

Christopher L. Cahill, Ph.D.

Education

Ph.D. Ecology. University of Calgary. 2014-2021.

Dissertation title: “Unveiling uncertainty and complexity in inland fisheries.”

GPA: 4.00/4.00.

Relevant courses:

Numerical computing for natural resources, instructor: Andre Punt, University of Washington. Programs used: ADMB, R, TMB, JAGS/BUGS

Bayesian decision analysis for resource management, instructor: Andre Punt, University of Washington. Programs used: R, JAGS/BUGS

Spatial, temporal, and spatial-temporal models for ecology, one-week workshop, instructor: Alain Zuur, Highland Statistics Ltd. Programs used: INLA, R

Hierarchical modeling using Template Model Builder, informal audit, instructor: Jim Thorson, National Oceanic and Atmospheric Administration. Programs used: Template Model Builder and R

M.Sc. Aquatic ecology. University of Alberta. 2011-2014.

Thesis title: “Assessing responses of fish to habitat enhancement in Barrenlands streams, NWT, Canada.” GPA: 3.85/4.00.

Relevant courses:

Advanced biometrics in R, instructor: Fangliang He, University of Alberta.

Fish population dynamics, instructor: Michael Allen, University of Florida.

Advanced Ecology, instructor: Cindy Paszkowski, University of Alberta.

B.Sc. Water resources (fisheries science option). University of Wisconsin-Stevens Point. 2007-2011. Advisors: Michael Hansen and Dan Isermann. GPA: 3.52/4.00.

Relevant courses:

Fish and wildlife population dynamics, Fisheries research, Fisheries management, Fish ecology, Natural resource economics, Limnology, Statistics, Calculus.

Publications

- Courtice, G., Bauer, B., Cahill, C., Naser, G., and Paul, A. *In press*. Suspended sediment releases in Rivers: toward establishing a safe sediment dose for construction projects. *Science of The Total Environment*.
- Cahill, C.L., Walters, C.J., Paul, A.J., Sullivan, M.G., and Post, J.R. 2022. Unveiling the recovery dynamics of walleye after the invisible collapse. *Canadian Journal of Fisheries and Aquatic Sciences* 79(5): 708-723.
- Courtice, G., Bauer, B., Cahill, C., Naser, G., and Paul, A. 2022. A categorical assessment of dose-response dynamics for managing suspended sediment effects on salmonids. *Science of The Total Environment* 807: 150844.
- Paul, A.J., C.L. Cahill, L. MacPherson, M.G. Sullivan, and M.R. Brown. 2021. Are Alberta's Northern Pike populations at risk from Walleye recovery? *North American Journal of Fisheries Management* 41: 399-409.
- Cahill, C.L, S. Anderson, A.J. Paul, L. MacPherson, M.G. Sullivan, B. van Poorten, C.J. Walters, and J.R. Post. 2020. A spatial-temporal approach to modeling somatic growth across inland recreational fisheries landscapes. *Canadian Journal of Fisheries and Aquatic Sciences* 77: 1822-1835.
- Wilson, K.L., J. De Gisi, C.L. Cahill, O.E. Barker, J.R. Post. 2019. Life history variation along environmental and harvest clines of a northern freshwater fish: plasticity and adaptation. *Journal of Animal Ecology* 88: 717-733.
- Cahill, C.L., S. Mogensen, K.L. Wilson, A. Cantin, R.N. Sinnatamby, A.J. Paul, P. Christensen, J.R. Reilly, L. Winkel, A. Farineau, J.R. Post. 2018. Multiple challenges confront a high-effort inland recreational fishery in decline. *Canadian Journal of Fisheries and Aquatic Sciences* 75: 1357-1368.

Cahill, C.L., K.L. Howland, M.F. Hulsman, F. Noddin, W.M. Tonn, G. Courtice, and D.Z. Zhu. 2016. Arctic Grayling movements through a nature-like fishpass in Northern Canada. *Transactions of the American Fisheries Society* 145: 951-963.

Hulsman, M.F., C.L. Cahill, A.C. Erwin, B.D. Lunn, W.M. Tonn, K.M. Howland, and A.B. Baki. 2016. Influence of potential fish competitors on Lake Trout trophic ecology in the lakes of the Barrenlands, NWT, Canada. *Journal of Great Lakes Research* 42: 290-298.

Courtice, G.J., A.B. Baki, C.L. Cahill, W.M. Tonn. 2016. Stream habitat connectivity in the Canadian Arctic: an on-site approach to design and construction. *Canadian Journal of Civil Engineering* 43:139-150.

Cahill, C.L., A.C. Erwin, K.L. Howland, M.F. Hulsman, B.D. Lunn, F. Noddin, W.M. Tonn, A.B. Baki, G. Courtice, and D.Z. Zhu. 2015. Assessing responses of fish to habitat enhancement in Barrenlands streams of the Northwest Territories. *North American Journal of Fisheries Management* 35: 755-764.

Courtice, G.J., A.B. Baki, D.Z. Zhu, C.L. Cahill, and W.M. Tonn. 2014. Stream modifications to enhance system connectivity for fish habitat compensation: a case study in the Barrenlands region of Canada. *Canadian Journal of Civil Engineering* 41: 650-659. *Paper of the year*.

Technical reports and assessment reviews

Zhu, X., L. Harris, C.L. Cahill, and R.F. Tallman. 2021. Assessing population dynamics of Arctic Char, *Salvelinus alpinus*, from the Halokvik and Jayko Rivers, Cambridge Bay, Nunavut, Canada. DFO Can. Sci. Advis. Sec. Res. Doc. 2021/016. iv + 34 p.

Harris, L.N., C.L. Cahill, T. Jivan, X. Zhu, and R.F. Tallman. 2021. Updated stock status of commercially harvested Arctic Char (*Salvelinus alpinus*) from the Jayko and Halokvik rivers, Nunavut: A summary of harvest, catch-effort and

biological information. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/062. v + 97 p.

DFO. 2018. Stock Status and Sustainable Harvest Levels for Arctic Char in Ijaruvung Lake, Iqalujjuaq Fiord and Irvine Inlet, Cumberland Sound, Nunavut. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2018/021. Assessment reviewer.

DFO. 2016. Assessment of Arctic Char (*Salvelinus alpinus*) in the Ulukhaktok area of the Northwest Territories. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2016/038. Assessment reviewer.

Cahill, C.L. 2015. Status of the Arctic Grayling in Alberta: Update 2015. Alberta Environment and Parks. Alberta Wildlife Status Report No. 57. Edmonton, Alberta, 96 p.

Cahill, C.L., G.C. Courtice, A.B. Baki, D.Z. Zhu, and W.M. Tonn. 2012. Preliminary Evaluation of M-Lakes Habitat Compensation Project. Report to Diavik Diamond Mines, Inc. 36 p.

Scientific communication to the public

C.L. Cahill and J.R. Post. March 2020. Common Walleye management misconceptions: part 2. Alberta Outdoorsmen. Monthly readership of 30,000 stakeholders. 3 pages.

C.L. Cahill and J.R. Post. February 2020. Common Walleye management misconceptions: part 1. Alberta Outdoorsmen. Monthly readership of 30,000 stakeholders. 3 pages.

External expert. I served as an external fisheries science expert during public consultation meetings on fisheries management practices hosted by Alberta Environment and Parks during January 2020. I attended 15 different four-hour public meetings and engaged approximately 2000 Albertans.

Presenter. Challenges facing the Bow River trout fisheries. December 2018. Presented to the Alberta Outfitters and Guide Association (AOGA). Invited by Alberta Environment and Parks and AOGA. Approximately 150 attendees.

CBC Calgary print and radio interviews. 2018. 50% drop in rainbow trout puts Bow River's 'world-renowned' sport fishery at risk.

<https://www.cbc.ca/news/canada/calgary/rainbow-trout-bow-river-1.4921565>

Various live and recorded television interviews. November-December 2018.

Topic: Bow River Rainbow Trout declines.

Selected leadership

Organizing committee. 2015-2017. International Charr Symposium. Duluth, Minnesota.

Organizing committee. 2015. Arctic Institute of North America International Student Conference. Calgary, Alberta.

Treasurer. 2012-2014. Animal Ecology Graduate Student Society. University of Alberta.

Organizing committee. 2010-2011. Wisconsin Chapter of the American Fisheries Society annual meeting.

Executive committee. 2010-2011. Wisconsin Chapter of the American Fisheries Society.

President. 2010-2011. Student Subchapter of the American Fisheries Society, University of Wisconsin-Stevens Point.

Treasurer. 2009-2010. Student Subchapter of the American Fisheries Society, University of Wisconsin-Stevens Point.

President and founder. 2007-2009. University of Wisconsin-Stevens Point recreational fishing team.

Project leader. 2007-2011. Student Subchapter of the American Fisheries Society, University of Wisconsin-Stevens Point.

Selected academic awards (16 total since 2009)

University of Calgary Silver Fellowship. 2020-2021. \$40,000 CAD.

Runner-up, Larkin Award (top fisheries PhD student in Canada). 2019. American Fisheries Society. Value: non-monetary.

Vanier Graduate Leadership Scholarship 2017-2019. Approximately 50 individuals awarded across the sciences in Canada per year. \$150,000 CAD.

Maritime Awards Society of Canada Graduate Scholarship. 2015. \$2,100 CAD.

Eyes High International Doctoral Scholarship. 2015-2016. University of Calgary. \$16,000 CAD.

Research Affiliate Scholarship. 2014-2015. Fisheries and Oceans Canada. \$30,000 CAD.

Chancellor's Leadership Award. 2009 and 2010. University of Wisconsin-Stevens Point. Non-monetary.

Teaching

Teaching assistant. R Wizardry. Winter 2020 and 2021. I co-designed lectures, contribute content, and taught students with diverse backgrounds the basics of the R programming language.

Co-instructor with J.R. Post. Winter 2018. Quantitative fisheries dynamics. Weekly seminar.

Teaching assistant. Winter 2015. Population Ecology. I co-designed lab exercises and instructed students in both programming and quantitative ecology skills such as matrix population modeling and population viability analysis.

Master tutor and natural resources writing fellow. 2008-2011. As an undergraduate, I taught undergraduate and graduate students how to write in a clear and concise manner. I also taught effective reading and writing techniques to individuals with learning disabilities.

Volunteer teaching. During my Ph.D., I led multiple workshops to teach graduate students the basics of Bayesian inference and hierarchical modeling using various programming languages including Stan, JAGS, and Template Model Builder. University of Calgary.

Cahill, C.L. November 2021. Using “tidy” coding techniques to improve your fisheries code. Quantitative Fisheries lab meeting, Simon Fraser University.

Selected presentations (>35 given in the past 5 years)

Cahill, C.L. September 2021. Using hierarchical modeling as a tool to inform quantitative inland fisheries problems. Quantitative Fisheries lab meeting, Simon Fraser University.

Cahill, C.L. and C.J. Walters. August 2021. Using Bayesian stock reduction analyses and retrospective recruitment simulations to inform harvest control rules for British Columbia’s commercial pink shrimp fisheries. Zoom presentation given to Fisheries and Oceans Canada (DFO) and the pink shrimp Harvesters association.

Cahill, C.L. and C.J. Walters. March 2021. Unveiling the recovery dynamics of Walleye following the invisible collapse. Invited seminar. Institute of Oceans and Fisheries. University of British Columbia. [Recording.](#)

Cahill, C.L. and C.J. Walters. February 2021. Unveiling the recovery dynamics of Walleye following the invisible collapse. Invited Webex seminar. Alberta Environment and Parks. 87 attendees.

Cahill, C.L., and C.J. Walters. November 2020. Modeling Alberta Walleye population dynamics during 1980-2018. Zoom presentation given to Alberta Environment and Parks fisheries management staff. 23 attendees.

Cahill, C.L. June 2020. A spatial-temporal approach to modeling somatic growth across inland recreational fisheries landscapes. Tuesday Inter-Lab Quantitative Seminar. Quantitative Fisheries Center, Michigan State University.

Cahill, C.L. March 2020. A spatial-temporal approach to modeling somatic growth across inland recreational fisheries landscapes. Invited Webex seminar. Alberta Environment and Parks. 52 attendees.

Cahill, C.L. February 2020. Alberta Walleye management and assessment: confronting common misconceptions. Invited lecture. Fish ecology. University of Calgary.

Cahill, C.L, A.J. Paul, and J.R. Post. January 2019. Is there evidence of density-dependent somatic growth in Alberta Walleye? Contributed paper. Canadian Conference for Fisheries Research. London, Ontario.

Cahill, C.L, and J.R. Post. January 2018. Coupling Bayesian time-series modeling with Alberta's Fall Walleye Index Netting data. Contributed paper. Canadian Conference for Fisheries Research. Edmonton, Alberta.

Cahill, C.L., S. Mogensen, K.L. Wilson, A. Cantin, R.N. Sinnatamby, A.J. Paul, P. Christensen, J.R. Reilly, L. Winkel, A. Farineau, J.R. Post. June 2017. Multiple challenges confront an inland recreational fishery in decline. Contributed paper. World Recreational Fishing Conference. Victoria, British Columbia.

Cahill, C.L., S. Mogensen, K.L. Wilson, A. Cantin, R.N. Sinnatamby, A.J. Paul, P. Christensen, J.R. Reilly, L. Winkel, A. Farineau, J.R. Post. January 2017. Multiple challenges confront an inland recreational fishery in decline. Contributed paper. Canadian Conference for Fisheries Research. Montreal, Quebec.

Cahill, C.L., R.F. Tallman, and J.R. Post. June 2015. Robin Hood in the Canadian Arctic: Among-Stock Comparisons of Arctic Char Population Dynamics. Contributed Paper. International Charr Symposium. Trømsø, Norway.

Cahill, C.L., R.F. Tallman, and J.R. Post. December 2014. Assessing the Sustainability of Arctic Char in northern Canada. Contributed Paper. ArcticNet's Arctic Change Conference. Ottawa, Ontario.

Cahill, C.L., and W. Tonn. January 2014. Modeling the Potential Effects of Climate Change on Arctic Grayling in Alberta. Contributed Paper. Canadian Conference for Fisheries Research. Yellowknife, Northwest Territories.

Cahill, C.L., A. Baki, G. Courtice, A. Erwin, K. Howland, M. Hulsman, B. Lunn, W. Tonn, and D. Zhu. January 2014. Assessing Responses of Fish to Habitat Enhancement in Barrenlands Streams. Contributed Paper. Canadian Conference for Fisheries Research. Yellowknife, Northwest Territories.

Cahill, C.L., A. Baki, G. Courtice, A. Erwin, K. Howland, M. Hulsman, B. Lunn, W. Tonn, and D. Zhu. January 2013. Evaluating Fish Habitat Compensation at Diavik Diamond Mines, NWT. Contributed Paper. Canadian Conference for Fisheries Research. Windsor, Ontario.

Cahill, C.L., J. Breeggemann, and D. Isermann. January 2011. Comparison of Structures for Estimating Age in Bluegill (*Lepomis macrochirus*). Contributed Poster. Annual Meeting Wisconsin Chapter American Fisheries Society. Stevens Point, Wisconsin.

Cahill, C.L., K. Mosel, and D. Isermann. January 2010. Population Demographics of Freshwater Drum (*Aplodinotus grunniens*) in Lake Winnebago, Wisconsin. Contributed Poster. College of Natural Resources Undergraduate Research Symposium. University of Wisconsin-Stevens Point. *Best poster*.

Experience related to fisheries science

Inland fisheries stock assessment specialist and instructor. *In progress.* I taught online courses on Bayesian stock reduction analysis and management strategy evaluation techniques in programs R and Stan to improve stock assessment capacity among provincial biologists in Alberta. I also co-developed omniscient manager simulations to guide harvest strategies for Alberta Walleye fisheries with Carl Walters. \$35,000 CAD contract from Alberta Environment and Parks.

Postdoctoral researcher. August-January 2021. Simon Fraser University. I developed models to extract bioenergetics parameters from capture-recapture data for Fraser River White Sturgeon. Supervisors: Brett van Poorten and Sean Cox.

***Pandalid* Shrimp stock assessment modeler.** 2021. I fitted age-structured stock assessment models to 13 British Columbia shrimp fisheries, developed and evaluated harvest control rules, and undertook a management strategy evaluation to inform industry and policy makers of sustainable fishing options. \$20,000 CAD contract from industry partners and Fisheries and Oceans Canada. Supervisors: Carl Walters and Villy Christensen.

Climate modeling instructor. 2015. I taught Alberta fisheries managers the numerical methods necessary to project the impacts of climate change on Alberta's coldwater fish. \$2,000 CAD contract for a one-day workshop.

Arctic Grayling status report writer. 2011-2014. Alberta Conservation Association and Alberta Environment and Parks. I updated all relevant information on the species in the province. \$6,000 CAD contract.

Consultant fisheries biologist. 2012. Diavik Diamond Mines, Inc. I worked as an external expert to discuss concerns raised by Indigenous community members regarding the effects of diamond mining on aquatic ecosystems in the Barrenlands region of Northern Canada. I was also responsible for ensuring group safety around helicopters, boats, and wildlife in remote settings. \$10,000 CAD contract for a ten-day program.

Fisheries research technician. 2010-2011. Fisheries Analysis Center, University of Wisconsin Stevens-Point. I extracted age and growth structures from various fishes and prepped these structures so that age could be estimated from them.

Assistant laboratory supervisor. 2009-2011. Aquatic biomonitoring laboratory, University of Wisconsin-Stevens Point. I sorted aquatic macroinvertebrates for use in biotic indices and ensured quality assurance and control of other employees' work.

Bull Trout research technician. 2010 summer. Fish Ecology Lab, Utah State University. I worked as part of a small team that surveyed federally threatened populations in remote settings in Oregon.

Fisheries and aquatics intern. 2009 summer. Utah Division of Wildlife Resources. I surveyed fish and aquatic resources throughout Utah in both front and remote backcountry settings, including creel surveys.

Knowledge translation

Quantitative fisheries partner. 2018-2021. Alberta Environment and Parks. I provided analytical support to government biologists to advance a wide range of conservation efforts throughout Alberta. This work involved many fish species and was above and beyond my dissertation research. I assisted government scientists and managers with Bayesian modeling, hierarchical modeling, harvest dynamics

modeling, data management and visualization, and communicated these analyses and assessment findings to stakeholders and policy makers.

Arctic stock assessment research affiliate. 2014-2017. Fisheries and Oceans Canada. I contributed to Arctic Char assessments and consultation meetings concerning the sustainability of fish stocks throughout Nunavut and the Northwest Territories. This work included interactions with community members, Indigenous Elders, and subsistence and commercial harvesters. My primary responsibilities were related to communicating assessment model findings to managers and community members. I also evaluated fisheries stock assessments as an assessment reviewer.

Co-leader, industry consultant. 2012. I transferred ecological knowledge to construction workers, engineers, and diamond mine managers to enable the construction of a 300-meter-long, \$3.5 million CAD fishpass in northern Canada. This work established the first experimental fishpass in northern Canada. I also guided construction retrofits of failed choke-pool, boulder-weir, and nature-like fishpass structures to increase connectivity between pristine lakes as per federal Fisheries Act authorizations. This work received the Canadian Society of Civil Engineering's Donald Stanley award for best paper in 2014.

Miscellaneous training

- Unconscious bias training module, Canada Research Chair online course
- Media training for graduate leadership circle students (University of Calgary)
- Conflict resolution and verbal judo workshop
- Northwest Territories supervisor and team leader certificate
- Arctic winter survival certificate
- Arctic summer survival certificate
- Ice road rescue training
- Underwater aircraft egress training
- 40-hour wilderness first responder training