

HDOA Aquaculture Development

Senate Water and Land Committee
January 18, 2024

Developing Sustainable Aquaculture in Hawaii



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Development Program
DEPARTMENT OF AGRICULTURE

Presentation Topics

- Identify HDOA's role in industry support.
- Describe current ADP programs and efforts.
- Specify resources required for industry expansion.



HDOA Aquaculture Support Functions

- Regulatory Services
 - Veterinary Services
 - Import Permit Administration
- Industry Development Activities



Aquatic Livestock Veterinary Services

Animal Veterinarian (Animal Industry Division)

- Protect animal health through the prevention, detection, and control of livestock diseases.
- Safeguard human health through the identification and control of livestock diseases transmissible to humans.
- Promote the economic well-being of livestock industry through investigations, research and by minimizing losses attributable to disease.



Import Permit Administration

HRS §150A / HAR Chapter 70 & 71– Plant and Non-Domestic Animal Quarantine and Microorganism Import

- Authorizes HDOA to administer a permit framework for the importation of non-domestic animals and plants
- Plant Industry Division / Plant Quarantine Branch manages permit process



Industry Development

HRS §151-51 Aquaculture

- Establishes Aquaculture Development Program
- Undertake activities required to develop and expand the aquaculture industry
 - Monitor and support aquaculture actions taken by Federal, State, County, non-profit and private agencies.
 - Serve as an information clearinghouse for aquaculture activities.
 - Coordinate development projects to investigate and solve biological and technical problems.



Aquaculture Development Program (ADP)

Aquaculture & Livestock Support Services (ALSS)

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ADP / ALSS

- Interchangeable program titles
 - ADP – Fiscal account
 - ALSS – Organization designation
- Component of Hawaii Department of Agriculture / Animal Industry Division
- Primarily focus on commercial aquaculture development and includes other livestock sectors



ADP Organization Structure

- Manager
- Aquatic Animal Veterinarian
- Economic Development Specialist
- Aquatic Livestock Specialist (4)
 - Positions included in FY23 budget
 - In process for establishing positions before recruitment



ADP Planning

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Aquaculture Development Strategic Framework



ADP Strategic Plan 2023 to 2033

Aquaculture Development Elements - allows connection and program integration with other agriculture development activities.

NOAA NMFS Focus Areas - facilitates alignment with Federal aquaculture and conservation efforts.

HDOA Tactical Priorities - reflect target areas for goal development and guide immediate and long-term projects.



Aquaculture Development Strategic Framework

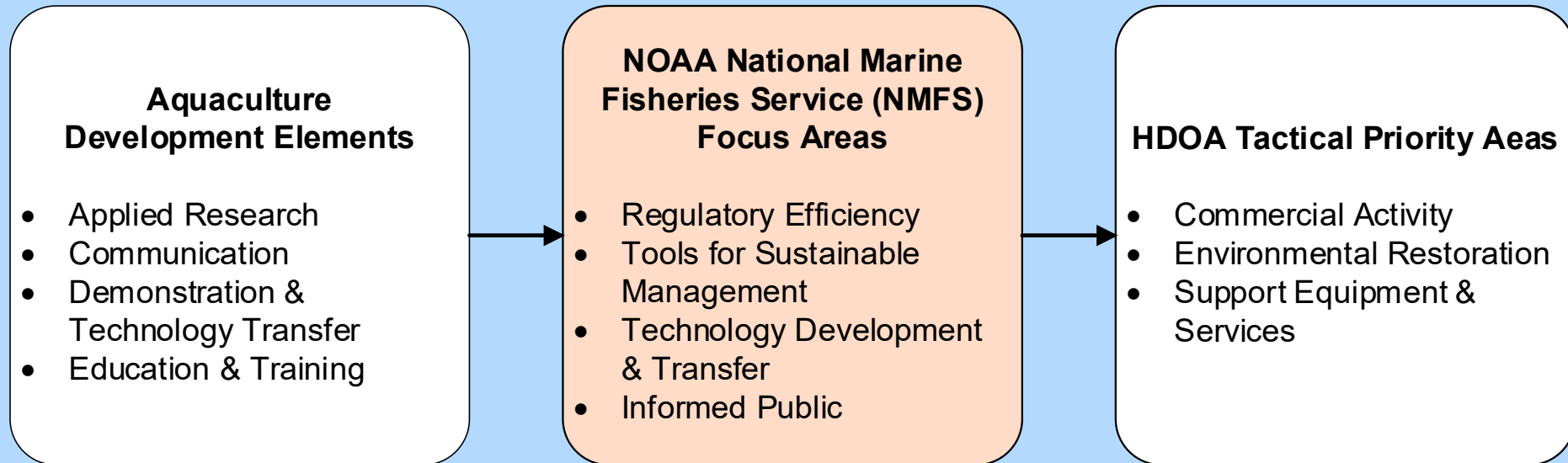


Industry Development Elements

- **Applied Research** - scientific study and research that seeks to solve practical problems.
- **Communication** - deliver accurate, reliable, science-based information to educate the public and attract new investors to the industry.
- **Demonstration & Technology Transfer** - show operators how the applied research can be applied and facilitate research adoption.
- **Education & Training** - educate teachers and students about aquaculture, its opportunities as a viable career.



Aquaculture Development Strategic Framework



NOAA NMFS Focus Areas

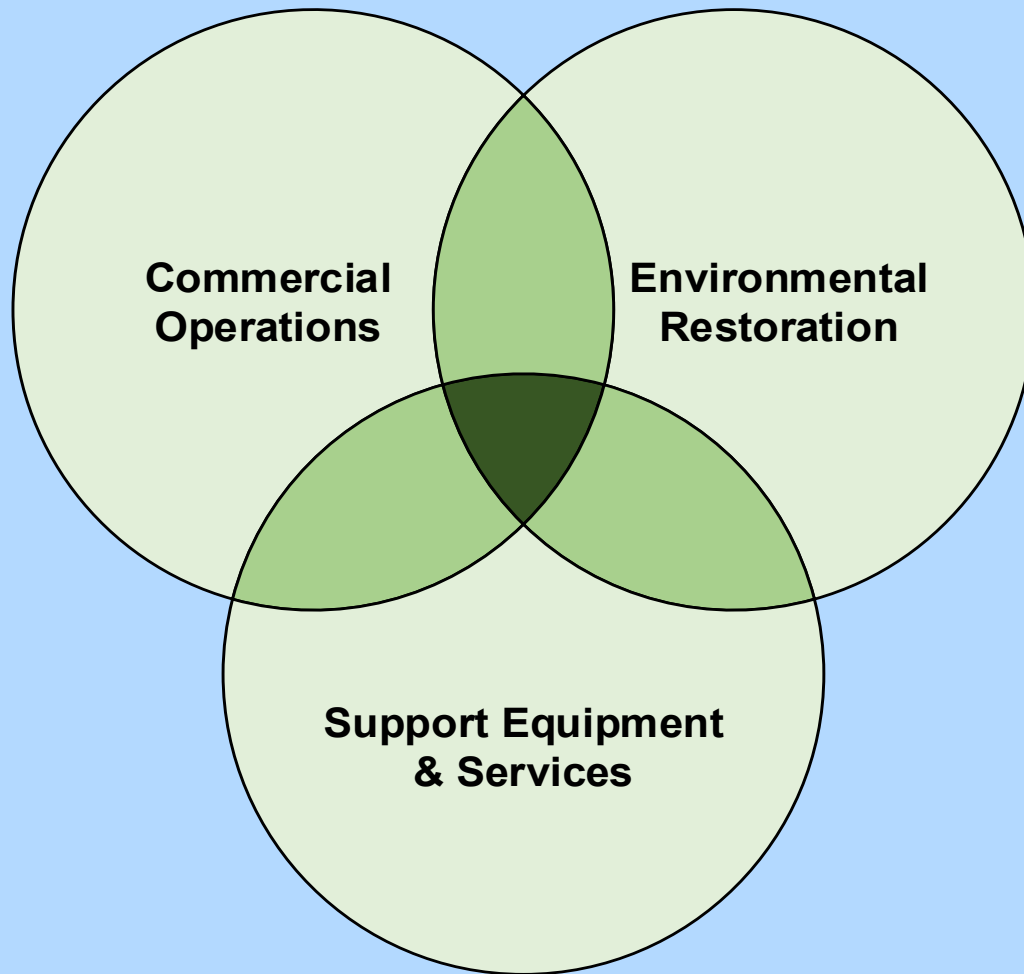
- **Regulatory Efficiency** - develop coordinated, consistent and efficient regulatory processes.
- **Tools for Sustainable Management** - encourage environmentally responsible aquaculture using best available science.
- **Technology Development and Transfer**- develop technologies and provide extension services.
- **Informed Public** - provide accessible, relevant, and current information.



Strategic Framework



Tactical Focus Areas



Commercial Production

- Includes the current aquaculture industry
- Farming of aquatic organisms including fish, mollusks, crustaceans, and aquatic plants.
- Implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc.
- Implies individual or corporate ownership of the stock being cultivated.



Environmental Restoration

- Emerging industry opportunity.
- Focus on macro-algae (seaweed), bivalves (oyster and clams) and sea cucumber.
- Certain species, when farmed in the right way, can serve as a tool to help address water quality degradation, habitat loss, and climate pressures.



Support Equipment and Services

- Encompasses value-added processing and other services to increase the efficiency of aquaculture operations and the effectiveness of related processes.
- Primary focus is developing new opportunities through traditional and cross-industry innovation.



Industry Statistics

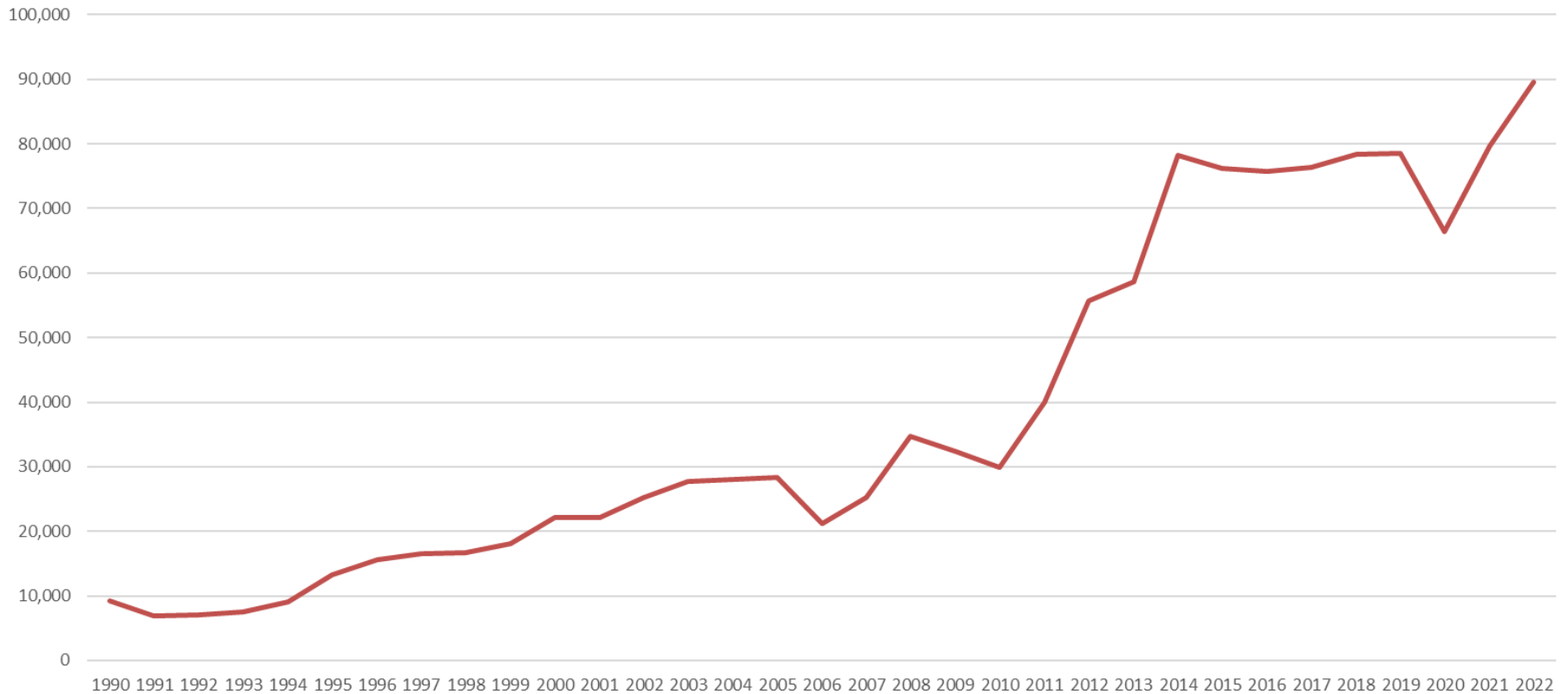
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Aquaculture Industry Value (\$1,000)

State Aquaculture Production



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2034 Aquaculture Value Forecast (\$M)

		2022	2034	% Change
Existing Categories	Algae	\$45.4	\$390.8	760%
	Ornamental	\$3.9	\$4.3	10%
	Other	\$40.3	\$124.4	209%
	Subtotal	\$89.6	\$519.5	
New Categories	Aquaponics		\$6.5	
	Value-Added Products		\$31.1	
	Conservation Activities		\$40.0	
	Subtotal		\$77.6	
Total Industry			\$597.1	

Existing Categories (1)

Algae

- Full production of seaweed startups
- Continued production at existing algae operations
- Establishment of proposed ocean farm which includes seaweed production

Ornamental

- Modest increase in current production

Existing Categories (2)

Other

- Continued production of abalone, catfish, kampachi, shrimp and tilapia to meet foodservice opportunities
- Expansion of SPF shrimp broodstock segment as global disease proliferate



New Categories

Aquaponics

- Currently not tracked as aquaculture by USDA NASS

Value-Added Products

- Based on a balanced industry distribution of 25% of total value

Conservation Activities (Restorative Aquaculture)

- Indigenous species of seaweed, oysters & sea cucumber
- Estimate based on global seaweed trends and local prime growing conditions



Potential of Restorative Aquaculture for Seaweed

- **Water Quality:** Improve water quality by filtering pollutants and excess nutrients from the water.
- **Habitat Provision:** Serve as habitat for various marine species, supporting biodiversity and ecosystem functions.
- **Climate Mitigation and Adaptation:** Contribute to climate mitigation by sequestering carbon dioxide and adaptation to climate change impacts.
- **Multiple Uses:** Massive potential applications in various industries.



2023 Global Seaweed Report (\$B)

World Bank / HATCH

	Short Term	Medium Term	Long Term
	Before 2025	2024-2028	After 2028
Animal Feed	\$1.12		
Methane-Reducing Additive	\$0.31		
Fertilizer	\$1.8		
Pet Food	\$1.08		
Nutraceutical		\$3.9	
Alternative Protein		\$0.45	
Biosynthetic Textile		\$0.86	
Bioplastic		\$0.73	
Green Construction Materials			\$1.4
Subtotal	\$4.31	\$5.94	\$1.4
Total		\$11.65	

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ADP Projects

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ADP Current Project List

	Commercial Activity	Environmental Restoration	Support Equipment & Svc
2022		Restorative Aquaculture Opportunity Report	
2023	ADP Strategy Improvement Report	Restorative Aquaculture Risk Assessment Indigenous Seaweed Bio-Composite Analysis	Digitize Aquaculture Permits & Regulatory Requirements for Hawaii
2024	Pilot-scale Black Soldier Fly (BSF) Bio-Refinery to Process Food Waste	Pilot-scale Seaweed Cultivation Using Sewage Effluent Convert Seaweed into Bio-Oil Feasibility Study	Update and Digitize Hawaii Aquaculture Best Management Practices



Moving Forward

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ADP Future Project List (1)

Title	Scope	Duration	Amount
Financing Restorative Aquaculture Projects	Conduct a market analysis study to identify the optimum mix of private sector, public sector, and philanthropic funding sources and mechanisms needed to support ecosystem projects.	1 Year	\$500,000
Restorative Aquaculture Feasibility Study	Conduct a feasibility study to identify potential sites for restorative aquaculture including nearshore and fishpond sites.	1 Year	\$500,000
Commercial Aquaculture Park Feasibility Study	Conduct a feasibility study to identify potential sites for aquaculture parks.	1 Year	\$500,000
Aquaculture Innovation Center Feasibility Study	Conduct a feasibility study to identify potential sites for an innovation center on Oahu.	1 Year	\$500,000



Aquaculture Park v. Innovation Center

Aquaculture Park Focus

- Production
- Capacity building and training
- Networking and collaboration between tenants

Innovation Center Focus

- Research and development
- Partnership and collaboration
- Community engagement



ADP Future Project List (2)

Title	Scope	Duration	Amount
Aquaculture Economic Impact Study	Estimate the economic impact on the State for the primary and ancillary levels of aquaculture.	1 Year	\$100,000
Wastewater Seaweed Treatment Commercial Demonstration	Develop a demonstration-level the benefits of seaweed integration into the wastewater treatment process.	2 Years	\$2,000,000
BSF Commercial Demonstration	Develop a small-scale commercial BSF production and processing facility to demonstrate economic and environmental benefits.	2 Years	\$2,000,000
Hydroponic Greenhouse Production Design	Test and establish baselines for optimum greenhouse hydroponic production in three most common micro-climate locations considering greenhouse design and building materials.	2 Years	\$2,500,000

ADP Future Project List (3)

Title	Scope	Duration	Amount
Polyculture Production System Demonstration	Develop and demonstrate a 10-acre model of diversified polyculture that integrates aquaculture pond culture, hydroponic greenhouse production and forestry production with focus on minimizing inputs and water re-use.	2 Years	\$2,500,000
	Total		\$11,100,000



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