

University of Delaware College of Earth, Ocean, and Environment: Past, Present and Potential

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University of Delaware

College of Earth, Ocean & Environment

Delaware Sea Grant

School of Marine Science & Policy

2024



Outline

- Who am I and why am I talking to you?
- An abridged history of the campus
- Current infrastructure & researchers
- Topics in the future growth of our Hugh R. Sharp Campus
 - Blue Economy Initiative
 - Fisheries & Aquaculture Innovation Center
- Resiliency issues/concerns





Professional Background

Marine Science B.S., Marine Bioscience Ph.D.

Commercial Fisheries
Observer & Data Processing



Diadromous & Marine Species
Management & Research



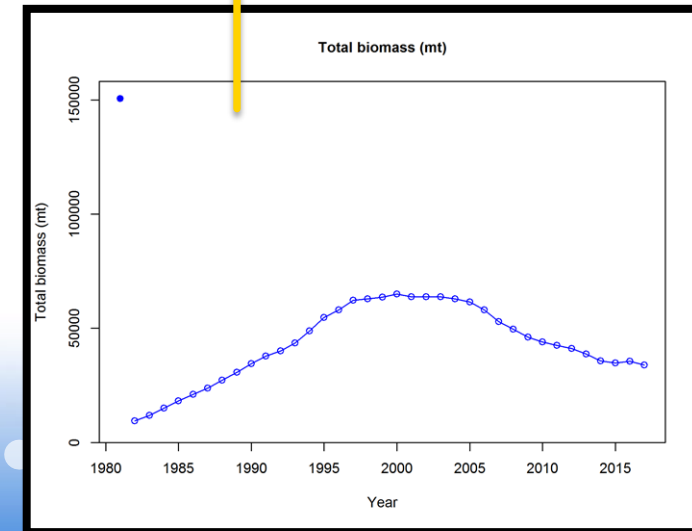
Interpretive Education & Research Specialist



Fisheries Biometrician



Adjunct Faculty



Fisheries Aquaculture Extension Research

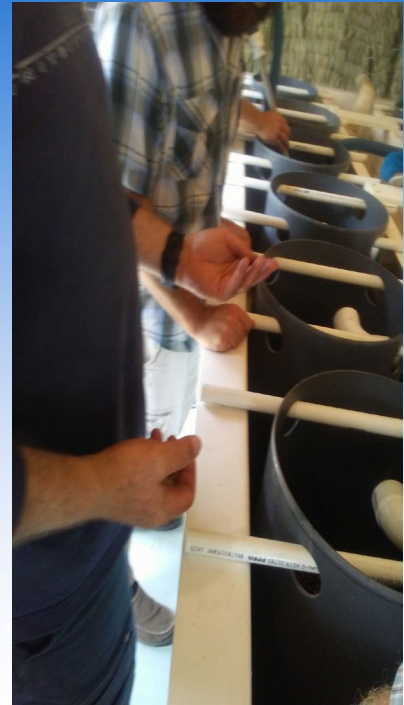
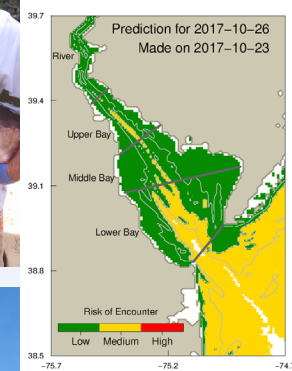


Photo credit: Helmut Debelius



Atlantic Sturgeon Predicted Occurrence

Green indicates low risk of encountering Atlantic Sturgeon
 Yellow indicates medium risk of encountering Atlantic Sturgeon
 Red indicates high risk of encountering Atlantic Sturgeon

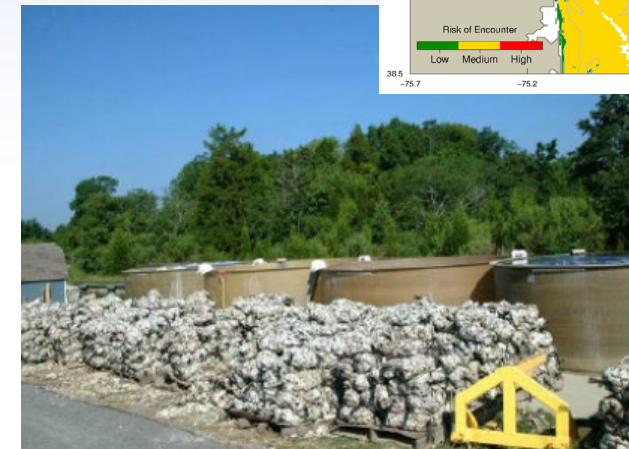


This product is developed for mature Atlantic Sturgeon using historic telemetry observations matched to date, bathymetry, and sea surface temperature and ocean color from NASA's MODIS AQUA satellite. The five regions (Delaware River, Upper Delaware Bay, Middle Delaware Bay, Lower Delaware Bay, and Atlantic Ocean) are divided into 5 meter depth bins.

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Ed.hahn@state.de.us as Delaware Division of Fish and Wildlife 3002 Bayside Drive Dover, DE 19901
 Breece, M. W., D. A. Fox, D. E. Hauke, I. Wirgin, and M. J. Oliver. 2017. Satellite Driven Distribution Models of Endangered Atlantic Sturgeon Occurrence in the Mid-Atlantic. *ICES Journal of Marine Science* 1387.



Photo credit: Brian Gratwicke



Science serving the Delaware coast!



University of Delaware





Early Marine Campus

- Interest from a group of local fishers exploring what would later be deemed recruitment variability in Atlantic Menhaden in 1950
- Early start of marine laboratory with borrowed expertise of Dr. Eugene Cronin (UMD), Dr. Daiber and Ms. Joanne Daiber in 1951

College of Earth, Ocean & Environment



Current Researchers

- One college, three departments
 - Dept. of Earth Science
 - 11 full time faculty (excludes joint and affiliate appointments)
 - Dept. of Geography & Spatial Science
 - 19 full time faculty (excludes joint and affiliate appointments)
 - SMSP
 - 30 full time faculty (excludes joint and affiliate appointments)
 - 160 undergraduate students
 - 66 graduate students





University of Delaware Otis Smith Lab Lewes,

Current Facilities

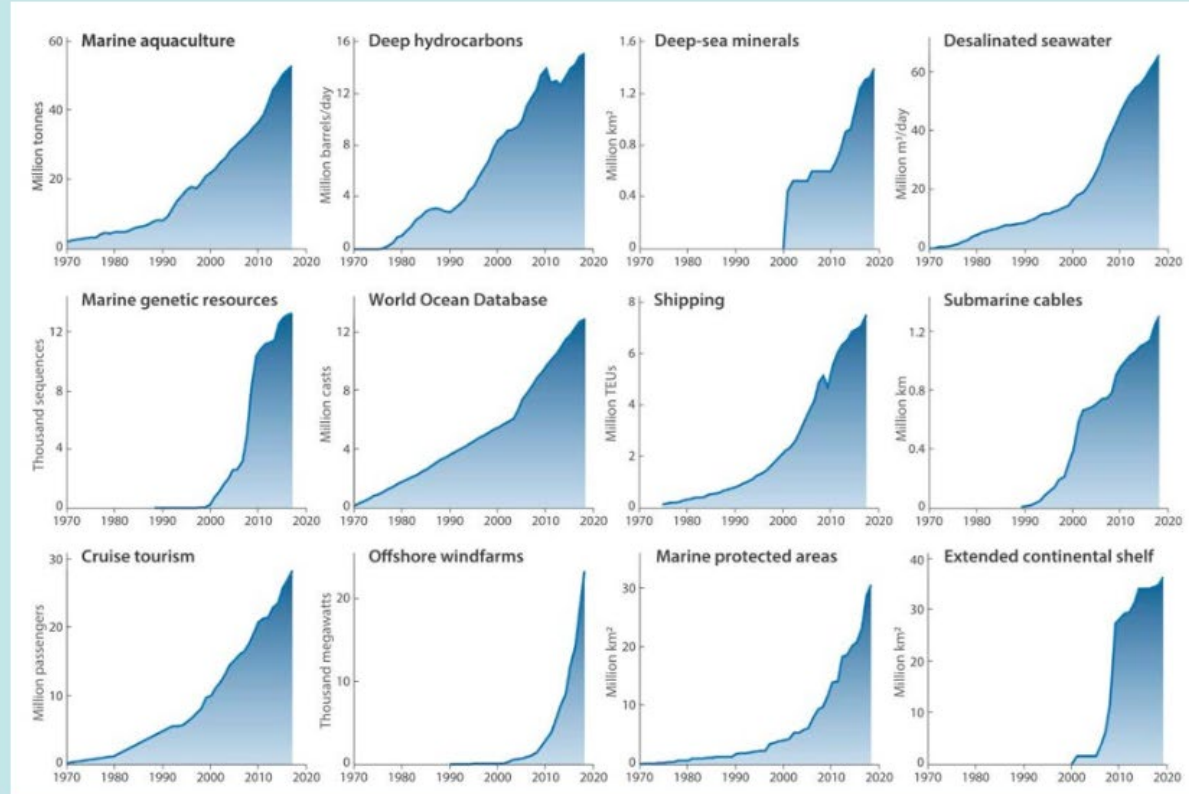




School of Marine Science & Policy

New Opportunities

The Blue Economy: Acceleration



IN 2018, THE AMERICAN BLUE ECONOMY:

SUPPORTED 2.3 MILLION JOBS

CONTRIBUTED APPROXIMATELY \$373 BILLION TO THE NATION'S GROSS DOMESTIC PRODUCT

GREW FASTER THAN THE NATION'S ECONOMY AS A WHOLE

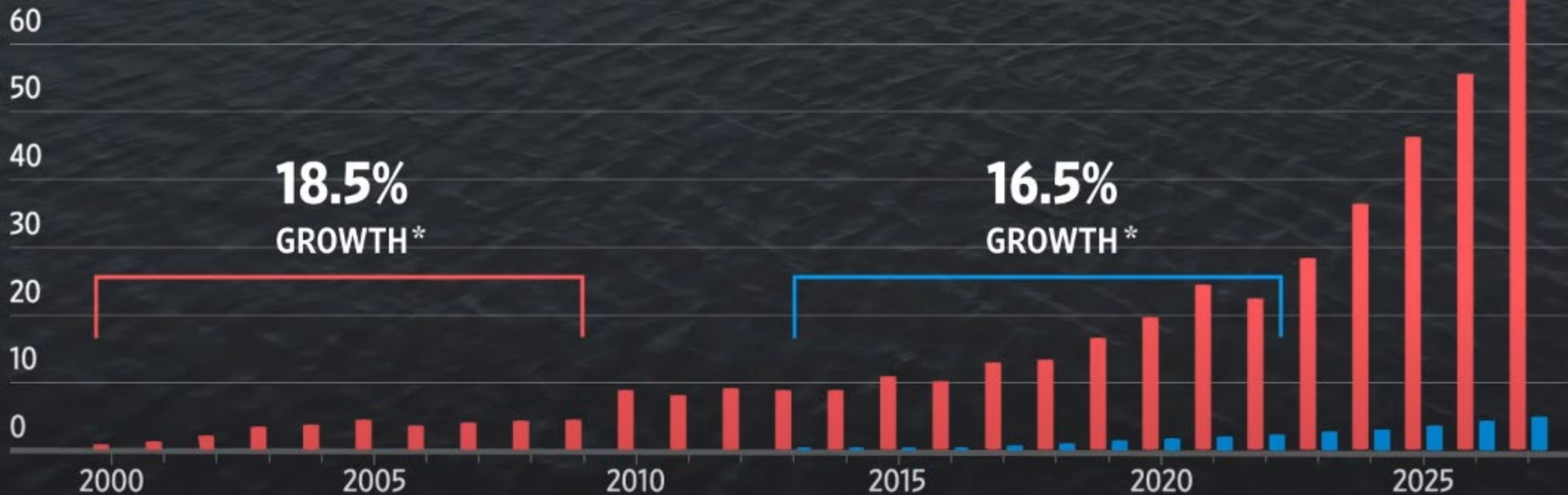
THROUGH ACTIVITIES SUCH AS TOURISM AND RECREATION, SHIPPING AND TRANSPORTATION, COMMERCIAL AND RECREATIONAL FISHING, POWER GENERATION, RESEARCH, AND RELATED GOODS AND SERVICES.

AERIAL AND MARITIME DRONE GROWTH

Estimated Total Addressable Market

- Aerial Drones
- Maritime Drones

\$70 billion



*COMPOUND ANNUAL GROWTH RATE

SOURCE: OCEAN AERO

DELAWARE'S BLUE ECONOMY

EXAMPLES OF CURRENT DELAWARE BLUE ECONOMY OPPORTUNITIES

PROJECT ABLE \$1.3M	OFFSHORE WIND TRAINING CENTER \$1.06 M
OYESTER HATCHERY \$1.6M	REEF @ UD \$750K

LEVERAGE FUNDING
BUILD CAPACITY
WORKFORCE DEVELOPMENT
INCREASE POLICY ADVOCACY
ENCOURAGE COLLABORATION



*Delmarva peninsula: by the Numbers- New Perspectives on the Ocean Economy of the Mid-Atlantic States by Middlebury institute of international studies at Monterey for the Mid-Atlantic regional council of the Ocean





Environmental Robotics & Sensors



Energy & Water Security



Environmental Biochemistry

Project ABLE

Align University of Delaware's ocean, engineering and entrepreneurship programs and resources to driving innovative solutions to support the Blue Economy and sustainability.

Expand Public-Private Partnerships focused on entrepreneurship, regional economic development and communities engagement.



"ABLE"

Build awareness of the University of Delaware's collective strengths and value propositions to develop stronger relationships with the Navy, NOAA and USCG.

Leverage strategic location and world class research & facilities to support a Mid-Atlantic BlueTech Testing and Evaluation (T&E) Range.



Remote Sensing & Big Data



Human Dimensions of Climate Change



Ecosystems & Fisheries



+



+



=



Delaware
BLUETECH PROGRAM



Theme Areas

1. Autonomous Systems for Offshore Surveys.
2. Acoustic Mapping and Mitigation of UXO through Machine Learning.
3. Marine Habitat Mapping and Monitoring.
4. Educational Outreach and Professional/Pre-Professional Training Opportunities.



Project *ABLE*

BlueTech for a better environment and increased economic opportunity

Vision

To make Delaware a leading national center in the application and development of autonomous systems in support of advancing the Blue Economy

Project ABLE will ignite the advancement of a BlueTech center of excellence in Sussex County, Delaware and advance the use and development of robotic systems to support offshore environmental research and monitoring particularly in support of offshore wind development and related activities.

Mission

Create new jobs and increase our knowledge and stewardship of the coastal environment through the use and development of advanced autonomous systems and sensors. To train the next generation of BlueTech Innovators.



• **Public Private Partnerships to Enhance Impact**

- Environmental Robotics
 - Forecasting & Data Products
 - Platform & Sensor Development
 - Fisheries Applications
- Educational Training
 - Bootcamps
 - Summer Camps
 - MS Robotics- internships
- UD REEF Eco Entrepreneurship program
- Defense & Energy
 - USNA EPA
 - NSWC Carderock EPA
 - Dover AFB Bedrock EPA
 - Orsted
 - Blue Water Wind

Engagement: DPP, Sussex Co, Lewes, UMD UAS Test Site, DSP Maritime Unit, DEMA, Mid-Atlantic Blue Tech Cluster (MABTC) non-profit, Global Oceans

International Partnerships:

- University of Waikato NZ
- University of Pisa (MOU)
- University of Malta (MOU)

Commercial Partners

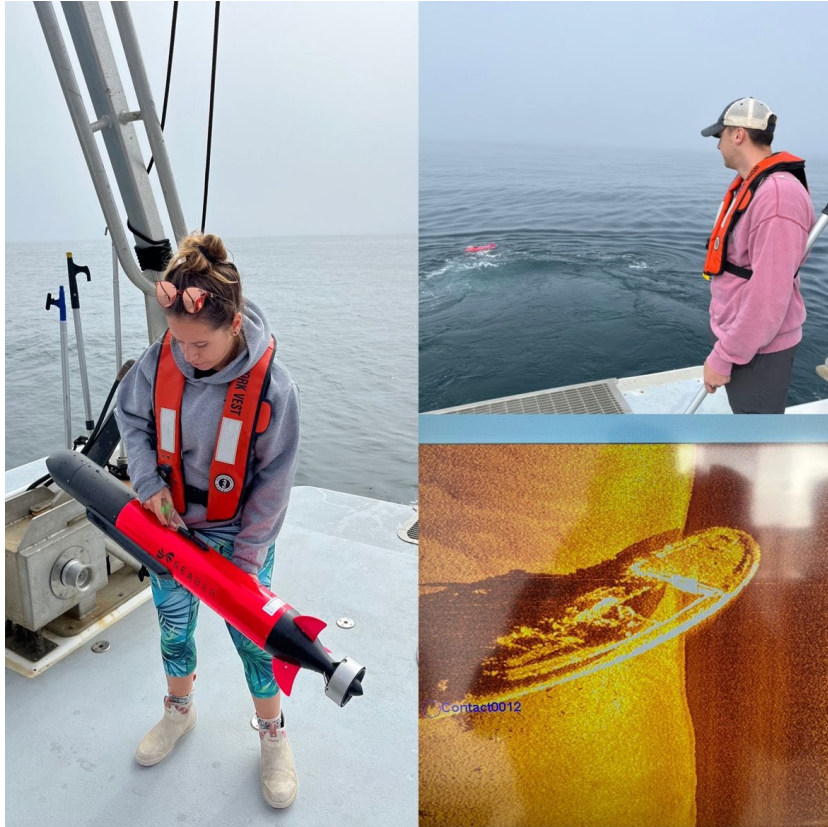


Proposals:
 NSF ERC- pending
 NSF IUCRC- pending
 SBIR/STTRS

Agency Partners



Project ABLE Recent Activities



Seaber AUV



JaiaBots





Efforts in Fisheries & Aquaculture

Pilot Oyster Hatchery 800 ft²

- 2023
 - 100,000 remote set spat on shell
- 2024
 - 460,000 remote set spat on shell
 - 600,000 seed oysters
- Unofficial target
 - 1,000,000 remote set spat on shell
 - 1,000,000 seed oysters





INNOVATION CENTER



BECKER
MORGAN
GROUP

ARCHITECTURE
ENGINEERING

Questions