



Dr. Patrick A. Nelson  
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### **Expertise and experience for Lake Sturgeon**

My areas of Lake Sturgeon expertise include habitat suitability modeling, population estimation, population viability analysis, risk assessment, and adaptive management approaches. I specialize in sample design, statistical analysis, and development of field studies for aquatic effects monitoring. I manage several Lake Sturgeon studies focused on collecting data to assess survival, growth, abundance, recruitment, and genetics. I was also a co-author on the 2016 Lake Sturgeon COSEWIC report.

### **Expertise and experience in the development and implementation of mitigation, effects monitoring, and effectiveness monitoring for Lake Sturgeon**

My experience has been developed over the last 24 years and ranges from aquaculture and parasitology to ecology and statistics. My experience has included: 1) experimental feed trials on post-yolk sac Lake Sturgeon through yearling, 2) diet and parasites studies of Lake Sturgeon, 3) development of Lake Sturgeon spawning studies, 4) Lake Sturgeon mark-recapture studies, 5) development of adaptive management strategies for Lake Sturgeon spawning and recruitment, 6) design of field programs to monitor project effects, 7) population genetic studies on Lake Sturgeon in Manitoba, Saskatchewan, and Ontario, and 8) population viability analysis for risk management.

### **Expertise and experience in the hydroelectric sector**

My knowledge and practise on regulated waterways in the hydroelectric sector is extensive (over 22 years). This includes independent review of impact assessments, habitat suitability studies, fish population studies, fish stranding studies, fish migration studies, and project management. I have been involved with several major hydroelectric projects, worked with hydraulic engineers to develop assessment methods for peaking power plants, and collaborated with regulators to develop adaptive management strategies. To date, I work with Manitoba Hydro, SaskPower, Fisheries and Oceans, Manitoba Water Stewardship, and First Nations to develop long-term plans for Lake Sturgeon in Saskatchewan and Manitoba.



## EDUCATION

**1995-2005** Doctor of Philosophy, Department of Zoology, University of Manitoba

Thesis - Ecology of sympatric catostomid fishes in a glacial riverine system: habitat, food, and biogeography

**1990-1994** B.Sc., Department of Zoology, University of Manitoba

## AREAS OF EXPERTISE

- Fish habitat and instream flow needs
- Population estimation and modeling
- Parasitology and trophic interactions
- Sample design and data analysis
- Biogeography

## RELATED EXPERIENCE

- **Manitoba Hydro:** i) Design and implementation of Lake Sturgeon population studies, habitat utilization studies, and Lake Sturgeon genetic studies on the lower Nelson and Hayes rivers (2004-present); ii) preparation of data for the environmental impact assessment of the Keeyask GS, including Lake Sturgeon population studies, existing environment and post-project impacts (2004-2013); iii) statistical analysis for adaptive management and decision making, parameter estimation for targets, benchmarks, and criteria development for the Pointe du Bois Spillway Replacement Project (2007-present) and the Keeyask Generation Project (2012-present); iv) population viability analysis for Lake Sturgeon to assess uncertainties with project effects on Lake Sturgeon regarding habitat fragmentation and population recovery (2013); entrainment studies on the Winnipeg River at Great Falls Generating Station (2010-2011).
- **SaskPower:** i) Lake Sturgeon studies on the Saskatchewan River, SK in the vicinity of the Forks (2014-present); ii) habitat and bathymetric surveys on Tobin Lake, SK (2012-2015); iii) Lake Sturgeon acoustic telemetry surveys on Codette and Tobin lakes, SK. (2012-present); iv) Lake Sturgeon studies on the Churchill River at Island Falls Hydroelectric Facility (2010-2011); v) fisheries issues associated with the E.B. Campbell Hydroelectric Station (2008-2010).

## Research

- **Manitoba Hydro:** i) Effects of growth and recruitment on Lake Sturgeon recovery and ii) population genetics of Lake Sturgeon in northern Manitoba using single nucleotide polymorphism approach with Louis Bernatchez at Université Laval.
- **SaskPower:** Population genetics of Lake Sturgeon in the Saskatchewan River watershed using single nucleotide polymorphism approach with Louis Bernatchez at Université Laval.

## SELECTED PUBLICATIONS AND CONFERENCE PRESENTATIONS

McDOUGALL, C.A., A.B. WELSH, W.G. ANDERSON, P.A. NELSON, and T. GOSELIN. (in prep). Rethinking the influence of hydroelectric development on Lake Sturgeon gene flow. PLoS One (Accepted January 2017).



HRENCHUK, C.L., C.A. McDOUGALL, C.C. BARTH and **P.A. NELSON**. (in prep). Movement and habitat use of juvenile Lake Sturgeon (*Acipenser fulvescens*, Rafinesque, 1817) in a large hydroelectric reservoir (Nelson River, Canada). *Journal of Applied Ichthyology* (Accepted September 2016).

**NELSON, P.A.**, C.A. McDOUGALL, AND C.C. BARTH. 2015. Modeling the effects of growth, recruitment, and population management in lake sturgeon population recovery. NASPS Meeting Oshkosh, WI

McDOUGALL, C.A., C.C. BARTH, J.K. AIKEN, L.M. HENDERSON, M.A. BLANCHARD, K. AMBROSE, C.L. HRENCHUK, M.A. GILLESPIE and **P.A. NELSON**. 2014. How to sample juvenile Lake Sturgeon, (*Acipenser fulvescens* Rafinesque, 1817), in Boreal Shield rivers using gill nets, with an emphasis on assessing recruitment patterns. *Journal of Applied Ichthyology* 30: 1402-1415.

BARTH, C.C., W.G. ANDERSON, S.J. PEAKE and **P.A. NELSON**. 2013. Seasonal variation in the diet of juvenile lake sturgeon, *Acipenser fulvescens*, in the Winnipeg River. *Journal of Applied Ichthyology* 29: 721–729.

**Articles or abstracts in preparation**

COSEWIC. In prep. COSEWIC Status Report on Lake Sturgeon *Acipenser fulvescens*. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

**NELSON, P.A.** C.A. McDOUGALL, and C.C. BARTH. In prep. The effect of growth, recruitment, and allowable harm on Lake Sturgeon recovery potential in Canada. (TBD)

**NELSON, P.A.**, and A. CHOUDHURY. In prep. Factors determining the richness and diversity of north temperate fish-parasite compound communities. (Drafted for *Journal of Parasitology*)

**NELSON, P.A.**, M.V. ABRAHAMMS, and W.G. FRANZIN. In prep. The shocking truth about electrofishing: are fish diversity estimates reliable? (Drafted for *Transactions of the American Fisheries Society*)

**NELSON, P.A.** and W.G. FRANZIN. In prep. Fish habitat and instream flow needs: A modified boat electrofishing method for medium to large rivers. (in preparation for *Transactions of the American Fisheries Society*)