Hybrid Multi-state Hatch project WDC51 (temporary renewal number: WDC\_TEMP\_1197).

Date: February 23, 2022

Location: Newport, OR – Hallmark Inn

Format: Hybrid (in person and virtual)

**Call to Order: 1:00 pm**

The first annual meeting of multi-state Hatch project WDC51: Advancing Aquatic Food Product Sustainability: Improving Quality, Utilization, and Safety was held immediately following the 72nd Annual Pacific Fisheries Technologist Meeting.

**Attendees**

**In Person:** Christina DeWitt (Oregon State University, Director Seafood Research and Education Center, Agriculture Experiment Station), Michael Ciaramella (Cornell University, Seafood Safety Specialist, Sea Grant), Denise Skonberg (University of Maine, Food Chemist, Agriculture Experiment Station), Evelyn Watts (Louisiana State University, Seafood Safety Specialist, Sea Grant and Agriculture Experiment Station), Keith Cox (Certified Quality Foods, Founder, University of Alaska-Juneau Adjunct Professor Fisheries Science), Pat Glaab (Silver Bay Seafoods, Director).

**Virtual:** Jung Kwon (Oregon State University, Nutritional Pharmacology, Agriculture Experiment Station/Extension), Cathy Lui (University of Maryland, Seafood Technology Specialist, Extension), Michael Qian (Oregon State University, Flavor Chemist, Agriculture Experiment Station), Hongda Chen (National Program Leader, NIFA Nanotechnology and Processing), Sam Chang (Mississippi State University, Director Mississippi Center for Food Safety and Post-Harvest Technology, Agriculture Experiment Station), Jacek Jazynski (West Virginia, Muscle Foods Safety, Agriculture Experiment Station), Jonathan Van Senten (Virginia Tech, Applied Economist, Agriculture Experiment Station), Quentin Fong (University of Alaska-Fairbanks, Seafood Marketing Specialist, Sea Grant), Razieh Farzad (University of Florida, Agriculture Experiment Station and Extension).

Note from virtual group

Question concerning Scope of Project. Clarification: The project includes Aquatic Foods from either marine of freshwater, wild harvest or farm. Note this project is focused on farm production practices that are directly linked to their impacts on food quality, safety or sustainable resource utilization (ie preventing food waste). For example, by-catch reduction techniques are strictly related to conservation goals. Bio-mass estimation in the wild is strictly related to sustainable harvest conservation goals. However, changes in harvest techniques that improve food quality, safety or extend shelf-life would be relevant to project goals. The ability to trace food from source of origin is directly linked to food safety and would be relevant to food safety goals. Sustainable utilization in the context of this project is linked to not wasting the resource once it is harvested.

1. **ISSUES (20 MIN)**

Submitted prior to meeting from Luxin Wang, UC Davis, not able to participate due to time conflicts.

1. Shall we include fresh water fish in the proposal? If yes, antimicrobial resistant is a concern and should be addressed as a team effort.
2. Water quality and overall environment stewardship need to be considered when proposing new or expanding current aquacultural production.
3. We may also want to emphasis the challenges that can be brought by international trades?
4. Shall we also consider food fraud?

*Group 1. Virtual participants*

- **Consideration on economic side**: what kind of economic aspect could be added to the project

Marketing, consumer perception/preference

- **Program for workforce development**: technical efficiency, financial literacy, soft skill management training, leadership training. Need for processing technology development for seaweed product

- lots of production push, but processing aspect, market development is behind and needs assistance

- **Alternative protein; plant-based seafood,**

Quality of fillet in aquaculture: producing fillet more nutritious and higher quality.

- **Byproduct utilization**

Some use in fish meal, but still significant portion is discarded. Need to develop better

**Sustainability:** utilization of co-product (rather than by-product) to develop new product developments, underutilized species utilization

Using natural resources for direct human consumption. Rather than as aquatic feeds

- **Traceability, safety.**

- Research into human nutrition, health benefits of seafood products, how to convey the information to the consumers

- Consumer education on food safety and other topics

Heavy metal contamination in aquatic food. Looking into the knowledge gap: actual risk vs consumer perception

**Other observation: urgent issue of workforce shortage**

Aquaculture producers: are they adopting new technologies, willingness to pay for sustainability

*Group 2. In person participants*

**-Emerging Industry: Seaweed**

-Food Safety and Food Processing: Best Practices

-Product Development

-**Harvest practices and their impacts on food quality, food safety, and food waste**

 -Includes both wild and farmed harvest practices

-**Diversification through secondary processing (product development and value-added processing) in order to enhance industry resilience to disruptions in global food supply chains**

 -Aquatic foods are some of the most globally traded food items. The pandemic caused food loss and waste due to restricted movement, lockdowns, and border closures. Sustainability is typically thought of in terms of systems that safeguard and generate economic, social and environmental outcomes. However, it has been noted that this definition is too limiting for dynamic agri-food chains and should be expanded to include the following attributes to accommodate the complex nature of food systems:

-economic: affordability, value-addition, economic development, efficiency and resilience

-environmental: pollution, resource use, biodiversity management, food loss, waste and consumer behavior

-social: producer-consumer interactions and relationships, food security and labor

-health: food safety, food quality/nutrition

-ethical: animal welfare in terms of feeding and health

(Nchanji and Lutomia, 2021)

-**Consumer behavior**

 -Consumption behavior: education of consumers about frozen seafood benefits and its role in reducing food waste

 -Outreach and Awareness about aquatic food quality and preparation

-Product quality ranks highest for influencing seafood purchase decisions by consumers (FMI Power of Seafood 2021). Few seafood consumers consider themselves knowledgeable about choosing or preparing seafood and admit that they want to know more about them. Additionally, many non-seafood consumers want more knowledge about seafood.

**-Impacts of Climate Change on production and processing as they relate to quality, food safety and food waste.**

 -shifting a harvest location placing strains on current quality/safety systems

 -shifting in species behavior, spawning times and how they impact product quality

-**Helping industry achieve higher automation**

 Impact of labor issues on processing capacity and capabilities

**-Data handling –** industry needs help with using the data they are collecting. Because much of the industry is rurally located and the seafood processing plants, in comparison to land based animal food processing, have a much smaller workforce, much of data collection is still done with paper systems. The industry needs help with new technology platforms (that are water and salt resistant) to help processors use data for actionable items.

-Examples provided

 – using data to understand when fish are about to spawn so that fishers can change location.

* Development of real time monitoring of processing waters to help plants manage waste stream discharges.
	+ Note: Issue size and location of aquatic food processing plants

**-Emerging Technologies: Aquatic Food Industry many times lagging the other proteins in technology.**

**-Aquatic Food Harvest and Processing Technology** is much more advanced in other countries than the U.S. As a country, we are not leading for technologically advancing aquatic food systems.

**-Packaging**: unlike all land based foods, marine based have the unenviable challenge of C. Bot Type E. This pathogen requires stricter control of cold chains in order for the industry to take advantage of the benefits of active (intelligent) and biodegradable packaging systems. Participants noted there seems to be lots of advances in this area with meat/poultry, but very limited advances in aquatic foods. Consequences are linked to economic and environmental sustainability disadvantages such as shorter shelf-life and more food waste than their competitors in other protein sectors.

-**All the non-thermal technologies**: again lots of proof of concept in meats/poultry, but not in seafood.

-**Aquatic food processing plants are small/medium size** when compared to their meat/poultry counterparts. Most processors are very seasonal in nature. In addition, plants are also rurally located and as a result have infrastructure limits (lack of: adequate municipal wastewater treatment facilities, transportation infrastructure, and frozen storage capacity).

**-Waste Issues:** Regulatory compliance with effluent that is released into the environment.

-A current critical issue at this time is most aquatic food plants operate with special permits for waste water discharge directly into receiving waters because the communities they reside in do not have sufficient waste water treatment infrastructure (example one plant can produce a waste water discharge that is equivalent to a town of 10,000 people). In Astoria (the largest coastal town in Oregon with a population of less than 9700) there are three seafood processors. The town would have to triple the size of its municipal wastewater treatment facility to accommodate the just the seafood processors. In addition, many plants are so rurally located that transportation of their solid waste is not economically viable, especially due to its highly degradable nature. As a result, valuable protein, fat and shell resources are often landfilled.

-Note: Internal rules from EPA require that renewal of discharge permits must always be stricter than previous permits. As a result, processors are now being severely challenged to limit water use, recover more solids, decrease bacterial loads, decrease chemical discharge, all while still maintain adequate sanitation to preserve the quality and safety of the aquatic food product. To date, none of the Oregon processors have been able to meet this challenge. Fines are their current and future.

-**Water Use/Re-use in the future**

-**By-product recovery and utilization of processing residuals**.

 -Green methods for production of chitosan. Most shell waste in US is landfilled.

**-Sanitation**

-**Alternative proteins/cellular proteins** to create aquatic food like products.

-**Micro-plastics**

-**Fraud**

-**Trim-loss,** bigger drip loss challenges than other proteins, 20-40% shrink due to poor quality

1. **JUSTIFICATIONS (20 min)**

Determined justifications can be developed once Issues are selected for the project.

**c. PROJECT OBJECTIVES (20 min)**

*Group 1 Virtual Participants*

**- Sustainable seafood production practice**

improving nutrient losses, resource utilization

**- new technology development to improve seafood safety and quality**

**- education, training, outreach – translatable**

*Group 2 In person Participants*

1. **Building Resilience in Aquatic Food Industries through Technological Advance to Address Safety, Quality and Utilization**
	1. **Promote & Develop Technology for By-product recovery and novel species utilization (perhaps a sub-objective of 1?)**
	2. **Develop Technologies and Programs to help the Aquatic Food Industries be more resilient to climate change and adopt more environmentally sustainable practices (perhaps a sub-objective of 1?)**
2. **Develop training and education programs that transfer knowledge and information to the aquatic food industry, k-12, higher Ed, consumers and other relevant end users.**
3. **Helping Industry adopt more ecologically friendly practices**
4. **Engaging traditional/local (stakeholder) knowledge to insure research and programming efforts are informed, transferable and impactful.**

**d. OUTREACH PLAN (20 min)**

Determined we should wait for Objectives to be selected before addressing outreach plan.

**e. UNDERGRADUATE EDUCATION (20 min)**

Group 1:

- Won’t be able to generate enough content for class from the project-generated knowledge,

not feasible to create new class.

some component to incorporate into existing class

(e.g. fish oil analysis, flavor analysis)

- Providing internship, research opportunities to undergrad is more feasible

(example, aquaculture focused internship opportunity supported by Florida sea grant)

- Creating and sharing online contents for undergrad education. For example, Youtube channel (target younger generation)

- IFT Student team product development competition focused on seafood

Group 2:

-Curriculum that covers aquatic food harvest and processing are limited (1 at OSU, 1 at Maine). Mainly delivered as either graduate only or as a dual listed (graduate/undergraduate) course, provided through guest lecture, or delivered through a lecture or two in a basic food chemistry or food microbiology class.

Opportunities Identified

-Develop programs or labs that could be used by undergraduate/graduate instructors in (food science, math, engineering, microbiology, fish and wildlife, agriculture economics or education).

-Noted that the Institute of Food Technologists has many of these for other foods, but none for seafood.

-Noted that the Association of Biological Lab Experiments has a repository for labs to be placed. Belief that aquatic food based labs would be popular.

-Work collaboratively in this project as a network to identify internship opportunities (from stakeholders) and potential participants. The project could create a national network for industry partners to connect with potential interns at academic partner institutions.

**f. ORGANIZATION/GOVERNANCE (20 min)**

Currently this project is in development, so an official chair is not yet required. Discussed the Past-Chair, Chair, and Incoming Chair as an acceptable model. Chair should select annual meeting location and is responsible for organizing/running meeting. Propose past or incoming chair be responsible for taking annual meeting minutes.

**Meeting Adjourned at 5 pm.**