Fish Futures Inc.

Conservation and Enhancement of Freshwater Fisheries

www.fishfutures.net

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Fish News

Scholarship Winner

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In *This Issue*

Fish Futures *Board of Directors*

Ask *the Professor*

Dear Professor,

I have two questions for you now that ice-fishing season is here... How do fish survive under the ice in winter, and how do they behave in winter - are they as active as they are in the warmer months?

Bob B.

Dear Bob,

The topic of how fish over winter is fascinating.

First, the cold water, between 0°C and 4°C under the ice, slows them down, and they need less food and oxygen than they do at warmer temperatures.

They also stop growing, lay down fat and mature fish develop their eggs or milt during the summer and fall, so they have lots of reserves and no high demands during the winter.

The biggest threat to over winter survival of fish is loss of oxygen from the water. This usually happens in lakes with little inflow or outflow of water and a lot of dead plant material.

The decaying plant material uses up oxygen, and, if heavy snow covers the ice on such a lake, little light can get under the ice, and living plants in the water can't make oxygen. When this happens, the large die-off of fish that results is called a winterkill.

Fish continue feeding under the ice, but less than in the summer. As the temperature drops, they move into deeper water and often congregate in areas where there is flowing water such as inlet streams or ground water springs.

Radio-tagged fish move more slowly and over less distance than in the open water season.

Some fish move during fall into the area where they will spawn next spring.

It is also worth noting that whitefish, ciscoes, brook trout, lake trout, and arctic char spawn in late fall, and burbot spawn under the ice in late winter.

Curious about Fish?

Send your Fish Biology / Habitat questions to: **AskTheProfessor@shaw.ca**

Scholarship Winner Studies Algae in Whiteshell Lakes

As a child growing up, Ainslie MacBeth spent time in a family cottage in Whiteshell Provincial Park. Her attachment to that place led eventually to an undergraduate thesis involving the park.

In 1999 an exotic blue-green algae was found in lakes in Whiteshell Provincial Park. Ainslie was determined to find out more about it.

Ainslie continued her work on the project as a Masters of Science student. Winning the 2003 Dr. Ken Stewart Scholarship in Aquatic Sciences, (sponsored by Fish Futures), a Faculty of Science Graduate Student Scholarship, and a Botany Department Scholarship, helped her further her study.

For Ainslie, the alga is a rather fascinating organism. Known to scientists as *Lyngbya wollei*, it has long woolly or dog-hair-like filaments that grow up to a half a metre in thickness at the bottom of the lake. It is known to occur in the southeastern United States.

As an introduced species, *L wollei* is not part of the native Whiteshell environment, and it changes the ecosystem it inhabits. Its dense mats of filaments are unpleasant to walk and swim in and can block light. It is also potentially toxic.

Now that the alga is here, how can it be managed?

Now that the alga is here, how can it be managed? Ainslie's study will serve to answer that question by asking a few others:

- Is the alga toxic?
- How did it get here?
- Are the lakes containing the alga typical of Whiteshell lakes or is there something unique about them?
- Could the alga spread to other lakes in the region?

Having spent two seasons in the field, surveying the park, studying the water quality, land use, and sediment cores, Ainslie is ready to begin a statistical analysis.

This statistical analysis of the data will hopefully provide some meaningful answers to the questions posed.

Ainslie's study will serve as a foundation for future research on the alga, and contribute important information on how to manage *L. wollei*.

SR

What is Fish Futures Inc.?

Fish Futures Inc. is a non-profit, registered charitable organization dedicated to the conservation and enhancement of freshwater fisheries through:

- Sponsorship, development and encouragement of research projects.
- Habitat preservation, enhancement and management projects.
- Public education to increase awareness of the value of freshwater fisheries and the need for conservation and enhancement of fish stocks and habitat.

Fish Futures is managed by a volunteer Board of Directors comprised of members of the public and representatives of government, industry and the scientific community.

For more information about Fish Futures Inc. please contact us at:

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Genetics Vs. Morphology

It has recently been determined that the rosyface shiner no longer exists in Manitoba.

In fact, it never did.

As it turns out, what was thought to be the rosyface shiner is actually the carmine shiner. This error in identification is part of the ongoing debate about how scientists identify and classify fish and other organisms.

Classifying fish to the species level can be difficult. A species is a group of organisms that is genetically (reproductively) independent of all other groups. Very different looking forms may interbreed readily and some identical forms may not interbreed at all.

Traditionally fish are classified based on what they look like - their morphology. With this method, what distinguishes one very similar species from another are minute details such as the number of and length of gill rakers etc. Scientists try to make sure that the characteristics used to distinguish species are inherited characteristics, so morphology is an indirect way of studying genetics. Until about the last 40 or so years, morphology was the best way we had to study genetics, but it is not always a good measure of genetic difference. For example if we based classification on characteristics that can change with temperature or food type, the classification would be meaningless.

Because morphology is not a perfect measure of genetic differences, a few species have since been reclassified. However, most classifications remain unchanged because morphology is still a pretty good measure of genetics.

According to Dr. Kenneth Stewart, author of the soon to be published *Freshwater Fishes of Manitoba*, the use of DNA to identify and classify organisms gives us a direct measure of genetic difference instead of the indirect one we get from morphology. However, technically, it is not yet possible to use DNA in the field. Also, the way we can use DNA at this time lets us look at only a few genes out of the tens of thousands that make an organism what it is. By contrast, each morphological characteristic is usually controlled by tens or hundreds of genes, so a morphological characteristic set samples a much larger portion of an organism's genome than a DNA study can (with present technology). Morphology and DNA studies are thus complimentary, but, as DNA technology advances, it may eventually replace morphology in the *science* of classifying organisms. It will not replace DNA in the practical problem of helping non-scientists identify the organisms they're looking at. For that, we will still need to describe what organisms look like.

The Manitoba population of carmine shiner, when it was thought to be the rosyface shiner, was classified as a threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Previously thought to occur only in the Whitemouth River watershed, the fish have now also been found in Tie Creek, George Lake, Bird River and the Pinawa Channel, however this distribution is still small and the population is isolated from others of its kind.

Dr. Stewart speculates that the carmine shiner probably entered Manitoba by transfer from Upper Mississippi River headwaters in northwestern Minnesota into Red River headwaters. Headwater transfers are still happening because there is no sharp divide between the Mississippi and Hudson Bay drainages. Carmine shiners are found today in the Minnesota River and several Red River tributaries in northwestern Minnesota. However, it's still a long and tortuous route from Red River headwaters in Minnesota to Winnipeg River tributaries in Manitoba. Although some of the channels in which they traveled are probably still available, if the species was destroyed in Manitoba it could not naturally repopulate from the Minnesota populations.

Regardless of the reclassification and the slightly wider range than previously thought, the fish will remain on the threatened list. SR