

A SUMMARY OF COMMERCIAL WHITEFISH DATA

NORTH ARM - RAINY LAKE

License FF913

**Ontario Ministry of Natural Resources
Fort Frances District
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Alyson Bisson
Resource Technician
Fort Frances Area

Table 1: Population characteristics of whitefish from the commercial catch of FF913, North Arm of Rainy Lake. 1985 to 2009.

year	sample size (n)	mesh size (mm)	mean age* (yrs)	modal age (yrs)	age range (yrs)	mean TL (mm)	TL range (mm)	mean RWT (g)	RWT range (g)	total annual mortality (%) (ages)	sex ratio M:F (%)
1985	107	127,133	7.89	7	5-13	492	433-610	1340	840-2180	47	66:33
1986	73	127,133	6.93	7	3-15	-	-	1440	740-2580	51	55:45
1991	105	108	6.51	6	6-10	477	410-600	1342	680-2400	66	45:55
1996	220	127,133	6.69	6	4-13	476	470-612	1312	870-3330	49	55:45
1998	228	127,133	7.76	8	5-14	501	428-599	1494	690-2640	58	45:55
2009	200	140	10.60	8	5-24	550	454-702	2063	1100-4400	38 (8-14)	57:43

* age determination from pectoral fin ray

T.L. = Total Length

RWT = Round Weight

Table 2: Population characteristics of whitefish from the commercial catch, North Arm of Rainy Lake, 1960 to 1973.

year	sample size (n)	mesh size (mm)	mean age* (yrs)	modal age (yrs)	age range (yrs)	mean TL (mm)	TL range (mm)	mean RWT (g)	RWT range (g)	total annual mortality (%)	sex ratio M:F (%)
1960	94	?	7.34	6	5-10	508	388-686	-	-	42	-
1965	168	?	5.95	6	3-14	460	356-686	-	-	39	-
1966	55	?	6.37	7	4-8	462	406-518	-	-	-	-
1968	261	?	6.44	6-7	4-9	462	343-660	-	-	54	-
1969	300	?	7.68	8	2-12	472	335-597	-	-	44	-
1970	206	?	7.41	8	3-14	475	381-650	-	-	55	-
1971	69	?	6.63	7	4-11	480	414-645	1041	610-2810	63	-
1973	33	?	5.15	5	3-8	458	381-516	-	-	68	-

* age determination from scales

T.L. = Total Length

RWT = Round Weight

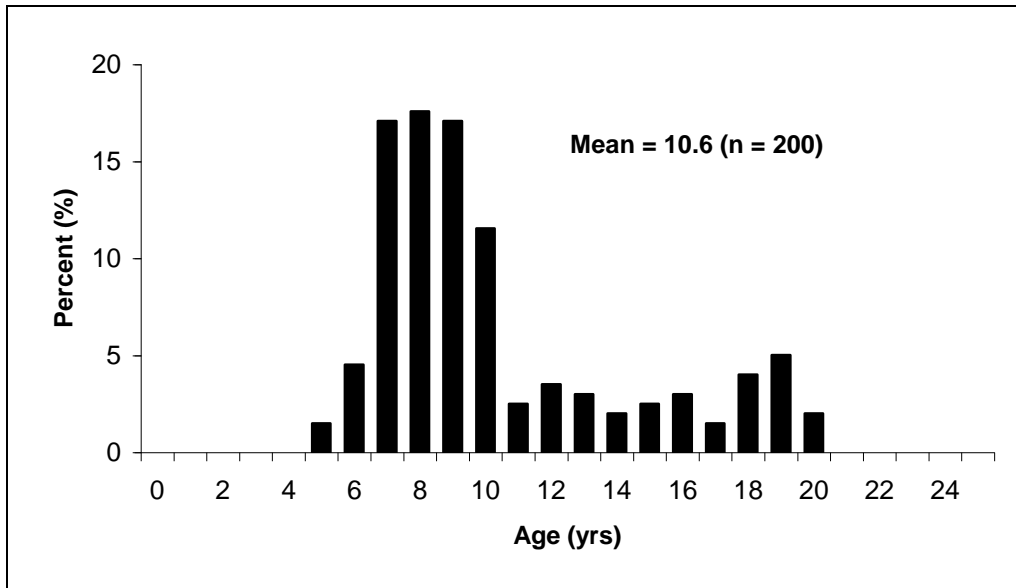


Figure 1: Age composition of lake whitefish from the commercial catch of FF913, North Arm of Rainy Lake, 2009.

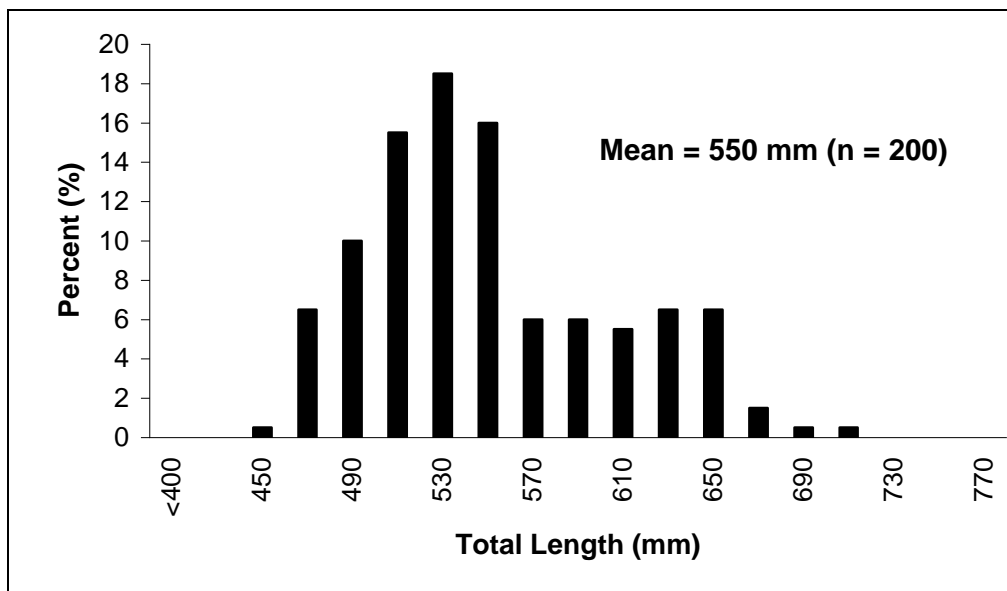


Figure 2: Length composition of lake whitefish from the commercial catch of FF913, North Arm of Rainy Lake, 2009.

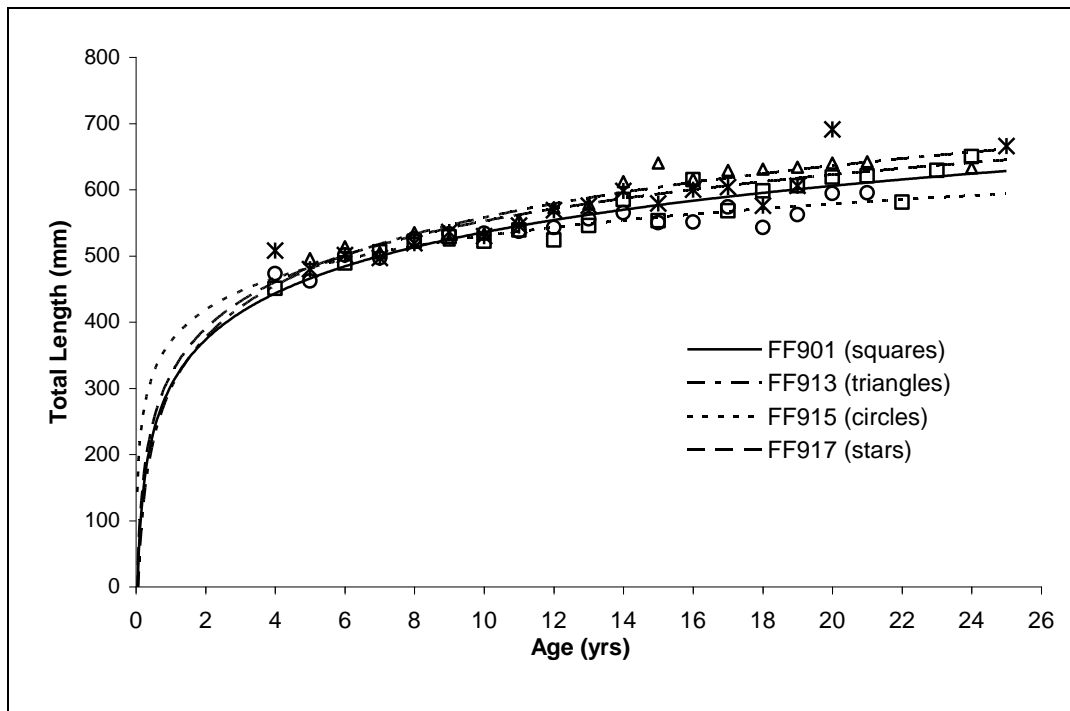


Figure 3: Lake whitefish growth (total length at age) for combined sexes in the South Arm, North Arm and Redgut Bay of Rainy lake based on Commercial catch sampling, 2009.

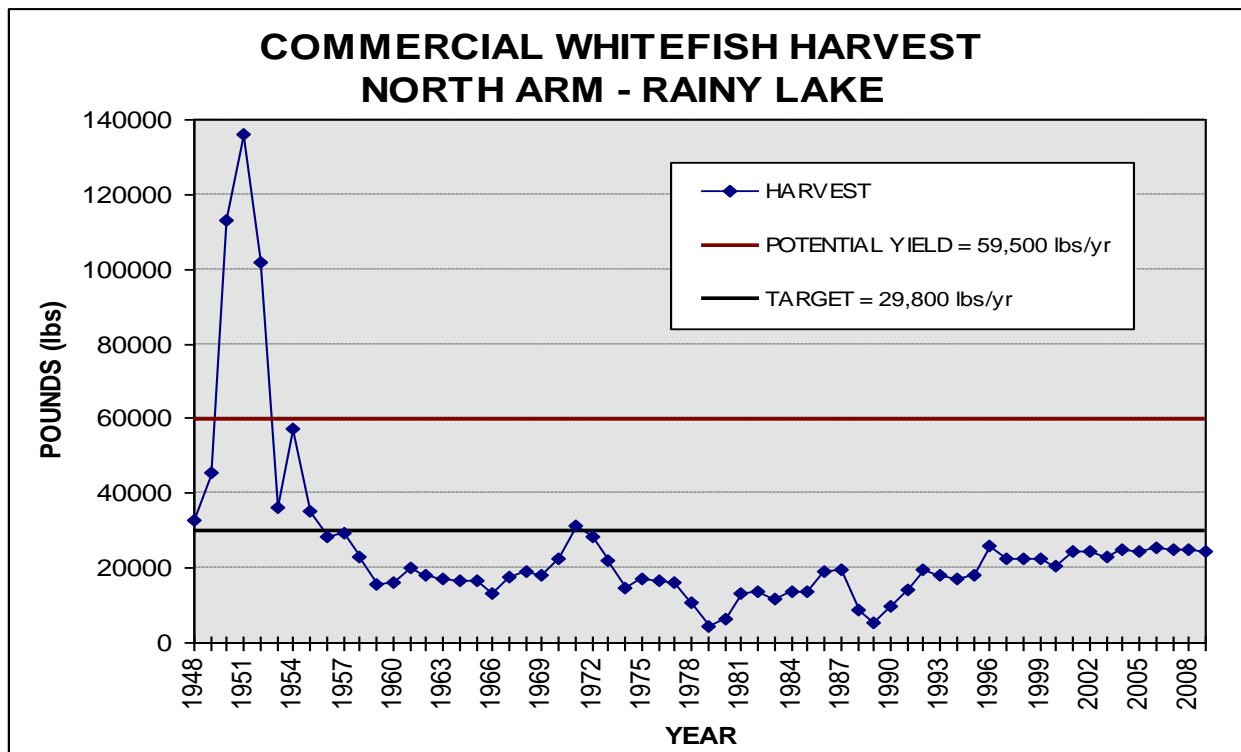


Figure 4: Commercial whitefish harvest, North Arm Rainy Lake, 1948-2009.

FF913 SAMPLING DETAILS:

- dates:

- October 8, 11, 1985
- June 4, 12, 1986
- May 30, 31, 1991
- July 10,11, 1996
- June 8, 10, 1998
- July 13, 22, 30, 2009

- in 2009 all fish were sampled from 140 mm (5.5") stretched mesh. In 1996, 77 of 220 (35%) were from 127 mm (5") mesh. In 1998, whitefish were not available by mesh size, with all 228 (100%) sampled from 127/133 mm (5/5.25") meshes combined.

- all fish sampled were sexually mature (both sexes)

- mean total length of fish captured in 140 mm (5.5") mesh was 550 mm (22 in) in 2009.

- mean round weight of fish captured 140 mm (5.5") mesh was 2063 g (4.5 lbs) in 2009.

- mortality estimates based on Chapman-Robson method from first fully recruited age to age 14. Total annual mortality in 2009 was 38%.

OBSERVATIONS:

- Age composition of the catch in 2009 shows more ages classes present than in previous years, with ages ranging from 5 to 24 years. Older fish (>13 years) are poorly represented or non-existent in the catch from 1985 to 1998, however age 13-24 fish are represented in the 2009 catch.
- Three age classes (7,8 and 9 yrs) contributed at least 15% to the catch sample. These three ages represented 52% of the total catch. Manitoba DNR (In: MacCallum, 1980) recommends that three year-classes should contribute at least 15% of the age composition, and that two of these year classes should be 75% mature, in order to provide long-term sustainable catches.
- A mean age of 11.53 years in 2009 (Table 1) is slightly higher than that observed on the South Arm (9.53 years in 2009 which included fish captured in 140 mm (5.5") mesh).
- Mean age of the catch increased from 7.76 years in 1998 to 10.60 in 2009, based largely on the stronger representation of older fish (>13 yrs old). These fish comprised (22%) of the catch in 2009. This same representation of year classes also appear in the catch sample from FF901 on the North Arm.
- Recruitment to the population is evident in all years, with the age 7-10 year olds being the strongest year classes by a large margin.

- Mean and modal age of the catch did not change significantly between 1985 and 1998 (Table 1). The mean age increased in the 2009 catch to 10.60, which is similar to the mean age of 9.53 years observed in the South Arm in 2009. The mean age was slightly below than the mean of 11.53 years observed in FF901 (Ash Bay and Manitou Sound area of the North Arm) in 2009.
- Mean age of the catch (10.60 years) is above the mean age of maturity expected for whitefish ie. 4 to 6 years (5.5-6.5 years on Lake Nipigon). The average age of the catch should be a minimum of 2 years above the average age of maturity to ensure a sustained harvest to the fishery (Christie and Regier, 1973; Manitoba DNR in MacCallum, 1980).
- Fewer than 7 age classes available to a commercial fishery would be cause for concern. (OMNR, 1999) In 2009, there were 18 age classes represented in the southern portion of the North Arm fishery.
- A shift in the length composition to larger fish and an increase in mean total length from 501 mm in 1998 to 550 mm in 2009 has occurred. This improvement corresponds to the shift in age composition and the effect of the strong 2000, 2001 and 2002 year classes (7,8 and 9 year olds) in the 2009 catch.
- Growth may be slightly faster than that measured from FF901 elsewhere on the North Arm, however growth rates in 2009 are similar in all 3 basins of Rainy Lake(South Arm, North Arm and Red Gut).
- Total mortality rate decreased significantly to 38% in 2009 from 58% in 1998, and has averaged 51% since 1985. This is just below the maximum level of 60%, which is recommended to provide a sustainable fishery (OMNR, 1983 - SPOF#15). Mortality is higher than South Arm which has averaged 36% since 1987, and elsewhere on the North Arm, which has averaged 41% since 1997.
- In the past, observed differences in growth, age composition and mortality suggested a possible presence of distinct whitefish stocks in the north (FF901) and south (FF913) portions of the North Arm basin. Based on the sampling in 2009, growth, age composition and mortality rates are becoming less distinct between the North Arm fisheries, which may suggest one stock for the entire basin, or it may simply be an indication that the population(s) are becoming more healthy. Further genetic testing or tagging studies would provide further evidence of stock discreteness or intermixing.
- Rainbow smelt were first confirmed in the North Arm of Rainy Lake in 1991 and reached high levels of abundance in the late 1990's. This invasive species is expected to have long-term negative impacts on whitefish recruitment and population levels. Since 1998, the number of age classes in the catch have increased significantly and mortality has decreased, providing little evidence to suggest that rainbow smelt have had a potential impact on the health of the whitefish population(s) in the North Arm.

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