LAKE MANAGEMENT PLAN

Region	Area	D.O.W. Number	County	D.O.W. Lake Name	Lake Class	Acreage
1	Park Rapids	03-0030	Becker	Boot	23	378 GIS 81 littoral

LONG RANGE GOALS:

- Maintain or improve the quality of fishing for Walleye by attempting to maintain a population with a mean catch per effort (CPE) index of at least 5 per gill net lift and a proportional stock density (PSD) of 30 to 60. Attempt to maintain a relative stock density (RSD) of preferred length (20") Walleye of at least 40 and an RSD of memorable length (25") Walleye of at least 4.
- Walleye abundance should be balanced with abundance of preferred forage, Yellow Perch, by attempting to maintain a Perch population with an average CPE index of at least 1 per gill net lift.
- Maintain related fish communities
- Protect or enhance desirable aquatic and riparian habitats (water quality, aquatic and riparian vegetation, and shoreline substrate).

OPERATIONAL PLANS:

- Conduct lake surveys or targeted sampling about every five years (2021, 2026...), or as needed to evaluate management efforts. Spring electrofishing may be included with evaluations to better assess Largemouth Bass, if feasible within time and manpower constraints. Targeted spring or fall electrofishing should be conducted, if feasible, to evaluate natural reproduction or stocking success of Walleye and to establish a baseline to evaluate potential Walleye fry stocking success.
- Stock Walleye fingerlings at a density of 2 pounds per littoral acre (165 pounds total) in 2018. Fall electrofish in 2018 and 2019 to develop a baseline for natural reproduction and a goal for a successful fry stocking. Stock walleye fry at a density of about 1,000 per littoral acre (80,000 total) in even numbered years from 2020 to 2024. Stock walleye fingerlings at a density of 1 pound per littoral acre (85 pounds total) later in the fall of even numbered years if survival of fry or contribution to year class strength does not appear adequate, as determined by electrofishing catch rates of young of the year (YOY) or yearling walleye (see *Stocking Plans*). Adjust stocking density, frequency, or size of fish if necessary or desirable to maintain desirable levels of abundance and size structures of Walleye and forage fishes at minimum costs.
- Monitor winter fishing pressure by conducting aerial fish house counts.
- Maintain free and adequate public water access to Boot Lake.
- Work with educators, groups, agencies, individuals or news media to provide aquatic education opportunities. Efforts may include presentations, news releases, personal contacts or special projects.
- Provide recommendations on permit applications that will minimize impacts to aquatic resources associated with projects in Boot Lake, its tributaries, or its watershed.
- Encourage, support and assist efforts of local, state or federal groups or agencies to improve water quality, and maintain or improve fisheries habitat in Boot Lake.

MID RANGE OBJECTIVES:

- Evaluate population characteristics (abundance, size and age structure, and growth) of Walleye, Yellow Perch, Northern Pike, Largemouth Bass, Black Crappie and Bluegill. Continue to refine definitions of desirable levels of abundance and size structure for managed fish species.
- Continue to evaluate the extent of natural reproduction of Walleye, and the contribution of stocked Walleye.

Adjust stocking rates, schedule or size of fish if necessary to maintain desirable levels of abundance and size structures of Walleye and forage fishes at minimum costs.

POTENTIAL PLAN:

- Use fee title purchase or easements to protect additional lands in the watershed of Boot Lake to maintain or improve lake water quality. Priority should be given to riparian lands adjacent to known spawning areas, sensitive shorelands, or other critical aquatic habitat.

SUBTOTAL $ Costs depend on size or extent of projects

- Estimate stocked Walleye survival and contribution to year class strength by marking stocked Walleyes with fin clips, tags or tetracycline, recapturing marked fish during assessments or surveys, and estimating relative proportion of stocked and non-stocked fish.

SUBTOTAL $ 5,000

<table>
<tr><td colspan="2">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)

(see following)</td><td>FOR CENTRAL OFFICE USE ONLY

Entry Date: | Year Resurvey:
Stock Species-Size-Number per Acre
Schedule: | Year Beginning
Population Manipulation
YES NO Year</td></tr>
<tr><td>Primary Species Management:
Walleye / Yellow Perch</td><td>Secondary Species Management:
Northern Pike, Black Crappie, Bluegill, Largemouth Bass</td><td>Development
YES NO Year</td></tr>
<tr><td>Area Supervisor's Signature:</td><td>Date
7/30/18</td><td>Creel or Use Survey
YES NO Year</td></tr>
<tr><td>Regional Manager's Signature:</td><td>Date
9/7/18</td><td>Other:
Year</td></tr>
</table>

Boot Lake is located about six miles northwest of the town of Two Inlets, in northeastern Becker County. Boot has a GIS measured surface area of 378 acres, a maximum depth of 109 feet, is 21% littoral (81 acres), and has been assigned to lake class 23. Boot Lake has no major surface water inlets. The outlet of Boot Lake is a small tributary stream to Indian Creek, but it is not navigable.

PAST MANAGEMENT:

Minnesota fishing lakes can be grouped based on similar physical and chemical characteristics. These groups of lakes have similar fish communities. Boot Lake has been grouped in lake class 23. Populations of Largemouth Bass, Bluegill, Rock Bass or Cisco (Tullibee) often characterize these lakes. Walleye, Northern Pike, Yellow Perch, Black Crappie, Pumpkinseed, Yellow Bullhead or White Sucker may also be found in some of these lakes.

Boot Lake has been managed primarily for Walleye with secondary emphasis on Northern Pike, Black Crappie, Bluegill or Largemouth Bass. Management activities have consisted of: statewide fishing regulations; fish stockings; posting Largemouth Bass spawning area; dark house spearing closure; development of angler access; and efforts to protect aquatic habitat.

Crappies were also stocked in Boot in 1950, 1965 and 1966. Northern Pike were stocked in Boot frequently between 1950 and 1985. Bluegill were stocked in 1966. Walleye fry were stocked in Boot in 1946-48 and 1952. Walleye fingerlings, yearlings or adults were stocked frequently between 1951 and 1976, and in even numbered years from 1978 to 2000.

Boot Lake participated in a statewide research project to evaluate Walleye stocking densities and sizes at stocking from 2001 through 2007. Walleye fingerlings marked with oxytetracycline were stocked at a density of about 1 pound per littoral acre (97 pounds total) in 2001. Marked Walleye fingerlings were stocked in 2003 at a density of about 2 pounds per littoral acre (190 pounds total). Marked Walleye fry were stocked at a density of about 1,000 per littoral acre (95,000 total) in 2005. Spring electrofishing in 2002, 2004 and 2006 and gill net sampling in 2004, 2006 and 2008 were used to evaluate the proportion of marked fish and contribution of stocked fish to the 2001, 2003 and 2005 year classes. Results of that project showed natural reproduction dominated contribution to the Walleye population. There were moderate or strong year classes in years when Walleye were not stocked (2002, 2004, 2006), substantial numbers of unmarked fish during some of the stocked years, and stocking strategy did not seem to make a difference.

Other research suggested that there may be a benefit to stocking Walleyes at densities as high as 1 pound per littoral acre per year average (2 pounds per littoral acre every other year) in some lakes. Following the statewide Walleye stocking research project, Walleye stocking in Boot Lake was resumed at an increased density of 2 pounds per littoral acre in even numbered years starting in 2008. In several years Walleye stockings consisted of various sizes and ages of Walleye due to mild winters, lack of winterkill, and carryover of fish in Walleye rearing ponds. Stocking various age fish in the same year will confound evaluation of natural reproduction and year class strength.

The south bay of Boot Lake was closed to fishing as a Largemouth Bass spawning area from 1951 through 1987. That practice was discontinued, presumably because it did not make a noticeable difference in the fish population. Boot Lake was closed to dark house spearing in 1947-48.

VARIOUS SURVEYS:

Boot Lake was mapped by the CCC in 1940 and remapped in 1971. The initial fishery survey was conducted in 1951. Lengths of individual fish were not recorded during that survey, so population size structure indices cannot be calculated or compared to other surveys. The lake was re-surveyed in 1974 and 1991. Population assessments were conducted in 1981, 1986, 1996, 2001, 2006 and 2011. A Standard Survey was conducted in 2016. Special assessments were conducted in 2002, 2004, 2006 and 2008 as part of the statewide Walleye stocking research project. Targeted nearshore sampling was conducted in 2016 to develop an Index of Biotic Integrity (IBI). A chemical analysis of lake water was conducted as part of the 1991 fisheries survey. Lake water chemistry was measured by Minnesota Pollution Control Agency (MPCA) in 1979, 1985-87, and by citizen lake monitoring in 2006 and 2008-09. Lake water transparency was recorded through the MPCA Citizen Lake Monitoring Program (CLMP) in 1978, and annually since 1980. Aerial fish house counts were conducted in 1993, 1995-96 and annually since 1998 to monitor trends in ice fishing pressure. Counts have ranged from 0 to 6 and averaged 3.

Mean gill net catch rates provide the best index of Walleye abundance. Average gill net catch rates of Walleye increased from 1951 through 1986 samples and have fluctuated since then (Figure 1). Walleye catch rates were below the interquartile or "normal" range (1.0 to 5.0 per gill net) for lakes with similar physical and chemical characteristics in 1951, within the interquartile range in

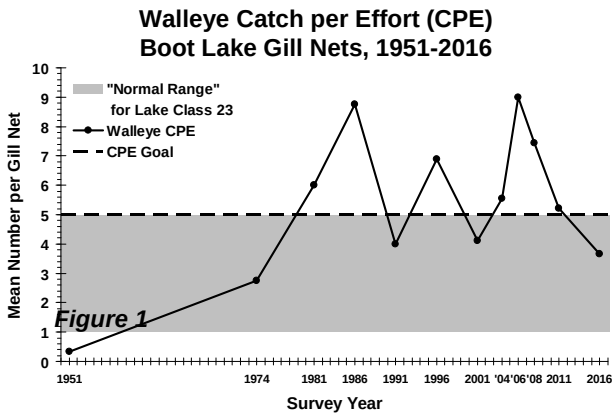

Figure 1

Figure 1

1974, and has fluctuated above and below the high end of the normal range in samples since then. The average of catch rates from all Boot Lake samples was 4.7 per gill net and the third quartile was 6.4 per gill net, following the 2001 assessment. The Management Plan goal was set at 5 per gill net in 1992. That goal is between the long term average and third quartile of historic Walleye catch rates. The average gill net catch rate of Walleye was higher than the long range goal in all samples from 2001 through 2011, but was below the goal in 2016.

Proportional Stock Density (PSD) is an index of population size structure that measures the proportion of stock sized (10" or larger) Walleye that are also a quality size of 15" or larger. Walleye PSD was above a desirable range of 30-60 in 1974 through 1996 samples, declined to just below the high end of the desirable range in 2001, then increased to above the desirable range in samples since 2001 (Figure 2). High PSDs are a reflection of a high proportion of large fish and fewer small fish in the sample, probably indicating low recruitment. Low PSDs are due to a high proportion of small fish and relatively few large fish, a less desirable condition for anglers. More desirable mid-range PSDs indicate enough small fish recruiting into the population to provide good fishing in the future, and enough large fish to provide good fishing now.

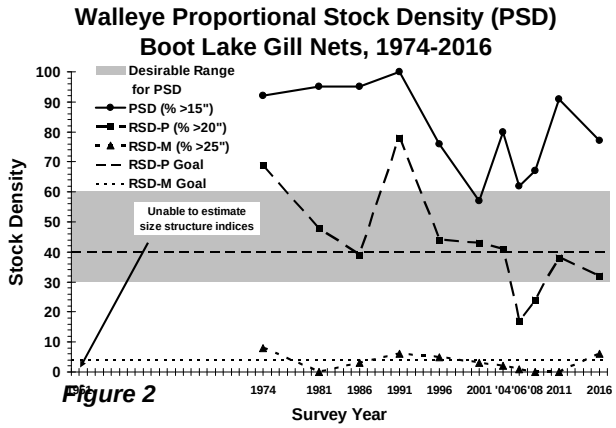

Figure 2

Relative Stock Densities measure the proportion of stock sized Walleye that are also a preferred size of 20 inches or larger (RSD-P or RSD-20), or the proportion that are also a memorable size of 25 inches or larger (RSD-M or RSD-25). The proportion of 20 inch or larger Walleye (RSD-P) in Boot Lake has been quite high, fluctuating between 39 and 78 from 1974 through 2004, declining substantially in 2006 then increasing again since then. The average of RSD-P from all Boot Lake samples was 54 and the first quartile was 43 following the 2001 survey. The Management Plan goal of at least 40 was set at that time near the first quartile of historic Walleye RSD-P. The RSD-P of Walleye has been below that goal since 2004, but still very good compared to other lakes. The RSD-P goal may hve been set too high in 2001. Proportions of 25 inch or larger Walleye (RSD-M) have historically been much lower, fluctuating between 0 and 8. The average of RSD-M values from all Boot Lake samples was 4 following the 2001 survey. The Management Plan goal of at least 4 was set at that time at the average of historic Walleye RSD-M values. The RSD-M of Walleye was below that goal from 1996 through 2011, but above the goal in 2016.

It has been difficult to evaluate natural reproduction of Walleye and the contribution of stocking, because there have been relatively few samples of the lake's fishery, Walleye were often stocked in consecutive years, and different sizes and ages of Walleye were sometimes stocked in the same year.

Walleye stocking in Boot Lake was reviewed in 2016-17 as part of a Walleye stocking program review in the Park Rapids Area. There were no significant relationships between abundance of age 1-6 Walleye and pounds, adjusted pounds or numbers of Walleye stocked six years prior. The relationship between year class strength and pounds of Walleye stocked that year was positive but not significant, but there were significant positive relationships between year class strength and numbers and size (Number per Pound) of Walleye stocked that year suggesting that numbers of Walleye fingerlings stocked may be more important than pounds stocked. From the stocking review it appeared that natural reproduction of Walleye was pretty good from 1999 to 2007, but lower before and after that. There was a significant positive relationship between Walleye abundance and abundance of Yellow Perch. Walleye fry stocking was tried once during the Walleye stocking review period, and catch rates from that year class in subsequent sampling were quite good. It was also noted that stockings of yearling and adult Walleye, mixed with

the fingerling stockings, confounded the evaluation. As a result of the evaluation, it was recommended that Walleye fry stocking should be attempted. However, fall electrofishing should be conducted at least two years prior to fry stockings to get a baseline of what to expect for electrofishing results from natural reproduction. In the meantime, Walleye fingerlings should continue to be stocked at a density of 2 pounds per littoral acre in even numbered years, and attempts should be made to stock only true fingerlings if available.

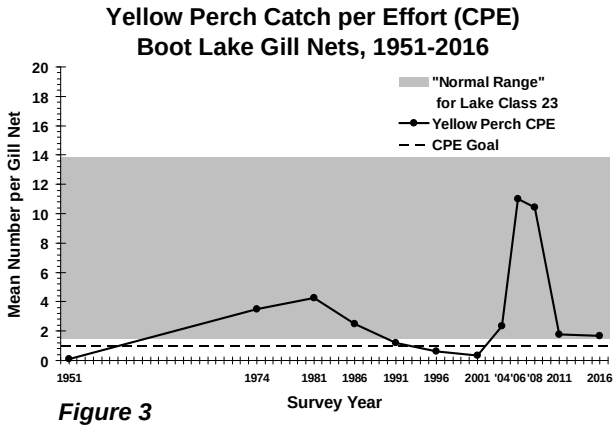

Figure 3

Average gill net catch rates of Yellow Perch in Boot Lake have generally been low (Figure 3). Perch abundance was well below the interquartile range for similar lakes in 1951, increased to within but near the low end of the normal range in the 1981 sample, declined through the 2001 sample to well below normal again, increased dramatically in 2006 to near the high end of the interquartile range, then decreased to near the low end of the normal range again in 2011 and 2016. Too few Perch were collected in many of the samples to be able to estimate population size structure indices. When size structure indices could be estimated, they were generally low. The proportion of quality sized (8 inch and larger) Perch in Boot Lake was below a desirable range of 30-60 in all samples except 1981, when it was within the desirable range. Proportions of Perch larger than a preferred size of 10 inches were either 0 or very low. There has never been a memorable size (12 inches or larger) collected in any sample at Boot Lake. Small size of Yellow Perch in Boot Lake may limit their value as a fishery for anglers. However, they are an important source of food for the lake's predator fish species, particularly Walleye and Northern Pike. There has been a significant positive relationship between Perch and Walleye. When one was abundant, the other was also abundant, and vice versa. It is important to maintain a good Perch population to provide adequate forage for the lake's predators. The average of Yellow Perch catch rates from all Boot Lake samples was 1.8 per gill net following the 2001 survey, and the first quartile was 0.5. The Management Plan goal of at least 1 per gill net was set at that time between the average and first quartile of historic Yellow Perch catch rates. Average gill net catch rates of Perch were below the goal in 1996 and 2001, well above the goal in 2006 and 2008, and slightly above the goal since 2008.

Average gill net catch rates of Northern Pike in Boot Lake were fairly stable and near the lower third of the interquartile or "normal" range for similar lakes from 1951 to 1981. Pike catch rates increased, and fluctuated around the upper half of the normal range since 1986. Northern Pike PSD fluctuated, but appeared to increase slightly since 1974. However, PSD was generally below or just barely within a desirable range of 30 to 60. The proportion of preferred size (28" or larger) Northerns has been 0 or very low in all samples. Only a single Northern Pike larger than a memorable size of 34 inches has been collected in any sample at Boot Lake and that was collected in 2011. Growth rates of Northern Pike have been slow and average weights have historically been low. Moderately high abundance, low proportion of large fish, slow growth and poor condition are likely an indication of the low productivity, oligotrophic nature of Boot Lake, and possibly high mortality, either from natural mortality, angler harvest, or both.

Average trap net catch rates probably provide the best index of Black Crappie abundance. Trap net catch rates of Crappies in Boot Lake have historically been very low, well below the interquartile range for similar lakes in all samples. Too few Crappies were collected in all samples to accurately estimate population size structure indices. Growth rates of Crappie have been normal compared to other similar lakes.

Average trap net catch rates also provide the best index of Bluegill abundance. Bluegill trap net catch rates in Boot Lake have fluctuated, with no apparent trend of increasing or decreasing over time. Average trap net catch rates of

Bluegill were within or just slightly above the interquartile range for similar lakes in all samples. Bluegill PSD has historically been low and relatively stable, fluctuating only slightly around the low end of a desirable range of 20-60 in all samples. There has never been any Bluegill sampled in Boot Lake larger than a preferred size of 8 inches.

Largemouth Bass have been collected with both gill nets and trap nets during the course of population assessments and lake surveys at Boot Lake, but those gears do not do the best job of sampling Bass. Average net catches of Bass have fluctuated, with no apparent trends of either increasing or decreasing over time. Too few Bass were collected in net samples to accurately estimate population size structure indices.

SOCIAL CONSIDERATIONS:

Boot Lake and its fishery are an important feature and recreational attraction for the northeastern Becker County area and surrounding communities. The lake and its fishery have the potential to contribute to local and state economies. There were 26 homes/cabins and two resorts with 14 cabins reported on Boot Lake during the 1991 re-survey. There were 33 homes/cabins and two resorts with 27 cabins reported in the 1996 assessment report. That amounted to a 27% increase in the number of homes/cabins during that five year period. Shoreline development was not reported in 2001 or 2006. There were 61 homes/cabins observed during the 2011 assessment, resulting in an 85% increase in development during the 15 year period between 1996 and 2011. There were 75 homes/cabins reported in 2016, resulting in a 23% increase in the most recent five year period and a 188% increase in the last 25 years. The number of cabins/homes observed in 2016 results in 11.0 cabins/homes per shoreline mile, which is in the 60th percentile of 103 lakes in the Park Rapids area where shoreline development has been recorded.

PRESENT LIMITING FACTORS:

Boot Lake is oligotrophic, meaning it has excellent water quality and clarity. But that also means that it is not very fertile or productive, as evidenced in poor growth rates, poor condition or small size structure of many fish species.

Although development on Boot Lake is about average for lakes in the Park Rapids area, it has increased 188% in the last 25 years. Development on the lake and within its immediate watershed has resulted in removal of aquatic and riparian vegetation and probably increased contribution of nutrients to the lake. Removal of native vegetation also increases the risk of erosion, both on the land and shoreline, and resulting siltation and sedimentation. Loss of vegetation, and the resulting loss of habitat and degraded water quality could negatively affect fish populations, reduce recreational opportunities, and reduce the aesthetic quality of the lake. In particular, emergent vegetation like bulrush provides spawning habitat for Black Crappie, Bluegill and Largemouth Bass. Removal of aquatic vegetation will have the greatest negative impacts on these species.

Natural reproduction or recruitment of some fish species may be limited by habitat, competition among themselves for available food or habitat, or competition with other fish populations. For example, abundance of Northern Pike is probably affected by the amount of seasonally flooded wetland habitat that they need for successful reproduction. During periods of high water levels there will be more of that type of wetland habitat and Northern Pike will probably be more abundant. During low water levels habitat will be limited and Pike abundance will be lower. Abundance of Perch may decrease with increases in Northern Pike abundance and increased competition or predation. Abundance of Walleye may be affected by abundance of Perch as available forage. Low levels of Perch may result in poorer growth, condition or survival of Walleye. Increased fishing pressure and harvest may affect abundance, size, or age structure of game fish populations, particularly because Boot Lake fish are often slow growing and may take some time to reach desirable sizes.

SURVEY NEEDS:

Fisheries surveys should be conducted at a minimum of about every five years to monitor population trends of managed fish species. If possible with fiscal and manpower constraints, sampling could include spring electrofishing to better evaluate Largemouth Bass. Targeted fall electrofishing should be conducted to evaluate natural reproduction of Walleye and to establish a baseline to evaluate potential Walleye fry stocking success, if

feasible within fiscal and manpower constraints. More frequent sampling may be necessary to determine management needs or better evaluate management efforts. Lake surveys may periodically include information about physical and chemical characteristics of the lake and its watershed that can be used to monitor long term habitat trends. Water quality sampling should be included if other groups are not sampling more frequently.

Citizen volunteers should be encouraged to collect water quality information on a regular basis. At a minimum, lake water transparency (secchi disk) should continue to be monitored through the MPCA Citizen Lake Monitoring Program. Periodically, water samples should be tested for chlorophyll-*a* and total phosphorus to look for long term trends.

Additional mark and recapture tagging work could be undertaken to estimate stocked Walleye survival and contribution to year class strength. Such a study could be conducted by marking stocked fingerlings with fin clips, tags or oxytetracycline or marking stocked fry with oxytetracycline, recapturing marked fish during special sampling, assessments or surveys, and estimating relative proportion of stocked and nonstocked fish.

HABITAT DEVELOPMENT AND PROTECTION:

Water sampling in 2008 and 2009 showed no significant trends in Total Phosphorus, Chlorophyll-*a*, or Trophic State Index, probably because it was too short a time period and there were too few samples. Secchi disk measurements from 1978 through 2016 indicated a significant increasing trend in water transparency, suggesting improving water quality during that period. The lake is considered oligotrophic based on all water quality observations. The 2015 Watershed Restoration and Protection Strategy (WRAPS) Report prepared for the Crow Wing River Watershed identified nutrient management, and increasing protected forest acreage in the watershed with conservation easements or acquisition as strategies to reduce phosphorus loading and maintain or improve existing water quality of Boot Lake.

The MN DNR Fisheries Habitat Plan used watershed disturbance as a surrogate of lake water quality. Modeling by DNR Fisheries Research staff suggests that total phosphorus concentrations increase significantly over natural concentrations in lakes with watershed land use disturbances greater than roughly 25%. Disturbed land includes urban development, agriculture, and mining. Those types of land use may contribute up to 15 times more phosphorus to surface waters than undisturbed lands. The plan suggested that watersheds with at least 75% of their area publicly owned or in conservation easements are reasonably protected from future disturbance and watershed degradation. The plan goes on to suggest that watersheds that are less than 25% disturbed but also less than 75% protected need additional protection to avoid future water quality degradation. Less than 25% of Boot Lake's watershed is disturbed, but less than 75% of the lake's watershed is currently protected by public ownership or conservation easements suggesting that protection efforts may be the most appropriate watershed management strategy to maintain or improve water quality.

MN DNR Ecological and Water Resources staff identified sensitive shorelands around several lakes in Cass and Hubbard Counties, using a model that incorporated data about wetlands, hydric soils and loon nesting areas to identify lakeshore areas used by focal species, areas of high biodiversity, and critical and vulnerable habitats. If possible, Boot Lake's shoreline should be surveyed, and efforts should be made to protect those sensitive shorelands, to identify important spawning areas or other critical aquatic habitat on Boot Lake, and to protect those areas from further development or habitat degradation.

Fisheries personnel will continue efforts to inform and educate the public about the value of riparian and aquatic habitats (water quality, vegetation and substrates), and the need to protect or restore them. Efforts of local, state or federal groups, agencies or individuals to maintain or improve water quality or fisheries habitat in Boot Lake will continue to be encouraged, supported and assisted. Aquatic plant management and work in protected waters permit applications will be reviewed, and recommendations will be provided to minimize loss or degradation of riparian and aquatic habitats. In particular, existing or prospective lakeshore property owners should be advised of the

benefits of riparian and aquatic vegetation in filtering runoff, as habitat and for shoreline protection. They should be encouraged to maintain existing or restore destroyed vegetation. They should be given options to obtain access to open water or to reasonably use lakeshore property, but still maintain as much vegetation as possible. Fisheries personnel will also work with developers of private land or planning and zoning authorities whenever possible, to provide recommendations and define guidelines for aquatic plant management or protection of sensitive habitat. In cases of erosion, property owners should be advised of options to protect their shorelines. Options may include reshaping, revegetation, or as a last resort in severe cases, rip-rap. Recommendations can be provided on a case by case basis.

LAND ACQUISITION:

Boot Lake has a state owned public access site with a concrete ramp located on the north end of the lake. Public access appears to be adequate for the present. However, additional land acquisition may be considered in the future to satisfy increased recreational demand or to ensure accessibility for shore fishermen, elderly or disabled. Any improvements in access should be weighed with anticipated negative effects of increased use.

Consideration should be given to acquiring property, acquiring conservation easements or using cost-share programs to protect additional lands in Boot Lake's watershed in order to maintain or improve lake water quality. Priority should be given to protecting riparian areas that will also maintain or improve physical habitat in the lake. High priorities will be identified spawning areas, sensitive shorelands, and other critical habitat, to protect them from development or further degradation, or to improve habitat in those areas. The highest priority will be to protect large tracts of privately owned undeveloped shoreline that meet those criteria. Consideration might also be given to acquiring property or using cost-share programs to protect marginal land and critically eroding areas, or provide vegetative buffer strips along the lakeshore or tributaries.

STOCKING PLANS:

Walleye fingerlings should continue to be stocked in Boot Lake at a density of 2 pounds per littoral acre (165 pounds total) in 2018. Walleye fingerling stockings have sometimes included older, larger fish and consequently, lower numbers. Larger fish typically have better survival, so fewer can be stocked and achieve similar results. However, there is a point when stocking too few will not produce desirable results. If stocked Walleye are less than 15 per pound average size, additional Walleye should be stocked to compensate for the lower numbers, if they are available. Stocking older fish in addition to fingerlings confounded the 2017 evaluation. Attempts should be made to stock only true fingerlings, if they are available.

Walleye fry should be stocked at a density of about 1,000 per littoral acre (100,000 total) in even numbered years from 2020 through 2024. Fall electrofishing should be conducted following fry stockings. A goal for a successful fry stocking will be determined from fall electrofishing in 2018 and 2019. If that goal is met, the fry stocking and/or natural reproduction will be considered successful. If electrofishing catch rates of young of the year Walleye in the fall following fry stocking do not meet the goal, natural reproduction and/or the fry stocking will be considered unsuccessful and Walleye fingerlings will be stocked at a density of 1 pound per littoral acre later that fall. If fry stockings have consistently proven unsuccessful in 3 attempts, following the 2024 stocking, Walleye stocking should revert back to fingerlings at a density of 1 pound per littoral acre in even numbered years. If fry stockings have generally been successful, that stocking strategy should continue without the need to electrofish and without the fingerling contingency stocking.

Recommendations for future changes in Walleye stocking schedules, densities, or sizes of fish will be based on results of evaluations. Walleye stocking frequency or rates could be adjusted in an attempt to increase abundance of Walleye, but only if abundance of Yellow Perch warrants, if other fish populations are not negatively affected, if growth or condition of Walleye are not jeopardized, and if Walleye stockings appear to be contributing significantly to the Walleye population. Walleye stocking frequency or rates may be decreased if Walleye stockings do not appear to be contributing significantly to the Walleye population or if other fish populations (particularly Yellow

Perch) are being negatively affected.

EVALUATION PLANS:

Fisheries sampling information will be used to evaluate population characteristics (abundance, relative abundance, size structure, age structure, growth or condition) of Walleye, Yellow Perch, Northern Pike, Black Crappie, Largemouth Bass, Bluegill, and forage fishes. Fisheries sampling information will also be used to build a more complete database, allow better comparisons of species' population characteristics over time, and might aid with evaluation of community interactions. Results will be used to evaluate and adjust management efforts, including stocking, if necessary to achieve desirable levels of abundance and size structure for managed fish species and forage fishes at minimum costs. Fall electrofishing for young of the year Walleye in 2018 and 2019 will be used as a baseline estimate of catch rates to expect from natural reproduction and to develop a goal of catch rates to expect from a successful fry stocking. Fall electrofishing in 2020, 2022 and 2024 will be used to evaluate fry stockings in spring of those years. Fall electrofishing in 2021, 2023 will be used to refine the goal for successful fry stocking. Periodic targeted sampling will provide information about physical and chemical characteristics of the lake and its watershed that can be used to monitor and evaluate long term habitat trends.