

Perspectives of an Industry Developer

Laura Morse: Director of
Environmental Compliance and Strategy

June, 2023

World's Leading Privately Held Sustainable Energy Company

CORE BUSINESS

Invenergy

Our Foundation

Developing and operating sustainable energy projects around the world



Wind

115 projects
18,086 megawatts



Solar

51 projects
6,474 megawatts



Storage

18 projects
1,537 megawatt hours
486 megawatts



Natural Gas

13 projects
5,964 megawatts

DIVERSIFIED SOLUTIONS



Invenergy
Services

Award-winning asset management and operations with an owner's mindset



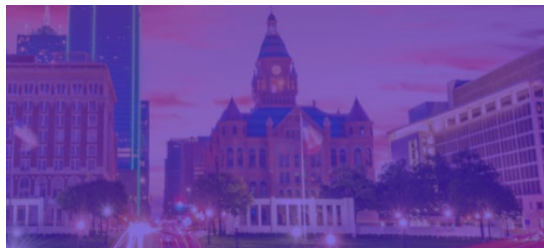
Invenergy
Transmission

Experience developing 4,100+ miles of transmission and collection infrastructure to bring power to market



Invenergy
Clean Water

Tackling the next sustainability challenge with an emerging water desalination business



ENERGIZE
VENTURES

Investing in digital solutions that drive affordability, reliability and security for energy and industry

About Myself

- 30+ years as a Marine Mammal field biologist and regulatory specialist
- Participated in MM shipboard and aerial surveys throughout US and globally
- Spent 2 years with NMFS as an MMPA permit specialist
- Joined Energy industry in 2012, and Invenergy this year
- Led efforts on NOAA-Industry data sharing agreements
- Initiated over \$10 million in marine science research including ECO-PAM
- Maine Offshore Wind Research Advisory Committee member
- Regional Wildlife Science Collaborative; Marine mammal and technology subcommittee member

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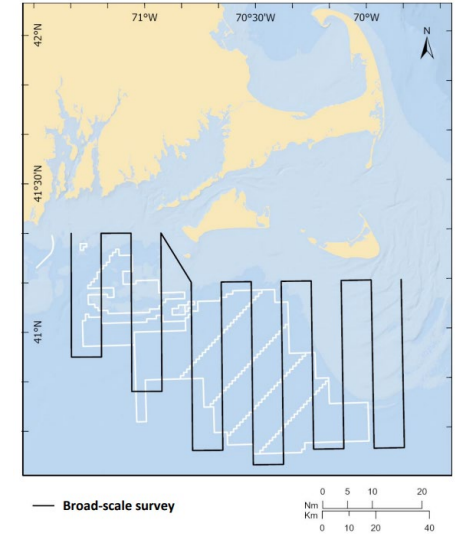


Offshore Wind **Investment** in Right Whale Research

Voluntary investments to date > **\$20 million** in directed NARW study efforts including:

- Developer co-funded aerial surveys
- WHOI Buoy listening network
- Glider deployments
- Bio-acoustic studies
- Zooplankton studies
- Oceanographic studies
- Advancing predictive habitat models
- Advancing acoustic and camera tools for real-time autodetection
- Advancing real-time sighting network

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Cross Collaboration and Multi-Institutional Engagement

- RWSC
- ROSA
- IOOS/NERACOOS/
MARACOOS
- Multi-State Investments
- Academic Institutions
- Non-profits
- Industry Suppliers



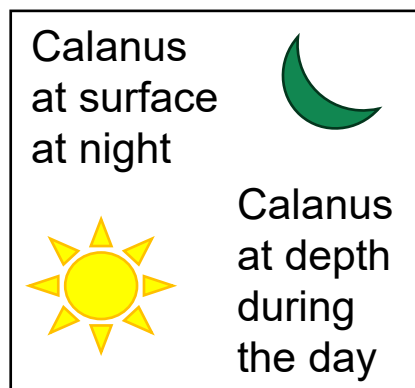
Committee Task: Ecosystems

*Comment on the ability to estimate the extent of **perturbations** (distance and magnitude) caused by WTG installation and operation, to the oceanographic regime. This will include **potential changes to ecosystem dynamics**, specifically for assessing whether these facilities could **substantially affect North Atlantic right whale prey availability** near Nantucket Shoals.*

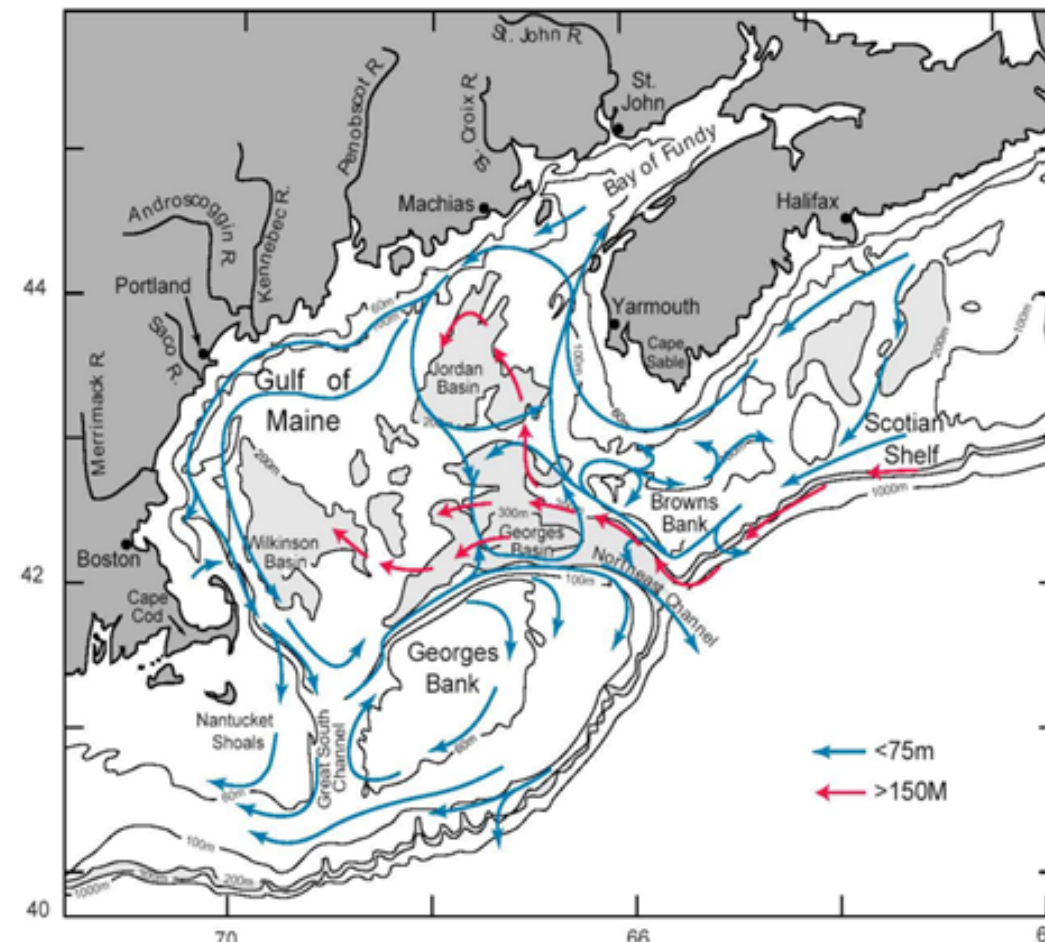
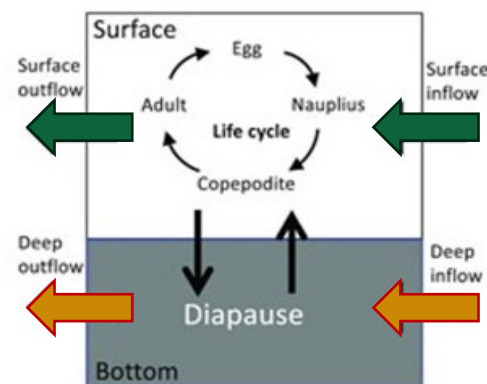
Complex Biological and Hydrodynamic Interaction

On multiple temporal scales, **foraging conditions are affected by hydrodynamics** at the **surface** (blue arrows show currents at depths of < 75 m) and **deeper in the water column** (red arrows show currents depths > 150 m).

Daily cycle



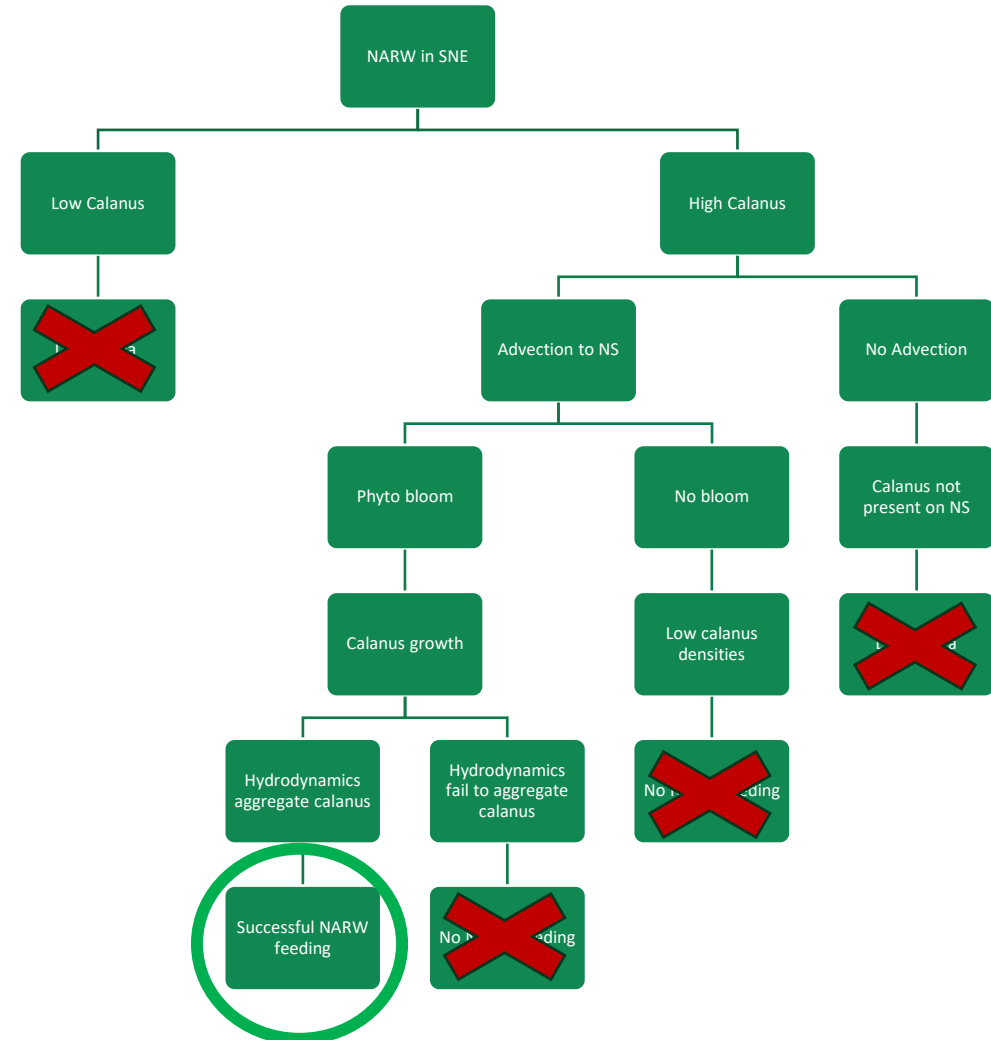
Annual cycle



The general circulation in GOM/GB region during stratification condition (May-September). From Beardsley et al. [1997].

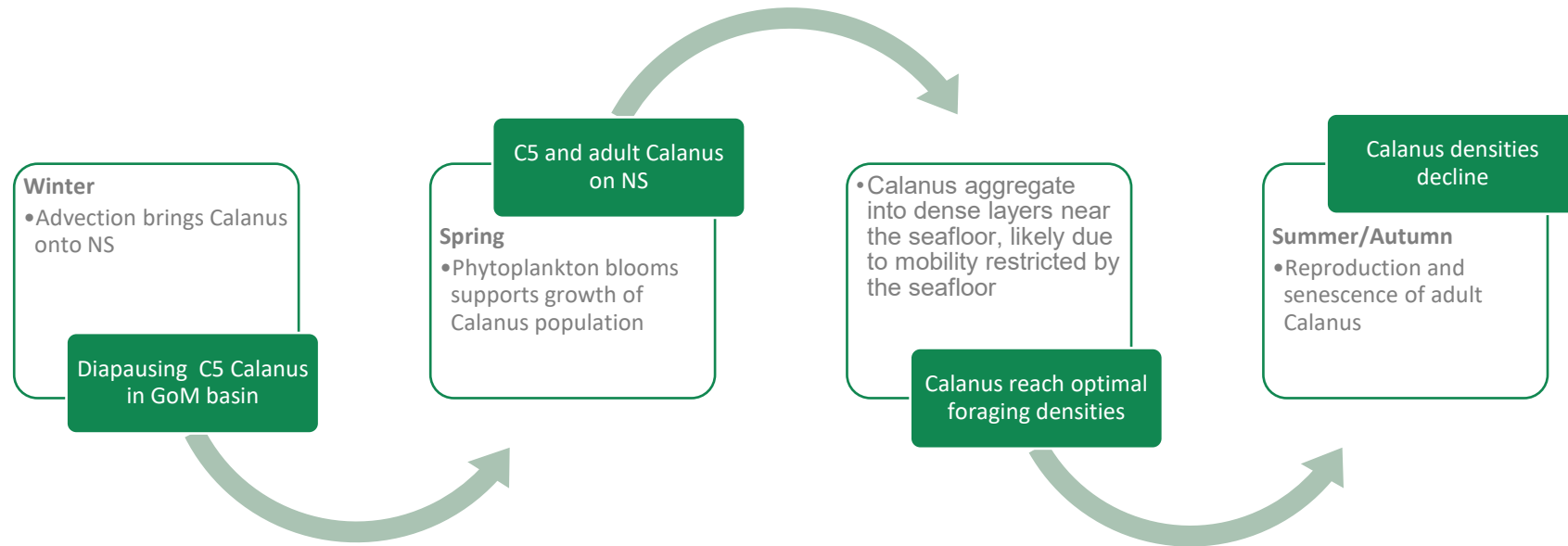
Conceptual model of NARW **successful foraging** conditions

Interplay of biological and physical conditions that lead to successful NARW foraging.



Conceptual Copepod Annual Cycle

Advection on to NS appear to be driven by regional currents and tides
Climate change may affect these regional circulation/current systems



It is important to consider the **strength** of relative forces of **existing area-specific conditions and stressors vs. any stressor** resulting from a windfarm

Relevant Literature

What we are seeing is right whales responding to a climate-driven change in their prey environment.

— Erin Meyer-Gutbrod

Climate-Associated Regime Shifts Drive Decadal-Scale Variability in Recovery of North Atlantic Right Whale Population

BY ERIN L. MEYER-GUTBROD AND CHARLES H. GREENE

Vol. 335: 243–258, 2015
doi: 10.3354/meps11372

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Climate-associated changes in prey availability drive reproductive dynamics of the North Atlantic right whale population

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Redefining North Atlantic right whale habitat-use patterns under climate change

Erin L. Meyer-Gutbrod^{1,*}, Kimberley T. A. Davies², Catherine L. Johnson³, Stephane Plourde⁴,
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OCEAN REGIME SHIFT IS DRIVING COLLAPSE OF THE NORTH ATLANTIC RIGHT WHALE POPULATION

By Erin L. Meyer-Gutbrod, Charles H. Greene,
Kimberley T.A. Davies, and David G. Johns



A juvenile right whale breaches against the backdrop of a ship in one of the Seasonal Management Areas implemented by NOAA Fisheries to reduce the likelihood of deaths and serious injuries to these endangered whales that result from collisions with ships. Photo credit: Florida Fish and Wildlife Conservation Commission, NOAA Research Permit #775-1600-10

Other NARW Considerations

Primary Sources of Mortality for NARWs

- Entanglements
- Vessel strikes

Newly Identified Areas with Aggregations

- Winter detections from ECO-PAM along the shelf break off NJ (ECO-PAM results)
- A large aggregation this spring along the shelf break east of the NY Shipping channel
- Recent shifts to Gulf of St Lawrence
- What are the relative importance of these areas?

Population Consequence of Disturbance Models (PCOD)

- Consideration of full suite of stressors and influence on population dynamics
- Project WOW further evolving PCOD models as it pertains to offshore wind efforts

Conservation Benefits of Offshore Wind

Addressing Sources of Mortality for NARWs

- Entanglements: Offshore wind can support the fishing industries shift to ropeless technology
- Vessel strikes: Advancing a realtime listening network, tools for detection, and sighting sharing

Climate Change

- Addressing the IPCC targets for CO2 reduction
- Slowing the rate of climate change

Science

- Offshore wind development and operations is triggering millions in research dollar investments
- Advancing the knowledge of protected species and local and regional ecosystems
- Transparency and ongoing data share

Developer Perspectives

Requests to the Committee in this process

- Consider **interannual variability** in the ecosystem
- Consider influence of **storm events** and increasing strength
- Consider influence of **climate change**
- Consider the **relative contribution** of **all feeding** areas to an individual NARW's energy intake and populations breeding success
- Your **recommendations** will help to **prioritize and target funding** for future offshore wind related research

Developers Commitments in this process

- Advance **best available science**
- Support **science-based** decision making
- Retain a focus on our **sustainability** principles and our **stewardship** of the environment we operate in

Innovators building a sustainable world

English

Innovadores construyendo un mundo sustentable

Spanish

持続可能な世界作りを目指す革新者

Japanese

Innowatorzy budujący zrównoważony świat

Polish

Des innovateurs construisant un monde durable

French

Invenergy

Join us.    