Acoustic Size Spectra of Fishes: Spatial and Temporal Variation within a Hydropower Reservoir along the Winnipeg River. \*L. Wheeland and G.A. Rose, Centre for Fisheries Ecosystems Research, Fisheries and Marine Institute of Memorial University of Newfoundland (Laura.Wheeland@mi.mun.ca; presentation).

Aquatic ecosystems are widely considered to be shaped by size-based processes. Size-spectra provide indicators for ecosystem status, and may be used to assess differences in fish communities among systems, habitats and over time. Hydroacoustics were used to derive length-frequency spectra of fish communities and map physical habitat characteristics at Lac du Bonnet, a hydropower reservoir along the Winnipeg River, Manitoba. A BioSonics DTX echosounder operating at multiple frequencies was deployed from a 17-foot Boston Whaler. Systematic surveys of parallel transects were used to assess the pelagic fish community. Additional habitat mapping tracks were completed perpendicular to survey transects, as well as near-shore circumscribing the reservoir. Size-spectra were derived from linear regressions of ln(abundance) x ln(length) of fishes within 5cm length intervals, with lengths derived from target strength measures. Spectra height is used as an index of overall abundance of fishes, with slope representative of the relative proportions of fish by size. Three distinct basins were identified within the reservoir, characterized by differences in bathymetry, substrate and flow. Spectra differed among these mesoscale habitats. Variation in spectra between surveys reflected changes in fish community structure across the season. Inter-annual variation in spectra within the basins occurred: height was greater in 2011 than 2012 in all three basins, while spectra slope did not vary significantly between years. The use of size-spectra from acoustic data has potential to provide cost-effective monitoring of changes in structure and productivity of aquatic ecosystems, in particular those associated with hydropower development.