



**DWARF (2014-2017)**  
**WP2 Limnetic fauna**

**Main species to be included**


- Copepods & Daphnia (several species)
- Tadpole shrimp (*Lepidurus arcticus*)
- Crustacea (*Mysis relicta/segerstralei*)
- Gammarid (*Gammaracanthus loricatus*)
- Arctic charr (*Salvelinus alpinus*)




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




Arctic charr



Tadpole shrimp



*Mysis relicta/segerstralei*



*Gammaracanthus loricatus*

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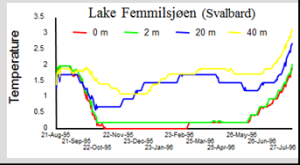
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**Localities/latitudes;**

- Southern Norway ~ 57-58°N
- Northern Norway ~ 68-69°N
- Svalbard ~ 78-81° N

**Maximum water temperatures (lakes)**  
 (normal surface temperature, August)

- Southern Norway ~ 20-25 °C
- Northern Norway ~ 12-20 °C
- Svalbard ~ 1-12 °C

Lake Femmilsjoen (Svalbard)

Temperature

0 m 2 m 20 m 40 m

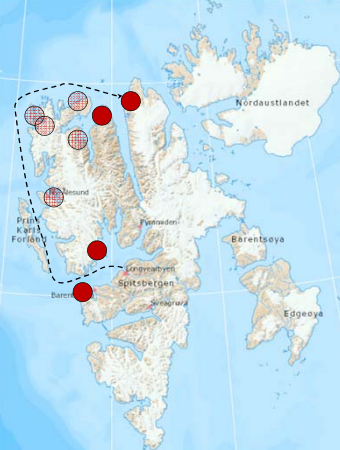
**First sampling, Svalbard**  
 (late August 2014)

**WP1 – Terrestrial fauna**  
**WP2 – Limnetic fauna**

- Four lake systems with Arctic charr
- One lake with *Gammaracanthus l.*
- One lake with *Mysis* spp.
- Several lakes with *Lepidurus*, etc.
- Several places with collembola
- Several places with mud-flies

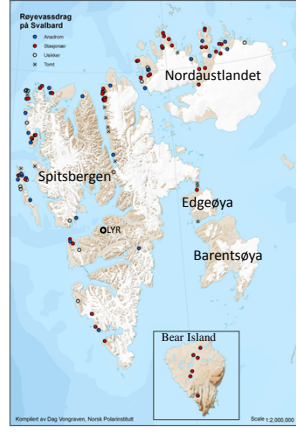
**Sampling 2015/16?**

- Main land, Norway
- Nordaustlandet
- Franz Josef Land???



**Svalbard lakes/ponds**

- most lakes have glacial origin
- hundreds/thousands of shallow ponds (fishless)
- «open» lakes, i.e. have access to SW two months a year, thus charr may feed in sea for a few weeks in summer (anadromous charr)
- landlocked lakes, only resident charr, including cannibals (> 150 lakes?)
- often sympatric charr morphs ("dwarfs" and "giants")
- meromictic lakes; e.g Kongressvatn, Jensenvatnet (both with Arctic charr)
- lakes with glacial relicts; (*Gammaracanthus* sp., *Mysis* sp.)
- «Cod» lake, containing cod and Arctic charr (both feeding on *Mysis*)
- water temperature may vary significantly among lakes



Røysestanding på Svalbard

- Anadrom
- Landlocked
- Tidal

Nordaustlandet

Spitsbergen

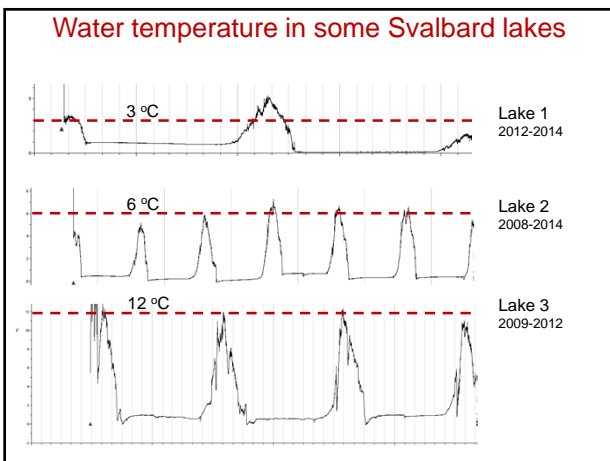
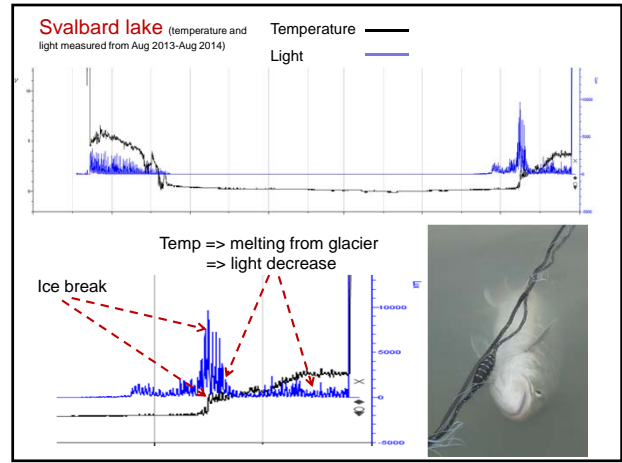
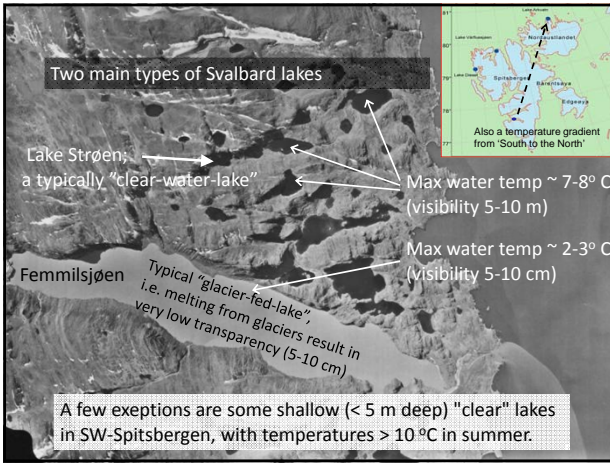
Edgeøya

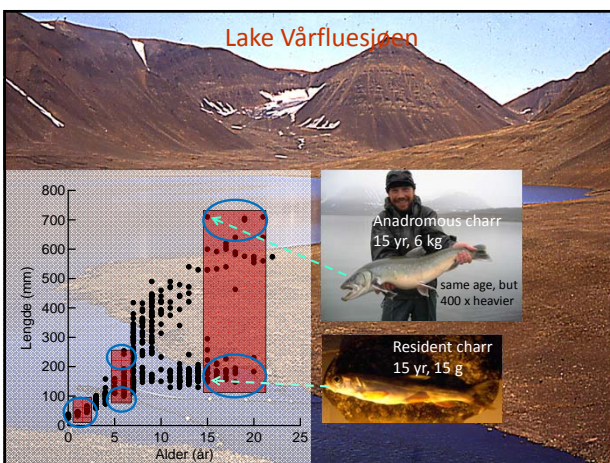
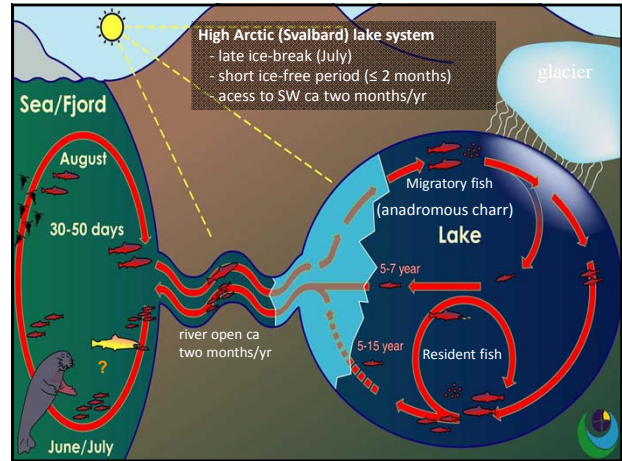
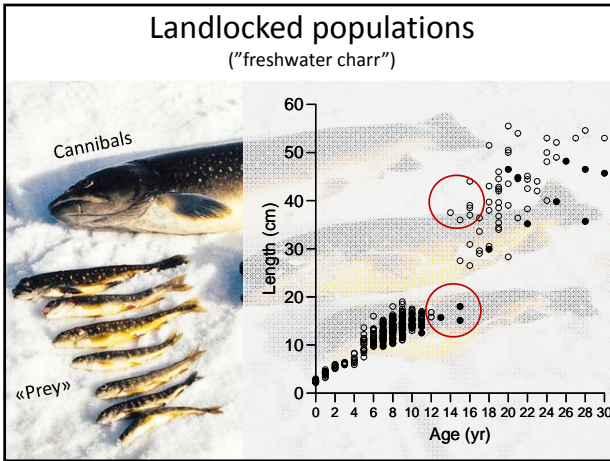
Barentsøya

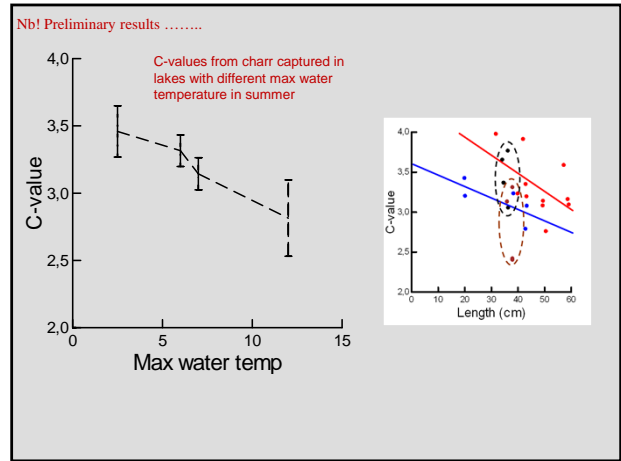
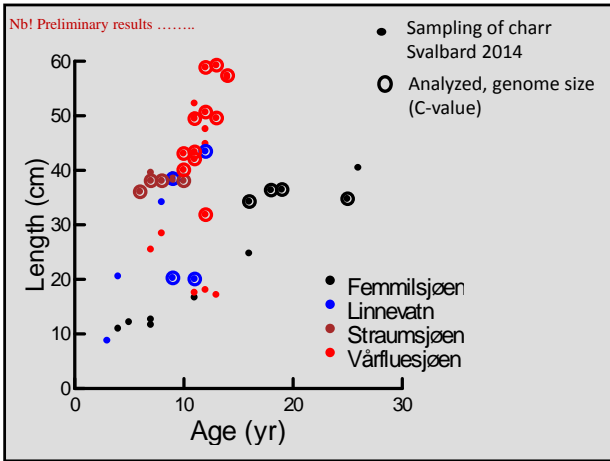
Bear Island

Kjøperlet av Dag Østergaard, Norsk Polarbibliotek

Skala 1:2.000.000





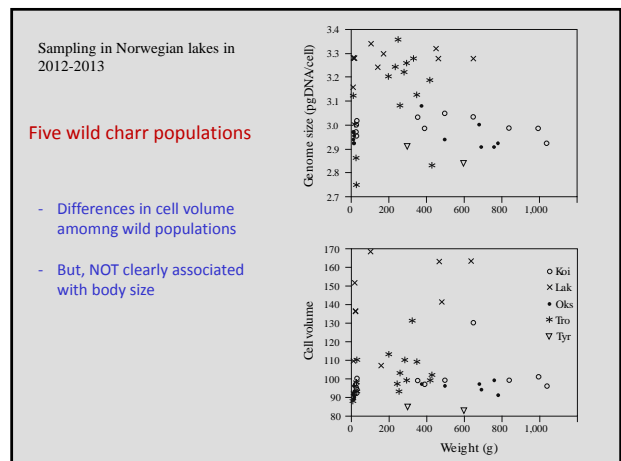


- Differences in cell volume related to weeks/ «age»
- but, NOT to temperature and NOT to final body size
- Differences in cell volume between wild populations
- But, NOT associated with body size

**Table 2.** C-value (in pg cell<sup>-1</sup>), cell volume (FSC) and cellular complexity (SSC) of erythrocytes from the temperature versus food treatments. FSC and SSC mean values in arbitrary units. Standard deviation in brackets.

Treatment	23.11.2011			22.12.2011			Weight
	C-value (pg/cell)	Cell volume (FSC)	Cell complexity (SSC)	C-value (pg/cell)	Cell volume (FSC)	Cell complexity (SSC)	
<b>HtHf</b>	2.78 (0.154)	85.8 (3.747)	6.53 (0.469)	2.75 (0.096)	94.35 (3.304)	6.34 (0.254)	290 g
<b>LtHf</b>	2.77 (0.225)	83.42 (4.812)	5.92 (0.464)	2.81 (0.058)	92.88 (3.255)	5.72 (0.204)	103 g
<b>HtLf</b>	2.67 (0.237)	84.375 (2.744)	5.475 (0.618)	2.84 (0.066)	92.51 (2.203)	6.43 (0.353)	101 g

HtHf = High temperature and high food ration  
LtHf = Low temperature and high food ration  
HtLf = High temperature and low food ration



Genome size versus cell size  
(the five wild populations)

