

# Research Bulletin

## NWT Cumulative Impact Monitoring Program

### A Window Into Habitat Use by Northern Fishes

#### Summary

Information on habitat use by northern fishes is limited yet critical to fish protection. We monitored movements and habitat use by Lake Trout, Burbot, and Northern Pike in a subarctic lake. Here we show that nearshore areas are important for all species, especially for Lake Trout, where foraging occurred for much of the year. This study provides a clearer understanding of seasonal timing of habitat use by predatory fishes in northern lakes considering a warming climate and other cumulative impacts.

#### Why is This Important?

Nearshore areas are particularly susceptible to habitat alteration from resource development, soil erosion, wildfires, and warming water temperatures. Knowing the seasonal patterns of habitat use by northern fishes will help us better understand and potentially mitigate cumulative impacts. In the absence of northern-based information, southern studies are often used.

#### What Did We Do?

We outfitted Alexie Lake with a fish positioning telemetry array. For two years we tracked depth, location, and activity of Lake Trout, Burbot, and Northern Pike with implanted acoustic transmitters. We paired these data with other environmental parameters such as lake bottom composition and water temperature to quantify fish habitat use.

#### What Did We Find?

- Nearshore habitat was shown to be important for all three fish species.
- There was little overlap in nearshore areas used by Lake Trout between years and among seasons indicated that access to a variety of nearshore resources is important.
- Burbot migrated daily from deep areas, where they were relatively inactive, to forage in shallow nearshore areas at night.
- Trout fall spawning is related to the wind condition at the time of spawning, rather than prevailing wind conditions. Spawning occurred in any suitable rocky material around the lake edge, rather than specific shoals exposed to predominantly seasonal winds, which is often the case for southern populations.
- Large Northern Pike actively hunt adult Lake Trout as evident by bite wounds observed on many Trout caught during the study.

#### What Does This Mean?

- Year-round presence and widespread use of nearshore areas highlight the importance of these habitats for fish communities in northern lakes.
- Our findings underscore the value of northern-based research and emphasizes that information from southern areas may not be directly applicable to northern lakes.



### What's Next?

Further analysis is recommended of Northern Pike movements and Lake Trout spawning behaviour.

### For More Information

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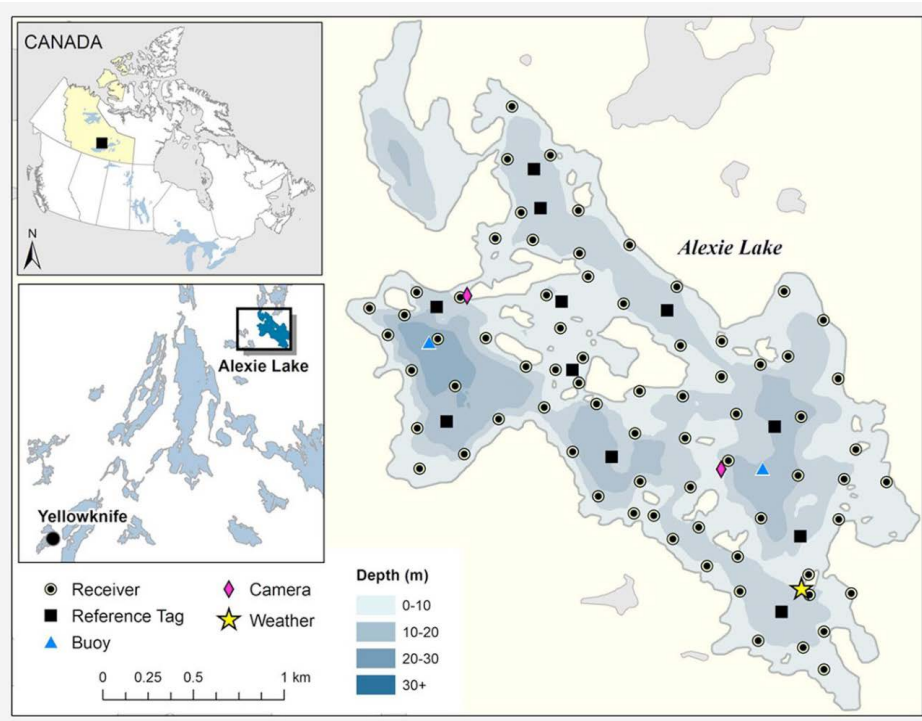
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[Blanchfield et al. 2023. Nearshore habitat use of Lake Trout. \*Movement Ecology\*.](#)

[Callaghan et al. 2016. Wind and Lake Trout spawning. \*Journal of Great Lakes Research\*.](#)

[Guzzo et al. 2016. Resource partitioning among piscivores. \*Journal of Great Lakes Research\*.](#)

[Cott et al. 2015. Burbot movements. \*Hydrobiologia\*.](#)



Locations of the fish-positioning telemetry array receivers, ice-monitoring cameras, weather station, and temperature-light loggers (“Buoy”) on Alexie Lake, NWT.



Nearshore areas are important for (A) Lake Trout spawning habitat - wave action keeps rocks clean of debris, and (B) habitat for small fishes, such as Ninespine Stickleback, that are important food for predatory fishes. Photos from Alexie Lake, NWT (Credit: P. Blanchfield).

**NWT CIMP** is a source of environmental monitoring and research. The program coordinates, conducts and funds the collection, analysis and reporting of information related to NWT environmental conditions. If you're conducting environmental monitoring and research, consider sharing your information with northern residents and decision-makers in a Bulletin.