



# **Maine Blue Economy Task Force**

Public Meeting

Thursday, October 10, 2024

# Welcome and introductions

Our team includes:

- **Michael Conathan** – Michael Conathan Consulting LLC
- **Charles Colgan** – Center for the Blue Economy
- **Dana O'Brien** – BioHarbor Strategies, LLC
- **Laura Taylor Singer** – SAMBAS Consulting, LLC

# Agenda

11:00 Welcome/Introductions

11:10 Defining & Describing Maine's Blue Economy

- *Based on what we have learned and read, are there elements missing from the current legislative definition to capture the full scope of our vision for Maine's Blue Economy?*

11:40 Deep Dive #2: Research & Development

- *Beth Orcott, Bigelow*
- *Jake Ward, UMaine*
- *Charles Tilberg, UNE (TBD)*
- *Blaine Grimes, GMRI*

12:25 Next Steps - Consultations

12:30 Adjourn

## Objectives for today

1. Review and refine an initial working definition of the blue economy.
2. Share perspectives on Maine's R&D efforts and where Maine could have greater impact.
3. Share updates on the consultation process and schedule.
4. Continue to meet the requirements of the [statute](#).



# Defining and Describing Maine's Blue Economy

- Legislative definition: “**business sectors that rely on the sustainable use of ocean resources for economic health, improved livelihoods, jobs or ecosystem health**”
- Areas commonly included: 1) ***economic activity connected to the ocean***; 2) ***sustainable use of the ocean***; and 3) ***technology innovation in ocean industries***.
- Legislation seeks input regarding “sectors within the state’s economy that **do not have** a specific economic development plan, strategy or roadmap”
- See [Overview of Maine’s Blue Economy](#)

# Consultations

## Legislatively required consultations

- Relevant state agencies
- Publicly funded institutions
- Blue Economy trade associations
- Boat building, marine tech, construction & engineering
- Blue Economy investors
- SEA Maine, ME Aquaculture Roadmap and OSW Roadmap
- Federally recognized Tribes
- Orgs engaged in conservation & sustainable island development

## **Upcoming Meeting Schedule**

- **Tuesday, November 19 - 10:00AM – 11:30AM**  
**Island Institute, Rockland**  
*What's working elsewhere? Review existing roadmaps*
- **Thursday, December 12 - 12:00PM – 2:00PM**  
**University of Maine, Orono**  
*Review & prioritize info gathered, prep for report drafting*
- **Friday, January 10 – 12:00PM – 2:00PM**  
**Remote only**  
*Review Draft Report, take final input from Task Force*

*All meetings will include a virtual option,  
but in-person participation is strongly encouraged when possible.*

**Bigelow** | Laboratory for  
Ocean Sciences

# **Bold Science for our Blue Planet**

*Discovery, Solutions, and Inspiration  
for a Better Future*

**Beth Orcutt**

*Vice President for Research*







**We study  
THE FOUNDATION OF  
GLOBAL OCEAN HEALTH.**

**DISCOVERY**  
John Burns





**And use our discoveries to  
IMPROVE THE FUTURE FOR  
ALL LIFE ON THE PLANET.**

**SOLUTIONS**

—  
DISCOVERIES

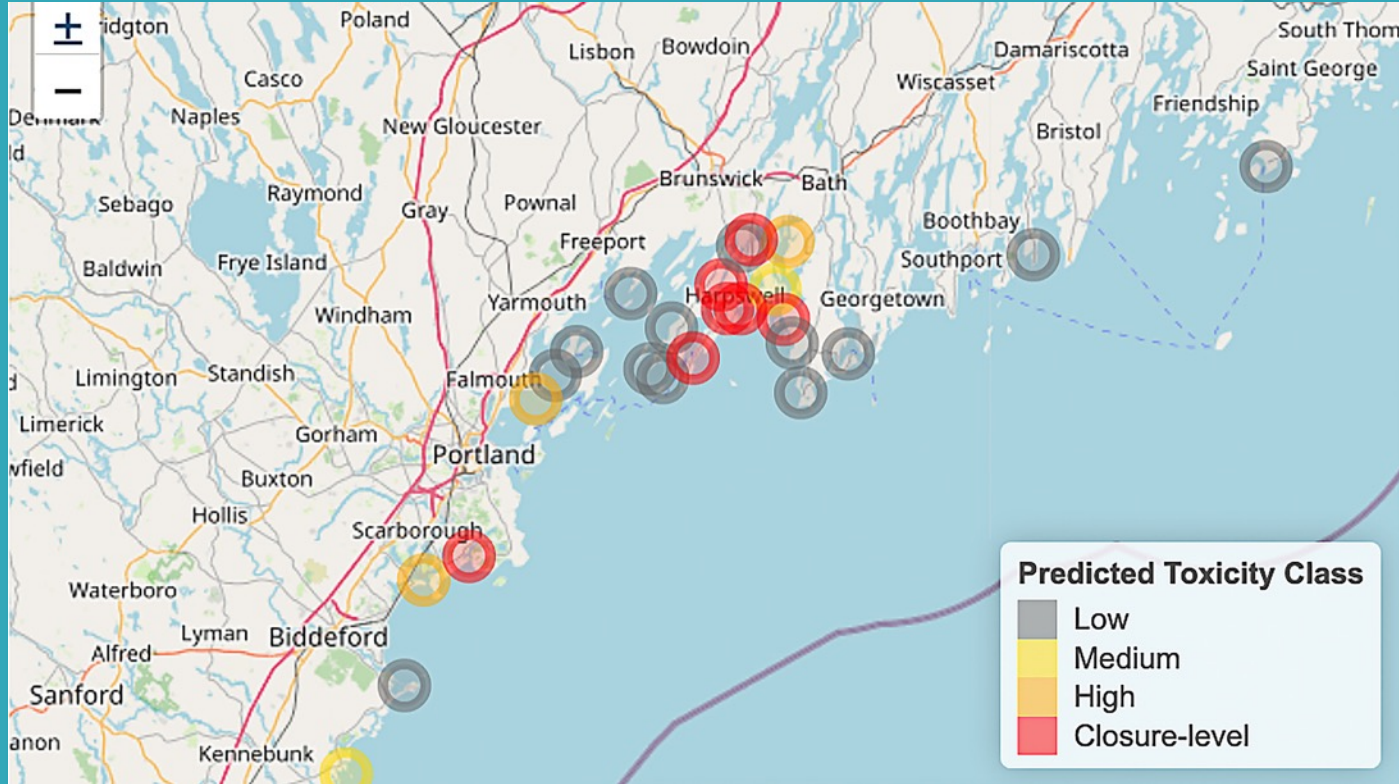
# Ocean Health And Function





# SOLUTIONS

## Example: Forecasting tools





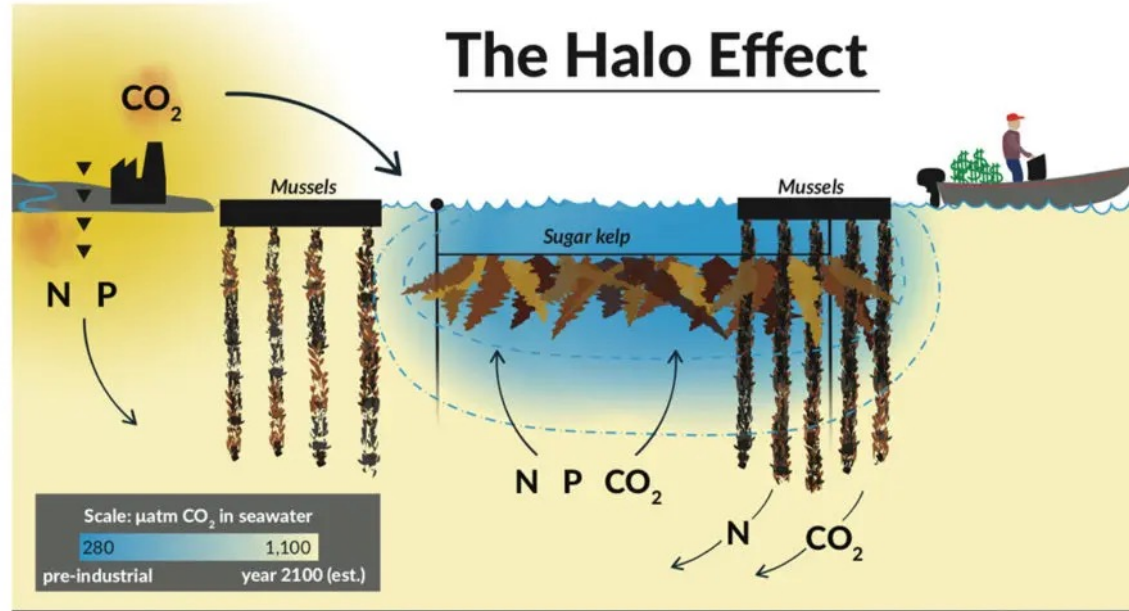
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DISCOVERIES

# The Ocean's Potential



# SOLUTIONS

## Example: Seaweed “halo” effect





# **FARMING SEAGRASSES AND SEAWEEDS:**

Responsible Restoration  
& Revenue Generation

A Report Generated by the Bigelow Laboratory for Ocean Sciences for the  
Interagency Working Group for the Farming of Seagrasses and Seaweeds

New report on potential  
for seagrass & seaweed  
“blue economy” potential  
in the US

## B



## AK and HI have high landings

WEST COAST				
AK	WA	OR	CA	HI
871,000+ (395+)	10,000 (4.5)	N/A (N/A)	N/A (N/A)	250,000+ (113+)

# Diversity of Products

<p>FOOD</p> 	<p>PET/ANIMAL FEED</p> 	<p>ALTERNATIVE PLASTICS</p> 	<p>GEL/EMULSIFYING AGENT</p> 
<p>CONSTRUCTION MATERIALS</p> 	<p>FERTILIZERS + BIOSTIMULANTS</p> 	<p>NUTRACEUTICALS</p> 	<p>ARTS + HANDICRAFTS</p> 
<p>BIOFUELS</p> 	<p>COSMETICS AND SKINCARE</p> 	<p>FABRICS + TEXTILES</p> 	<p>WHAT'S NEXT?</p> 

# Diversity of Products

2030 Market Forecast



where Bigelow is innovating with seaweed



where others in ME are innovating with seaweed

<p>FOOD</p>  <p>\$2B</p>	<p>PET/ANIMAL FEED</p>  <p>\$0.7B</p>	<p>ALTERNATIVE PLASTICS</p>  <p>\$0.7B</p>	<p>GEL/EMULSIFYING AGENT</p> 
<p>CONSTRUCTION MATERIALS</p>  <p>\$1B</p>	<p>FERTILIZERS + BIOSTIMULANTS</p>  <p>\$2B</p>	<p>NUTRACEUTICALS</p>  <p>\$4B</p>	<p>ARTS + HANDICRAFTS</p> 
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# FARMING SEAGRASSES AND SEAWEEDS:

Responsible Restoration  
& Revenue Generation

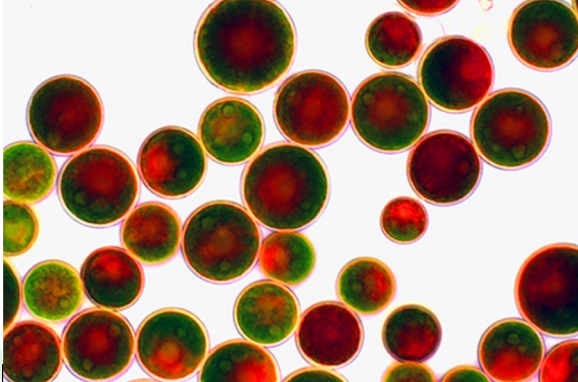
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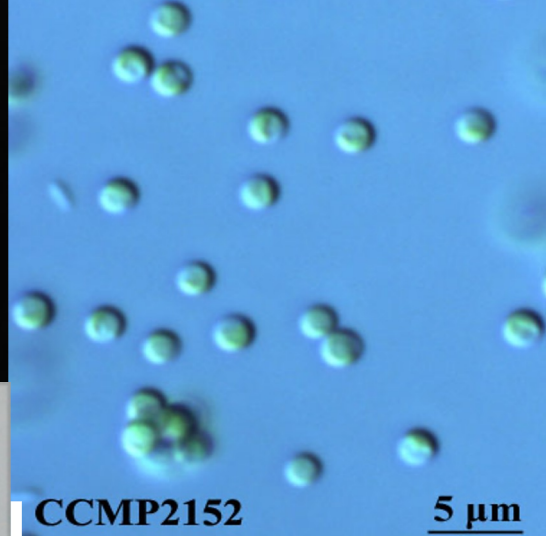
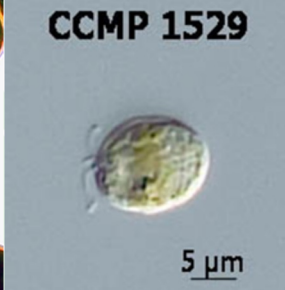
→ *Recommendations are  
poised for adaptation into  
a **Maine-specific seaweed  
road map***







**CCMP 1529**

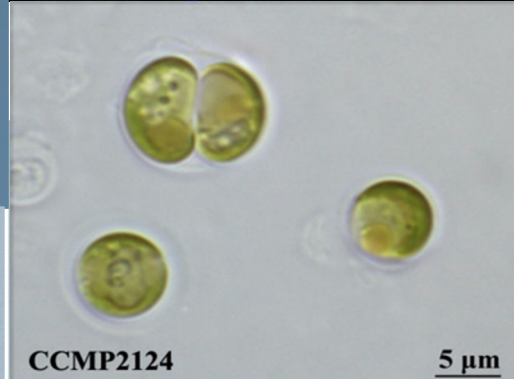


**CCMP2152**

5 µm



**CCMP 3099**



**CCMP2124**

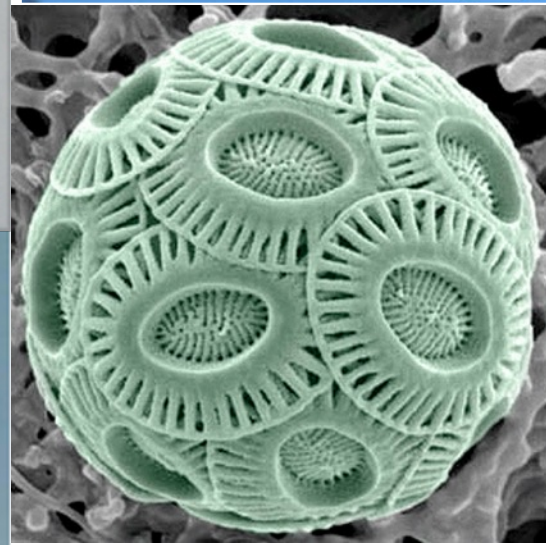
5 µm



10 µm



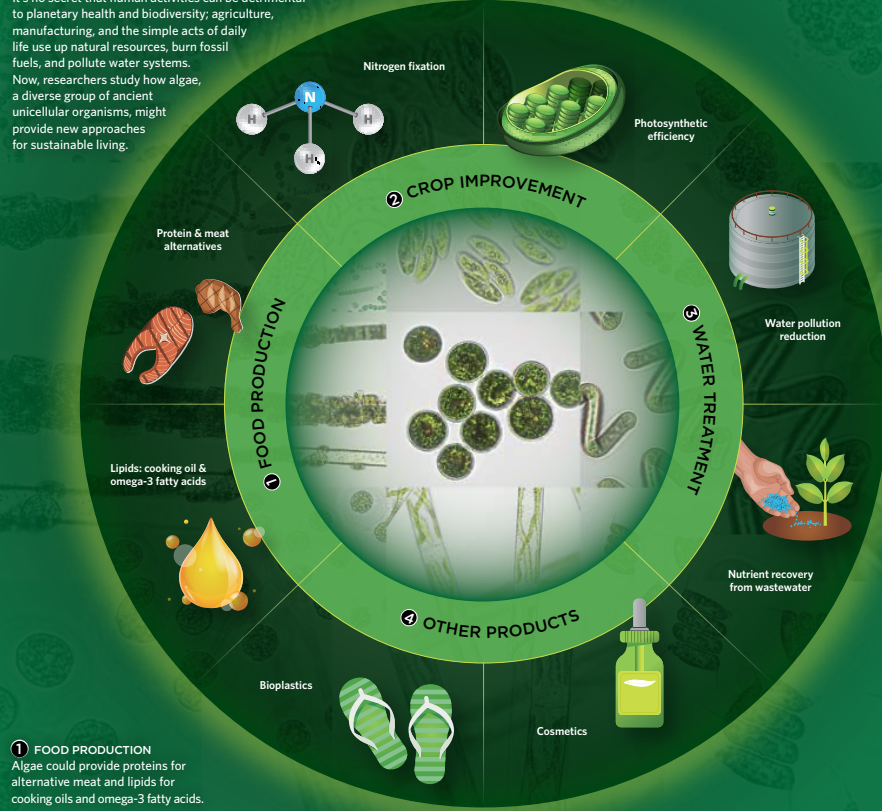
**CCMP908**



# ALGAE: THE NEXT GREEN REVOLUTION

Researchers explore algal biology for new strategies to help humans live more sustainably.

It's no secret that human activities can be detrimental to planetary health and biodiversity; agriculture, manufacturing, and the simple acts of daily life use up natural resources, burn fossil fuels, and pollute water systems. Now, researchers study how algae, a diverse group of ancient unicellular organisms, might provide new approaches for sustainable living.



Microalgae-based solutions can also fuel “blue economy” growth

*Bigelow is home to the most genetically diverse collection of microalgae in the world  
And we just received \$7M in federal funds to create an algae accelerator in ME!*





## Bigelow Laboratory to Co-Host Blue Economy Event

September 18, 2024

On Sept. 24, Bigelow Laboratory is hosting an **event** that will showcase the exciting and innovative possibilities of microalgae. Co-hosted with Gulf of Maine Research Institute, the event is part of GMRI's Blue Economy Summer Series. It will bring the private sector to Bigelow Laboratory's campus in East Boothbay to strengthen Maine's position in biotech innovation and the algal economy.



## New \$7 Million Grant to Power Algae-Based Innovation

August 27, 2024

Bigelow Laboratory has secured a \$7 million award from the National Science Foundation to build the Maine Algal Research Infrastructure and Accelerator with a team of partners from across Maine. MARIA will strengthen research infrastructure — with state-of-the-art equipment, education programs, and networking opportunities — to serve as a nucleus of innovation potential for algae-based solutions in the agriculture, aquaculture, energy, and pharmaceutical sectors.



# Diversity of Products



where Bigelow is innovating with **MICROALGAE**

FOOD



PET/ANIMAL FEED



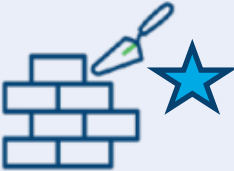
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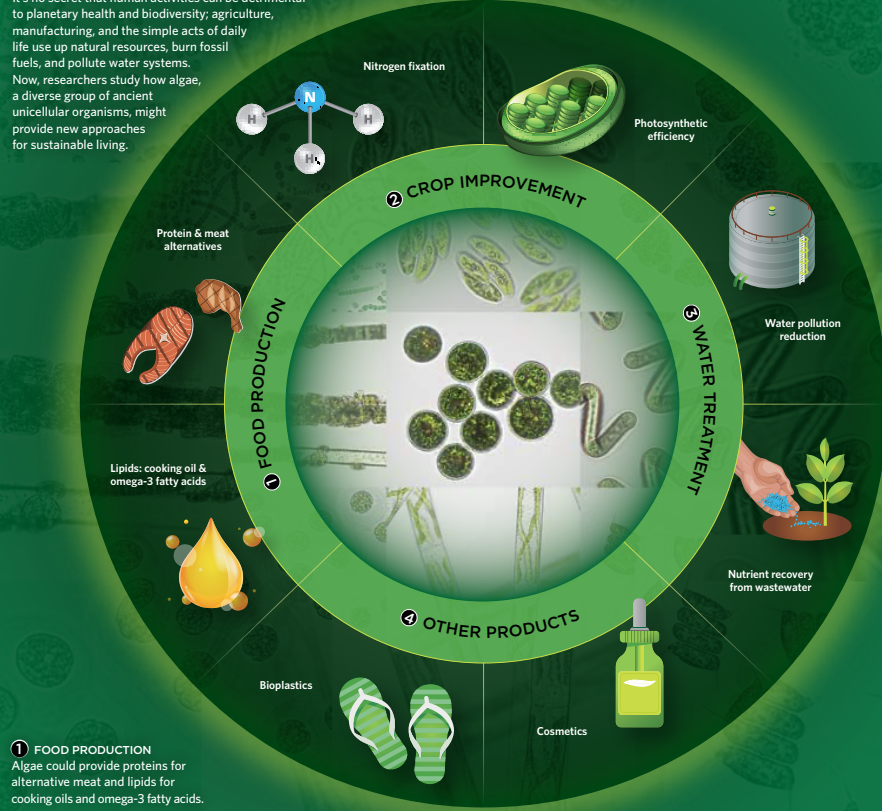
WHAT'S NEXT?



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→ *Also needs a roadmap!*



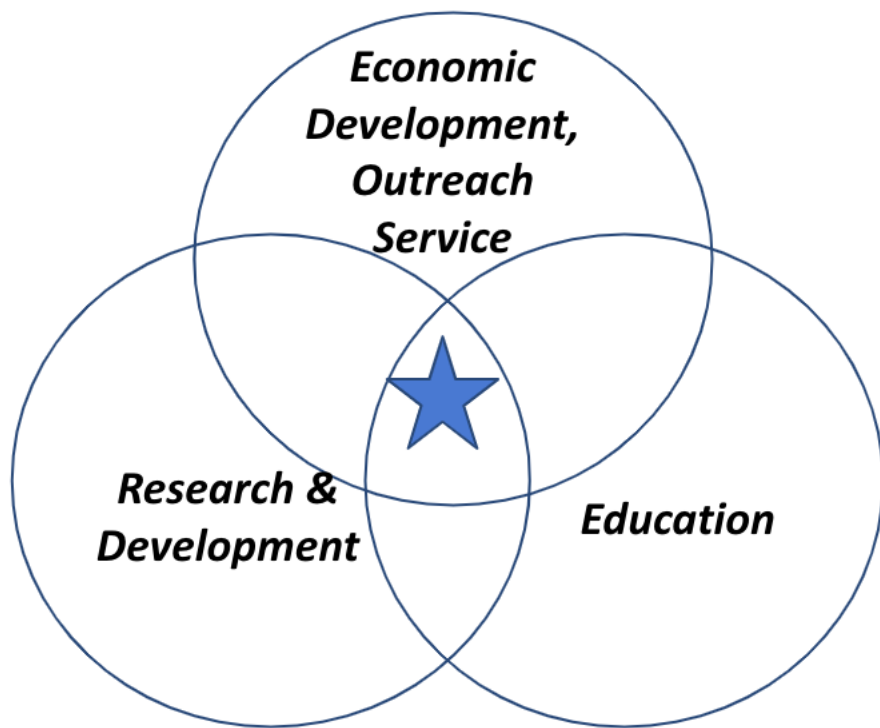


## UNIVERSITY OF MAINE'S CONTRIBUTIONS TO A SUSTAINABLE BLUE ECONOMY

Blue Economy Task Force  
October 10, 2024

Jake Ward  
Strategic Partnerships and Innovations

## An R1 Land Grant, Sea Grant, Space Grant University Grounded in Maine's Needs



# UMaine MARINE

[Home](#)

[Units](#)

[The Blue Economy](#)

[Funding](#)

[Researcher Spotlight](#)

[Seed Grants](#)

[Events](#)

[People](#)

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Enhancing Social,  
Environmental and  
Economic Wellbeing



## UMaine MARINE

Created on the foundation of its nationally and internationally recognized marine programs, world-class research, and cutting-edge facilities, the University of Maine **Marine Aligned Research, Innovation, and Nationally-recognized Education** or UMaine MARINE is a unique Maine-based initiative that brings together university, industry, government, and community collaborators who through integrated and innovative transdisciplinary marine research, education, and outreach are dedicated to the enhancement of social and economic wellbeing in Maine and beyond.

Visit the [UMaine MARINE units webpage](#) for participating units.

### Vision

To make Maine a global leader as a marine state.

### Mission

To provide through innovative transdisciplinary marine research, education, and strategic partnerships, transformative solutions that improve the quality of life and enhance the social and economic wellbeing of the people of Maine and beyond.

### Goals

- To sustainably advance marine-oriented community needs and economic development in Maine and beyond
- To balance good stewardship of marine resources with economic development
- To develop a national model of innovative transdisciplinary marine research, education, and outreach
- To grow and develop cutting-edge marine resources and facilities
- To further strategic partnerships and community engagement
- To enable attainment of significant external resources to support the initiative's vision, mission and goals

## UNITS/CENTERS/PROGRAMS



Aquaculture Research  
Institute



Center for Cooperative  
Aquaculture Research



Cooperative Extension



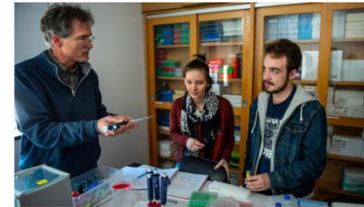
Darling Marine Center



Lobster Institute



Maine Sea Grant



School of Marine Sciences



University of Maine at  
Machias



College of Engineering and  
Computing



School of Economics

**Aquaculture**



**Tourism & Recreation**



**Marine Defense**



**Renewable Energy**



**Marine Transport & Trade**



**Fisheries**



**Energy Efficiency & Electrification**



**Carbon Sequestration**



**Marine Biotechnology**



**Ocean Monitoring & Surveillance**



**Coastal Protection**





## *Solutions require talent, innovation, infrastructure and investment!*

- **Talent** – faculty, staff, students, entrepreneurs, partners (i.e. DMR, USDA-ARS, companies)
- **Innovations** – ideas, IP, data, methods, policies, business practices, etc.
- **Infrastructure** – facilities, labs, equipment, locations, waterfront, vessels, etc.
- **Investment** – institutional, federal & state, philanthropy, angel, equity, company
- Leverage, leverage, leverage – OPP, OPM, OPB



- Our greatest talent opportunity is through our students – undergrad, masters, Ph.D.'s
- Growing - Research Learning Experiences (RLE's), internships and pathway to careers

What are the areas of opportunity UMaine/UM Machias are currently working on in the blue economy sector?

*From Colgan 9/11/2024:*

**Opportunities Based on Maine Strengths**

- Living Resources
- Boats and alternative fuel propulsion
- Marine construction
- Research

**Opportunities Based on US Strengths**

- Ocean Measurement Technologies and Data
- Renewable Energy
- Fish based animal foods
- Marine Pharmaceuticals

*Solutions require talent, innovation, infrastructure and investment!*

## Opportunities Based on Maine Strengths – **Research**

Each project has talent, innovation, infrastructure and investment

FY2024 444 awards SPONSOR TOTAL \$187,147,253

### **“Blue” Research revenue ~\$48m, 80+**

#### Federal Agencies

- National Science Foundation
- Department of Energy
- Department of Defense
- Department of Commerce
- Department of Interior
- NASA
- NOAA
- USDA-ARS

Maine Dept of Education, Marine Resources,  
Transportation

UNH, URI, UCSD, U of Maryland, Woods Hole, GMRI, etc.

States of CA, NY

Other companies and foundations

### **Research Expenditures –Economic Impact**

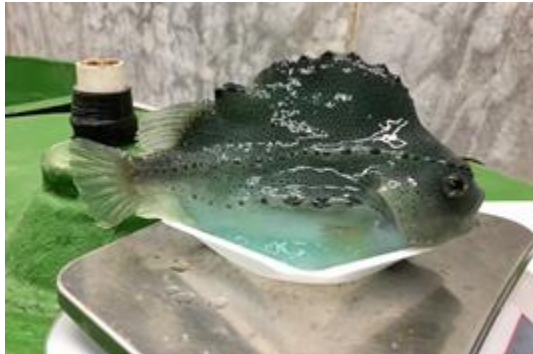
#### Local Spending

- Wages and benefits
- Materials and supplies
- Equipment and facilities
- Sub-awards
- Student tuition

## Opportunities Based on Maine Strengths – ***Living Resources*** Each has talent, innovation, infrastructure and investment

### **Living Resources - Aquaculture**

- ARI – Aquatic Animal Health, RAS systems, alternative feeds
- CCAR – Incubation, lumpfish as a cleaner
- DMC – Scallops, kelp, incubation
- DEI – Maine Gold Mussel, scallops,



### **Living Resources - Fisheries**

- SMS, DMC, Lobster Institute, Sea Grant – Lobster settlement, stock assessments with DMR, highly migratory species, marine mammal monitoring, coast/community resiliency, etc.



## Alternative Fuels

- FBRI + ARI –Recent \$10m USDA
- Woody biomass to fuels and fish feeds
- Builds from 10+year DOE and Defense funded forest residuals to jet fuel
- Near commercial pilot scale at our FBRI Technology Research Center
- Commercial partners on fuel and feed



## Boats and Shipping

- ASCC large scale additive manufacturing (3D printing)
- Projects with Maine boat builders for 3D printed tooling and parts
- Pilot projects funded by MTI, DOE, DOD
- Secure Composite Shipping Containers (GSS)
- Navy vessels







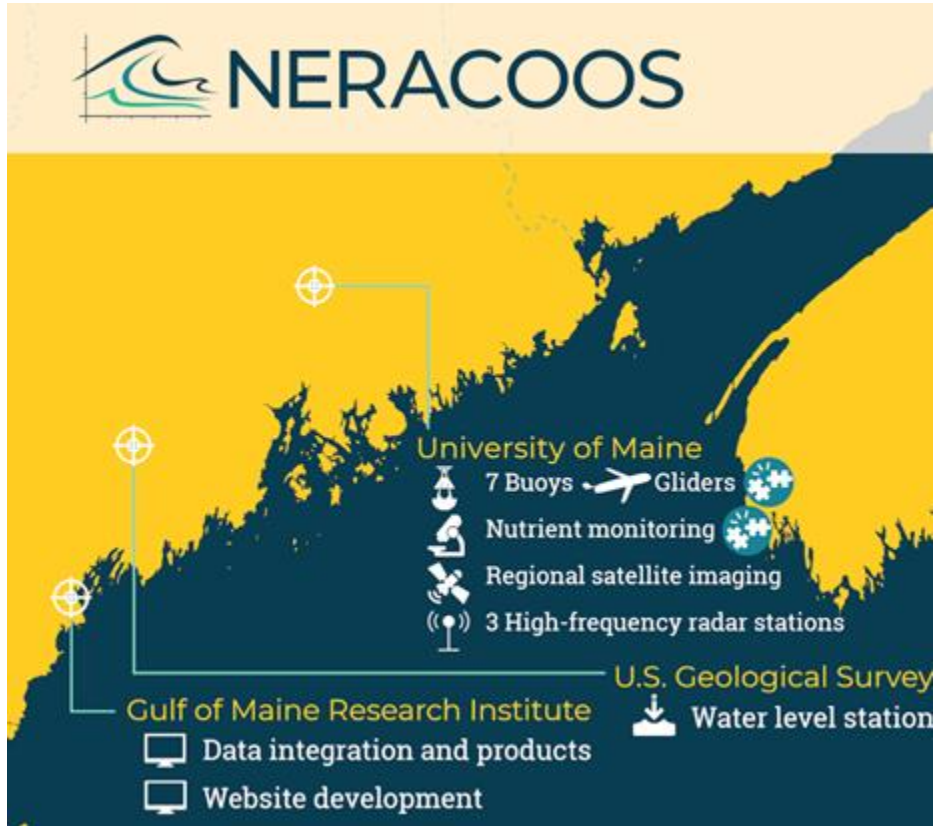
### Floating Platforms

- ASCC precast floating concrete OSW, wave energy, other possibilities
- Mooring systems –taut, synthetic
- Partners/funding DOE, private company funding

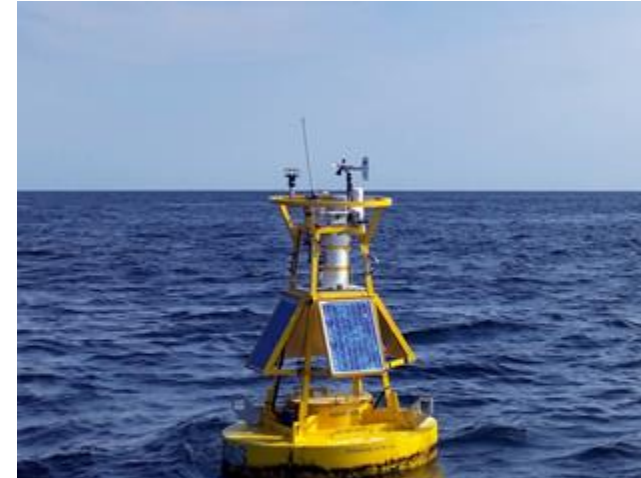
### Coastal Infrastructure

- College of Engineering and ASCC Transportation Infrastructure Durability Center
- Projects in field demonstration
- Composite sheet piles
- High flow culverts
- Floating breakwater
- Partners/funding with MDOT, communities, ACOE





- Satellite monitoring
- MESONET weather monitoring
- Fish tagging and tracking
- Coastal data collection
- Citizen science
- FY25 Next Gen UMOOS for NERACOOS



- Custom buoys for Mexico, Caribbean
- LIDAR resource assessment buoy licensed to WHG
- PAL for marine mammal monitoring

## Science and Technology

- Floating Platforms OSW, wave energy
- Testing support for tidal (ORPC)
- Novel mooring systems
- Lidar Buoy
- Manufacturing
- Demonstration sites
- Wind/wave scale model tests



## Social and Economic

- Stakeholder outreach and input
- Economic modelling
- Community benefits
- Commercial partnerships & investment
- Energy off-take innovation
- Co-location evaluations
- Technology Licensing

## Environmental and Ecological

- Under and above water
- Baseline and site assessment supporting NEPA, EAs
- Permitting
- Monitoring plans
- Maine OSW Research Consortium





## Pet Foods

- Dog biscuits with green crabs



## Other Food

- Value added squid
- Recipes for whole scallop
- Sensory panels, shelf-life studies
- Sustainable packaging

## Marine Pharm/Nutraceutical

- Fish Vaccines
- Extracts from lobster waste – Marin Skin





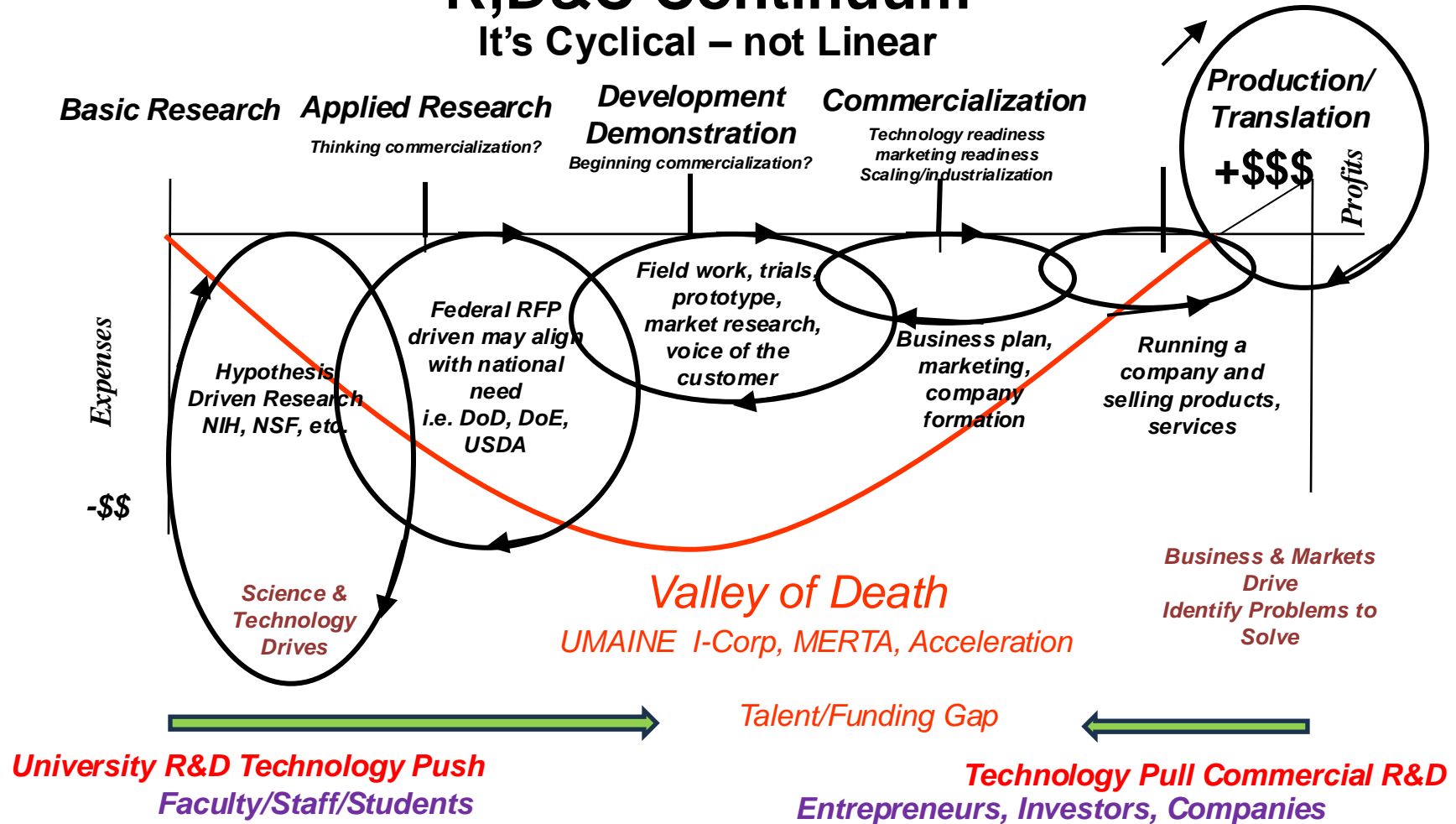
Where is the innovation going?

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What can be done to support UMaine getting to the next phase?

# R,D&C Continuum

It's Cyclical – not Linear



What can be done to support UMaine getting to the next phase?

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*Talent to move innovations through the valley of death!!!*

*Go Blue!*



Thank You!

Blue Economy Task Force  
October 10, 2024

Jake Ward  
[jsward@maine.edu](mailto:jsward@maine.edu)



# Case Study: Marine Defense Talent



## **Need:** highly skilled employees

- General Dynamics Bath Iron Works, Pratt & Whitney, and Navy-run Portsmouth Naval Shipyard
- Defense sector employs more than 20,000 people at over 150 companies.
- Defense spending in Maine totaled \$3.2 billion in 2021.
- Over the next five years, anticipate needing to fill over 7,500 positions.

## **Solution:**

- Undergraduate internships
- Training engineers and designers
- Maine Defense Industry Alliance