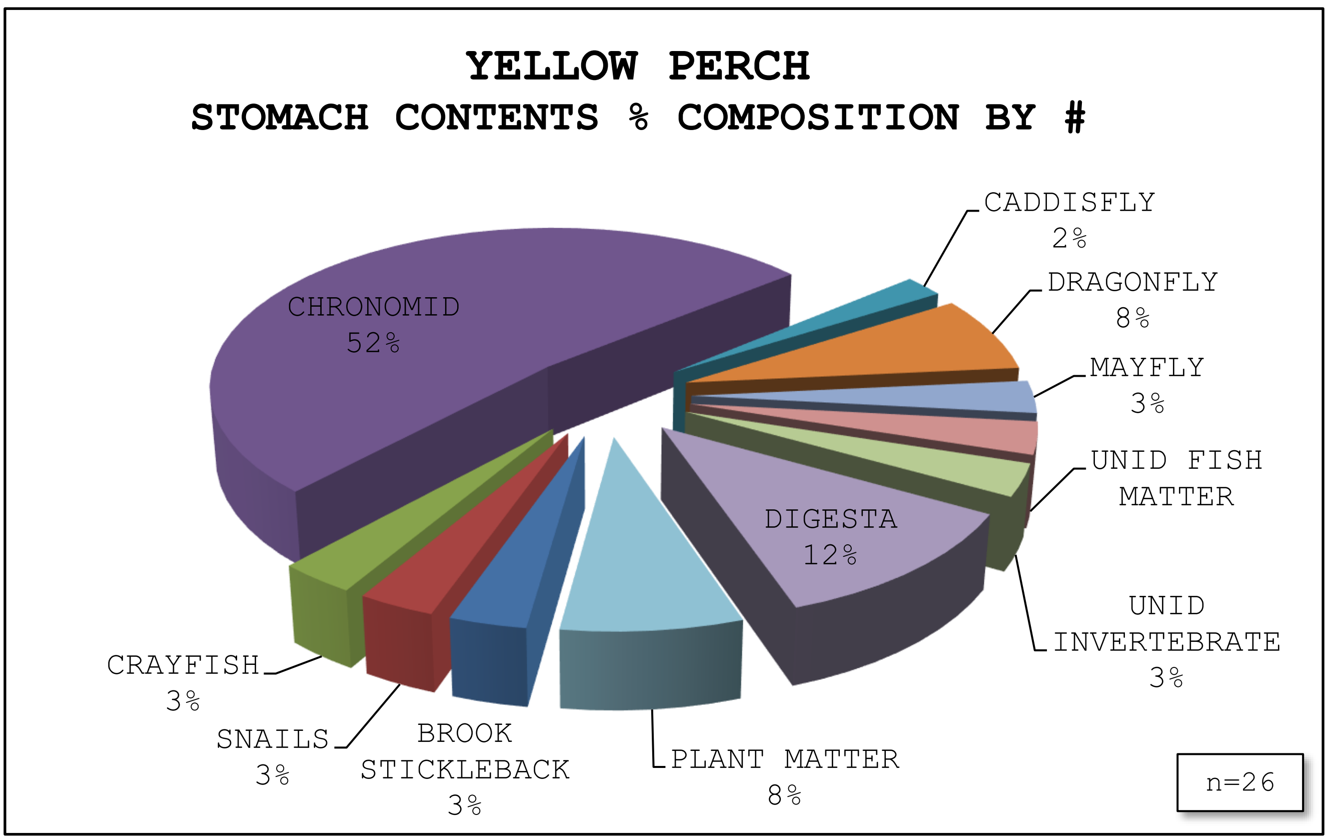
CONTENT ITEMS	CLASS/ORDER /SPECIES	TOTAL # OF CONTENT	TOTAL # OF OCCURENCES	FREQUENCY OF OCCURRENCE	% COMPOSITION BY #
YLPR	PERCA FLAVESCENS	0	0	0	0
BROOK STICKLEBACK	CULAEA INCONSTANS	0	0	0	0
SNAILS	GASTROPODA	9	2	100	30
CRAYFISH	DECAPODA	0	0	0	0
CHRONOMID	CHIRONOMIDAE	0	0	0	0
CADDISFLY	TRICHOPTERA	0	0	0	0
DRAGONFLY	ODONATA	0	0	0	0
WATER BOATMEN	COLEOPTERA	17	1	50	57
MAYFLY	EPHEMEROPTERA	0	0	0	0
UNID FISH MATTER		0	0	0	0
UNID INVERTEBRATES		1	1	50	3
DIGESTA		0	0	0	0
PLANT MATTER		3	1	50	10
TOTAL		30	5	250	100

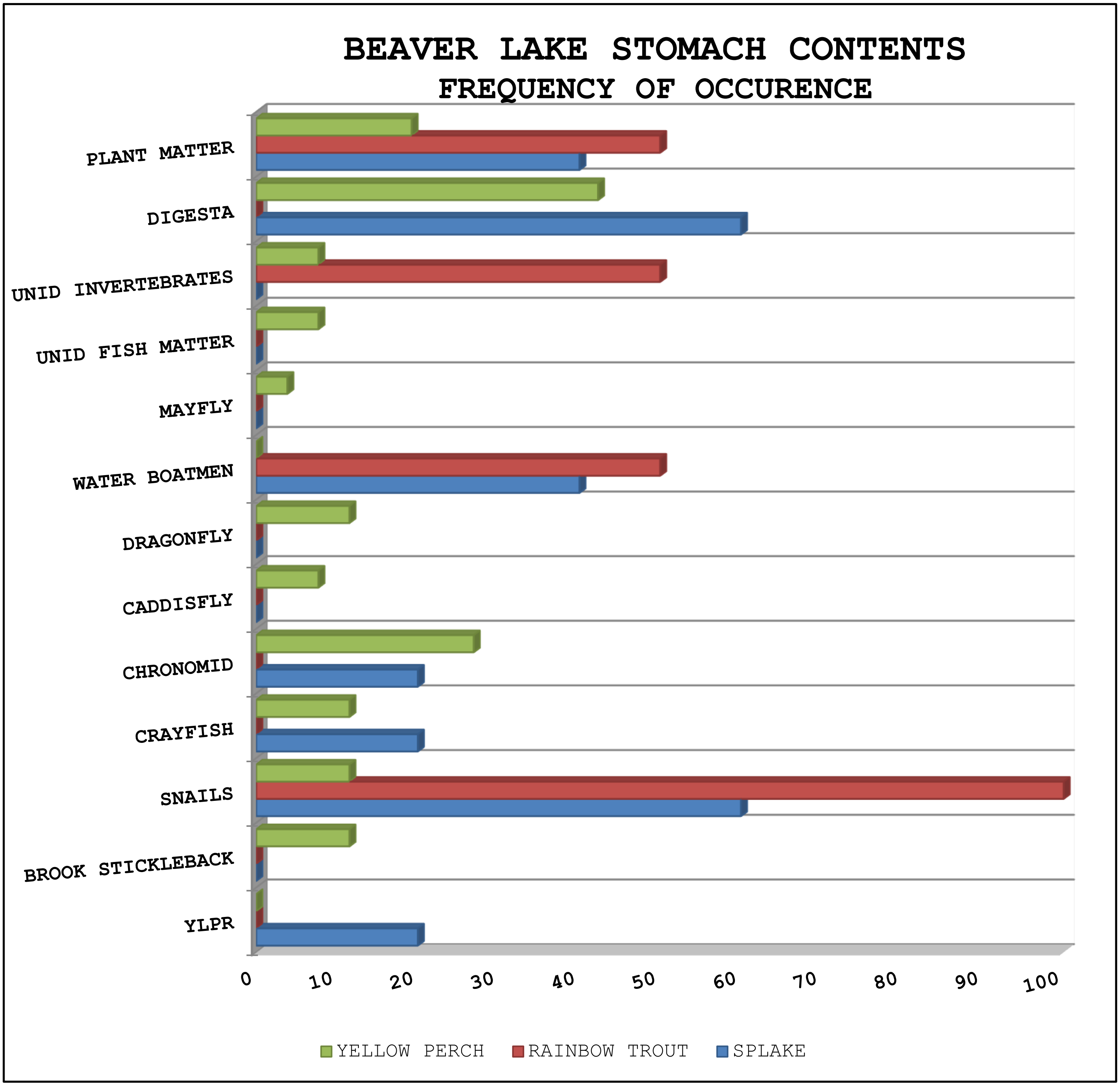


Twenty six yellow perch stomachs were analyzed. Perch ranged from 160 to 246 mm in fork length and 60 - 180 g in weight. Twenty-two out of twenty-six perch sampled were mature female and three were mature males. Yellow Perch displayed the most diverse diet feeding on 11 of 13 content items. 52% of perch stomachs contained chronomids. All other contents composition found within yellow perch was less than 8%.

Table 5: Beaver lake yellow perch stomach contents

CONTENT ITEMS	CLASS/ORDER /SPECIES	TOTAL # OF CONTENT	TOTAL # OF OCCURENCES	FREQUENCY OF OCCURRENCE	% COMPOSITION BY #
YLPR	PERCA FLAVESCENS	0	0	0	0
BROOK STICKLEBACK	CULAEA INCONSTANS	3	3	12	3
SNAILS	GASTROPODA	3	3	12	3
CRAYFISH	DECAPODA	3	3	12	3
CHRONOMID	CHIRONOMIDAE	49	7	27	52
CADDISFLY	TRICHOPTERA	2	2	8	2
DRAGONFLY	ODONATA	7	3	12	7
WATER BOATMEN	COLEOPTERA	0	0	0	0
MAYFLY	EPHEMEROPTERA	3	1	4	3
UNID FISH MATTER		3	2	8	3
UNID INVERTEBRATES		3	2	8	3
DIGESTA		11	11	42	12
PLANT MATTER		7	5	19	7
TOTAL		**94**	**42**	**162**	**100**





Frequency of occurrence provides a somewhat crude qualitative picture of the food spectrum (Crisp, 1963). Both trout species indicate snails as the most available food item. This could also indicate a competition between species. Johnson (1977) stated when frequency of occurrence of a food item exceeds 25% in two or more predators, competition was likely. Therefore, competition for prey species such as snail and water boatmen could occur between rainbow trout and splake.

3. Black Beaver Lake

Black Beaver Lake contains brook and rainbow trout within the 70 hectares of freshwater. The lake possesses a consistent 2 - 3 meter depth with a small area reaching depths of just over 6 meters. Because of the lake's bathymetric structure occasionally the lake partially winterkills. In 2007 and 2009, dissolved oxygen reached a low of 1 ppm.

The eight sites sampled for the winter assessment included: Site numbers 007, 013, 014, 018, 020, 023, 026, and 030. Stratums within these sites were 100% shallow (Figure).

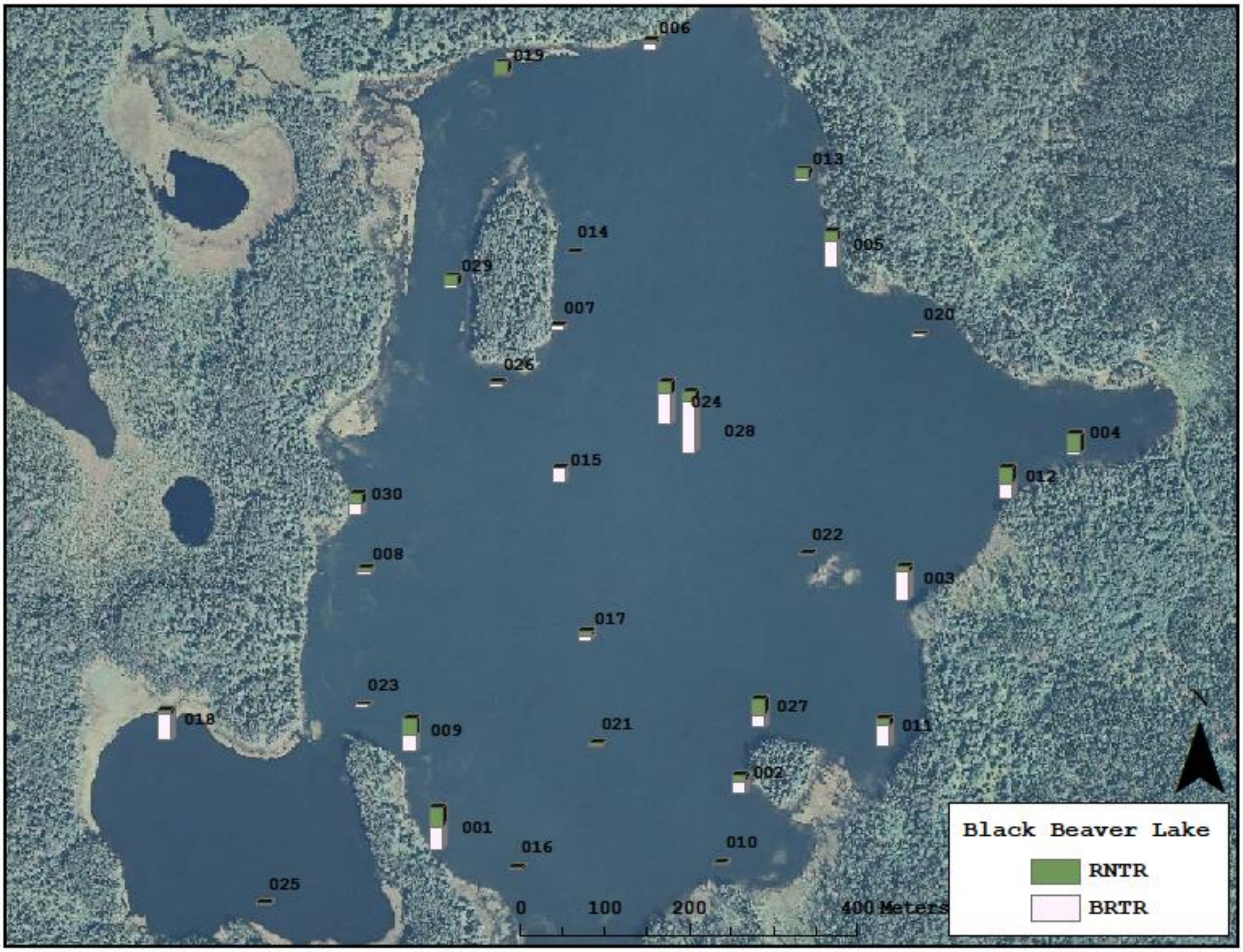
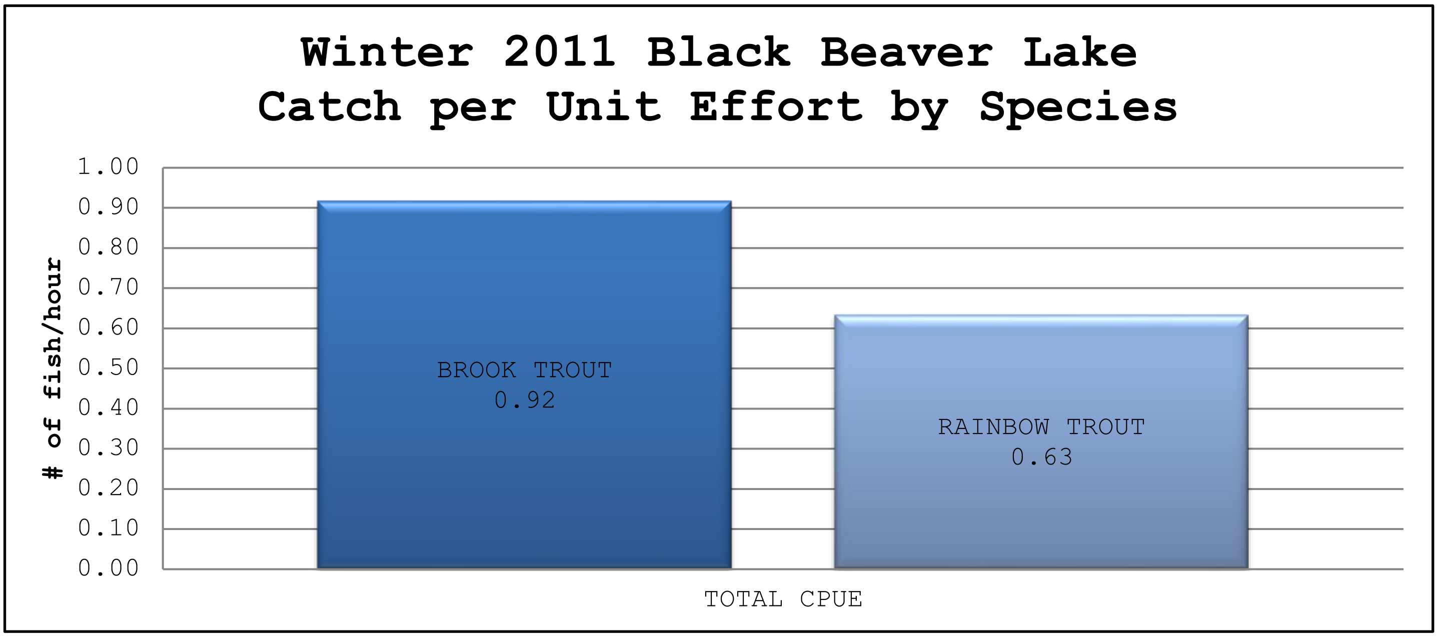


Figure 16: Summer stocked trout sites and CPUE per species. Eight sites utilized for winter sampling

Results from the **2010-2011 Winter Stocked Trout Lakes Assessment** include the following;



Sampling time: December 21st, 2010 – February 7th, 2011

Average air temperature: -20.5°C

Average sample time: 62.8 min

Total caught: 26 fish

Total tagged: 25 fish

Total recaptures: 0 fish

Average depth sampled: Shallow 2.5 m

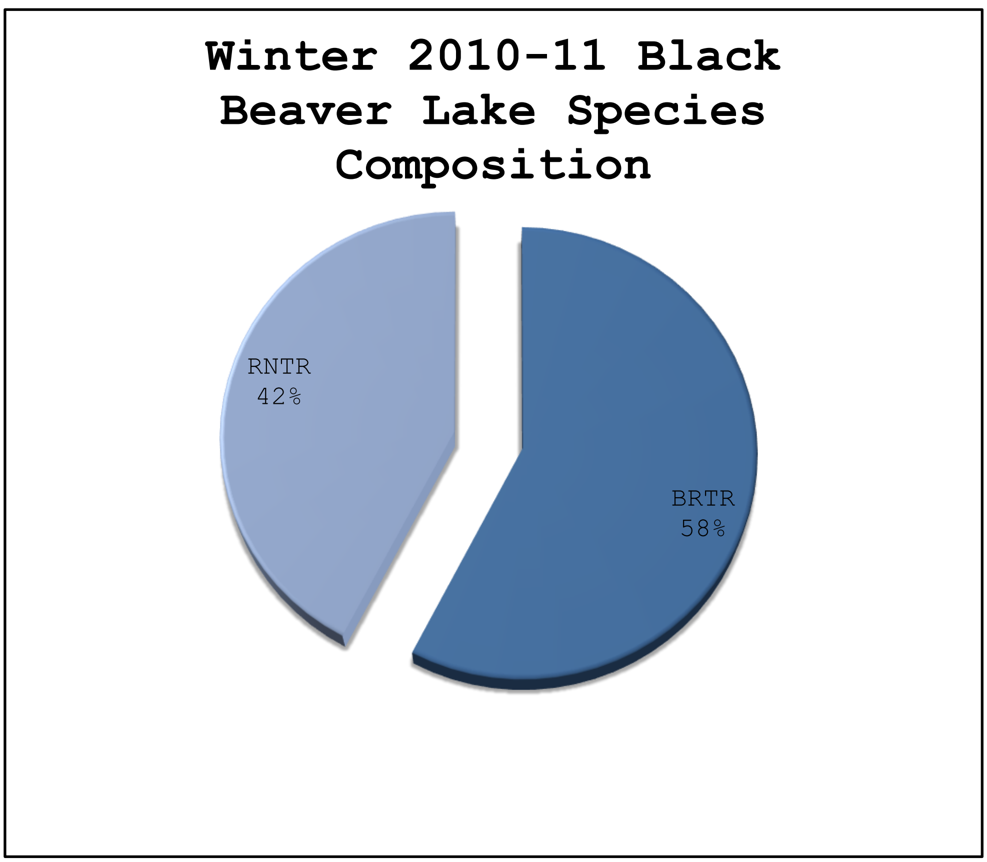
Lake CPUE: 1.55 fish/hour

Species CPUE:
BRTR 0.92
RNTR 0.63

Catch %/stratum: Shallow 100%

Species Composition (n=26):

RNTR (42%)
BRTR (58%)



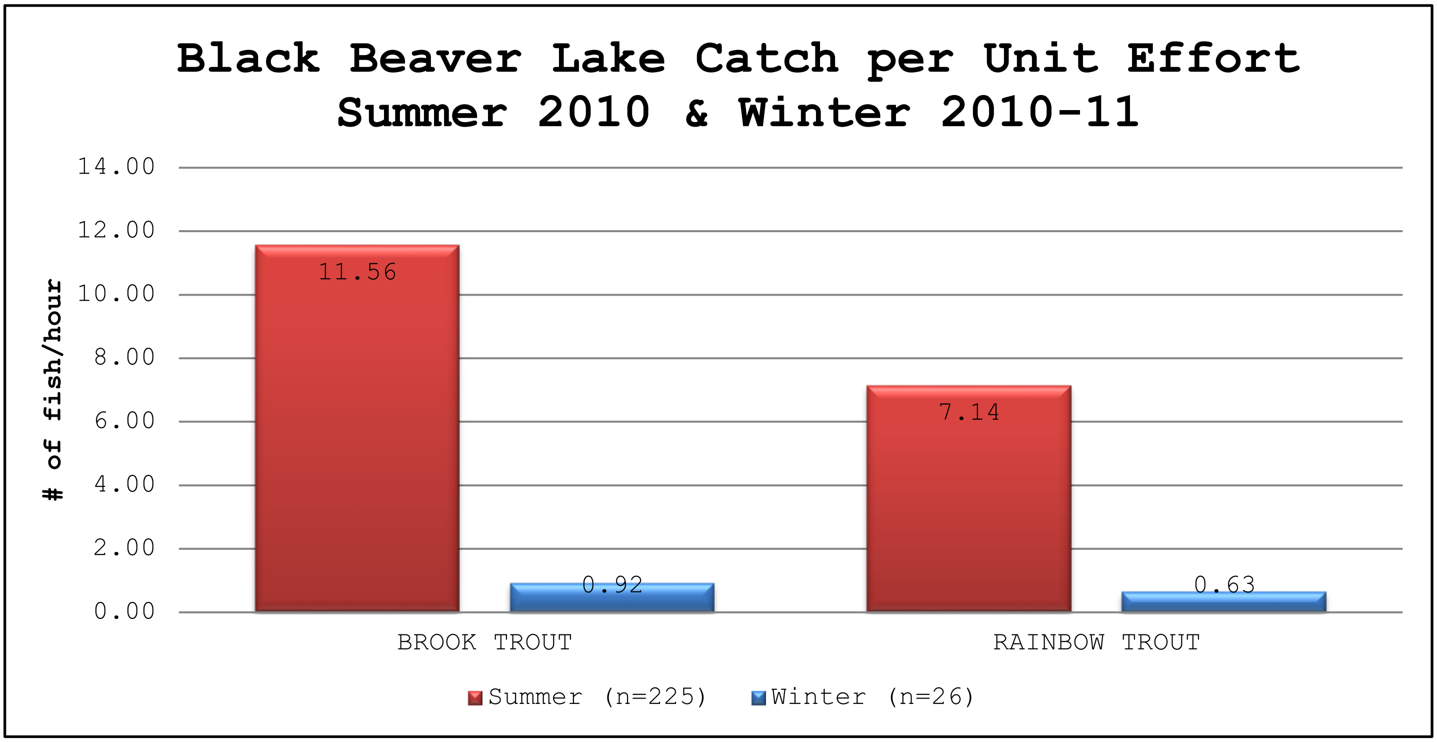


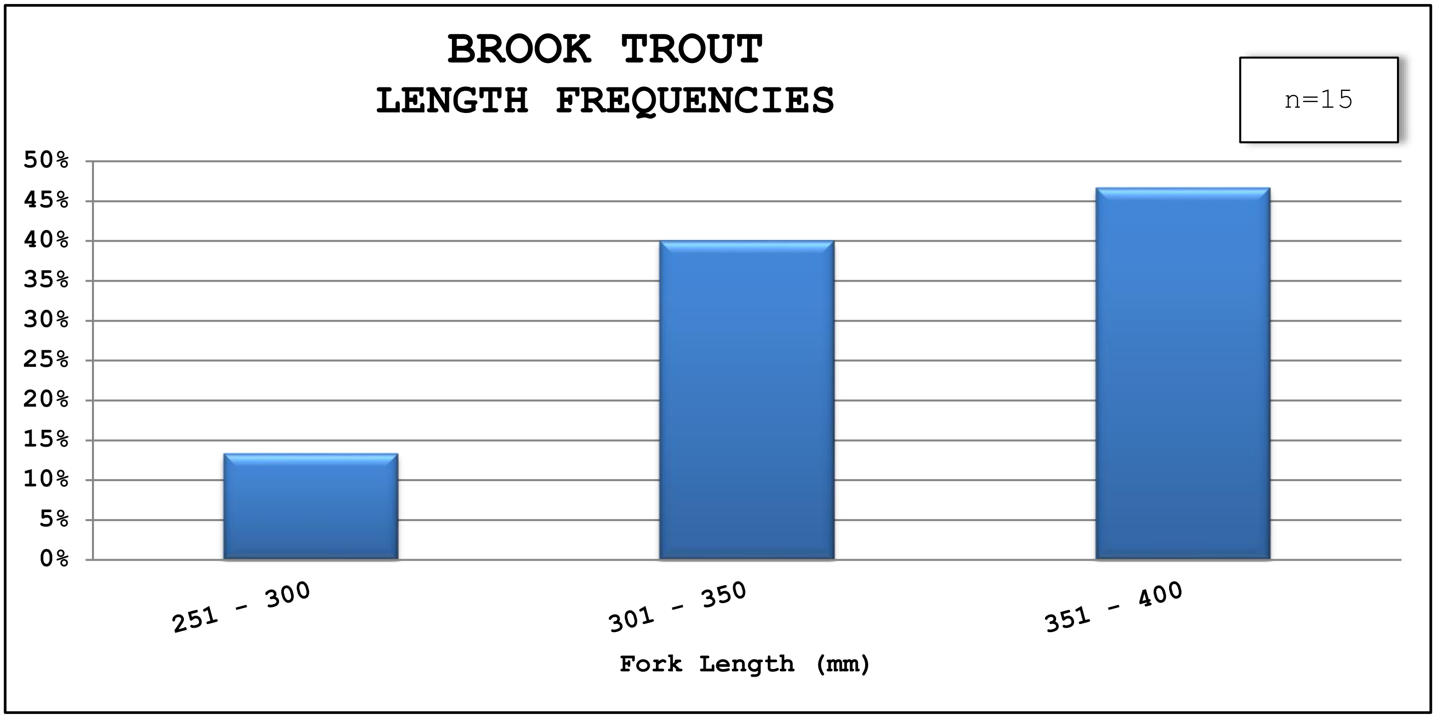
Figure 17: Black Beaver lake comparison of CPUE between summer 2010 and winter 2010-11

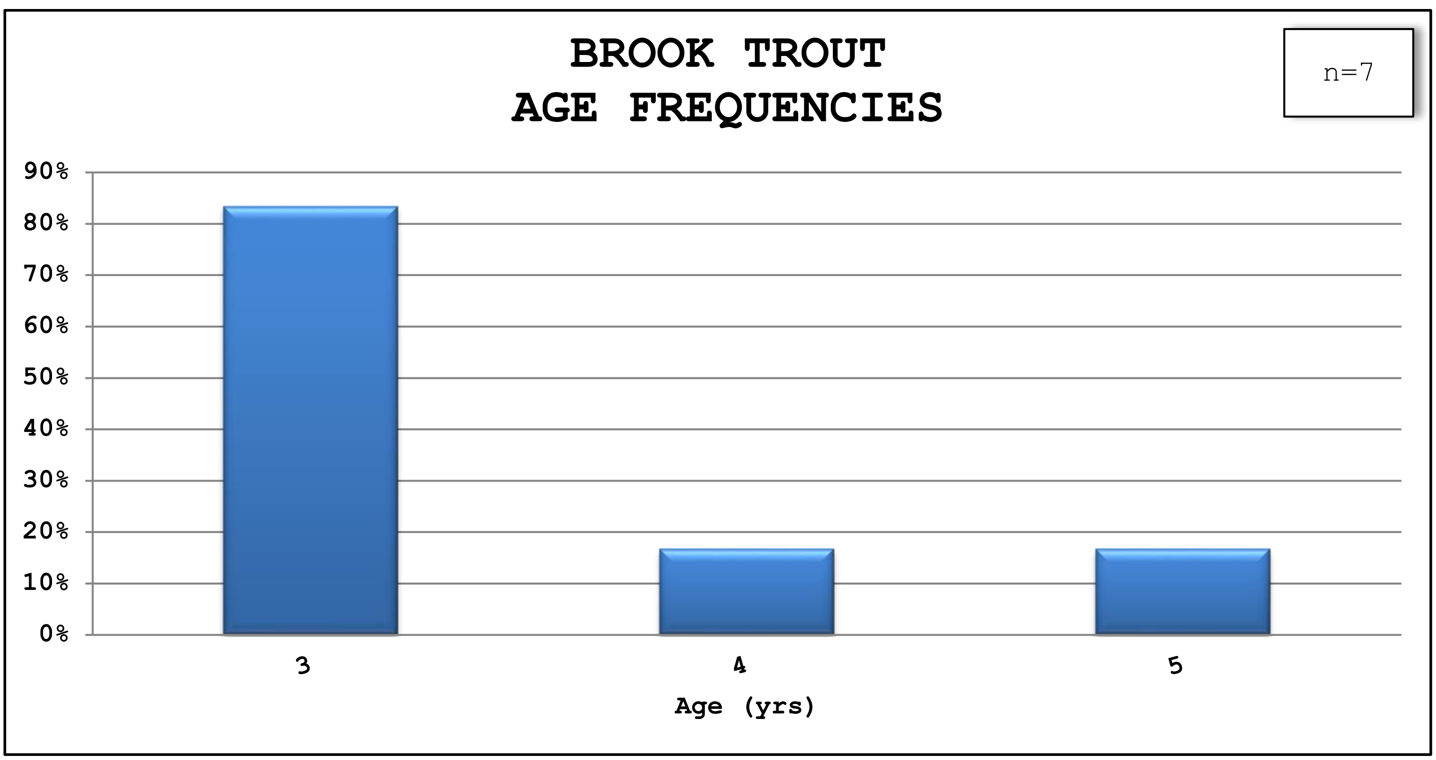
The 2010-11 catch per unit for both trout species significantly dropped from summer to winter (Figure 17). Various factors could affect CPUE including, seasonal behaviour, habitat preference and dissolved oxygen conditions.

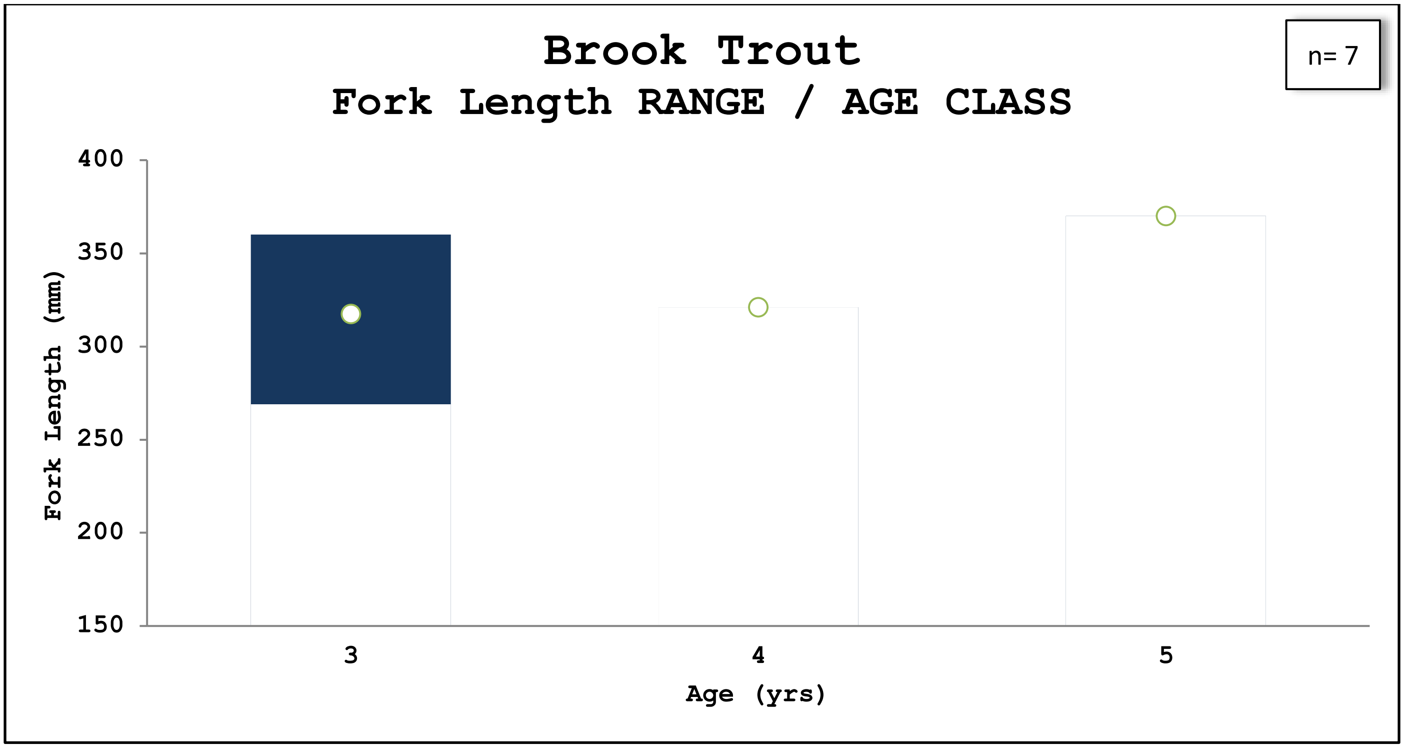
Species

Brook Trout

A total of fifteen brook trout were caught in winter sampling. Brook Trout ranged in fork lengths from 266 - 370 mm, total lengths 277 – 381 mm and total weights 215 - 720 g. Average brook trout were 332.1 mm fork length, 342.5 mm total length and weighed 489.2 g. Seven of the fifteen brook trout were aged from 3 – 5 years of age.






Brook Trout
Fork Length RANGE / AGE CLASS
n= 7
Fork Length (mm)
400
350
300
250
200
150
3
4
5
Age (yrs)

General condition of brook trout during the winter were comparable to trout sampled during the summer of 2010 (Figure 18).

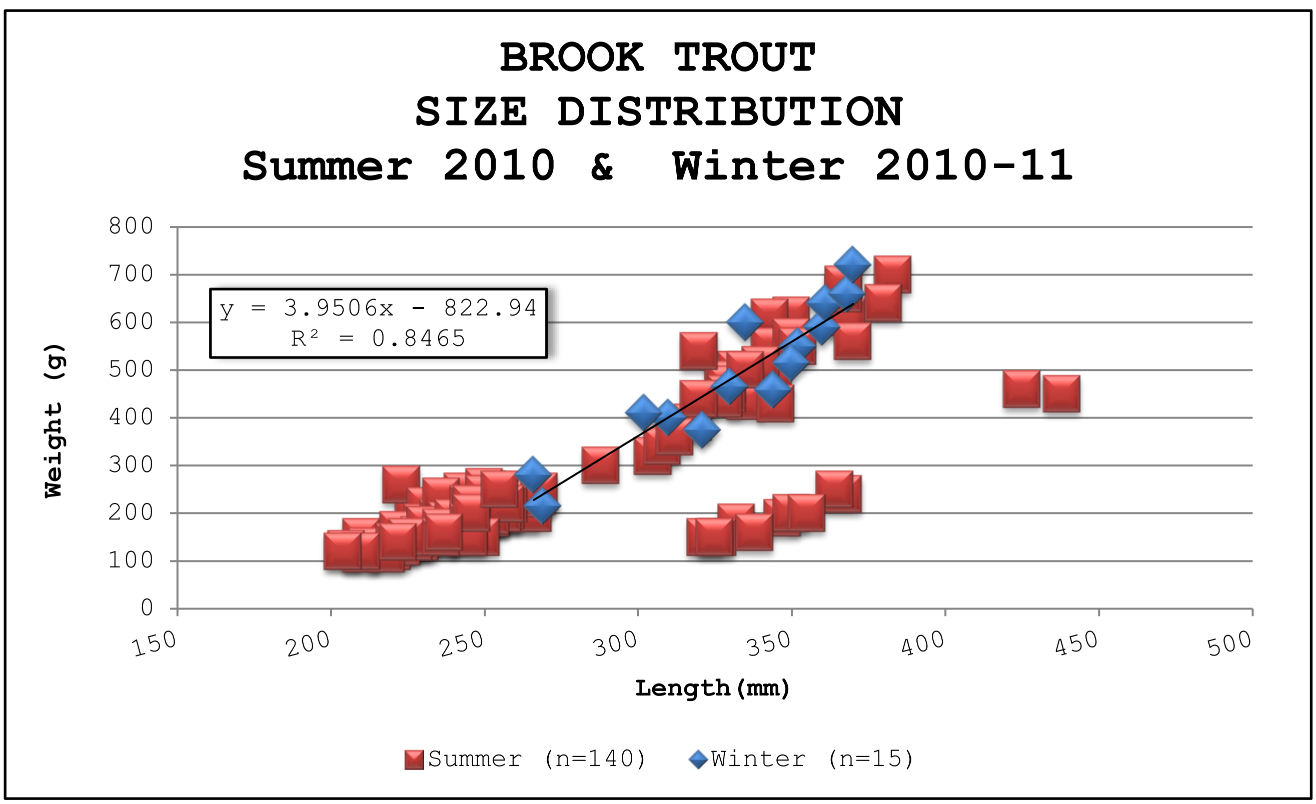
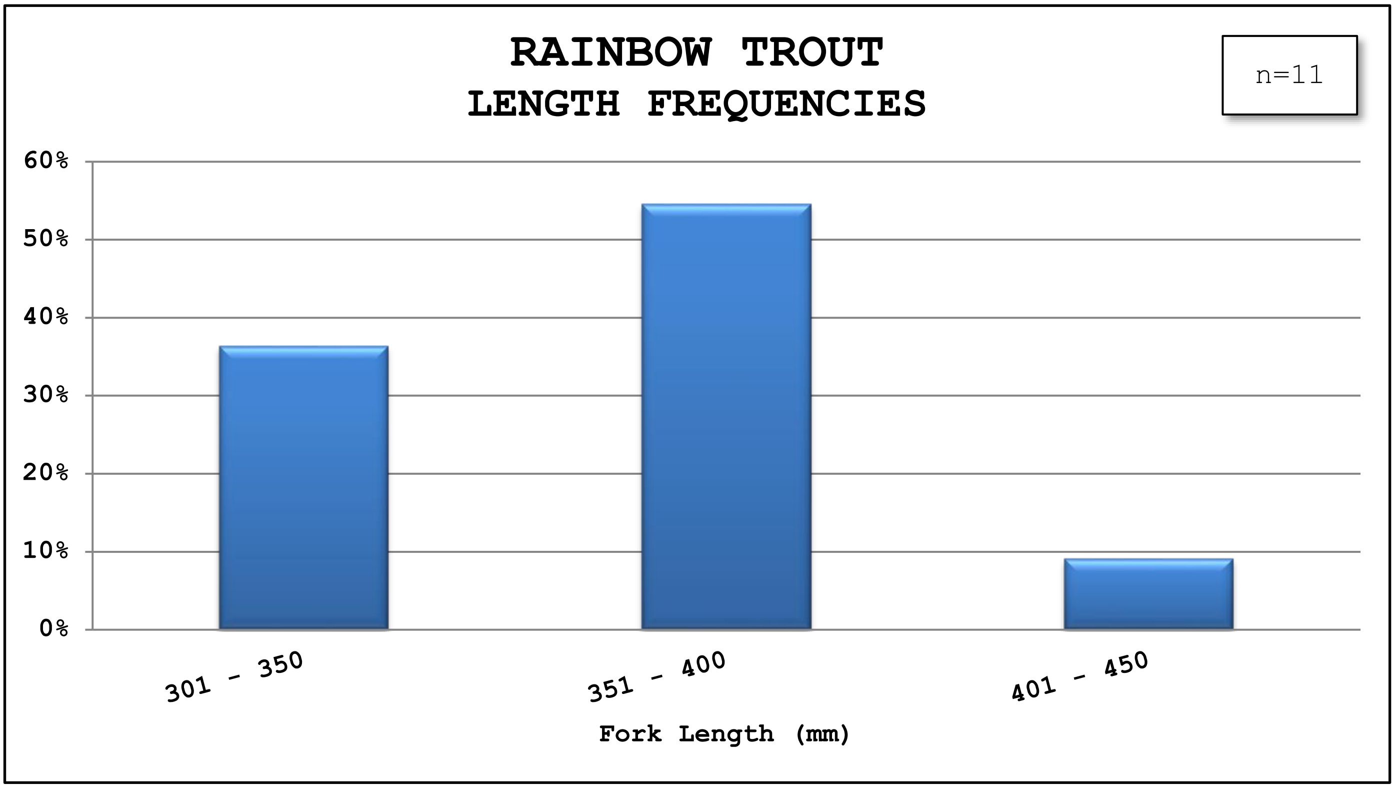
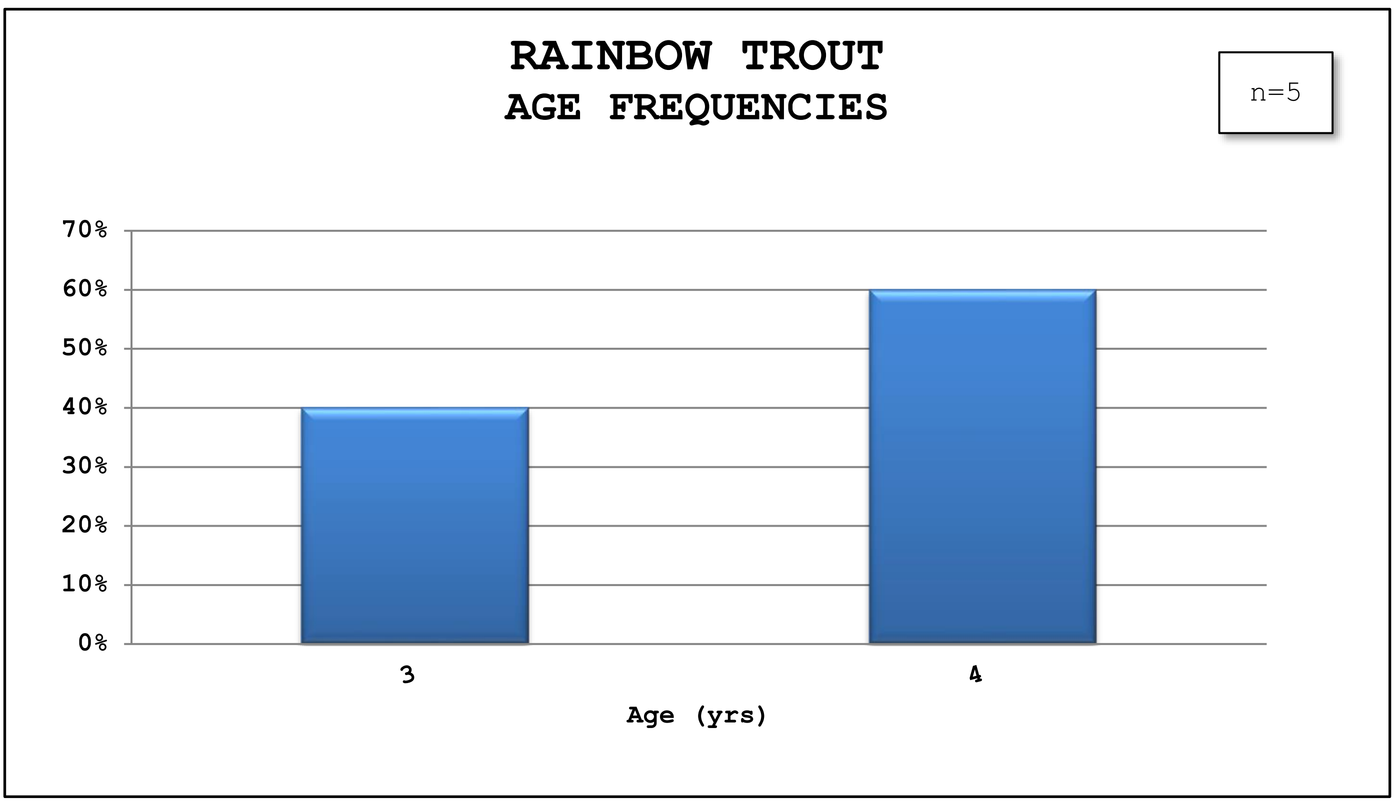


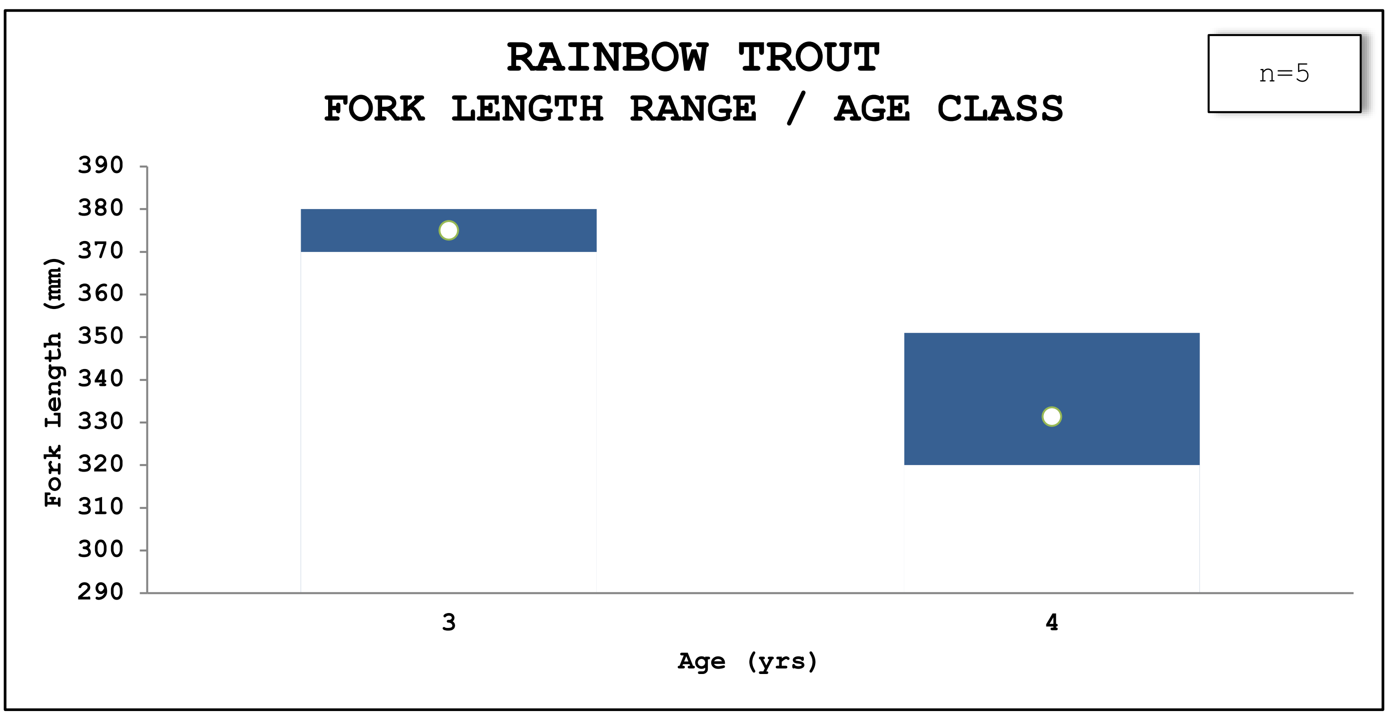
Figure 18: Black beaver lake brook trout size distribution

Rainbow Trout

A total of eleven rainbow trout were sampled in the winter of 2010-11. Trout ranged with a fork length of 320 - 412 mm, total length 332 - 436 mm, weight 420 - 1050 g. Average was 351.5 mm fork length, 367.5 mm total length and 578.2 g weight. Five rainbows were aged.






RAINBOW TROUT
FORK LENGTH RANGE / AGE CLASS
n=5
Fork Length (mm)
390
380
370
360
350
340
330
320
310
300
290
3
4
Age (yrs)

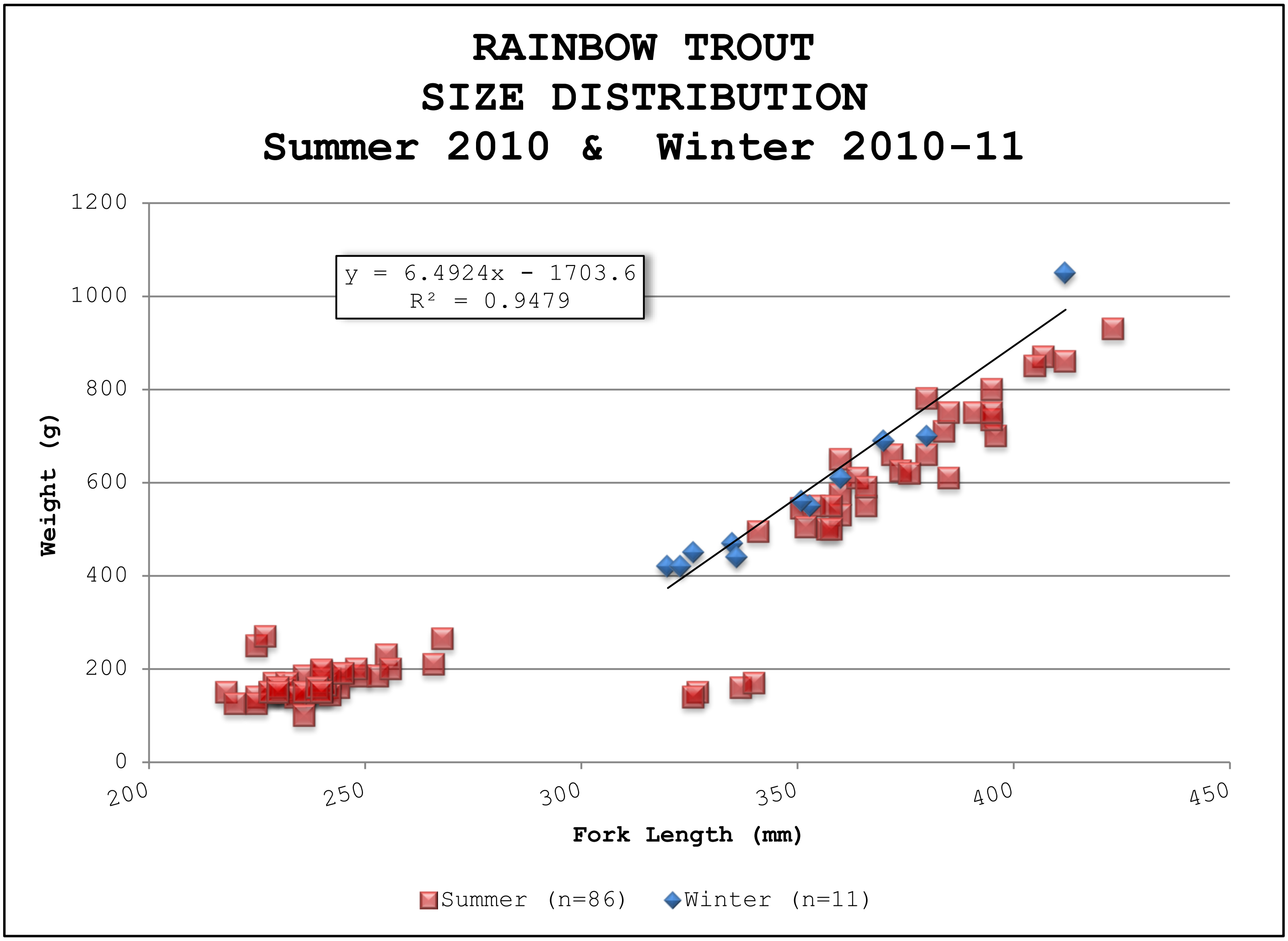


Figure 19: Black beaver lake rainbow trout size distribution

Condition of winter rainbow trout were similar to summer sampled rainbows within length categories of 300 to 450 mm (Figure 19). Anglers during sampling period also noted rainbows were feeding well and stomachs were full. There were no recaptures or mortalities to assess growth or feeding habits, although fish sampled were among the higher weight distribution of their size classes.

Habitat Assessments

Table 6: Habitat of winter sites

DATE	CLOUD COVER	BAROMETRIC PRESSURE	SITE	STRATA	SUBSTRATE	VEGETATION	FISH COVER	CLARITY	BRTR	RNTR
07/02/2011	2/8	1031	018	SHALLOW	SOFT MIX	HIGH	MEDIUM	GOOD	0	0
21/12/2011	8/8	1029 (RISING)	013	SHALLOW	SAND	LOW	NA	GOOD	2	0
22/12/2011	0/8	1035	020	SHALLOW	SOFT MIX	MED-LOW	LOW	POOR	3	1
04/01/2011	8/8	1010	014	SHALLOW	SOFT MIX	MEDIUM	MED-LOW	POOR	0	0
04/01/2011	8/8	1010	007	SHALLOW	SOFT MIX	MEDIUM	MEDIUM	POOR	3	2
01/02/2011	0/8	1045	030	SHALLOW	SOFT MIX	LOW	LOW	POOR	4	2
01/02/2011	0/8	1045	026	SHALLOW	SOFT MIX	LOW	LOW	GOOD	1	2
05/01/2011	2/8	1013	023	SHALLOW	SOFT MIX	LOW	LOW	GOOD	2	4

Habitat within sites sampled at Black Beaver Lake consisted of soft substrate, low to medium fish cover and were all within shallow stratums. There were two sites (#018 & #014) where no fish were found and one site (#013) where only brook trout were caught (Figure 20). Catches display both species frequent similar habitats. Because of Black beaver lake's generic morphology, relationships between habitat types and CPUE could not be distinguished. The shallow depths also create varied dissolved oxygen levels throughout the lake. Fish movement may be more influenced by oxygen levels than habitat types.

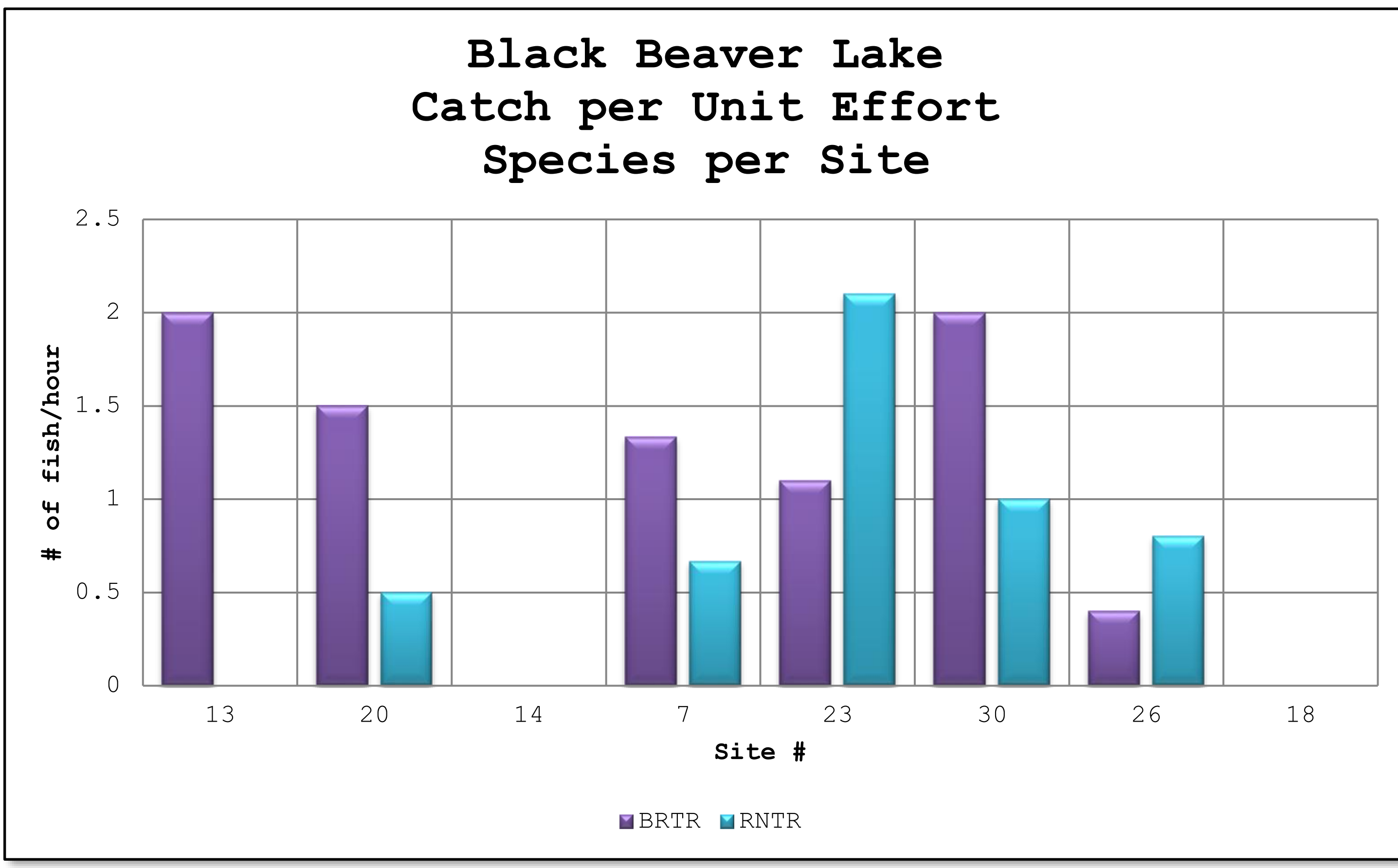
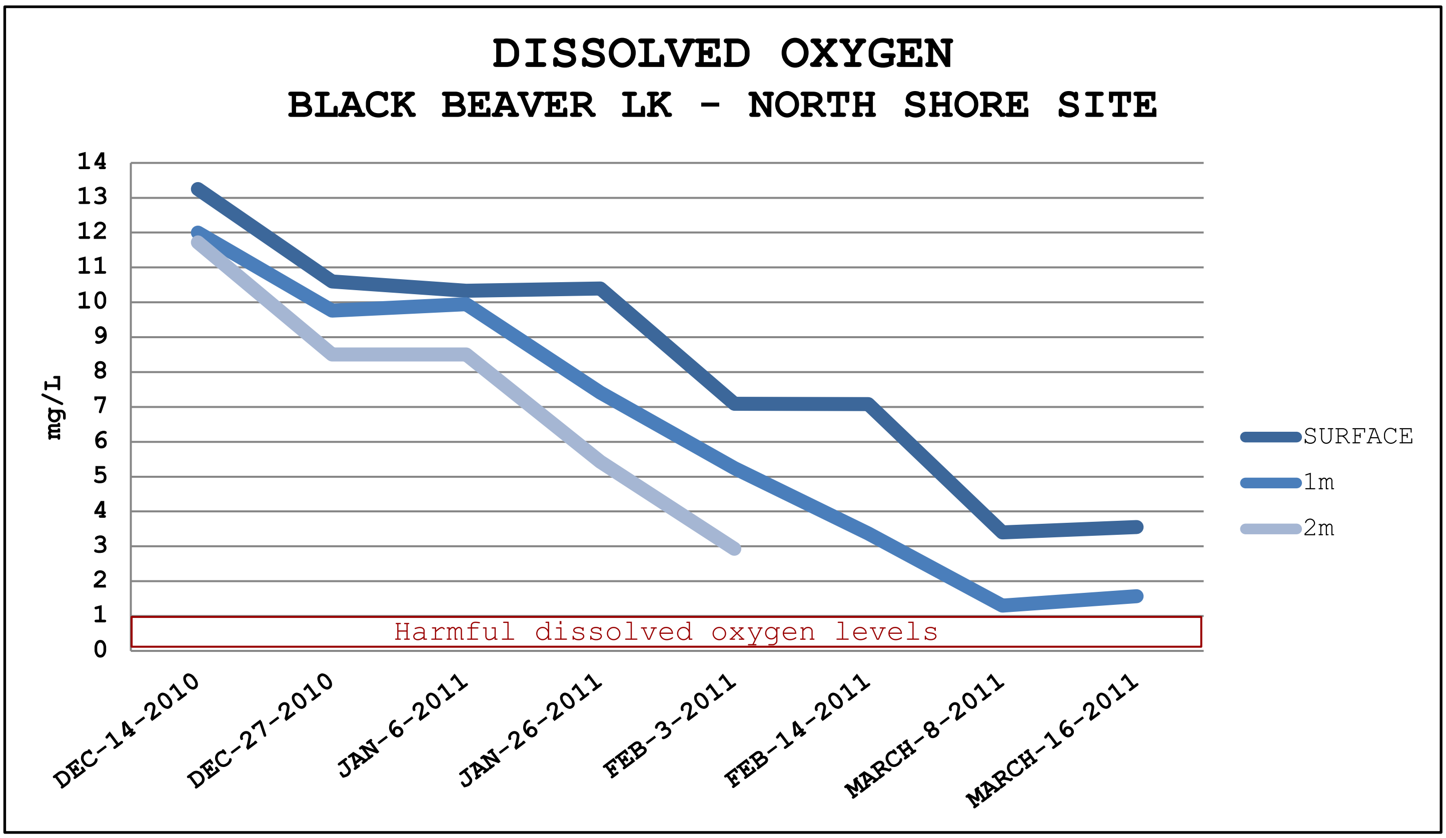


Figure 20: Comparison of CPUE per species at winter sites

Dissolved Oxygen

Black Beaver Lake's dissolved oxygen was tested eight times at five different sites from December 14th, 2010 to March 16th, 2011. The North Shore site was most utilized due to unsuitable ice conditions at other sites throughout the year. Levels dropped steadily following January 6th and levelled at 3.5 mg/L (25% oxygen saturation) at surface and 1.5 mg/L (11% oxygen saturation) at 1 m below surface.

Parameters from the Deep Hole site (approximately 6 meters deep) were first collected February 14th, 2011. Oxygen saturation at surface and 1 m below was 62% and 24%, respectively. March 16th levels at this site were slightly higher than the North Shore site at 35% at surface and 16% at 1 m below surface. All sites remained above the harmful levels throughout the year.



4. Glad Lake

Glad Lake is located east of HWY #366 south to Wellman Lake. It is 75.7 hectares in size containing crystal clear water with maximum depths of 35.6 meters. Master angler species caught here include lake trout, arctic char, northern pike, rainbow trout and walleye. The eight sites sampled for the winter assessment included: Site numbers 001, 003, 005, 006, 008, 014, 024, and 025 (Figure 21). Stratums within these sites were 63% shallow and 37% deep.

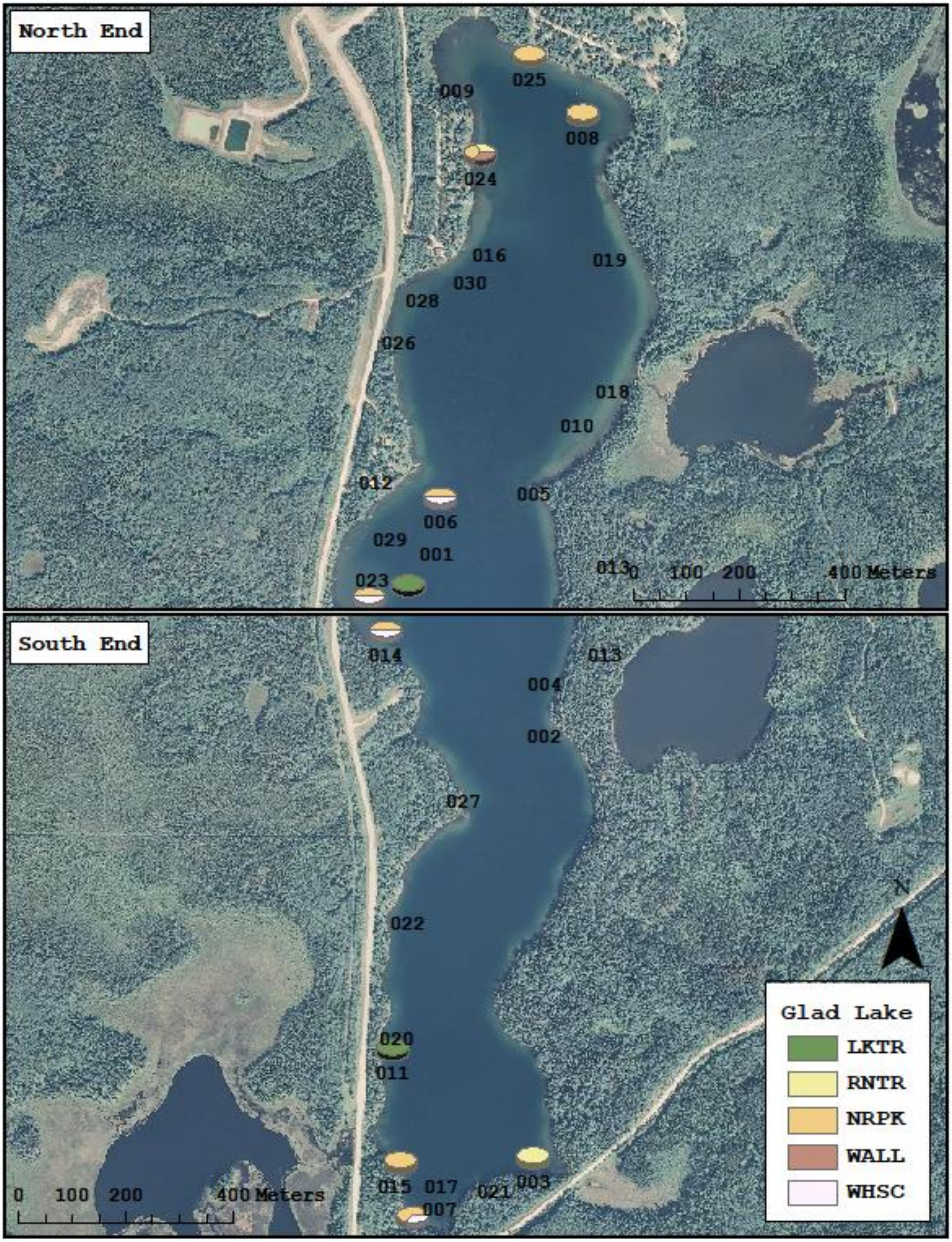


Figure 21: Summer stocked trout sites and species composition. Eight sites utilized for winter sampling

Results from the 2010-2011 Winter Stocked Trout Lakes Assessment include the following;

Sampling time: January 26th – February 28th

Average air temperature: -14.8°C

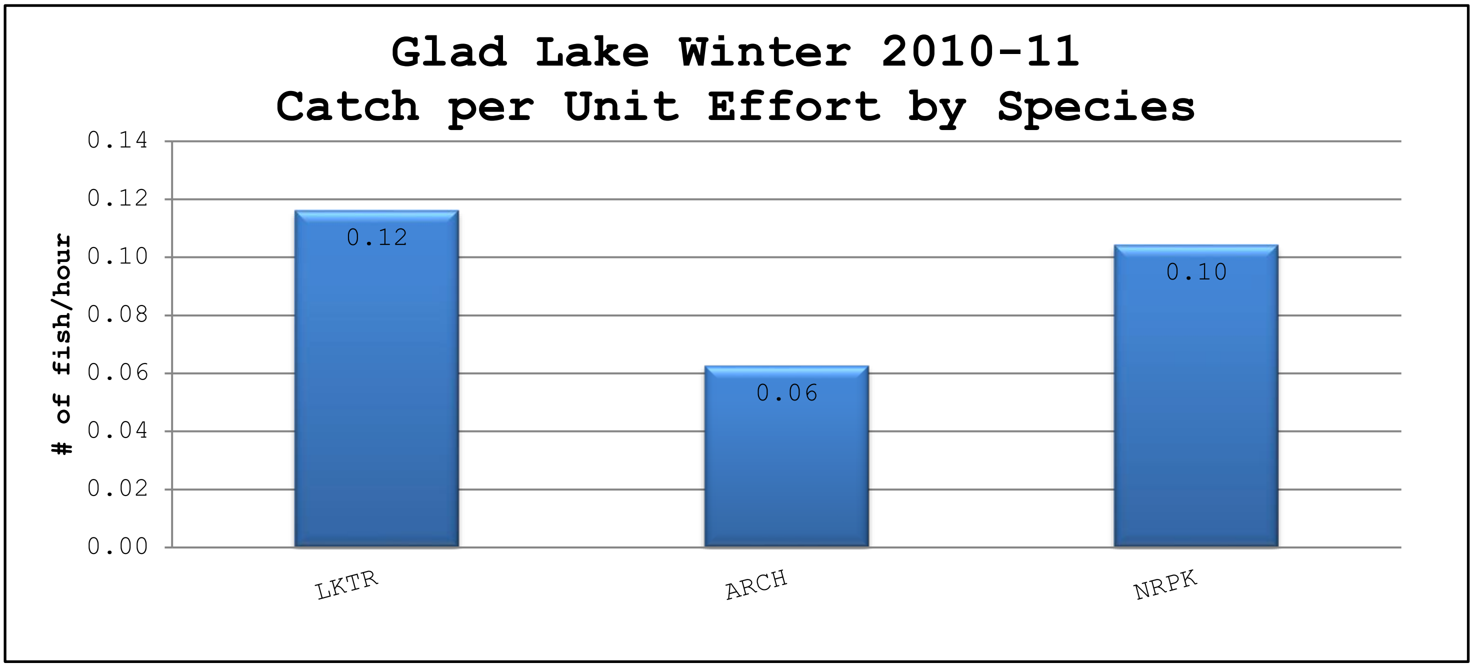
Average sample time: 60 min

Total caught: 5 fish

Total tagged: 5 fish

Total recaptures: 0 fish

Average depth sampled: Shallow 4 m, Deep 6.6 m



Lake CPUE: 0.235 fish/hour

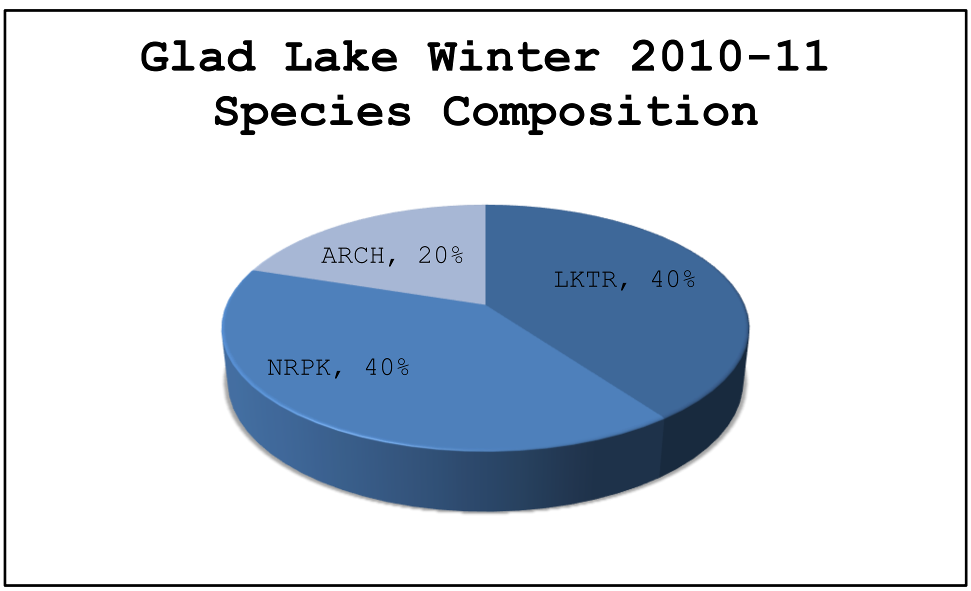
Species CPUE:

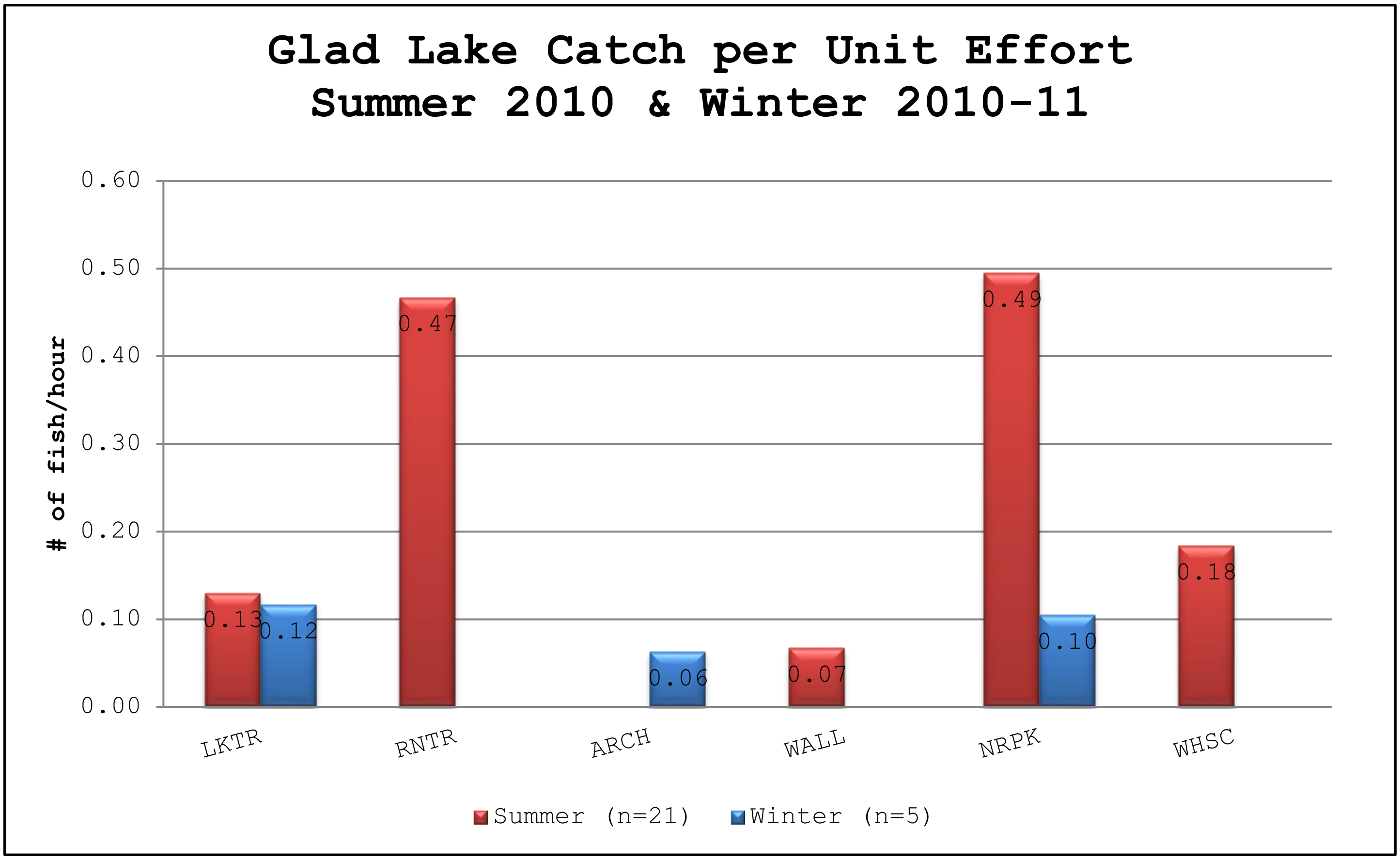
LKTR 0.12
ARCH 0.06
NRPK 0.10

Catch %/stratum: Shallow 80%, Deep 20%

Species Composition (n=5):

NRPK (40%)
LKTR (40%)
ARCH (20%)





Species

Table 7: Biological data of fish caught at Glad Lake winter 2010-11

SPECIES	*FORK LENGTH (mm)*	*TOTAL LENGTH (mm)*	*WEIGHT (g)*	*AGE (years)*	*TAG NUMBER*
NRPK	622	656	1990	-	2668
NRPK	1000	1090	9380	-	14530
LKTR	660	728	3160	7	2664
LKTR	572	626	1940	7	2647
ARCH	646	688	2820	-	1901

Lake Trout

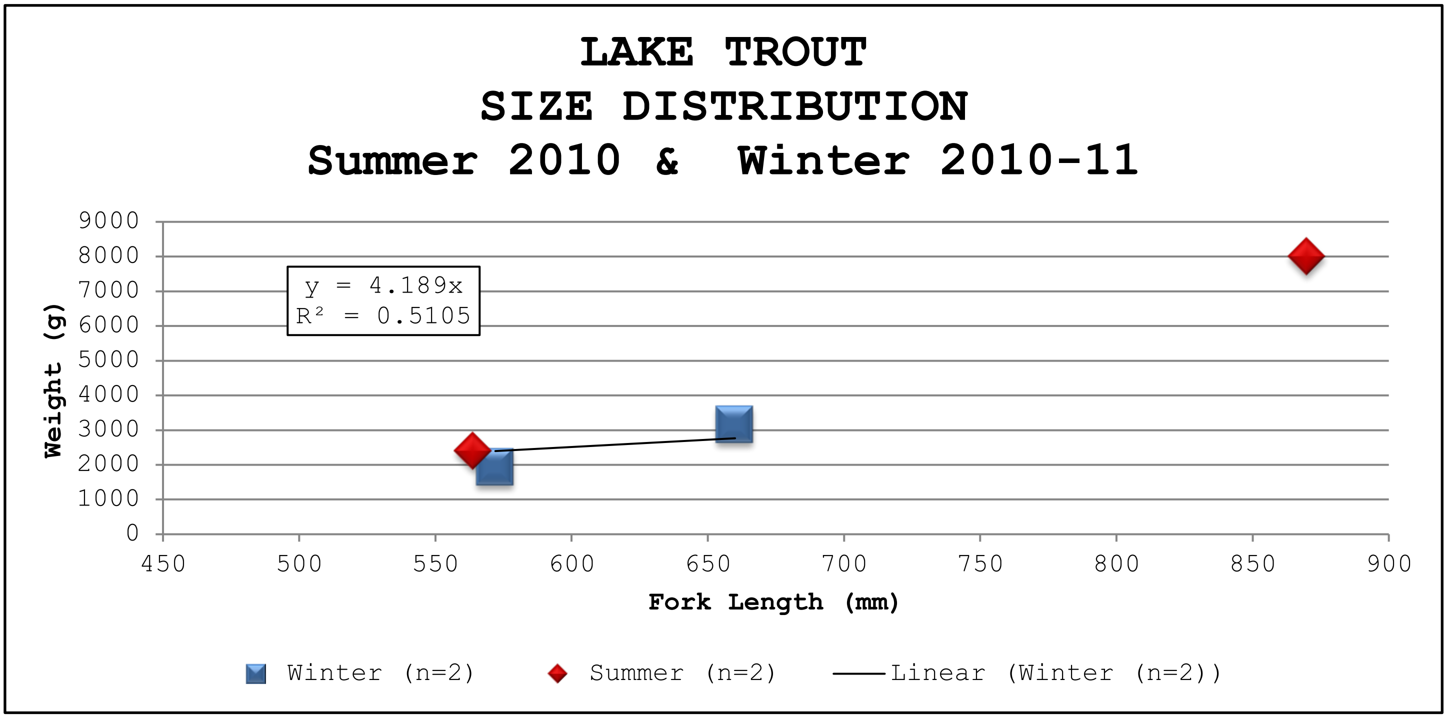


Figure 22: Glad Lake, lake trout size distribution

Lake trout were found to be fairly similar between the two sampling seasons (Figure 22). The winter trout were slightly lower in weight but this could be due to the age difference. Winter trout sampled were both 7 years of age while the trout sampled during the summer were 9 and 12 years of age.

Arctic Char

Only one arctic char was caught during sampling. Refer to table 7 above.

Northern Pike

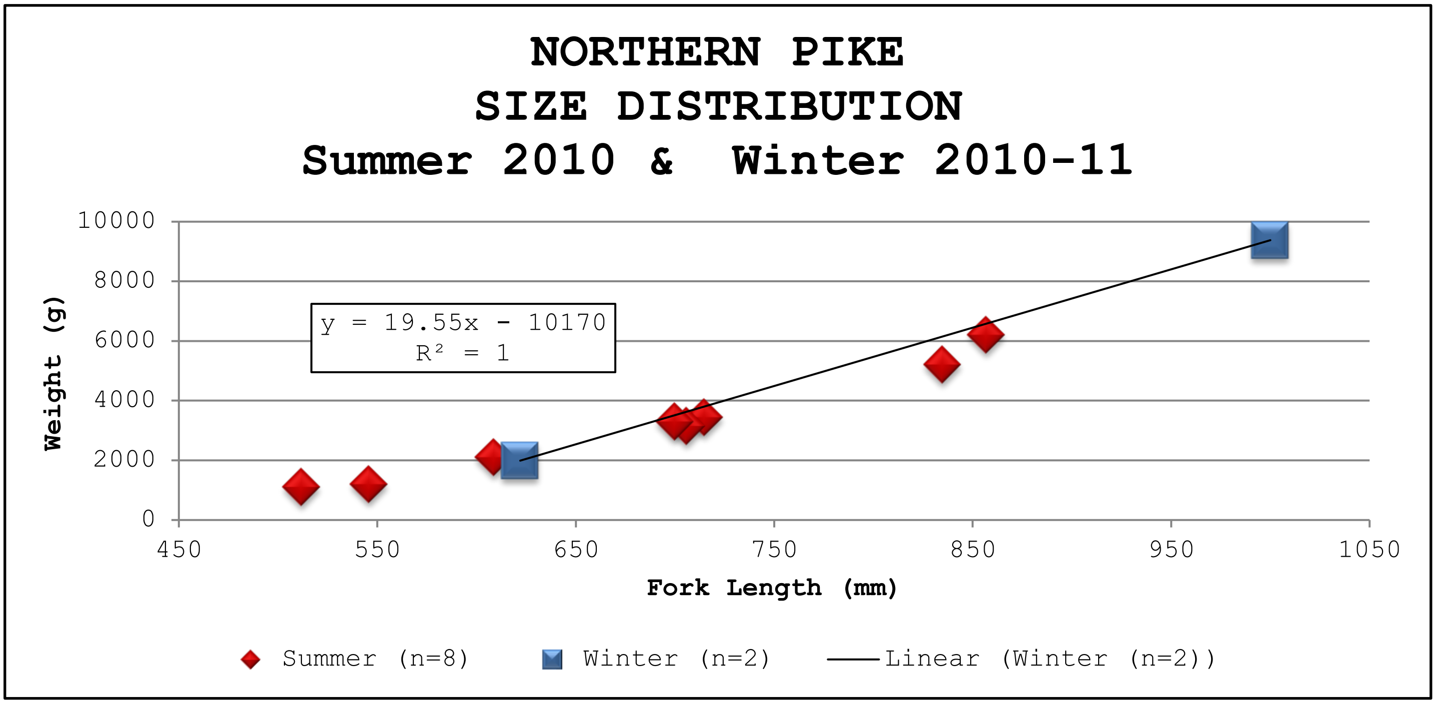


Figure 23: Glad Lake northern pike size distribution

A total of two northern pike were caught during the 2010-11 winter sampling period. Size distributions between sampling periods are comparable (Figure 23).

Habitat Assessments

Table 8: Habitat of winter sites

DATE	CLOUD COVER	BAROMETRIC PRESSURE (h/PA)	SITE	STRATA	SUBSTRATE	VEGETATION	FISH COVER	CLARITY	LKTR	NRPK	ARCH
15/02/2011	2/8	997	SITE 008	SHALLOW	SOFT MUCK	LOW	NONE	EXCELLENT			
15/02/2011	2/8	997	SITE 025	SHALLOW	SAND/ SOFT MUCK	LOW-MED	LOW	GOOD	1		
22/02/2011	2/8	1009 (RISING)	SITE 005	DEEP	FIRM SAND/CLAY	MED-HIGH	MEDIUM	EXCELLENT			
28/02/2011	8/8	1016	SITE 006	SHALLOW	SANDY,FIRM SILT	LOW	MEDIUM - HIGH	EXCELLENT			1
02/02/2011	6/8	1018 (FALLING)	SITE 001	SHALLOW	SOFT MUCK	LOW	LOW	EXCELLENT		1	
02/02/2011	6/8	1018 (FALLING)	SITE 014	DEEP	SOFT MUCK	LOW	LOW	EXCELLENT	1		
31/01/2011	0/8	1045	SITE 003	SHALLOW	FIRM SILT	HIGH	MEDIUM	EXCELLENT		1	
26/01/2011	1/8	1011	SITE 024	SHALLOW	FIRM SILT	MEDIUM	LOW	EXCELLENT			

Glad Lake is considered an oligotrophic lake which are unproductive, low in nutrients and algae, and usually very transparent. Oxygen rich oligotrophic lakes seldom have oxygen depletion problems, even during midwinter, so fish can roam and feed throughout the lake basin all season (Gruenwald, 1999). This could indicate why catches are low and may suggest feeding patterns influence winter fish behaviour more than habitat type in Glad Lake (Figure 24).

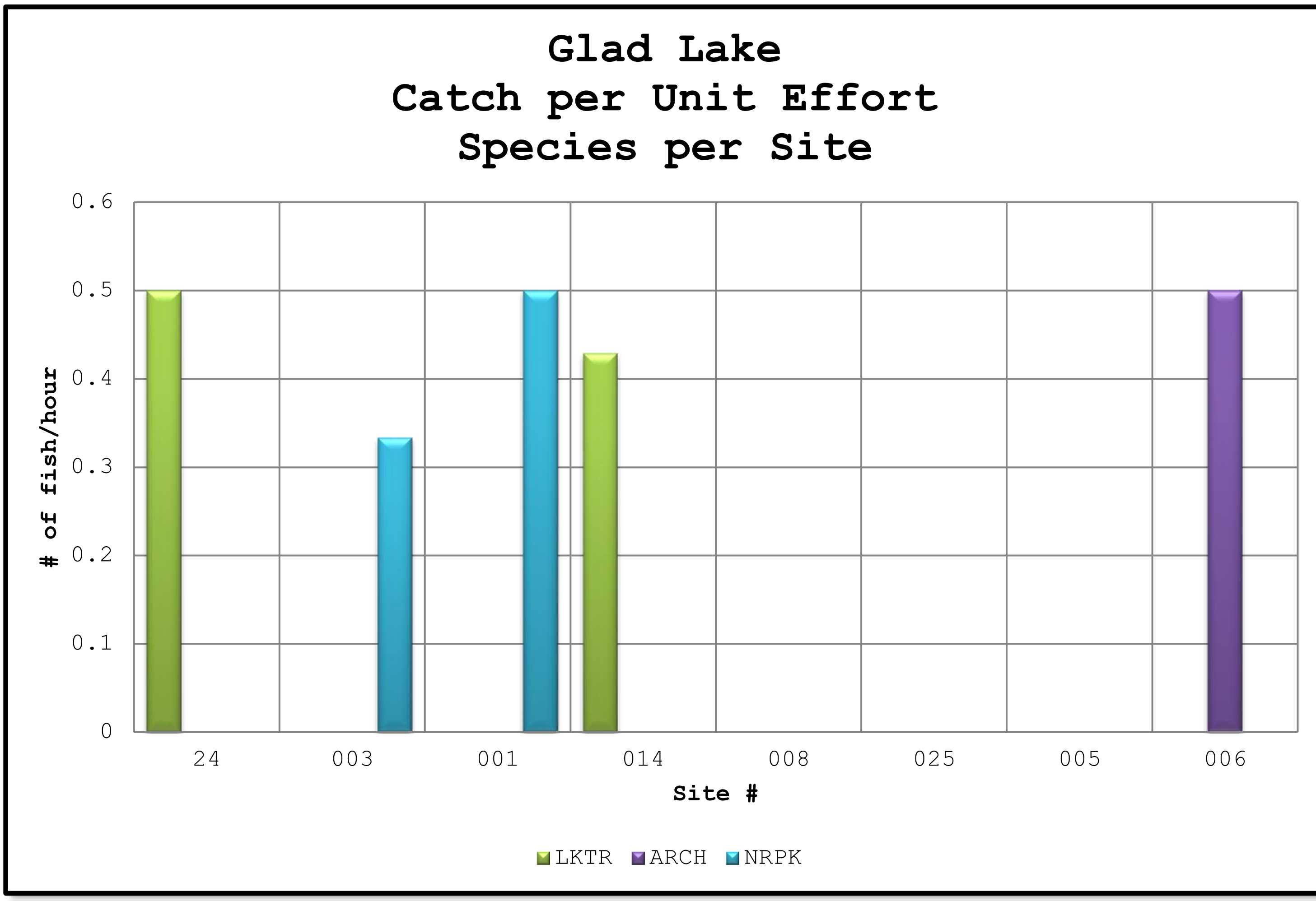
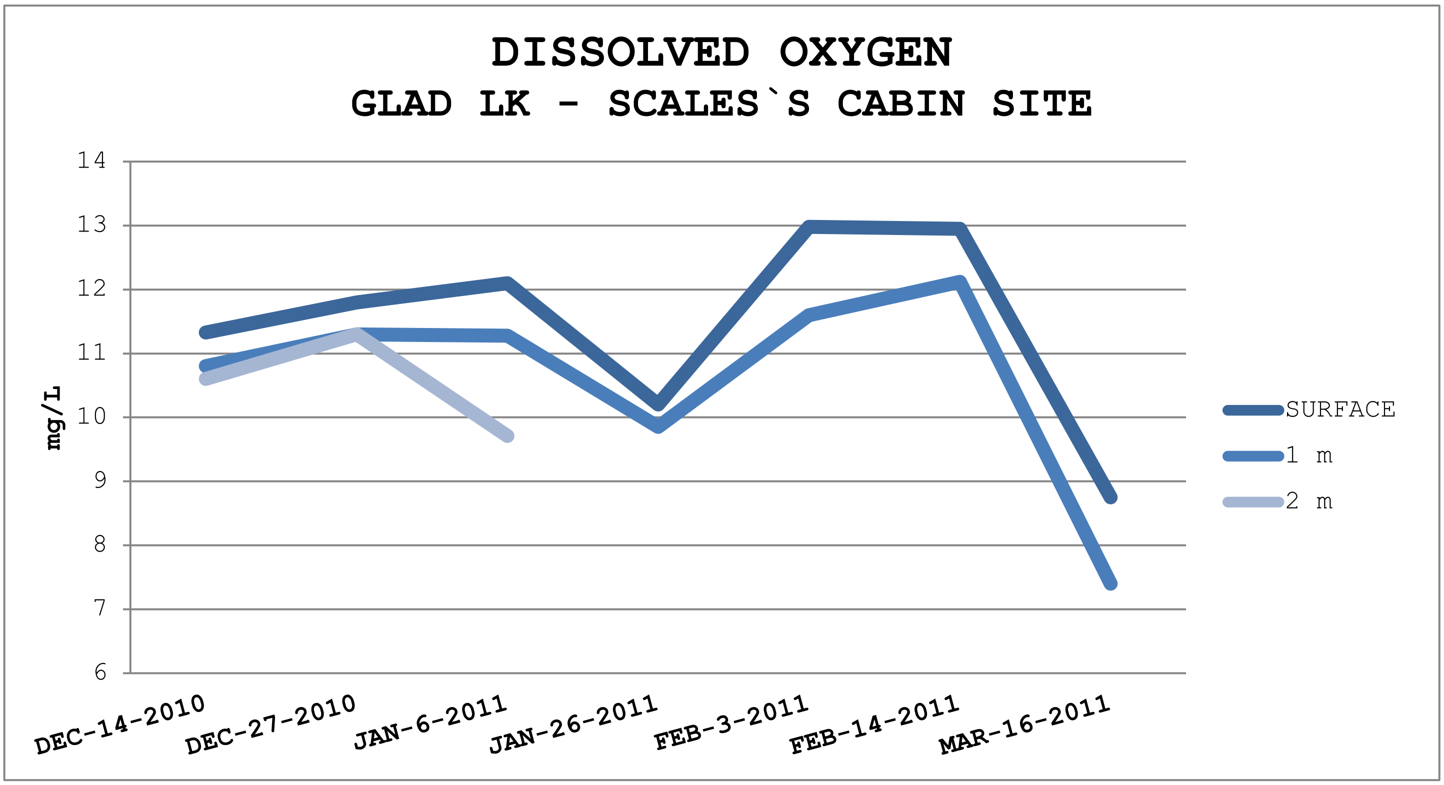


Figure 24: Comparison of CPUE per species at winter sites

Dissolved Oxygen

Dissolved oxygen was collected at three sites between December 14th, 2010 and March 16th, 2011. Due to the morphology of Glad Lake levels remained excellent throughout the winter. Oxygen saturation reached highest levels at 90% at 1 m below surface on February 14th and lowest at 55% on March 16th. Jackfish Bay site, which is located at the far north end of the lake, reached the lowest level of dissolved oxygen out of all sites at 2.98 mg/L 1 m below surface, but still remained above harmful levels.



5. Two-Mile Lake

Two Mile Lake is a well-used fishery for anglers of all ages. The lake is renowned for good fishing experience for young children angling yellow perch. Two Mile Lake is 42.1 hectares with a maximum depth of 16.8 meters. Anglers have proven to be successful with other species found in the lake, with record rainbow trout and brook trout recorded. Since 1975 the lake has been stocked with rainbow and brook trout to establish a desirable species in the lake.

The eight sites sampled for the winter assessment included: Site numbers 001, 003, 005, 006, 014, 016, 021, and 025 (Figure 25 & 26). Stratums within these sites were 63% shallow and 37% deep.

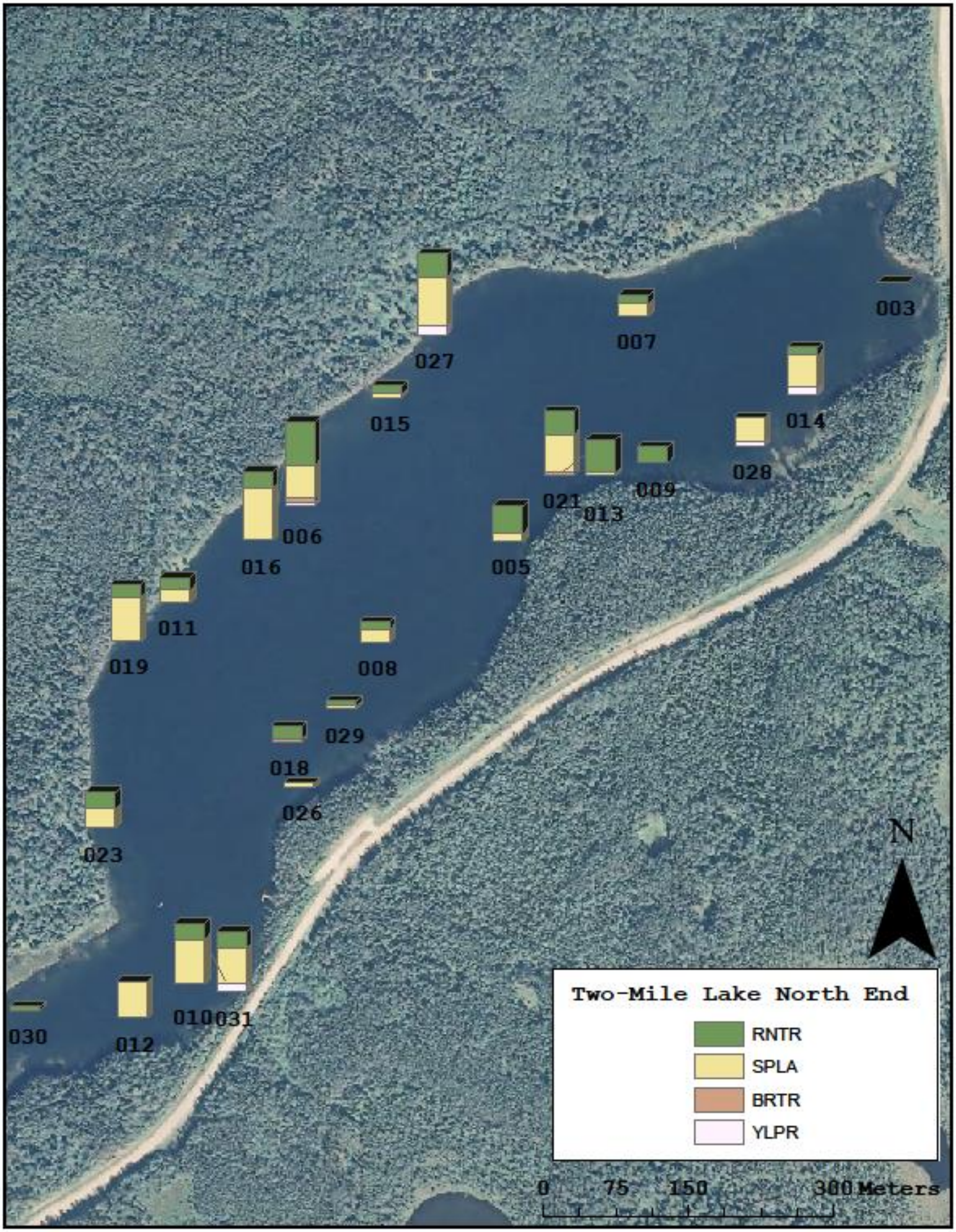


Figure 25: Summer stocked trout sites and CPUE per species. Eight sites utilized for winter sampling

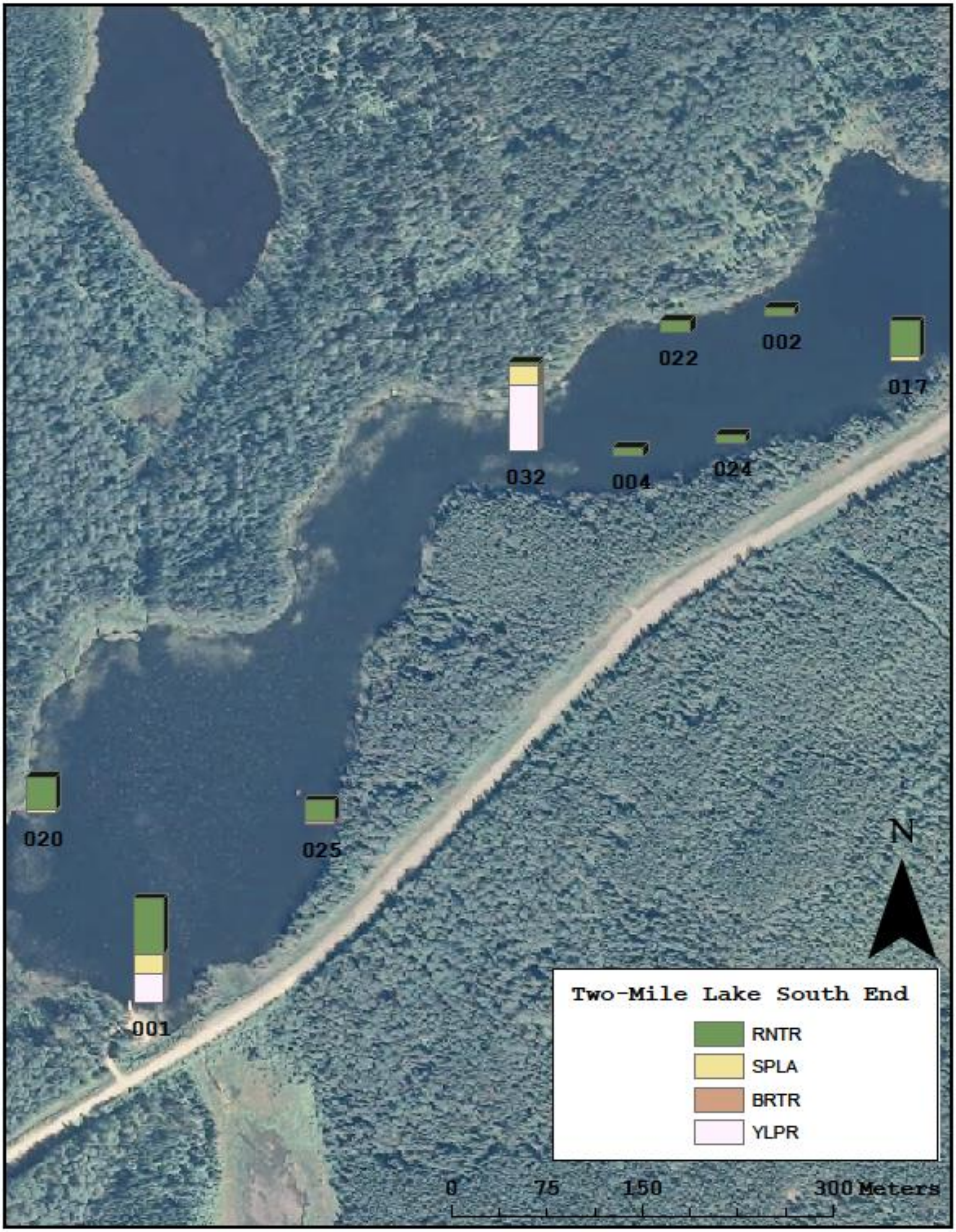


Figure 26: Summer stocked trout sites and CPUE per species. Eight sites utilized for winter sampling

Results from the **2010-2011 Winter Stocked Trout Lakes Assessment** include the following;

Sampling time: January 10th - February 9th, 2011

Average air temperature: -18.8 °C

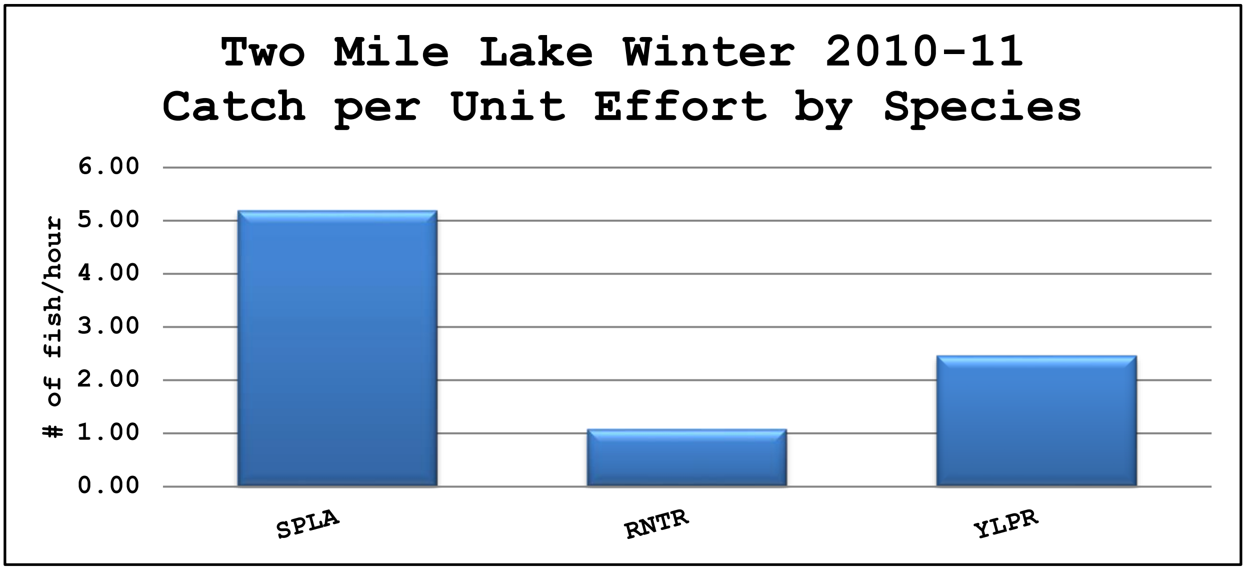
Average sample time: 62 min

Total caught: 143 fish

Total tagged: 71 fish

Total recaptures: 2 fish (SPLA Only)

Average depth sampled: Shallow 3.8 m, Deep 8.2 m



Lake CPUE: 8.73 fish/hour

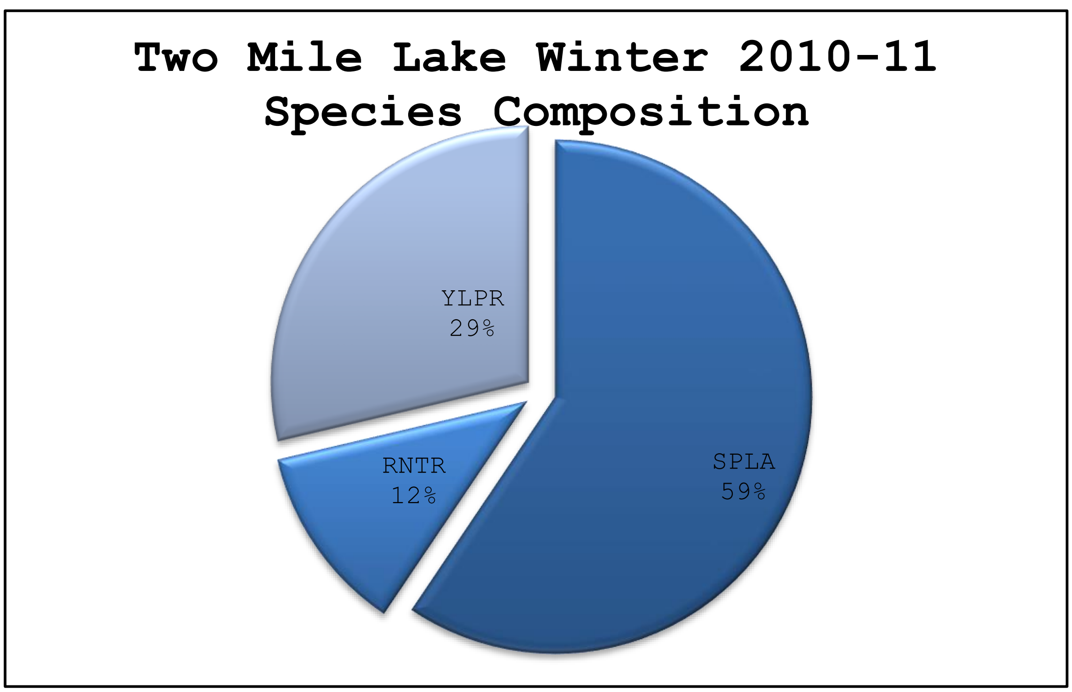
Species CPUE:

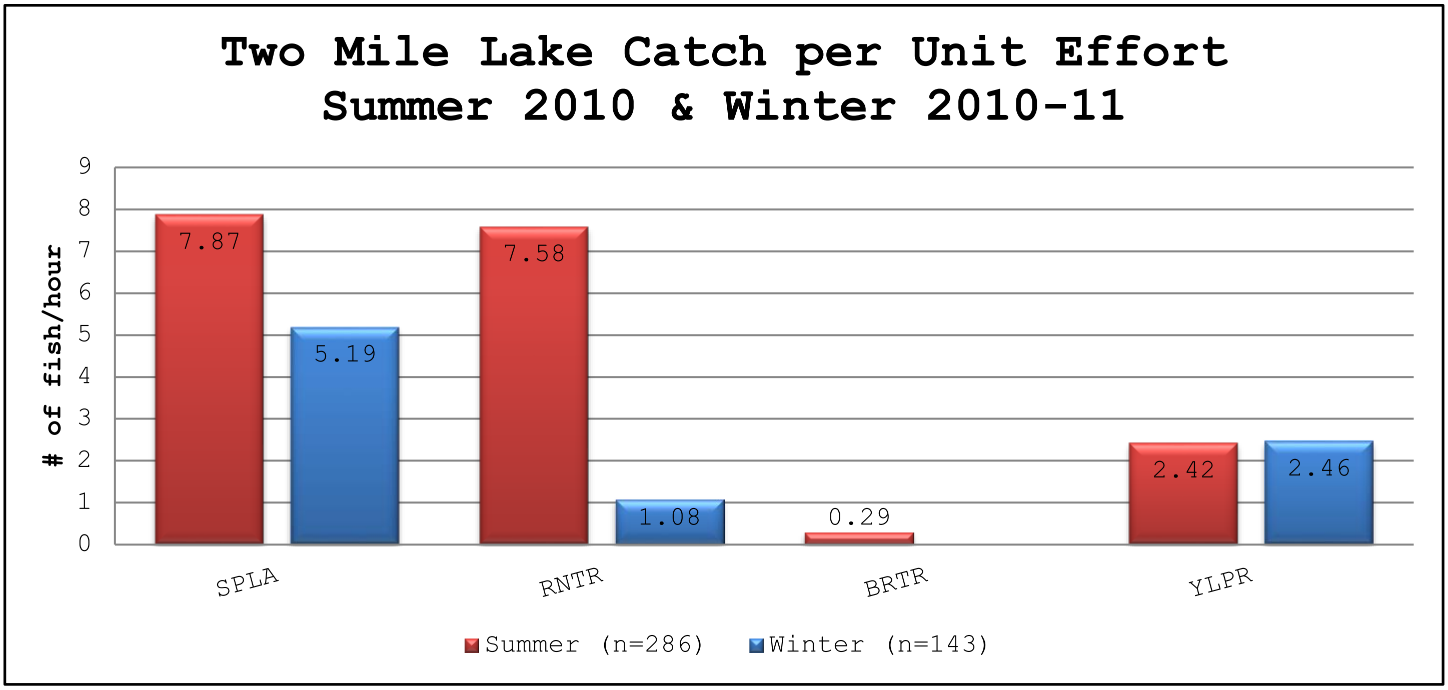
SPLA 5.19
RNTR 1.08
YLPR 2.46

Catch %/stratum: Shallow 75%, Deep 25%

Species Composition (n=143):

SPLA (59%)
RNTR (12%)
YLPR (29%)



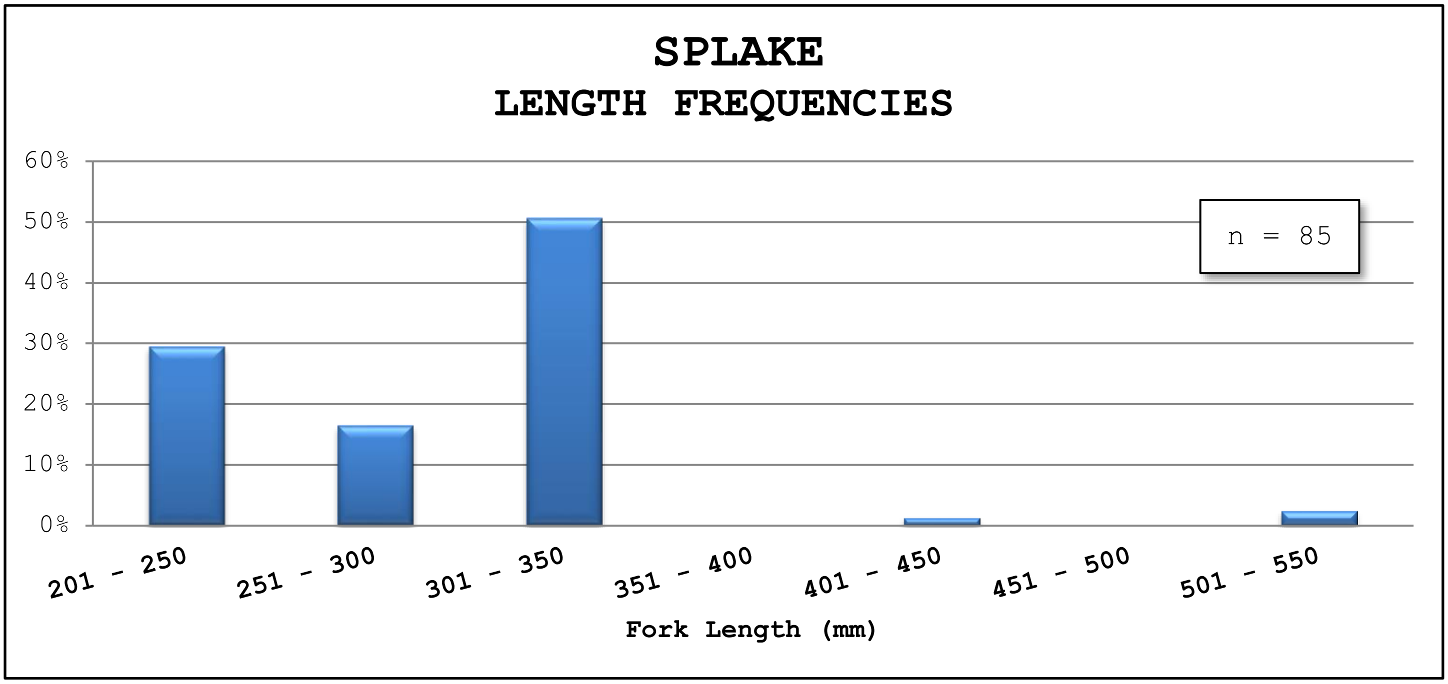


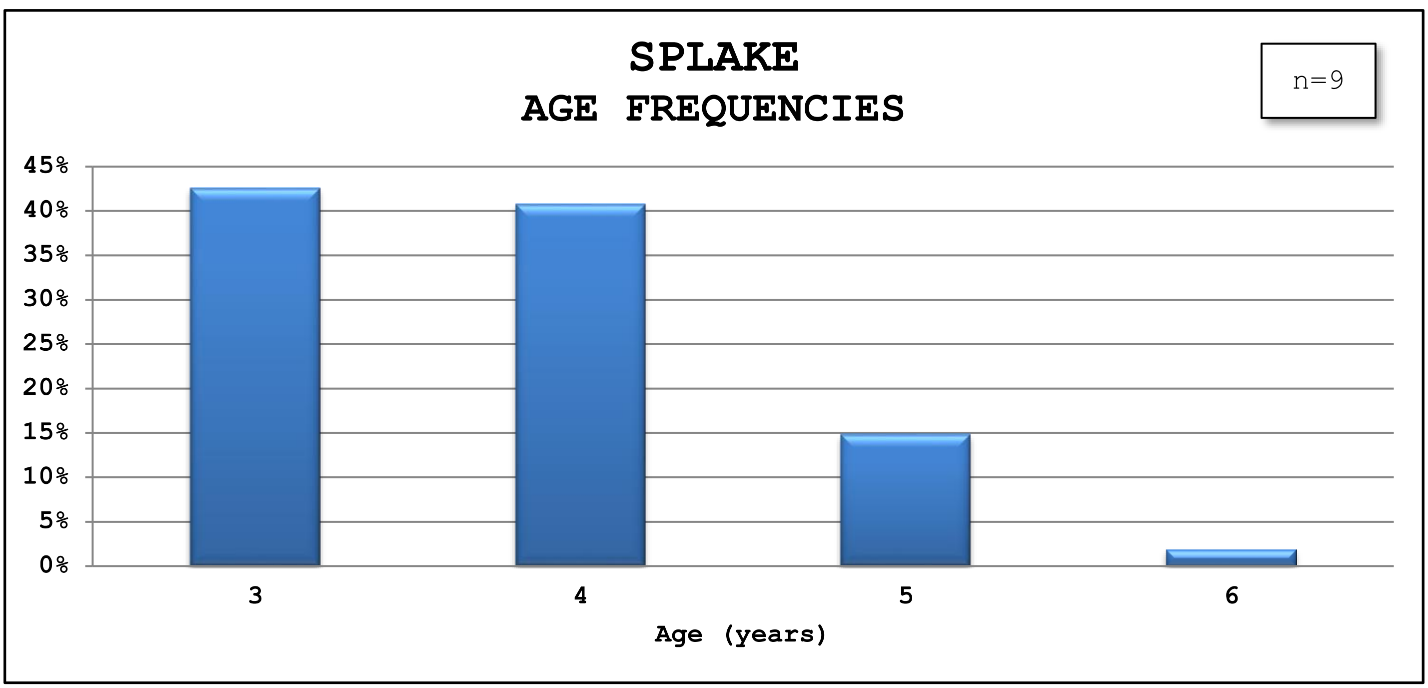
All species excluding yellow perch had a lower catch of fish per hour during winter sampling compared summer 2010. Again it is apparent behaviour or movement is affected by certain factors during winter periods, such as water temperature, feeding patterns and dissolved oxygen. See stomach contents for further discussions.

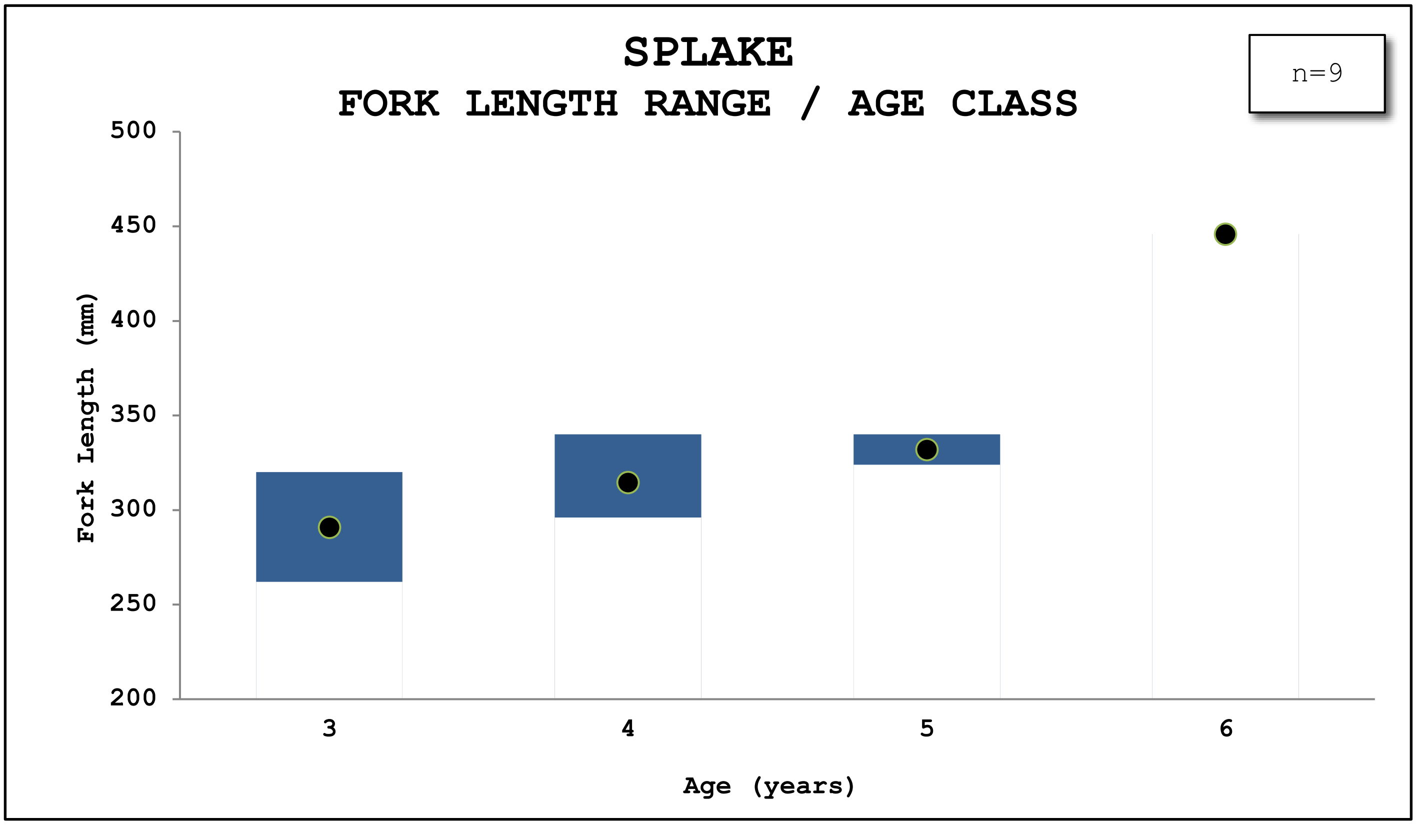
Species

Splake

A total of eighty-five splake were sampled in the winter of 2010-11 ranged with a fork length of 204 – 532 mm, total length 232 – 568 mm, and a weight of 100 – 1590 g. The average splake was 294.7 mm fork length, 315.6 mm total length and a weight of 286.8 g. Nine splake were analyzed for age.






SPLAKE
FORK LENGTH RANGE / AGE CLASS
n=9
500
450
400
350
300
250
200
Fork Length (mm)
3
4
5
6
Age (years)


FLAMAN
RENTALS

When comparing size distribution of splake sampled during the summer versus winter, the smaller length classes are comparable in condition (Figure 27). On the other hand larger splake showed a decrease in weight during the winter period. One of these splake was a recapture and had a weight decrease of 210 grams within the 6 month growing period

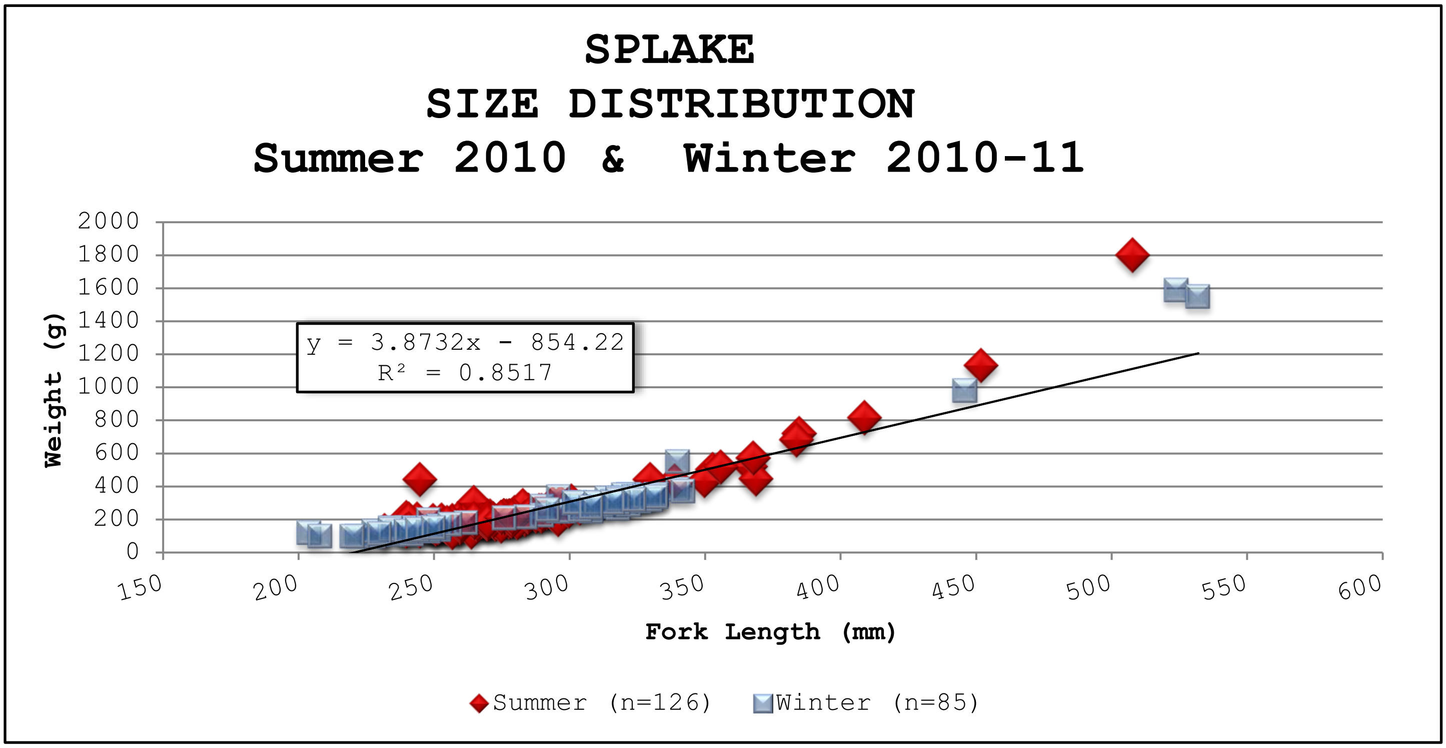


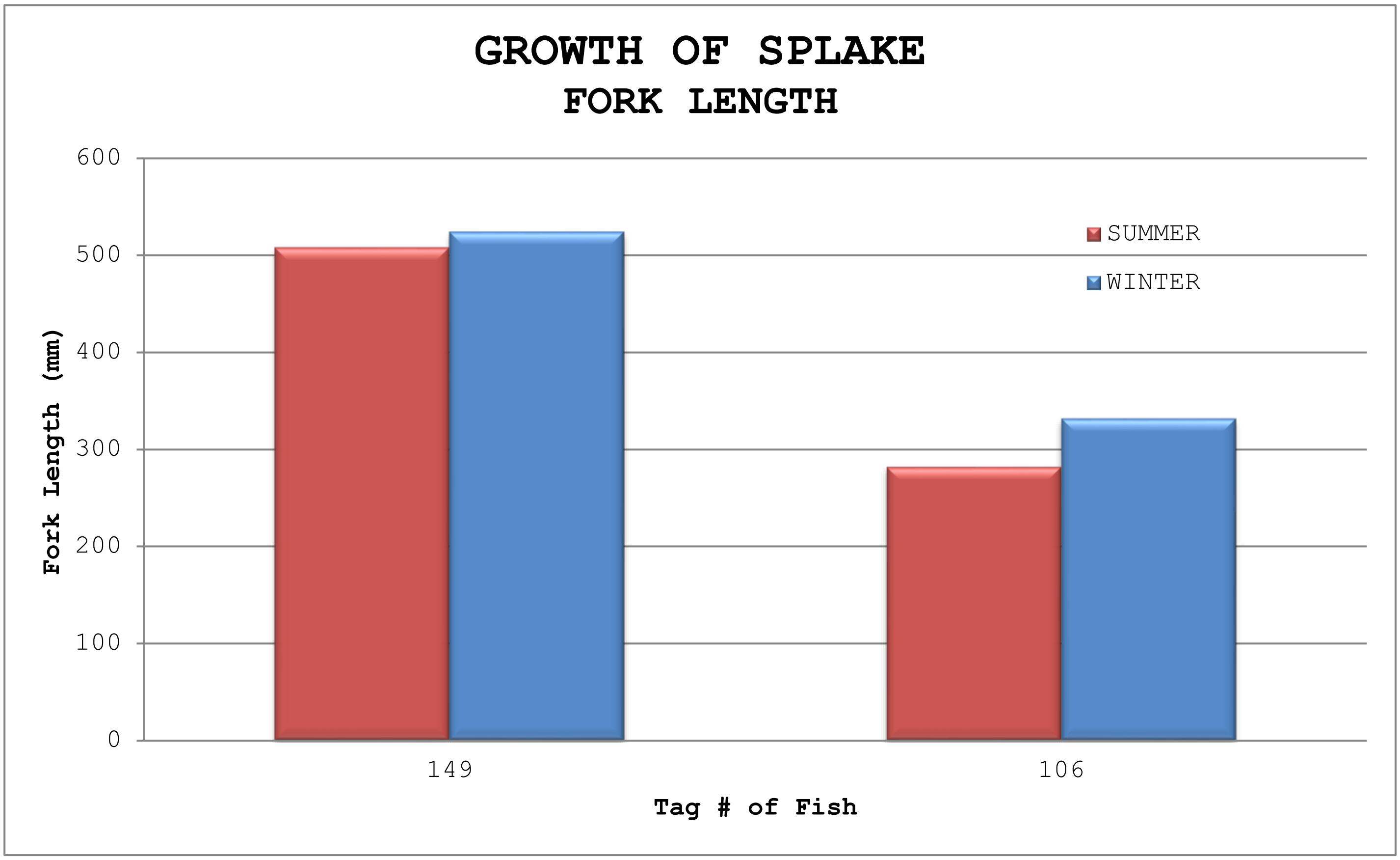
Figure 27: Two Mile lake splake size distribution

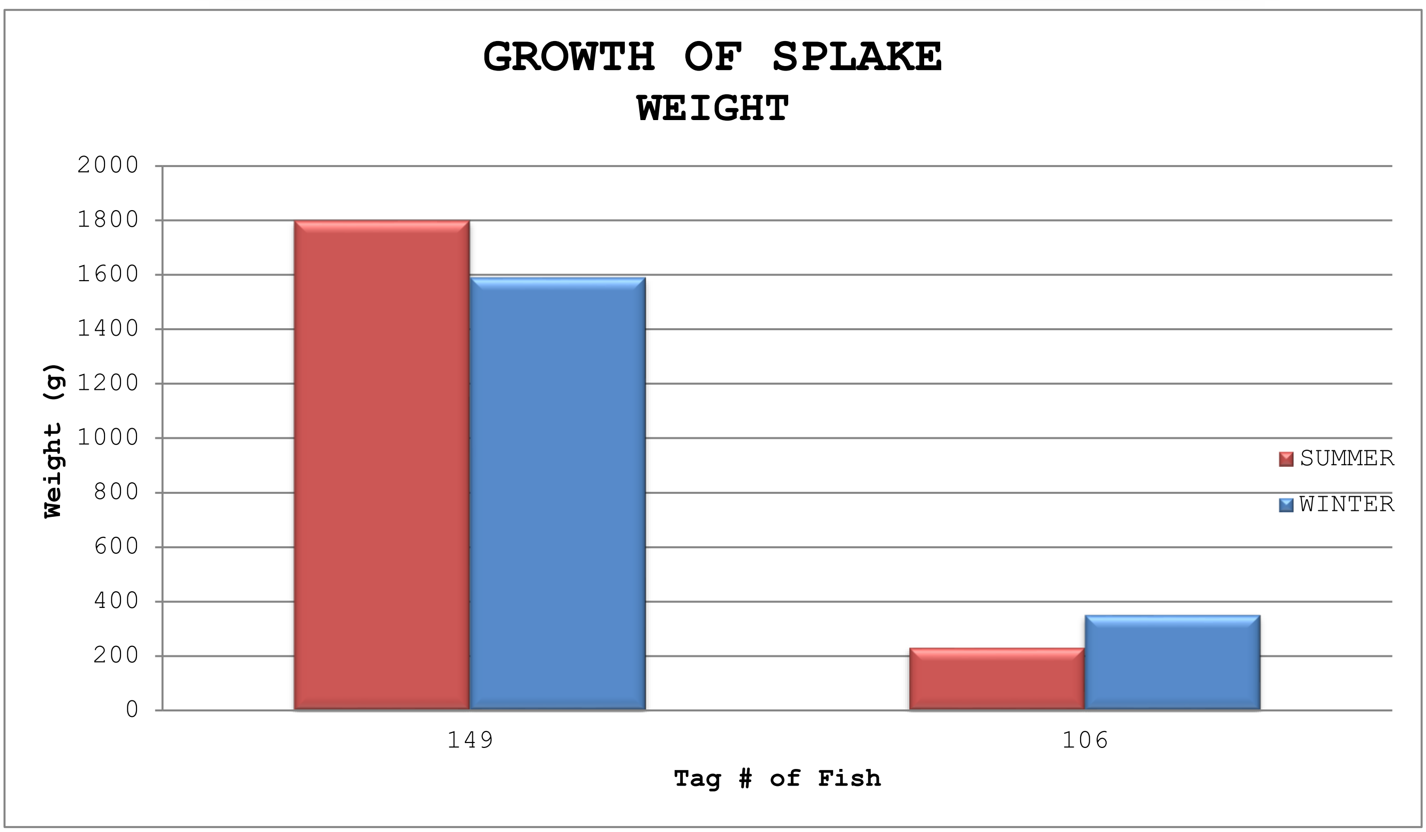
Recaptures indicate specific growth and condition of individual species within a specific waterbody. During winter sampling two splake were re-caught, one small and one large (Table 9).

Table 9: growth of recaptured splake at Two Mile lake

TAG #	FORK LENGTH		GROWTH (mm)	TOTAL LENGTH		GROWTH (mm)	WEIGHT		GROWTH (g)	DAYS OF GROWTH
	SUMMER	WINTER		SUMMER	WINTER		SUMMER	WINTER		
149	508	524	16	531	558	27	1800	1590	-210	201
106	282	332	50	301	350	49	230	360	130	202

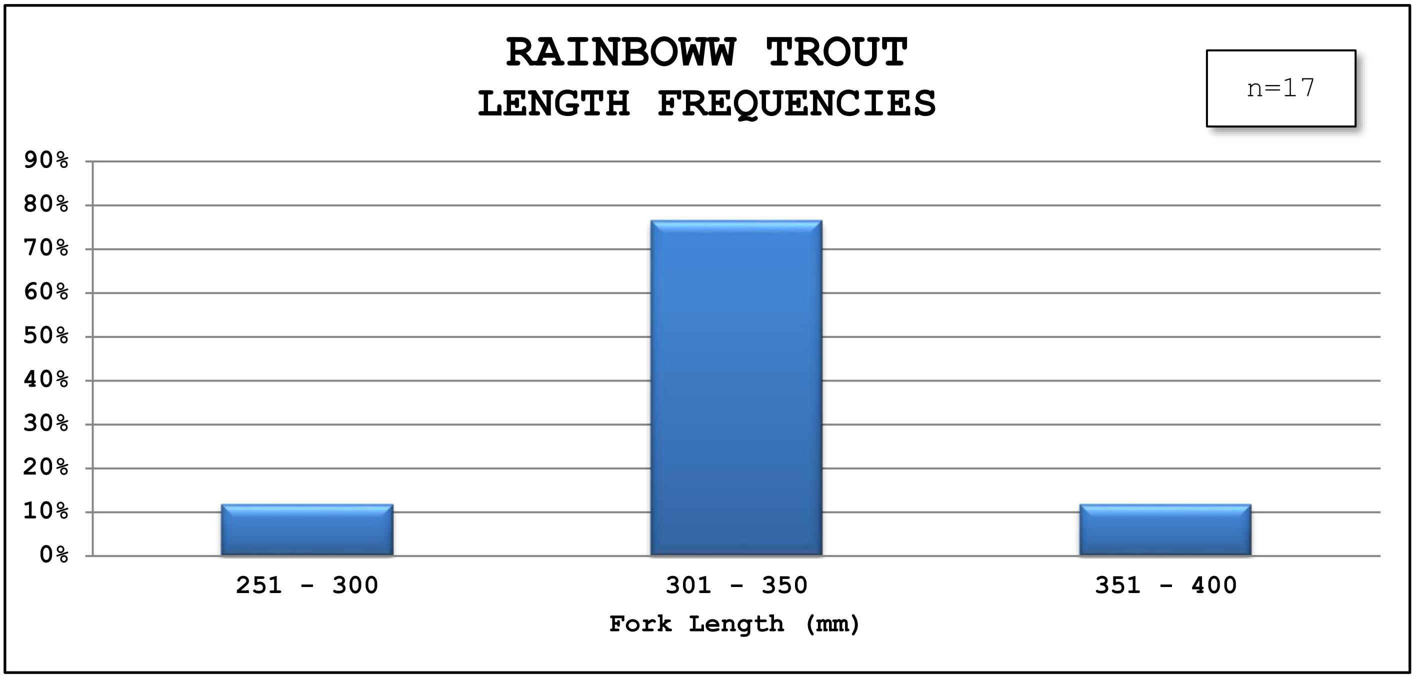
Both splake displayed an increase in length with the larger splake (tag #149) having an average growth of 0.1 mm/day and the smaller splake (tag #106) having a growth 0.25 mm/day. Although the larger splake did show a decrease in weight by 1.04 g/day. Results from both Beaver and Two Mile Lake indicate splake exhibit significant growth within the first few years of life.

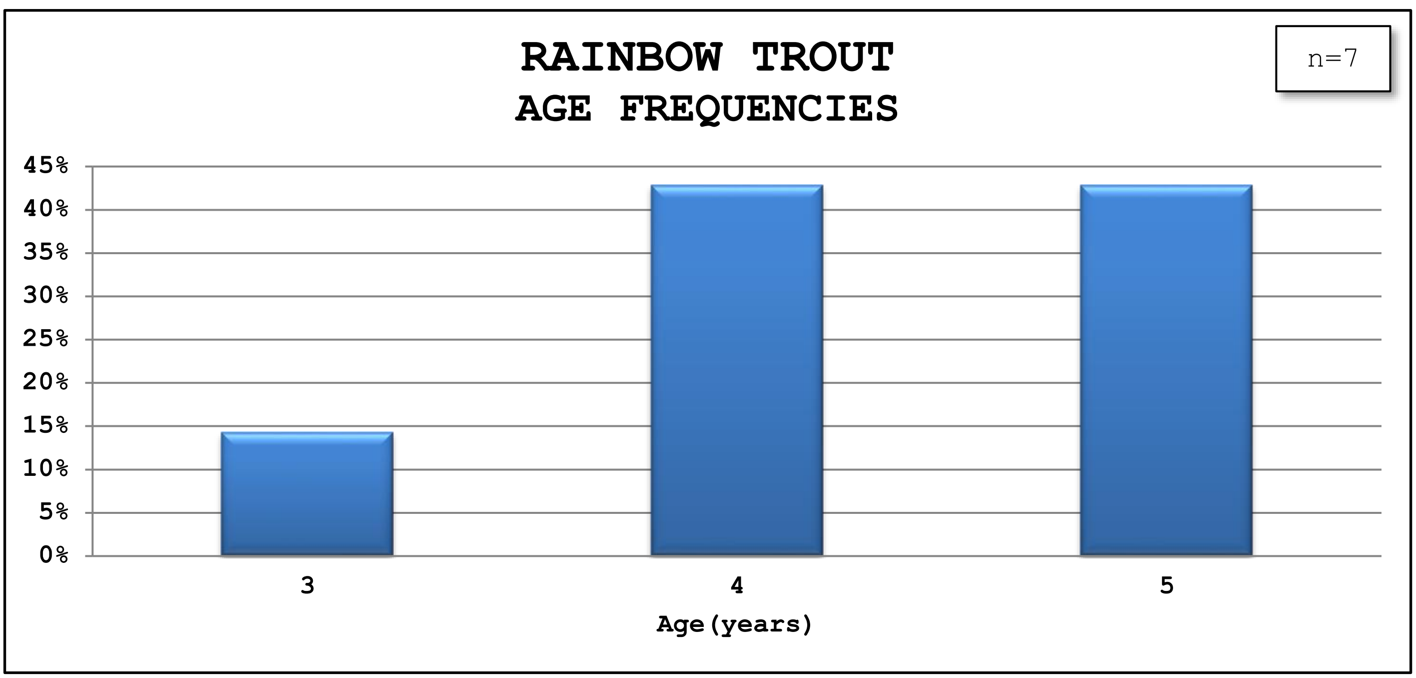

GROWTH OF SPLAKE
FORK LENGTH
600
500
400
300
200
100
0
Fork Length (mm)
SUMMER
WINTER
149
106
Tag # of Fish

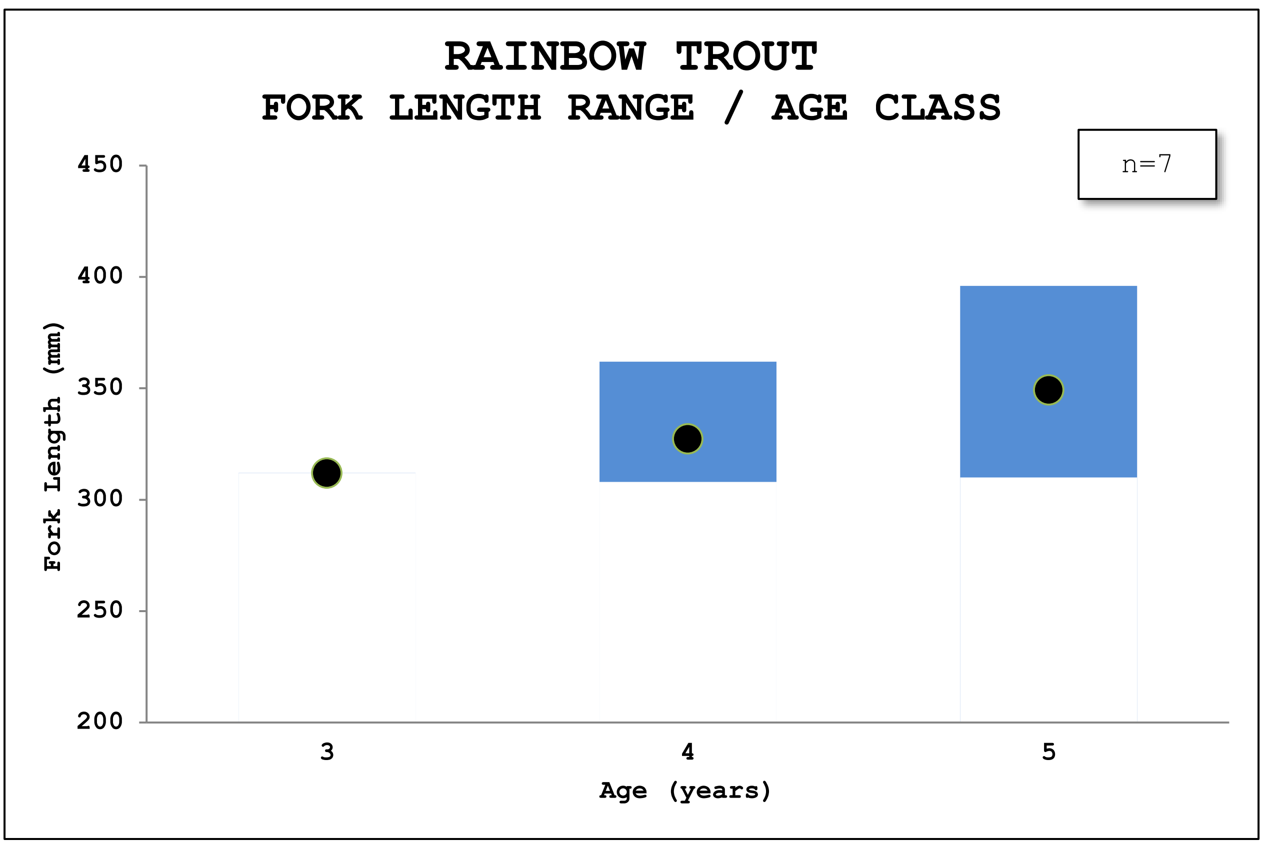

GROWTH OF SPLAKE
WEIGHT
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Weight (g)
149
106
Tag # of Fish
SUMMER
WINTER

Rainbow Trout

A total of seventeen rainbow trout sampled in the winter of 2010-11 ranged with a fork length of 290 - 321 mm, total length 306 – 416 mm, weight 260 – 367.5 g. Average splake were 321.9 mm fork length, 338.6 mm total length and 376.5 grams. Ages of seven rainbows were analyzed and ranged from 3 to 5 years of age. There were no recaptures of rainbow trout during winter sampling.

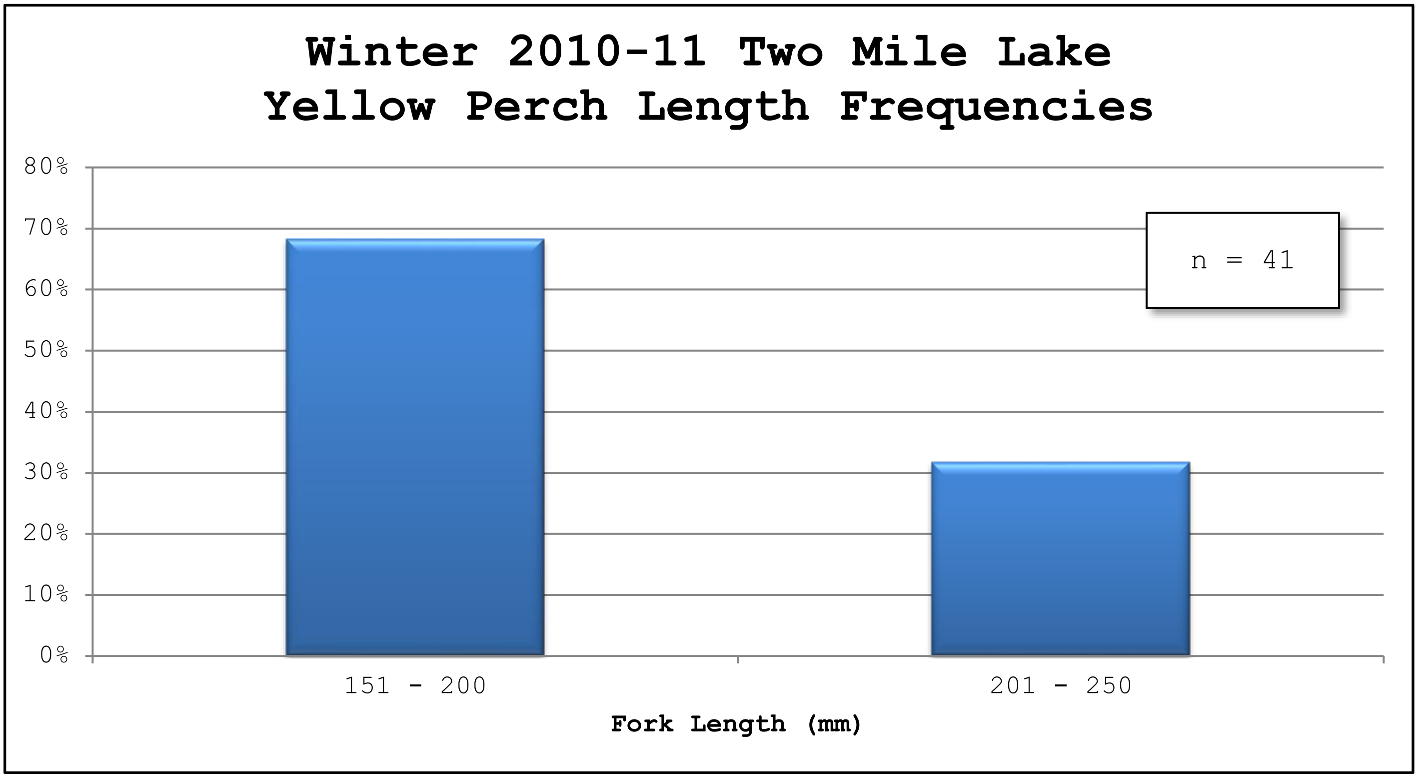





RAINBOW TROUT
FORK LENGTH RANGE / AGE CLASS
n=7
450
400
350
300
250
200
Fork Length (mm)
3
4
5
Age (years)

Yellow Perch

A total of forty-one yellow perch were sampled in the winter of 2010-11 ranging with a fork length of 158 - 226 mm, total length 164 - 236 mm, weight 70 - 190 g. Average 192.3 mm fork length, 201.5 mm total length and 103.7 grams in weight. 32% of YLPR possessed black spot, 15% with yellow grub and 29% having both black spot and yellow grub. 24% of all YLPR caught appeared healthy.



INFORMATIONAL NOTE:

Black spot is a parasite and is rarely fatal to fish. A heavy infection may make a fry's eyes bulge. If heavily infected fish live in stressful conditions (poor nutrition, injury, crowding, etc.), they could die (Unknown, Publications, 2011). Yellow grub is a parasite which may live for several years in the fish, therefore can develop high infestations. It is possible that yellow grub may kill fish under some circumstances, but normally a fish is not noticeably affected by the parasite. (Unknown, Black Spot & Yellow Grub, 2011). Both parasites require certain stages and hosts in their life cycle to survive including birds, snails and fish.

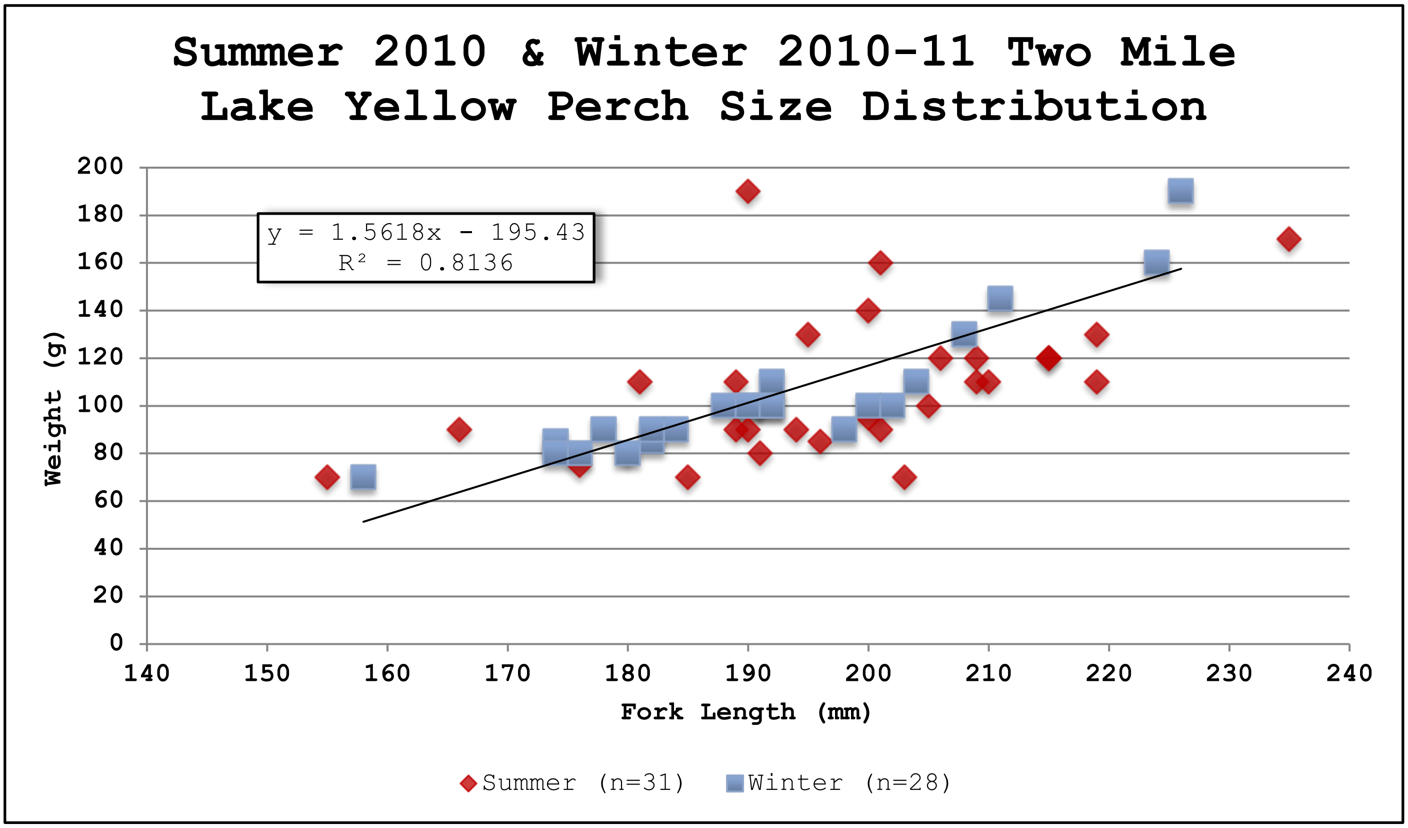


Figure 28: Two Mile lake yellow perch size distribution

General condition of yellow perch during the winter were not comparable to perch sampled during the summer of 2010 (Figure 28). See stomach contents for further discussions.

Habitat Assessment

Table 10: Habitat of winter sites at Two Mile lake

DATE	CLOUD COVER	BAROMETRIC PRESSURE (h/PA)	SITE	STRATA	SUBSTRATE	VEGETATION	FISH COVER	CLARITY	SPLA	RNTR	YLPR
JAN-10-2011	8/8	1036	003	SHALLOW	MUCK	HIGH	HIGH	GOOD	10	2	11
JAN-11-2011	8/8	1039 (RISING)	014	SHALLOW	SILT	MED-HIGH	MEDIUM	GOOD	7	3	6
JAN-12-2011	8/8	1038 (FALLING)	021	SHALLOW	FIRM SILT	LOW	LOW-MED	POOR	7	2	0
JAN-12-2011	8/8	1038 (FALLING)	005	DEEP	SILT	HIGH	LOW-MED	GOOD	11	2	1
FEB-9-2011	0/8	1023 (FALLING)	006	SHALLOW	SILT	LOW	NONE	EXCELLENT	31	3	11
FEB-9-2011	0/8	1023 (FALLING)	016	DEEP	MUCK	LOW-NONE	NONE	POOR	6	0	4
FEB-8-2011	4/8	1026 (FALLING)	001	SHALLOW	MUCK	MEDIUM	MEDIUM	GOOD	10	4	1
FEB-8-2011	4/8	1026 (FALLING)	025	SHALLOW	MUCK	LOW	NONE	POOR	2	3	9

Within sites sampled at Two Mile Lake general habitat consisted of silt & muck substrate with good clarity (Table 10). All species were found to inhabit both vegetated and non-vegetated habitats. Diversity of habitat types and total catches make it difficult to identify any patterns on preferred habitat requirements. Splake CPUE did show a noteworthy increase at site #006 on February 9th (Figure 29). Only parameters which display differences to other sites sampled are excellent clarity and zero cloud cover. This could speculate relations between feeding activities and sunlight penetration through ice.

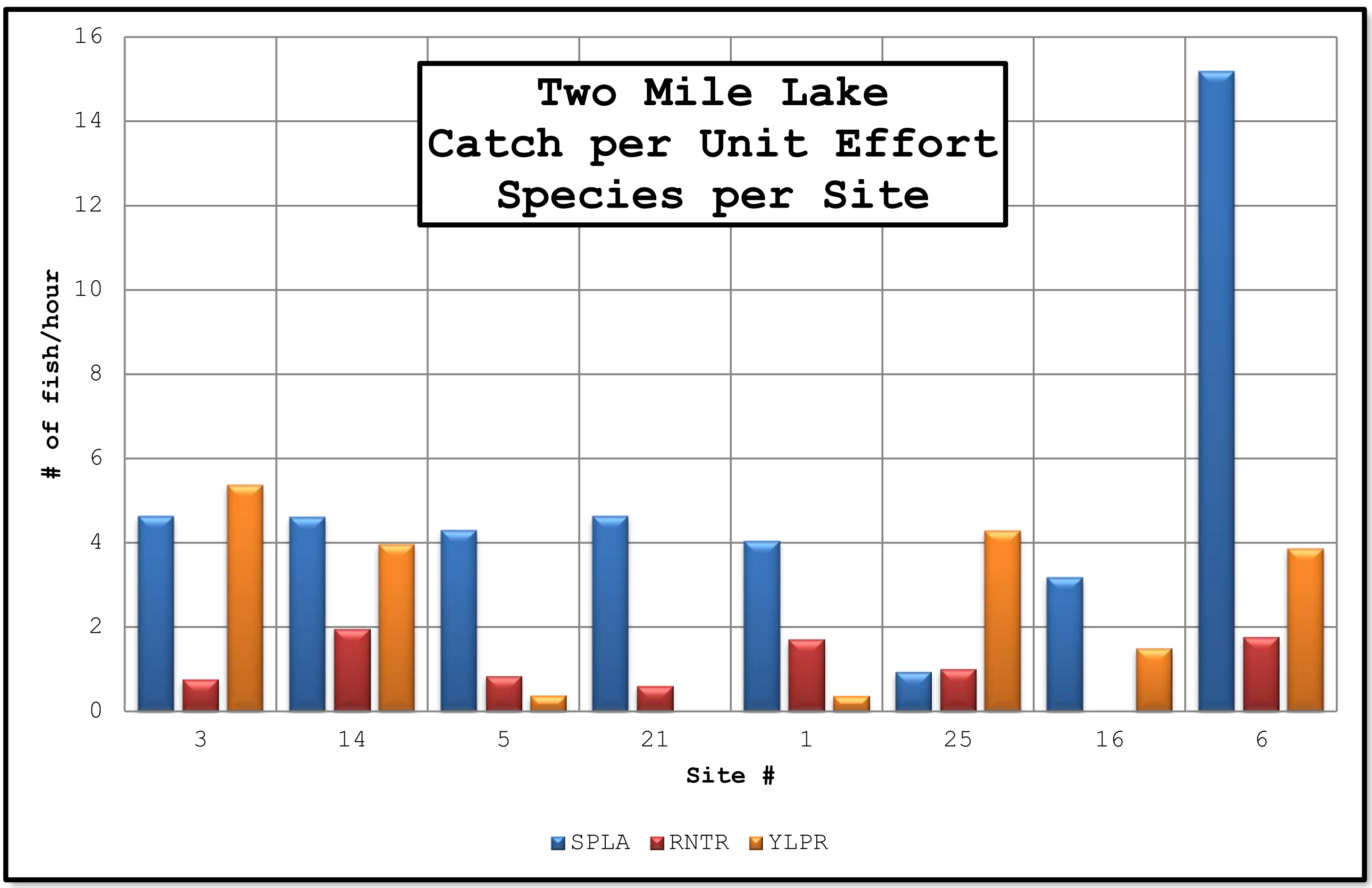
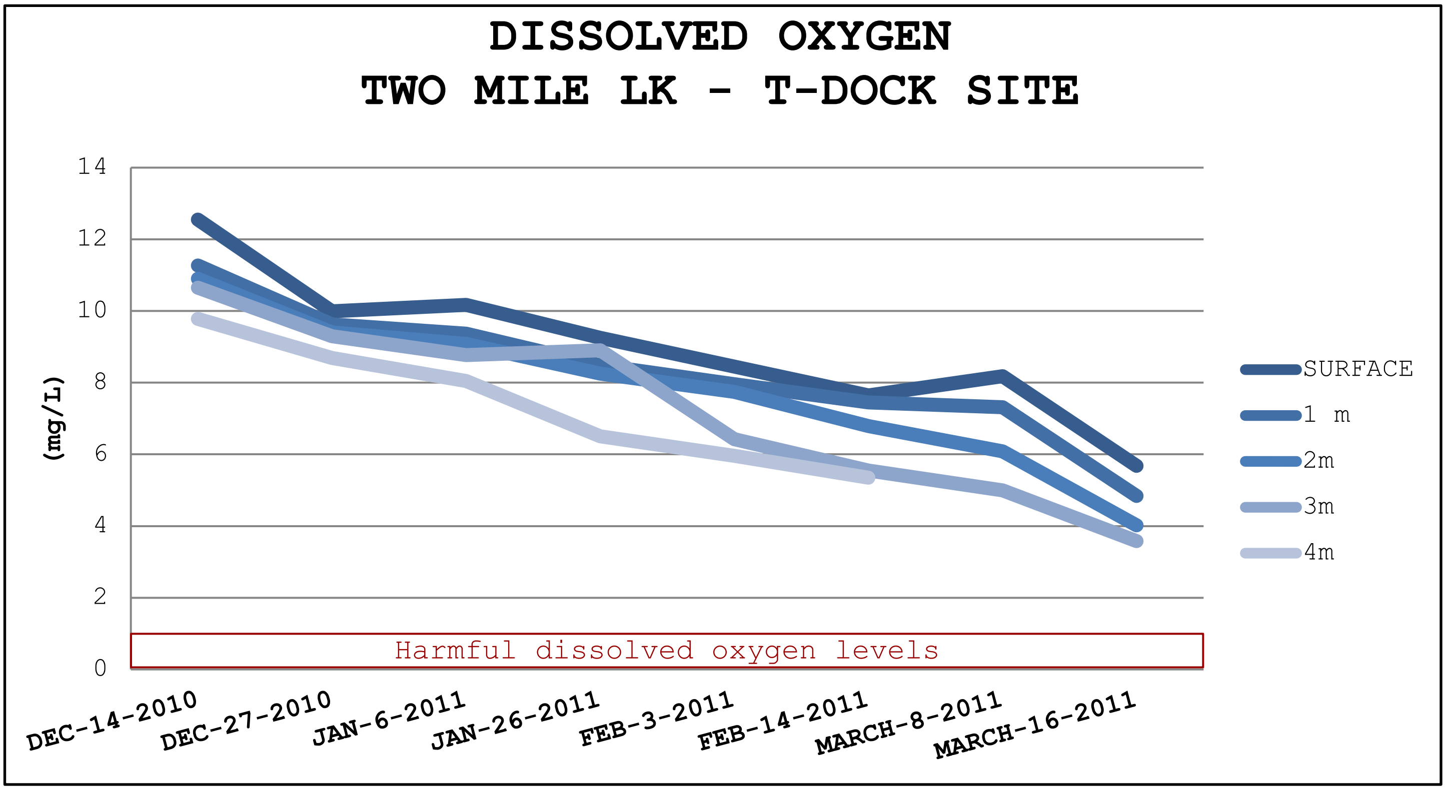


Figure 29: Comparison of CPUE per species at winter sites

Dissolved Oxygen

Two Mile Lake's dissolved oxygen levels were tested eight times from December 14th, 2010 to March 16th, 2011. Dissolved oxygen levels remained fair throughout the entire season. When dissolved oxygen and temperature are known estimated percent oxygen saturation can be calculated. At the T-Dock site saturation ranged from 84% to 35% at 1 m below surface within the sampling period.



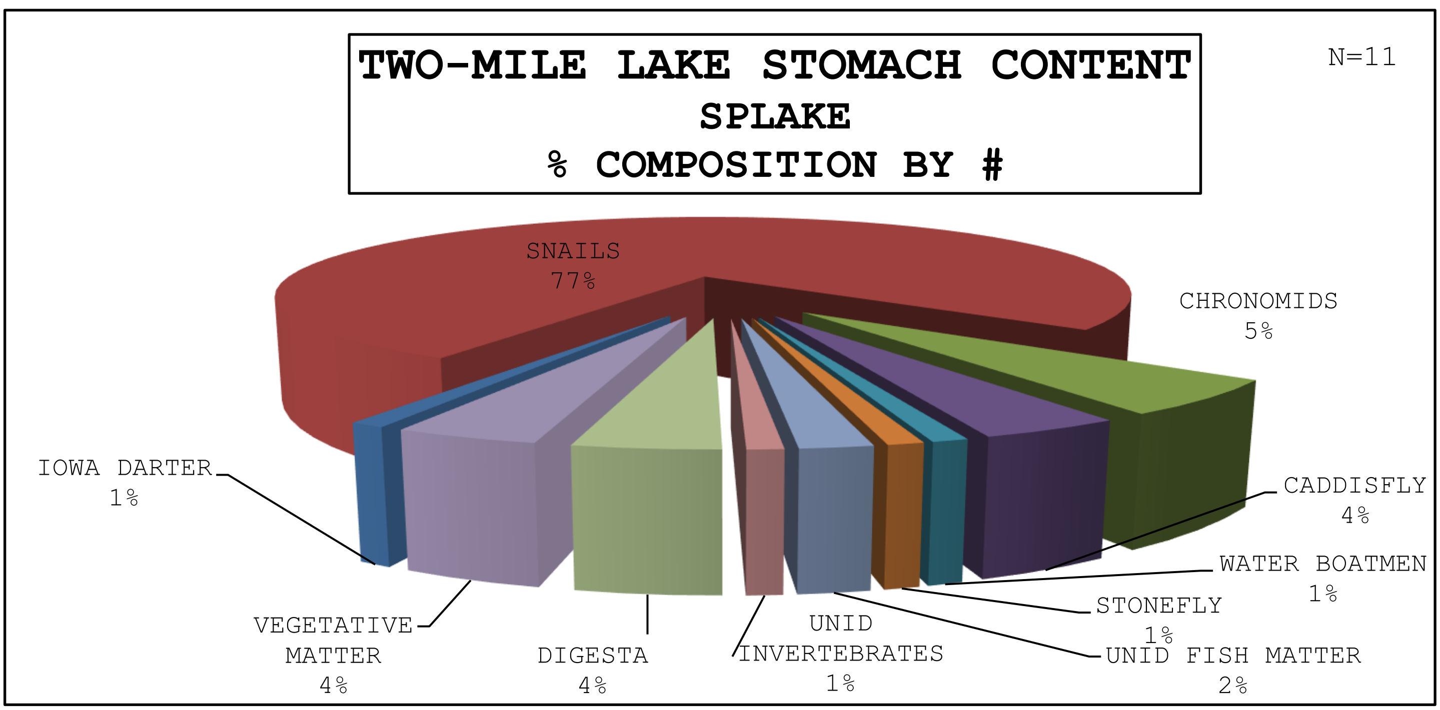
Stomach Content Analysis

Splake

Eleven splake samples were collected, with six mature females, two mature males, two immature males and one immature unknown. These fish were mortalities of total catch. Fork lengths ranged from 228 – 542 mm and weights from 100 – 1550 g in weight. Splake stomachs contained ten different content items (Table 11). Nine percent of stomachs were empty. Results were as follows:

Table 11: Two Mile lake splake stomach contents

	CONTENT ITEMS	CLASS \ ORDER \ SPECIES	TOTAL # OF CONTENT	TOTAL # OF OCCURENCES	FREQUENCY OF OCCURRENCE	% COMPOSITION BY #
SPLA (N=11)	YELLOW PERCH	PERCA FLAVESCENS	0	0	0	0
	BROOK STICKLEBACK	CULAEA INCONSTANS	0	0	0	0
	IOWA DARTER	ETHEOSTOMA EXILE	1	1	9	1
	SNAILS	GASTROPODA	82	4	36	77
	CRAYFISH	DECAPODA	0	0	0	0
	CHRONOMIDS	CHIRONOMIDAE	6	1	9	6
	CADDISFLY	TRICHOPTERA	4	2	18	4
	DRAGONFLY	ODONATA	0	0	0	0
	WATER BOATMEN	COLEOPTERA	1	1	9	1
	MAYFLY	EPHEMEROPTERA	0	0	0	0
	FRESHWATER SHRIMP	AMPHIPHODA	0	0	0	0
	STONEFLY	PLECOPTERA	1	1	9	1
	UNID FISH MATTER		2	2	18	2
	UNID INVERTEBRATES		1	1	9	1
	DIGESTA		4	4	36	4
	VEGETATIVE MATTER		4	4	36	4
	TOTAL		106	21	191	100



Percent composition by number does not provide the dietary importance of a food item. Factors that prevent this include; 1) numerical estimates overemphasize the importance of small prey items taken in large numbers 2) for many stomachs it is difficult to estimate numbers in each category because of mastication of the food, especially in cyprinids, before it reaches the stomach, and/or the effects of the digestive process 3) this method is not suitable for dealing with food items such as macro-algae and detritus (Hyslop, 1980).

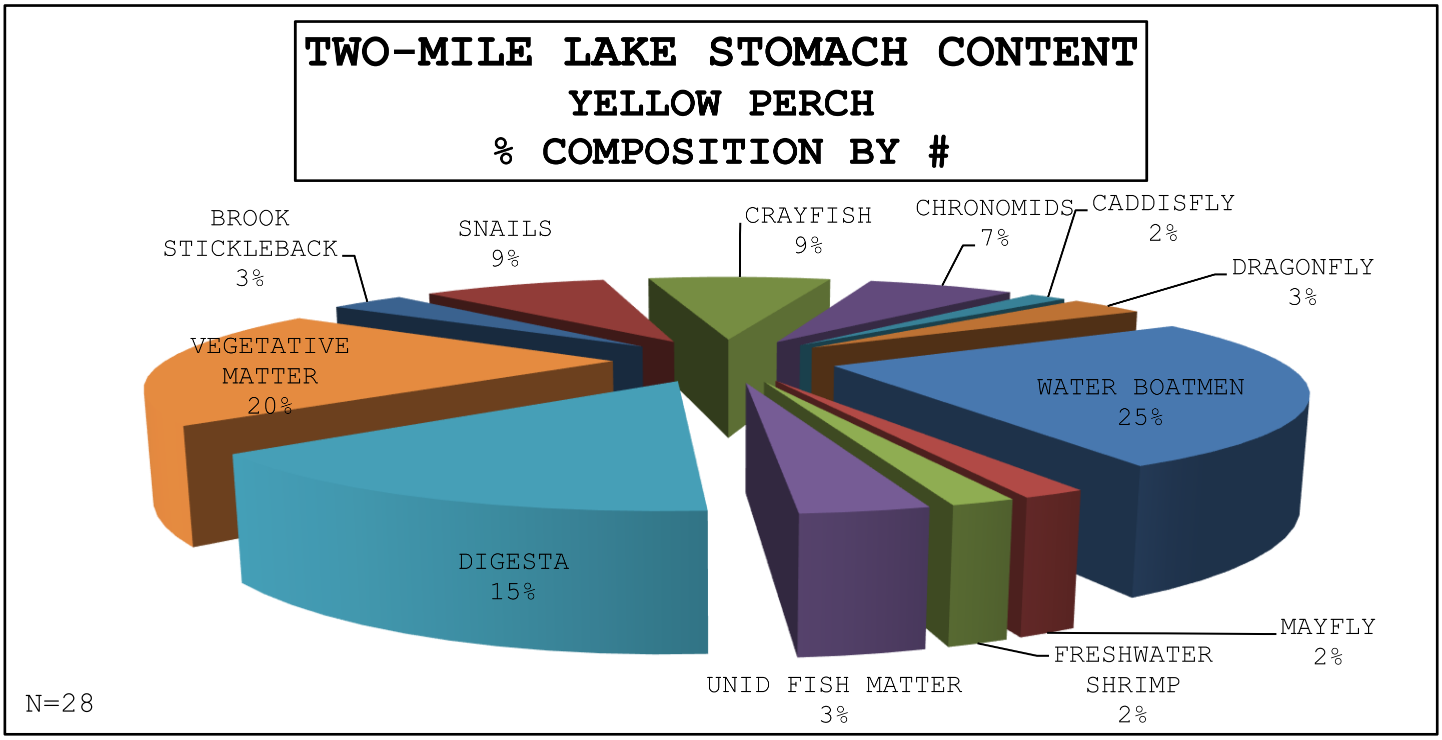
Ball (1961) suggested that numerical methods (such as % composition by number) give a better indication of the amount of effort exerted in selecting and capturing different organisms. Splake displayed great effort and preference for snails during the sampling period in comparison to other items.

Yellow Perch

Twenty-eight yellow perch samples were collected, with twenty-two mature females, one mature male, four immature males and one unknown. Fork lengths ranged from 158 – 294 mm and weights from 70 – 199 g. Yellow perch stomachs contained twelve different content items (Table 12). Empty stomachs were found in twenty-one percent of yellow perch. Results were as follows:

Table 12: Two Mile lake yellow perch stomach contents

	STOMACH CONTENT ITEMS	CLASS \ ORDER \ SPECIES	TOTAL # OF CONTENT	TOTAL # OCCURENCES	FREQUENCY OCCURRENCE	% COMPOSITION BY #
YELLOW PERCH (N=28)	YELLOW PERCH	PERCA FLAVESCENS	0	0	0	0
	BROOK STICKLEBACK	CULAEA INCONSTANS	2	2	7	3
	IOWA DARTER	ETHEOSTOMA EXILE	0	0	0	0
	SNAILS	GASTROPODA	5	1	4	8
	CRAYFISH	DECAPODA	5	4	14	8
	CHRONOMIDS	CHIRONOMIDAE	4	1	4	7
	CADDISFLY	TRICHOPTERA	1	1	4	2
	DRAGONFLY	ODONATA	2	2	7	3
	WATER BOATMEN	COLEOPTERA	15	1	4	25
	MAYFLY	EPHEMEROPTERA	1	1	4	2
	FRESHWATER SHRIMP	AMPHIPHODA	1	1	4	2
	STONEFLY	PLECOPTERA	0	0	0	0
	UNID FISH MATTER	UNID FISH MATTER	2	2	7	3
	UNID INVERT	UNID INVERT	0	0	0	0
	DIGESTA	DIGESTA	9	9	32	15
	VEGETATIVE MATTER	VEGETATIVE MATTER	12	8	29	20
	TOTAL		59	33	117.86	100



Yellow perch selected a variety of food items. Water boatmen and vegetation were of the highest percent composition by number at 25% and 20%, respectively. Vegetation could contribute to some nutrition as Nielson and Johnson (1983) state some fish can derive, most or all of their nutritional needs from detritus.

Frequency of Occurrence between Species

Frequency of occurrence gives little indication of the relative amount or bulk of each food category present in the stomach. Despite this, the method provides a somewhat crude qualitative picture of the food spectrum (Hyslop, 1980). Frequency of occurrence provides a rough index that snails and vegetation were most available for splake (Figure . Vegetation is not considered a food/prey item of fish (just a by product that is consumed from feeding on the bottom) it provides an indication of their feeding habitat (Urban, 2004).

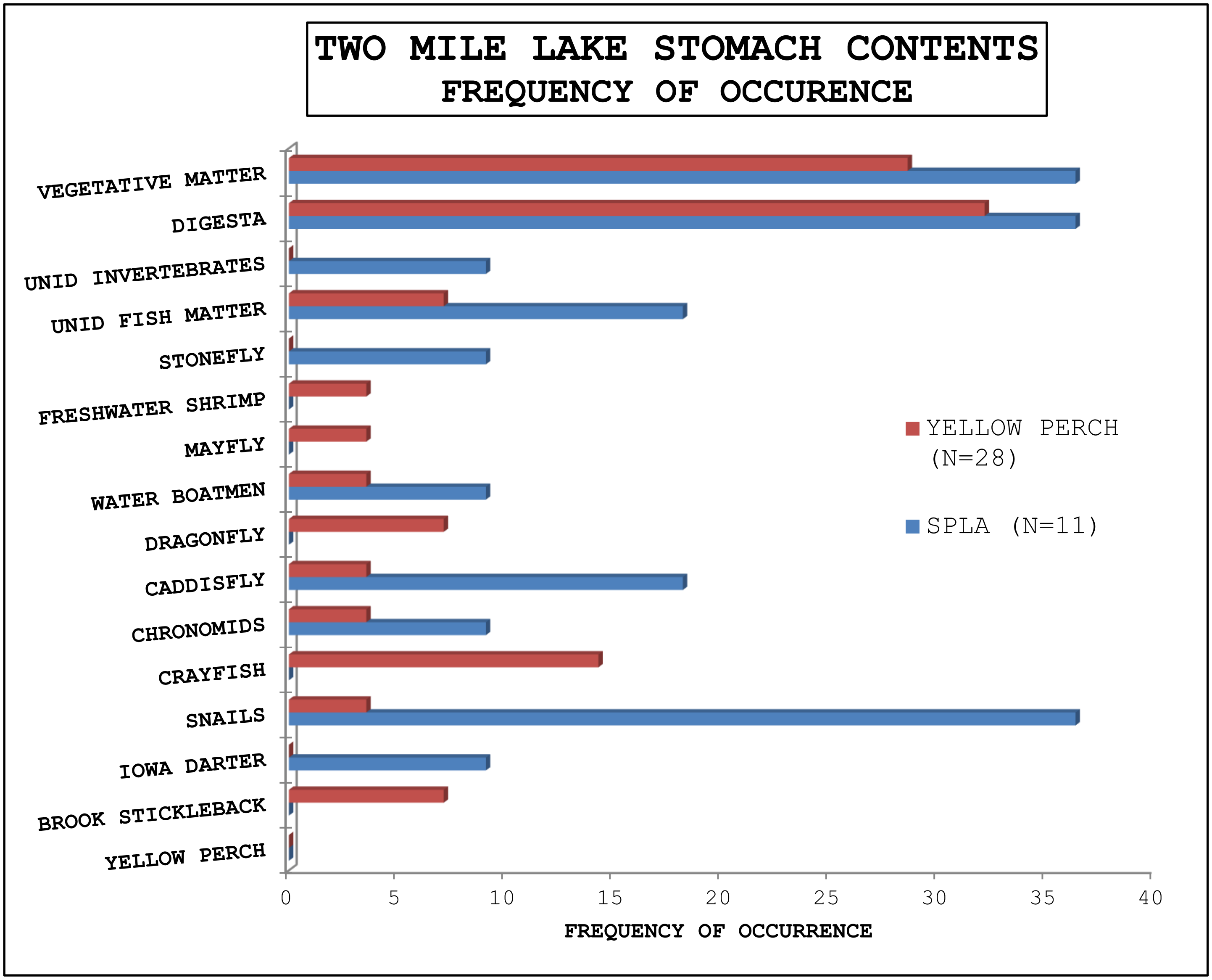
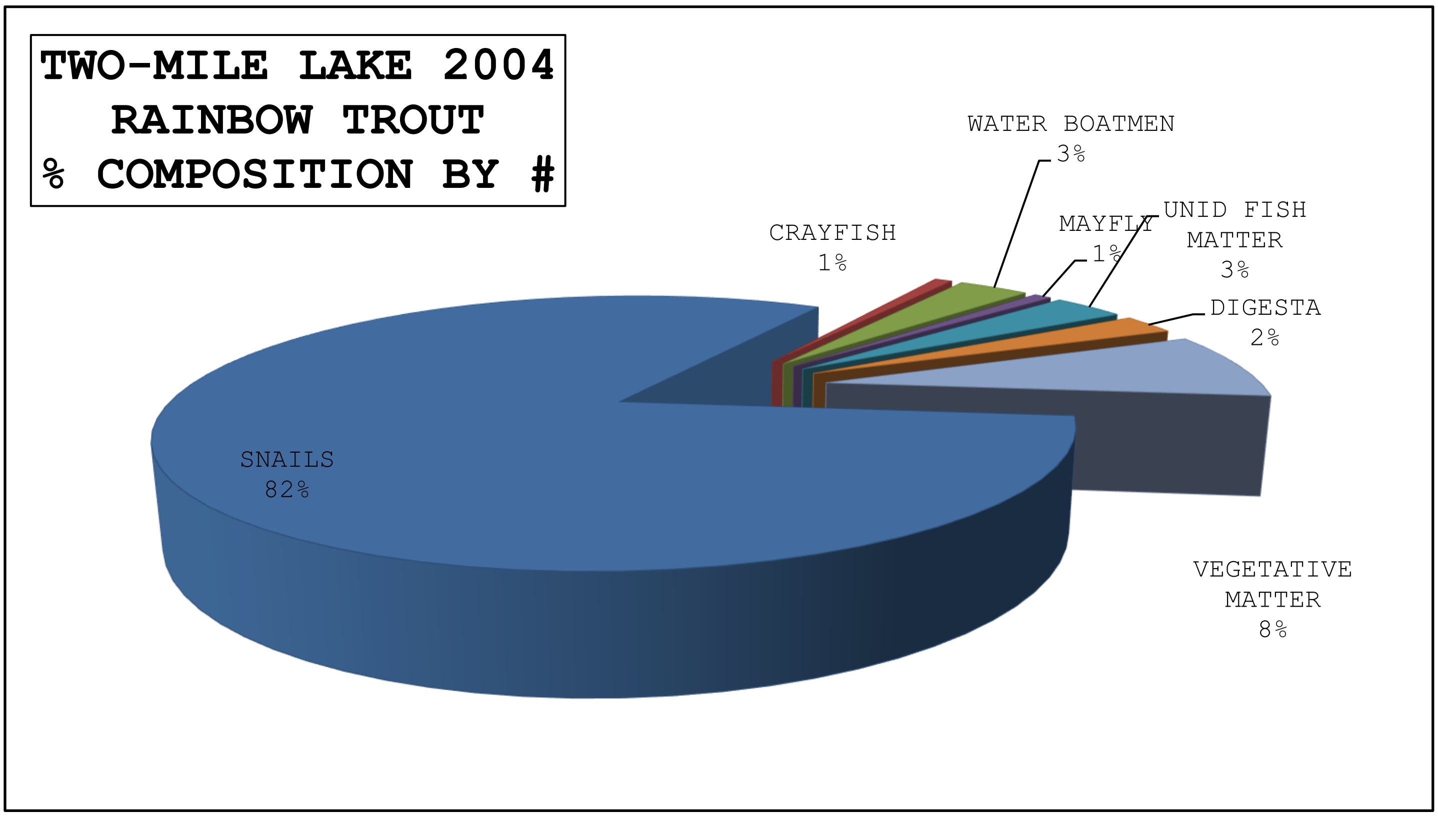


Figure 30: frequency of occurences between splake and yellow perch stomach contents

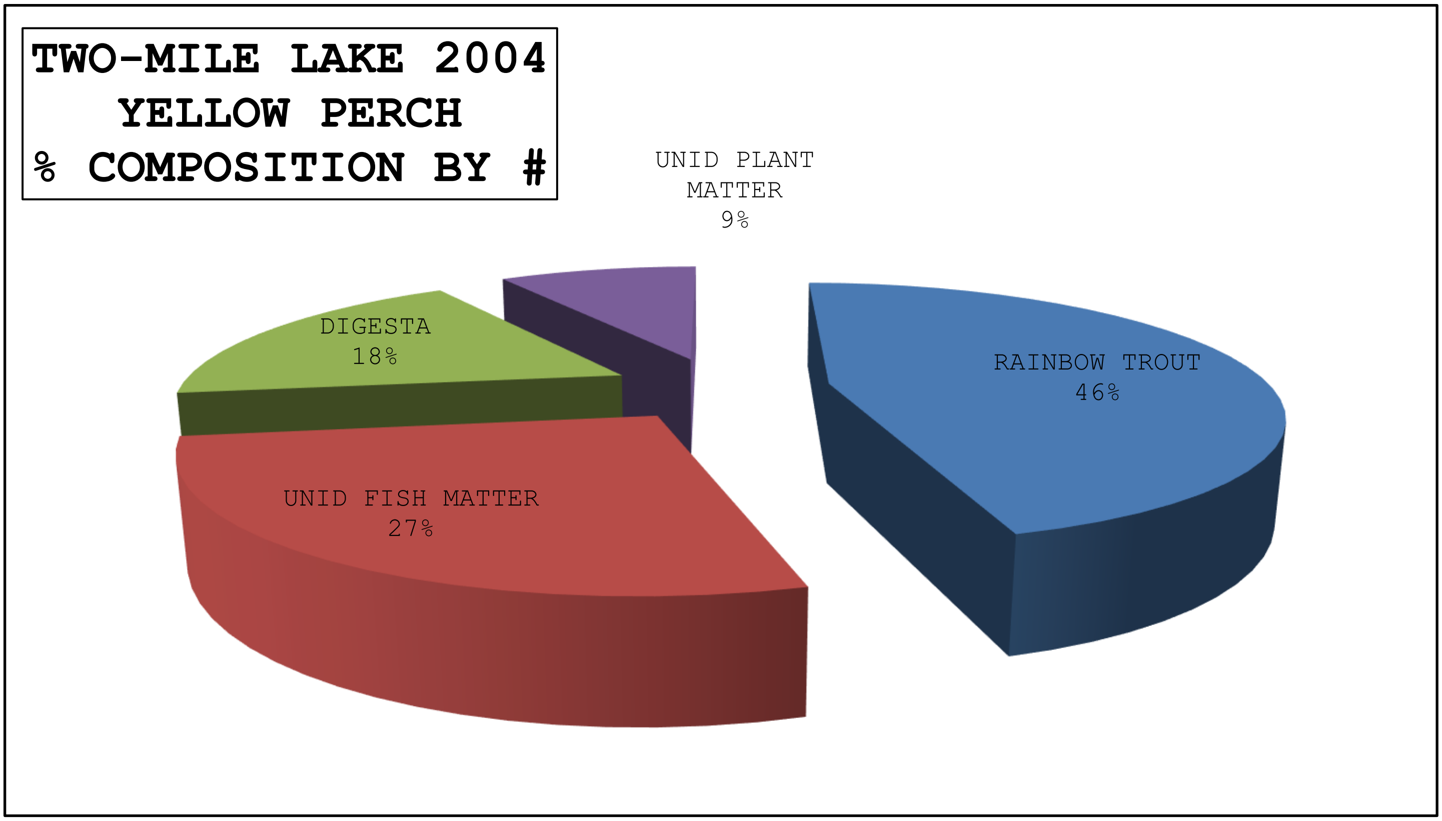
This method has also been used as an indicator of inter-specific competition by assuming that where the occurrence of a food item exceeded 25% in two or more predators competition was likely. (Johnson, 1977). Competition for prey between yellow perch and splake at Two Mile Lake is unlikely as there are no occurrences of food items above 25% for both species, except vegetation and digesta. Again these items are considered to be a by product of feeding.

2004 Stomach Content Analysis

In 2004, Keewatin Community College conducted a stomach content study to determine; 1) relative utilization of content items 2) if there was a relationship of feeding habits in rainbow trout and yellow perch. Results would aid in management and fish stocking efforts. The study timeline was January 22nd to January 24th. A total of twenty-nine fish were caught from three randomly selected locations. Species caught included fourteen rainbow trout and seventeen yellow perch. To demonstrate the difference and importance of food content items a similar series of calculations were completed, including frequency of occurrences, percent composition by number and wet weight, absolute importance indices and relative importance. Results were as follows:



RNTR (n=14)	CONTENT ITEMS	CLASS \ ORDER \ SPECIES	TOTAL # OF CONTENT	TOTAL WEIGHT WEIGHT OF FOOD ORGANISM (g)	TOTAL WET WEIGHT OF FOOD ORGANISM (g)	FREQUENCY OF OCCURRENCE	% COMPOSITION BY #	% COMPOSITION BY WEIGHT	ARI INDEX	RI INDEX
	RAINBOW TROUT	ONCORHYNCHUS MYKISS								
	SNAILS	GASTROPODA	101	6	38.863	42.860	81.452	41.419	165.727	0.414
	CRAYFISH	DECAPODA	1	1	0.213	7.143	0.806	0.227	8.176	0.020
	WATER BOATMEN	COLEOPTERA	4	3	7.383	21.429	3.226	7.868	32.523	0.081
	MAYFLY	EPHEMEROPTERA	1	1	0.007	7.143	0.806	0.007	7.957	0.020
	UNID FISH MATTER		4	4	5.623	28.571	3.226	5.993	37.790	0.094
	DIGESTA		3	3	3.817	21.429	2.419	4.068	27.916	0.070
	VEGETATIVE MATTER		10	10	37.930	71.429	8.065	40.424	119.917	0.300
	TOTAL		124	28	93.836	86.29	100	100.006	400.006	0.999



YLPR (n=17)	CONTENT ITEMS	CLASS \ ORDER \ SPECIES	TOTAL # OF CONTENT	TOTAL WEIGHT WEIGHT OF FOOD ORGANISM (g)	TOTAL # OF OCCURENCES	FREQUENCY OF OCCURRENCE	% COMPOSITION BY #	% COMPOSITION BY WEIGHT	ARI INDEX	RI INDEX
	RAINBOW TROUT	ONCORHYNCHUS MYKISS	5	5	40.939	33.333	45.455	67.039	145.827	0.534
	SNAILS	GASTROPODA								
	CRAYFISH	DECAPODA								
	WATER BOATMEN	COLEOPTERA								
	MAYFLY	EPHEMEROPTERA								
	UNID FISH MATTER		3	3	13.136	20.000	27.273	21.511	68.784	0.252
	DIGESTA		2	2	4.504	13.333	18.182	7.376	38.891	0.142
	UNID PLANT MATTER		1	1	2.480	6.667	9.091	4.061	19.819	0.073
		TOTAL	6	6	20.12	0.00	54.546	32.948	127.49	0.467

Yellow perch in 2004 were found to feed primarily on fish. It was stated that due to this diet there was a lower probability of successful feeding, explaining why 42% of perch stomachs were empty.

Rainbow trout in 2004 were found to feed on six different content items including: vegetative matter, snails, water boatmen, unidentified fish matter, mayflies, and crayfish. Nutrition of a content item can be indicated by percent composition by weight. Snails were considered of high nutritional value and highly available. Splake were not present in 2004, therefore rainbow trout will be used for comparison.

Competition between yellow perch and rainbow trout were thought to be unlikely as there were no similar content items found. One concern found during 2004 was the yellow perch were found to be feeding on stocked rainbow trout.

Discussion

Two Mile Lake was reclaimed in 1987 in effort to rid over populated rough fish and to develop a trout fishery. Following this Two Mile was stocked with brook and rainbow trout for several years. With unsuccessful results in decreasing perch populations, splake were introduced in 2006. Splake have actually been used as a predator to reduce the abundance of stunted populations of both brook trout and yellow perch (Kerr, 2000) .

Splake sampled in 2011 and rainbow trout found in 2004 both indicate their main diet includes snails. Fish sizes were similar with rainbows fork length ranging from 333 - 402 mm and splake ranging from 228 – 532 mm, but averaging at 318 mm. Together the frequency of occurrence and composition by weight in 2004 confirmed snails as a highly available and nutritional item for trout. This appears to still be the case as snails in splake contained a composition by number of 77% and a frequency of occurrence of 36%.

Perch displayed a diverse diet in 2011 and only 6% were of fish contents. Difference in results between years can be explained by the size of fish. Perch sampled in 2004 sizes ranged from 256-315 mm in fork length and 205 – 480 g in weight, while 2011 perch were quite small at 158 – 226 mm and 70 - 190 g. The benefit in perch remaining smaller in size prevents high predation on stocked trout.

It is important to monitor the status of both species due to their predator prey relation. Lack of predators allows prey fish populations to proliferate, but because of limited available forage, they usually become stunted. (Waybrant, 2008). Competition within yellow perch and the lack of predatory splake could explain their condition and size distribution.

Another factor to consider is seasonal feeding behaviour and available prey. Splake are known to inhabit shallower waters in the winter compared to summer to feed, as water temperatures are cooler. If this is the case, splake should display a healthier condition ***if prey*** species are highly available in these depths. From stomach content results and recapture information, it appears larger sized splake require prey species with more nutritional value than snails to maintain conditions throughout winter, while smaller splake can still maintain growth depending on this diet. Data collected from 2004 and 2011 can be compared to future sampling at Two Mile Lake to identify, understand and monitor feeding behaviours. Additional findings derived from stomach content analysis can help distinguish future actions if necessary for effective management at Two Mile Lake.

6. Publications / Public Awareness

During the winter season, Swan Valley Sport Fishing Enhancement technicians were approached by two local school groups to organize a hands on presentation on the local work and research being conducted related to fisheries. This included three field day presentations with grade 7 & 9 classes from Minitonas Middle Years School (14 students from each class) & a grade 7 class from Ecole Swan River South School (56 students).

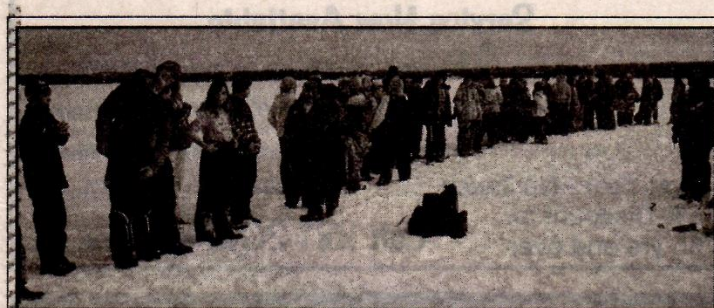
Students had the chance to learn about fish populations in the valley and the importance of proper management of our lakes. Students also experienced the work involved in winter sampling, including tagging walleye with telemetry tags, and an afternoon of ice fishing.

THE GREAT OUTDOORS – Just recently, students from Minitonas Middle Years' School in Grade 6 and 9 had an opportunity to have another great outdoor educational experience at Wellman Lake United Church Camp Jan. 25 and 27. Students not only went cross country skiing in the morning, but they also enjoyed a nutritional lunch provided by Mrs. Kathy Dvorak in the Conference Centre at WLUCC. Following lunch, the students then put on snowshoes and headed out onto Regatta Bay to learn about "ice netting" and do some ice fishing as well. Swan Valley Sport Fishing Enhancement members were on hand to discuss fish populations within our lakes in the valley and help students understand why we need to study our bodies of water to make sure we have fish for the future. The students also witnessed a walleye tagging procedure which will help the SVSFE study the migration of this fish, and others like it, throughout the lake. It was a great day thanks in part to the work done by Holly Urban, Melissa Johnston and Ian Kitch of the SVSFE for providing their expertise in this area. We look forward to future opportunities like this one to enhance our students learning outside the classroom. See more photos from this trip on the *Swan Valley Star and Times'* Facebook page.

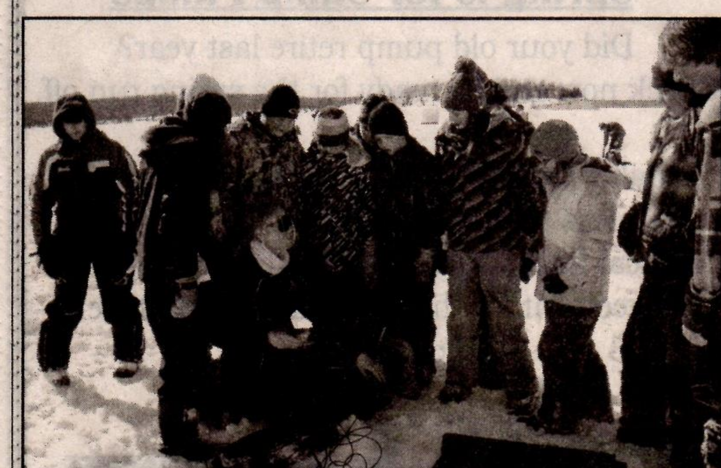
Feb 8, 2011 Star + Times

– **Submitted photo**

A10 - **THE STAR & TIMES** Tuesday, March 22, 2011



OUTDOOR ADVENTURES – On March 10, a total of 56 Grade 7 students from ESRSS travelled up to Whitefish Lake for a great day of ice fishing. It was a warm day that was enjoyed by all. We would like to acknowledge Ian Kitch, Regional Fisheries Manager, as well as Melissa Johnson from Swan Valley Sport Fishing Enhancement, for spending the day with us teaching us about telemetry (tracking fish), showing us their underwater camera and informing us about fish habitat. We would also like to acknowledge the Swan Valley Sport Fishing Enhancement group and the ESRSS Parent Advisory Council for providing funding to purchase equipment and food for the day, as well as to Daytrom Distributers for supplying goods for our bonfire lunch. – **Submitted photo**



Anglers and cottage owners were also informed of the work being conducted at the various lakes. Anglers were encouraged to report catches of tagged fish and report findings of stomach contents of fish kept throughout season. Interested locals also occasionally participated in sampling efforts.

7. Acknowledgements

Swan Valley Sport Fishing Enhancement would like to thank everyone for their cooperation with the 2010-2011 Winter Stocked Trout Assessment. The strong interest and support from our local anglers and community is much appreciated. SVSFE is very thankful towards anglers who continue to submit tagged fish information, with these submissions we are able to produce valuable information for the management of our local lakes.

A very important thank you is extended towards Ian Kitch – Regional Fisheries Biologist, and Lloyd Rowe – Fisheries Biologist (Dauphin) who are continually supporting SVSFEs' efforts. Thank you to Tabitha Jordan - Water Stewardship and Maria TerHorst - Manitoba Conservation for their help with the project during some pretty harsh weather conditions. Every extra hand helping out made the project a success. Thank you to an interested volunteer; Rob Anderson who also participated in the project by helping with dissolved oxygen testing and habitat assessments.

We were also fortunate that the grader man kept our roads well ploughed, and was available on the one day we needed a pull! Thanks!

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 2010 Stocked Trout Winters Assessment, that ensure adequate fish stock for future generations.

8. References

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