WORKFORCE DEVELOPMENT PANEL
AQUACULTURE WORKFORCE DEVELOPMENT

EMMA HAUSER
AQUACULTURE OUTREACH SPECIALIST
UNIVERSITY OF WISCONSIN STEVENS POINT NORTHERN AQUACULTURE DEMONSTRATION FACILITY
WISCONSIN SEA GRANT
WHAT MAKES UWSP NADF UNIQUE

✓ **Aquaculture Experience** Expert staff and skilled experience available at the facility working with variety of species/systems

✓ **Commercial Scale & Industry Applied** Research and Demonstration (23,000 – 44,000L RAS grow-out systems)

✓ **Over 15 Species of Freshwater Fish Researched** at various life stages including food fish, bait fish and conservation species

✓ **Various Production Systems** showcasing RAS, flow-through, outdoor pond, cold water and cool water incubation, and larval systems

= TECHNICAL ASSISTANCE

= RESEARCH CAPACITY

= EDUCATIONAL OPPORTUNITIES
1. SPARKING INITIAL INTEREST
   • EDUCATIONAL TOURS (~200 K-12 ANNUALLY)
   • HANDS ON ACTIVITIES AT EVENTS
2. INCORPORATION INTO THE CLASSROOM - DONATIONS, TECHNICAL ASSISTANCE, RELATIONSHIP BUILDING
3. OWNERSHIP, INCENTIVES, FUTURE POSSIBILITIES- INDEPENDENT STUDY, INTERNSHIPS, APPRENTICESHIPS
FUTURE INITIATIVES:

• **STREAMLINE EFFORTS & NATIONAL COLLABORATION (USAS, NAA, AFS CERTIFICATION).**

• **BUILD UPON EXISTING NETWORKS (4-H/AGRICULTURE PROGRAMS)**

• **CURRICULUM ENHANCEMENT (WISCONSIN SEA GRANT PARTNER)**

• **LEVERAGE GRANTS/FUNDING TO SUPPORT INITIATIVE**

• **DEVELOP PRACTICES FOR REACHING HIGHSCHOOL & UNDERGRADUATE STUDENTS**

• **DETERMINE IMPACTS**
Outreach Activity
Inspiring and Learning Opportunity

Dong-Fang Deng
Aquaculture Nutrition Lab
School of Freshwater Sciences, University of Wisconsin-Milwaukee
Education

Research Tours and Demonstration
Hands-on Learning
undergraduate and high school students
Communication
Aquaculture in Action

TOOLS FOR TEACHING SCIENCE

@ Maryland Sea Grant

J. Adam Frederick
Assistant Director for Education
Maryland Sea Grant College
Institute of Marine and Environmental Technology
Aquaculture in Action- tools for teaching science

- Technology integration
- Hands-on science
- Long-term research and data collection
- Raise and release native species
Aquaculture in Action - tools for teaching science

**VOLUMES**

<table>
<thead>
<tr>
<th>Description</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank Side A:</td>
<td>61.36 cubic feet</td>
</tr>
<tr>
<td>Tank Side B:</td>
<td>61.36 cubic feet</td>
</tr>
<tr>
<td>Main Biofilter:</td>
<td>12.50 cubic feet</td>
</tr>
<tr>
<td>Settlement Tub:</td>
<td>25.46 cubic feet</td>
</tr>
<tr>
<td>Main Pump</td>
<td>8.46 cubic feet</td>
</tr>
<tr>
<td>Anaerobic Tub:</td>
<td>1.39 cubic feet</td>
</tr>
<tr>
<td>Effluent Filter:</td>
<td>3.04 cubic feet</td>
</tr>
<tr>
<td>Biofeed Filter:</td>
<td>3.04 cubic feet</td>
</tr>
<tr>
<td>Total Piping Volume:</td>
<td>9.46 cubic feet</td>
</tr>
<tr>
<td>Total System Volume:</td>
<td>189.07 cubic feet</td>
</tr>
</tbody>
</table>

**Index of Tank Drawings**

1. Aerial View
2. View from the Classroom
3. View from Outside
4. Tank Details

**Flow Rate Analysis**

Flow rate trials below display the liters of water being pumped out in liters per second. Trials 1-5 were done by pulling water from tank side A, whereas trials 6-10 were done from tank side B.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.083 liters/sec</td>
</tr>
<tr>
<td>2</td>
<td>0.088 liters/sec</td>
</tr>
<tr>
<td>3</td>
<td>0.074 liters/sec</td>
</tr>
<tr>
<td>4</td>
<td>0.074 liters/sec</td>
</tr>
<tr>
<td>5</td>
<td>0.091 liters/sec</td>
</tr>
<tr>
<td>6</td>
<td>0.102 liters/sec</td>
</tr>
<tr>
<td>7</td>
<td>0.103 liters/sec</td>
</tr>
<tr>
<td>8</td>
<td>0.105 liters/sec</td>
</tr>
<tr>
<td>9</td>
<td>0.099 liters/sec</td>
</tr>
<tr>
<td>10</td>
<td>0.104 liters/sec</td>
</tr>
</tbody>
</table>

Average Flow Rate: 0.091 liters/sec
Standard Deviation: 0.015 liters/sec
ELLIO T NELSON
MICHIGAN STATE UNIVERSITY
MICHIGAN SEA GRANT
The Michigan Aquaculture Workforce Pathway
Recruiting and Training Teachers
Recruiting and Training Teachers

- Recruiting through existing networks
  - Michigan Math and Science Centers
  - Center for Great Lakes Literacy
  - National Sea Grant aquaculture contacts
Training Teachers – Professional Development

- 3 day workshops in MI and WI (2018)
- 2 Day Workshops at LSSU (2022 and 2023)
- ½ Day Workshop at Wisconsin Aquaculture Association Meeting (2020 and 2023)
- Presentations at aquaculture associations and Center for Great Lakes Literacy

- Over 200 teachers and educators trained in why aquaculture is important and how to use aquaculture in the classroom since 2019
Training Teachers – Compiling and Distributing Resources
K-8 Programs and High School Aquaculture Challenge
K-8 Programs

- Boat 2 School (6th Grade)
- PreK – 5th Library Program
- 3rd and 5th grade in classroom programs
- 7th and 8th grade programs at LSSU-CFRE

- Since 2018, over 1000 PreK-8th Grade youth exposed to aquaculture as food production and important for food security!
8th-12th Grade - Aquaculture Challenge

- High School Competition
- A 4 part Challenge
  - Build
  - Monitor
  - Business Plan
  - Seafood Outreach
Aquaculture Challenge

- One-on-One Support is key
- Teacher Training is key
- Virtual platform has made it very open and accessible
- Over 50% low income schools. Diverse student populations
- Teacher and student post-evaluations
- Since 2018
  - Over 500 high school youth participants!
  - Over 50 Teacher coaches
  - Schools from MI, WI, OH, MN, NY, NE, IA, IL and IN
Post-secondary Training at LSSU
Post-secondary Curriculum Development: MI Sea Grant led effort

- Advisory group
- In depth workshop
- Model curriculum document
- Eventually utilized by LSSU to create programs
Lake Superior State University Aquaculture Programs

- Long Term programs that have channeled people into the industry
  - Fisheries and Wildlife Major
  - Biology Major
- Programs Created in 2018 and 2019
  - Aquaponics Entrepreneurship AAS (16 enrolled or graduated)
  - Aquaponic Production Minor (3 enrolled or graduated)
  - Aquaculture Minor (6 enrolled or graduated)
- These programs have led to more:
  - Aquaculture Classes
  - Aquaculture Internships
Recent LSSU Graduates Have moved on to...
Adult / Continuing Education
GLAC activities in 2019-2022

We hosted three Great Lakes Aquaculture Days in 2020-2022

1. Virtual conference with 11 talks and panel discussions ending in a cooking competition
2. Virtual farm tours with Q and A with farmer
3. Hybrid fish health workshop

Events website: greatlakesseagrant.com/aquaculture/events/featured/
MI Sea Grant New Farmer Resources

SITE SELECTION PLANS FOR NEW AND EXPANDING AQUACULTURE FACILITIES IN MICHIGAN

COMMERCIAL AQUACULTURE in Michigan

SITING GUIDEBOOK
SANDRA NAAS
ASHLAND HIGH SCHOOL
AGRICULTURE/NATURAL EDUCATION
Aquaculture Labor Data

This table shows a list of occupations with job duties that are similar to those of farmers, ranchers, and other agricultural managers.

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>JOB DUTIES</th>
<th>ENTRY-LEVEL EDUCATION</th>
<th>2022 MEDIAN PAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural and Food Science Technicians</strong></td>
<td>Agricultural and food science technicians assist agricultural and food scientists.</td>
<td>Associate's degree</td>
<td>$46,140</td>
</tr>
<tr>
<td><strong>Agricultural and Food Scientists</strong></td>
<td>Agricultural and food scientists research ways to improve the efficiency and safety of agricultural establishments and products.</td>
<td>Bachelor's degree</td>
<td>$74,940</td>
</tr>
<tr>
<td><strong>Agricultural Engineers</strong></td>
<td>Agricultural engineers solve problems concerning power supplies, machine efficiency, the use of structures and facilities, pollution and environmental issues, and the storage and processing of agricultural products.</td>
<td>Bachelor's degree</td>
<td>$83,260</td>
</tr>
<tr>
<td><strong>Agricultural Workers</strong></td>
<td>Agricultural workers maintain crops and tend livestock.</td>
<td>See How to Become One</td>
<td>$33,290</td>
</tr>
<tr>
<td><strong>Animal Care and Service Workers</strong></td>
<td>Animal care and service workers attend to or train animals.</td>
<td>High school diploma or equivalent</td>
<td>$29,790</td>
</tr>
<tr>
<td><strong>Construction Equipment Operators</strong></td>
<td>Construction equipment operators drive, maneuver, or control the heavy machinery used to construct roads, buildings, and other structures.</td>
<td>High school diploma or equivalent</td>
<td>$51,050</td>
</tr>
</tbody>
</table>
What are Top 5 Best Paying Related Aquaculture Jobs in Wisconsin

We found a few jobs that pay more than jobs in the Aquaculture category in Wisconsin.

For example Aquaculture Engineering jobs pay as much as $91,152 (200.8%) more than the average Aquaculture salary of $45,398.

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Annual Salary</th>
<th>Monthly Pay</th>
<th>Weekly Pay</th>
<th>Hourly Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquaculture Engineering</td>
<td>$136,550</td>
<td>$11,379</td>
<td>$2,625</td>
<td>$65.65</td>
</tr>
<tr>
<td>Work From Home Aquaculture Technician</td>
<td>$52,299</td>
<td>$4,358</td>
<td>$1,005</td>
<td>$25.14</td>
</tr>
<tr>
<td>Aquaculture Specialist</td>
<td>$45,372</td>
<td>$3,781</td>
<td>$872</td>
<td>$21.81</td>
</tr>
<tr>
<td>Aquaculture Technician</td>
<td>$37,302</td>
<td>$3,108</td>
<td>$717</td>
<td>$17.93</td>
</tr>
<tr>
<td>Fish Farm Technician</td>
<td>$32,924</td>
<td>$2,743</td>
<td>$633</td>
<td>$15.83</td>
</tr>
</tbody>
</table>
Workforce Characteristics

Largest Occupations

- Office and Administrative Support
- Transportation and Material Moving
- Production
- Sales and Related
- Food Preparation and Serving Related
- Educational Instruction and Library
- Construction and Extraction
- Management
- Healthcare Practitioners and Technical
- Installation, Maintenance, and Repair
- Healthcare Support
- Building and Grounds Cleaning and Maintenance
- Business and Financial Operations
- Protective Service
- Personal Care and Service
- Community and Social Service
- Farming, Fishing, and Forestry
- Computer and Mathematical
- Architecture and Engineering
- Arts, Design, Entertainment, Sports, and Media
- Life, Physical, and Social Science
- Legal
- Military-only
Top Growing Occupations

- Transportation and Material Moving
- Management
- Construction and Extraction
- Business and Financial Operations
- Healthcare Practitioners and Technical
- Arts, Design, Entertainment, Sports, and Media
- Computer and Mathematical
- Legal
- Community and Social Service
- Farming, Fishing, and Forestry
- Military-only
How much do high school students jobs pay per hour?

$7.45

National Average

$39.18

$20 /hour
Youth Apprenticeship (YA) is a 1- or 2-year program that gives juniors and seniors in high school the chance to explore a career area of interest. Students spend part of their school day earning credit and wages while they gain valuable industry experience under the guidance of a local business mentor.

YOUTH APPRENTICESHIP PROGRAMS INCLUDE:

- Agriculture, Food & Natural Resources
- Architecture & Construction
- Arts, A/V Technology & Communications
- Finance
- Health Science
- Hospitality, Tourism & Lodging
- Information Technology
- Manufacturing
- Marketing
- Science, Technology, Engineering & Math (STEM)
- Transportation, Distribution & Logistics
Grow Your Pipeline of Talent

A robust recruitment strategy is pivotal for expanding your company’s talent pool. A significant portion of students completing a Youth Apprenticeship program often transition to full-time or part-time roles with the YA employer while pursuing further education beyond high school. By engaging in the Youth Apprenticeship initiative, you not only invest in the future of a qualified apprentice who aligns with your company’s requirements but also stand to reduce employee turnover and retention costs by seamlessly hiring graduates from the youth apprenticeship program into full-time positions.
Employer Responsibilities

- Interview and hire YA student(s)
- Participate in mentor training sessions
- Provide on-the-job training to YA student(s)
- Pay YA student(s) at least a minimum wage
- Participate in regular Progress Reviews with apprentice(s) at least 3 times per year
- Ensure 450 hours per year of worksite training/work hours
- Comply with employment of minor labor laws in Wisconsin

View Program Employer Overview

View Employer Timeline
In the Youth Apprenticeship program, you get to work with highly motivated students and create positive relationships with local school districts. Apprenticeships also allow companies to shape apprentices’ skills to meet specific business needs, ensuring a well-trained workforce. As a partner in this program, you not only serve as an employer but also as a mentor to support high school students.
How to get started

- Call the nearest high school.
- School’s guidance counselor or Local YA Coordinator.
- Reach out to your local Future Farmer of America program
- Reach out to your nearest CESA
- Department of WD YA Site: https://dwd.wisconsin.gov/apprenticeship/ya/
- Or https://www.apprenticeship.gov/employers/explore-apprenticeship
QUESTIONS & DISCUSSIONS