

Subject: : Paflyfish General Forum

Topic: : Fryin' up wild browns

Re: Fryin' up wild browns

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URL:

In regard to the projected future rise in air temperatures and brook trout- I just found this recent study:

Quote:

...Federal agency managers, conservationists, anglers, and people in general have coalesced around the brook trout's plight in relation to the robust nonnative trout, in some cases completely removing all trout from a stream and then starting over with brookies. But in 2006, Forest Service research on the possible effects of rising air temperatures on stream water temperatures sent new ripples of alarm through the community of land managers and trout advocates. The research found that over the next century projected rises in temperature might leave only very high mountain headwaters as refuges for coldwater-dependent native brook trout.

The dismal projection relied on widely accepted assumptions about the relation between air and water temperatures; if the air temperature rises by a degree, the water temperature will follow suit, rising by approximately 0.8 of a degree. Since most climate change models predict a 4 degree rise in air temperature over the next century, this would mean a 3.2 degree increase in stream temperatures. For trout and other coldwater creatures that are already at the southern-most extent of their range, this temperature increase could make their homes too hot for comfort—and maybe for survival.

This seemed like very bad news, but it got Forest Service researcher Andrew Dolloff thinking about factors other than temperature rise—slope aspect, forest canopy, and elevation—that aren't taken into account in the large-scale climate models used in the trout habitat studies. "The models used in the coldwater fish habitat studies assumed a pretty close correspondence between rising air and water temperatures," says Dolloff. "My colleagues and I decided to try to verify this—and to provide some very specific information for future planning—by measuring air and water temperatures in streams that fell within patches identified as brook trout habitat."...

...When studies, including one by researchers in Dolloff's team, suggested drastic reductions in the historical range of native eastern brook trout based on predictions of temperature rise from the major climate change models, scientists from the National Forest System and the Forest Service Southern and Northern Research Stations, launched a pilot study. Fifty study sites were randomly selected from habitats that presently or historically hosted brook trout populations. Mark Hudy, Forest Service Washington Office National Aquatic Biologist at James Madison University, identified the habitats or patches, which are located on both public and private lands. The researchers adorned each of the 50 study sites with two thermographs (digital thermometers) one in the water at the outlet of a brook trout stream and another dangling from a nearby tree.

Day in and day out, the thermographs record air and stream temperatures every 30 minutes. Originally the researchers intended to show how factors like slope and aspect might affect stream temperature, but were in for a surprise when they got readings back from the pilot study in Virginia. "Even in the 50 sites we used for the pilot study it was soon apparent that water temperatures are not always coupled with air temperature, sometimes not at all," says Dolloff. "This suggests that it's really a local matter, and that brook trout might not be as vulnerable to climate change as first projected." During the pilot study, Dolloff began collaborating with Paul Angermeier, a scientist with U.S. Geological Survey (USGS) also based in Blacksburg, to start developing models that combine stream information from the Forest Service and the USGS, a task long in the making and now in process because of a joint climate change research project launched in 2010. For Dolloff it was an easy fit: he and Angermeier have a 25-year history of collaboration.

A wider lens

What started in Virginia has spread, both conceptually and geographically and grown into a full collaboration between the Forest Service and USGS. The study now includes 204 sites and extends from Georgia to Maryland, and the first full year of data has brought good news for trout; the relationship between water and air temperature is relatively insensitive, which means that a rise in air temperature does not lock in a corresponding rise in water temperature. "That said, we also found that the correspondence between water and air temperatures varies a lot from one site to the next," says Dolloff, "It really matters where you are." In sites with a larger drainage area, for example, the water temperature tends to be much more sensitive to air temperature."...

More here-- <http://www.fs.fed.us/ccrc/narratives/good-news-trout.shtml>

That's only a forecast, of course. But the indications are hopeful- as long as the forest canopy manages to stay intact under the projected future climate conditions. I think that's the big unknown factor.