

Adult Steelhead Assessment 2011



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Co-op Angler 2011

(A partnership in science between the Ministry of Natural Resources and the North Shore Steelhead Association)

Introduction

- Three steelhead assessment projects were conducted during the spring of 2011
- They are as follows:
 - A) McIntyre River Steelhead Population Assessment
 - B) Portage Creek Steelhead Population Assessment
 - C) Co-op Angler Study
- All studies were conducted in partnership with the North Shore Steelhead Association and the Ministry of Natural Resources
- This report summarizes the three studies and discusses the overall health of steelhead stocks from Thunder Bay to Marathon (Lake Superior).

Steelhead Assessment 2011 (A partnership between MNR and the NSSA)

Steelhead anglers from the North Shore Steelhead Association (NSSA), in conjunction with the Ontario Ministry of Natural Resources (MNR), collected 1255 adult steelhead data samples (fork length, sex and scales) from twenty-two Lake Superior tributary streams from Thunder Bay to Marathon (April and May 2011). Two tributaries, McIntyre River (Thunder Bay) and Portage Creek (Black Bay), were used as “Index Streams” to estimate the steelhead population size in each basin.

Methods

Sampling kits (knife, measuring tape, gloves, scale envelopes, pencil and instructions) were supplied to interested anglers. A workshop was held April 15, 2011 where participants received an overview of the program and sampling instructions were distributed. Anglers were to sample adult steelhead during their angling endeavours between April and June. Names and email addresses were recorded from anglers receiving kits. Samples were to be returned to MNR by mid-June. Follow-up emails and phone calls were made in June.

Life history data (Appendix 1), extracted from the scale samples (Figure 1) and the data entry in an Excel data base were conducted by (North Shore Environmental Services) NSES. On the McIntyre River and Portage Creek, we also estimated population size using an annular fin clip series shown in appendices 2 and 3.

The population estimates were based on a ‘Petersen Population Estimate’ shown in Appendix 4. Adult steelhead are fin clipped in year one and recaptured in year two. The repeat spawners with fin clips in year two complete the formula.

2011 Projects

A) McIntyre River Steelhead Population Assessment

Four members of the North Shore Steelhead Association (with extensive experience at handling, biologically sampling and tagging steelhead) were required to angle, fin clip (tag a subset) and collect length, sex and scale samples from the adult steelhead population from April until June Appendix 2.

B) Portage Creek Steelhead Population Assessment

Members of the North Shore Steelhead Association conducted the steelhead capture (angling) and the Ministry of Natural Resources conducted the biological sampling and tagging from April to June Appendix 3.

C) Co-op Angler Study

Steelhead anglers attended a workshop held during early April. They were given an overview of the program. Sampling kits were distributed to anglers so they could sample the steelhead they caught during normal angling trips during the spring of 2011.

Collecting the data



Sample Kit



Measuring length



Gender (male or female ?)



Scale Sample

Life History Extrapolation

Steelhead Scale:
Age 5 years
(2 stream, 3 lake,
3rd spawn)

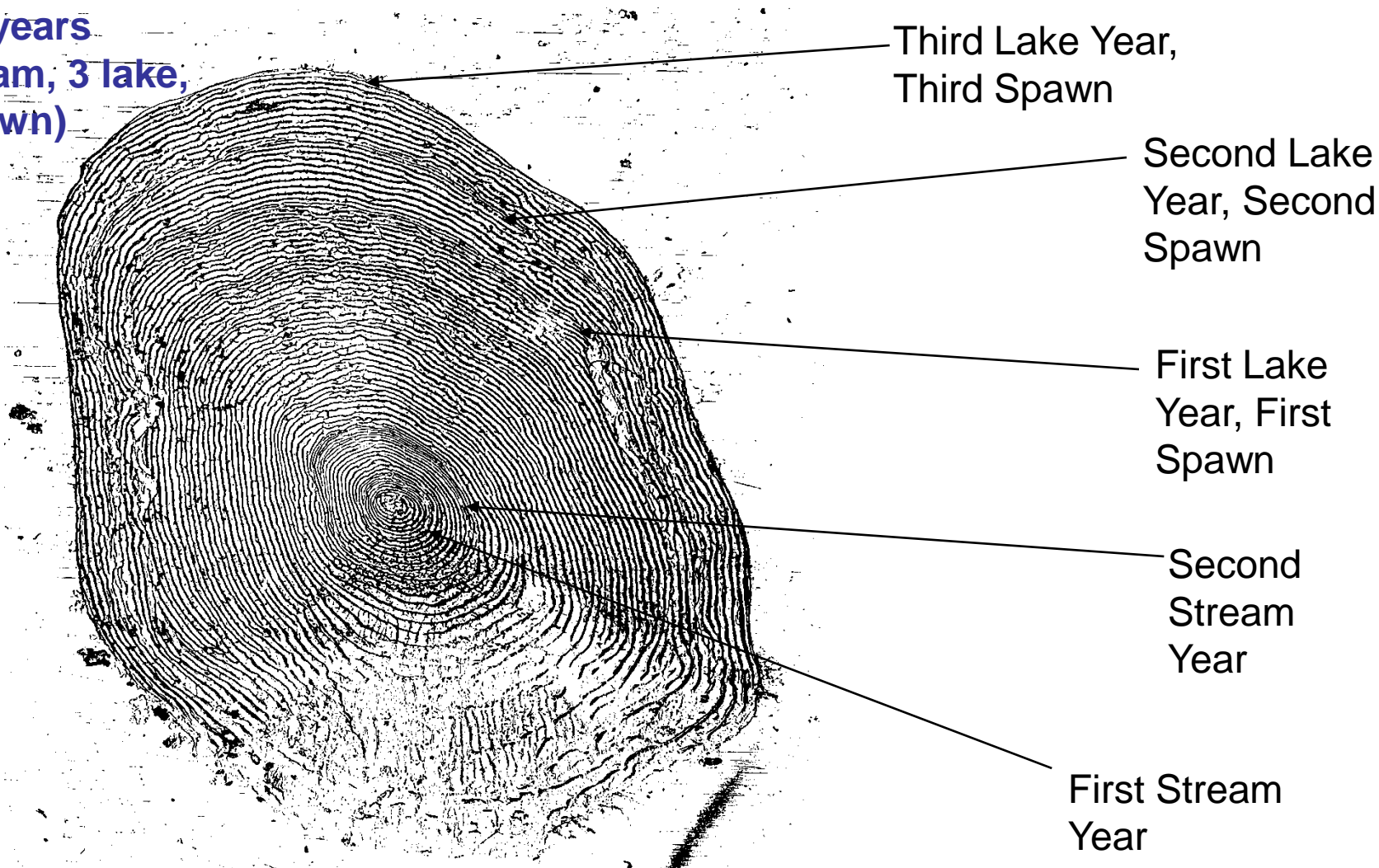


Figure 1.

Table 1.

Co-op Angler 2011

Steelhead Samples by Tributary

A) Thunder Bay

Whitefish River	78
Neebing River	52
McIntyre River	410
McVicar Creek	27
Wild Goose Creek	11
Current River	3
McKenzie River	8

B) Black Bay

Portage Creek	210
Coldwater / Spring Creek	22
Wolf River	36
Black Sturgeon River	4

C) Terrace Bay

Jackpine River	78
Cypress River	185
Gravel River	8
Little Gravel River	22
Dublin River	5
McInnis River	3
Hewittson River	2
Mcleans River	5
Steel River	17
Prairie River	78
Deadhorse River	2

McIntyre, Portage Creek Population Trends

- These two graphs indicate the trends in adult steelhead population size up to the present time. Figure A is the McIntyre River, Thunder Bay, Figure B is Portage Creek, Black Bay.
- In Figure A, the McIntyre River maintained a population size of approximately 400 adults increasing to 900 in 2004, 1500 in 2008 and to 2400 in 2010. Catch limits were reduced from five per day to two per day (one over 50cm, one under 50 cm) in 1996, and to one per day (maximum size of 69 cm) in the spring of 1999.
- In Figure B, Portage Creek was closed to fishing in the spring of 2004 (previously had a five-fish daily limit). The adult population size increased from 600 fish in 1992 to over 1000 in 1999. By 2004, the population size exceeded 2000, remained above 1600 until 2008, then declined to 600 adults in 2010.

Adult Population Estimates

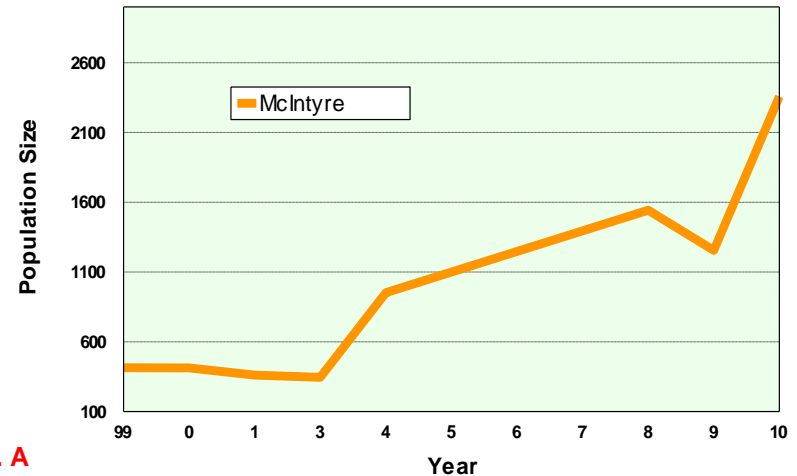


Fig. A

Note: 1999 to 2004 (Counting Fence), 2008 to 2010 (Petersen est.)

Adult Population Size 1991 to 2010

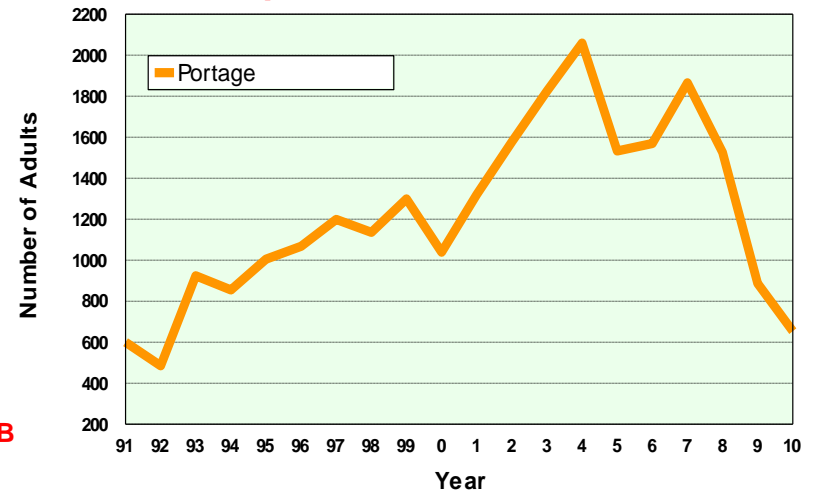


Fig. B

Thunder Bay

In the Thunder Bay basin, the following tributaries were sampled: Whitefish, Neebing, McIntyre Rivers and McVicar Creek.

- A) The 2004 year class, now aged seven years, remains prominent in all rivers with the exception being McVicar Creek. Age three-and four-year old fish from 2007 and 2008 were dominant in McVicar Creek, the Neebing River (2008) and the McIntyre River (2007)

Wild Goose Creek had age two to four year old adults with no fish older than age 4 years (small sample size).

- A) Most Thunder Bay stream steelhead have two stream years prior to migrating to Lake Superior (smolting). The Neebing River fish favoured one year of stream life.

Wild Goose Creek had only one stream year adults present.

Age Structure 2011

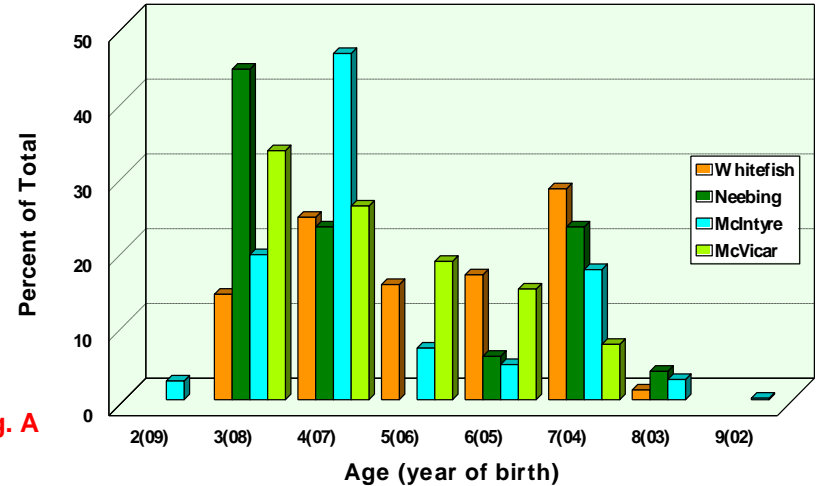


Fig. A

Number of Stream Years 2011

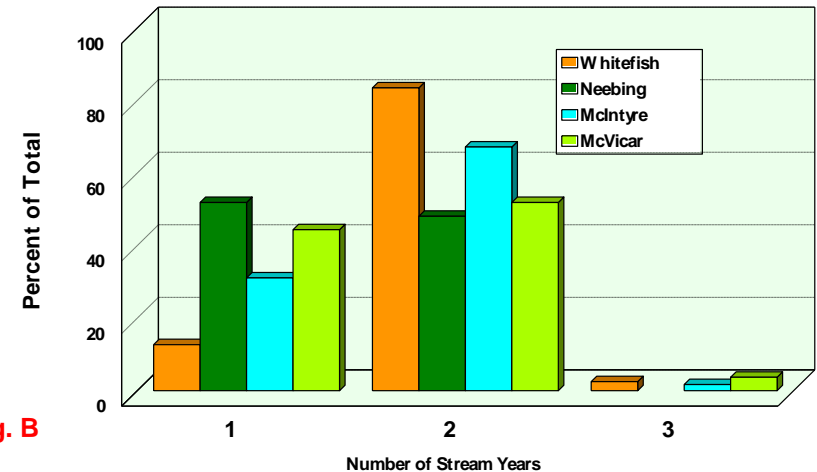


Fig. B

Black Bay

The Black Bay Basin includes three tributaries: Portage Creek, Coldwater and Wolf Rivers.

A) Age seven steelhead from the 2004 year class remain strong in all three rivers. The Coldwater River had a high percentage of age three and age four year steelhead from the 2007 and 2008 year classes. Portage Creek and the Wolf River were the only tributaries sampled with adult steelhead older than age seven. Age ten and eleven year steelhead were present in the Wolf River and Portage Creek watersheds.

B) Stream life was divided between one and two years in both the Coldwater and Wolf Rivers. Portage Creek was dominated by age one smolts.

Age Structure 2011

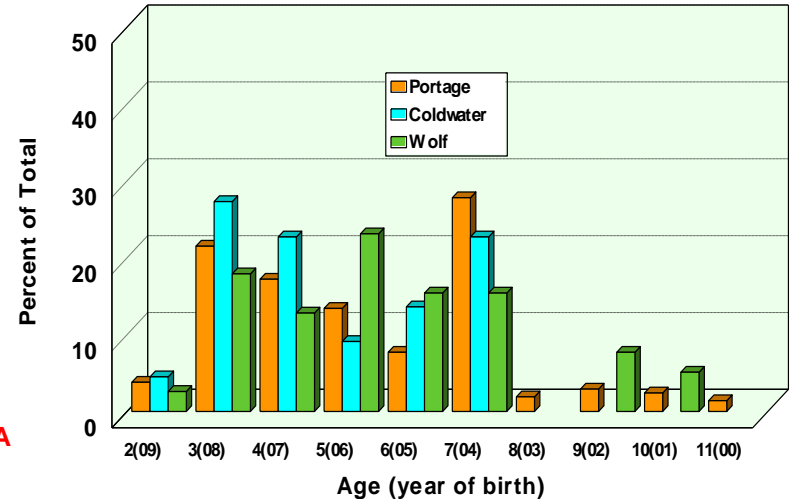


Fig. A

Number of Stream Years 2011

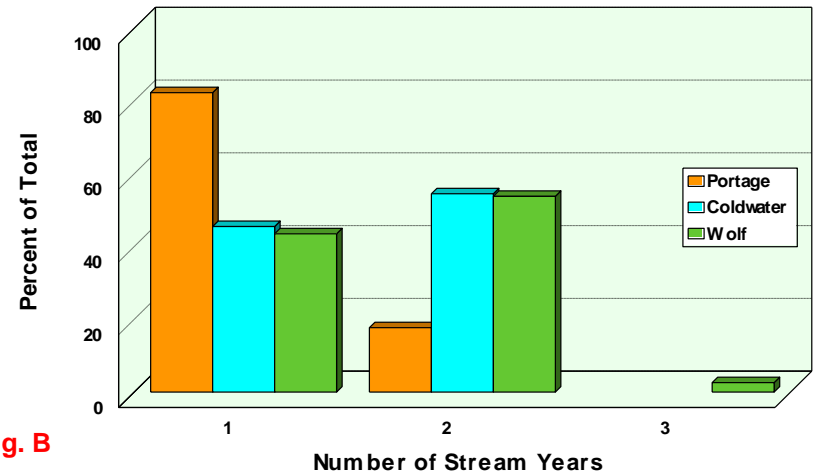


Fig. B

Nipigon to Marathon

The Nipigon to Marathon shoreline of Lake Superior is represented by three larger tributaries: Jackpine, Cypress and Prairie Rivers. Smaller tributaries (e.g. Dublin, McInnis, Little Gravel and Hewittson Creeks) had small sample sizes so were grouped together for analyses.

A) As with Thunder Bay and Black Bay, the 2004 year class (age seven years) still remains prominent in the spawning population. Early recruitment of age two males (2009 year class) was a bit of a surprise in the Jackpine and Cypress Rivers. The Prairie River was dominated by ages four to seven, with no younger spawning fish sampled in this year's adult population. The 2006 year class was the strongest in all three tributaries.

In the smaller tributaries, age four year steelhead (2007) were strongest at 24%. The 2004 year class, age seven were at 20%. A total of 4% of the sample were age eight to ten years old.

B) The Jackpine and Cypress River steelhead have mostly one year of stream life before migrating to Lake Superior. The Prairie River had a dominance of two year smolts. Age three year smolts were rare (Fig. B).

Small tributaries had 56% one stream year and 44 % two years.

Age Structure 2011

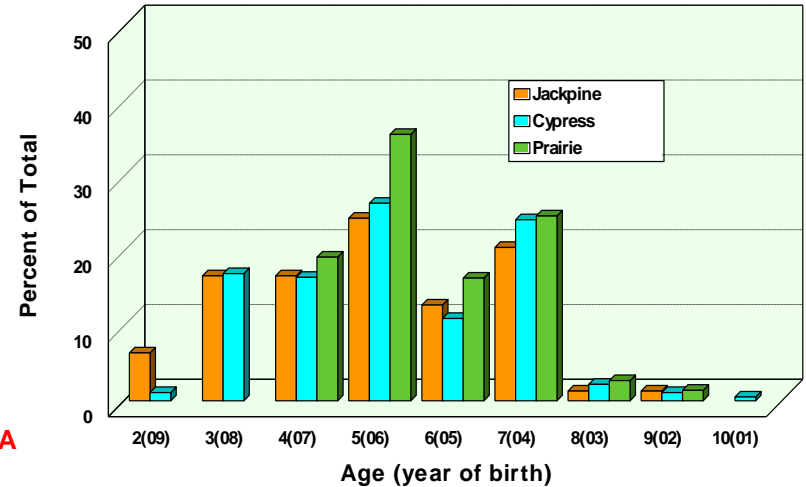


Fig. A

Number of Stream Years 2011

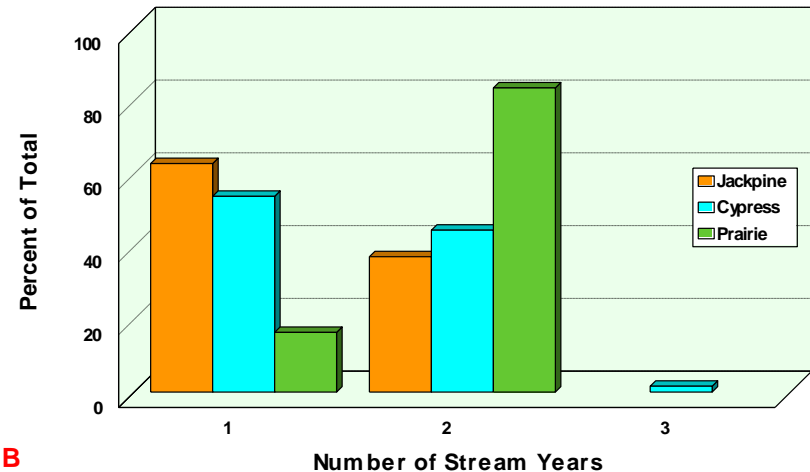


Fig. B

Thunder Bay Steelhead

A) In the Thunder Bay tributaries that were sampled, steelhead spawn for the first time at ages three, four and five years. Females generally require two lake years prior to spawning for the first time. Males are often only one lake year at maturity. Females are mostly age three and older at first spawn, with males often reaching maturity at two and three years of age. The Neebing River and McVicar Creek had a high percentage of age five first-time spawners (mostly females) with three lake years prior to spawning for the initial time.

B) In Thunder Bay tributaries, at least fifty percent of the spawning populations were repeat spawners. McVicar Creek was the exception with 41% spawning more than once. All tributaries had adults spawning for the fifth consecutive year. The McIntyre River had a small percentage of adults spawning for the sixth and seventh years. Wild Goose Creek had a 40% repeat spawning rate.

Age at First Spawning

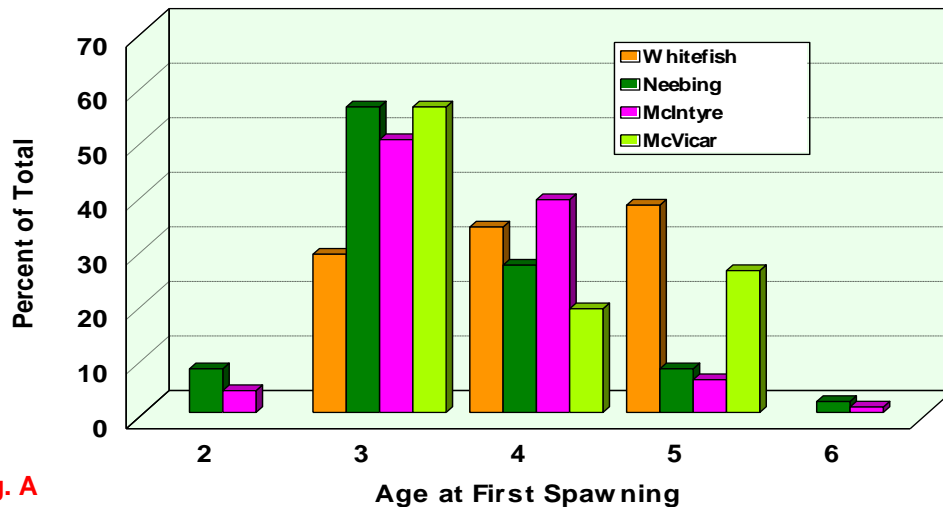


Fig. A

Number of Spawning Events 2011

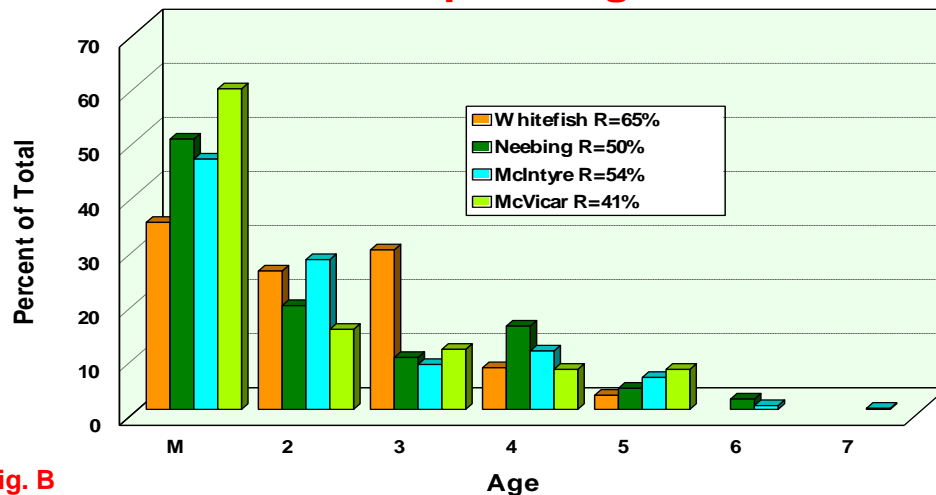


Fig. B

R= repeat spawning percentages

Black Bay Steelhead

- A) In the Black Bay tributaries, steelhead matured mostly at three and four years of age. Age two fish were mostly males and steelhead aged five at maturity were predominantly females.
- B) Portage Creek and the Wolf River have high repeat spawning rates and multiple spawning, from six to nine times. The Coldwater River had a lower repeat spawning rate than the other two tributaries that were sampled.

Age at first spawning 2011

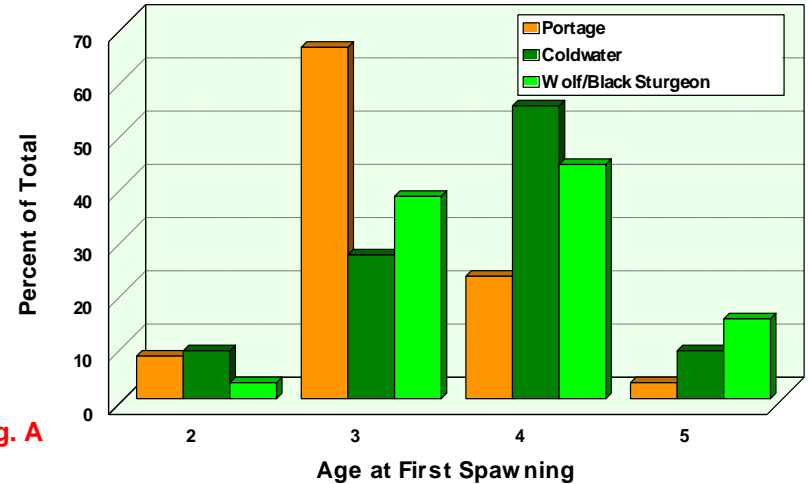


Fig. A

Number of Spawning Events 2011

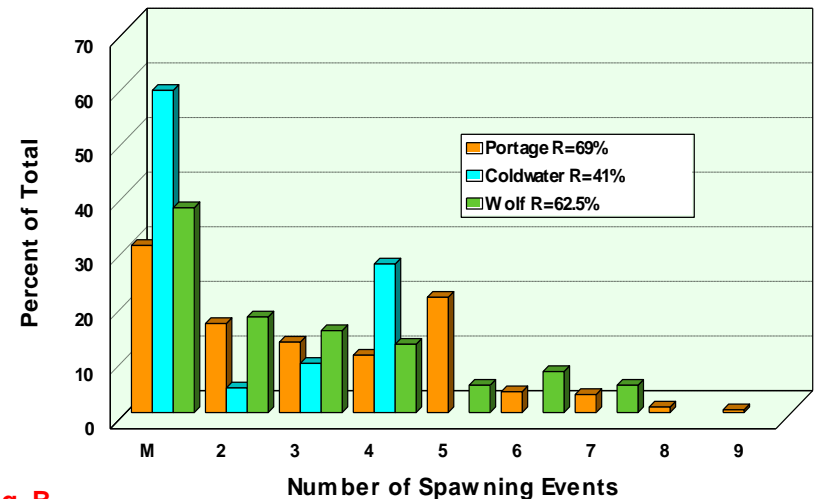


Fig. B

R= repeat spawning percentages

Nipigon to Marathon

- A) Maturity occurred at ages three to five with the exception of the Prairie River where mostly age four and five year old first-time spawners occurred. The occasional steelhead in the Cypress and Prairie Rivers delayed maturity until six years of age.
- B) Repeat spawning rates were all in the 60% range. Few adults had multiple repeat spawning more than five times....the Cypress River had a few steelhead spawning for the sixth, seventh and eighth times..
- Small streams in the RosSPORT area had 56% repeat spawners...21% were spawning for at least the fourth time.

Age at First Spawning

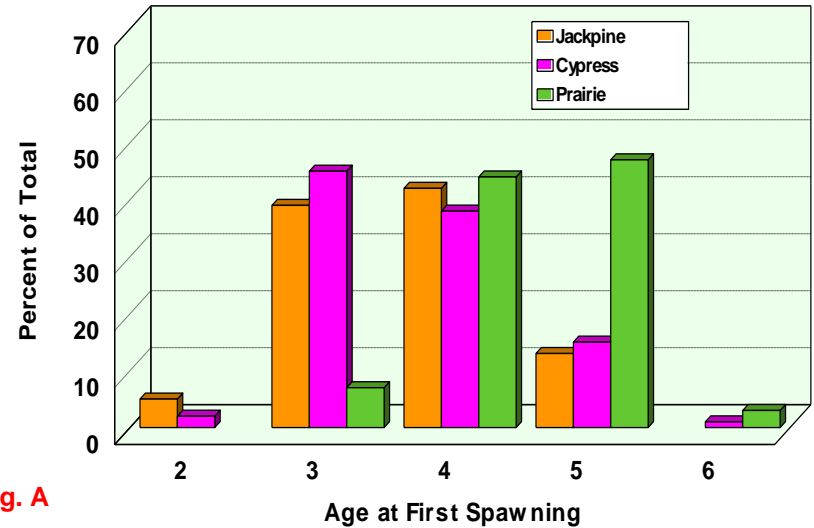


Fig. A

Number of Spawning Events 2011

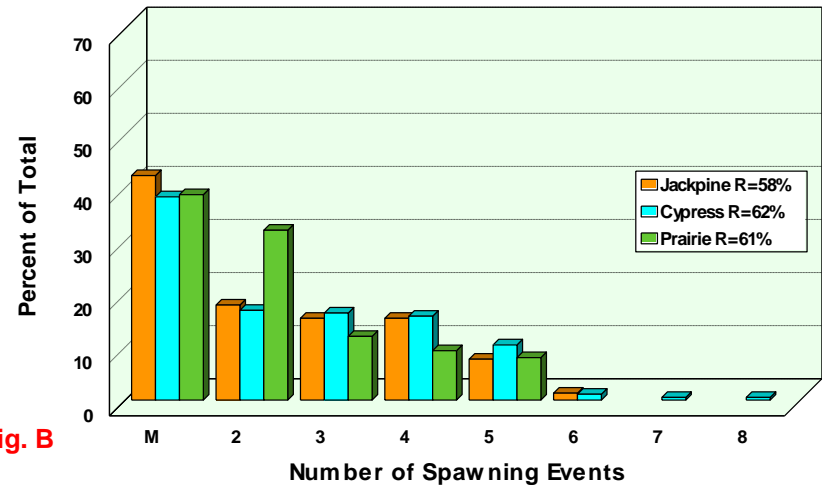


Fig. B

R= repeat spawning percentages

Weight and Age of your Steelhead

Lake Superior Steelhead

Weight for Length Categories

A) Figure A illustrates the fork length of steelhead (in cm) versus the round weight (in kg). The weight vs. length of Lake Superior steelhead varies considerably. Spawning adults can lose close to 30% of their weight during their spawning migration. Temperature conditions and food supply in Lake Superior affect the condition of steelhead and cause considerable variation in weighting. This chart is, therefore, a general guide.

B) Figure B illustrates the age of steelhead for their fork length (in cm). Once steelhead reach maturity, their growth in subsequent years slows considerably. Some small steelhead can be very old and some large steelhead can be quite young (reached maturity later in life).

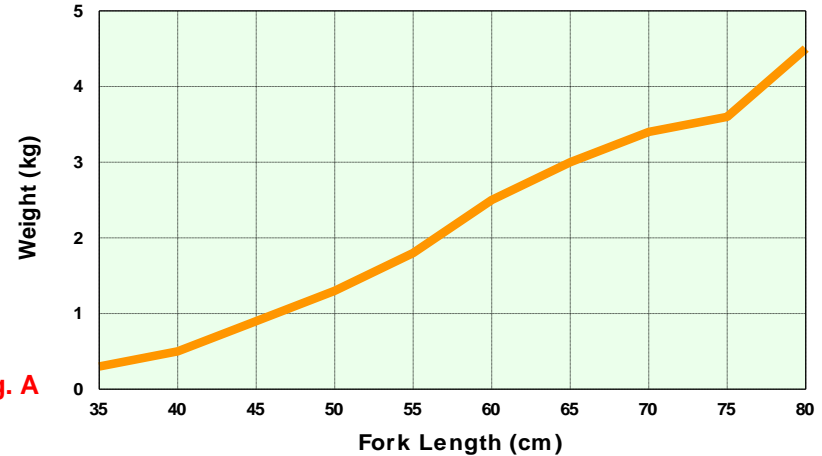


Fig. A

Note: 2.54 cm = 1 in ; 1 kg = 2.2 lb

Lake Superior Steelhead

Fork Length at Age

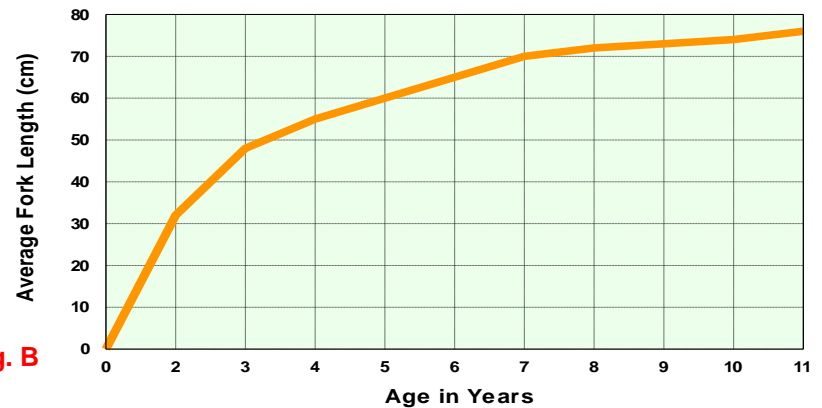


Fig. B

Note: This is a general guide. Growth will vary considerably with maturity, stream life and feeding behavior.

Thunder Bay and Black Bay Population Trends

A) The McIntyre River (Thunder Bay) and Portage Creek (Black Bay) can be used to “index” the abundance of steelhead in these two basins.

Black Bay (Portage Creek) reached a peak in adult abundance in 2004. The population has now declined to levels seen in the early 1990’s. The opposite has occurred in Thunder Bay (McIntyre River). A steady increase in the adult steelhead population has occurred since the mid-2000’s.

Regulations controlling harvest appears to have benefited Thunder Bay streams.

Black Bay has undergone a change in the fish community...more perch and walleye, which may be affecting the steelhead survival.

B) Figure B illustrates the number of age three year adult steelhead in Portage Creek, by year. The only strong year class of age three fish since 2005 was the 2004 year class that entered the spawning population at age three in 2007.

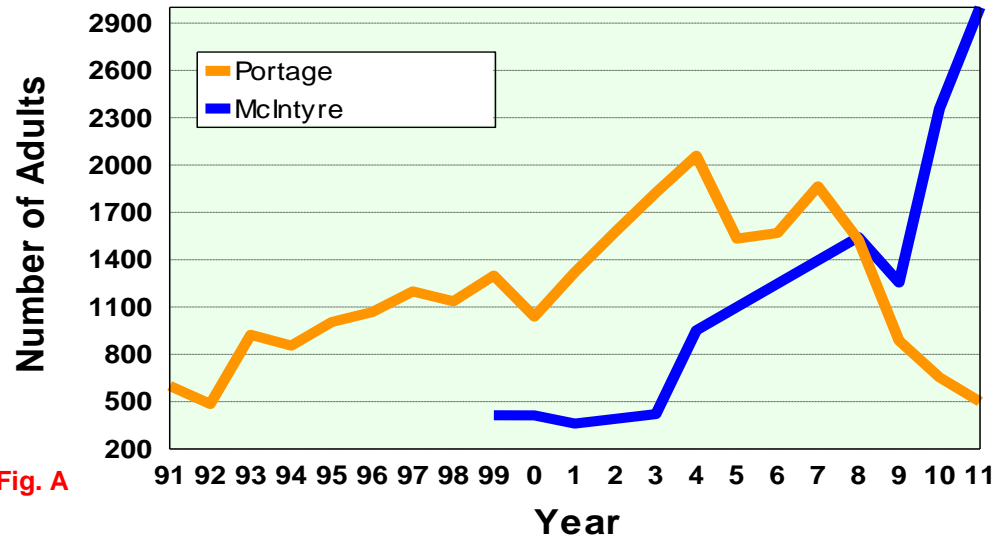


Fig. A

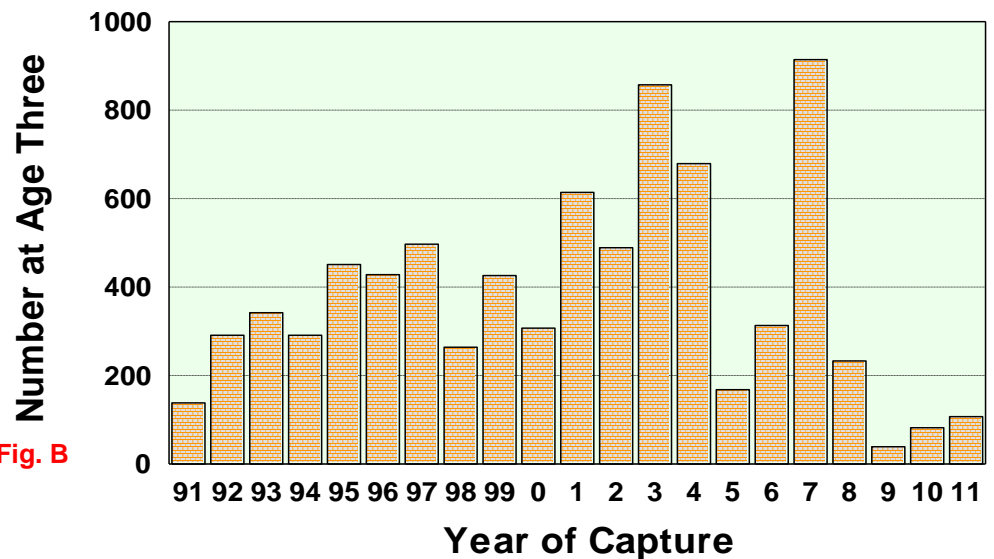


Fig. B

What is happening in Black Bay ??

- A Figure A illustrates age structure as a percent of the total catch. Age distribution in Portage Creek is similar to the McIntyre River with the exception of age four steelhead.
- B Figure B is the age distribution expressed in estimated number of steelhead calculated from the population size. The Portage Creek numbers, by age, are considerably lower due to a smaller population size.

Adult Steelhead Populations

Age Structure and Year Class 2011

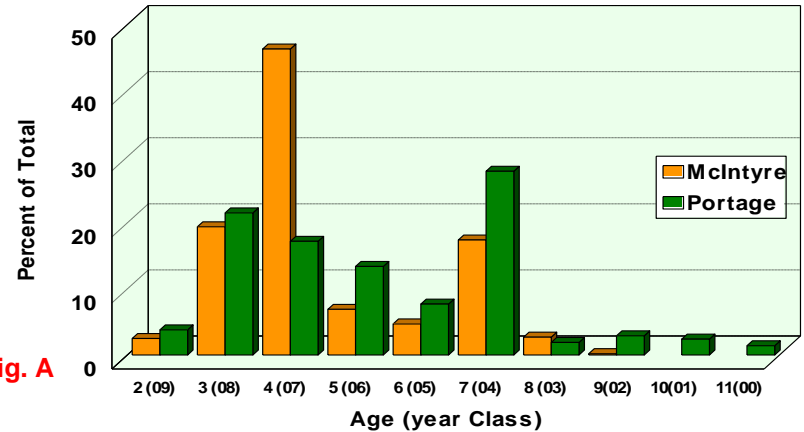


Fig. A

Adult Steelhead Populations

Age Structure and Year Class 2011

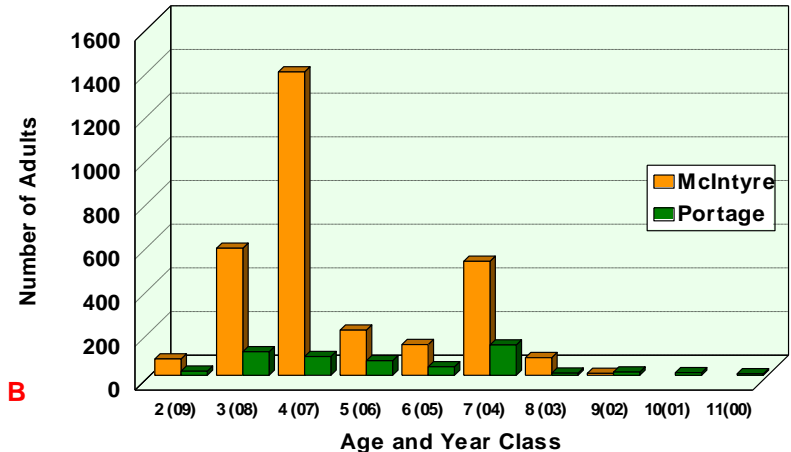


Fig. B

Summary

- The status of the steelhead population in Thunder Bay is a good news story. Based on the present population size in the McIntyre River, the age structure and angler catches, steelhead populations are better than they have been in a long time. This can be attributed to the reduced harvest limits (1996 and 1999) and the strong year classes of 2004, 2007 and 2008. In order to maintain populations at a high level, we need to continue to minimize harvest so strong year classes can be maintained into the older year and buffer poor year classes with the larger more fecund (high egg production) repeat spawners.
- In the Rosspoint to Marathon section of Lake Superior, angler catches were excellent this spring. Combined with the age structure and high repeat spawning rates, the fish stocks appear to be healthy.
- Black Bay steelhead populations appear to have declined significantly since the mid 2000's. Portage Creek presently has an adult population size estimated at 600 fish, down from over 2000 adults in 2004. Anglers that fish the Wolf and Coldwater Rivers on a regular basis are observing downward trends, like Portage Creek. Environmental conditions are generally similar over large geographic expanses of Lake Superior. The very strong steelhead year classes of 2000 and 2004 were wide spread along the north shore of Western Lake Superior. With that in mind, the 2007 and 2008 year classes that were strong in Thunder Bay tributaries should have strength throughout our study area. However, both these year classes produced low numbers of juvenile steelhead in Black Bay (see Portage Creek 2011 age data). Changes in the Black Bay fish community (increases in walleye, perch and smelt abundance) may be responsible for a decreased survival of juvenile steelhead in the lake environment resulting in lower recruitment into the spawning population.

Acknowledgements

The authors of this report would like to thank the following persons and groups for all their hard work in making these projects successful.

McIntyre River Population Study

Randy Beamish, Wes Bender, Keith Ailey and Terry Kosolowski

Portage Creek Population Study

Mike Deschamps, Tom Kleinboeck, Davis Viehbeck, and NSSA membership

Co-op Angler steelhead data collection

Davis Viehbeck and Terry Kosolowski organized and facilitated the information workshop, kept track of participants and collected the sample data. Thanks to all the steelheaders that collected the data.

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Web Site: Frank Edgson

Editing and proofing data report: Laurie McMillan, OMNR

Appendix 1.

Steelhead life history information from scale samples (recorded on Excel Data base) Coldwater River 2011 data

Date	Flen	Sex	Spw	Lk/Sp	St.	Lk.	Age	Mat.
May-13	336	2	1	1	2	1	3	3
May-13	673	2	4	3	1	6	7	4
May-13	622	2	4	2	2	5	7	4
May-13	585	2	1	2	2	2	4	4
May-13	430	2	1	1	2	1	3	3
May-13	641	2	1	3	2	3	5	5
May-17	616	2	3	2	2	4	6	4
May-17	521	1	1	2	2	2	4	4

Legend: Flen. (fork length), Spw. (# of spawns), Lk/Sp (# lake years @ first spawn), St. (# stream years), Lk. (# lake years), Age (total age), Mat. (age at maturity)

Appendix 2.

McIntyre River Population Study 2008 to 2012 Sampling Procedure

2008 Adipose Clip, Sampling: Fork length, sex and scale sample

2009 Right Ventral clip, Sampling: Fork length, sex and scale sample

2010 Left Pectoral clip, Sampling: Fork length, sex and scale sample

2011 Front Dorsal clip, Sampling: Fork Length, sex and scale sample, tag

2012 Front Anal clip, Sampling: Fork Length, sex and scale sample, tag

Appendix 3.

Portage Creek Tagging and Clipping Summary 2000 to 2012

- 2000 352 sampled and tagged (pink Floy MNR 26000, Adipose clipped)
- 2001 376 sampled and tagged (red Floy MNR 28000, Front Dorsal clipped)
- 2002 605 sampled and tagged (dark blue Floy MNR 30000, Left Ventral clipped)
- 2003 758 sampled and tagged (yellow Floy MNR 33000, Front Anal clipped)
- 2004 832 sampled and tagged (green Floy MNR 35000, Right Pectoral clipped)
- 2005 654 sampled and tagged (orange Floy MNR 39000, Adipose clipped)
- 2006 627 sampled and tagged (purple Floy MNR 40000, Front Dorsal clipped)
- 2007 938 sampled and tagged (red Floy MNR 42000, Right Ventral clipped)
- 2008 707 sampled and tagged (Lt. blue Floy MNR 47000, Left Pectoral clipped)
- 2009 380 sampled and tagged (green Floy MNR 38 000, Anal clipped)
- 2010 289 sampled and tagged (white Floy MNR 44 000, Adipose clipped)
- 2011 211 sampled and tagged (copper Floy MNR 43000, Left Ventral Clipped)
- 2012 ?? sampled and tagged (orange Floy MNR 44000, Right Pectoral clipped)

Appendix 4.

Calculating Petersen (Mark/Recapture) Population Estimates

Using 2009/ 2010 McIntyre River Adult Steelhead Estimates

2009 Population Estimate

marked 2009 (RV) X # repeat spawners 2010 / recaps from 2009 (RV)
164 (RV) X (71% of 280) 199 / 26 (RV)

2009 POP. = 1255 + - 412 (95 % confidence)

2010 Population Estimate

marked 2010 (LP) X # repeat spawners 2011 / recaps from 2010 (LP)
290 (LP) X (53.7% of 408) 219 / 26 (LP)

2010 POP. = 2358 + - 810 (95% confidence)