HOW WILL CLIMATE CHANGE AFFECT FRESHWATER FISHING?

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October 10, 2016

IORT-PR-2016-02

ABSTRACT
This fact sheet reviews how climate change can affect freshwater fishing in the United States. Climate change can affect the availability and diversity of target species, the environmental and aesthetic quality of fishing sites, as well as the policies used to manage freshwater fishing.

Inland recreational fishing is a big deal. It results in billions of dollars spent in local economies and millions of dollars generated for state agencies through license sales. To manage for the impacts of climate change on inland recreational fishing, an understanding of the connections between natural and human systems is necessary. There are still plenty of unknown factors, but scientists are beginning to outline how these changes might play out. This fact sheet focuses on:

1. How the changing availability of fish affects fishers;
2. How a changing environment changes fishers’ recreation decisions; and
3. How policy and management decisions toward climate change directly and indirectly change fishers’ decisions and opportunities.

Below, find examples drawn from recent research (Hunt et al., 2016) of how climate change will likely affect the future of recreational fishing in the U.S.

FISHERS AND FISH

Although seemingly straightforward, knowing how the abundance and variety of fish actually affects fishers is not clear. It is easy to assume that there is a strong relationship between the quantity of fish available at a recreational fishing site and fisher wellbeing, but there is not actually much evidence for this. In fact, research has shown catch rates decline much more slowly than fish stock. This is because fishers with different skill levels focus their efforts in different ways. Skilled fishers stick to sites with fewer fish for reasons not related to fish abundance. But, whether the catch matters to the fisher or not, it is clear that climate change will substantially alter fish abundance and variety within inland waters in the U.S.

Some authors estimate that climate change could negatively impact the economic value of recreational fishing by between $101 million and $7.1 billion by the year 2100. This negative impact may occur in several ways. For instance, it could...
occur through reduced distribution and numbers of cold water fish species. In the early 1990s, fishers in western, mountainous, and northeastern states mostly targeted cold water fish. Since that time, the focus has changed overwhelmingly to warm water species. It is not clear that climate change was a direct cause of this phenomenon. Other factors, such as management decisions and overexploitation, could also have had an influence on fish communities.

Climate change also has the potential for positive impacts on fishing in some regions. One study, for instance, looked at the effects of a doubling of greenhouse gas emissions on Rainbow Trout, other trout, and panfish in the northeastern U.S. Within the region, Maine and New Hampshire were predicted to benefit from climate change, though the outcomes for New York and Vermont were less certain.

Increased climate variability can impact fishers through drought. Fishing was down, for example, at Lake Mead on the Arizona-Nevada border after the closure of several boat launches and marinas during low water levels due to drought. In another example, over a quarter of marina operators on the Canadian side of the Laurentian Great Lakes have had to close slips and conduct dredging activities to combat low water levels.

Some scientists have predicted positive impacts on recreational fishing (including inland and marine) as temperatures increase. Higher temperatures would result in longer open water fishing seasons and more comfortable temperatures for outdoor activities. However, it is also important to consider how these warmer temperatures will affect fish populations. Most impacts will be negative, with higher temperatures and lower flow rates resulting in reduced fish diversity and abundance.

Climate change is also expected to increase extreme weather events. Weather and wind damage to boats represented the third most common claim to insurance companies among members of the Boat Owners Association of the United States between 2008 and 2012, up from fifth just a few years before. Such damage will increase costs for equipment, maintenance, and insurance.

**ECONOMICS, POLICY, AND FISHING**

National and local policies aimed at reducing the impacts of climate change can also affect fishing. Efforts to reduce greenhouse gas emissions are already underway in many places around the world. These efforts make energy more expensive by increasing fuel prices. Higher costs, fishery closures, and changes in species and habitat will likely change fishers’ choices in destinations and the number of fishing trips they take. These changes will likely reduce fishing in remote locations, while places nearer to cities will see increased use. Fuel
costs will also affect how people use their boats, concentrating use nearer to boat launches and perhaps increasing the use of non-motorized watercraft.

Although climate models predict more punctuated precipitation across most of North America, the change will likely not be an overall benefit to fishing. Demand for water will likely increase because of population growth, reduced snowmelt runoff, and food production. In many parts of the U.S., maintaining water flow to protect fisheries will be competing with residential, commercial, and agricultural demands. As water temperature, quality, and levels are negatively affected, so too is fishing.

**CONCLUSION**

Climate change has and will continue to impact freshwater recreational fishers and fish. Part of the challenge scientists and managers face is trying to understand how people and systems will respond and protect fish populations and fishing opportunities. To date, research into the effects of climate change on fishing has been very general, making specific impacts of climate change on the well-being of inland recreational fishers highly uncertain. Research is still too limited to make a list of winners and losers. Climate change and social responses to the impact of climate change are likely to create new challenges for both scientists and land managers.

**REFERENCE**