

# Swimming Upstream

## Freshwater Fish in a Warming World

**A changing climate poses new risks for America's freshwater fish. More than 33 million adults spend nearly \$42 billion annually on recreational fishing activities. Warming waters can mean lost habitat for cold-water species, encroachment of species typically found in warmer areas, and exacerbation of existing stressors for fish and wildlife such as habitat loss, pollution, invasive species, and disease. We must act now to protect our treasured freshwater fish resources.**

**W**ater temperatures in rivers, streams, and lakes are increasing, with significant impacts for fish health and distributions. In a study of 40 major rivers and streams in the United States, half have experienced significant warming trends over the past 50 to 100 years. Fish are especially sensitive to water temperatures, as indicated by their generalized grouping into cold-water, cool-water and warm-water species. As water temperatures move away from species' optimal temperature range, growth and survival rates decline, reproductive success declines and the fish become more susceptible to the stresses of pollution, parasites, and disease. Via these mechanisms affecting fish health and populations, water temperatures play a fundamental role in determining the distribution and abundance of the various fish species.



Mikey Sabadic/NWF 2015 Photo Contest



Bill Butcher/USFWS/Flickr

**O**ur freshwater ecosystems have borne the devastating effects of multiple assaults. Intensified land clearing and development have destroyed or degraded shorelines, floodplains, and wetlands. Sediments, pesticides, herbicides, and fertilizers enter our waterways from agricultural land. Excessive water use dries out some streams while dikes, dams, and stream channelization all change the basic ecology of aquatic ecosystems. The introduction of non-native species and diseases creates additional stress. Climate change will interact with these various stressors, in many cases creating even more challenging conditions for fish.



# Actions to Help Freshwater Fish



Mikey Sabadie/NWF 2015 Photo Contest

## Use the Clean Power Plan

The Environmental Protection Agency's Clean Power Plan is a critical step in reducing our country's climate-disrupting carbon pollution and spurring the transition to wildlife-friendly clean energy sources in a flexible way that works for each state. Supporting the Clean Power Plan, protecting it from being weakened, and ensuring it is effectively implemented in the states will have great benefits for fish, wildlife, and anglers. The EPA and implementing state governments need the support of hunters, anglers and conservationists to speak up in defense of the Clean Power Plan and the implementation of state-based clean energy solutions.

## Support Strong Action on Methane

Methane is a potent greenhouse gas that traps more than 80 times as much heat as carbon does over a 20 year time period, meaning a small amount of pollution can have big impacts on climate. The EPA has finalized a rule calling for the reduction of methane emissions from new sources in the oil and gas sector. Next, the EPA must fulfill its promise to cut methane pollution from existing oil and gas operations. These rules need support from sportsmen and women who are seeing the impacts to wildlife firsthand.



Linda Tanner/Flickr

## Safeguard Aquatic Habitats

Healthy ecosystems are more resilient to the potential effects of climate change. Management to reduce other stressors such as water pollution, extreme flooding caused by rapid high-volume runoff from impervious surfaces and agricultural areas, invasive species, and habitat fragmentations will likely reduce the effects of a changing climate. We must work to reduce these other stressors, as well as reduce greenhouse gases such as carbon dioxide and methane.

For more information, visit:

[www.nwf.org/sportsmen](http://www.nwf.org/sportsmen)

