

WISCONSIN & MINNESOTA AQUACULTURE CONFERENCE



2024

MARCH 22-23

LEGENDARY WATERS RESORT
RED CLIFF, WISCONSIN

FRONT COVER DESIGNED BY: ANGELA M. CLINEFELTER

WELCOME TO THE WISCONSIN & MINNESOTA AQUACULTURE CONFERENCE!

Thank you for your support in attending the annual Wisconsin aquaculture conference!

This year Wisconsin joined the Minnesota Aquaculture Association to support a multi-state conference showcasing industry, research, and extension in our region, presented by over 40 experts from our region and beyond. We encourage you to take advantage of this important opportunity to learn and connect with one another.

In addition, we request the following from our audience:

- ✓ **Take time during the breaks to meet with vendors**, their support is critical for this conference to happen. Information on vendors and sponsors is also included in this packet.
- ✓ **Check out the student posters around the room**. These students will be giving lightning talks about their projects on Friday evening where you will be asked to vote on your favorite. Winners receive a prize!
- ✓ **Please ask questions** of the presenters and panelist. You may ask questions directly or utilize SLIDO at the QR code at right, to ask questions anonymously. You can also go to [slido.com #2308024](https://slido.com/#2308024)
- ✓ **Please fill out the evaluation form** before you leave, drop off at the registration table. This form is crucial for us to know how to better your needs for future events.



WE THANK EVERYONE WHO HAS MADE THIS CONFERENCE A SUCCESS
INCLUDING OUR SPEAKERS, VENDORS, SPONSORS, AND ALL OF YOU!



THURSDAY, MARCH 21

4PM-6PM VENDOR CHECK IN/SETUP

FRIDAY, MARCH 22

6:30-8:00 AM: VENDOR CHECK IN/SETUP/SIGN IN

- TOUR SIGN-UP WILL BE OPEN FRIDAY MORNING AT 7:30AM, FIRST COME FIRST SERVE, SIGN UP OPEN UNTIL 12PM NOON FRIDAY OR UNTIL FULL

7:30 AM: COFFEE, PASTRIES

8:00-8:30 AM: WELCOME: MODERATOR BEN GOLLON

8:00-8:10 AM: WISCONSIN AQUACULTURE

- BEN GOLLON, WAA PRESIDENT
- RANDY ROMANSKI, WI DEPARTMENT OF AGRICULTURE, TRADE & CONSUMER PROTECTION

8:10-8:20 AM: MINNESOTA AQUACULTURE

- CLARENCE BISCHOFF, MNAA PRESIDENT
- JIM OSTLIE, MN DEPARTMENT OF AGRICULTURE
- ED ANESHANSLEY, AQUATIC DESIGN SERVICES
- LUKE JODOIN, STEAMBOAT ROAD CONSULTING

8:20-8:30 AM: THE NATIONAL AQUACULTURE ASSOCIATION, CHARLIE CULPEPPER

8:30-9:15AM: WHIRLING DISEASE DISCUSSIONS: MODERATOR BEN GOLLON





9:15-10:00AM: REGULATIONS & CHALLENGES: MODERATOR DON SCHREINER

9:15-9:45AM: WPDES PERMITTING PROCESS: NATE WILLIS

9:45-10:00AM: FISH SEX RATIOS IN POND CULTURE AND ITS IMPACTS: STEPHANIE SHAW, WI DNR

10:00-10:40AM: AQUACULTURE ECONOMICS AND FINANCE: MODERATOR AMY SHAMBACH

10:00-10:10AM: LOCAL TO NATIONAL FUNDING OPPORTUNITIES: AMY SHAMBACH, ILLINOIS | INDIANA SEA GRANT

10:10-10:20 AM: FARM SERVICE AGENCY-ELAP: SETH CROSS, USDA

10:20-10:30 AM: WALLEYE RAS OPERATION BUDGETING TOOL: TYLER FIRKUS, UWSP NORTHERN AQUACULTURE DEMONSTRATION FACILITY

10:30-10:40 AM: QUESTIONS/DISCUSSIONS

10:40-11:00AM: BREAK/TRADE SHOW

11:00-12:00PM: WATER QUALITY MANAGEMENT: MODERATOR TYLER FIRKUS

11:00-11:20 AM: UNDERSTANDING YOUR SOURCE WATER FOR USE IN RAS: ANDREW JACQUE, WATER QUALITY INVESTIGATIONS

11:20-11:40 AM: SYSTEM DESIGN AND ITS IMPACTS ON WATER QUALITY MANAGEMENT: EDWARD ANESHANSLEY, EDA AQUATIC DESIGN SERVICES

11:40-12:00PM: QUESTIONS/DISCUSSIONS





12:00-1:00PM: LUNCH- SPONSORED BY THE GREAT LAKES AQUACULTURE COLLABORATIVE

12:20-12:50PM: GLENN FORD: MODERATOR DON SCHREINER

1:00-1:45PM: WORKFORCE DEVELOPMENT- STRATEGIES, NEEDS & DIRECTION: MODERATOR EMMA HAUSER

1:00-1:35PM: PANELISTS: INTRODUCTIONS, STRATEGIES & OPPORTUNITIES

- EMMA HAUSER, UWSP NORTHERN AQUACULTURE DEMONSTRATION FACILITY & WI SEA GRANT
- DONG-FANG DENG, UWM SCHOOL OF FRESHWATER SCIENCES
- ADAM FREDERICK, MARYLAND SEA GRANT
- ELLIOT NELSON, MICHIGAN SEA GRANT
- SANDY NAAS, ASHLAND HIGH SCHOOL
- OLIVIA DACHEL, COOPERATIVE EDUCATIONAL SERVICE AGENCY
- IAN MEEKER, BAYFIELD COUNTY 4-H & EXTENSION

1:35-1:45PM: QUESTIONS/DISCUSSIONS

1:45-2:20 PM: PRODUCT MARKETING: MODERATOR SHARON MOEN

1:45-2:10PM: PANELISTS: INTRODUCTIONS, STRATEGIES & OPPORTUNITIES

- KRISTA KNIGGE, WI DEPARTMENT OF AGRICULTURE, TRADE & CONSUMER PROTECTION
- ERIC GOERDT, NORTHERN WATERS SMOKEHAUS
- MICHAEL ZIEBELL, ITERRO LIFE

2:10-2:20PM: QUESTIONS/DISCUSSIONS





2:20-3:00 PM: PRODUCT PROCESSING: MODERATOR LAUREN JESCOVITCH

2:20-2:30PM: UNDERSTANDING HACCP: LAUREN JESCOVITCH, MICHIGAN SEA GRANT

2:30-2:45PM: PANELISTS: INTRODUCTIONS, STRATEGIES & OPPORTUNITIES

- BILL BODIN, BODIN FISHERIES
- JOSEPH DEPERRY, RED CLIFF FISH COMPANY
- KYLE WOOLEVER, SUPERIOR FRESH

2:45-3:00PM: QUESTIONS/DISCUSSIONS

3:00-3:15PM: BREAK/TRADE SHOW

3:15-4:00PM: STUDENT PRESENTATIONS: MODERATORS: LASONYA LUTHER & EMMA KRACO

STUDENT POSTER PRESENTATIONS: 3 MINUTES, 2 SLIDES, 1 TOPIC: AUDIENCE VOTES BEST POSTER/PRESENTATION (WINNER ANNOUNCED AT 6PM)

4:00-4:30PM: BREAK/VENDORS/POSTERS

4:30PM TOUR OPTIONS:

4:30-5:20PM OPTION 1: UWSP- NORTHERN AQUACULTURE DEMONSTRATION FACILITY- 30 CAP

4:30-5:20PM OPTION 2: RED CLIFF HATCHERY- 20 CAP

4:30-5:00PM OPTION 3: BODIN FISHERIES PROCESSING FACILITY-15 CAP

4:30-5:00PM OPTION 4: RED CLIFF FISH COMPANY PROCESSING FACILITY- 15 CAP





5:30-6:00PM: CASH BAR/WAA & MNA MEETINGS

6:00PM: ANNOUNCE STUDENT WINNERS

**6:00-8:00PM: EAT WISCONSIN FISH -COOKING DEMONSTRATION & SOCIAL:
SHARON MOEN & TITUS SEILHEIMER.**

THANK YOU TO OUR FARMERS WHO DONATED THEIR WONDERFUL PRODUCTS!



ATLANTIC SALMON AND GREENS DONATED BY SUPERIOR FRESH.

SALMON JERKY DONATED BY RUSHING WATERS FISHERIES.

SMOKED FISH SPREAD DONATED BY JEREMIAH'S BULLFROG FARM-EAT MY FISH.





SATURDAY, MARCH 23

7:30AM: COFFEE/PASTRIES

8:00AM-12:00PM: UWSP NADF RAS WORKSHOP (PRE-REGISTERED ATTENDEES ONLY)

8:00AM-12PM: LEGENDARY WATERS CASINO

ROOM A:

8:00AM-12:00PM: AQUACULTURE IN THE CLASSROOM: MODERATOR BARB EVANS, LAKE SUPERIOR STATE UNIVERSITY

8:00-8:15AM: **BUILD IT!** AN INQUIRY BASED AQUACULTURE ACTIVITY: ADAM FREDERICK, MARYLAND SEA GRANT

8:15-8:45AM: AQUACULTURE- WHAT? WHY? HOW? ELLIOT NELSON, MICHIGAN SEA GRANT

8:45-9:15AM: **RE-IMAGINE** YOUR SYSTEM, ADAM FREDERICK

9:15-9:25: BREAK!

9:25-10:30AM: AQUACULTURE IN ACTION! **POLYPONICS**: ADAM FREDERICK

10:30-11:40AM: **Virtually Empowering BIPOC Youth in Aquaculture**

✚ 10:30-10:40AM: INTRODUCTION, LA SONYA LUTHER

✚ 10:40-11:00AM: FIBER ARTS OMAHA: JOYFUL EARTH'S FIN-TASTIC DISCOVERY CONTEST WINNERS

✚ 11:00-11:20AM: EMERGING LADIES ACADEMY

✚ 11:20-11:40 AM: LAKOTA YOUTH DEVELOPMENT





11:40-12:00PM: HOW CAN I TEACH AQUACULTURE? - RESOURCE SHARING
& NETWORKING: ELLIOT NELSON, BARB EVANS, ADAM FREDERICK

ROOM B:

8:00-10:00AM: FARMING INSIGHTS: MODERATOR DON SCHREINER

8:00-9:30AM: PANELISTS: PRACTICES, CHALLENGES AND SOLUTIONS

- WALLEYE LARVICULTURE: MIKE NEUKIRCHEN, FOUNTAIN FRESH
- WALLEYE GROW-OUT: COLIN BURSIK, AQUA GARDEN
- WALLEYE/PERCH CULTURE: ANNIE SCHMITZ, WOODS & WATERS
- YELLOW PERCH CULTURE IN RAS: PETER SHEP, MULBERRY
AQUAPONICS
- SHRIMP CULTURE: MICHAEL ZIEBELL, ITERRO
- BAIT FISH CULTURE: BARRY THOELE, LINCOLN BAIT
- RAINBOW TROUT & ARCTIC CHAR FLOW THROUGH: DAVE SUNDAL,
JEREMIAH'S EAT MY FISH BULLFROG FARM
- ATLANTIC SALMON RAS/AQUAPONICS: KYLE WOOLEVER, SUPERIOR
FRESH
- AQUAPONICS: STEPHANIE ROSIO, FOREST COUNTY POTAWATOMI
BODWEWADMI KTEGAN

9:40-10AM: QUESTIONS/DISCUSSIONS

10:00-10:30AM BREAK/TRADE SHOW





10:30-12:00PM FISH HEALTH & BIOSECURITY: MODERATOR MYRON KEBUS

10:30-10:45AM: FISH HEALTH SURVEY IN THE NORTH CENTRAL REGION
RESULTS: MYRON KEBUS, MICHIGAN STATE UNIVERSITY

10:45-11:05AM: BEST MANAGEMENT PRACTICES FOR THE HEALTH OF YOUR
FARMED FISH: ETHAN HAEFNER AND LAUREL SACCO, UNIVERSITY OF
MINNESOTA

11:05-11:20AM: WHAT STEPS TO TAKE WHEN PROBLEMS ARISE: MYRON
KEBUS, MICHIGAN STATE UNIVERSITY

11:20-11:40AM: THOUGHTS ON CURRENT FISH HEALTH CASES: ROBERT
SMITH, CLAYTON VETERINARY CARE

11:40-12:00PM: DISCUSSION/QUESTIONS

ROOM B

12:00-1:00 PM LUNCH & KEYNOTE

**12:15 PM- FEDERAL ADVOCACY UPDATES FROM THE NATIONAL
AQUACULTURE ASSOCIATION: CHARLIE CULPEPPER**

1:00PM: CLOSING REMARKS



PRESENTER BIOS

ANESHANSLEY, EDWARD. Ed is a professional engineer and technology innovator in the field of Recirculation Aquaculture System (RAS) and Aquaponics. He has 20+ years of experience in engineering, design, construction methods, site development, civil works, project implementation and commissioning. He is the current founder and president of EDA-Aquatic Design Services, offering RAS technology training and investing in cutting-edge educational and research system design. Ed has an educational background in Natural Resources from the University of Maine, and a Masters in the field of Agricultural and Biological Engineering from Cornell University.

BISCHOFF, CLARENCE. Clarence holds a BS in Sociology/Economics and a Master of Social Work degree from the University of Minnesota, Twin Cities and is the founder and President of Blue Water Farms. He is an environmental activist and community organizer who has focused on sustainability for the past twenty years. He is currently one of the founders and is President of the Minnesota Aquaculture Association. He serves as Secretary of the East Phillips Neighborhood Institute that includes a BWF high-tech aquaponics farm as part of the Urban Farm Project long-range plan. His recent experiences include developing a farmer's market, a community food cooperative, and Natural Step study groups. Clarence's sustainably operated businesses include Vasa Gardens, a market farm, and Cardinal Hardwoods, a supplier of forest products and custom woodworking services for contractors. Prior to his leadership in the sustainability field, Clarence was a Human Services professional, providing supervisory and staff development to public and higher education organizations. A major theme of this work was the development of community-based services to replace institutional care for disabled children and adults.

BURSIK, COLIN. Colin is the owner of Aqua Garden. Aqua Garden is an aquaponic facility in Rice Lake, WI. Their RAS system raises walleye for food production and captures organic nutrients to help grow fresh herbs and lettuce on aeroponic towers. The team first brought fresh walleye to market in the summer of 2023 and are looking to expand their grow out facilities within the next couple of years.

BODIN, BILL. Bill Bodin, the youngest of the 4th generation of the Bodin Fisheries family, has been managing Bodin Fisheries since 2017. Having grown up in the family business in the 70's and 80's, Bill returned in 2016 to take the lead managing role from his brother Jeff after his 42 years of running the Fisheries portion of the family business. Bill is the Secretary of the Lake Superior Commercial Fisheries Advisory Board to the WI Department of Natural Resources, is HACCP Certified by the Wisconsin Department of Agriculture, Trade and Consumer Protection and is currently Vice President of Bodin's Inc.

CROSS, SETH. Seth is the National Program Manager at US Department of Agriculture - Farm Service Agency, presenting on Emergency Assistance for Livestock, Honeybees, and Farm-raised Fish (ELAP) which provides financial assistance to eligible producers of livestock, honeybees, and farm-raised fish for losses due to disease, certain adverse weather events or loss conditions, including blizzards and wildfires, as determined by the Secretary.

CULPEPPER, CHARLIE. Charlie is the Director of Membership Recruitment and Public Outreach with the National Aquaculture Association. Born in South Georgia, Charlie graduated from the University of Georgia with a Bachelor of Science in Wildlife and Fisheries Biology and began his aquaculture career after college working at several food fish farms in the Georgia and North Carolina. He then went on to obtain a Master of Science in Aquaculture from Mississippi State University in 2015. Charlie then began work in aquaculture regulation and development at the Florida Dept. of Agriculture and Consumer Services, Division of Aquaculture, serving as the Assistant Division Director from 2019 - 2022. Now as a relieved and recovering regulator, Charlie works to grow the National Aquaculture Association's ranks and bring American aquaculture into a new era through coalition building, political advocacy, and public education.

DACHEL, OVLIVIA. Olivia Dachel is a distinguished STEM educator with over two decades dedicated to integrating advanced technology, place-based experiential learning, and environmental conservation into her

teaching. With a rich background in Educational Technology, Limnology, and Conservation Biology, her expertise notably enriches students' understanding of freshwater ecosystems and conservation. Dachel's innovative approach, particularly her use of immersive environmental contexts, has profoundly impacted both students and fellow educators. Her active involvement in prominent educational forums, such as the Wisconsin Environmental Educators Conference, the Computer Science Teachers Association, and the Minnesota Science Teachers Conference, along with her role as the CESA 12 Regional Youth Apprenticeship Coordinator, exemplifies her commitment to advancing education and filling the market demand of talented 21st century STEM workers and scientists. Through project-based learning and leveraging local environments, Dachel not only enhances educational relevance and engagement but also fosters a deep-rooted environmental stewardship among future generations, positioning her at the forefront of STEM education innovation. Her students have competed in numerous Aquaculture Challenges and produced three team challenge winners in collaboration with Sea Grant and Emma Hauser of University of Wisconsin-Stevens Point Northern Aquaculture Demonstration Facility.

DEPERRY, JOSEPH. Boozhoo (Hello), I'm Joseph DePerry. I was born and raised here in, Miswaabekong (Red Cliff). I'm passionate about exercising our Treaty Rights. I enjoy traveling throughout the ceded territories hunting, fishing, and foraging with my wife, Rachel.

DONG-FANG, DENG. Dr. Deng is a fish nutritionist with the School of Freshwater Sciences, Milwaukee, WI. She has a PhD in fish nutrition from the University of California, Davis, USAM.S. in Animal Science, University of California, Davis, USAM.S. in Aquaculture Nutrition, Zhongshan (Sun Yet-Sen) University, China, a B.S. in Zoology, Zhongshan (Sun Yet-Sen) University, China. She is currently a professor and senior scientist with the University of Wisconsin-Milwaukee as well as Aquaculture Outreach and Extension Specialist for the University of Wisconsin Sea Grant Institute.

EVANS, BARB. Dr. Evans (Ph.D. Ecology and Systematics; University of Kansas). Currently Professor of Biology at Lake Superior State University. Research background in foraging behavior of planktivorous fish, and retinal development in various fish species led to an interest in early life history of fish as well as aquaculture. Recognizing the potential for sustainable food production through aquaculture and the need for education to support workforce development led to the Youth Education in Aquaculture project. To support this endeavor, several aquaponics training facilities have been established at LSSU.

FIRKUS, TYLER. Tyler is the Facility Operations Manager for the University of Wisconsin Stevens Point Northern Aquaculture Demonstration Facility. Tyler oversees the day-to-day operations, develops the research program, and prepares manuscripts to disseminate research conducted at the facility. Tyler received his PhD at Michigan State University in Fisheries and Wildlife and Environmental Toxicology, his master's degree in Zoology and Physiology at the University of Wyoming, and his bachelor's degree in biology from the University of St. Thomas. His previous research has focused on the effects of a variety of stressors on fish reproductive and growth physiology, including the sub-lethal effects of Sea Lamprey parasitism on two different Lake Trout morphotypes at UWSP NADF from 2016- 2019.

FORD, GLENN. Glenn has founded and organized Praxis Holdco, InCity Farms, and Praxis Marketplace, all emerging food ventures and Aquaponics facilities established to serve inner city and rural communities. Combining expertise from degrees in business and economics with years of experience as a senior executive in a number of companies including PepsiCo, Glenn is working toward a collaboration between food production facilities and grocery stores to catalyze the economic development of underserved communities.

FREDERICK, ADAM. For more than 28 years, Maryland Sea Grant and Assistant Director for Education, J. Adam Frederick, has provided professional development for educators (formal and non-formal) on a variety of topics including aquaculture and aquaponics, marine biodiversity, invasive species, science pedagogy for the classroom, and curriculum that promotes project-based learning. The Aquaculture in Action program is one of the signature programs that provides opportunities for student-driven research and a model for the raise and release of native

species of fish in Maryland. Mr. Frederick has served as the chair for the Sea Grant Educators Network, and President of the Mid Atlantic Marine Education Association and the National Marine Educators Association.

GOERDT, ERIC. Eric is the owner of Northern Waters Smokehaus of Duluth, Minnesota. Goerdts has been studying fish smoking since the mid-nineties while stationed in Sitka, Alaska with the Coast Guard. Since opening in '98, Goerdts has pushed the boundaries of fish smoking and has expanded into other meats including salami. Goerdts' fish is used in local restaurants including the Brewhouse, Zeitgeist Arts Cafe, Kippis, Nokomis, and the New Scenic Cafe. It also appears on the shelves of the Whole Foods Co-op in Minneapolis-St. Paul and Duluth. Recently, the University of Minnesota Press has published the company's first cookbook, *Smoke on the Waterfront: The Northern Waters Smokehaus Cookbook*, A cultural icon of Lake Superior cuisine shares its story, recipes, and techniques.

HAEFNER, ETHAN. Ethan is an undergraduate student at the University of Minnesota in his final year studying fisheries and wildlife conservation biology with an emphasis in fisheries management. He is currently deciding between going into the fish health field or the medical field.

HAUSER, EMMA. Emma has been the Aquaculture Outreach Specialist for the University of Wisconsin-Stevens Point Northern Aquaculture Demonstration Facility as well as Wisconsin Sea Grant since 2014. She is responsible for showcasing facility research, incorporation of aquaculture into local schools, representing the facility at various public events, organizing and leading tours, managing the facility website and video production. Emma received her Bachelor of Science in Environmental and Ecology Biology from the University of Wisconsin- Eau Claire.

JACQUE, ANDREW. Dr. Andrew Jacque is the Chief Scientist and Founder of Water Quality Investigations, LLC (WQI). WQI has developed specialized methods that assess water sources for biofilm growth potential, biostability and the potential for microbiologically influenced corrosion. This approach has been used in drinking water, process water, wastewater and RAS systems. Because RAS systems rely upon natural biofilm growth for ammonia removal, the source water for these systems and operations of the systems themselves should not impede or hinder this important waste removal process.

JESCOVITCH, LAUREN. Lauren Jescovitch is an Extension educator with Michigan State University Extension and Michigan Sea Grant. She has a PhD in aquaculture from Auburn University and works with the Great Lakes region addressing needs from aquaculture, commercial fishing, and seafood processing industries.

JODOIN, LUKE. Luke is a project manager with Steamboat Road Consulting, a production and operations consulting firm servicing the aquaculture industry at local, national, and international levels. Luke fosters sustainable aquaculture growth across diverse scopes, from small-scale seaweed and shellfish farms to large commercial projects. Luke is a part of the team developing The Minnesota State Aquaculture Plan and looks forward to collaborating with a variety of stakeholders.

KEBUS, MYRON. Dr. Myron Kebus is an assistant professor at the College of Veterinary Medicine, Michigan State University and has been working as the north central regional Aquaculture Outreach Veterinarian since 2022. He has provided extensive direct outreach assistance on fish veterinary concerns to fish farmer and veterinary stakeholders. He is a 1992 graduate of the University of Wisconsin-Madison, School of Veterinary Medicine, and received his master's degree in aquaculture/veterinary science from the University of Wisconsin-Madison in 1990. His master's research investigated stress in rainbow trout, particularly as it pertains to fish hatcheries. In 1993, after a year of mixed animal veterinary practice, he started the Wisconsin Aquatic Veterinary Service, the first fish-only private veterinary practice in the Midwest, and provided veterinary services to fish farms, public aquariums, pet fish retailers, wholesalers, and hobbyists. From 1999 to 2022 he was Wisconsin's State Fish Health Veterinarian, directing the Fish Health Program for the Division of Animal Health, in the Wisconsin Department of Agriculture, Trade and Consumer Protection. Most recently he was an aquaculture research subject matter expert with the University of Minnesota, College of Veterinary Medicine, Secure Foods Systems team where he helped developing a risk assessment and associated guidance for viral hemorrhagic septicemia in the Great Lakes region. He is a

founding member and is the past president of the American Association of Fish. He is the past chair and currently serves of the Aquatic Veterinary Medicine Committee of the AVMA, representing Private and Public Food Animal Production.

KNIGGE, KRISTA. Krista Knigge serves as the Administrator of the Division of Agricultural Development at the Department of Agriculture, Trade and Consumer Protection. As Administrator, Knigge guides the marketing of the state's agricultural products locally, regionally, and internationally. She also directs farm and business development services. Knigge grew up on a family dairy farm in Omro, Wisconsin. Her family was the first in the United States to install robotic milkers. She is involved in the farm's social media promotion today. Knigge holds Bachelor of Science degrees in agricultural economics and agricultural journalism from the University of Wisconsin – Madison. Together with her husband, Corey Geiger, they own a herd of Angus and Wagyu cattle and Holstein dairy cows.

LAWRENCE, MARGARET. Margaret is a senior at Lake Superior State University in Sault Ste. Marie, MI. She will be graduating this May with a bachelor's in biology with a concentration in Food and Ecology, and minors in Aquaponic Production, Natural Resources and Environmental Science. She is the current president of the Lake Superior State University Aquaculture Club. Her special interest is in combining silviculture and aquaponics to reduce hatchery effluent and produce saplings for transplantation.

LUTHER, LA SONYA. La Sonya's focus is about integrated Multi-Trophic Aquaculture and integrated small animal husbandry raising them in an indoor/outdoor holistic environment a created zero-waste food ecosystem. In addition, La Sonya desires to incorporate the raising of mealworms, black soldier flies, wax worms, and vermicomposting to provide fresh live feed for a small scaled-down animal husbandry production & aquaculture ecological homestead. La Sonya has greatly benefited from her studies and huge passion for Herbalism, Ethnobotany, and Wildcrafting, which she also incorporates into her holistic hometown homestead experiences. She was the farm manager of our family farm Bountiful Farm while also a homeschool educator of her two beautiful daughters from December 2012 until August 2017. Now, with one being a first-generation college student at the University of Nebraska-Lincoln. *"It is my desire to share the life experiences of what I have learned and experienced with the youth as I believe that my knowledge and these life experiences will help to empower, engage, and inspire our BIPOC youth to provide environmentally sustainable earth stewardship, conservation, and prosperity solutions to problems within our community."* La Sonya played an immense role in supporting three underrepresented youth groups to attend this conference with funds provided by the Great Lakes Aquaculture Collaborative.

MEEKER, IAN. Ian is the 4-H Youth Development Educator for the University of Wisconsin Division of Extension. Ian has been Bayfield County's Youth Development Educator for over 20 years. His area of focus is developing and leading outdoor adventure programs for local youth that provides access to a variety of local wilderness destinations through canoeing, kayaking, biking and xc skiing. In 2016 he collaborated with the with The University of Wisconsin Steven's Point Northern Aquaculture Demonstration Facility to write a successful grant to provide equipment and teacher training for the school districts of Ashland, Bayfield, and Washburn to integrate Aquaculture and Aquaponics into their science curriculum.

NAAS, SANDY. Naas has more than 30 years of experience related to conservation and currently serves as an agriculture and natural resources Instructor and FFA adviser at Ashland High School. She is also the owner and primary natural resources scientist at Stable Solutions, an environmental consulting firm in Ashland. She has been chair of the Bayfield County Conservation Congress and vice chair of the Bayfield County Deer Advisory Council. She previously worked as a soil and water scientist at JZ Environmental and held the position of county conservationist at the Ashland, Bayfield, Douglas, Iron and Adams county land and water conservation departments. Naas is an avid hunter and angler, and a certified trapper education instructor.

NELSON, ELLIOT. Elliot is an Extension educator with Michigan Sea Grant and Michigan State University Extension. Elliot's work focuses on promoting coastal economies and protecting Great Lakes ecosystems in the Eastern Upper Peninsula of Michigan and across the state. His topic areas include aquaculture workforce development, aquaculture and seafood consumer education, coastal tourism development, birding education programs, 4-H partnerships, and tribal partnerships. Elliot is based at the Lake Superior State University Center for Freshwater Research and Education (LSSU-CFRE) in Sault Ste Marie, MI, where he regularly works alongside LSSU-CFRE staff and partners.

NEUKIRCHEN, MICHAEL. Mike worked in the HVAC industry for over 30 years, former Owner of "Complete Control, Inc." an Energy Management Firm and an Independent Field Office for Siemens Building Technologies. At Complete Control, Inc. he had over 100 employees that included Tradesmen, Technicians, Mechanical Engineers, Electrical Engineers, Application Engineers, Project Managers, and others. His main role was as an Application Engineer, applying program code and controls, bringing life to the designs of Mechanical & Electrical Engineers. Currently retired and having fun in the Aquaculture industry raising walleye from egg to fingerlings in indoor recirculating systems.

OSTLIE, JIM. Jim has been with the Minnesota Department of Agriculture since 2007 as a Livestock Specialist and FarmLink Coordinator. His role is focused on producer assistance, state livestock and ag organizations, and farmland access and succession. In 2023 he was tasked with working with the Aquaculture Industry to utilize state allocated funding to move forward with a state Aquaculture Plan.

POTHOVEN, ANDREW. Andrew is a junior at Lake Superior State University, located in Sault Ste. Marie, MI. He is double majoring in Biology and Fisheries and Wildlife Management, concentrating in Fisheries. He is the vice president of the Lake Superior State University Aquaculture Club. His special interest is using zebrafish as a model organism for aquatic research.

ROMANSKI, SEC. RANDY. Secretary Romanski was announced secretary of the Wisconsin Department of Agriculture, Trade and Consumer Protection by Governor Tony Evers in 2020 and was subsequently confirmed by the Wisconsin State Senate. Governor Evers has reappointed Romanski as DATCP Secretary. Prior to his appointment, Romanski served as DATCP deputy secretary and interim secretary. He brings decades of experience in government administration and policy development to the department. Romanski has held leadership roles at multiple state agencies including DOT, DNR, and DOJ. Originally from Wisconsin Rapids, Romanski earned his bachelor's degree in Political Science from the University of Wisconsin-River Falls and his master's degree in Public Policy and Administration from the Robert M. La Follette School of Public Affairs at the University of Wisconsin-Madison. Romanski resides in Monona, Wisconsin.

ROSIO, STEPHANIE. Steph is the Aquaponics/Farm Technician at the Potawatomi Farm, Bodewadmi Ktegan, located near Laona, WI. She has always had a passion for gardening and farm life so when the opportunity arose to work at the farm, she immediately applied and has never been happier.

SCHMITZ, ANNIE. Annie Schmitz is a Fish Biologist with Woods and Waters Fish Farm. She specializes in larval rearing of percids and has over 5 years of experience in aquaculture raising yellow perch in recirculating aquaculture systems.

SCHRANK, AMY. Amy Schrank is the Extension Program Leader and an Assistant Extension Professor in Fisheries and Aquaculture at Minnesota Sea Grant. She is also an Adjunct Assistant Professor in the Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota. Her current research activities include understanding how sustainable aquaculture can help meet local seafood demand, best practices for raising Yellow Perch in recirculating aquaculture systems (RAS), and how invasive, hybrid cattails affect fish communities in lakes. She leads the Great Lakes Aquaculture Collaborative, and her extension work involves collaborating with fisheries and aquaculture researchers, industry members, and managers around Minnesota and the Great Lakes region to provide research support and a bridge to communicate technical information to interested communities.

SHAMBACH, AMY. Amy Shambach is Illinois Indiana Sea Grant's aquaculture marketing outreach associate who works with the aquaculture industry in the USDA's North Central Region. Her work focuses on the demand side of domestic farm-raised aquaculture production and consumer education, aquaculture production and K-12 education. Before working for Illinois-Indiana Sea Grant, she worked in the private sector. She has experience working with a variety of different aquaculture systems and species. Amy holds an AA in Marine Science Technology and an AS in Science and Mathematics from the College of the Redwoods, and a BS in biology from Ball State University with a focus on aquatic biology. Today she works in outreach and extension.

SHEP, PETER. Peter is co-owner of "Mulberry Aquaponics LLC" with the landowner James Hougan in Stoughton, Wisconsin. Mulberry Aquaponics breeds yellow perch on site, raising fingerlings in a RAS system that was built and insulated in a dairy barn. Outside of the farm, Peter worked with Stoughton High School on their own aquaponics system. Peter has also assisted David Northey of "Northey Farms LLC" in Deerfield, Wisconsin, and is currently retrofitting his tanks into a recirculating system. Peter aided in breeding the fish at Northey's facility using RAS in spring 2023. Peter's advisor was Dr. Dong Fang Deng at the University of Wisconsin School of Freshwater Science, where he learned the basic methods for RAS yellow perch breeding. He has since modified the method to be commercially viable. Peter plans on branching out to walleye breeding by next year 2025.

SMITH, ROBERT. Dr. Robert K Smith is a Wisconsin native, did his undergraduate studies at the University of Wisconsin – River Falls and received his Doctor of Veterinary Medicine degree from the University of Missouri – Columbia in 1982. He has been in private practice for more than 40 years and is the owner of Clayton Veterinary Care in Clayton, Wisconsin. He is currently licensed in Wisconsin, Minnesota, and Missouri. Currently, approximately 60% of his practice is aquaculture in which he completes over 100 veterinarian fish health assessments each year, performs virology, bacteriology testing, and official fish assessments for exportation into multiple states and countries, along with being active in both the private and the public aquatic production medicine area.

SACCO, LAUREL. Laurel is pursuing a PhD in the conservation sciences program following a fisheries and aquatic biology track at the University of Minnesota. She is working on several collaborative projects related to fish health and intends to pursue a career in this area.

SHAW, STEPHANIE. Stephanie is a Northern Lakes Fisheries Research Scientist in the Office of Applied Science for the Wisconsin DNR. She's worked for the Office Applied Science for several years. Her research focuses on the ecology and management of gamefish populations in Wisconsin. A few of her recent research projects have addressed questions related to walleye declines in northern Wisconsin, the sex ratio of hatchery reared walleye, and the influence of catch-and-release angling on muskellunge and lake sturgeon populations.

SISLER, SEAN. Sean is the Commercial Aquatic Programs and Fish Health Consultant at the Minnesota Department of Natural Resources. Sean works with Aquaculture, Minnow Dealers, Lake Superior Fishing Guides, Fish Packers, and Commercial Netters. Sean received a bachelor's degree in Fish and Wildlife from Lake Superior State University and a master's degree in Conservation Biology from the University of Minnesota. Sean has worked in natural resources has worked in natural resources over 20 years and has interest in fish physiology and fisheries management.

SUNDAL, DAVE. Sundal, Dave. "Dockside Dave" is the Production/Operations manager at Jeremiah's Bullfrog Fish Farm - Eat My Fish. He started at the farm in 2000 after a few seasons at a DNR Hatchery. He graduated from University of Wisconsin - Stevens Point with a Bachelor of Science degree in Biology and Water Resources with an emphasis on Fisheries. As well as growing, processing, and marketing fish, he is the farm cook during the summer months of "Hobo Chefin" - "The meal of low expectations and big surprises."

THOELE, BARRY. Barry has 37 years of experience in wholesale bait in MN, with 25 years building Lincoln Bait baitfish farm in Staples Minnesota. He has been involved with and critical partner of multiple research projects with the University of Minnesota and Minnesota Sea Grant. He is on the Industry Technical committee for the North Central Regional Aquaculture Center, representing Minnesota as well as the Minnesota Aquaculture Association.

WILLIS, NATE. Nate Willis has been a Wastewater Engineer for the DNR's Water Quality Bureau since 2017. In this role he serves as a Wastewater Program expert on PFAS, storage structures, and WPDES permitting of aquaculture facilities, pulp/paper mills, waste haulers, and airports.

WOOLEVER, KYLE. Kyle entered commercial aquaponics at a small-scale farm and eventually began working at Superior Fresh, where he oversaw all fish production. He then transitioned to Director of Operations where he oversees both the Greenhouse and Aquaculture operations. He is married to Brianna, and has two sons, Eli and Cooper, living the good life in a little cabin in the woods.

ZIEBELL, MICHAEL. Michael is the President & Chief Executive Officer at The trū Shrimp Companies, Inc. trū Shrimp is a US-based company that produces superior-quality shrimp that are traceable, sustainable and antibiotic free. Michael received his Master of Business Administration (MBA), General Management and Leadership from University of St. Thomas. His previous positions include EVP Chief Marketing Officer for The Schwan Food Company, Vice President of Sales and Marketing for Tastefully Simple, an Instructor of Marketing at St. Cloud State University, and President and Chief Executive Officer at Fey Industries.

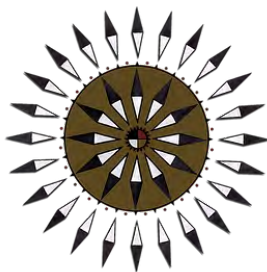
VIRTUALLY EMPOWERING BIPOC YOUTH

SUPPORTING AQUACULTURE IN THE CLASSROOM SESSION

Funds from the Great Lakes Aquaculture Collaborative and much support from La Sonya Luther enabled these three underrepresented youth organizations to attend this conference.



FIBER ARTS OMAHA is a vibrant community dedicated to celebrating and exploring the rich world of fiber arts. We bring together enthusiasts of all skill levels, from seasoned artisans to those just beginning their creative journey with textiles and fiber arts from plant and animal. We believe in the power of hands in craftsmanship and creativity to connect people. Through workshops, classes, and gatherings, we provide opportunities to learn new techniques and share expertise.



LAKOTA YOUTH DEVELOPMENT. Our students represent the Youth Society of **Lakota Youth Development** and are primarily native youth from the Rosebud Indian reservation in south central South Dakota. Our Lakota culture has always emphasized the need to be in balance with the natural world and be good stewards in our community and region, thus having a positive impact in the larger ecosystems across the country including our water. Water is sacred to our culture and is our first medicine, these are cultural teachings that we help our youth to embrace and to learn as many ways as possible how they as individuals as well as a group can impact the natural order of the environment. At a minimum, do no harm.



EMERGING LADIES' ACADEMY students are girls ranging from 10 -18yrs old. We are a nonprofit organization that is based out of Omaha, Nebraska with the mission to empower black girls in technology. We expose them to three tech tracks, computer science, engineering, and BioMedical Science. The study of Aquaculture aligns within our BioMedical Science track. Under its Biomedical Science track, Emerging Ladies Academy demonstrates a commitment to diverse educational pathways, including aquaculture. The academy recognizes

the significance of aquaculture within the broader context of biomedical sciences, understanding its vital role in areas such as nutrition, disease prevention, and environmental sustainability. By integrating aquaculture into its

curriculum, Emerging Ladies Academy embraces the interdisciplinary nature of biomedical science. It equips aspiring women with the knowledge and skills needed to contribute to advancements in this field. This inclusive approach reflects the academy's dedication to empowering women in various domains, fostering a comprehensive understanding of biomedical sciences, including the impactful realm of aquaculture.

STUDENT ABSTRACTS POSTER & PRESENTATION COMPETITION

Don't miss these amazing student presentations on Friday evening before the cooking demonstration. Use the voting card in your folder to vote on your favorite student presentation for the 1. young student award and 2. undergraduate student award.

1. YOUNG STUDENT COMPETITION

The only requirement was to provide a statement on why they were interested in Aquaculture.

 **"Sushi is my favorite food" -Amin King Davis:** 3rd grader from Hitchcock Elementary school.

"Thank you very much for this great opportunity. My name is Amin King Davis, and I am almost 9 years old. I am now in third grade at Hitchcock Elementary School. I don't know a lot about fish farming, but I would like to learn about it. I really like going fishing with my grandpa. I've never seen a fish farm before. I'm interested to see how it's done. We eat fish a lot in our family, especially salmon and sushi. Sushi is my favorite food. I would like to know how to farm fish to make sure we always have sushi to eat.

Every spring I work in my grandma's garden to plant all the food we eat in the summer and fall. She has turned half of her back yard into our family garden. We usually plant tomatoes, peppers, eggplant, green onions, goji berries and many other veggies. I am very interested in agriculture because my mom told me the food from our family garden is healthier for us since we don't spray chemicals on our plants. I am very curious to learn how to grow food on big farms without chemicals. I would like to learn a lot more about farming so I can one day make a difference for the better future in how food is grown. Thank you for your time and I hope you are having a great day."

 **"Friendly Fishy Farmer" system - Eiliyah Khabir** a homeschooler in the 4th grade.

"Hi. My name is Eiliyah. I'm 10 years old and I go to school at my home. At first, I thought it was strange not getting up every morning to go to a building with teachers, students, desks and tests. I don't really miss any of that stuff. Except I do miss my friends a little. I found out a lot about the real world being at home. I always thought that vegetables and meat were grown in a factory and packaged just like the chips and cookies we get at Hy Vee. I never thought that I could be the one to create or catch my own food. I have never seen food come from anywhere except the grocery stores. I always thought you had to be a professional farmer, grocery store or the Government to create the food we eat.

It's like having a superpower, being able to grow or catch food all on your own that you can actually eat! I think this Aquaculture conference could help people understand that anyone can do this! Even me.

My goal is to learn new, different, and easy ways to farm fish for anyone anywhere! I want to create a fun system, a "Friendly Fishy Farmer" system that's easy and available for someone who wants to farm even if they don't have a

big yard or farmland. If we can create our own food source and take care of our family without relying on a company or the government then....

We can do ANYTHING! We are SUPERHEROES!

From La Sonya Luther, Organizer:

“As the organizer of this wonderful opportunity for bringing our young people to the table, I am humbled and grateful for the motivation of these young people and encouragement of their parents to allow them to step out and take a chance to submit their entries to attend the Wisconsin Aquaculture Conference in spite of not meeting the preferred guidelines and for the parents for supporting both of these winners’ curiosity and their excitement. For me they are automatic Winners, and I am so happy they were willing to step out and share with me their excitement. It truly made it all the worth to see this made possible for them”.

2. HIGH SCHOOL & UNDERGRADUATE STUDENT COMPETITION

Present on a particular aquaculture research, education, or demonstration project.

GROWTH RATE OF EASTERN WHITE CEDAR IN AQUAPONICS VERSUS SOIL

Margaret J. Lawrence*, Barbara I. Evans

School of Science and Medicine

Lake Superior State University

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Silviculture and aquaponics are novel topics that have been intriguing scientists and foresters alike. In theory, by combining the two disciplines, pre-existing fish hatcheries could add on an aquaponics system to reduce excess nutrients: thereby reducing eutrophication in local waterways while growing saplings for multiple purposes. The nutrient waste will potentially grow saplings faster than in conventional agriculture, giving them a competitive advantage. These saplings could be used for forest restoration purposes or landscaping, thus increasing the number of native trees in landscaping, and restoring natural habitats.

In a preliminary study conducted last year, Eastern White Cedar saplings were successfully sprouted from seed, using only damp paper towels and a grow light. Seedlings were transferred into a deep-water culture system (DWC)



and grown for approximately 8 months before being transferred to soil. The saplings thrived in the deep-water culture system and are now successfully thriving in soil. However, there was a large variation in size of saplings, possibly because half of the sprouts were transferred into the DWC system later than the other half. Two of these saplings were transplanted in front of the Native American Center on campus at Lake Superior State University in September 2023.

The study was continued in February 2023, this time with consistent planting schedules and control groups, to compare stem growth rates between aquaponically grown and soil grown saplings. The aquaponics saplings were grown in a DWC with no added media, leaving the roots floating.

Whereas the soil grown saplings were in 10-inch pots with Black Gold soil. Soil and water chemistry and stem height were recorded every two weeks. Both sample groups received the same environmental conditions.

Preliminary results show a higher survival rate in aquaponics compared to soil. Overall, combining silviculture with aquaculture has potential benefits for protecting the aquatic environment and creating a new field of aquaponics.

DETERMINING THE EFFECTS OF SEDIMENTS FROM DIFFERENT WATER BODIES IN MICHIGAN ON ZEBRAFISH (*DANIO RERIO*)

Andrew Pothoven

School of Science and Medicine
Lake Superior State University
Sault Sainte Marie, MI 49783

Zebrafish are a popular model organism in a variety of fields such as genetics, aquaculture research, and toxicology. Their popularity is due to many factors, such as their low cost, high fecundity, well-known genome, and sensitivity to contaminants and poor conditions. Lake Superior State University recently acquired a multi-tank aquarium system to develop a zebrafish research facility. The first undergraduate research project with this new facility will investigate the effects of contaminated waters and sediments from water bodies across Michigan on zebrafish eggs. So far, the multi-tank aquarium has been assembled, and money has been secured to purchase a zebrafish breeding chamber. Future directions of this project will include collecting sediments and analyzing them for contaminants and subjecting the zebrafish eggs to these polluted waters and sediments. This will help determine if each polluted water body sampled is still hazardous to sensitive organisms.

THE INFLUENCE OF ECOREGIONS AND LAND USE AND LAND COVER ON FISH ASSEMBLAGES IN SOUTHERN MINNESOTA

Authors: **Masaki Hara**, and Dr. Susan Colvin

Level III ecoregions of the conterminous United States provide an ecosystem framework for facilitating environmental understanding and aiding management practices. In southern Minnesota near Mankato, there are two level III ecoregions: to the east in the North Central Hardwood Forests (NCHF) and to the west are the Western Corn Belt Plains (WCBP). Formerly, The NCHF contains a mosaic of deciduous forests, wetlands, and lakes, with predominant land uses of cropland agriculture, pasture, and dairy operations. Tall Grass Prairie prior to settlement, the WCBP is predominately used for agriculture due to its fertile mesic prairie soils, temperate climate, and adequate precipitation during the growing season. Pockets of prairie habitat still occur along with wetlands specific to this ecoregion, specifically prairie potholes. Land use impacts can cause reduced water quality, impaired ecosystem functioning, and loss of fish habitat which will negatively influence fish diversity, ecosystem functions, natural resource-based economies, and recreational opportunities. Understanding fish diversity and population dynamics, land use, land cover, and water quality helps us to understand the relationship between fish species and their habitat, and how environmental factors affect fish distributions in these ecoregions. This research project investigates how land use and land cover may impact fish assemblage diversity in lakes in these ecoregions. Specifically, we will examine how land use and land cover may affect fish diversity and distributions, and water quality similarly or disparately between ecoregions.

MY FIRST HANDS-ON EXPERIENCE IN AQUACULTURE RESEARCH ON YELLOW PERCH

Owen Bellin (12th Grade, High School Student)

Emma K. Kraco and Dong-Fang Deng (Mentors)

School of Freshwater Sciences University of Wisconsin-Milwaukee

Yellow perch is a favored food fish in Wisconsin. Given the declining harvest from fisheries, aquaculture arises as a crucial avenue to meet market demands. The advancement of aquaculture technology is imperative for establishing sustainable yellow perch aquaculture. One aspect of my learning experience involved monitoring the development of yellow perch embryos treated with formalin or salt (5 ppt). Employing a microscope and ImageJ software, I documented embryo development and observed endogenous nutrient changes in response to various treatments. Another facet of my learning involved understanding protocols for preparing aquatic feed, involving ingredient sorting, grinding, mixing, pelleting, and drying. The precise control of each step influences the ultimate quality of the feed produced. The third area of my expertise pertains to the maintenance of fish tanks, which includes cleaning, monitoring water quality, data recording, and conducting sample collections. My hands-on experience has been both captivating and influential, providing valuable insights that will undoubtedly contribute to my academic journey and future career in freshwater sciences.

FEEDING WALLEYE FINGERLINGS FOR MAXIMUM GROWTH AND STRESS RESILIENCE THROUGH STRATEGIC FEEDING

Pranil Panda (High School Intern) and Jose Samano (Undergraduate Summer Intern)
Alexander J Gregory and Dong-Fang Deng (Mentors)
School of Freshwater Science, University of Wisconsin-Milwaukee

Walleye (*Sander vitreus*) is one of the important fishery species, renowned for its delectable taste. However, the declining walleye population has had severe repercussions on commercial harvests, necessitating the development of technology to support aquaculture and viable hatcheries for stocking enhancement to meet local seafood demands. Among the crucial factors influencing fish growth performance, feed plays a pivotal role, along with water quality management, thereby significantly impacting aquaculture production efficiency. This study aims to determine optimal feeding rates for walleye fingerlings based on growth performance and their tolerance to environmental stress.

Walleye fingerlings with an average initial body weight of 0.47 g were subjected to varying feeding rates (% body weight per day) at 6, 10, 14, 18, 22, and 26% over two weeks. The fish were cultured in a flow-through water system, utilizing three tanks with 50 fish each for every feeding rate. At the end of the two-week feeding period, subsamples of fish underwent acute hypoxia (dissolved oxygen <2 ppm) and heat shock, with water temperature incrementally raised from 19°C to 27°C at a rate of 1°C/15mins, followed by exposure to 27°C for 18 hours. The study revealed that weight gain and feed conversion ratio increased with higher feeding rates, and fish fed at rates ranging from 18 to 26% exhibited similar weight gain. The tolerance to acute heat shock and hypoxia was not compromised by different feeding rates under the given conditions. The findings suggest that an 18% feeding rate is optimal for walleye with body weights ranging from 0.47 to 1.7 g. This study provides crucial baseline information for the effective management of walleye hatcheries.

AGE AND GENDER MATTER: ACUTE IMPACT OF CHLORINE CONTAMINATION AND HEAT SHOCK ON YELLOW PERCH

Jacob Peterson (Undergraduate Student)
Alexander J Gregory, John P Conto and Dong-Fang Deng (Mentor)
School of Freshwater Science, University of Wisconsin-Milwaukee

Yellow perch (*Perca flavescens*) is a crucial ecological and economic freshwater fish in the Great Lakes region. However, the population of yellow perch has faced a significant decline, attributed to environmental stressors such

as habitat loss, contaminant pollution, food web disruption, and climate change. This study aims to understand the effects of chlorine contamination, primarily stemming from the widespread use of disinfection chemicals (bleach), and heat shock on yellow perch.

Initially, we evaluated the impact of varying chlorine concentrations (0, 0.1, 0.2, 0.4, and 0.6 ppm) on larval fish (25 days post-hatch) over four hours. Each treatment comprised three replications, with forty fish in each replication. Subsequently, juvenile fish (average body weight, 25.1 g) were exposed to the same chlorine concentrations in a 24-hour test, with six fish per tank and three tanks per treatment. The third test subjected yellow perch (average body weight 72.1 g) to heat shock, raising the temperature from 20°C to 32°C at a rate of 1°C/15 mins. Mortality was monitored for 20 hours with the fish exposed to 32°C. Results revealed significant mortality in larval fish at 0.4 and 0.6 ppm chlorine (100%), 0.2 ppm chlorine (92.5%), and 0.1 ppm chlorine (35.8%), with less than 1% mortality in the control group. Juvenile fish exhibited 5.5% mortality at 0.4 ppm and 25% at 0.6 ppm chlorine, with no mortality in other treatments. In particular, all mortalities in the chlorine tests were female. In the heat shock test, male fish experienced 100% mortality, while female fish had 46% mortality. These preliminary findings highlight that 1) larval fish are more susceptible to chlorine contamination compared to juvenile fish; 2) males display greater resistance to chlorine contamination, while females demonstrate higher tolerance to heat shock. The results contribute a baseline to our preliminary understanding of the immediate environmental threats faced by yellow perch, informing conservation and management strategies for this fish.

THANK YOU TO ALL CONFERENCE SPONSORS



The Great Lakes Aquaculture Collaborative (GLAC) is a federally funded project that seeks to create a regionwide group to foster relevant, science-based initiatives that support aquaculture industries in the Great Lakes region that are environmentally responsible, competitive, and sustainable. GLAC is currently helping to strengthen the aquaculture community in the Great Lakes region, provide decision-makers in all eight Great Lakes states with science-based aquaculture information and help clarify how aquaculture regulations are implemented. GLAC was a major sponsor and organizer of this conference as well as financially supporting various underrepresented students and individuals to attend. Learn more: greatlakesseagrant.com/aquaculture/



**University of Wisconsin
Stevens Point**

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University of Wisconsin-Stevens Point Northern Aquaculture Demonstration Facility (UWSP NADF) is a one-of-a-kind facility in the Midwest and joins only a handful in the U.S. that provide applied research, demonstration, education, and workforce development capabilities. The state-of-the-art, dynamic facility, showcases new advances in aquaculture system technology such as sustainable land based recirculating aquaculture, while also providing traditional aquaculture systems such as flow through raceways and outdoor ponds for industry-based research projects. The facility is a national leader in aquaculture training and skill development, leading to nearly 100% job placement for aquaculture technicians and interns. Learn more: aquaculture.uwsp.edu



University of Wisconsin Sea Grant Institute. Wisconsin Sea Grant aligns with the National Sea Grant College Program's goal of supporting sustainable fisheries and aquaculture, funding research that generates actionable information grounded in solid science—research that fish farmers can use. To name just a few examples, Sea Grant-supported research helps Wisconsin fish farmers learn how to best raise certain species, understand what consumers want to eat, develop effective marketing strategies for their products, stay on top of sustainable, environmentally responsible practices. Wisconsin Sea Grant supports various aquaculture staff including:

- Emma Hauser, Aquaculture Outreach (UW-Stevens Point)
- Dong-Fang Deng, Aquaculture Outreach (UW-Milwaukee),
- Sharon Moen, Food-Fish Outreach Coordinator (Lake Superior Field Office)
- Titus Seilheimer, Fisheries Specialist (Manitowoc Field Office).

Learn more: www.seagrants.wisc.edu/



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AquaTactics is an aquaculture veterinary practice based in Washington State that has multi-state licensed veterinarians and fish vaccine experts to help provide you with comprehensive fish health services, including consults, biosecurity audits, integrated treatment and disease prevention plans. Stop by our booth and check out our new automated injection vaccination machine. Learn more: <http://www.aquatactics.com/>



Wisconsin Department of Agriculture Trade and Consumer Protection (WI DATCP) partners with all the citizens of Wisconsin to grow the economy by promoting quality food, healthy plants and animals, sound use of land and water resources, and a fair marketplace. Their vision is to deliver efficient and effective programs and services to Wisconsin agriculture, consumers, and businesses, to provide market confidence and to enhance competitiveness and profitability. Core values include **Diversity, Accountability, Teamwork, Customer Service, Professionalism.**

Learn more: datcp.wi.gov



Harrietta Hills

BIRD COMMANDER

Bird Commander. Bird Predation is one of the most significant issues for aquaculture nationwide. Bird Commander by Harrietta Hills offers effective solutions with laser bird deterrence. While birds play a crucial role in ecosystems, they can also pose challenges for agriculture, aquaculture, and various types of commercial and industrial infrastructure. We feature the AVIX Autonomic Mark II bird deterrent laser as well as the Handheld 500 to effectively control birds. Visit us to learn more: birdcommander.com/



Kasco Marine is based in Prescott, WI and has been in business since 1968. Our major product offering to the aquaculture community is surface aerators. They are designed to help with emergency oxygen conditions, CO2 elimination in RAS systems as well as supplying oxygen for fish health and growth. One person can move them from tank to tank. All exposed metal is marine grade stainless steel. We also offer diffused aerator for deeper ponds to eliminate thermal and chemical stratification as well as d-icing to prevent winter kills. Learn more: www.kascomarine.com



Blue Water Farms' vision is to revolutionize food systems with a commitment to sustainability, cutting-edge technology, and a focus on consumer needs to provide nutritious, safe, and delicious food that is accessible to everyone. Learn more: bluewaterfarmswalleye.com



Shanghai Wholesale Marketplace was established in 2007 and holds a reputation for providing wholesale Asian foods throughout the 5-state area. Based in the heart of Minneapolis and St. Paul, our primary warehouse exceeds 100,000 square feet and hosts 13 loading docks. To better serve our customers, we now also provide a full retail experience in the warehouse, while still maintaining our distribution network. In 2021, We opened our first satellite location - a fully independent grocery store (Market Fresh, in Roseville, MN). Through our partnerships and network of existing customers, Shanghai Wholesale is an excellent Marketing and Distribution partner the aquaculture industry. We have the experience, infrastructure, logistics, and talent to ensure the products produced can be quickly and efficiently put into the hands of the consumer. Learn more: shanghaiwholesale.com

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