Temporal changes in feeding ecology and life histories of fishes in Faroese lakes

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Background

- Small subarctic lakes are in general pristine cold water ecosystems with simple but unique communities.
- Contemporary threats are: warming, eutrophication, water level changes, non-native species, etc...

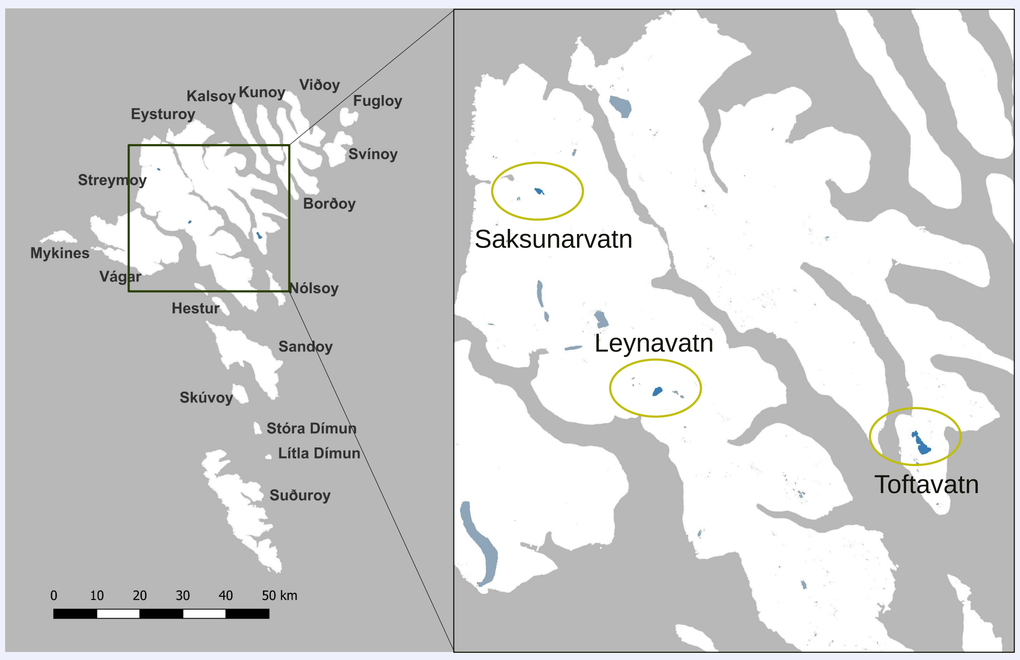


Fig 1. The locations of the three lakes sampled in August 2022.

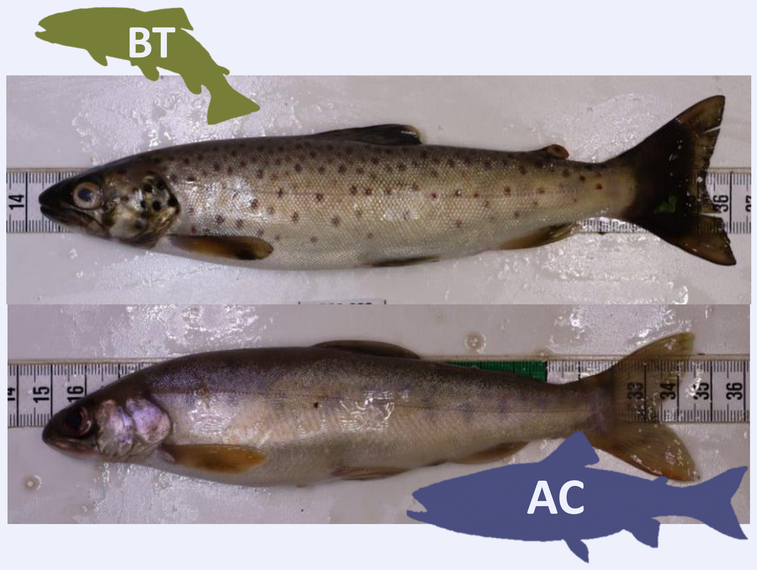
Goals of the project

1. Have fish communities and their prey changed in the last 20 years in Faroese lakes?
2. Have water parameters during the summers changed?
3. How does fish diversity within and among species vary across lakes?

Why is this important: we study how cold water lakes respond to warming and anthropogenic changes

Methods

- We sampled 3 lakes with various fish communities using similar methods as the NORLAKE project in 2000.[1, 2]
- Each lake was also sampled for benthic and pelagic invertebrates at the shore and in deep water.
- Fishes were caught by standardized gill nets and minnow traps.
- Loggers record daily temperature at various depths (2022 to 2023).



From top left to bottom right

Fig 2. Plankton sampling from the littoral station in lake Leynavatn
Fig 3. Fishing with minnow traps in lake Toftavatn
Fig 4. Brown trout (BT) *Salmo trutta,* and Arctic charr (AC) *Salvelinus alpinus* from Leynavatn (two males).
Fig 5. Sampling lake bottom sediment using kajak corer.

Preliminary results

- Abundance of fish have increased in the 3 lakes since 20 years (Fig.6)
- Additional fishes were found across lakes:
  Toftavatn: BT and sticklebacks
  Saksunarvatn: BT and eels
  Leynavatn: BT and AC
- BT are now more numerous than AC in Leynavatn (ratio BT/AC [2022: 85/66] vs. [2000: 51/138])

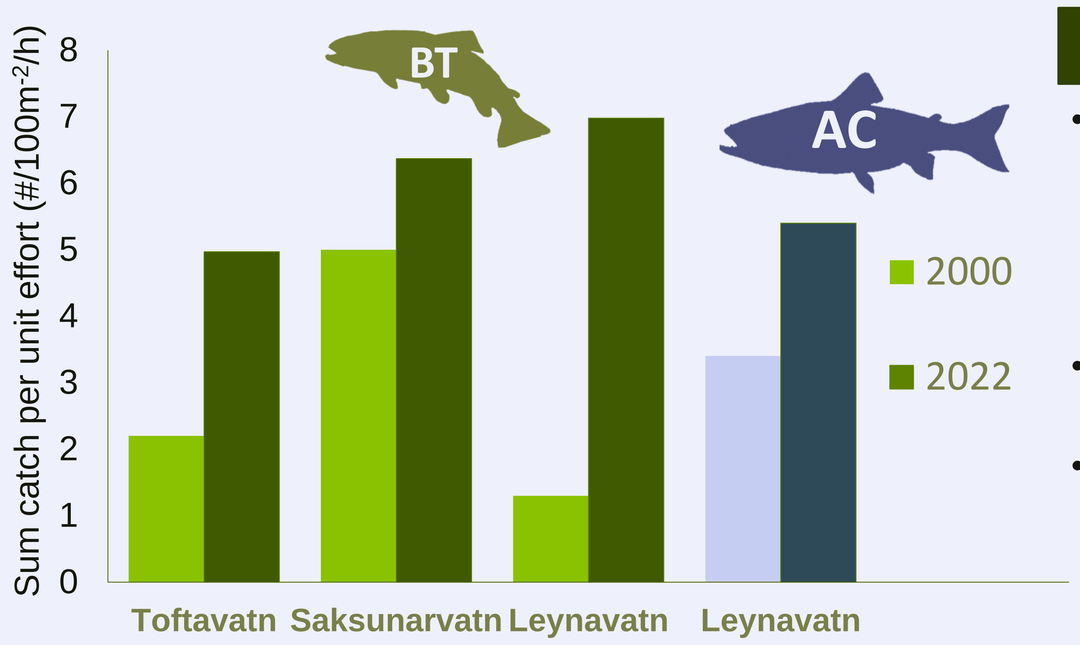


Fig.6 Number of brown trout (green) and Arctic charr (blue) caught in three Faroese lakes in 2000 and 2022.

Future research

- Within species diversity of BT: does BT eat and look different in presence/absence of other fish species?
- How does food availability vary across lakes and across time?
- Has the phenology of fishes changed in 20 years? Are there more fish but smaller/ younger fish?

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By the way: We are looking for a Master Student to join the team !

References

1. Jeppesen, E. et al. 2002. Ecology of five Faroese lakes: Summary and synthesis. *Ann. Soc. Sci: Færoensis Suppl.* 36: 126-139.
2. Malmquist, H.J. et al. 2022. Biology of Brown trout (Salmo trutta) and Arctic charr (Salvelinus alpinus) in four Faroese lakes. *Ann. Soc. Sci: Færoensis Suppl.* 36: 94-113.