ClimateWire
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5. SCIENCE: Climate will dramatically shift world fish populations *(10/08/2009)*

Lauren Morello, E&E reporter

Climate change is poised to dramatically alter the global distribution of commercially caught fish, according to new research.

The study, published today in the journal *Global Change Biology*, is the first attempt to examine climate change's potential effects on fisheries worldwide. It projects how the shifting ocean temperatures will affect 1,066 species, ranging from tiny krill to sharks.

Tropical regions will be hit hardest, the study finds, with their average "catch potential" dropping up to 40 percent. But northerly waters will benefit from warming, with an average 30 to 70 percent increase in catch potential as species native to southerly climes move north.

"Overall, there will be no difference in the global catch," said Daniel Pauly, an author of the study and a fisheries scientist at the University of British Columbia. But the research suggests that, in the future, the geographic distribution of commercially fished species will be markedly different than it is now.

"There will be winners and losers," Pauly said. "Northern Europe, especially Norway and Iceland, and Alaska will win out. Countries that are in the tropics, for example in the Caribbean or Southeast Asia, will lose out."

The United States, with the exception of Alaska and Hawaii, also appears to be among the losers, along with Indonesia, Chile and China.

In some regions, scientists have already observed species migrating in response to shifts in the temperature and oxygen content of ocean water, Pauly said. Tropical jumbo squid, for example, have migrated north into waters off the coast of British Columbia. Scientists believe the squid are responding to an expanding low-oxygen layer in the ocean's middle depths.

Africa could suffer the most

"They are very mobile, and I presume they're preying on [native species] that haven't moved north yet," Pauly said.

Still, the new study doesn't address how some looming threats to marine life -- including ocean acidification and the expansion of low-oxygen "dead zones" -- could complicate ocean species' ability to adapt to a warmer world.

Those are issues the scientists plan to address in a future paper, Pauly said.

In the meantime, they say they're concerned that many areas where their study projects declining catches are those where fish are a major source of protein for nearby human settlements.

"Many tropical island residents rely heavily on the oceans for their daily meals," lead author William Cheung of the University of East Anglia said in a statement. "These new findings suggest there's a good chance this important food source will be greatly diminished due to climate change."

According to the nonprofit WorldFish Center, many African countries' economies are the most vulnerable to climate-driven changes in fishery hauls, because they rely heavily on fish to supply food and income. Twenty-one of 33 nations on the international nonprofit group's "most vulnerable" list are located in Africa, where fish accounts for half of the animal protein humans consume each day (*ClimateWire*, Feb. 6).

Meanwhile, the U.N. Food and Agriculture Organization concluded in February that climate change is compounding the effects of existing threats to commercial fisheries, such as pollution and overfishing. The report warned that climate change could slow or otherwise alter the course of ocean currents, which help maintain water quality and transport nutrients (*E&ENews PM*, Feb. 22).

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