

## CLIMATE TALK

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A few weeks ago, America celebrated the 70<sup>th</sup> anniversary of the end of World War II. While a glorious day for a war-torn world, it came with the devastation of two Japanese cities and launched humankind into the era of the atomic age. Citizens of Hiroshima and Nagasaki that survived the blasts were further exposed to radiation by drinking the water. Little was known at the time of the effects from atomic weaponry, and water remained contaminated for months.

Today the Department of Defense has a new threat to national security: Climate change. In 2014, Secretary of Defense Chuck Hagel stated, "Rising global temperatures, changing precipitation patterns, climbing sea levels, and more extreme weather events will intensify the challenges of global instability, hunger, poverty, and conflict." This statement leads one to conclude that the US military has identified the changing climate as a global problem. It would then seem that humankind has yet again entered a new era: one of global warming.

Looking specifically at our area, weather predictions for the Chequamegon region include an increase in the number of 90° days each year, increases in the frequency of heavy storms, and an increase in the amount of snowfall. But what are the implications of climate change to area waterways?

According to the Coldwater Fish and Fisheries Working Group Report of the Wisconsin Initiative on Climate Change Impacts (WICCI), climate change in air temperature and precipitation will affect water temperatures and flow in streams, likely causing a reduction in all coldwater habitats and fish species in Wisconsin.

Wisconsin has over 54,000 miles of river and stream, with the Wisconsin section of the Lake Superior Basin containing 2,500 river and stream miles. The DNR has classified over 10,000 miles of trout streams in the state, with the basin section having 1,300 miles. While the Lake Superior Basin contains only 5% of the State's total river and stream miles, it contains 12% of the State's trout miles. Many of these are coldwater streams with maximum daily mean water temperatures below 69°F (20.7°C).

Fish such as brook trout are the type of fish that need and depend upon cold water to survive and spawn. Coldwater streams maintain cold temperatures into the summer. Water temperature is a crucial factor in determining where and what type of aquatic life can live.

The WICCI Report further states that climate-induced changes in stream temperature and flow will not be uniform. The ability of streams to buffer changes in warm temperatures and flow will vary. This will directly affect fish in our area.

The USA Journal of Fisheries Biology published an article in 2010 titled "Predicted effects of climate warming on the distribution of 50 stream fishes in Wisconsin". Using computer modeling, researchers



identified estimated habitat loss to fish when average water temperatures increase. Looking specifically at brook trout, if water temperatures increase by 2°F, Wisconsin will lose 43% of known brook trout habitat, with the remaining habitat being primarily in the northern half of Wisconsin. If water temperatures increase by 4°F, Wisconsin will lose 94% of brook trout habitat, with the Lake Superior Basin containing most of the remaining habitat. In a worst case scenario, if water temperatures increase 7°F, it is predicted that all of the current brook trout habitat will be gone.

Climate change is the modern day atomic bomb. But unlike the past, we can plan and take steps to minimize effects as they become apparent. These steps include implementing best management practices to offset the negative impacts to coldwater resources and directing efforts and resources to locations that will provide the greatest benefit.

One of the programs of the Bad River Watershed Association (BRWA) is to reconnect coldwater habitat for brook trout and other native fish. There are hundreds of miles of classified trout streams in the region, and many more miles of undesignated and unknown coldwater streams supporting essential living conditions for trout and other aquatic life. During summer months, these smaller coldwater streams provide a refuge for fish as the summer temperatures rise.

In the Bad River watershed alone, there are over 1000 stream crossings. Many of these crossings, usually culverts, are barriers for fish passage to upstream waters. Using temperature monitors, BRWA identifies cold water streams suitable for trout habitat and then locates impaired crossings in need of restoration.

Unlike the bombings of Nagasaki and Hiroshima, we may not know the full effects of warming temperatures to the earth for years to come. We do know that the Chequamegon region is critical to sustaining coldwater fish habitat in Wisconsin.

*Tony Janisch is Executive Director of the Bad River Watershed Association, a non-profit community environmental organization that engages citizens to monitor the quality and health of area waterways and restores habitat for the benefit of fish and other aquatic life.*