Management Priority: 8

NA-01570-01

LAKE MANAGEMENT PLAN

Ecological Lake Class: 22

Region	Area	D.O.W. Number	County	D.O.W. Lake Name	Acreage
NE	Grand Rapids F216	31-0392	Itasca	Wabana	Surface – 2,215 Littoral - 785

Long Range Goal:

- Maintain the Walleye gill-net catch at 5.0/net, above the lake mean of 4.6/net.
- Maintain the Northern Pike gill-net catch at the lake mean of 3.5/net with fish >34 inches present.
- Maintain angling opportunities for Largemouth & Smallmouth Bass through natural reproduction.

Operational Plan:

- **Base stocking** - Stock Mississippi strain Walleye fingerlings at 1 pound/littoral acre (785 lbs.) annually.
- **Survey:** Conduct a standard survey in July 2025 to correspond to the IBI survey schedule. Set 15 gill nets and 15 trap nets in the locations used in 2015. Collect ageing structures from Walleye and Northern Pike. Conduct spring night electrofishing (collecting scales) for Largemouth and Smallmouth Bass and revise the management plan as needed.
- Encourage anglers to harvest Largemouth Bass <14 inches and release Northern Pike >22 inches.

Midrange Objective:
Monitor changes in the fish community, including abundance and size structure of game fish populations.

Potential Plan: Consider conducting a targeted survey for Black Crappie to investigate the population if time permits. The survey would include the use of trap nets in the spring.

TOTAL $ 1,000.00

NARRATIVE: (Historical perspectives - various surveys; past management; social considerations; present limiting factors; survey needs; land acquisition; habitat development and protection; commercial fishery; stocking plans; other management tools; and evaluation plans)

VARIOUS SURVEYS:
Initial Survey - June 1947
Re-Surveys - July 1975, July 1985,
Population Assessment - August 1980, July 1990, 1995, 2000, 2005, 2009
Standard Survey – July 2015
Natural Reproduction Checks (Seining) - 1957, 1963
IBI survey - 2015
Lake Investigation - Trap netting - July 1956
Whitefish/Tullibee Sport netting checks – 1955, 1971, 1975
Lake Mapped - May 1980
Lake Management Plan - 1986, 2002, 2006, 2010, 2016
Sunfish Removal Project - 1954
MPCA Lake Assessment Program (LAP) report – 1992

Check the appropriate boxes below:

- ☐ **Superior National Forest**
- ☒ **Chippewa National Forest**
- ☐ **Leech Lake Indian Reservation**
- ☐ **1854 Ceded Territory**

Primary Species Management:	Secondary Species Management:	
Walleye	Northern Pike/Largemouth & Smallmouth Bass	
Area Supervisor Signature:	**Date:**	
Regional Manager Signature:	**Date:**	

LAKE MANAGEMENT PLAN

Wabana Lake is a 2,215 acre lake located 11 miles north of Grand Rapids, MN in the Mississippi River watershed. Wabana Lake is in ecological lake class 22. Lakes in this classification are typically large (mean surface area = 3,545 acres), deep (mean depth = 102 ft), clear (mean Secchi disk = 9.9 ft), and have a mean littoral area of 38% with relatively hard water (mean total alkalinity = 147 ppm). Other area lakes in class 22 include Deer, Pokegama, and Turtle Lakes. Wabana Lake has littoral area of 785 acres and a maximum depth of 115 ft. The Secchi disk transparency in the 2015 survey was 18.0 ft. Mean total alkalinity for the summer of 2000 was 117 ppm and the Trophic Status Index was calculated to be 40, characterizing the lake as mesotrophic (MPCA Lake Assessment Program Report). The lake has several large bays and connecting channels to Bluewater and Little Trout Lakes.

Various Surveys and Past Management

Several surveys of the fish community were completed from 1956 to 2015 (Table 1). Data from the initial survey (1947) do not appear in the table because the nets used were not comparable.

Table 1. Historical gill-net and trap-net catch rates for selected species in Wabana Lake.

Date	GN/TN	Bluegill TN	Smallmouth Bass GN	Yellow Perch GN	Tullibee GN	Walleye GN	Northern Pike GN
7/09/1956	0/16	42.9	-	-	-	-	-
7/28/1975	12/16	6.6	0.5	1.0	6.3	0	4.2
8/04/1980	15/10	14.1	1.2	1.8	2.6	0	3.2
7/29/1985	15/10	24.0	1.3	8.6	0	4.3	2.5
7/16/1990	15/10	22.5	0.3	4.0	5.3	4.3	3.5
7/10/1995	15/12	71.7	1.1	9.1	4.2	4.5	4.4
7/10/2000	15/15	21.6	0.6	5.8	2.7	2.9	2.9
7/11/2005	15/15	40.5	0.4	5.7	3.9	3.5	5.4
7/20/2009	15/15	42.6	0.7	11.5	3.7	7.5	1.5
7/13/2015	15/15	23.7	0.9	4.7	4.6	4.9	4.1
Lake mean		31.0	0.8	5.8	3.7	4.6[a]	3.5
Lake median		23.9	0.7	5.7	3.9	4.3[a]	3.5
				Lake class 22			
1st quartile value		3.7	0.2	7.1	0.5	4.0	3.0
Median		15.3	0.4	17.1	1.6	6.6	5.0
3rd quartile value		42.8	0.9	33.9	5.2	9.6	7.9

[a] Mean and median catch rates for Walleye do not include data prior to 1985 (introduced population).

Lake Management Plan (LMP) goals are established based on what a lake's capable of producing. These goals are derived from previous catches or size structure for the individual lake, as well as data from lakes within the same Ecological Lake Classification. Lake Management Plan goals can change as additional information is collected on a lake. The previous LMP had Northern Pike and Walleye as primary species for management while Largemouth and Smallmouth Bass were considered secondary species. The previous LMP goal for Northern Pike was to maintain a gill-net catch of 3.5/net with a PSD of 90, and RSD-P of 20, and RSD-M of 10. The Walleye LMP goal has been to maintain a catch of 6.0/gill net with size structure goals of PSD = 60, RSD-P = 25, and RSD-M = 5. The previous goals for bass were to improve size structure to include memorable length fish of 17 inches for Smallmouth Bass and 20 inches for Largemouth Bass in the future electrofishing surveys. In order to simplify the LMP, the size structure goals for bass and Walleye were removed because there is no active management to achieve those goals.

Wabana Lake was stocked with Walleye fry, bass, crappie and sunfish from 1912 to 1944. Northern Pike, Black Crappie and Largemouth Bass were stocked in the 1940's and 50's. Northern Pike fingerlings, yearlings and adults were frequently stocked from 1960 through 1979. Only Walleye have been stocked since 1983. Walleye fry were stocked in 1912, 1953 and 1984. The early fry stockings were unsuccessful at establishing a population. Walleye management shifted to fingerling stocking in the early 1980's when DNR fisheries became proficient at raising fingerlings in natural ponds. A Walleye pond was operated in 1986 and 1987, just off Buckman Cove on the north end of the lake, but no Walleye were produced.

Northern Pike - Northern Pike catch rates have generally been low, ranging from 1.5/net to 5.4/net (Table 1). Following the lowest catch on record in 2009, the catch improved to 4.1 fish/net in 2015. The catch exceeded the LMP goal and was between the lake class 1st quartile value and median. Northern Pike ranged from 12.6 to 37.0 inches and had a mean length of 23.7 inches. Size structural indices had PSD, RSD-P, and RSD-M values of 69, 13 and 2. Although size structure was good compared to many Northern Pike populations, the size structure goals were not attained and will likely not be attained in the absence of length based regulations. Size structure has been good in all previous surveys; pike over 28 inches have been sampled in all the assessments since 1975 (Table 2). Pike of memorable length (over 34 inches) have been sampled in five of the last six surveys. In 2015, nine year-classes were identified by scales and cliethra with fish from age 2 to age 11 present. Age-2 fish represented 35% of the sample. Northern Pike averaged 24.3 inches after four years of growth. Growth was good compared to the statewide averages.

Table 2. Wabana Lake Proportional Stock Density (PSD) and Relative Stock Density (RSD) indices for preferred-length and memorable-length **Northern Pike** sampled in gill nets from 1975 to 2015. Standardized lengths were used to calculate structural indices (Stock length = 14 in., Quality length = 21 in., Preferred length = 28 in., Memorable length = 34in.).

Date	Stock sample size	PSD	RSD-P	RSD-M
7/28/1975	51 [a]	74	16	0
8/04/1980	55[a]	65	18	0
7/29/1985	38[a]	95	5	0
7/16/1990	53	94	19	2
7/10/1995	62	44	11	0
7/10/2000	44	89	23	4
7/11/2005	81	85	27	4
7/20/2009	23	83	13	4
7/13/2015	61	69	13	2

[a] Indicates stock density indices were derived from combined gill net and trap net data, though very few fish were sampled in trap nets.

Walleye - There was not a fishable Walleye population in Wabana Lake prior to 1983 when Walleye stocking established the population (Table 1). Walleye were first sampled in gill nets in 1985. Walleye gill-net catches were within the inter-quartile range and varied only slightly from 4.3 to 4.5/gill net from 1985 to 1995. Natural reproduction was difficult to evaluate in these assessments because a combination of fingerling and yearling fish were stocked, resulting in few un-stocked year classes (Table 3). After an every other year stocking regime from 1986 to 1994, the stocking frequency was reduced to determine the extent of natural reproduction. In 1999, a fall night electrofishing survey was conducted to sample age-0 (young-of-the-year) Walleye, but none were sampled. The gill-net catch rate in 2000 declined to 2.9/net, below the lake class first quartile and lower than the previous management plan goal. The 2005 assessment evaluated a period when four of the previous nine years were stocked. The gill-net catch rate in that assessment remained below the first quartile value at 3.5/net, with the majority of fish attributed to stocked year classes. The results of these assessments confirmed that natural reproduction was limited and fingerling stocking contributed substantially to the population (Figure 1 & 2). Walleye fingerlings and yearlings/adults have been stocked annually since 2004 at a rate of 1 pound/littoral acre.

The Walleye gill-net catch was 7.5 fish/net in 2009 but declined to 4.9 fish/net in 2015. The 2015 catch approached the management goal of 6.0 fish/net and was within the interquartile range of 4.0 to 9.6 fish/net for the lake class. The sampled fish ranged from 6.6 to 25.5 inches and had a mean length of 15.8 inches. Size structure goals were essentially attained having PSD, RSD-P, and RSD-M values of 63, 25 and 2. Eleven year-classes from age 1 to 14 were identified by scale, opercle and otolith analysis. Age-2 to age-4 fish were the most commonly captured, representing 60% of the sample. Walleye averaged 15.9 inches at age 4, which was similar to the statewide average.

Table 3. Wabana Lake Walleye stocking from 1983 to 2015.

Year	Number	Pounds	Size	Year	Number	Pounds	Size
1983	8,196	1,592	Yrl*	2005	8	8	Adl
1984	2 million		Fry	2006	18,541	774	Fgl
1986	14,621	530	Fgl	“	55	11	Yrl
“	2,983	153	Yrl	2007	7,750	430	Fgl
1988	30,120	546	Fgl	“	824	206	Yrl
1990	1,413	135	Fgl	“	164	139	Adl
“	1,541	428	Yrl	2008	11,682	668	Fgl
1992	22,813	540	Fgl	“	90	30	Yrl
“	16	6	Yrl	“	50	87	Adl
1994	9,620	563	Fgl	2009	10,159	783	Fgl
1997	12,628	547	Fgl	2010	11,775	785	Fgl
2000	18,721	739	Fgl	2011	8,867	520	Fgl
2002	12,734	785	Fgl	2012	6,052	1,061	Fgl
2004	44,245	1,338	Fgl	2013	23,031	785	Fgl
2005	17,843	650	Fgl	2014	23,535	785	Fgl
“	310	100	Yrl	2015	11,935	775	Fgl

*Included some fingerlings and adults. Fgl = fingerling, Yrl = yearling, Adl = adult.

Bluegill - Trap-net catch rates for Bluegill have varied considerably, ranging from 6.6 to 71.7/net. The trap-net catch rate for Bluegill in 2015 was 23.7/net. Sampled Bluegill ranged from 3.2 to 9.5 inches with a mean length of 6.0 inches. Trap-net PSD was 57 and RSD-P was 4. Bluegill were not aged in 2015, but growth was similar to the lake class average for all ages in 2009. Size structure has generally been poor, with few fish over 8 inches sampled in any survey. A sunfish removal project was attempted in 1954 to reduce sunfish and improve size structure. The

project was deemed unsuccessful because size structure remained poor in the 1956 assessment.

Largemouth Bass - Spring night electrofishing has been more effective in sampling bass than standard test-netting. Electrofishing has been conducted five times since 1995 and the catches have varied considerably from 17.6 to 135.5/hour. In 2015, the eight electrofishing stations were modified to 15 minutes (on-time) and to more evenly represent Largemouth and Smallmouth Bass habitat. Due to changes in the stations location and effort, catch rates are not comparable. However, it appears bass numbers have declined in Wabana following a period of higher recruitment in many Grand Rapids area lakes. The catch was 31.9/hr on-time in 2015. The sampled fish ranged from 6.3 to 15.6 inches and had a mean length of 10.8 inches. Seven year-classes were identified from scales with fish from age 2 to 9 present. The 2011 age class represented 56% of the sample. Growth was slow compared to statewide averages for all ages. The Lake Management Plan goal to sample more 20 inch and larger fish was not achieved in 2015 and may not be realistic for the lake.

Smallmouth Bass - Gill-net catch rates for Smallmouth Bass have varied from 0.3 to 1.3/net in past assessments and exceeded the lake class 3rd quartile value (0.9/net) in four assessments (Table 1). Catches in spring electrofishing surveys have been fairly low, ranging from 0.4 to 14.7/hour in five samples since 1995. The catch was 14.7 fish/hr on-time in 2015. The sampled fish ranged from 6.0 to 16.8 inches and had a mean length of 10.4 inches. Five year-classes were identified from scales and opercles. Fish from age 2 to age 8 were present with age 3 and 4 representing 86% of the sample. Growth was similar to the statewide average through age 4 and slower for older fish. Our goal to sample more 17 inch and larger fish with electrofishing was not achieved in 2015, but some were sampled in the summer gill nets.

Tullibee - Tullibees are difficult to sample with our standard summer surveys due to their pelagic nature. Catch rates on Wabana have been surprisingly stable, ranging from 0 to 6.3 fish/net with a mean of 3.7/net (Table 1). The catch of 4.6 in 2015 was near the 3rd quartile value of 5.2/net for class 22 lakes. The sampled fish ranged from 7.3 to 20.0 inches and had a mean length of 14.2 inches. The majority of the fish were 17.0 to 19 inches. No attempt was made to age the fish but the size distribution would suggest at least three age classes were present.

Yellow Perch - Yellow Perch catches have never exceeded the lake class median of 17.1 fish/gill net. The 2015 catch was 4.7 fish/gill net and catches have ranged from 1.0 to 11.5/net since 1975 (Table 1). The sampled Yellow Perch ranged from 5.5 to 11.0 inches and had a mean length of 7.0 inches. Due to their poor size structure, perch are probably more important within the fish community as a prey source than as a species desired by anglers.

Other species sampled in the 2015 and prior surveys include Black Crappie, Black Bullhead, Common Shiner, Green Sunfish, Hybrid Sunfish, Pumpkinseed Sunfish, Rock Bass, White Sucker, and Yellow Bullhead. Additional species observed while sampling near-shore for IBI included Banded Killifish, Blackchin Shiner, Blacknose Shiner, Bluntnose Minnow, Brook Stickleback, Central Mudminnow, Golden Shiner, Iowa Darter, Johnny Darter, Least Darter, Mimic Shiner, Mottled Sculpin, Pugnose Shiner, and Spottail Shiner.

Social Considerations

Much of the shoreline of Wabana Lake is privately owned with some in state or federal ownership (Chippewa National Forest). The 1985 survey reported that 60% of the shoreline was undeveloped forest and 39% was private homes and cabins with the remaining 1% being agricultural. At that time, there were 5 resorts with 37 cabins and 95 private homes/cabins on the lake. In 2015, there were 113 properties with buildings valued at $20,000 or more, plus three resorts around the lake. There are two state-owned public accesses. One is located in the northwest corner of the lake off Bluewater Road (C.R. 335) and the other is at the southeast end of the lake off C.R. 49. The US Forest Service maintains five boat-in campsites on the lake.

Wabana Lake was one of 90 lakes included in an aerial creel survey during the summer of 2001 and winter of 2001-02. Angling pressure counts were made randomly on 28 separate days for the summer and 17 days for the winter. Wabana Lake had an estimated total of 21,909 hours of angling pressure in summer 2001. On a per acre basis, it

received an estimated 9.9 angler-hours/acre, which was the fourth highest of the eleven class 22 lakes in the survey. For comparison, angler pressure/acre was 5.6, 9.1 and 11.8 hours for Pokegama, Deer and Turtle Lakes, respectively. Estimated fishing pressure was lower in the winter season, at 2.3 angler-hours/acre; a relatively low rate compared to other area lakes.

Present Limiting Factors

The stocking history of Wabana Lake clouded any evaluation of natural reproduction prior to the 2000 population assessment. The 2000 and 2005 assessments demonstrated natural reproduction was poor in the periods evaluated and the Walleye population was maintained primarily through fingerling stocking. The 1985 survey rated Walleye spawning habitat as good, with scattered gravel and rubble around the lake. Although spawning habitat appears good, natural reproduction/recruitment has been limited. Class 22 lakes like Wabana, Deer and Turtle are deep, clear lakes with modest fertility. In general, Walleye natural recruitment is poor in these lakes in the Grand Rapids area. It is thought that because these lakes are large and deep, they tend to warm slowly and zooplankton are not available to young Walleye for food in the early life stages.

Catch rates for Yellow Perch have never been high, however, growth of Northern Pike and Walleye have been good. Low Yellow Perch may limit Walleye potential. Tullibee provide additional prey for both species. Cool water species growth is good compared to the warm water species in Wabana. White Sucker are also present but catch rates have been lower.

Poor Bluegill size structure is often associated with overabundant populations. Bluegill catch rates have fluctuated in past assessments, but size structure has remained poor even as far back as the initial 1949 survey. Bluegill size structure is likely limited by general lake fertility and high intra-specific competition. Good water clarity suggests that lakeshore development has not yet adversely affected water quality.

Survey Needs

A standard survey will be conducted in mid-July 2025 to correspond to the IBI survey schedule. Set 15 gill nets and 15 trap nets to correspond with locations used in 2015. Spring night electrofishing will be conducted for Largemouth and Smallmouth Bass, with the eight standard stations established in 2015. Age structures will be collected from Largemouth and Smallmouth Bass (from electrofishing), Northern Pike and Walleye. Consider conducting a spring trap net survey targeting Black Crappie if time permits.

Habitat Development and Protection

The 1947 survey described a diverse plant community with aquatic vegetation present along the entire perimeter of the shoreline. Excellent fish habitat in the form of aquatic plants was said to be abundant in several of the bays. Common floating leaf and emergent species included white and yellow water lilies, hardstem bulrush, and floating leaf pond weed. Other common aquatic plants included bushy pondweed, coontail, sago pondweed, largeleaf pondweed and muskgrass (chara). The 1975 survey reported a similar plant community and noted that submerged vegetation extended out to a depth of 14 feet, with the largest concentrations in the lake's north, southeast and southwest bays. In August of 2000, the Minnesota County Biological Survey conducted a partial plant survey of Wabana Lake. This survey also described a rich plant community of 44 native taxa of aquatic/wetland plants, including a rare aquatic plant *Utricularia gibba* (humped bladderwort).

The MPCA Lake Assessment Program report (2002) listed the water quality of the Wabana Chain as very good compared to other lakes in the northern lakes and forest region. The report also stated that relatively small increases in phosphorus inputs could have a dramatic effect on water quality.

Habitat protection is on-going through the environmental review process. As lakes like Wabana become increasingly developed, lakeshore residents will have a larger impact on their future. In order to maintain or improve fish and wildlife populations, water quality and habitat must be protected. Although the effect of land use decisions on one lake lot may seem relatively small, the cumulative impact of many lakeshore owners "fixing up"

their property can result in a significant decline in water quality and habitat. For example, removing shoreline and aquatic vegetation, installing sand beach blankets, fertilizing lawns, mowing to the waters' edge, uncontrolled run-off and failing septic systems all contribute excess nutrients and sediment, which degrade water quality and habitat. Understanding these impacts and taking steps to avoid or minimize them will help to insure our quality fisheries can be enjoyed by future generations. The Wabana Chain of Lakes Association promotes practices to sustain water quality.

It was noted in the last management plan that the US Forest Service was considering a project to modify the outlet dam and the downstream culvert (at County Road 49) to allow fish passage. The culvert on County Road 49 was replaced in 2012 with a bridge. The project does allow fish passage to the dam and should reduce downstream erosion now that the stream is no longer constricted by the undersized culvert. There was a rock weir placed above the bridge to maintain water levels. There are no plans to modify the dam to allow fish passage to the lake at this time. Future dam modifications may be desirable to facilitate fish passage.

Commercial Fishery
There is no record of commercial harvest on Wabana Lake and there is no potential for such a fishery at this time. Recreational Tullibee netting has been closed since 1983. The closure was initially due to perceived low Tullibee and Yellow Perch numbers and the commencement of Walleye management. However, Tullibee are an important prey species for trophy predators so their protection remains warranted.

Stocking Plans
Base stocking - Mississippi strain Walleye fingerlings will be stocked annually at a rate of 1 pound/littoral acre (785 pounds total). Past assessments have documented the success of Walleye fingerling stocking in Wabana Lake. Following the period of reduced stocking in the late 1990's, the gill-net catch declined and very little natural reproduction was observed. The Walleye gill-net catch in 2009 was the highest on record following a period of stocking 1 pound/littoral acre annually. Although the stocking rate remained the same, the 2015 catch was lower. It is not uncommon to have an initial response to stocking but then a leveling-off to more normal for a lake (Figure 1 & 2).

Public Input
Three individuals from the lake association participated in the development of the plan and it is available for public review and comment during the winter of 2016.

An individual said the Walleye stocking has been great and most species have remained fairly consistent. He said that he has heard the fear mongers on other lakes about Muskies but feels that if they're not going to affect other species, bring them on. He believes crappies have declined in size and availability, but primarily due to increased pressure and harvest. He suggests both locals and boats from the landing are frequently observed at popular spots and thinks the possession limit is consistently ignored.

The old plan was available for public review and comment in March 2010. One person called to ask about the plan. He said he thought the lake has a good Walleye population due to the stocking program and agreed it should be continued. He also asked about the possibility of a special regulation to protect large Northern Pike. Although Wabana Lake would be a good candidate for such a regulation, it would also be very controversial due to the interest in darkhouse spearing on the lake.

Revised by: Steve Mero and replaces the 2010 lake management plan.

Reference:
Klang, J. K., and S. Heiskary. 2002. Water quality update and trend monitoring in Itasca County. Lakes: Little Wabana, Wabana, Bluewater and Trout. Minnesota Pollution Control Agency. Environmental Outcomes Division.

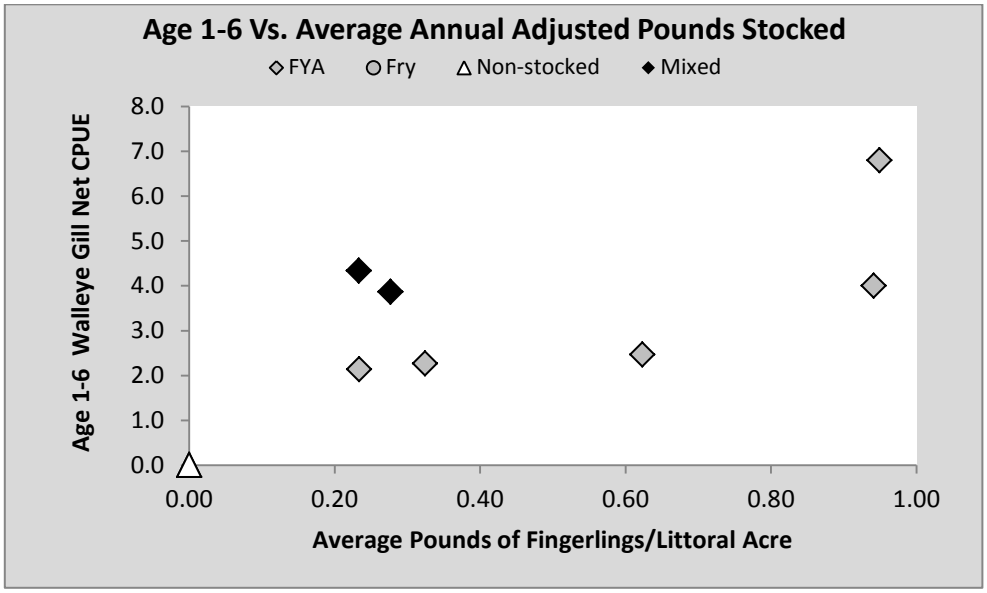

Figure 1. Walleye gill-net catch-per-unit-effort (CPUE) for age 1 to 6 fish compared to the average annual adjusted pounds of fingerlings/littoral acre stocked in Wabana Lake.

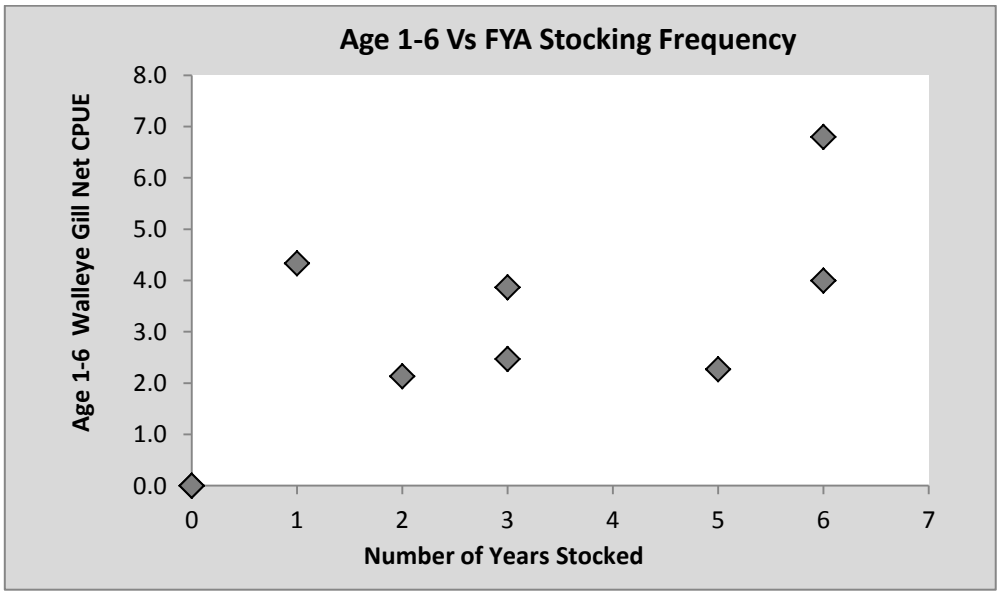

Figure 2. Walleye gill-net catch-per-unit-effort (CPUE) for age 1 to 6 fish compared to the number of years stocked during the evaluation for Wabana Lake.