North Shore Steelhead Assessment

A Partnership in Research

2015

Ontario

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NORTH SHORE Steelhead ASSOCIATION

Goals and Objectives

- Partnership with Ontario Ministry of Natural Resources and Forestry (OMNRF) Upper Great Lakes Management Unit (UGLMU) and the North Shore Steelhead Association (NSSA)

- Documenting the status of wild steelhead populations in tributaries of North West Lake Superior using adult population estimates and life history characteristics

- Applied science that can be used to develop steelhead management plans and regulate harvest

- Monitor present regulations and habitat manipulation…. before and after (adaptive management)

Co-op Angler 2015

Introduction

- Five steelhead assessment projects were conducted during the spring of 2015.
- They are:

  A) Neebing River Steelhead Population Assessment

  B) McIntyre River Steelhead Population Assessment

  C) McVicars Creek Steelhead Population Assessment

  D) Portage Creek Steelhead Population Assessment

  E) Cypress River Steelhead Population Assessment

  F) Co-op Angler Study

- All studies were conducted in partnership with the North Shore Steelhead Association (NSSA) and the Ontario Ministry of Natural Resources and Forestry (OMNRF).

Steelhead Assessment 2015

Projects and Methods

A) Neebing River Steelhead Population Assessment

Two anglers from the NSSA worked with local land owners angling adult steelhead. Captured fish were measured, sexed, fin clipped, and a scale sample taken

B) McIntyre River Steelhead Population Assessment

Four experienced anglers biologically sampled, fin clipped and tagged adult steelhead they captured while angling during the spring spawning migration (May and June).

C) McVicars Creek Steelhead Population Assessment

Three experienced anglers biologically sampled and fin clipped and tagged adult steelhead they captured while angling during the spring spawning migration (May and June).

D) Portage Creek Steelhead Population Assessment

Anglers from the NSSA angled, biologically sampled, fin clipped and tagged adult steelhead during the spring spawning migration (May and June)

C) Cypress River Steelhead Population Assessment

Three experienced anglers biologically sampled and fin clipped and tagged adult steelhead they captured while angling during the spring spawning migration (May and June)).

E) Co-op Angler

Anglers from the North Shore Steelhead Association received sampling kits (tape, glove, knife, envelopes and instructions) and biologically sampled their steelhead catches (fork length, sex, and scale samples from north shore tributaries during the spring. Scientific permits were issued by MNR.

The population estimates were based on a 'Petersen Population Estimate'; 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.

Live Sampling Methods

Sample Kit

Measuring Length
(fork length in mm.)

Gender (male or female ?)

Scale Sample

Co-op Angler, Sample Size / Stream 2015

		Basin	Tributary	Sample Size
A		Thunder Bay	Whitefish River	73
			Neebing River	139
			McIntyre River	94
			McVicars Creek	219
			Blind Creek	32
			MacKenzie River	79
B		Black Bay	Portage Creek	55
			Spring Creek	27
		Nipigon Bay	Jackpine River	38
			Cypress River	159
C			Prairie River	31
			Steel River	15
			Miscellaneous Nipigon Bay tribs.	26
			others	23

Petersen Population Estimate

Number of Fish Clipped in Year #1 X Repeat Spawners in Year # 2 / by Clips from Year # 1 Captured in Year # 2

Example :

250 marked in Year #1
150 Repeat Spawners Year # 2
30 Marked fish from Year # 1 Captured in Year #2

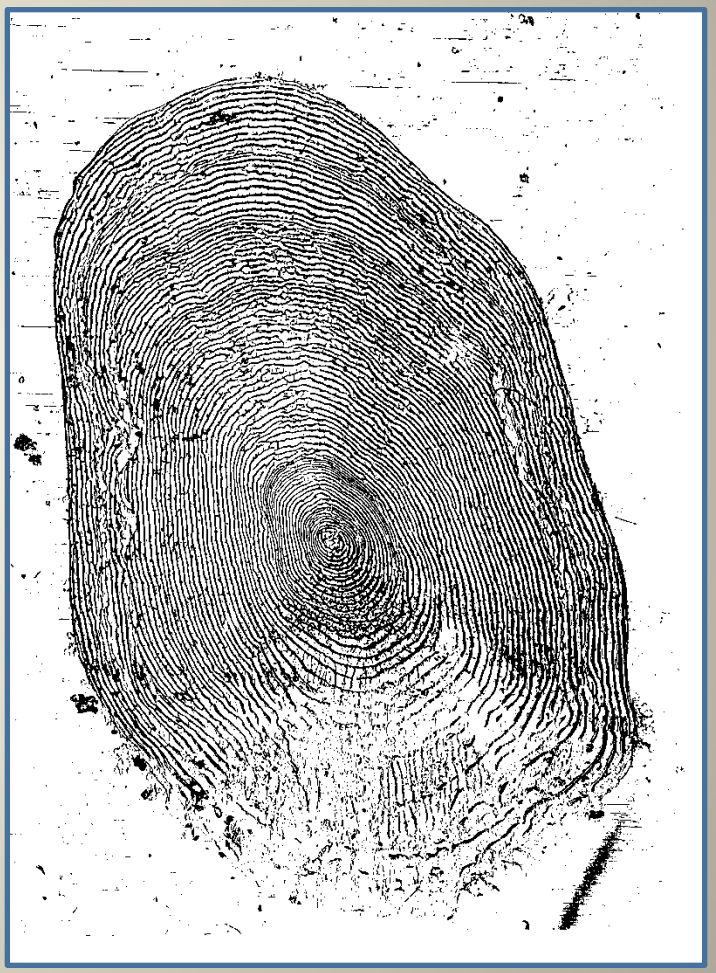
$$\frac{250 \times 150}{30} = 1259 \pm 95\ \%\ \text{Confidence (year \#1)}$$

Estimated Number of Adults

Neebing River……..1120 (north branch 2014)
McIntyre River……..2000 (2012)
McVicars Creek……1518 (2014)
Portage Creek…….282 (2014)
Cypress River……..2396 (2014)

Data Obtained from Scale Samples

- Number of stream years
- Number of lake years
- Total age
- Age at maturity
- Lake Years at Maturity
- Number of spawning events
- Size at age



Steelhead Scale:
Age 5 years

(2 stream, 3 lake, 3rd spawn)

Life History

Third Lake Year, Third Spawn

Second Lake Year, Second Spawn

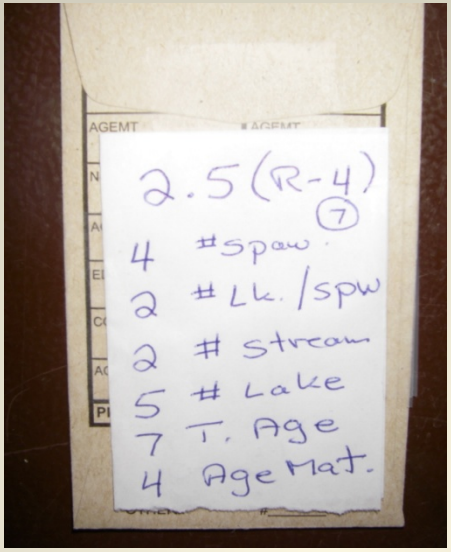
First Lake Year, First Spawn

Second Stream Year

First Stream Year

Data Management

A



B

A: Fish data recorded on envelope, scale sample placed inside

B: Life history coded on back of envelope

C: Life history data transferred to Excel spread sheet

Portage Creek Spring 2012

														Clips on Capture			
Year	Date(d/m/y)	Colour	Tag	Flen	Lamp.	Sex	Spw.	L/spw.	Str.	Lk.	Age	Mat.	CLA	CLC3(FD)	CLC1(AD)	CLC7(RP)	CLC2(AN)	CLC5(LV)
2012	15/04/2012	Yellow	49000	432		1	1	2	1	2	3	3	RP					
2012	15/04/2012	Yellow	49001	581		2	2	2	2	3	5	4	RP					
2012	15/04/2012	Yellow	49002	384		1	1	2	1	2	3	3	RP					
2012	15/04/2012	Yellow	49003	479	S	1	2	1	1	2	3	2	RP					
2012	15/04/2012	Yellow	48004	614		1	2	3	1	4	5	4	RP					
2012	15/04/2012	Yellow	49005	366		1	1	1	1	1	2	2	RP					
2012	15/04/2012	Yellow	49006	551		1	2	2	1	3	4	3	RP				An	
2012	15/04/2012	Yellow	49008	594	W	2	6	2	1	7	8	3	RP					
2012	15/04/2012	White	44050	522		1	3	1	1	3	4	2	RP		Ad			LV
2012	21/04/2012	Yellow	49009	492		2	1	2	1	2	3	3	RP					
2012	21/04/2012	Yellow	49010	521		2	1	2	1	2	3	3	RP					
2012	21/04/2012	Green	38115	631		2	4	2	2	5	7	4	RP		Ad		An	

C

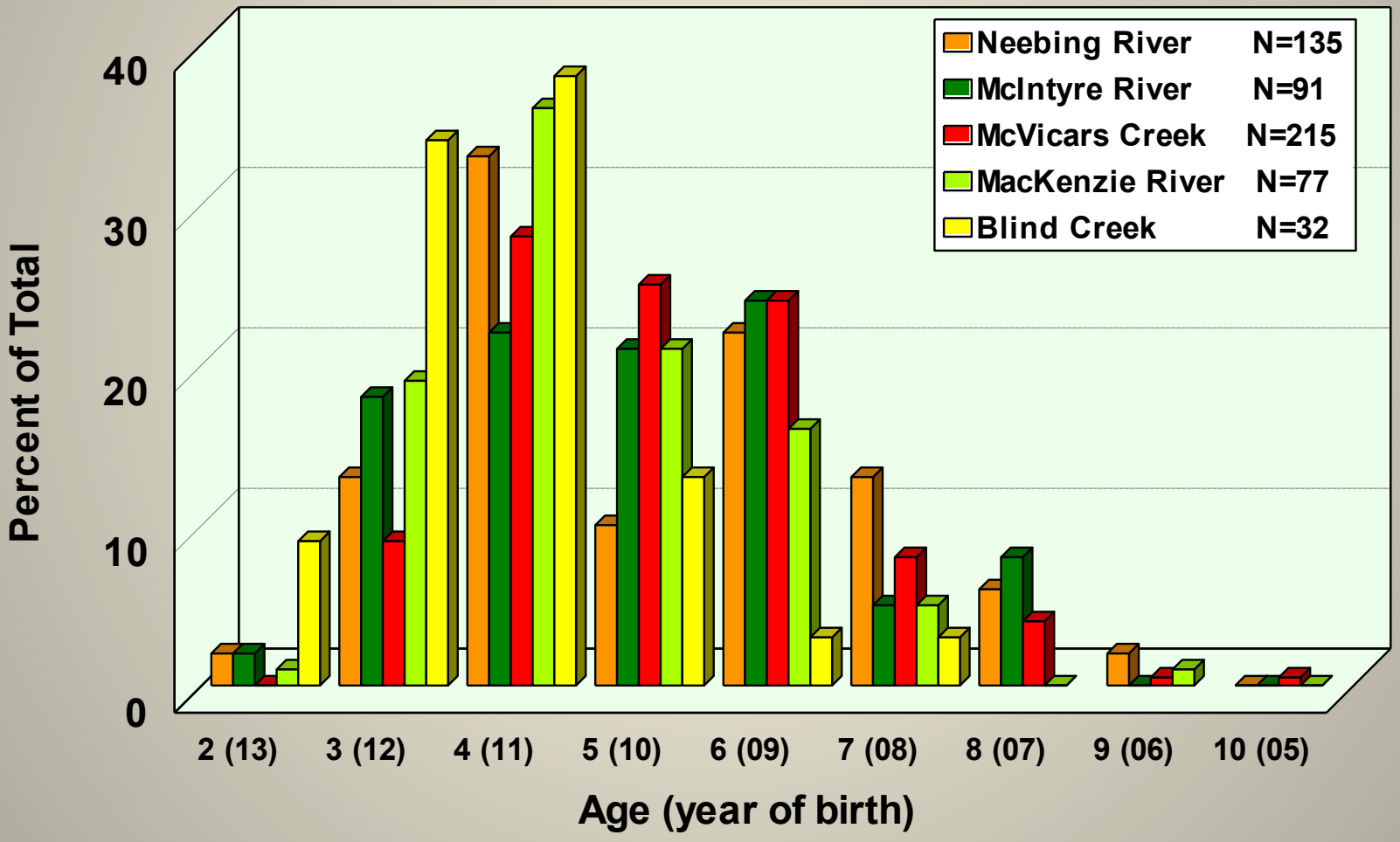
Adult Steelhead Life History from Scale Sample (Recorded on Excel Database)

Flen	Sex	Spw	Lk/Sp	St.	Lk.	Age	Mat.
450	2	1	2	1	2	3	3
380	1	1	1	2	1	3	3
470	1	2	1	2	2	4	3
510	1	2	1	2	2	4	3
580	2	1	2	2	2	4	4
600	2	2	3	2	4	6	5
540	1	2	1	2	2	4	3
340	1	1					
680	2	5	2	2	6	8	4
470	2	1	2	2	2	4	4
510	1	2	1	2	2	4	3
610	2	6	2	1	7	8	3
690	9	4	3	2	6	8	5
640	2	3	2	2	4	6	4
490	1	2	2	1	3	4	3
580	2	1	3	1	3	4	4

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

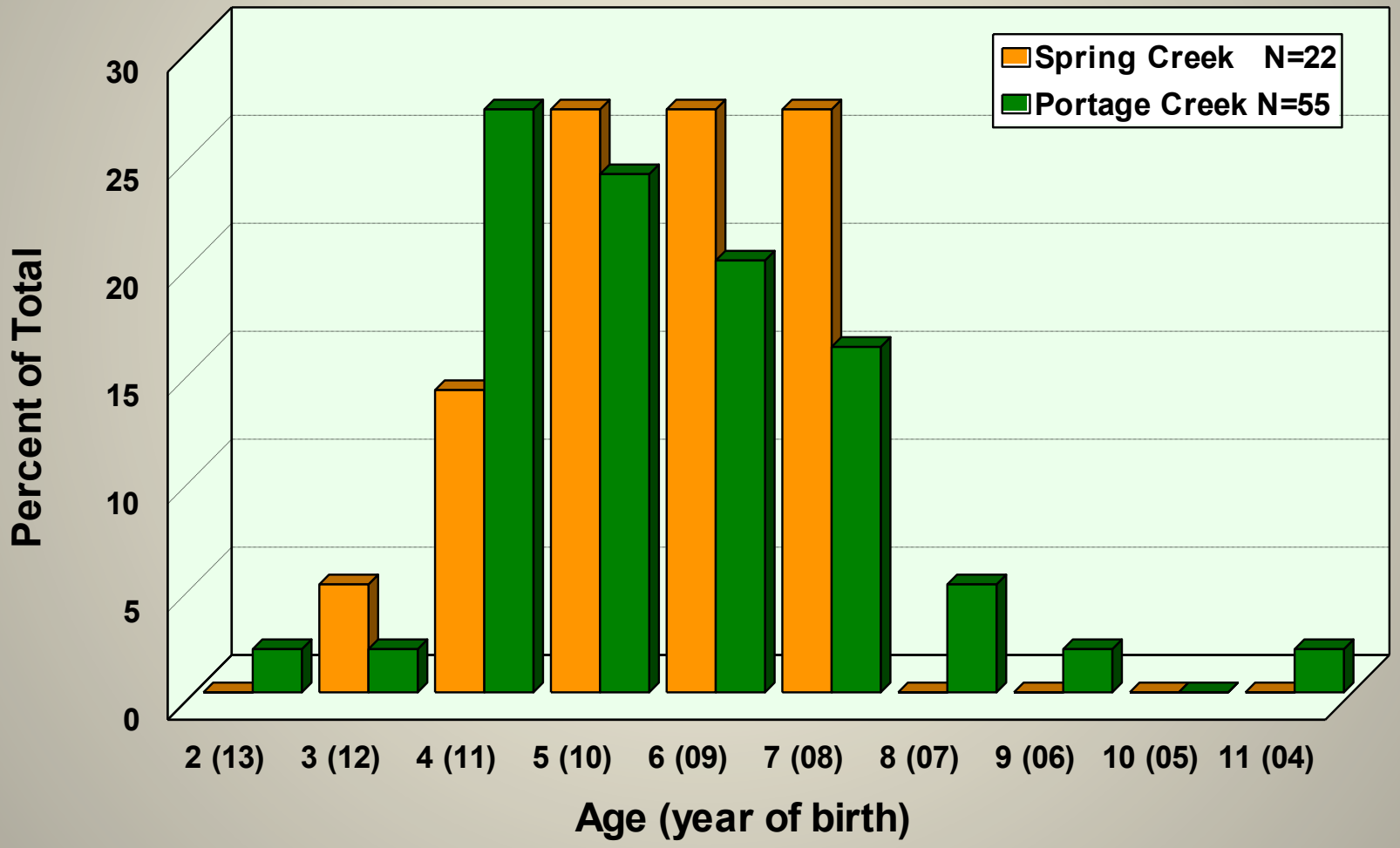
Steelhead, Thunder Bay Tributaries

Age Structure 2015



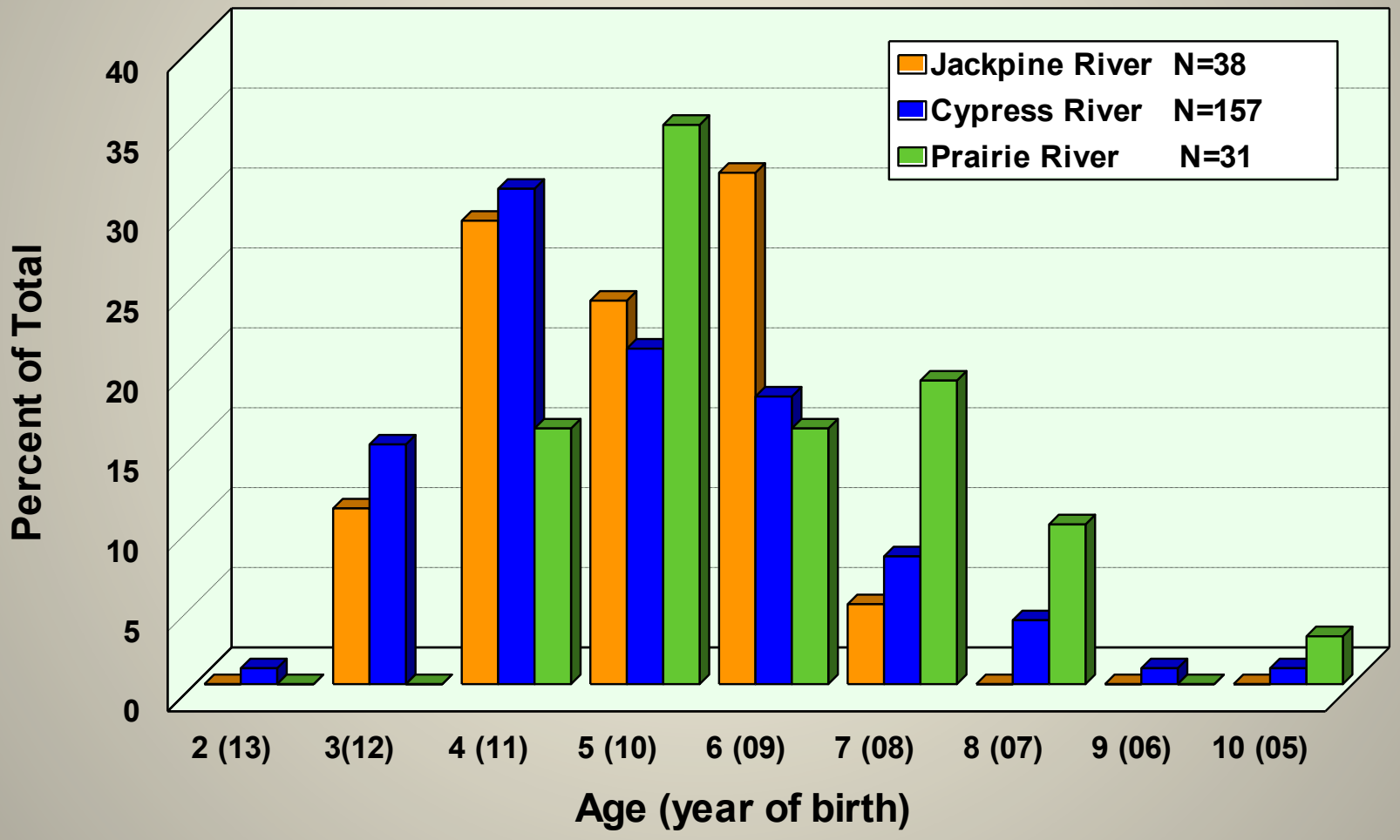
Steelhead, Black Bay Tributaries

Age Structure 2015



Steelhead, Nipigon Bay Tributaries

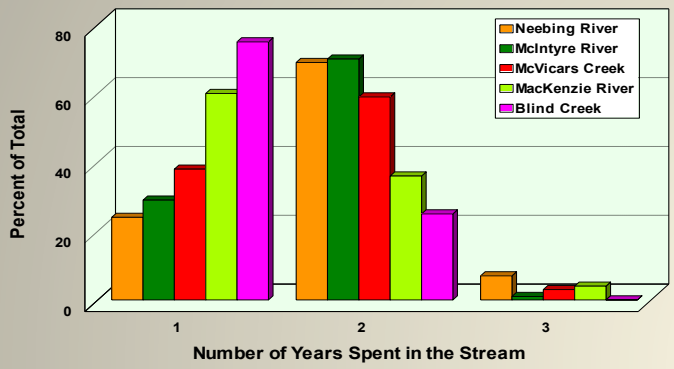
Age Structure 2015



Smolting History 2015

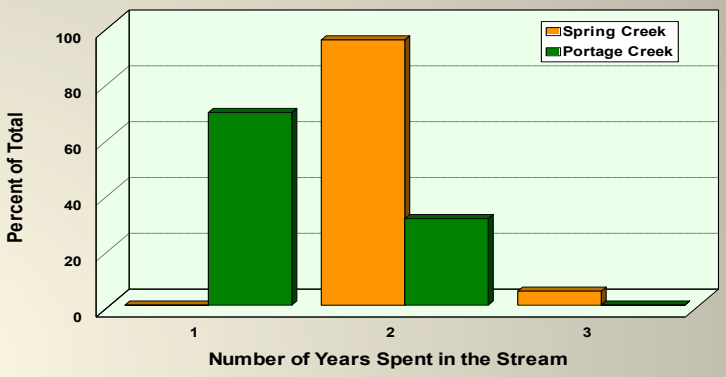
Steelhead,Thunder Bay Tributaries

Number of Years Spent in the Stream



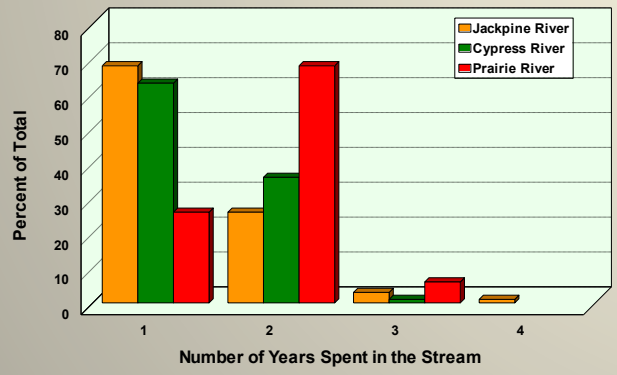
Steelhead, Black Bay Tributaries

Number of Years Spent in the Stream



Steelhead, Nipigon Bay Tributaries

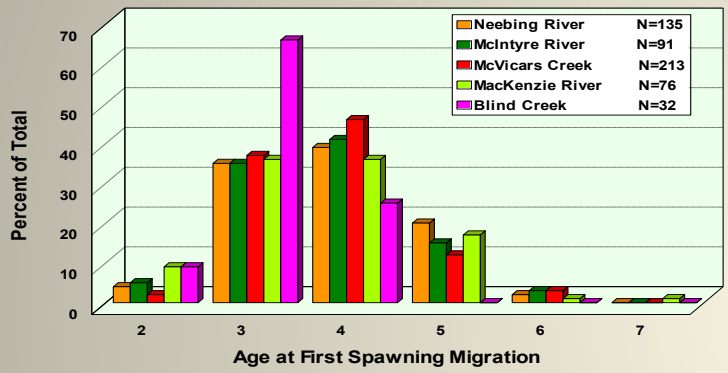
Number of Years Spent in the Stream



Steelhead Maturity

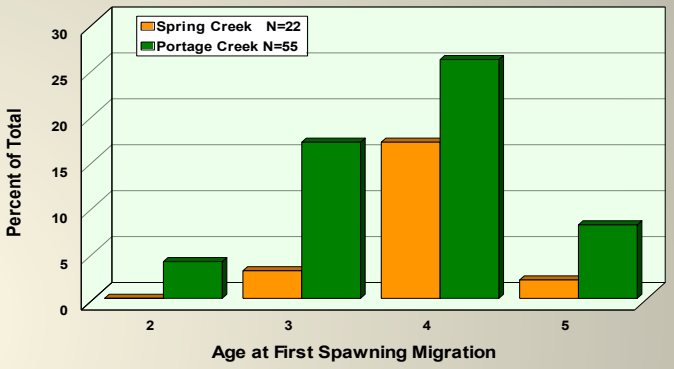
Steelhead, Thunder Bay Tributaries

Age at Maturity 2015



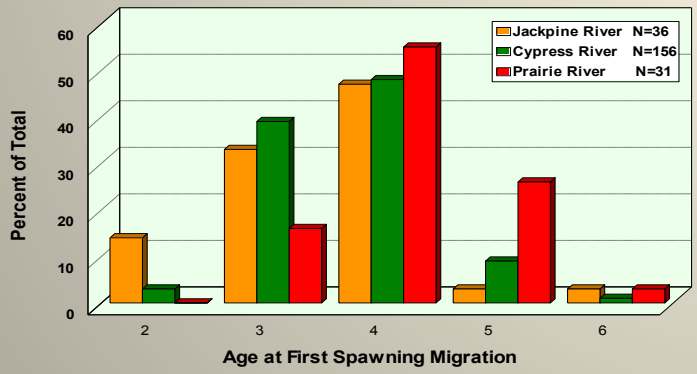
Steelhead, Black Bay Tributaries

Age at Maturity 2015



Steelhead, Nipigon Bay Tributaries

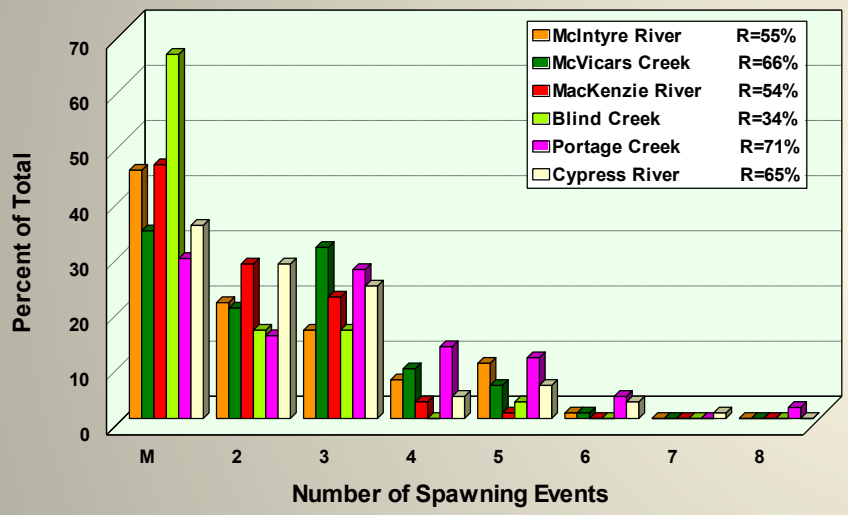
Age at Maturity 2015



Repeat Spawners

Lake Superior, Steelhead

Repeat Spawning 2015



A healthy adult Steelhead population:

55% repeat spawners = 45% total annual mortality (30% natural mortality, 15% fishing mortality or harvest)

Weight and Age of your Steelhead

Figure A

Length to Weight

- A 60 cm. (24”) steelhead weighs 2.5 kg. or 5.5 Lbs.
- A 75 cm. (30”) steelhead weighs 3.8 kg or 8.5 Lbs.

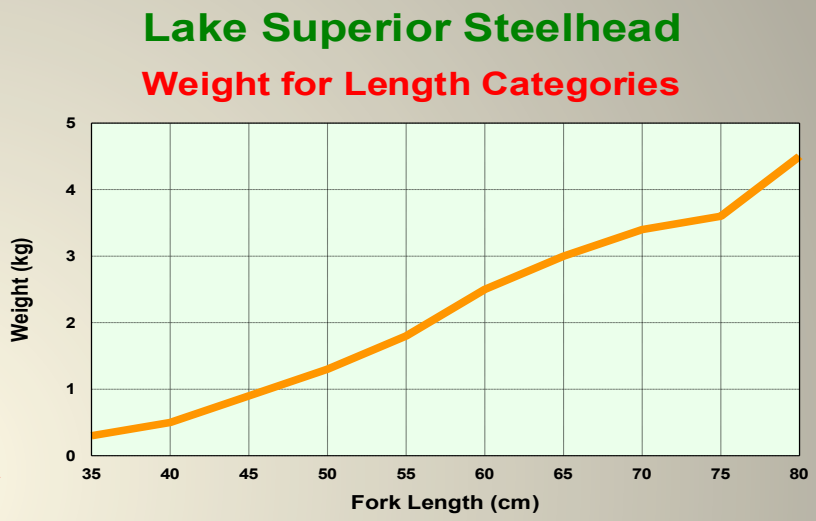


Fig. A

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

Figure B

Fork Length to Age

- A 50 cm. (20”) steelhead is 3 years old
- A 70 cm. (28”) steelhead is 7 years old

Note: Length at age will vary depending on stream life and maturity

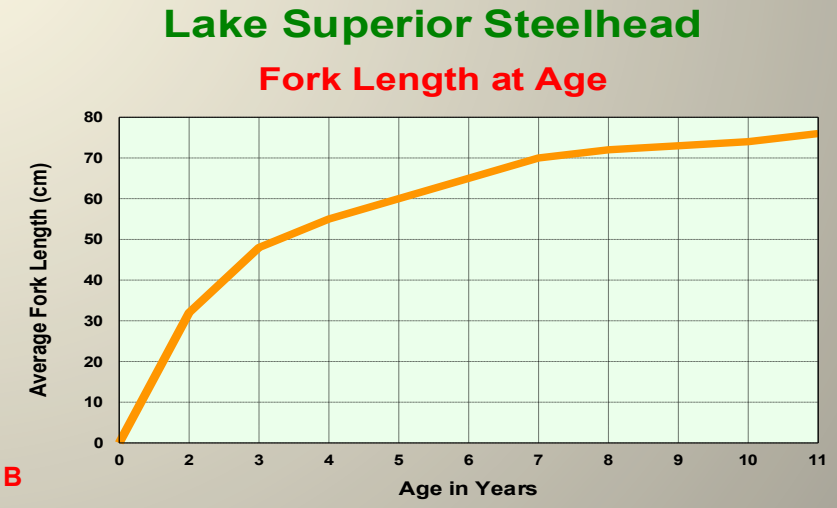


Fig. B

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

What is happening in Black Bay ??

Figure A
Illustrates the population size in Portage Creek and the McIntyre River.

Figure B
Age classes as a percentage

Figure C
Age Classes as the estimated number of individuals

Note:
Adult steelhead in years 2012 (age 3) to 2009 (age 6) (Fig. C) show a significant difference in the numbers of adults….strong recruitment in Thunder Bay tributaries is poorly represented in Portage Creek and other Black Bay tributaries.

Lake Superior, Steelhead

Adult Population Size 1991 to 2014

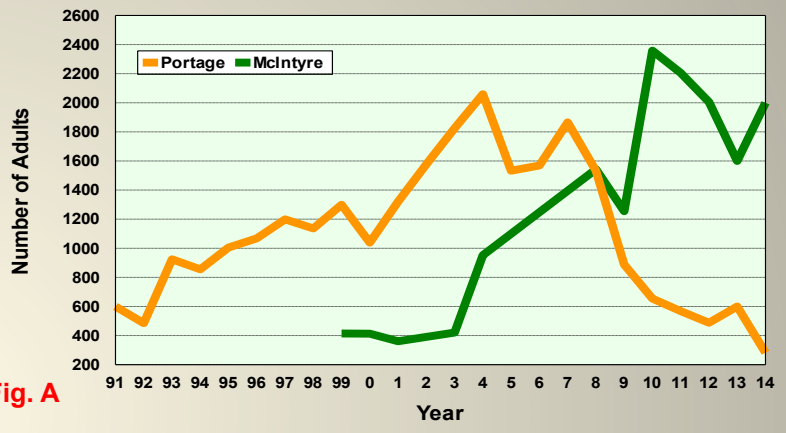


Fig. A

Lake Superior, Steelhead

Age Structure and Year Class 2015

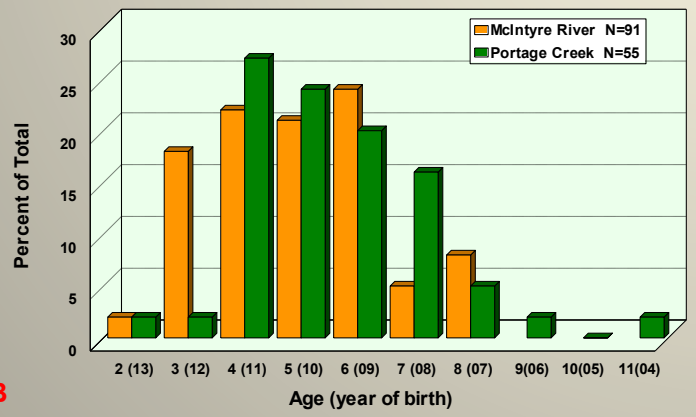


Fig. B

Lake Superior, Steelhead

Age Structure and Year Class 2015

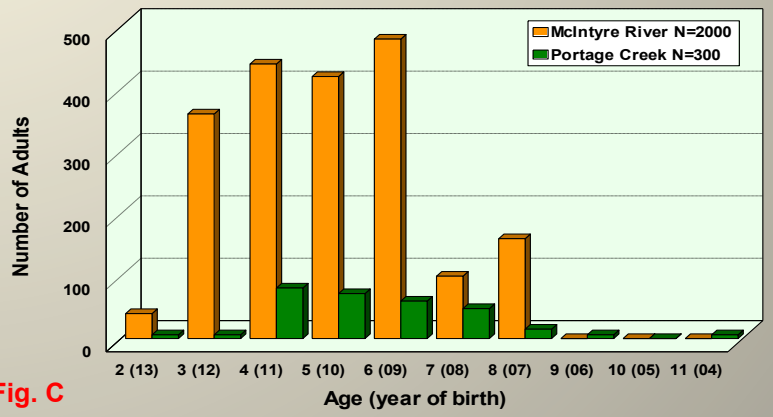
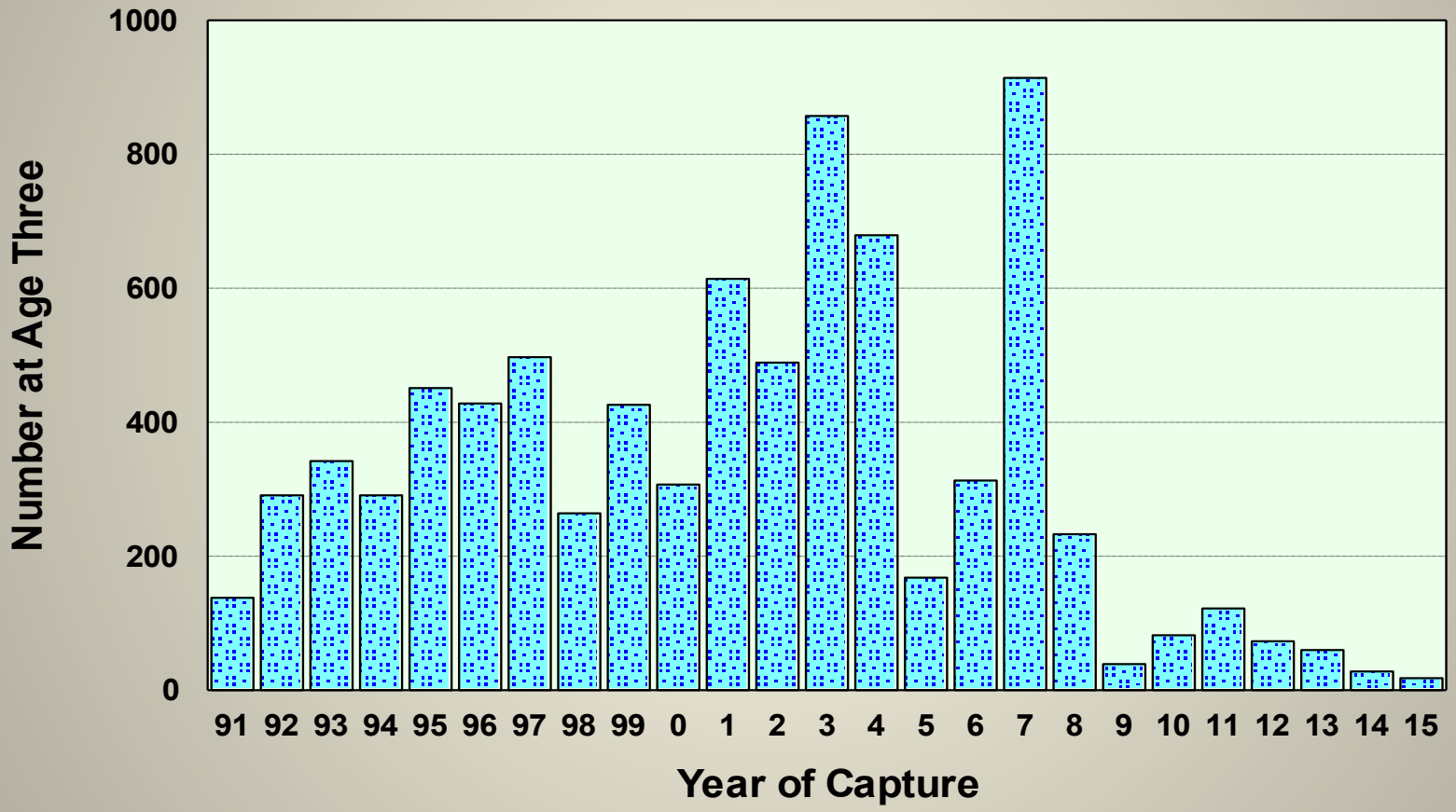


Fig. C

Portage Creek, Steelhead

Number of Age Three Adults 1991 to 2015



Portage Creek (Black Bay tributaries) maintains a high repeat spawning rate but poor juvenile recruitment (2009 to 2015) into the spawning population as illustrated above.

Lake Superior Steelhead: Summary

Thunder Bay

- Thunder Bay is a good news story.
- Adult steelhead population estimates were 1800 to 2000 (years 2010 to 2014) in the McIntyre River and 1300 (year 2014) in McVicars Creek
- 2009 to 2012 year classes all show good to excellent recruitment of juveniles
- Population size, age structure and repeat spawning levels are all indicators of healthy adult steelhead populations

Black Bay

- Black Bay is not good news
- Portage Creek reflects what is occurring throughout Black Bay…..it's adult steelhead population size has declined to 300 (2014) from 2000 (2007)
- Poor survival of juveniles to first time spawning and low angler success in all tributaries has occurred over the past five years
- Changes in the Black Bay fish community (walleye and perch abundance) is the probable reason for the steelhead decline

Nipigon Bay

- Nipigon Bay streams show a positive trend similar to Thunder Bay
- 2009 and 2011 year classes in the Jackpine R. and Cypress R. appear strong
- An adult population in the Cypress River was estimated to be 1800 to 2300 (2013 and 2014)
- Age structure and the percent of repeat spawning indicate strong juvenile recruitment and low harvest levels

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McIntyre River Population Study:

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McVicars Creek Study:

Kyle Stratton, Norm and George Stieh

Portage Creek Population Study:

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Cypress River Population Study:

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Web Site:

Frank Edgson

Future Activities

- Maintain co-op angler program including population estimates
- Continue Portage Creek Study
- Annual reports
- Graduate work
- Peer reviewed publications
- Questions: jgeorge@tbaytel.net

Protection of Wild Steelhead Populations is in your Hands