

Restoration of Alpine Lakes Stocked with Exotic Sportfish under a Changing Climate



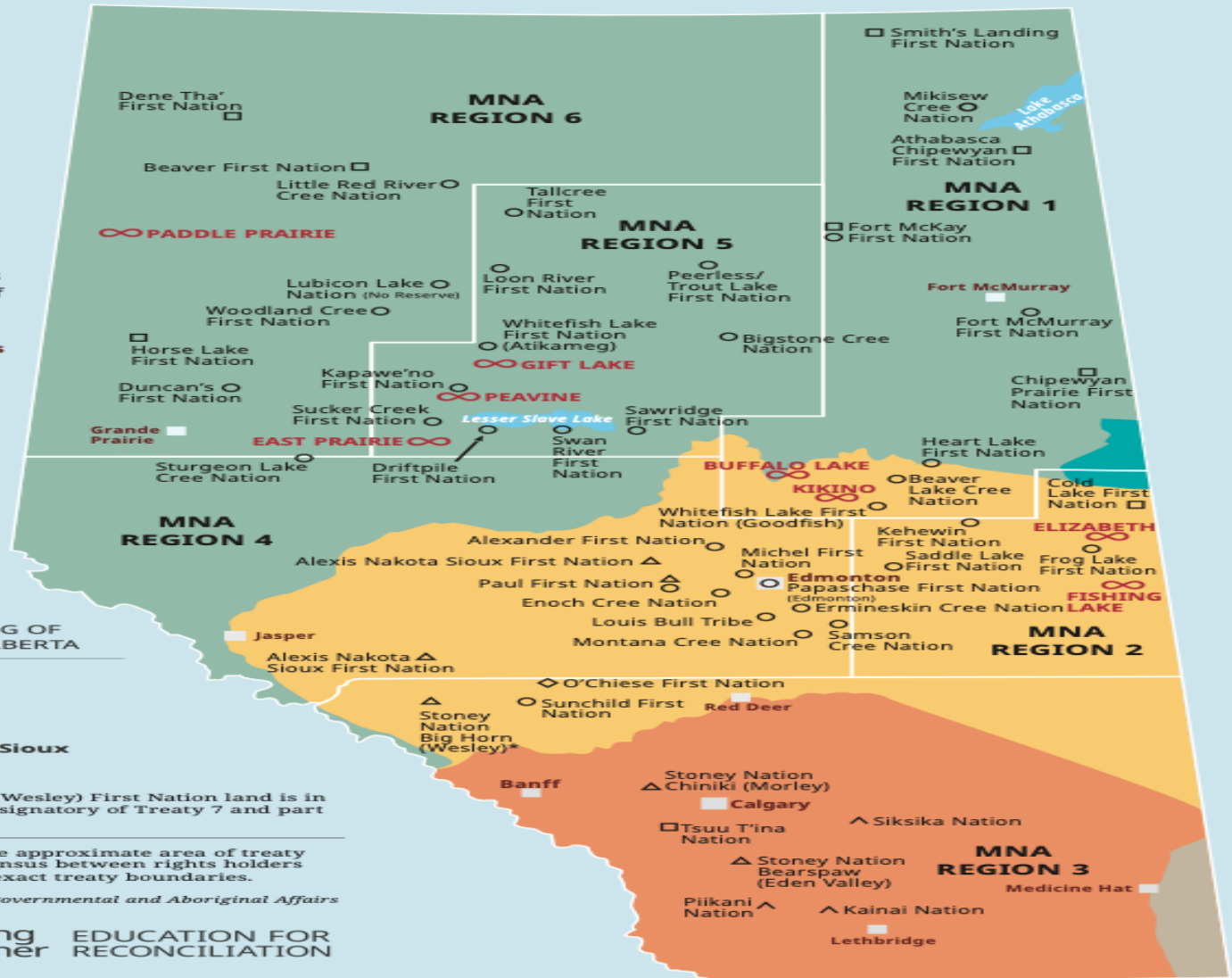
WE ARE ALL TREATY PEOPLE

- TREATY 4
- TREATY 6
- TREATY 7
- TREATY 8
- TREATY 10

∞ Métis Settlements

MNA Regional Zones
Métis Nation of Alberta (MNA)
Association

■ Cities and Towns



LANGUAGE GROUPING OF FIRST NATIONS IN ALBERTA

- Cree
- Dene
- ◇ Cree/Saulteaux
- △ Stoney/Nakota/Sioux
- ^ Blackfoot

*Although the Big Horn (Wesley) First Nation land is in Treaty 6 territory, it is a signatory of Treaty 7 and part of the Stoney Nation.

Note: This map shows the approximate area of treaty land as there is no consensus between rights holders and stakeholders about exact treaty boundaries.

Adapted from Alberta Intergovernmental and Aboriginal Affairs



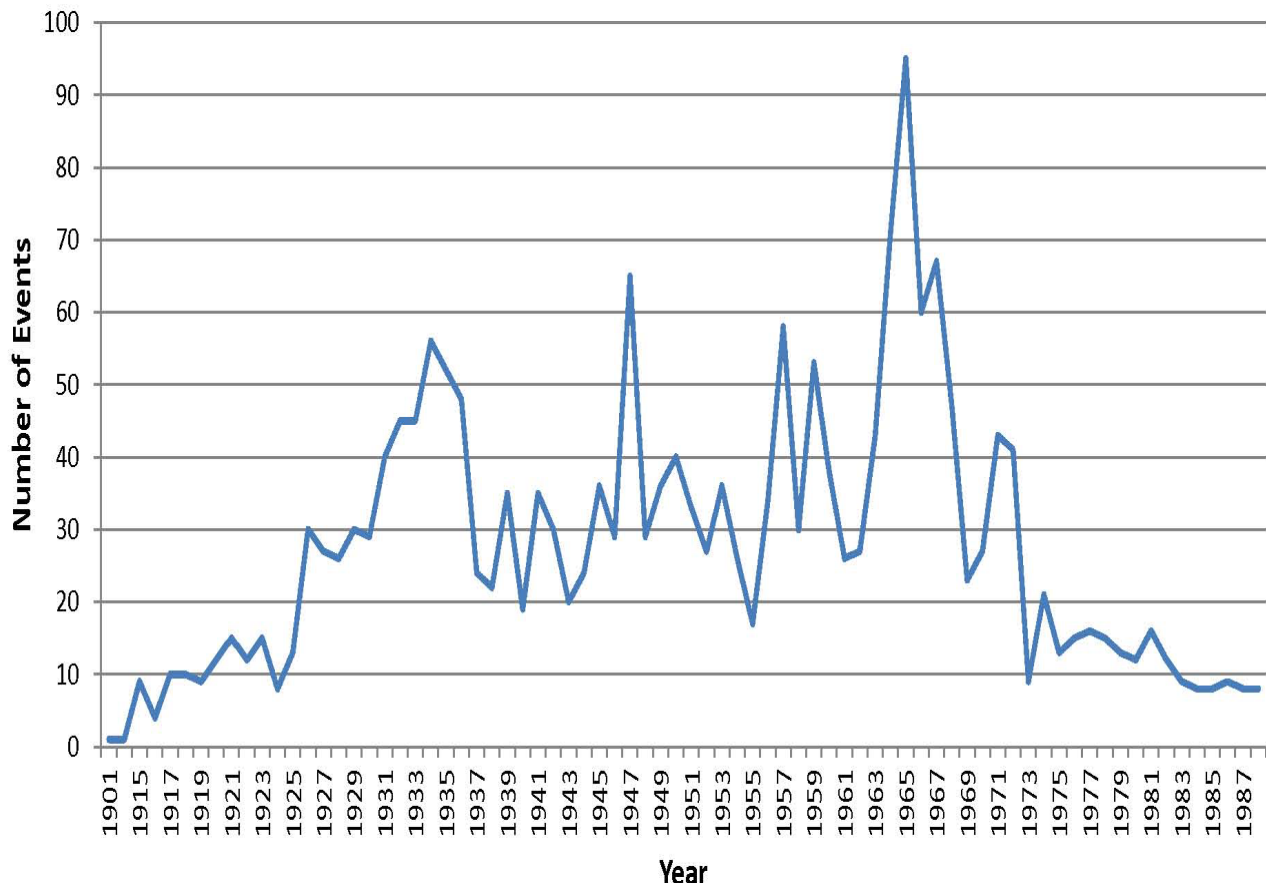
Walking Together EDUCATION FOR RECONCILIATION



The Alberta Teachers' Association



Introductions of Non-Native
Sportfish in National Mountain
Parks during the 20th Century



Termination of Fish-Stocking in National Mountain Parks

- Charlie Pacas, Parks Canada



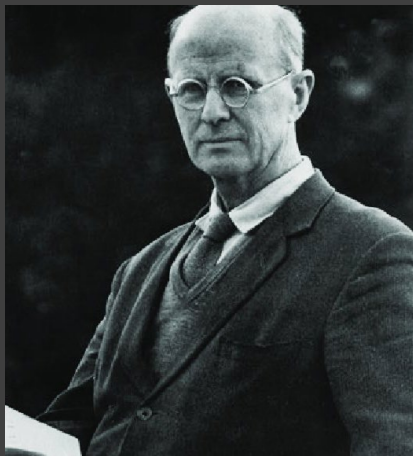
How do stocked alpine lake ecosystems recover back to their natural fishless state?



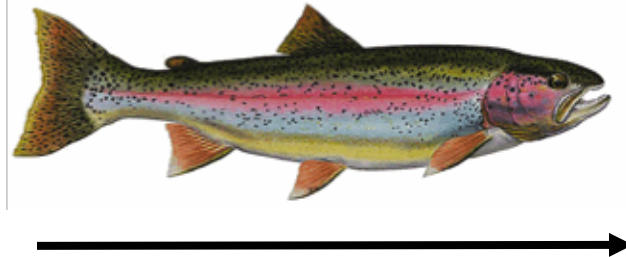
**THE
ECOLOGY OF
INVASIONS
BY ANIMALS
AND PLANTS**

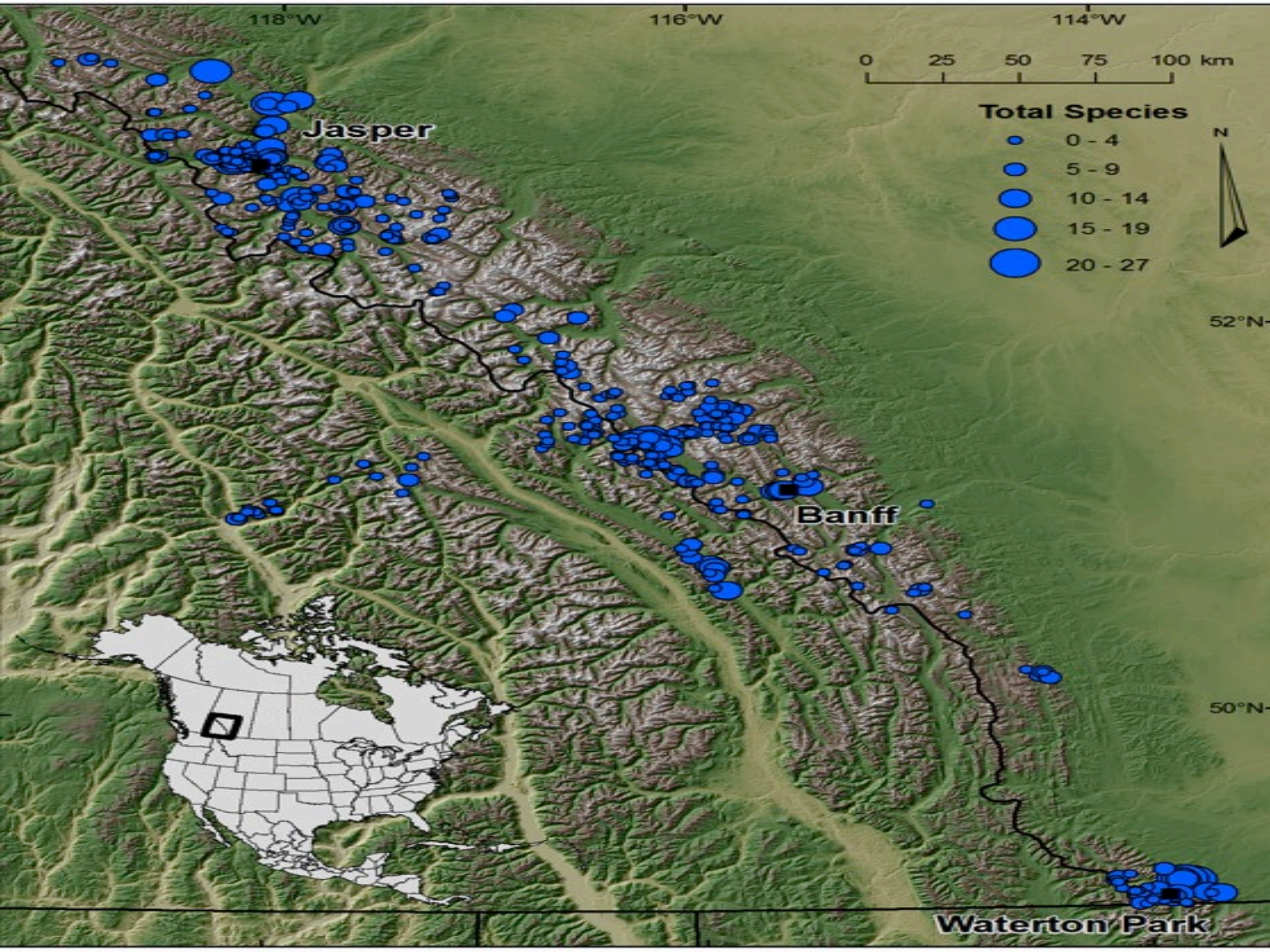


**CHARLES S.
ELTON**



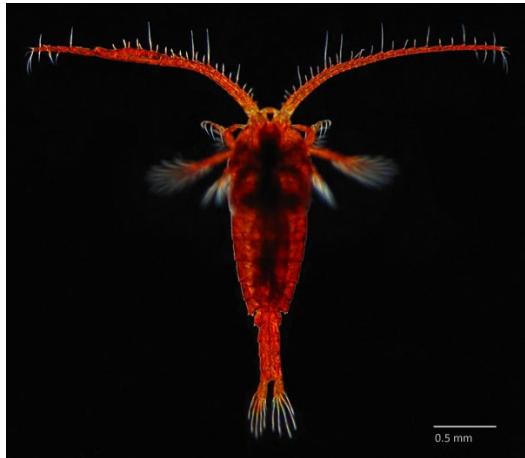
Size-Selective Predation by Introduced Fish on Fishless Lake Communities

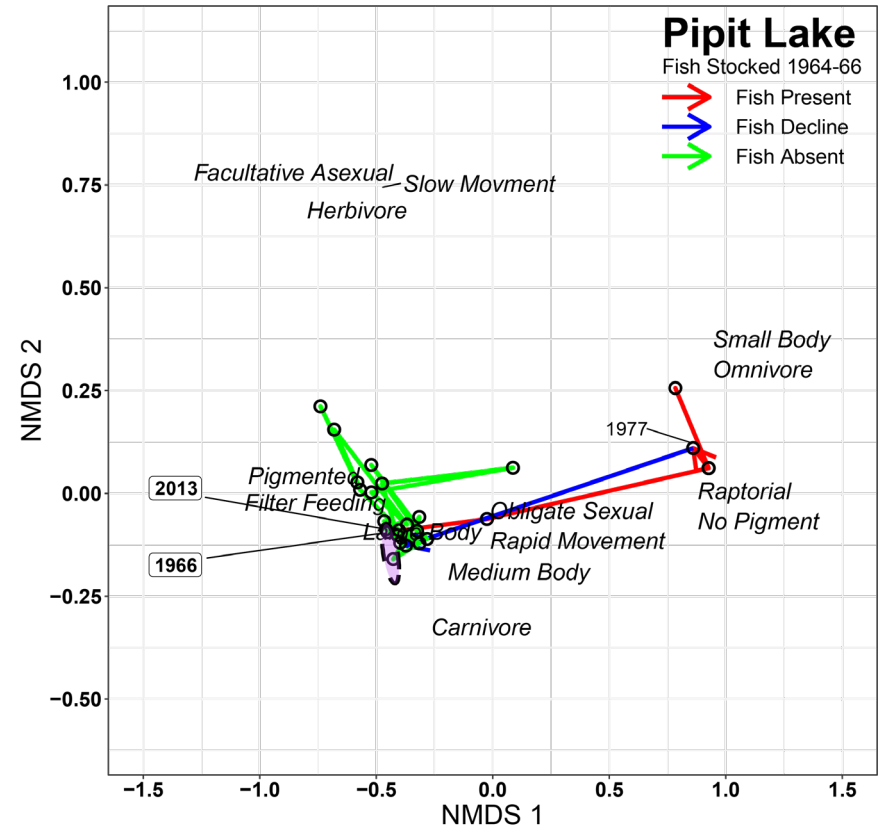
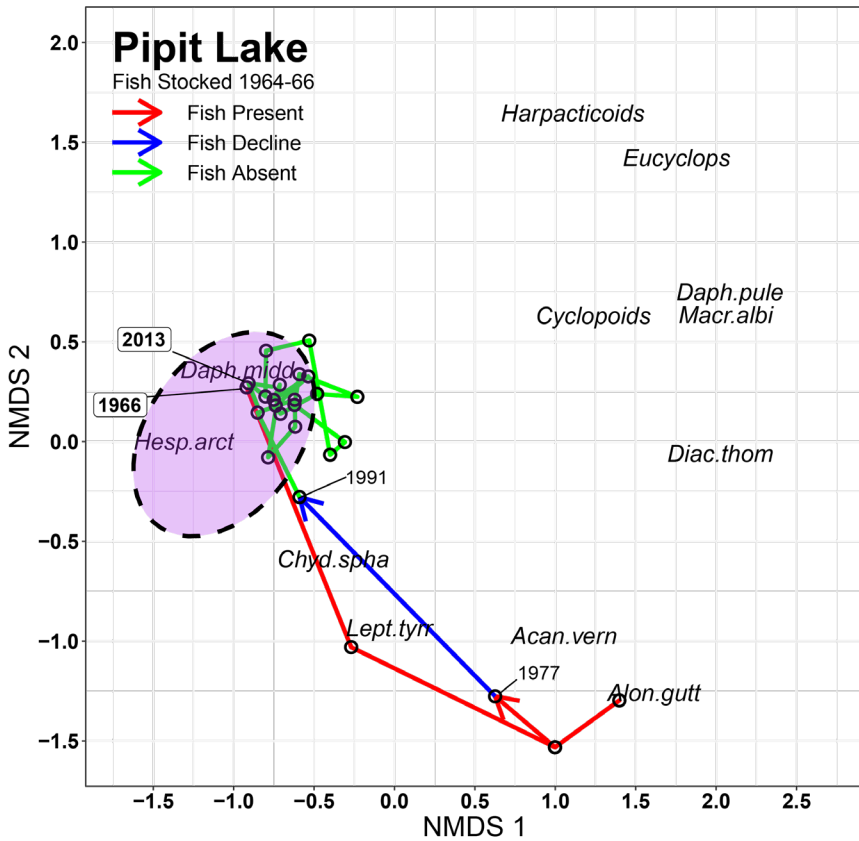




Pipit Lake

A Case of Natural Recovery in a Deep Lake

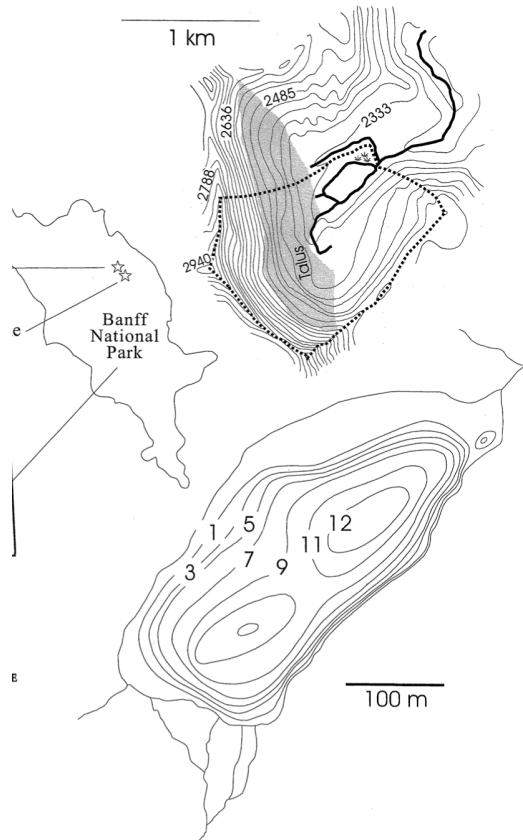




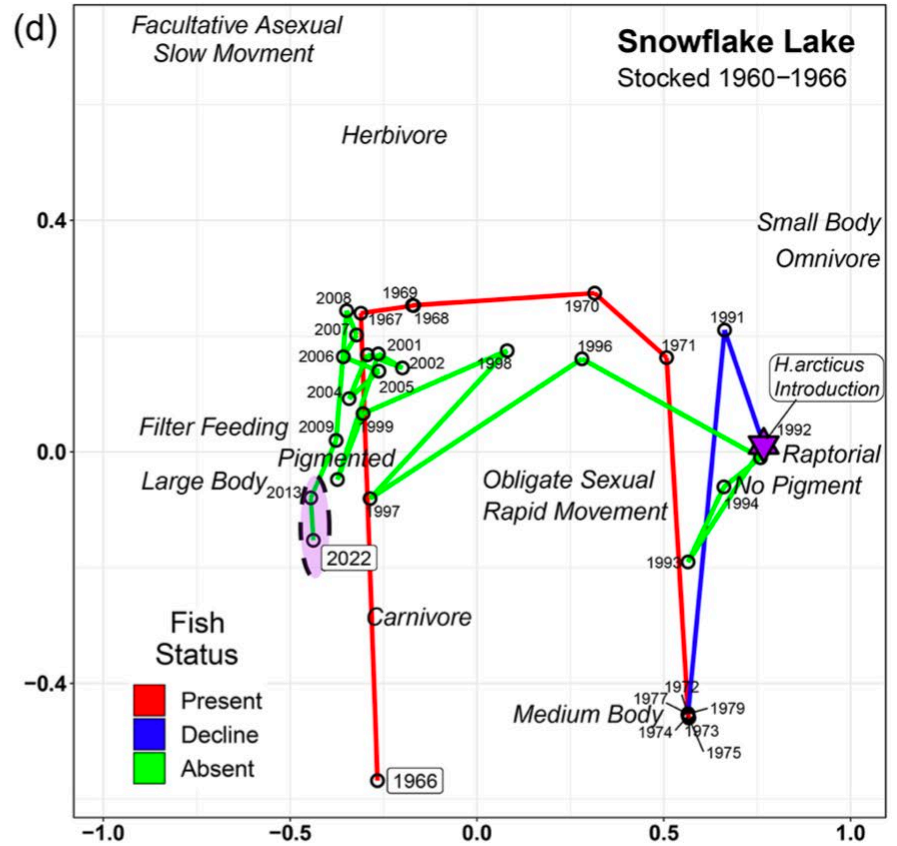
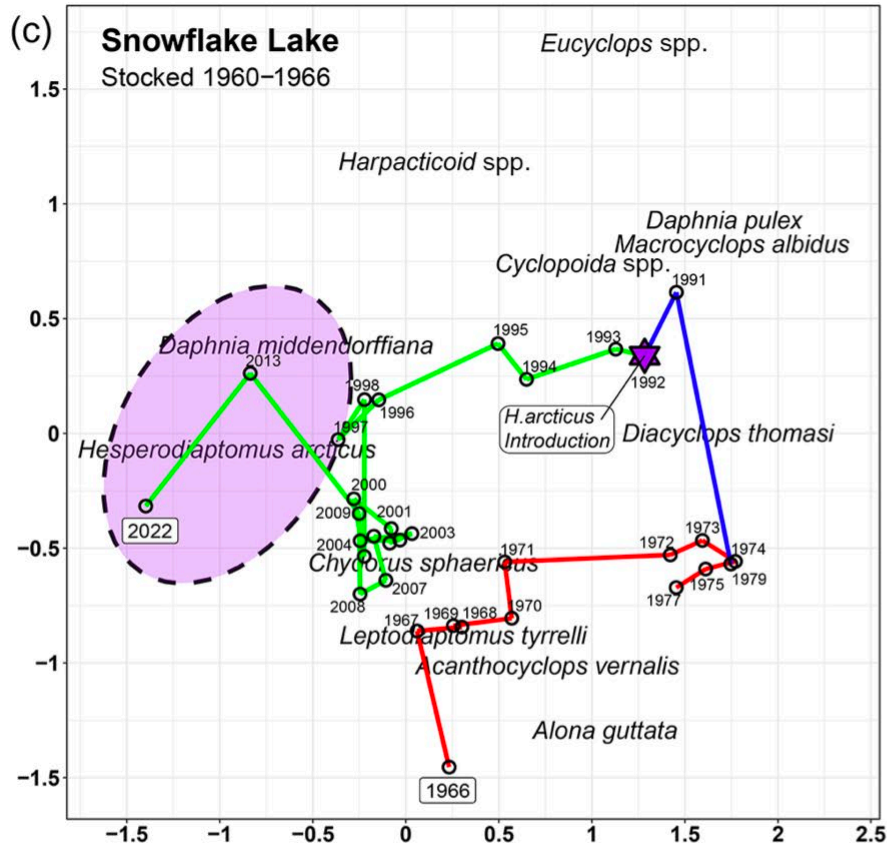
Recovery backtracks along the path of initial biological impoverishment (Stuparyk & Vinebrooke 2024. *Ecosphere* 15:e4836)

Snowflake Lake

Reintroduction of Key Species into a Small Lake



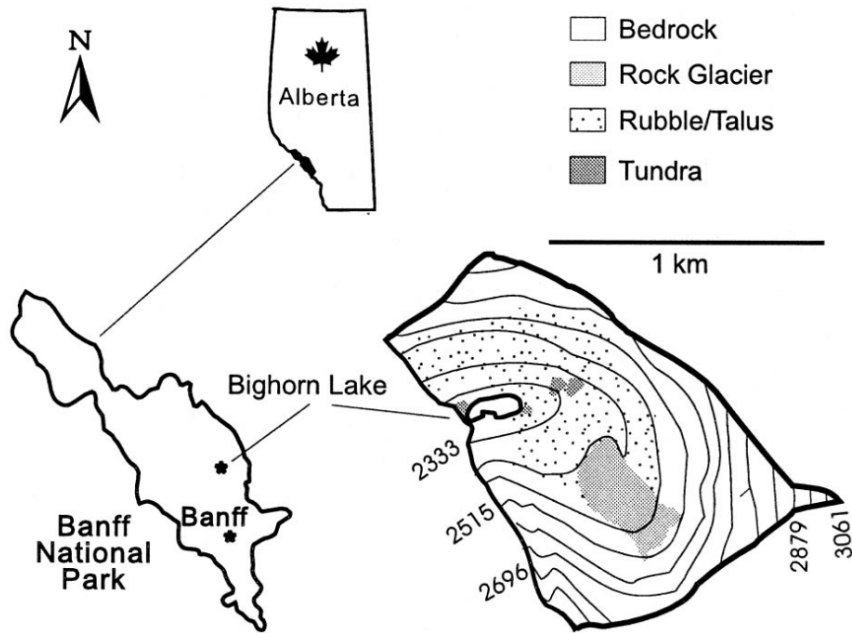


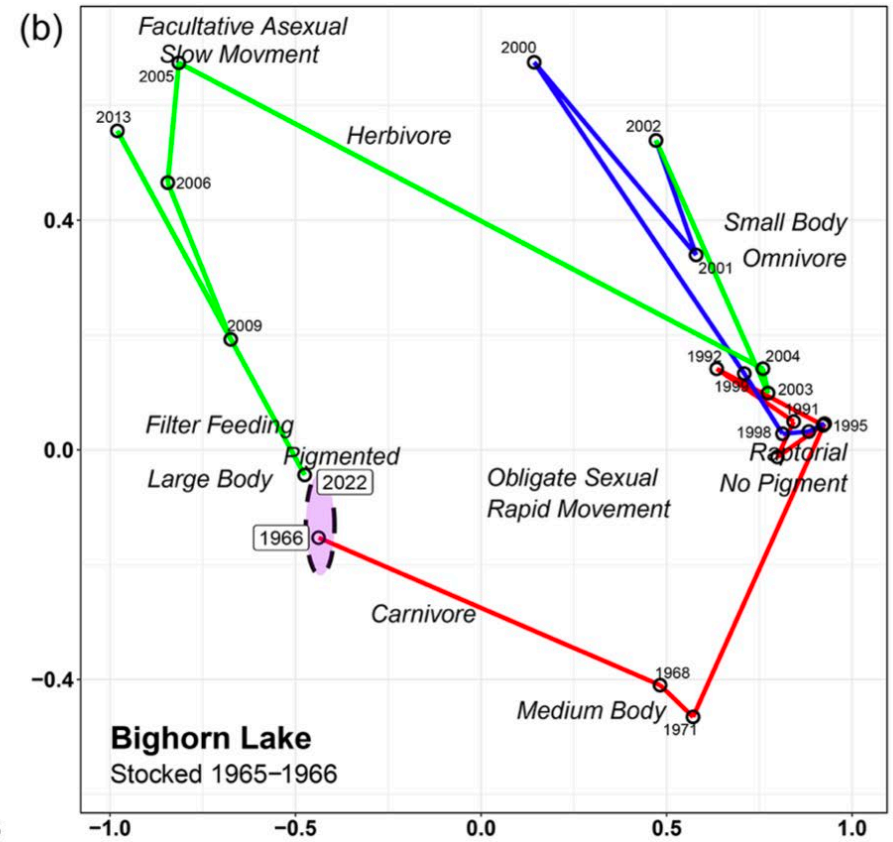
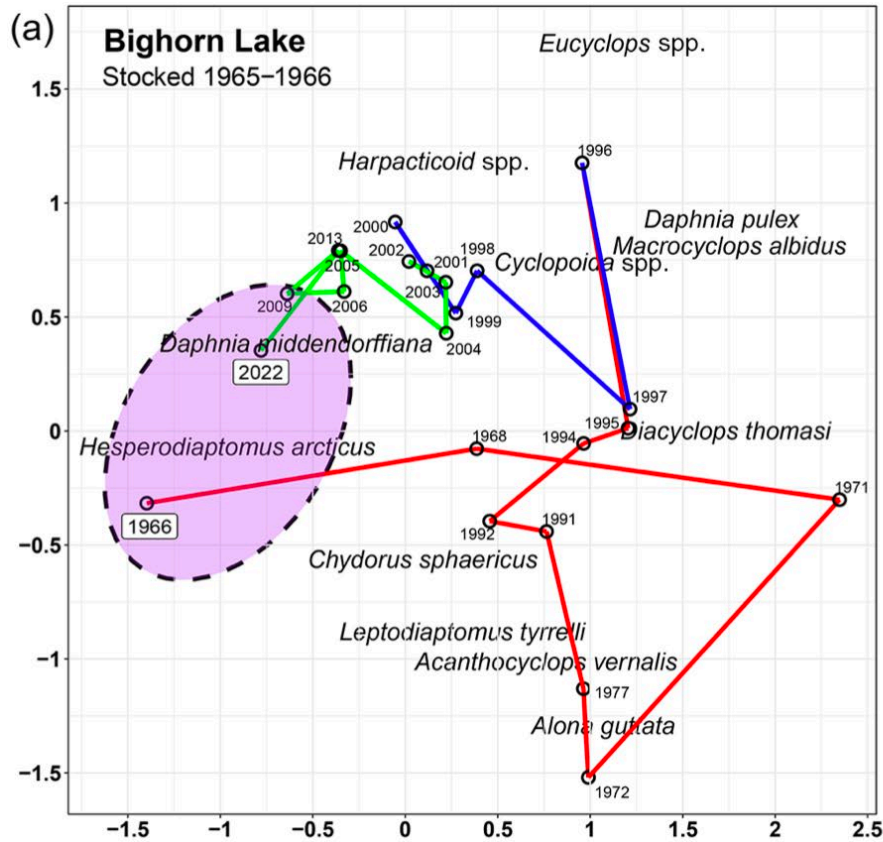


Shift in trait selection causes the trajectory of recovery to contrast that of earlier fish impact (Stuparyk & Vinebrooke 2024)

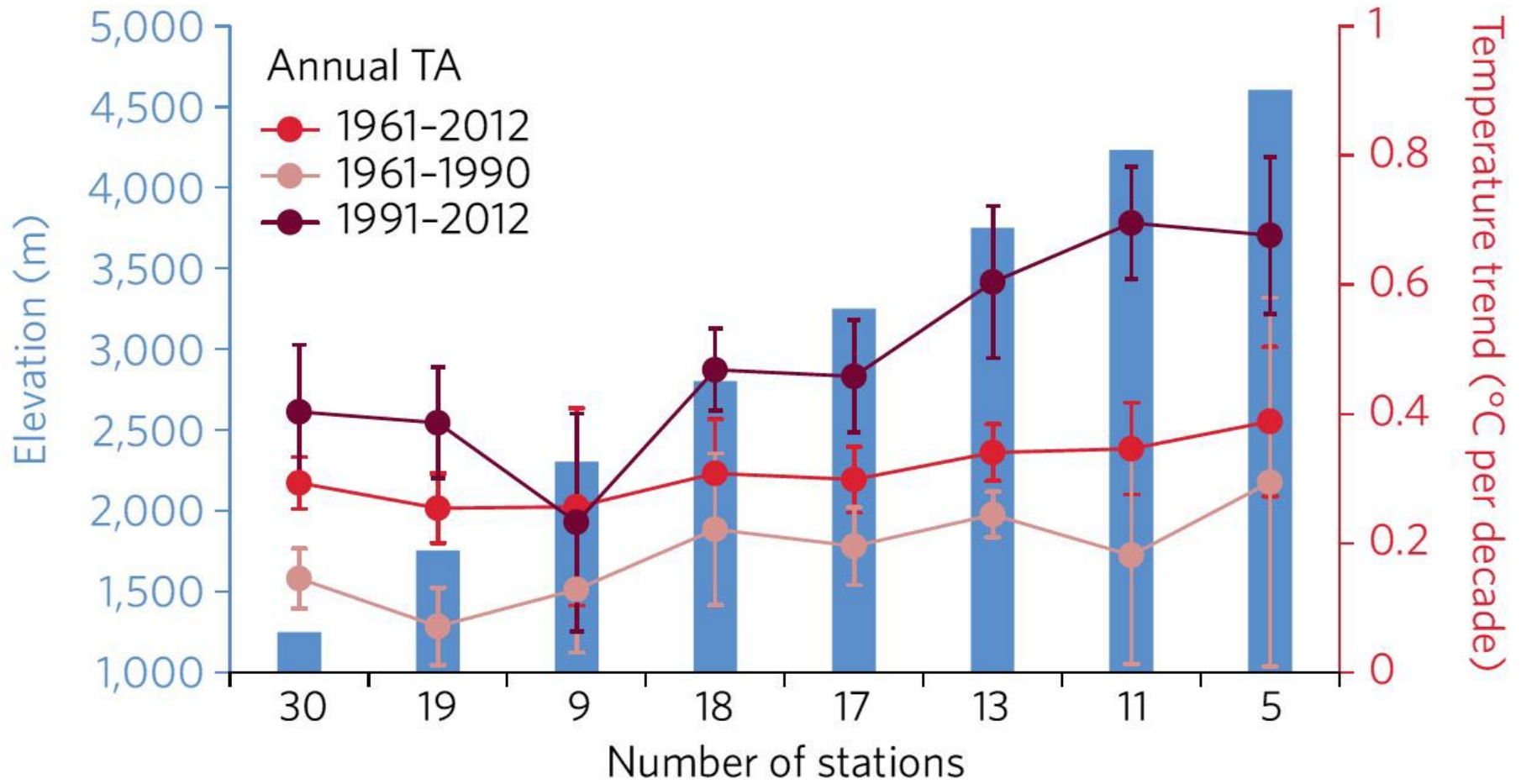
Bighorn Lake

Gill-Net Removal of Sportfish and Reintroduction of Species into a Small Lake

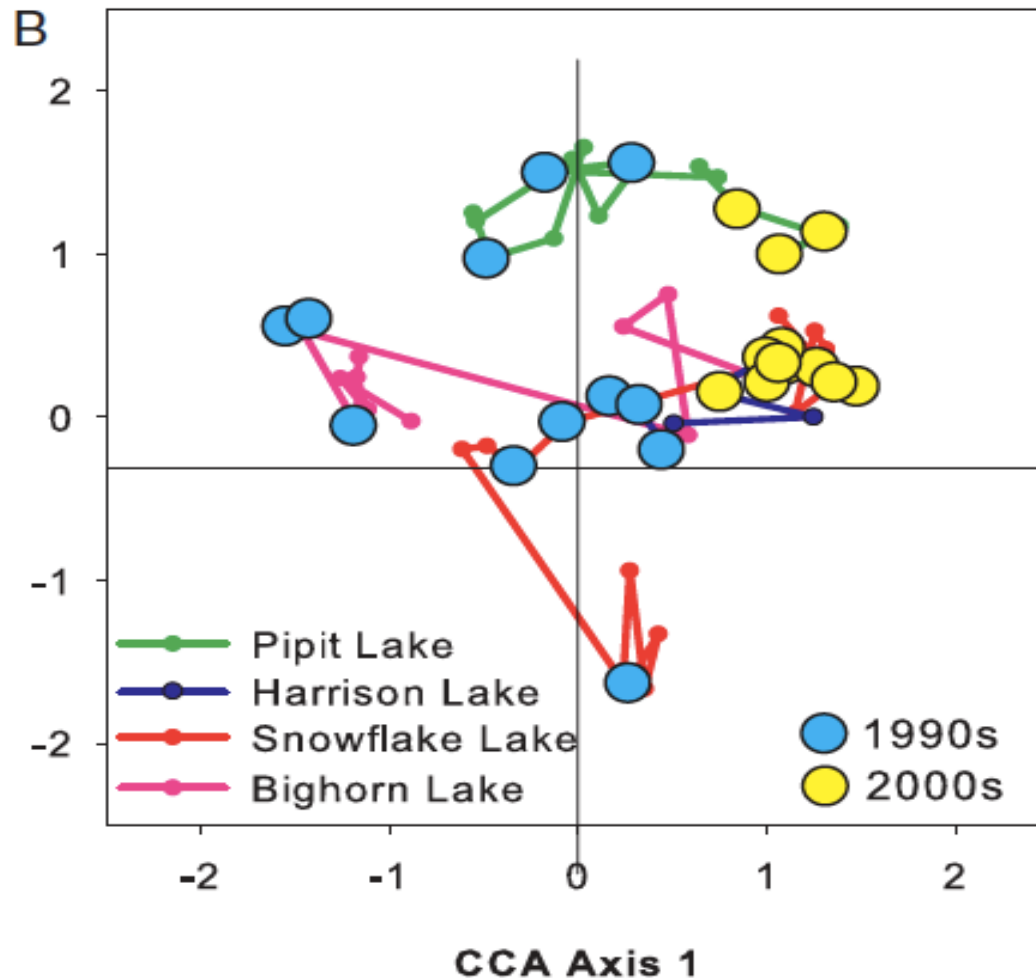




A shift in trait selection from tolerance of predators to dispersal potential explains contrasting impact and recovery trajectories

a

Alpine environments are warming at faster rates than those at lower elevations (Pepin et al. 2020).

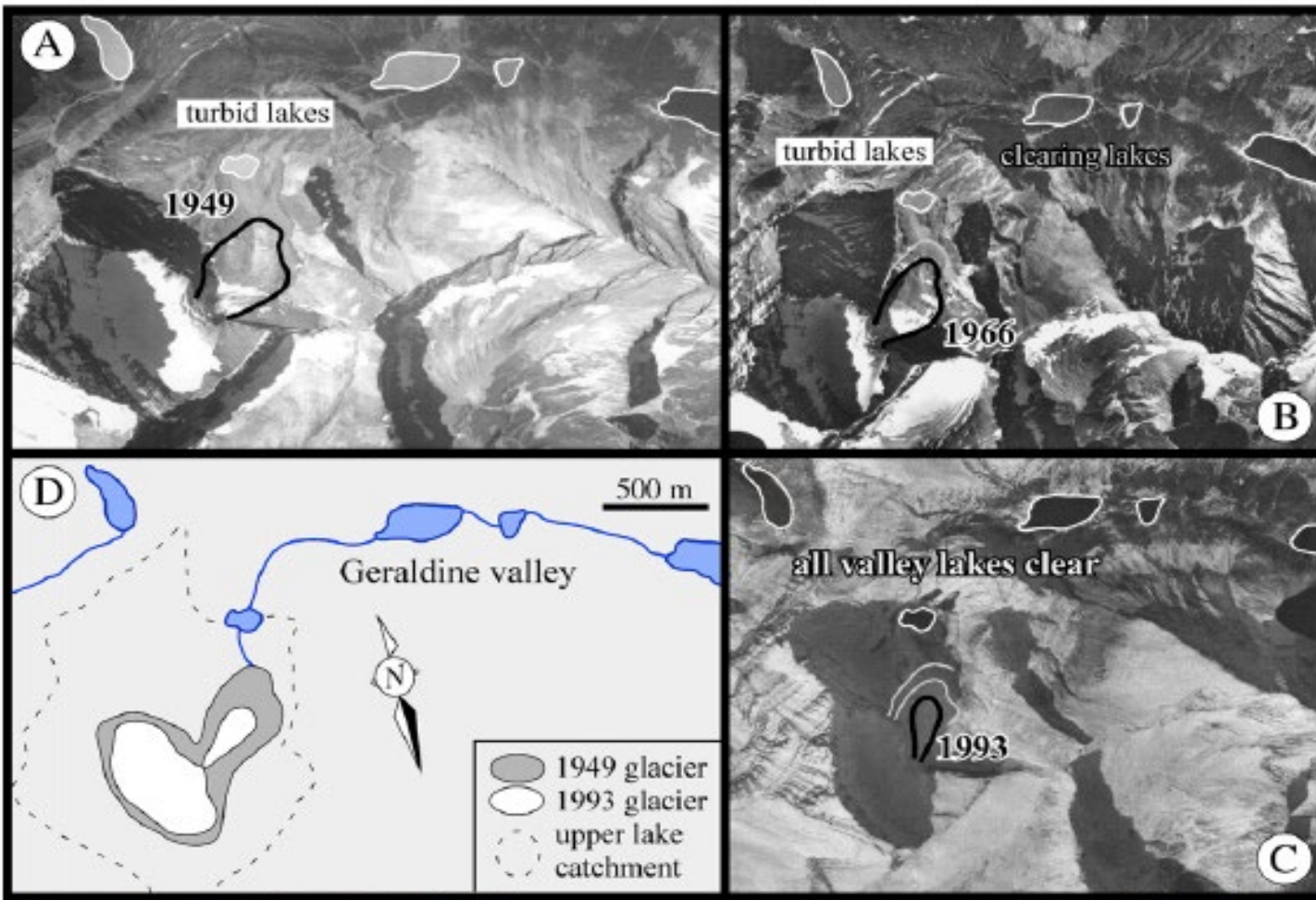


Recent climate extremes alter alpine lake ecosystems

Brian R. Parker*, Rolf D. Vinebrooke, and David W. Schindler†

Department of Biological Sciences, University of Alberta, Edmonton, AB, Canada T6G 2E9

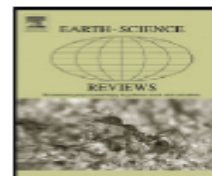
Contributed by David W. Schindler, July 3, 2008 (sent for review October 30, 2007)



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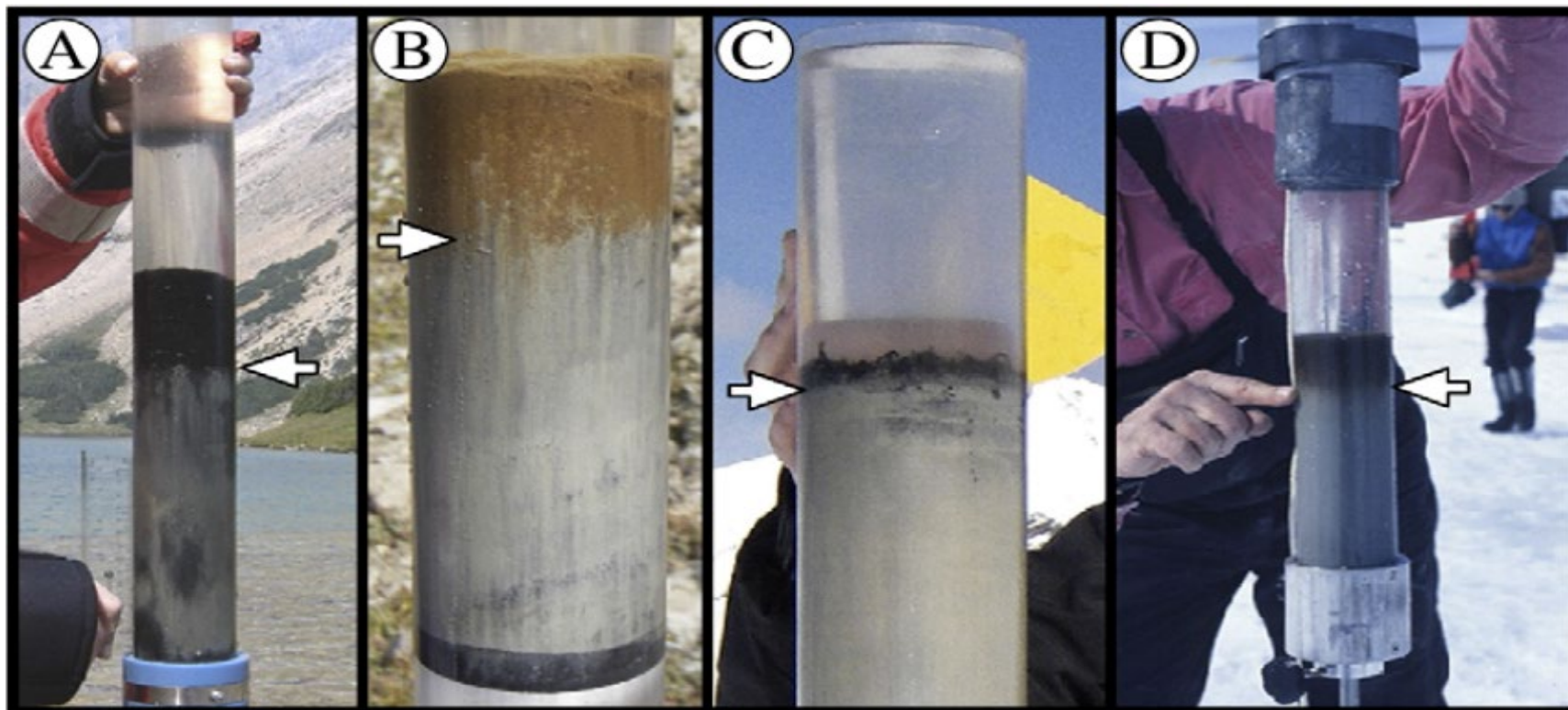
Earth-Science Reviews

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Stratigraphic expressions of the Holocene–Anthropocene transition revealed in sediments from remote lakes

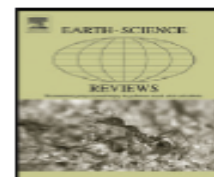
Alexander P. Wolfe ^{a,*}, William O. Hobbs ^b, Hilary H. Birks ^c, Jason P. Briner ^d, Sofia U. Holmgren ^e, Ólafur Ingólfsson ^f, Sujay S. Kaushal ^g, Gifford H. Miller ^h, Mark Pagani ⁱ, Jasmine E. Saros ^j, Rolf D. Vinebrooke ^k



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Take-Home Messages



- Need for lake restoration efforts depends on lake size and the magnitude of occupancy by the introduced sportfish.
- In general, full recovery takes ~20 - 30 years regardless of restoration strategy.
- Climate change confounds restoration efforts for alpine lakes.

