

BUCK LAKE WALLEYE MANAGEMENT

Fisheries Management Update - Prairies Area

July 2011



Government
of Alberta ■

Background

Buck Lake has native fish populations of Walleye, Lake Whitefish, Northern Pike, Yellow Perch, Burbot, White Sucker, Trout-perch, Brook Stickleback, Iowa Darter and Spottail Shiner. The lake has a long history of providing an excellent summer Walleye sport fishery and a winter Lake Whitefish commercial fishery. It also supports a First Nations fishery.

Over the past decade, fisheries biologists have noted a decline in the populations of both Walleye and Lake Whitefish. Furthermore, the size of Walleye being caught has decreased. These trends are a concern to the resource users who fish Buck Lake, as well as the fisheries biologists who manage it.

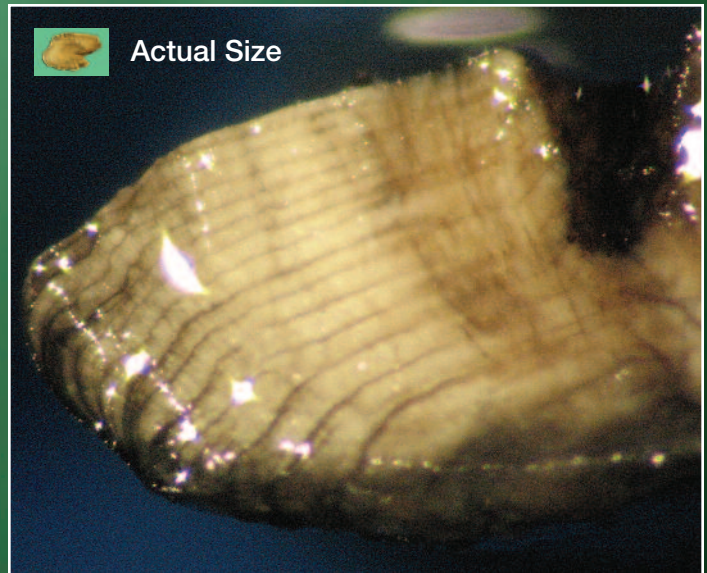
Recreational fishing, ongoing summer kills and cumulative habitat loss are currently the main factors affecting fish populations in Buck Lake. Other factors, such as the harvest of Lake Whitefish through the commercial and First Nations fisheries are relatively minor. Recent surveys of recreational fisheries indicate that the current minimum size limit regulation on the recreational fishery is responsible for the decline in Walleye size.



Collecting Biological Data

Alberta Sustainable Resource Development and the Alberta Conservation Association monitor fish populations in the lake using index netting surveys and angler surveys. Over the past 10 years, index netting surveys were completed in 2004, 2005, 2006, 2007, 2008 and 2010, and summer angler surveys were conducted in 2004, 2005 and 2008. The combined research and data from these two health determination methods give biologists a good indication of how well fish populations are doing in Buck Lake.

The “rings” on this otolith (earbone) indicate this fish is 15 years old.



The two main tools for monitoring fish populations in Alberta lakes are index netting surveys (Fall Walleye Index Netting surveys or FWINs) and angler surveys (creel surveys).

Index netting surveys are done in the fall when water temperatures are between 10°C and 15°C, and Walleye are most evenly distributed throughout the lake. Sampling locations are randomly chosen. The nets have eight different panels with varying mesh sizes to ensure fish of different sizes are caught. Fish caught are sampled for length, weight and gender. Structures such as fins or otoliths (bones in inner ear), are collected to determine the age of the fish. Validation studies show this sampling methodology is very accurate for determining the abundance of Walleye and less accurate for determining Northern Pike abundance. Validation studies have not been completed for other species such as Lake Whitefish or Yellow Perch.

For angler surveys, the number of boats and anglers are counted on the lake to determine the amount of angler use or angler hours. Anglers are interviewed at the boat launches to determine catch and harvest rates. This provides information about the amount of fishing pressure on the lake and how many fish that anglers catch and release or take home.



Status of Fisheries in Buck Lake

Why were there changes to the Walleye regulations?

A research project was started in 2005 to examine how the fisheries regulations may affect the growth and size of Walleye. This project was initiated to address concerns about small or stunted fish at a number of lakes in Alberta, including Buck Lake. As part of the study, a specific change to the Walleye regulations was implemented which reduced the legal possession size limit of Walleye on Buck Lake from one fish over 50 centimetres (total length) to one fish over 43 centimetres (cm). This change to the Walleye regulations was intended to be short term and last only a few seasons as part of the research experiment. The project was extended, however, because of the reluctance of anglers to change the new harvest regulation and the interest by fisheries biologists in collecting additional data. The research data now conclusively indicates that the current regulation does not support a sustainable Walleye population and must be changed.

Understanding the need for changes to the Walleye regulations.

After the reduction in the size limit for Walleye in 2005, fisheries biologists saw a dramatic change in the fishery. The time anglers spent angling during the summer increased almost five times from 4.4 hours/hectare (ha) in 2004 to 21.3 hours/ha in 2008. The Walleye yield, which is the weight of Walleye harvested (includes the estimated weight of the Walleye that died from catch-and-release mortality) increased from 0.3 kilograms per hectare (kg/ha) in 2004 to an unsustainable level of 2.3 kg/ha in 2005 before declining to 1.6 kg/ha in 2008. The long-term sustainable yield for a healthy Walleye population in Alberta lakes is about 1.0 kg/ha. The research data clearly indicates that the current Walleye yield from Buck Lake is not sustainable, and fisheries biologists are concerned about the declining Walleye population and the future of the fishery.

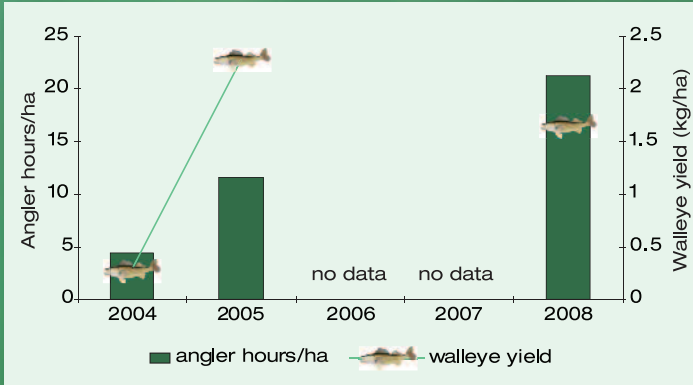
The index netting studies indicate there has been a steady decline in the Walleye population from 44 Walleye per net in 2004 to 26 Walleye per net in 2010.

Over the same time period, a decrease in the size of the fish being caught was also observed. In the 2004 index netting sample, many Walleye between 40 cm and 50 cm in length were caught. However, by 2008 the numbers of Walleye between 40 cm and 50 cm were half of what was being caught in 2004. By 2010, biologists observed that the abundance of the Walleye population and their size had declined well below the levels found in 2004.

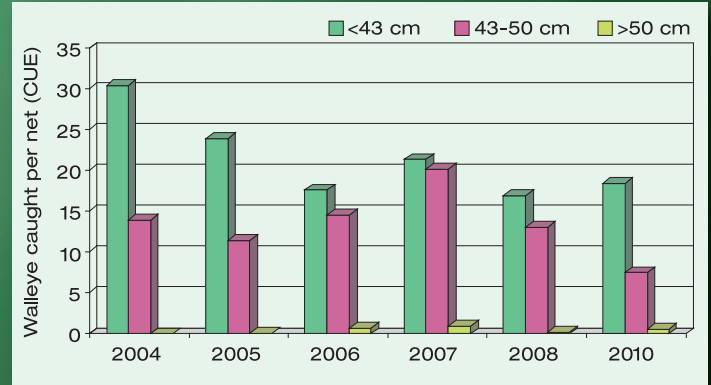
On a positive note, the 2010 data also identified a large number of Walleye between 35 cm and 40 cm. These fish should enter the fishery in the next few years which should help increase both the population numbers and the size of Walleye being caught in the future. Unfortunately, these increases will not be enough to sustain a healthy Walleye fishery under the current regulations and levels of use.

One of the main conclusions from the research project is that the current Walleye regulations, which allow the harvest of one to three Walleye over 43 cm or 50 cm, has a negative effect on the abundance and size of Walleye in the population. In simple terms, the research clearly shows that the current Walleye regulations result in the rapid removal (harvest) of the fastest-growing Walleye from the population. At the same time, the current regulations protect a portion of the Walleye population that grows quickly, then plateaus soon after sexual maturity and never grows larger than 50 cm in size. We refer to this growth-type as “hockey sticks” because of the hockey stick shape of the growth curve. The “hockey stick” growth-type now describes a large proportion of Walleye in Buck Lake. This growth-type in Walleye is not desirable by anglers or by fisheries biologists trying to maintain a healthy, balanced fishery. As a result, fisheries biologists would like to develop a population of Walleye in Buck Lake where a higher proportion of the population is larger than 50 cm to better balance growth-types. If this doesn't occur, natural selection could have longer-term evolutionary consequences such as a population of stunted Walleye that grow no larger than 50 cm.

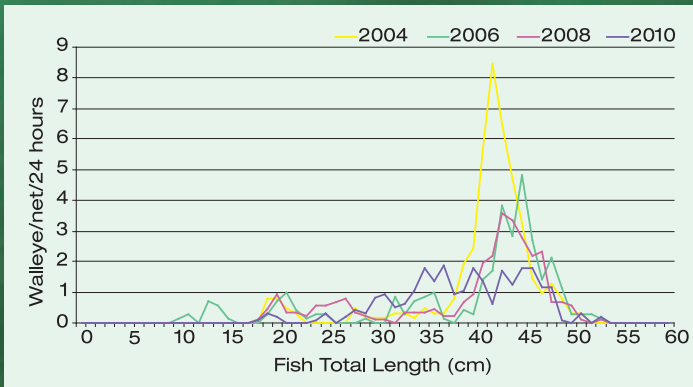
Angler Pressure and Walleye Yield



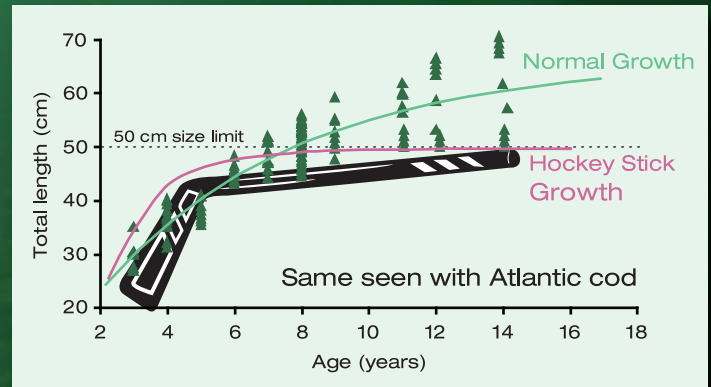
Fall Walleye Index Netting Catch by Size Category



Fall Walleye Index Netting Catch by Size Category



Hockey Stick Growth



The Proposal:

To restore the Walleye population to a better balance between size, growth rates and maturity, Alberta Sustainable Resource Development is proposing a change to the Walleye regulations on Buck Lake. The proposed regulation change would allow a limited harvest of fish less than 43 cm. This regulation change would increase the number of medium to large-size Walleye. Once the population of medium and large-size Walleye recovers, management options will be re-visited.

The proposed changes to Walleye harvest on Buck Lake will be managed through the use of the Special Walleye Licence (tag) system. This system is currently being used successfully on other Alberta lakes such as Pigeon Lake, Lake Newell and Lac Ste. Anne. These Walleye fisheries have responded positively to the implementation of the tag system and are now maintaining healthy Walleye populations.



Why a Tag System?

Why are we proposing the use of a tag system instead of just allowing everyone to harvest one Walleye per day? In Alberta, sport fishing is managed through an open access system. Under this system, everyone who is eligible to sport fish is able to fish as many water bodies as they want, as frequently as they want, during the open season. The changes in the angling use in Buck Lake from 4.4 hours/ha in 2004 to 21.3 hours/ha in 2008 demonstrates how dramatic and variable changes in angling pressure can be. Managing a popular fishery resource that has a limited supply of fish is very challenging for biologists when they do not control the number of people using the fishery. A Walleye tag system enables fisheries biologists to carefully manage the number of Walleye being harvested. It also helps biologists to better determine the effects of other factors on Walleye populations like habitat loss, summer fish kills and illegal harvesting.



Calculating Tag Numbers

Biologists use angler survey data and index netting results to determine the number of tags that will be issued. These studies are done regularly on high-priority water bodies to ensure that the data being used are current. The number of Walleye tags issued in a particular year is determined from the most recent index netting and angler survey results. There are three size categories for Walleye tags: less than 43 cm, 43 cm to 50 cm and greater than 50 cm. Targets have been set for fish population numbers in each of these size categories. If the index netting surveys show Walleye numbers exceeding targets for a size category, this means there is a surplus of fish in that size category that can be harvested. Fishing by other users and accidental mortality caused by catch-and-release fishing are also taken into account before the number of tags to be issued is finalized. In addition, the possibility that not all anglers who are drawn for tags use or keep fish is also considered in the final calculation. Initially, the number of tags that will be issued will be greater than the number of Walleye legally harvested in 2008, the last year an angler survey was done.

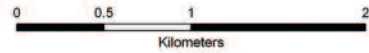
Summerkill

Summer kill is a term used to describe fish kills caused by high water temperatures, low dissolved oxygen levels in the water or a combination of these two factors. Summer kill typically occurs after a period of hot, calm weather, which can also cause large algae blooms to occur. Eventually, the algae dies due to natural causes; however, if the die-off occurs suddenly, it can deplete the oxygen in the water column and cause a fish kill. This depletion of oxygen can occur very quickly, but the recovery of oxygen levels can also occur quickly. In central Alberta lakes, Lake Whitefish are the most sensitive species to high water temperatures and low oxygen levels, so they are typically the first species to be affected.

Buck Lake Bathymetric Survey

in Township 46, Range 06
West of the Fifth Meridian

- Rivers / Streams
- Highways
- Minor Roads
- Provincial Park
- Contours in Meters

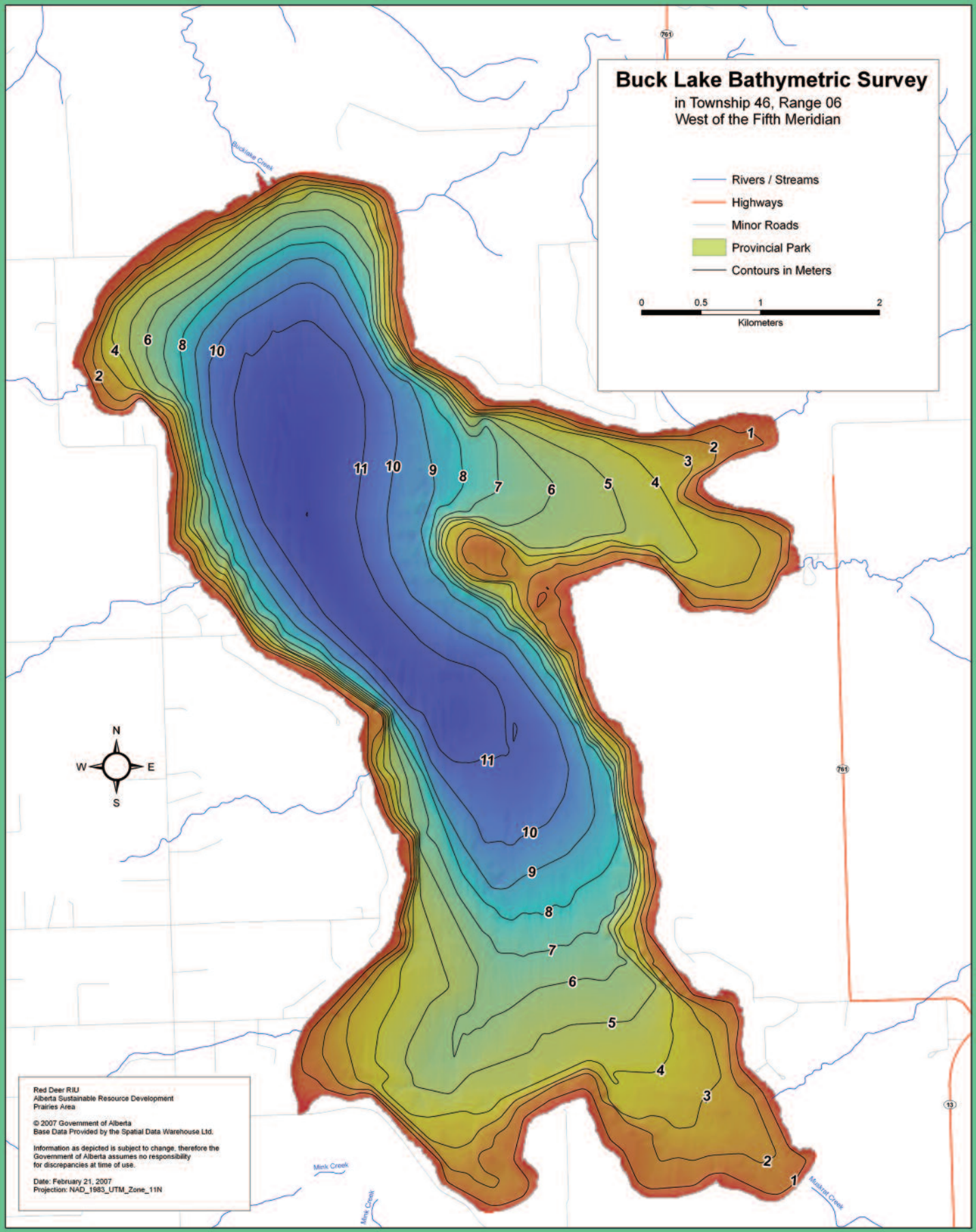


Red Deer RIU
Alberta Sustainable Resource Development
Prairies Area

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Date: February 21, 2007
Projection: NAD_1983_UTM_Zone_11N



Next Steps

During the summer of 2011, meetings will occur directly with anglers and other interested stakeholders to discuss the proposal to change the Walleye regulations and provide an opportunity for feedback. Information will also be posted to www.srd.alberta.ca and www.mywildalberta.com

For more information please contact the Senior Fisheries Biologist in Red Deer:
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Senior Fisheries Biologist
Email: Vance.Buchwald@gov.ab.ca

Fish Habitat

Aquatic shoreline plants such as cattails and bulrushes are important fry-rearing habitat for the young of all fish species in Buck Lake. Shallow vegetated waters along the lakeshore are also important spawning and feeding areas for many fish species. The impacts of ongoing shoreline development such as beach development and the building of retaining walls and clearing of shoreline vegetation (e.g., cattails, bulrushes and waterside shrubs and trees) have reduced Buck Lake's capacity to produce fish.

Fish rely on different parts of Buck Lake for different stages of their life cycles. The whole lake provides habitat for fish in some form or other, whether it be for spawning, feeding, rearing of young fish or food production (e.g., plankton, aquatic insects, crustaceans and snails). If key life cycle requirements are not met or are disturbed due to loss of habitat, fish population numbers are adversely affected. Protection of habitat both within and surrounding the lake is very important in maintaining a lake that is fish friendly and environmentally healthy for us to live and play at.



Additional information may be found at:

Website:

www.srd.alberta.ca/FishWildlife/FisheriesManagement/PrairiesAreaFisheriesManagement.aspx

The results of the research project on Walleye growth characteristics and Alberta's Walleye regulations is available at:

http://repository.library.ualberta.ca/dspace/bitstream/10048/960/1/Spencer_Stephen_Spring+2010.pdf

Creel survey and index netting reports prepared by the Alberta Conservation Association are available by searching under Buck Lake at: www.ab-conservation.com/go/default/index.cfm/publications/conservation-reports/report-series/search/

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