Regulation Proposal Form

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Proposal Title	
Diamond Lake Northern Pike Regulation Change	
Author	**Date**
Scott Toshner	06/30/2011

Location Information:

Affected water(s)	
Diamond Lake	
County	**WBIC(s)**
Bayfield	2897100

Upstream/downstream boundaries, if applicable—Law Enforcement should be consulted
n/a

Will this regulation affect Ceded Territory water and are there any anticipated impacts to tribal fisheries?
Yes ☒ **No** ☐

Current Regulation

Minimum length of 32 inches and a daily bag of one fish for northern pike.

Proposed Regulation

Minimum length of 26 inches and a daily bag of two fish for northern pike.

Management Goal

Summary statement that characterizes the desired fishery (e.g. provide a naturally reproducing harvest-oriented walleye fishery; provide a bass fishery dominated by large adults that maximizes predation on smaller fishes)

Restore northern pike population in Diamond lake to quality size structure, while allowing limited angler harvest.

Description of the Water(s) and Fishery

Provide a brief description of the water(s), past regulations and other management actions. Summarize all applicable fisheries data, particularly from surveys meeting protocols (Table 1).

Diamond Lake is a 341 acre drainage lake near the headwaters of Eighteen Mile Creek in Bayfield County. Diamond Lake is a low range mesotrophic lake with clear water, has private riparian ownership along the entire lake with the exception of the public access on the southern end of the lake and is a popular recreational lake in the area. Diamond Lake has a maximum depth of 83 feet and a total alkalinity of 33 mg/l.

Diamond Lake has a long stocking history. Walleye have been the only species stocked since 1969. Prior to 1969 the majority of the stocking involved rainbow trout and largemouth bass and to a lesser extent northern pike, smallmouth bass and brown trout. Rainbow, brown and brook trout were stocked from 1959 to 1968 in an attempt to create a two-story fishery. Survey results from 1968 found few trout and little carry over into subsequent years from stocking; at that time trout stocking was discontinued and walleye stocking was initiated (Weiher 1972). Walleye stocking began in 1969 and was intended to establish a self-sustaining fishery that might exercise biological control over an abundant but slow growing bluegill population. Prior to 1969 there had been only a remnant walleye population (Pratt 1976). Walleye stocking was discontinued in 1980 due to evidence of natural reproduction and a decline of black crappie and bluegill (Schram 1981). The first walleye population estimate occurred in 1990 and found that six walleye year classes were produced naturally after stocking had been discontinued. However, after the six naturally reproduced year classes of walleye there were 5 years with no evidence of natural reproduction and bluegill abundance had reached levels that were comparable to levels prior to walleye stocking (Kampa and Sand 1991). Kampa and Sand (1991) found this perplexing and speculated that Diamond Lake did not have habitat conditions conducive to walleye reproduction since walleye were present in the lake for many years prior to stocking even though their numbers were just detectable. However, the six year classes of naturally reproduced walleye seemed to diminish this argument. The authors also speculated that the presence of smelt in Diamond Lake might have also been a factor, suggesting that smelt could be significant predators on early life history stages of walleye.

Whether environmental conditions or smelt predation acted alone or in concert in walleye declines in Diamond Lake was unknown.

The current northern pike regulation (32 and 1) was promulgated in 1995 with the goal of producing a higher quality northern pike fishery and encouraged by information which indicated presence of a smelt and cisco forage base, good growth rates and good thermal conditions for northern pike (Scholl 1994). Pre-regulation implementation a survey was completed and post-regulation implementation four surveys have been completed, the last in 2009. These surveys collected relative abundance, length frequency and angler catch and harvest data. These data show that the intent of the 32 and 1 regulation was not met.

Evaluating the 32 and 1 northern pike regulation after the 2009 comprehensive survey was a management recommendation of the 2005 fishery survey report (Toshner 2005). Relative abundance of northern pike has increased since 1990 (0.9 fish/lift) to an average of 2.3 fish/lift (N = 4, SD = 0.58), but is still considered low. The length frequency of northern pike captured during spring fyke netting period show that overall the quality of the northern pike fishery has not improved (Figure 1). Only one northern pike over 32 inches has been found in the four survey periods since the regulation change. Creel surveys indicate that angler catch has increased especially from 2006 to 2009 (Table 1). However, the increase in angler harvest from 2006 to 2009 was due to the illegal harvest of northern pike under 32 inches. In all years post regulation change angler harvest has been low to non-existant, therefore angler harvest is not likely the lack of increase in size structure of the northern pike population. Benike (2004) found that Largon Lake in Polk County, Wisconsin, took eight years for the 32 in minimum length regulation to produce significant differences in northern pike size structure. Diamond Lake has had the 32 and 1 regulation for 14 years and still no differences in size structure can be detected. Considering that Diamond Lake is less productive than Largon Lake it may not have the productive capacity to produce growth rates of northern pike that enable populations to increase size structure significantly.

Implementing a 26 and 2 regulation could subject up to 19% of the northern pike population to angler harvest if the average for post-regulation change fyke netting surveys is used a benchmark. The abundance of northern pike over 26 inches was low in all surveys and the angler harvest would likely be low. Since the bulk of the northern pike population is currently below 26 inches, and has been throughout survey history, harvest of fish over 26 inches would likely have little impact on total abundance.

Currently Diamond Lake is receiving fall fingerling walleye stockings every year at a rate of 5 fish/acre and a restrictive walleye regulation of a 15 inch minimum length limit and a 20 to 28 inch no harvest slot with only 1 fish over 28 inches allowed has been implemented in an attempt to reestablish a naturally reproducing walleye population.

Table 1. Angler catch, harvest, directed effort (%) and total angler pressure (hr/acre) of northern pike from creel surveys from 1996 to 2009 for Diamond Lake, Bayfield County, Wisconsin.

Year	1996	2003	2006	2009
Catch	745	232	798	1249
Harvest	8	2	0	34
directed effort (%)	19	13.4	19	14.6
proj pressure (hr/acr)	13.6	4.8	10.5	12.8

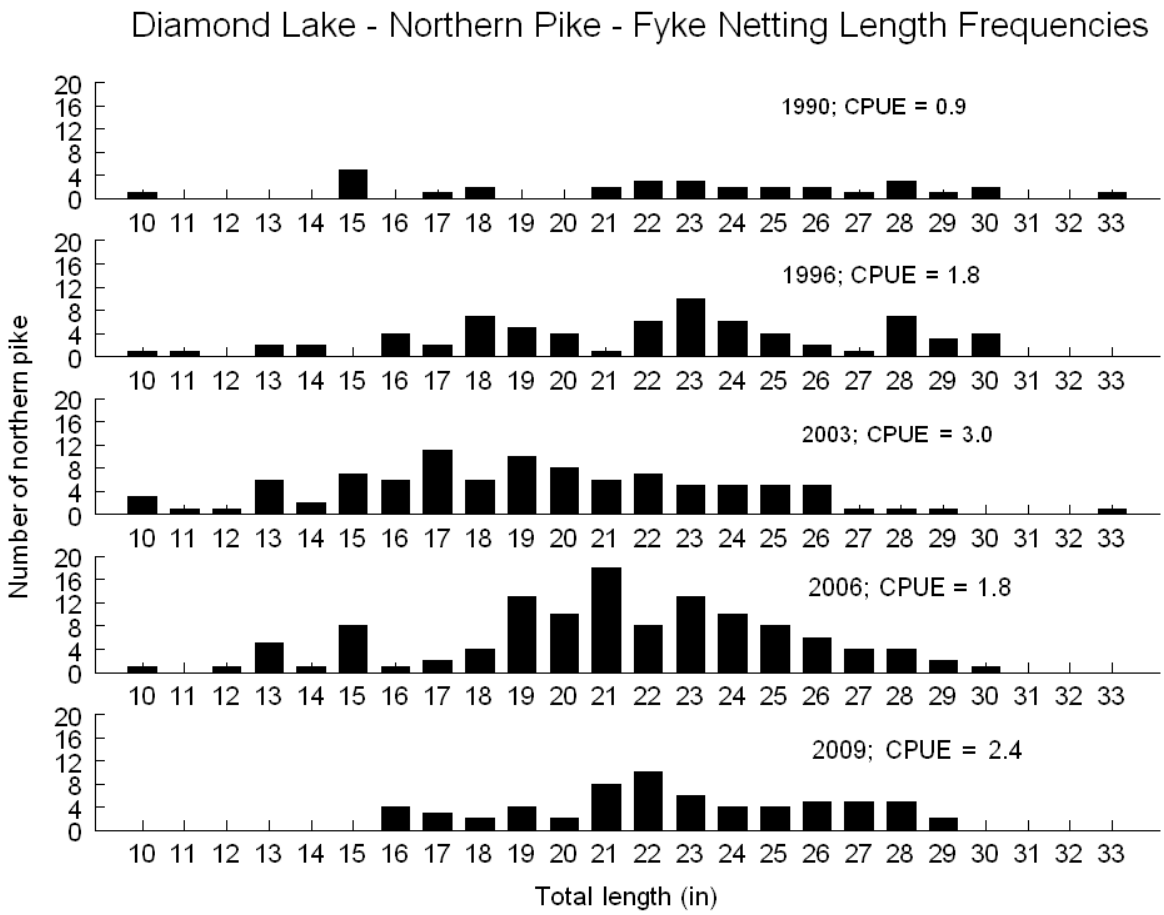

Figure 1. Northern pike length frequency and relative abundance (CPUE) for Diamond Lake, Bayfield County, Wisconsin.

Management Objective(s)

a) Goals are general, objectives are specific. Objectives are used to evaluate the effectiveness of your action and determine if you have achieved your goal. Provide a management objective that is specific, measurable, able to be achieved, related to the goal, and has a temporal component (e.g. increase walleye harvest rate to 0.1 fish/hour while maintaining recruitment at or above 10 YOY/mile within 5 years; increase largemouth bass RSD14 to 35 and bluegill RSD8 to 15 within 5 years

Increase northern pike PSD to 70 and RSD-28 to 20 as measured by SN1 sampling protocols within 8 years of regulation implementation.

b) Describe how the management objective and associated target levels for metrics were developed (e.g. lake management plan, stakeholder meeting, comparison to other water(s)).

Management objectives were derived from using the size structure from previous size structure levels in Diamond and comparision to other regional levels.

Current Problem

Use survey data or provide context for a similar water or group of waters (e.g. lake type, watershed) to demonstrate how the fishery is not meeting the desired management objective. Identify hypothesized problem(s) you hope to address.

Diamond Lake has the biological potential to produce quality length northern pike. Since the 32/1 regulation went into effect in 1995 northern pike PSD has declined from a high of 73 in 1990 to 43, while larger northern pike (RSD-28) proportions have declined during the same period from 28 to 4. The 32/1 regulation failed to increase northern pike size structure and essentially elimiated any angler harvest from Diamond Lake.

The current northern pike regulation (32 and 1) was implanted in 1995 with the goal of producing a higher quality northern pike fishery. Pre-regulation implementation a survey was completed and post-regulation implementation four surveys have been completed, the last in 2009. These surveys collected relative abundance, length frequency and angler catch and harvest data. These data show that the intent of the 32 and 1 regulation was not met.

Relative abundance of northern pike has increased since 1990 (0.9 fish/lift) to an average of 2.3 fish/lift, but is still considered low. The size structure of northern pike captured during spring fyke netting period show that overall the quality of the northern pike fishery has not improved. Only one northern pike over 32 inches has been found in the four survey periods since the regulation change. Creel surveys indicate that angler catch has increased especially from 2006 to 2009. However, the increase in angler harvest from 2006 to 2009 was due to the illegal harvest of northern pike under 32 inches. In all years post regulation change angler harvest has been low to non-existent; therefore angler harvest is not likely the lack of increase in size structure of the northern pike population. Diamond Lake has had the 32 and 1 regulation for 14 years and still no differences in size structure can be detected. Considering that Diamond Lake is less productive it may not have the productive capacity to produce growth rates of northern pike that enable populations to increase size structure significantly.

Implementing a 26 and 2 regulation could subject up to 19% of the northern pike population to angler harvest if the average for post-regulation change fyke netting surveys is used a benchmark. The abundance of northern pike over 26 inches was low in all surveys and the angler harvest would likely be low. Since the bulk of the northern pike population is currently below 26 inches, and has been throughout survey history, harvest of fish over 26 inches would likely have little impact on total abundance.

Proposed Regulation Justification

How is the regulation change expected to meet your objective(s)? Demonstrate expected results of the regulation using tools such as modeling, comparisons to other waters, peer-reviewed literature, etc...

The justification for the proposed regulation was derived from statewide guidance memo for regulation changes and is the southern portion of Wisconsin's standard northern pike regulation. The change to a 26 and 2 regulation for northern pike would increase angler harvest opportunity while keeping predator numbers high in an attempt to control rainbow smelt through predation.

Evaluation Plan

Provide a suggested plan and timeline for evaluating whether the objectives are met in response to the regulation change. Indicate potential courses of action if objectives are not being met. If proposed regulation is not part of the "toolbox" (Table 2) the evaluation plan needs to be additionally detailed with an explanation of how the costs of evaluation will be covered.

Diamond Lake is a "treaty trend lake" and therefore has comprehensive surveys completed every 3 years. This will enable the effects of this regulation change to be tracked over time just as it has to this point in time. Assessments will be done using SN/1 protocol.

Previous Action

Include details on previous regulation proposals that were intended to address the current problem, if applicable.

Northern pike regulations have changed over time in Diamond Lake. There was no minimum length and a bag limit of 5 northern pike until 1995 when a 32 in minimum length limit and a bag limit of one was implemented. .

a. Has the proposal previously been proposed for consideration by the FH Board or in Spring Hearings? It has been through the spring hearings in the form of a citizen resolution.

b. Has a similar regulation been considered for other nearby waters? Yes, Tomahawk and Sandbar Lakes in Bayfield County have the same regulation.

Public Participation in Developing Proposed Regulation

Was input solicited from stakeholders when developing the proposed regulation change? Include documented comments from affected user groups (positive and negative), contacts made with local Conservation Congress Representatives, lake associations, angler groups, etc…

Initially members at the annual meeting of the Diamond Lake Association requested the change of northern pike regulations in 2005. At that time WDNR related that gathering more data would enable better evaluation of the regulation and that after the 2009 survey a management decision could be made.

A resolution was introduced in the 2010 spring Conservation Congress hearings which requested the change in the northern pike regulations detailed above. A copy of the resolution is attached. The resolution passed with 32 yes and 2 no votes. The Chairperson of the Bayfield County Conservation Congress (Jerry Merryfield) helped Mr. Goeltz draft the resolution and has been involved in the process. This regulation will affect Ceded Territory water and the impacts to tribal fisheries would be neutral.

Small Business and Fiscal Effect

Explain who is likely to be economically impacted and in what way. If possible, provide estimates.

It is difficult to estimate the ecomomic impact of this regulation, but it would be reasonable to expect increased angler activity with the potential to harvest a few northern pike.

Draft Question: **for inclusion in Spring Hearing questionnaire**

This proposal would (insert proposed regulation): Do you support changing the northern pike regulation on Diamond Lake in Bayfield County from a 32 inch minimum length and bag limit of 1 fish/day to a 26 inch minimum size limit and a bag limit of 2 fish/day?

Northern pike relative abundance, length frequency, angler catch and harvest data collected pre and post implementation of a more restrictive regulation in 1995 show that the objectives of the regulation are not being met. In addition, citizens have expressed the desire to have the ability to harvest a limited number of northern pike. Changing the regulation to a 26 inch length limit and a 2 fish/day bag limit would continue to protect the northern pike population abundance while affording anglers the opportunity to harvest an occasional northern pike.

The Management Goal is: Restore northern pike population in Diamond lake to quality size structure, while allowing limited angler harvest.

This regulation proposal is one tool to help meet the management goal because: It would protect northern pike from harvest until reaching quality length. As such northern pike would be available for angler harvest and help provide biological control for smelt populations.

Do you favor : Changing the minimum length limit for northern pike in Diamond Lake from 32 inches to 26 inches, and increasing the daily bag from one fish to two fish?

Fish Team Supervisor Regulation Proposal Review Checklist

Proposal Title		
Diamond Lake Northern Pike Regulation Change		
Author	**Reviewer**	**Date**
Scott Toshner	Terry Margenau	8/01/2011

Location Information

Affected waterbody(ies)?	
Diamond Lake	
County	**WBIC(s)**
Bayfield	2897100

Fish Team Supervisor Reviewer Notes:
This proposal is a corrective response to a statewide northern pike initiative from the mid-1990s. One of the goals was to establish a few "trophy" pike waters. Diamond Lake was selected because of it's forage base cool and water refuge. Howvever, after 15+ years the goals of establishing a trophy northern pike fishery have not been realized. Further, the quality of the northern pike size structure has decreased. This proposal aims to restore/create a northern pike fishery where anglers can have limited harvest yet the overall size structure is protected allowing biological control for the smelt population. Everybody wins.

Recommended Action by Fish Team Supervisor Approve ☒ Reject ☐

Regional Fish Supervisor Regulation Proposal Review Checklist

Proposal Title		
Diamond lake Northern Pike Regulation Change		
Author	**Reviewer**	**Date**
Scott Toshner	Steve AveLallemant	08/05/11

Location Information

Affected waterbody(ies)?
Diamond Lake

Regional Fish Supervisor Reviewer Notes:
The background information in the draft question however could be shortened considerably. Much of the narrative uses terms unfamiliar to most folks who would read it (i.e. not biologists). Suggest it be reworded to more simply state/show that sizes of northern pike have not improved in 15 years of regulation.

Recommended Action by Regional Fish Supervisor Approve ☐ Reject ☐

Species Team Regulation Proposal Review Checklist

Proposal Title		
Diamond Lake Northern Pike Regulation Change		
Author	**Reviewer**	**Date**
Toshner	Cunningham	12/28/2011

Location Information

Affected waterbody(ies)?
Diamond Lake

Species Team Reviewer Notes:
(Cunningham-Lead Reviewer) The objectives from the 1995 NOP Regs Proposal for the 26/2 bag were:
1) increase the size and number of northern pike caught by anglers; specifically improve catch rates of 20”-26” fish
2) increase the numbers of northern pike (density) and their reproduction (recruitment)
3) Improve population size structure
3) decrease angler harvest

GIFSIM modeling simulations suggested that fishery characteristics for northern pike will change after the 26/2 bag in the following ways:
1) Anger catches will increase 42-59%;
2) Mean weight of harvested pike will be 3.3-4.3 times heavier;
3) Northern pike yield (total lbs harvested) will decrease 8-32%;
4) Angler harvest (numbers of pike) will decrease 65-85%.

The selection of pike special regulation waters was based on the following; fast pike growth, limited recruitment (% littoral), large-sized soft-rayed prey, and cool water refugium often present (mean and max depth).

The goal of the NOP Special Regulations waters were to:
Increase the opportunity to catch bigger pike.
More specifically, the objectives of the 32 and 40-inch limits were to improve /restore size structure and catch rates of quality sized pike in lakes that can support them. Diamond Lake has all of the attributes for successfully managing for quality northern pike (limited recruitment, deep cool-water refugium, soft-rayed prey). Harvest goals were never an element of the establishment of the 32-inch minimum regulation. The 1995 goal was to increase the opportunity to catch bigger pike. I would argue that the Diamond Lake 32-inch minimum was successful in part, as CPE's increased from 0.9 np/net lift in 1990 to 2.4 np/net lift in 2009, however, size-structure did not improve. Admittedly the size structure has not increased. But Diamond Lake, in part, was selected in 1995 because it had an excellent size structure we sought to protect. The lack of any further size structure improvements may be more related to angler non-compliance, as Pierce and Tomcko have shown that is doesn't take a lot of non-compliance to negate potential benefits. I doubt in the Diamond Lake Pike population has experienced compensatory growth problems given the modest increases in density. In that size structure is the outcome of growth and mortality schedules, I don't understand how less protection will improve size structure? This situation seems quite similar to the Butternut Lake (Forest Co.) proposal, where our management objective have changed more so than the described failure of the reg. to achieve a given outcome. From our earlier modeling we knew harvest would decrease >85%. Well, on Diamond I get the impression that the harvest reduction is much much greater (Table 1 doesn’t contain the 1990 estimates). However, directed effort for pike has not declined from 1996-2009 so anglers still enjoy fishing the pike with the 32/1. I quess some members of the local public are not yet ready for primarily a Catch and Release Pike Fishery. In stark contrast to the Lake Six (Iron Co.) pike proposal, Diamond Lake can be managed for quality pike and the proposed 26/2 bag remains a better choice than no min length/5 daily.

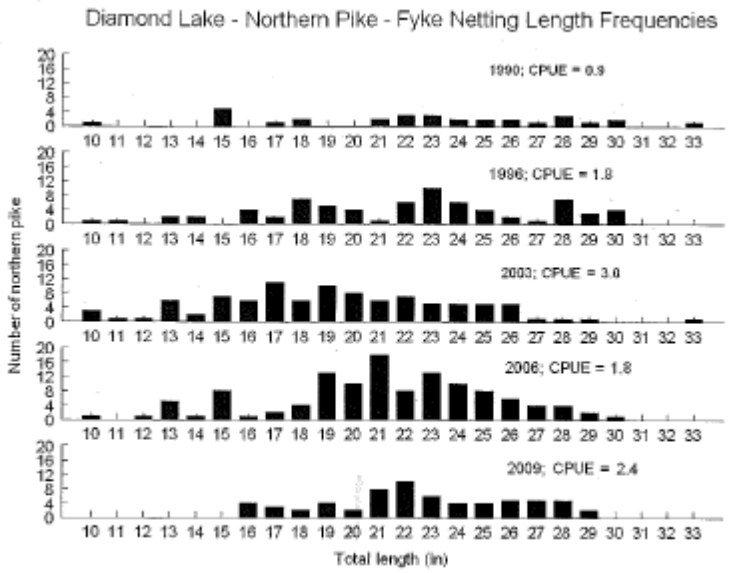

Figure 1. Northern pike length frequency and relative abundance (CPUE) for Diamond Lake, Bayfield County, Wisconsin.

Recommended Action by Species Team Approve X☐ Reject ☐