Christopher L. Cahill

Quantitative Fisheries Center · Michigan State University · 375 Wilson Rd. Room 101a · East Lansing, Michigan 48824 Cahill10msu.edu J 517-899-8230 ChrisFishCahill Www.canr.msu.edu/qfc

Employment

ssociate Director and Assistant Professor	2022-present
Quantitative Fisheries Center	-
Department of Fisheries and Wildlife	
Michigan State University	
Postdoctoral Researcher	202I-2022
Simon Fraser University	
Consultant	2014-2022
Alberta Environment and Parks, Fisheries and Oceans Canada (DFO), etc.	
Education	
University of Calgary, Ph.D. Ecology	2021
University of Alberta, M.Sc. Ecology	2014
University of Wisconsin-Stevens Point, B.Sc. Fisheries Science	2011

Technical expertise

Population dynamics and fisheries stock assessment

Development, application, and evaluation of age-structured stock assessment models, harvest control rule design and the estimation of reference points, development of advice frameworks for sustainable fisheries management using management strategy evaluation

Decision analysis

Application of decision-theoretic tools including utility theory, expected value of perfect information (EVPI), certainty equivalent policies, and tradeoff analysis for natural resource management using Monte Carlo simulation

Spatial and spatiotemporal modeling

Spatiotemporal modeling using INLA-SPDE frameworks, integration of GIS data into ecological models

Hierarchical modeling

Mixed-effects and state-space modeling of ecological processes. Bayesian inference using JAGS, Stan, and tmbstan via Markov Chain Monte Carlo and its variants, frequentist inference using TMB and RTMB via Laplace approximation

Programming and scientific computing

Extensive programming experience in R, JAGS, Stan, ADMB, TMB, RTMB, data visualization, parallel computing, reproducible workflows with Quarto and Git/GitHub, debugging, high-performance computing on Debian-based Linux systems, basic Unix and Bash scripting

Grants

Cahill, C.L. Expanding lessons from data-rich inland fisheries to data-limited scenarios for climate adaptation. Climate Adaptation Science Center. United States Geological Survey. \$200,000. Project years: 2023-2025.

Administrative awards

Brenden, T.O. and C.L. Cahill. Quantitative support for inter-jurisdictional fisheries management on the Great Lakes. Funding source: Minnesota Department of Natural Resources. \$67,995. Project years: 2021-2025.

Brenden, T.O. and C.L. Cahill. Quantitative support for inter-jurisdictional fisheries management on the Great Lakes. Funding source: Illinois Department of Natural Resources. Amount: \$83,857. Project years: 2021-2025.

Graduate and postgraduate mentorship

I directly mentor the following researchers:

Max Majinska (M.S.): Investigating juvenile Lake Sturgeon movement and behavior in Saginaw Bay tributaries using acoustic telemetry, intensive fieldwork, and time-to-event models.

Caleb Branam (M.S.): Contributing to a USGS Climate Adaptation Science Center project aimed at improving inland fisheries monitoring through hierarchical and simulation-based modeling.

Dr. Lisa Chong (Research Assistant Professor): Focused on advancing stock assessment practices across the Great Lakes to better inform sustainable management. Dr. Chong was previously a postdoctoral researcher with the QFC under my supervision.

I serve(d) on the following graduate committees:

Simon Freeman. M.S., Bay Mills Indian Community and Northern Michigan University	in progress
Nick Boucher. Ph.D.	in progress
Ben Cehelsky. M.S.	2022-2025
Sam Courtney. M.S.	2022-2023

Stock assessment, applied statistics, and programming advice or outreach provided during the last calendar year

Kandace Griffin (Ph.D., in progress) sea lamprey movement modeling Matt Faust (Ph.D., in progress) hierarchical selectivity models Mike Shaw (Ph.D., in progress) introduction to RTMB Justin Miller (Ph.D., in progress) stream network and spatial modeling Dr. Daniel Hayes (MSU), converting Excel and Visual Basic code to R Dr. Sean Lewandoski (USGS) spatio-temporal hierarchical modeling for larval sea lamprey abundance Ben Rook (MiDNR) 1842 Treaty Waters Whitefish stock assessment models Ben Turschak (MiDNR) hierarchical somatic growth models for salmon Steve Lenart (MiDNR), 1836 Treaty Waters Whitefish stock assessment models Jason Smith (Bay Mills Indian Community) 1836/42 Treaty Waters Whitefish stock assessment models Aaron Schultz (Great Lakes Indian Fish & Wildlife Commission) Mille Lacs Yellow Perch stock assessment Mark Luehring (Great Lakes Indian Fish & Wildlife Commission) Ceded Territory walleye catch curves

Stock assessment and fisheries sustainability impact in the Great Lakes

During 2023–2025, a majority of my effort was spent on high-priority stock assessment tasks identified by QFC Partners throughout the Great Lakes. These assessments provide the scientific foundation for harvest decisions, treaty obligations, and long-term sustainability in some of the most economically and culturally important fisheries in the basin. This work has, in some cases, directly changed perceptions of stock status and sustainability. The accomplishments associated with these efforts to date are summarized below and in the attached letters of support from the Great Lakes Fishery Commission and Michigan Department of Natural Resources.

Whitefish stock assessments in the 1836 and 1842 Treaty Waters of the Great Lakes following the 2023 Fishing Decree

- 1. Developed and maintained relationships with biologists from all tribes within the Chippewa Ottawa Resource Authority (CORA) and the Michigan Department of Natural Resources tasked with maintaining and updating Treaty Waters stock assessments
- 2. Led a small team of QFC researchers that painstakingly converted Lake Whitefish stock assessment models from ADMB to RTMB to both standardize the code base and ensure long-term accessibility, transparency, and maintainability of Treaty Waters assessments. Translated 15 statistical catch-at-age models (1,500–2,000 lines of ADMB code each) into RTMB
- 3. Discovered and corrected a number of critical technical issues within existing ADMB models that hid evidence of lake-wide population declines throughout Lake Michigan
- 4. Trained tribal and state stock assessment biologists on a suite of diagnostic methodologies aimed at improving model evaluation and transparency
- 5. Lowered technical barriers to entry and promoted greater inclusion in the Treaty Waters stock assessment process as per QFC Partner and tribal biologist feedback
- 6. Manuscript of findings drafted, awaiting permission to submit data and/or assessment model output for publication

Yellow Perch stock assessment updates in Lake Erie to address model non-convergence as per Lake Erie Committee and stock assessment biologist concerns

- 1. Supported the development of revised assessment approaches by modernizing model code (transitioning from ADMB to RTMB and base R), restructuring data inputs, and improving model stability to support more robust decision-making through participation in the Lake Erie Percid Management Advisory Group (*In progress* with Drs. Lisa Chong and Travis Brenden)
- 2. Strengthened collaboration among agency biologists by providing regular technical updates, facilitating communication on data and assessment challenges, and building consensus around model improvements
- 3. Provided monthly updates and technical guidance to stock assessment biologists and members of the Lake Erie Committee, focusing on data limitations, reference point calculations, and model improvement strategies
- 4. Diagnosed and corrected bias in mortality rate reference point calculations, leading to assessment biologists recommending lower quotas throughout Lake Erie in 2025

Peer-reviewed publications

Google Scholar profile: citations: 198, h-index: 8, i10-index: 8

Faust et al. **Accepted**. Indirect estimation of contact selectivity for gill nets using hierarchical models. *Canadian Journal of Fisheries and Aquatic Sciences*.

Montealegre-More et al. **Major revisions**. Using machine learning to inform harvest control rule design in complex fishery settings. *Fish and Fisheries*.

Griffin et al. 2025. Migrating sea lamprey follow river thalwegs to facilitate safe and efficient passage upstream. *Journal of Experimental Biology* 228 (4): JEB249539. **Chosen as highlighted feature article by Editor**.

Hayes et al. 2024. The crucial role of objectives in the eight steps of management. *Aquatic Ecosystem Health & Management* 27 (4), 57-60.

Krabbenhoft et al. 2023. Synthesizing professional opinion and published science to build a conceptual model of walleye recruitment. *Fisheries* 48 (4), 141-156.

Courtice et al. 2022. Suspended sediment releases in Rivers: toward establishing a safe sediment dose for construction projects. *Science of the Total Environment* 848, 157685.

Cahill et al. 2022. Unveiling the recovery dynamics of Walleye after the invisible collapse. *Canadian Journal of Fisheries and Aquatic Sciences* 9(5):708–723.

Courtice et al. 2022. A categorical assessment of dose-response dynamics for managing suspended sediment effects on salmonids. *Science of the Total Environment* 807, 150844.

Paul et al. 2021. Are Alberta's Northern Pike populations at risk from Walleye recovery? *North American Journal of Fisheries Management* 41 (2), 399-409.

Cahill et al. 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 et al. 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 et al. 2018. Multiple challenges confront a high-effort inland recreational fishery in decline. *Canadian Journal of Fisheries and Aquatic Sciences* 75: 1357-1368.

Cahill et al. 2016. Arctic Grayling movements through a nature-like fishpass in Northern Canada. *Transactions of the American Fisheries Society* 145: 951-963.

Hulsman et al. 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 et al. 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 et al. 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 et al. 2014. Stream modifications to enhance system connectivity for fish habitat compensation: a case study in the Barrenlands region of Canada. **Paper of the year** in *Canadian Journal of Civil Engineering* 41: 650-659.

Books (in preparation)

Thorson J.T., Kristensen K., and C.L. Cahill. Spatio-Temporal Models for Ecologists. CRC Press. Co-author on 2nd edition, leading conversion of modeling examples from Template Model Builder to R-Template Model Builder. Public code available at https://github.com/spacetime-ecologist/spacetime-ecologists-RTMB.

Manuscripts and book chapters (in preparation)

Chong et al. Nonstationary production dynamics drive the decline and collapse of Lake Whitefish in Lake Michigan. Target journal: *Canadian Journal of Fisheries and Aquatic Sciences*.

Griffin et al. Keeping pace: migrating sea lamprey adjust swim speed in response to shifting head currents to maintain groundspeed. Target journal: *Journal of Experimental Biology*.

Cahill et al. Jensen's inequality systematically inflates Lake Erie Percid reference points. Target journal: *Canadian Journal of Fisheries and Aquatic Sciences*.

Chong et al. Introduction to stock assessment: models, diagnostics, and uncertainty. Analysis of freshwater fisheries data, 2nd Edition. American Fisheries Society, Bethesda, Maryland.

Peer-reviewed technical reports and stock assessment reviews

Zhu et al. 2021. Assessing population dynamics of Arctic Char, Salvelinus alpinus, from the Halokvik and Jayko Rivers, Cambridge Bay, Nunavut, Canada. Department of Fisheries and Oceans (DFO) Can. Sci. Advis. Sec. Res. Doc. 2021/016. iv + 34 p.

Harris et al. 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 et al. 2012. Preliminary Evaluation of M-Lakes Habitat Compensation Project. Report to Diavik Diamond Mines, Inc. 36 p.

Selected presentations († indicates mentee presentation)

†Majinska, M.D., S.F. Colborne, C.L. Cahill, and C.S. Vandergoot. May 2025. Streamside vs traditional: observations on juvenile Lake Sturgeon in the Saginaw River basin. Michigan Department of Natural Resources Lake Huron Southern basin coordination meeting.

Cahill, C.L., L. Chong, and T. Brenden. February 2025. Why are Lake Erie Yellow Perch sustainable harvest rate (i.e., F_{MSY}) estimates so high? Presentation to Lake Erie Percid biologists and Lake Erie Committee members.

†Majinska, M.D., S.F. Colborne, C.L. Cahill, and C.S. Vandergoot. February 2025. A retrospective look at the challenges of juvenile Lake Sturgeon telemetry. Great Lakes Acoustic Telemetry Observation System (GLATOS). Ann Arbor, Michigan.

†Majinska, M.D., S.F. Colborne, C.L. Cahill, and C.S. Vandergoot. January 2025. Streamside vs traditional: observations on juvenile Lake Sturgeon in the Saginaw River basin. Midwest Fish and Wildlife Conference. St. Louis, Missouri.

†C.J. Branam, H.S. Embke, and C.L. Cahill. January 2025. Evaluating data-limited population assessment tools for Walleye. Midwest Fish and Wildlife Conference. St. Louis, Missouri.

Cahill, C.L, L. Chong, and T. Brenden. November 2024. Nonstationary production dynamics drive declines and collapse in Lake Michigan Lake Whitefish populations. International Council for the Exploration of the Sea (ICES) Methods Working Group headquarters in Copenhagen, Denmark.

†Chong, L. and C.L. Cahill. November 2024. Status of stock assessment and training in the Great Lakes. International Council for the Exploration of the Sea (ICES) Methods Working Group headquarters in Copenhagen, Denmark.

†C.J. Branam, H.S. Embke, and C.L. Cahill. August 2024. Simulation testing Walleye *Sander vitreus* population assessment methods. United States Geological Survey Midwest Climate Adaptation and Science Center Annual Gathering. East Lansing, Michigan.

Cahill, C.L., and L. Chong. March 2024. Using RTMB for Whitefish assessments. Presentation to 1836 Treaty Waters stock assessment biologists. Charlevoix, Michigan.

†Majinska, M.D., C.S. Vandergoot, C.L. Cahill, J. Chiotti, D.L. Larson, J.C. Jolley, D.W. Hondorp, E.A. Baker, and K.T. Scribner. Febuary 2024. Traditional vs streamside: understanding the Lake Sturgeon Reintroduction in the Saginaw River basin. Graduate Student Organization Symposium, Michigan State University.

Cahill, C.L. November 2023. Challenges translating stock assessments in the Great Lakes to RTMB. International Council for the Exploration of the Sea (ICES) Methods Working Group Presentation hosted by the Quantitative Fisheries Center at Michigan State University.

†Majinska, M.D., C.S. Vandergoot, C.L. Cahill, J. Chiotti, D.L. Larson, J.C. Jolley, D.W. Hondorp, E.A. Baker, and K.T. Scribner. September 2023. Traditional vs streamside: understanding the Lake Sturgeon reintroduction in the Saginaw River basin. Sturgeon for Tomorrow Banquet.

†Majinska, M.D., Vandergoot, C.S., Cahill, C.L., Chiotti, J., Larson, D.L., Jolley, J.C., Hondorp, D.W., Baker, E.A., K.T. Scribner. May 2023. Streamside vs traditional: a look at ongoing Lake Sturgeon reintroduction efforts in Saginaw Bay. Great Lakes Acoustic Telemetry Observation System (GLATOS). Ann Arbor, Michigan.

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. Trømso, 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.

Teaching

Stock Recruitment and Fishery Reference Points Co-instructor with Dr. Travis Brenden June 2025 Duluth, Minnesota

Maximum Likelihood Estimation with R-Template Model Builder (RTMB) Co-instructor with Dr. Jim Bence December 2024 and 2025 Michigan State University Applied Bayesian Modeling for Natural Resource Management Course website: https://github.com/QFCatMSU/FW-Bayes Fall semester 2023 Michigan State University

Guest lectures for FW 364 Topic: Age and age-structure as a driver of population dynamics Spring 2023, 2024 Michigan State University

Guest lecture for FW 894 Fall 2022 Michigan State University

R Wizardry Teaching assistant Winter 2020 and 2021 University of Calgary

Quantitative Fisheries Dynamics Co-instructor with Dr. John Post Winter 2018, weekly seminar University of Calgary

Population Ecology Teaching assistant Winter 2015 University of Calgary

Master Tutor and Natural Resources Writing Fellow 2008-2011 University of Wisconsin-Steven Point

Teaching testimonials

"This course was awesome. The instructor is very knowledgeable and was very supportive of each student's learning. I really appreciated the ability to participate online. I feel like this course gave me tools that will be directly applicable to my dissertation"

"It was a *fantastic* course, and I hope it keeps being offered in the future – I am sure recommending it to people in my department."

"Chris did a great job, especially for teaching this course for the first time. He was understanding of the difficulty of the material and some our inexperience in our statistical backgrounds. He was very patient with us when we didn't understand things, offered plenty of opportunities for good discussion, and challenged us."

Leadership and professional service

International Council for the Exploration of the Sea (ICES) training group Chair. 2025. I lead the development, management, and reporting of the international training program for ICES, coordinating courses and priorities to support sustainable ocean science and fisheries management across the North Atlantic and globally. Website of ICES training courses.

Diversity, equity, and inclusion committee. 2025. Department of Fisheries and Wildlife, Michigan State University.

Graduate outreach committee. 2022-2024. Department of Fisheries and Wildlife, Michigan State University.

Organizing committee. 2023, 2024. Center for Ecosystem Management / QFC annual meeting. Hosted at University of Guelph and Michigan State University, respectively.

Organizing committee. 2023. ICES methods working group meeting. Hosted at Quantitative Fisheries Center, Michigan State University.

Co-organizer. 2022. Two-day symposium on stock assessment at the American Fisheries Society Annual Gathering in Grand Rapids, Michigan.

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.

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.

Peer-review contributions

I currently serve as a reviewer for the following journals:

Canadian Journal of Fisheries and Aquatic Sciences Fisheries Research North American Journal of Fisheries Management Transactions of the American Fisheries Society Fisheries Ecology and Management

Previous experience related to fisheries

Inland fisheries stock assessment specialist and instructor

2021-2023. 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.

Postdoctoral researcher

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

Pandalid 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.

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.

Arctic Grayling status report writer

2011-2014. Alberta Conservation Association and Alberta Environment and Parks. I updated all relevant information on the species in Alberta.

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.

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

Academic awards

University of Calary Silver Fellowship. 2020-2021. \$40,000 CAD. Runner-up, Larkin Award (top fisheries Ph.D. student in Canada). 2019. American Fisheries Society. Non-monetary. Vanier Graduate Leadership Scholarship. 2017-2019. Approximately 50 individuals awarded across the sciences in Canada annually. \$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, 2010, University of Wisconsin-Stevens Point. Non-monetary.

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 a 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, boulderweir, 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

Media training (Michigan State University) Unconscious bias training (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 Arctic summer survival Ice road rescue training Underwater aircraft egress training 40-hour wilderness first responder training

References

Dr. Carl Walters Professor Emeritus Institute for the Oceans and Fisheries University of British Columbia

Dr. Travis Brenden Director and Professor Quantitative Fisheries Center Department of Fisheries and Wildlife Michigan State Universtiy

Dr. Michael Hansen Supervisor (Retired) Hammond Bay Biological Station United States Geological Survey

Dr. Andrew Paul Senior Science Advisor, Fish and Aquatic Ecosystems Office of the Chief Scientist Alberta Environment and Protected Areas