

Changes in the distribution and abundance of Rainbow Smelt (*Osmerus mordax*) in the lower Nelson River and Lake Winnipeg, Manitoba, Canada - 1990s-2010s

A presentation to the 19th International Conference on Aquatic Invasive Species, Winnipeg, Manitoba, Canada – April 13, 2016

Richard Remnant¹, Chelsey Lumb², Don Macdonald², and Regan Caskey¹

¹ – North/South Consultants Inc.

² – Manitoba Conservation and Water Stewardship

Acknowledgements

Data obtained from a variety of sources:

Lower Nelson River

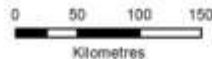
- MCWS and Manitoba Hydro - CAMP
- Keeyask Hydropower Limited Partnership

Lake Winnipeg

- MCWS, DFO, and LWRC, with some funding from the Fisheries Enhancement Fund
- MCWS and Manitoba Hydro - CAMP
- Katie Sheppard, University of Manitoba

Background



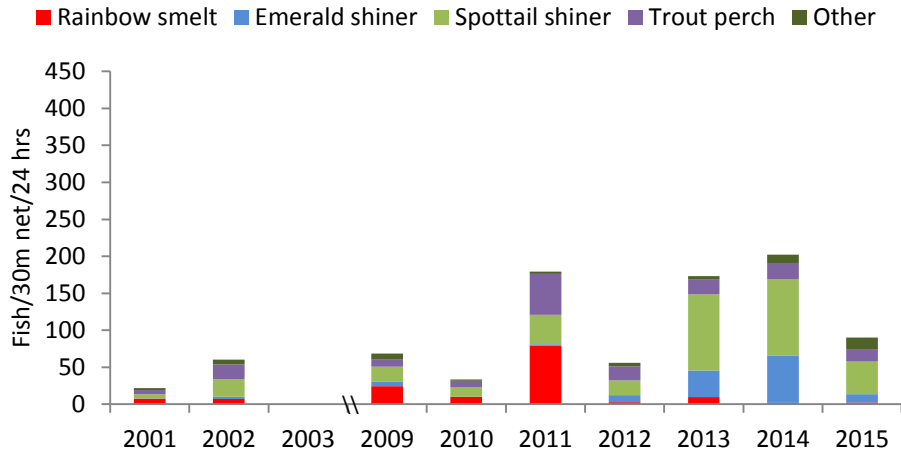


Coordinate System: UTM Zone 14, NAD 83
 Date Source: Canvec © Her Majesty the Queen in
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 Created By: North/South Consultants
 Date Created: 31/03/2016

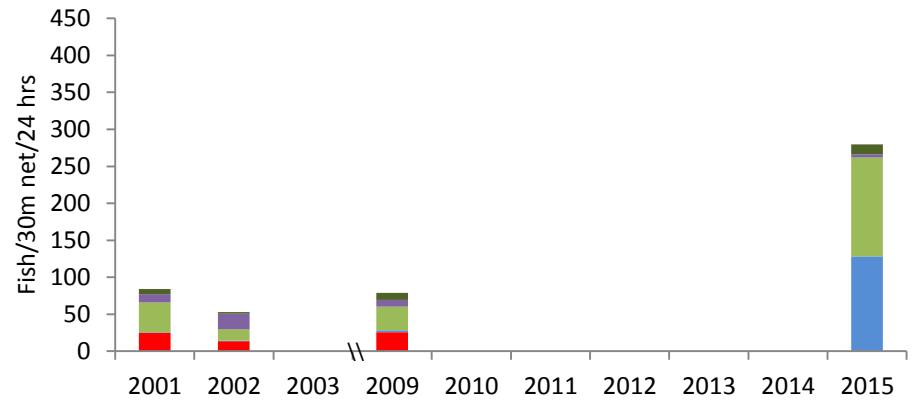
Manitoba
 Overview

Small mesh index gillnet catch in lower Nelson River water bodies, 2001-2015

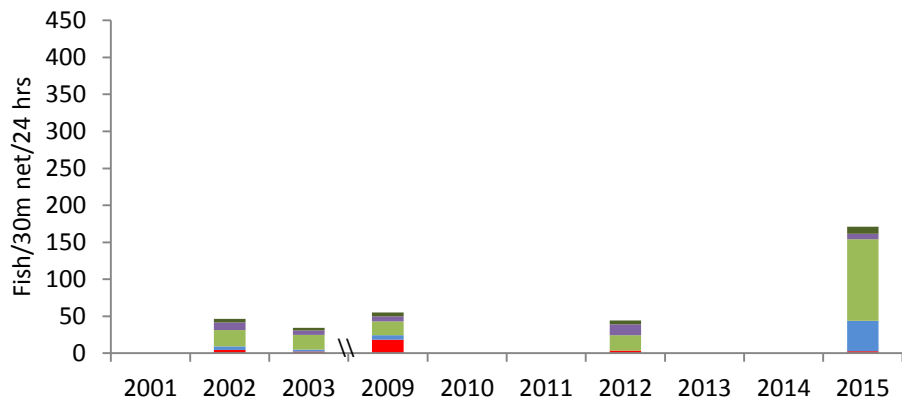
Split Lake



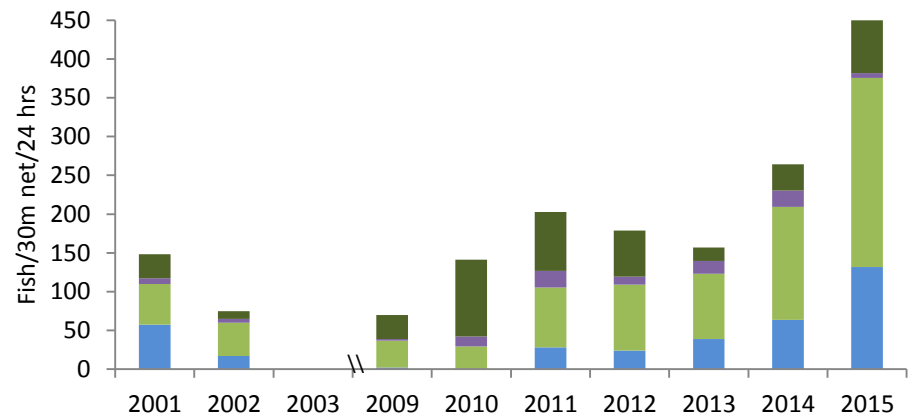
Gull Lake



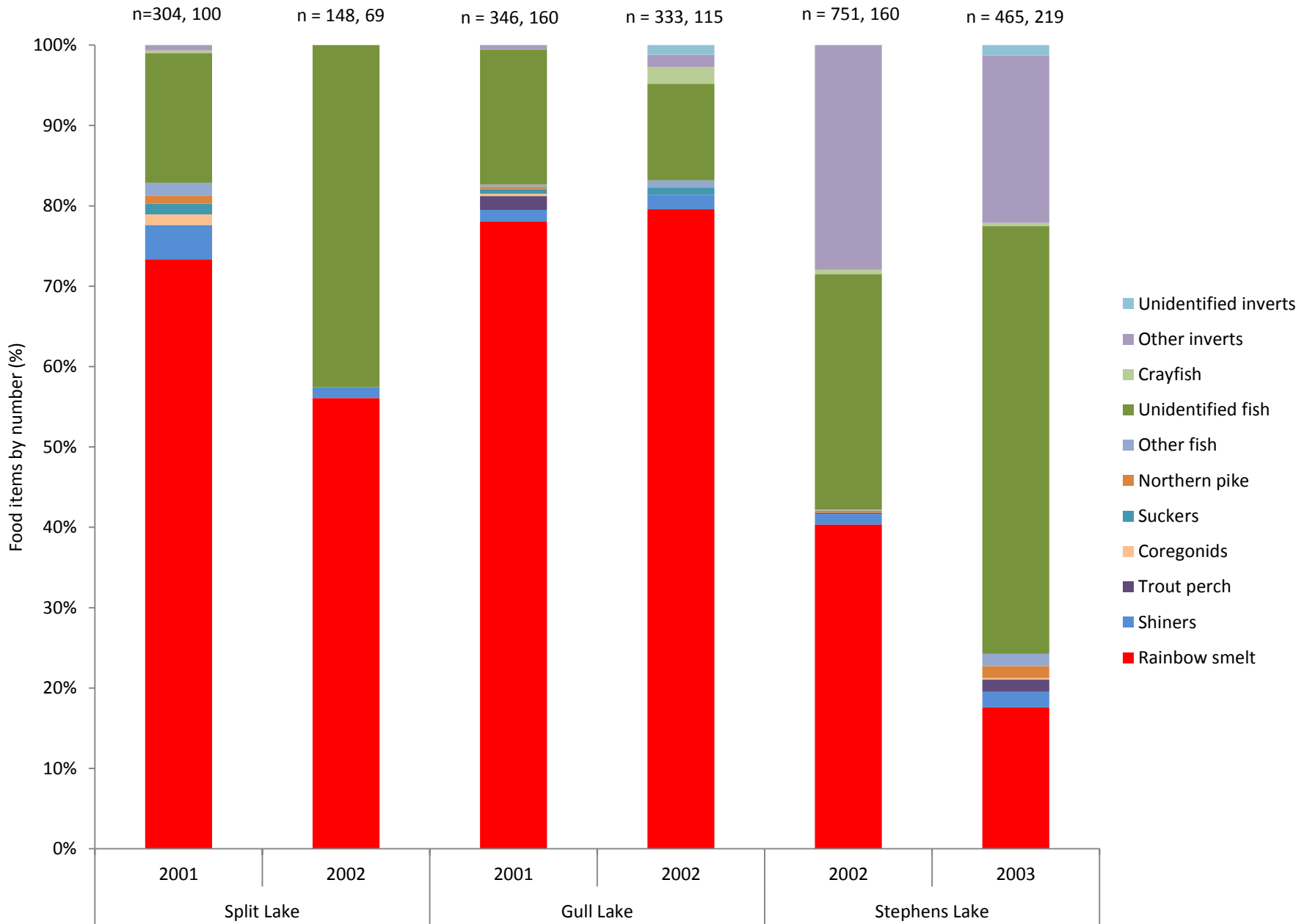
Stephens Lake



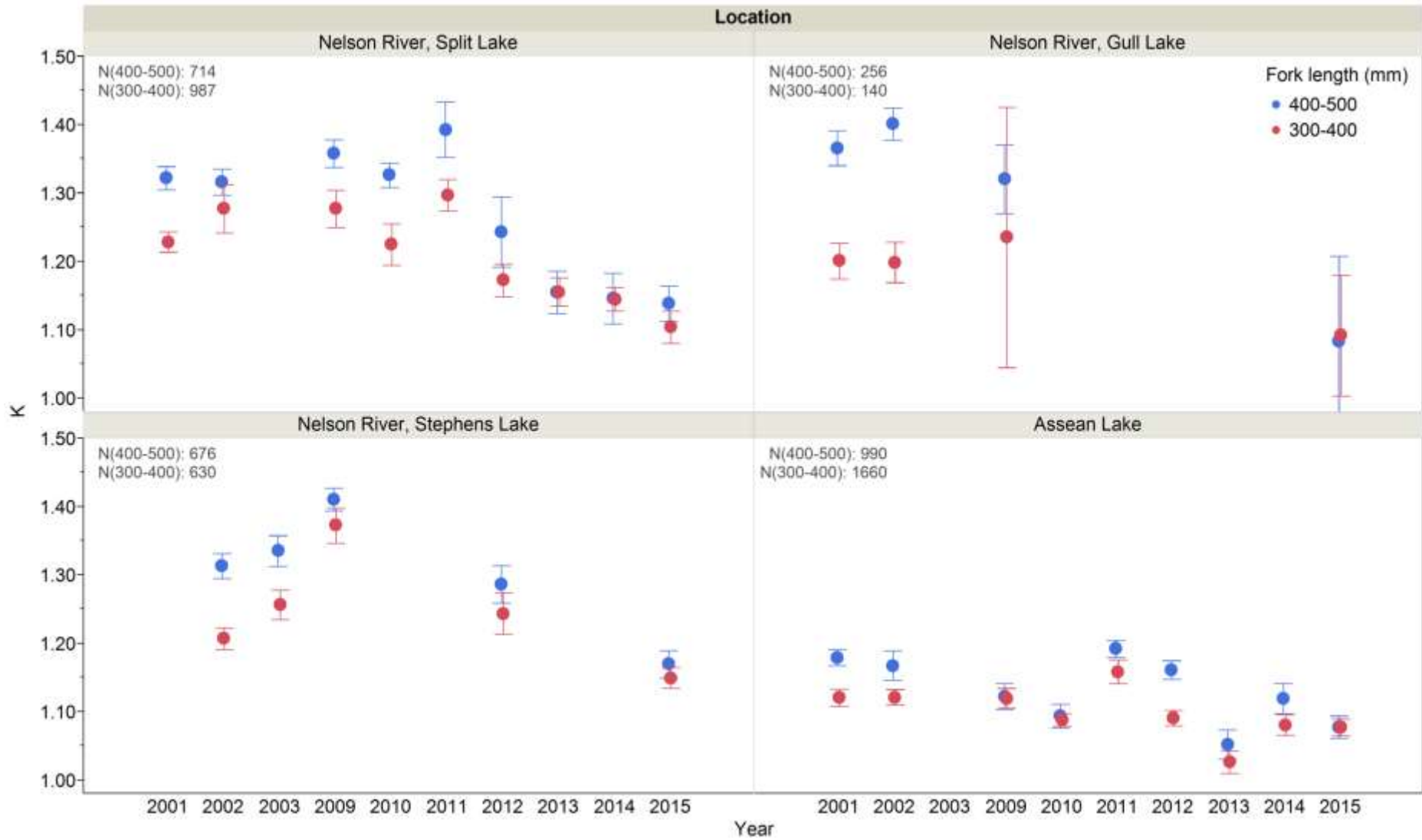
Assean Lake



Walleye diet in lower Nelson River water bodies, 2001-2003

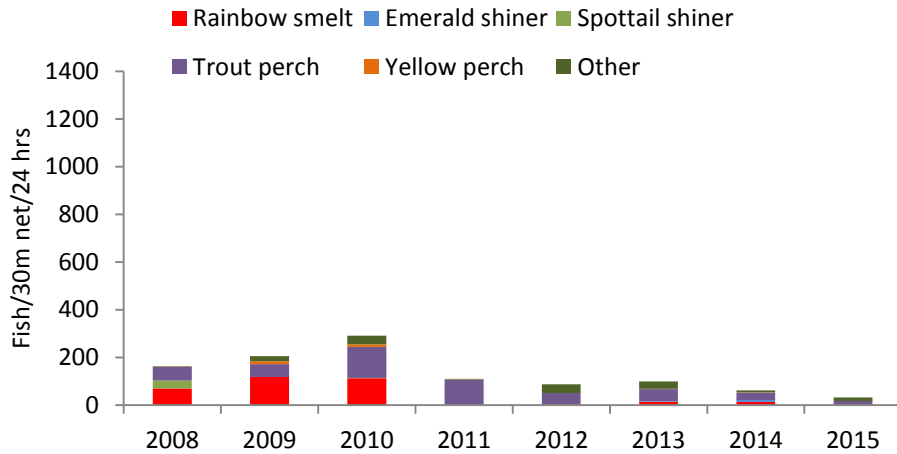


Fulton's Condition Factor for Walleye captured in the lower Nelson River, 2001-2015

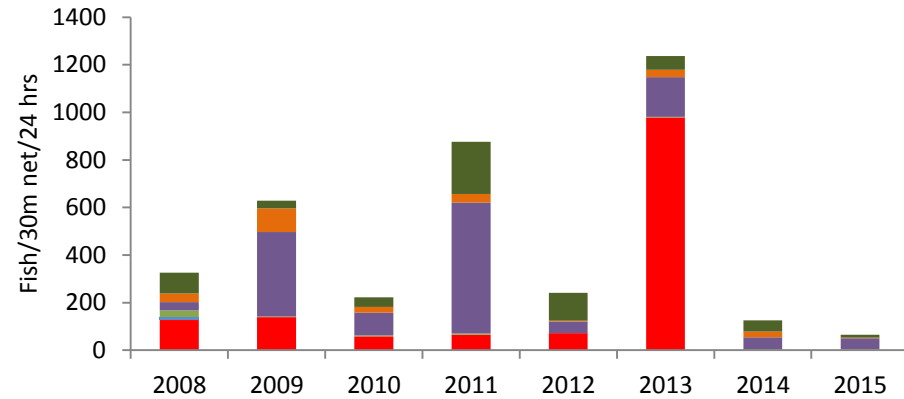


Small mesh index gillnet catch in Lake Winnipeg and Lake Winnipegosis, 2008-2015

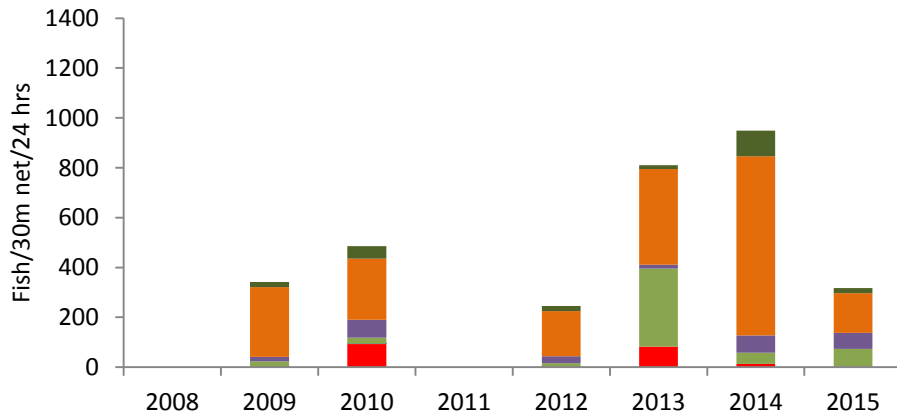
Lake Winnipeg Mossy Bay



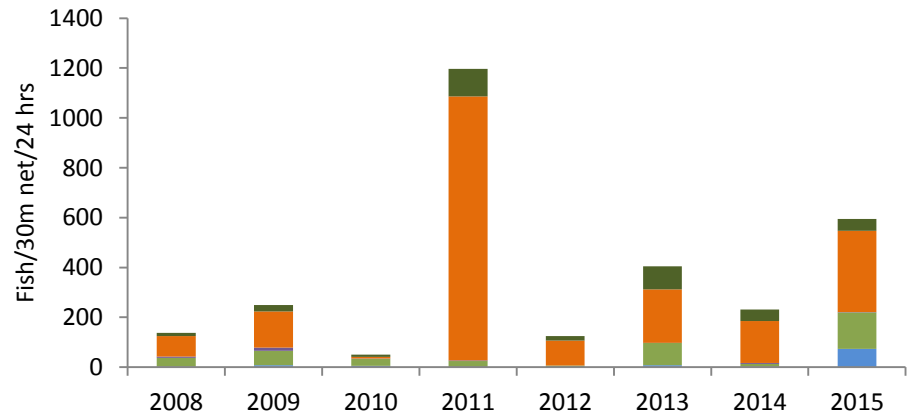
Lake Winnipeg Grand Rapids



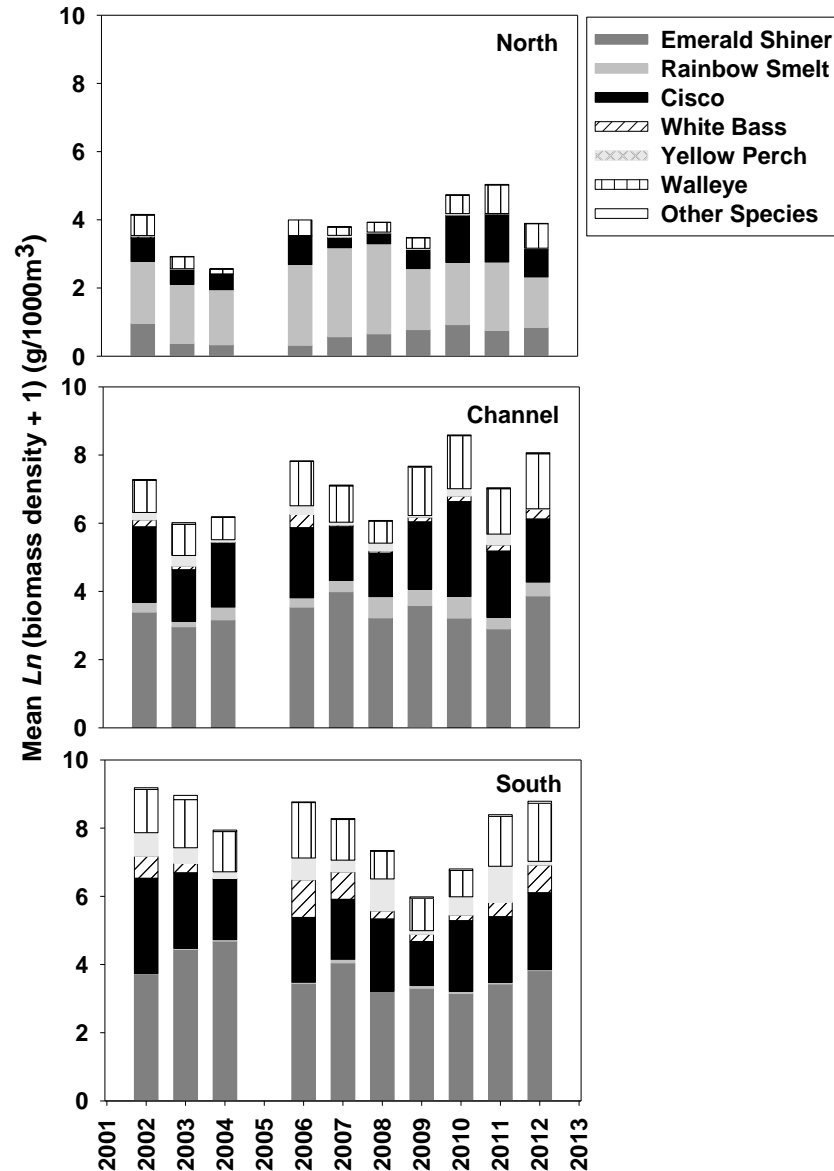
Lake Winnipeg Sturgeon Bay



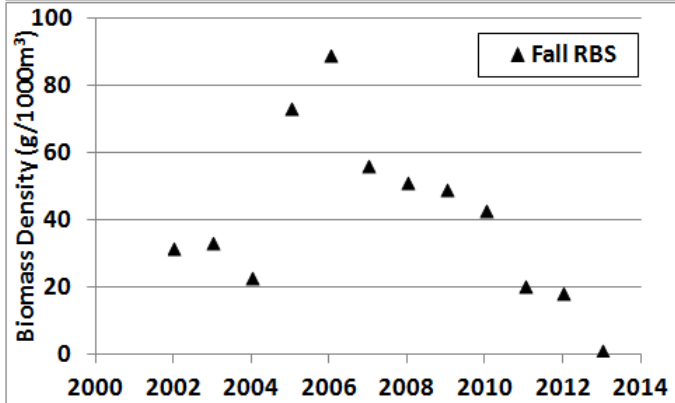
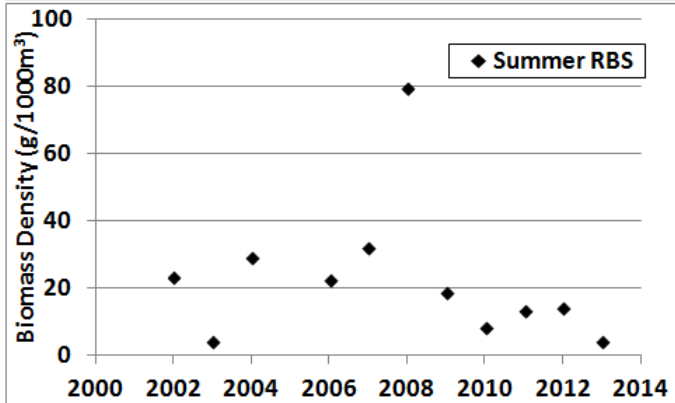
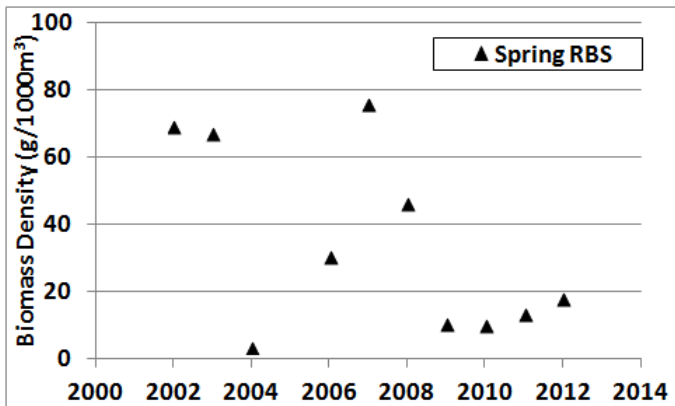
Lake Winnipegosis



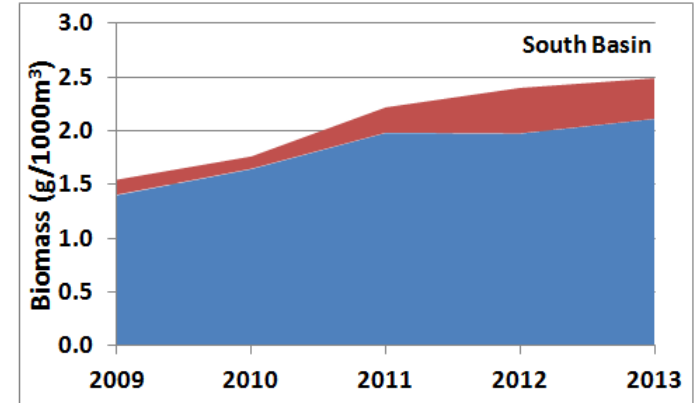
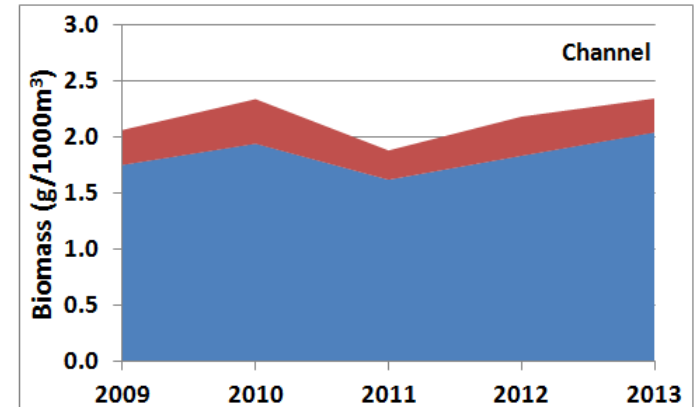
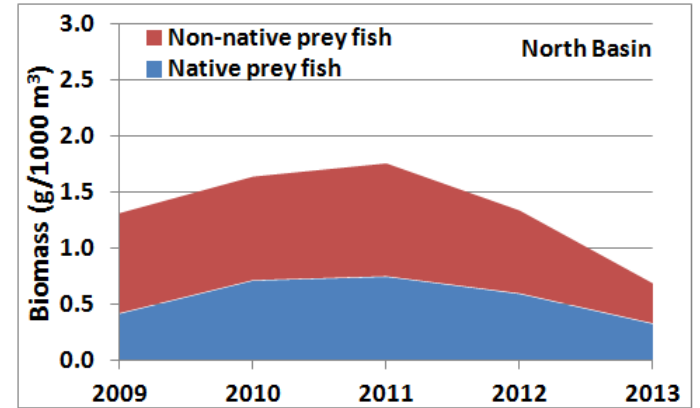
Pelagic Fish Community Monitoring



Annual mean biomass density of species by basin, weighted by trawl depth and season

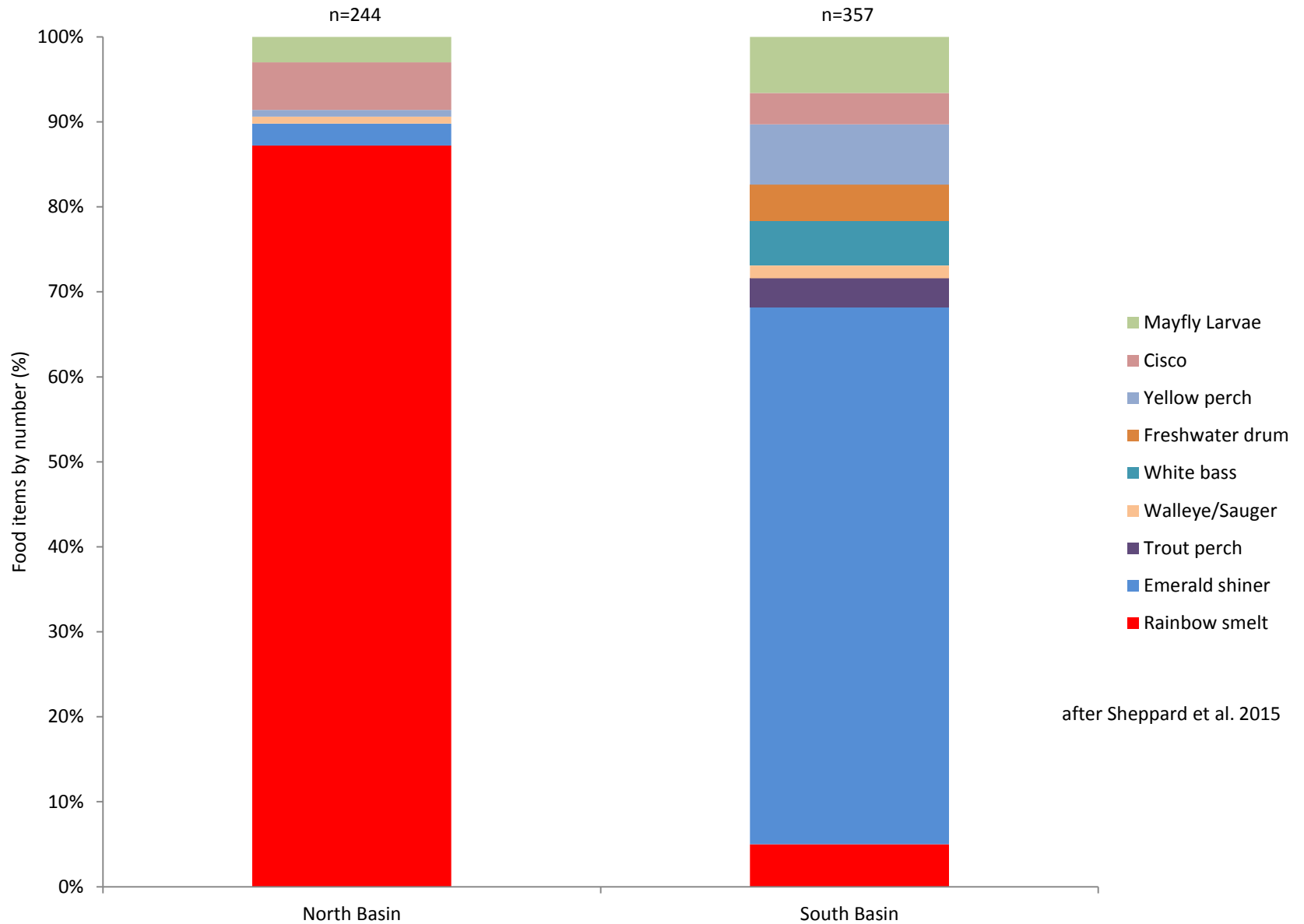


Rainbow Smelt biomass density (not transformed) in the north basin by season, 2002 to 2013



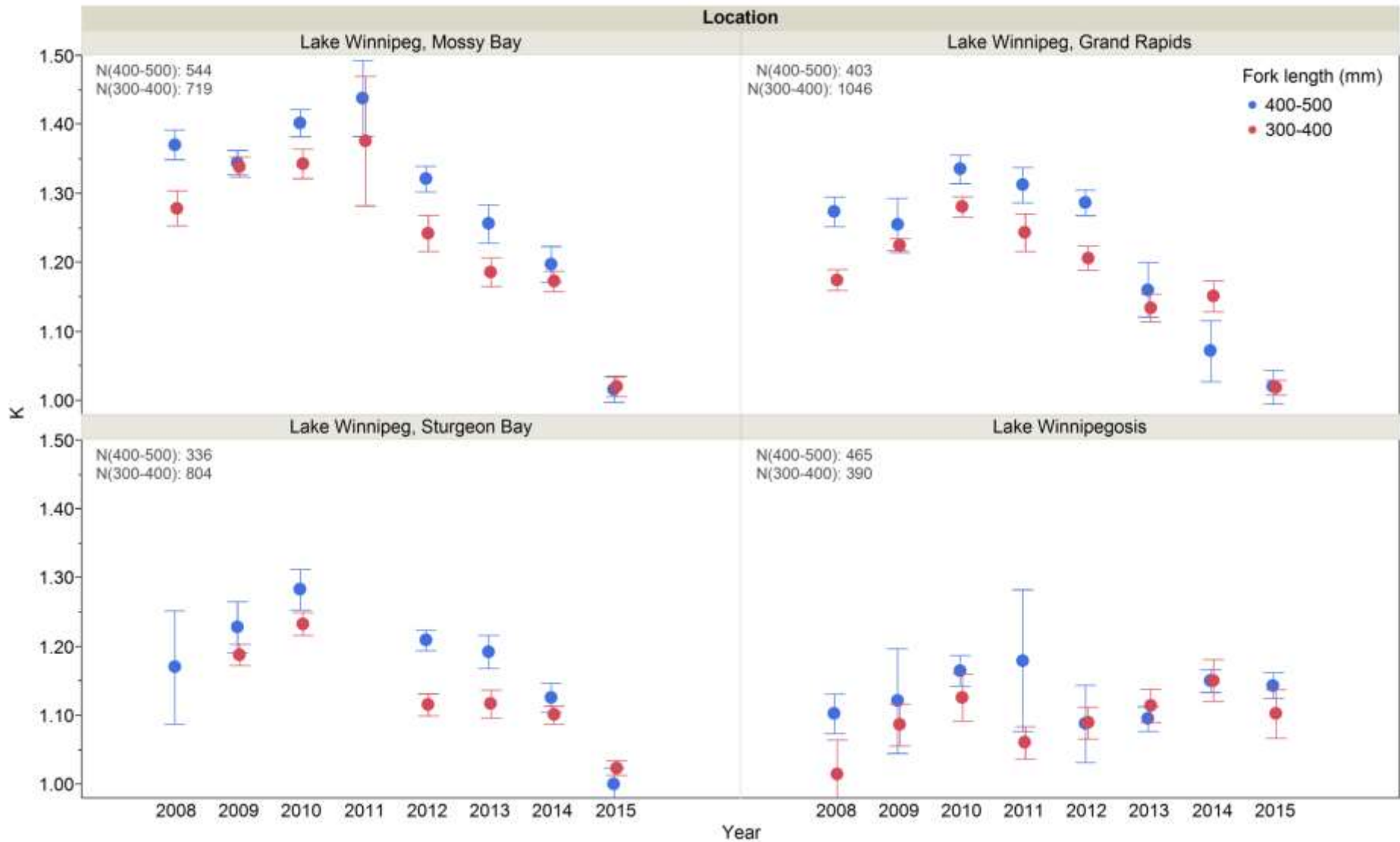
Lake Winnipeg prey fish biomass by basin, 2009 to 2013

Walleye diet in Lake Winnipeg, 2010-2011



after Sheppard et al. 2015

Fulton's Condition Factor for Walleye captured in Lake Winnipeg, 2008-2015



Walleye Condition

2014



2015



Summary of Results

- Lower Nelson River
 - Decline in Rainbow Smelt CPUE
 - Overall CPUE of small bodied fish not declining in most waterbodies
- Lake Winnipeg
 - Decline in Rainbow Smelt CPUE and biomass in North Basin
 - Apparent decline in overall small bodied fish biomass in North Basin

Discussion – Potential explanations for decline in Rainbow Smelt abundance

- Seasonal die-offs
- Disease
- Changes in food web
 - Bottom-up changes (temperature, nutrients)
 - Top down changes (competition, predation)
 - Role of other invasive species (Bythotrephes, Dreissena)
- Recent phenomenon in Manitoba waters

Questions?

