

# Coldwater Fish in Wisconsin

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As the world progresses, humans are using more and more gases that hurt our ozone layer. When the heat comes from the sun and to the earth, it can get through our atmosphere, but it cannot get back out because of the amount of gases blocked in our ozone layer. Because of this, climate change is happening all over the world. It is even affecting us here in cold, snowy Wisconsin. Climate change, also known as “global warming,” does not just mean that the temperatures increase, it can also mean that the temperatures can decrease. Here in Wisconsin, the temperatures seem to be getting colder every winter and warmer every summer. Here in Wisconsin, not only humans are affected by climate change, but animals are also greatly affected by climate change, especially cool water fish.

Wisconsin is made up of mostly coolwater and coldwater species of fish in cool water and cold water streams, lakes, and ponds. For example, in a report lead in writing by Matthew Mitro (2010), Mitro and assistant writers said, “In addition to over 10,000 miles of managed trout streams, another 22,000 of Wisconsin’s 54,000 stream miles may be suitable for cold water species such as mottled sculpin” (p. 6). Another example of a coldwater fish in Wisconsin is the brook trout. In another article written by Matthew Mitro (2009), he states that, “Coldwater fish have specific thermal requirements and typically thrive in streams in which the mean summer (June-August) daily water temperature does not exceed 22°C” (p. 2). We have plenty of streams and lakes here in Wisconsin that do not exceed that temperature, but the summer heat from the climate change may affect that temperature greatly.

Coldwater fish and cool water fish need that cold water in the streams and lakes to survive. They cannot thrive in the warmer water. During the summer months, lakes become warm on top of the water and cold on the bottom, and the climate change effects will make the

oxygen levels in the cold layer of water at the bottom decrease (Mitro, 2010, p. 6). This will affect the coldwater fish, making their numbers get lower and lower (Mitro, 2010, p. 6). The hotter air in the summer will harshly decrease the number of fish due to the climate change in Wisconsin.

Although it doesn't look good for coldwater fish, there are things that we can do to help preserve them. First of all, we can start by "implementing environmental management activities" (Mitro, 2010, p. 13). One of the biggest things that humans can do to help the cold water fish is to watch what goes into the lakes and streams from groundwater. Chemicals and garbage that go into the water can raise the temperature, adding to the effects of climate change, and we can monitor this to help the coldwater fish. Another thing that we can help is "directing management efforts and resources to locations where they will provide the greatest benefit" (Mitro, 2010, p. 13). This means that there are some streams and lakes that will lose cold water fish to climate change no matter how much is done to help, or that some lakes and streams will be fine even with the climate change and no management needs to be done. We can help preserve the cold water fish if we help out the lakes and streams to make sure they do not get too warm for the cold water fish. If we try to help all of the lakes and streams in Wisconsin, we would be wasting time and money. We need to focus on the lakes and streams that are the most valuable to this problem, otherwise the coldwater fish may be replaced by warm water fish.

When it comes to the topic of whether or not coldwater fish will be replaced by warm water fish in the 21<sup>st</sup> century, I believe it is possible based on the information I found while researching this topic. If the cold water streams and lakes are going to be heated up in the

summer, and trying to manage the streams and lakes is no help, soon the coldwater fish will no longer exist in Wisconsin. If this occurs, and the cold water streams and lakes become warm water lakes and streams, the warm water fish will soon be living in them. For example, in the worst case given by the Wisconsin Initiative on Climate Change Impacts (WICCI) could be that the brook trout goes down by 100% because of the climate change based on the number of brook trout right now, the brown trout could go down by 88.2% because of the climate change, and the mottled sculpin could go down by 95.4% (Mitro, 2010, p. 27-29). The numbers do not look good for the cold water fish, and if the lakes and streams become warm enough for coldwater fish to decrease at these numbers, it would be warm enough for warm water fish to inhabit them.

The climate change that is affecting Wisconsin affects more than we think it does. Not only does it decrease the number of cold water fish in the lakes and streams, but it will also affect the economy. Money is made off of selling fish to stores, and without the fish, we make no money or the price of fish rises significantly. Also, Mitro (2009) states that, "cold water fisheries are a core part of our culture and identity" (p.1). Coldwater fish in Wisconsin make our culture who we are as a state. Our fish fries on Friday nights are huge to our economy. We would still have fish to catch, consider that the warm water fish would inhabit the warmer lakes and streams if the coldwater fish numbers decrease significantly, but they would not be the same.

Cold water fish are a big part of our culture and economy, but they are declining because of the climate change occurring around the world. They need the temperature to be 22 degrees Celsius or lower in order to survive. Because of the streams and lakes heating up, the

warm water fish will begin to inhabit the streams and lakes more and more. We can try to help the cold water fish by focusing on the groundwater that goes into the water and by concentrating our efforts on the lakes and streams that will benefit from it the most, but this may not be enough. Humans are creating the problem with the gases that are being put into the ozone layer, and cold water fish, along with other animals, may have to pay the price for our mistakes.

## References

Mitro, M. (2009). Coldwater Fish and Fisheries WG. In Wisconsin Initiative on Climate Change Impacts. Retrieved November 23, 2014.

Mitro, M., Lyons, J., & Sharma, S. (2010, December). Coldwater Fish and Fisheries Working Group Report. In Wisconsin Initiative on Climate Change Impacts. Retrieved November 23, 2014.