Spatial Distribution of Inconnu, *Stenodus leucichthys nelma* (Pallas, 1773), in the Southern Great Slave Lake

Xinhua Zhu [1]*, Deanna Leonard [2], and Melanie Toyne [1]

[1] Fisheries and Oceans Canada, 501 University Crescent, Winnipeg, MB R3T 2N6, Canada

[2] Fisheries and Oceans Canada, 5204-50th Avenue, Yellowknife, NT X1A 1E2, Canada

**** Tel 1-204-983-7795, Fax 1-204-984-2403, Email Xinhua.Zhu@dfo-mpo.gc.ca***

KEYWORDS: Distribution, Abundance, Biomass, Inconnu, Prey Resource, Turbidity, Community-Based Ecomonitoring, Depth, Great Slave Lake

BACKGROUND

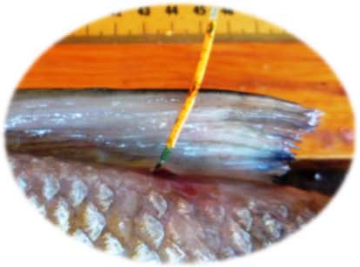
Inconnu, *Stenodus leucichthys nelma* (Pallas, 1773), is distributed from northwestern North America and west in the Arctic drainages of northern Asia to the White Sea (Scott and Crossman 1998). Three ecotypes have been identified in Northwest Territories: anadromous (lower Mackenzie River), non-anadromous (Great Slave Lake: GSL), and riverine (upper Mackenzie River) (Reist and Bond 1988; Howland et al. 2000; Stephenson et al. 2005; Bradford et al. 2008). Ascribed to the pisciverous salmonid, its top-down controls of trophic dynamics in the GSL ecosystem has been recognized. Inconnu is caught as by-catch in the GSL commercial fishery, but is also important for recreational and Aboriginal fisheries. Recently, it was listed as "maybe at risk" in Northwest Territories (NWT 2010). To monitor the population dynamics, the relationship between spatial distribution of population abundance and environmental dependence was of importance, but relatively seldom studied.

OBJECTIVES

- ✓ Summarize the abundance, biomass, and biological characteristics of Inconnu population dynamics;
- ✓ Describe the spatial distribution in the southern GSL which connects rivers, Slave, Little Buffalo, Buffalo and Hay as well as Mackenzie ecosystems;
- ✓ Integrate the changes of abundance and biomass of Inconnu population into GSL ecomonitoring reference framework.

MATERIALS AND METHODS

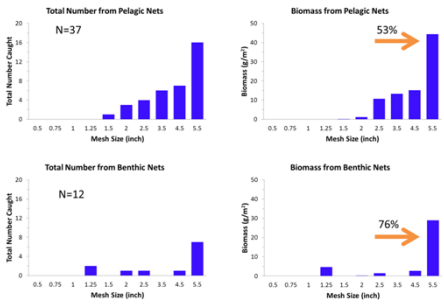
Data were collected by a series of depth-stratified random gillnetting in areas IW, IE, and III of GSL from July 10 to August 17, 2012. Water environmental parameters were collected using a YSI. Numbers and biomass per unit effort (NPUE and BPUE) were log-transformed and multivariate statistics, such as detrended correspondence analysis (DCA) and redundancy analysis (RDA), were applied by Canoco 4.5 (ter Braak & Šmilauer. 2003).



RESULTS AND CONCLUSION

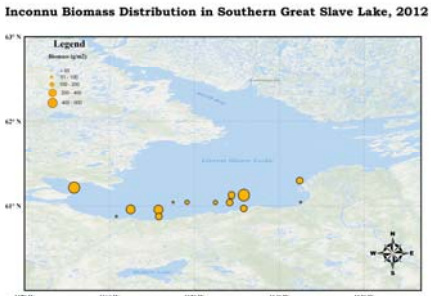
A total of 52 Inconnu were captured by 56 effective settings. NPUE and BPUE in the pelagic settings were estimated to 1958 per square kilometer and 7.77 g/m^2, which were more than double those in benthic settings. Fork length ranged from 277 to 943 mm with an average of 680±20 mm. The round weight varied from 140 to 8995 g with an average of 3837±269 g. Half (50%) of fish caught had mature gonads, 38% were immature, and 12% were resting.

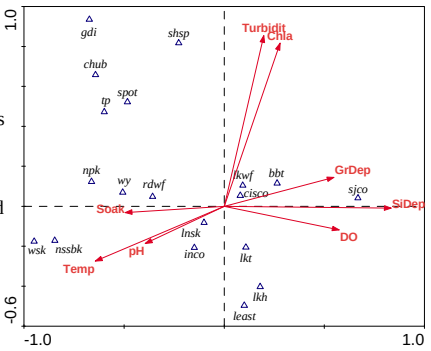
In the pelagic nets, the number and biomass of Inconnu caught increased with increasing mesh size, but mesh size 140 mm alone caught 53% of the fish. In the benthic nets, the 140 mm again caught most of the fish (76%), but a trent in catch abundance with mesh size was not seen.



Despite the general dispersal in the surveyed areas, the spatial distribution was characterized by a patchiness along the 20-m isobath in the southern shore of GSL.

The maximum gradient lengths in DCA were found to be less than 3, indicating that the association of NPUE and BPUE versus environmental variables is best represented by linear relationships. RDA revealed that the first two axes can better delineate the environmental dependence of the spatial distribution. Inconnu biomass was negative to turbidity and positive to ciscoes biomass. The significance of both variables should be integrated into an ecomonitoring reference framework to assess the stock status and sustainability of Inconnu in GSL.





ACKNOWLEDGEMENTS

This study was funded by DFO AFS and NWT CIMP in 2011-2012 and 2012-2013. Aboriginal communities were engaged in hand-on training session and field research activities, especially Peter Sabourin, Shawn Buckley, Barry Buckley, Irene Graham, Donald Beaulieu, Doug Lafferty, Sam Biscaye, Sam Rymer, and Margo Edjericon. Rosy Bjornson and Patrick Simon from DKFN, George Low and Michael Low from AAROM, and Kristy Smith from University of Manitoba are sincerely appreciated of their assistance and coordination.

Fisheries and Oceans Canada | Pêches et Océans Canada

LITERATURE CITED

Reist, J.D. & Bond, W.A.1988; Scott, W.B., & E.J., Crossman. 1998; Howland, K.L. et al. 2000; ter Braak, C.J.F. & P. Šmilauer. 2003; Stephenson, S.A. et al. 2005; Bradford, M.J. et al. 2008; NWT SARA 2010