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MEDIA RELEASE

Scientists propose amphibian protection

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An ecological strategy developed by four researchers, including two from Simon Fraser University, aims to abate the grim future that the combination of two factors could inflict on many amphibians, including frogs and salamanders.

A warming climate and the introduction of non-native fish in the American West's mountainous areas are combining to threaten the habitat that this ecologically critical group of species needs to thrive.

Previous studies predict the combined effect of climate change and non-native fish could cause amphibian populations to decline and even become locally extinct.

In their newly published study in the journal *Frontiers in Ecology and the Environment*, researchers examine this challenge and propose several new climate adaptation tools to reduce threats to amphibians.

The researchers say the novel suite of tools could help prioritize the restoration of amphibian habitats in Western North America's mountainous regions.

Wendy Palen, an SFU ecologist, Maureen Ryan, a postdoctoral fellow at SFU and the University of Washington (UW), Michael Adams, a research ecologist at the U.S. Geological Survey and Regina Rochefort, a science advisor at Washington State's North Cascades National Park, co-authored the paper.

Many amphibians in the American West's mountainous areas need predator-free wetlands and lakes during their aquatic life stages. "Amphibians predominantly use mountainous areas' small, shallow ponds to breed and feed," explains Ryan, the study's lead author.

"These kinds of wetlands are at the highest risk of drying up under climate change due to reduced snowpack and longer summer droughts. Non-native fish, such as brook and rainbow trout, were introduced for recreational fishing almost a century ago. They remove amphibians from the biggest and most stable lakes in the environment. Fish eat most amphibians and even at low densities can devour a lake's whole amphibian population."

Mindful of an opportunity to help amphibians, the researchers collaborated with UW colleagues to develop new maps and hydrological models of climate impacts specific to mountainous regions.

They are using these tools along with biological survey data to identify regions where native species are most threatened by the combined effects of climate change and fish. They then hope to work with area managers who would implement fish removals.

"Our work suggests that removing fish from strategic sites may restore resilience to landscapes where inaction might lead to

tipping points of species loss," says Palen.

The SFU Earth to Ocean Research Group member has been collaborating with Adams since 1999 to evaluate threats to amphibians in mountainous regions.

"We hope newly developed wetland modeling tools can improve climate adaptation action plans so that intact ecosystems persist in the face of a changing climate," says Palen.

Hydrologists and remote sensors helped the researchers develop models that project a substantial loss of wetlands in America's western mountains over the next 40 to 80 years.

They note the combined threat of climate change and fish to amphibian survival also exists in B.C. but records of where fish have been introduced are scarce.

The researchers remind us that 95 per cent of the American West's lakes are currently stocked with non-native fish, so removing them from a few sites doesn't threaten recreational fishing opportunities.

Backgrounder:
Non-native fish can be removed using piscicides, such as the organic compound rotenone. Where possible, managers of high-elevation protected areas also remove fish with gill nets, a more arduous approach.

The U.S. Department of the Interior's Northwest Climate Science Centre, the David H. Smith Conservation Research Fellowship Program, the U.S. Fish and Wildlife Service's North Pacific Landscape Conservation Cooperative, the Natural Sciences and Engineering Research Council, and the Canada Research Chairs Program funded this research.

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