

Growth variability and mercury tissue concentration in anadromous Arctic charr

Summary

Project Leader(s)

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The project was designed to build on prior work that examined probable climate change related growth and contaminant impacts on land-locked populations of Arctic charr by extending the analysis to include migratory or anadromous populations of Arctic charr. Differences in THg accumulation rates in the two life-history (land-locked and migratory) types of Arctic charr were analysed and the relative influences of diet, temperature and habitat on growth and THg accumulation along a north south gradient from Nain to Ellesmere Island were assessed. Anadromous Arctic charr THg concentrations were found to increase marginally toward the north, possibly as a result of intermittent marine migration. Lacustrine Arctic charr THg concentrations were more variable among populations than values recorded for anadromous populations, with no discernable trend by latitude. The project also examined individual variation in marine growth as it related to temperature in conjunction with Inuit led population management initiatives in the Ungava Bay region. For similar temperatures, individual Arctic charr growth rates in Ungava exceeded those obtained from monitoring of Arctic charr populations along the Labrador coast. Increased nearshore productivity associated with the large freshwater discharges from the Koksoak River are hypothesized to account for the differences, with Labrador populations being more food limited than Ungava populations. Study results have yielded some of the first insights into marine habitat associated growth rates for Arctic charr in the Ungava region and provided critical data for assessing the possible impacts of climate change on THg accumulation in anadromous Arctic charr and understanding of differential accumulation rates in lake and marine feeding fish. Enhanced understanding of habitat-specific accumulation rates and growth variation will permit more accurate prediction of the effects of climate change on the important anadromous stocks of Arctic charr exploited by the Inuit in traditional subsistence fisheries. Such information also formed the core information used as input into the Eastern sub-Arctic regional IRIS, specifically the chapter entitled: Arctic charr in a changing climate: predicting possible impacts of climate change on a valued northern species ArcticNet. Finally, study information will also contribute to the improvement of management abilities to make informed decisions about the risks associated with continued country food consumption in the face of climate warming.

People

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Publications

Articles Published in Refereed Publications

Chavarie, L., Dempson, J. B., Schwarz, C. J., Reist, J. D., Power, G., Power, M., 2010, Latitudinal variation in growth among Arctic charr in eastern North America: evidence for countergradient variation?, *Hydrobiologia*. DOI 10.1007/s10750-009-0043-z , 1, Accepted

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Godiksen, J. A., Svenning, M. A., Sinnatamby, R.N., Dempson, J. B., Borgstrom, R. and Power, M., 2010, Stable isotope-based determinations of the average temperatures experienced by young-of-the-year Svalbard Arctic charr (*Salvelinus alpinus* (L.)), *Polar Biology*. DOI 10.1007/s00300-010-0907-8., 1, Published

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Sinnatamby, R. N., Shears, M., Dempson, J. B. and Power, M., 2010, Temporal analysis of otolith-inferred temperatures experienced by young-of-the-year Arctic charr, *Salvelinus alpinus*, in Labrador, Canada, ArcticNet 7th Annual Scientific Meeting, December 14-17, 2010, Ottawa., 1, Published

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