

Norwegian institute for Nature Research

NINA

Martin-A. Svenning (martin.svenning@nina.no)

Arctic Ecology Department (NINA-Tromsø)

- 20 research fellows
- 2 advisors UiT (Ims/Yoccoz)
- 2 II-positions at UiT
- 3 phd/postdocs
- 5 master students
- Most/all research conducted in Arctic areas, i.e. North-Norway, Svalbard and Russia
- Strongly connected to arctic ecology
- Three p. working with fish

High North Research Centre on Climate and the Environment
Fram Center
(NP, NINA, NIVA, NILU, ...)

Kjell Mork
Polen-Norway?

Piotr Glowacki
↓
Jan Kozłowski (Nov 5, 2012)
Jan Marcin Wesławski
↓
Maria Włodarska-Kowalczyk
↓
DWARF
(Nov 29, 2012)

DWARF (see proposal)

- Temperature drives size of animals
- Bergmans rule; declining temperature => increasing size?
- Effects of global warming on the size of Arctic organisms
- Declining body size a response to global warming?
- Most notable impact on ecosystems at high latitudes?
- Reduced body size and communities & ecosystem processes?

Σ **Elevated temperatures => size reductions in high latitude ectotherms**

WP1 – Terrestrial fauna (H-P. Leinaas)
WP2 – Limnetic fauna (M-A. Svenning)
WP3 – Marine pelagic fauna
WP4 – Marine benthic fauna
WP5 – Paleontological record of size distribution in foraminifera
WP6 – Database and literature survey on relationships between genome-, cell and body size and temperature/habitat (Dag Hessen)
WP7 – Synthesis of the results, transfer of knowledge, public outreach

WP1/WP2: Leinaas/Svenning/Hessen; joint sampling, sites, time etc.

WP2 Limnetic fauna

Four main species to be included

- Arctic charr, *Salvelinus alpinus*
- Tadpole shrimp, *Lepidurus arcticus*
- Crustacea, *Mysis relicta/segerstralei*
- Gammarid, *Gammaracanthus loricatus*

All these species are found from S-Norway to the northernmost lakes on Svalbard

Arctic charr

Tadpole shrimp

Mysis relicta/segerstralei

Gammaracanthus loricatus

WP2 Limnetic fauna

Four main species to be included

- Arctic charr, *Salvelinus alpinus*
- Tadpole shrimp, *Lepidurus arcticus*
- Crustacea, *Mysis relicta/segerstralei*
- Gammarid, *Gammarachanthus loricatus*

Localities/latitudes;

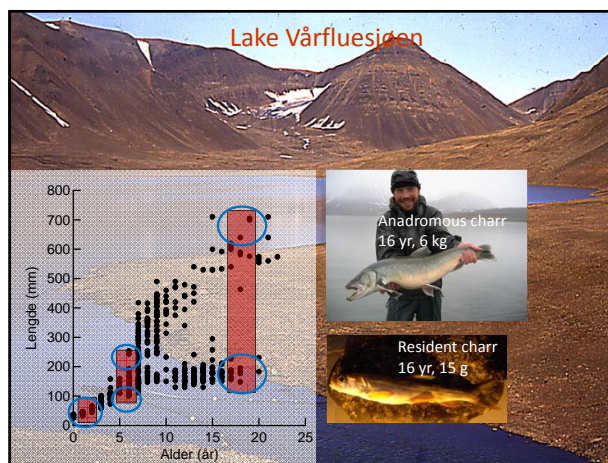
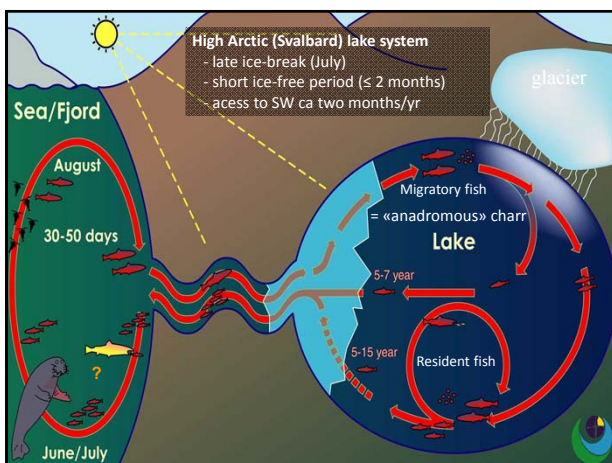
- Southern Norway ~ 57-58°N
- Northern Norway ~ 68-69°N
- Bear Island? ~ 74-75°N
- Svalbard ~ 78-81°N

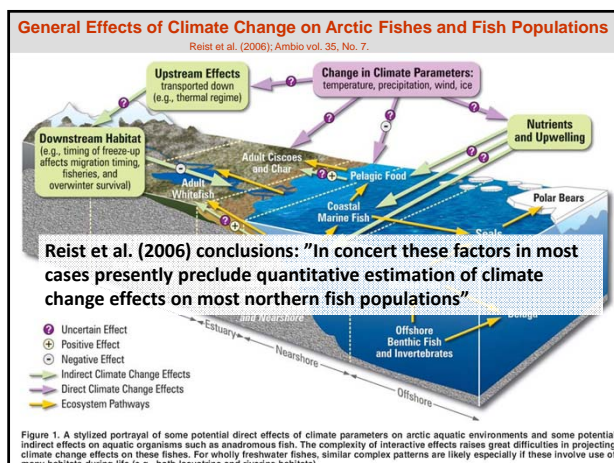
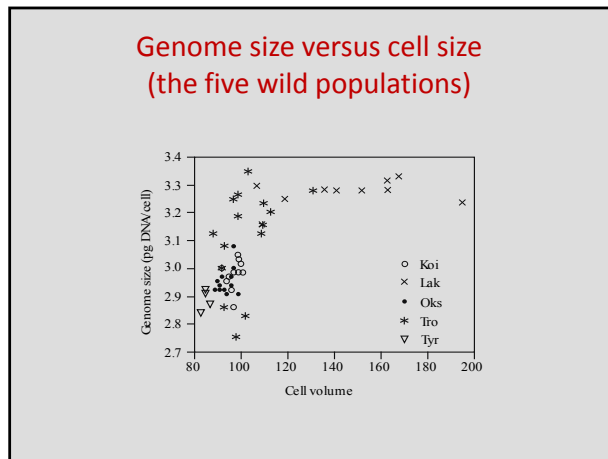
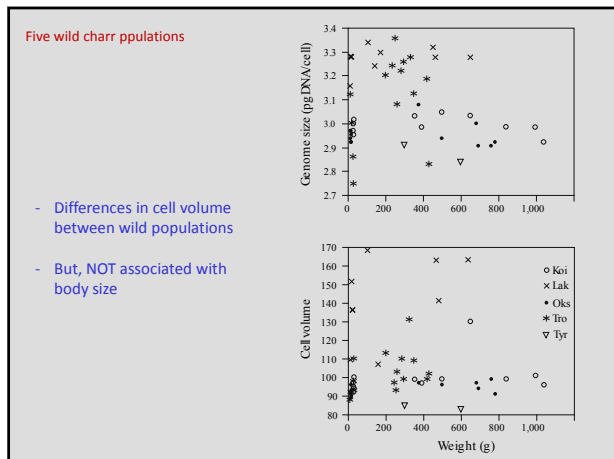
Maximum water temperatures
("typical" lake system in summer)

- Southern Norway ~ 20-25 °C
- Northern Norway ~ 12-15 °C
- Bear Island? ~ 5-9 °C
- Svalbard ~ 2-6 °C

Svalbard lakes

- less than 0.5 % of Svalbard is covered by lakes
- along most of the «western» coast (glaciers in east)
- map is only showing (some of) lakes with Arctic charr
- mostly small lakes, i.e. < 1 km²
- Brånevatnet (NA), ≈ 9 km²
- Femmilsjøen (5 English miles~ 8 km); 7.7 km², 80 m deep
- Lake Linné; 4 km², 35 m deep





norACIAs climate scenarios for Svalbard

(1961-90 til 2071-2100)

Temperature

- mean annually temperature **increases** from 3 °C i SW to 8 °C in NE
- highest in autumn/winter (up to 8 °C) and lowest in summer (2-4 °C)

Precipitation

- mean annually **increase** with 10-40 %
- less increase in S/SV and largest in N/NE
- "all over" it is suggested high increase in snowfall (although the "winter season" is shorter)

From Ferland et al. 2008

The text box provides specific climate scenarios for Svalbard. Under the 'Temperature' section, it notes a mean annual increase from 3 °C in the southwest to 8 °C in the northeast, with the highest increases occurring in autumn/winter (up to 8 °C) and the lowest in summer (2-4 °C). Under the 'Precipitation' section, it notes a mean annual increase of 10-40%, with the largest increases in the north/northeast and the least in the south/southwest. It also suggests a high increase in snowfall across the region, although the winter season is shorter.

