Offshore Wind & Fish:
Experience from the Block Island Wind Farm

Drew Carey

WinWind 2021

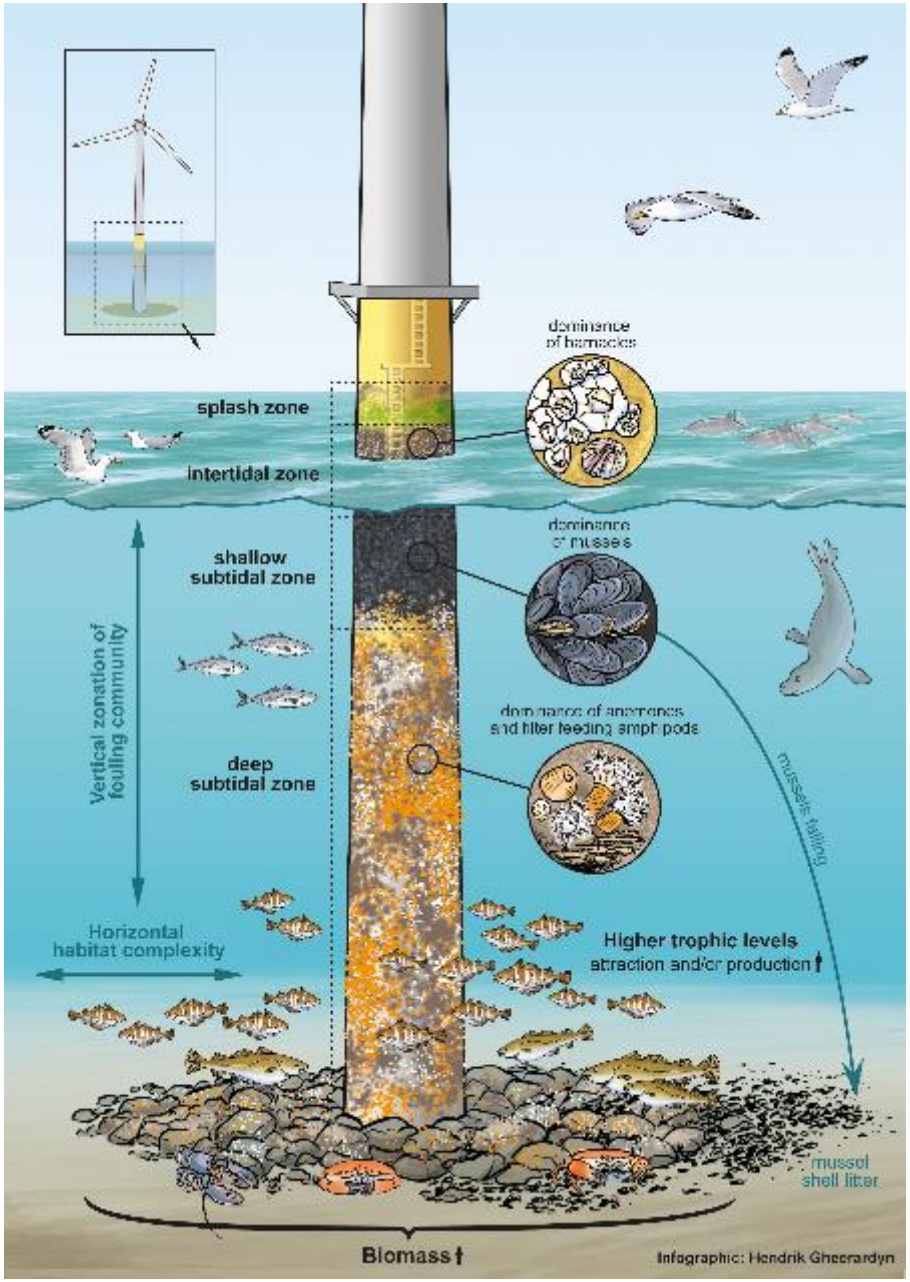
Artificial Reef Effect

Introduction of hard surface from intertidal to seafloor offshore: allows growth of organisms

Filter feeders near surface discharge waste that supplies food to seafloor

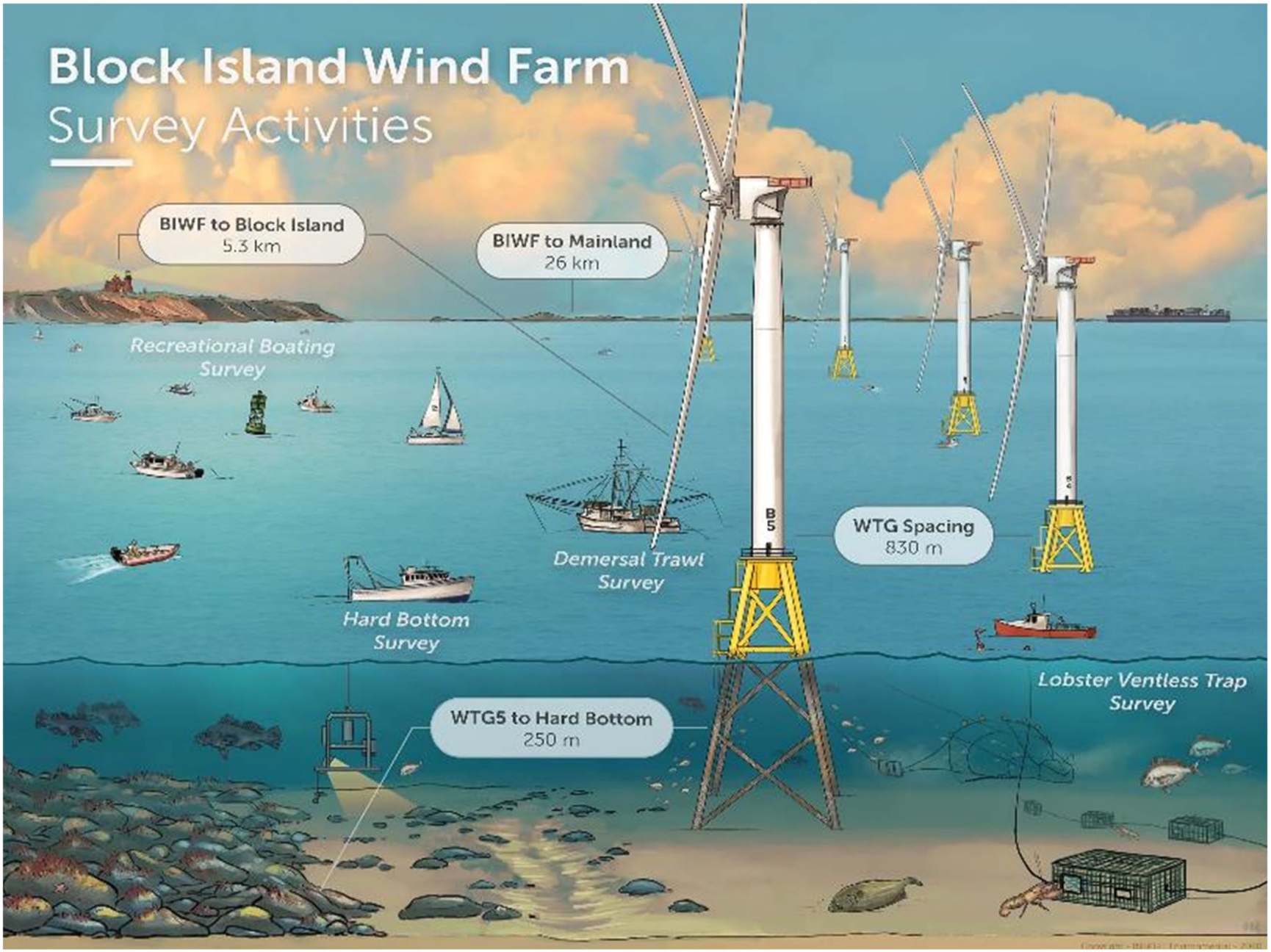
Fish are attracted to structure for food, refuge almost immediately

Creates a small 'island of biodiversity' and increases food to seafloor communities



Degraer et al. 2020 www.inspireenvironmental.com/news

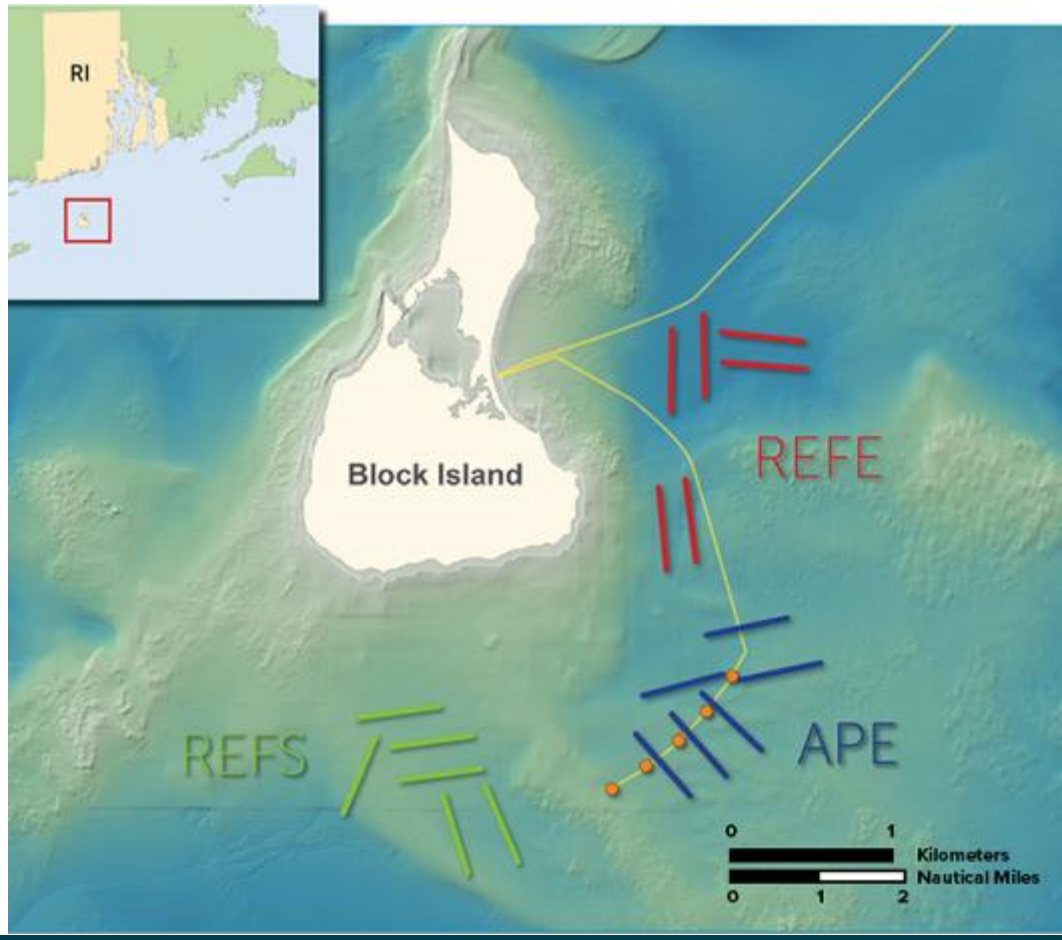
INSPIRE ENVIRONMENTAL

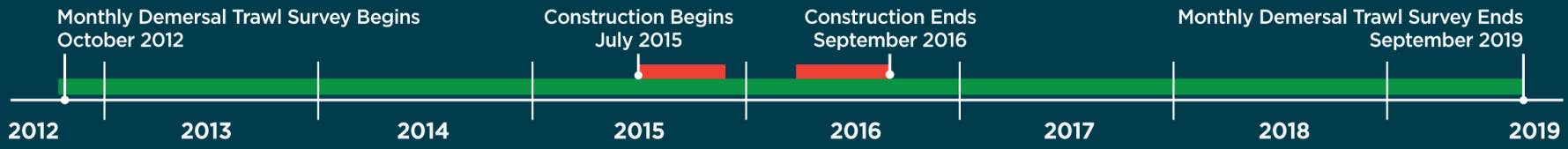


INSPIRE ENVIRONMENTAL

Demersal Trawl Survey

- Conducted on commercial trawler
- Otter trawl consistent with other regional studies
- 20 minute tows, once a month
- Three Study Blocks
  - Reference South – 2 tows
  - Reference East – 2 tows
  - Area of Potential Effect – 2 tows
- Seven Years of Surveys
  - 2 years before construction
  - 2 years during construction
  - 3 years after construction



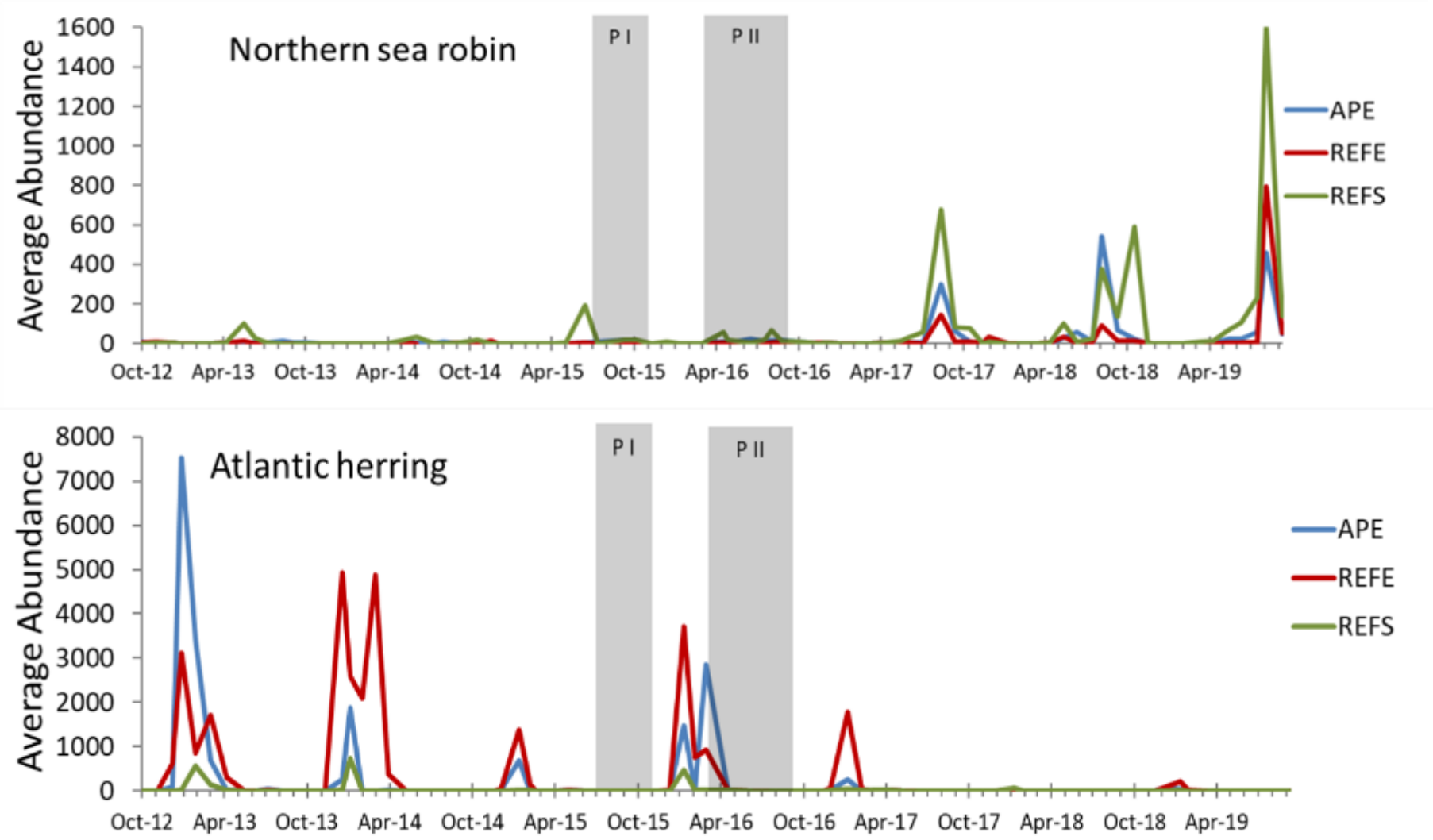


INSPIRE ENVIRONMENTAL

Block Island Wind Farm Trawl Survey Sampling October 2012 – September 2019

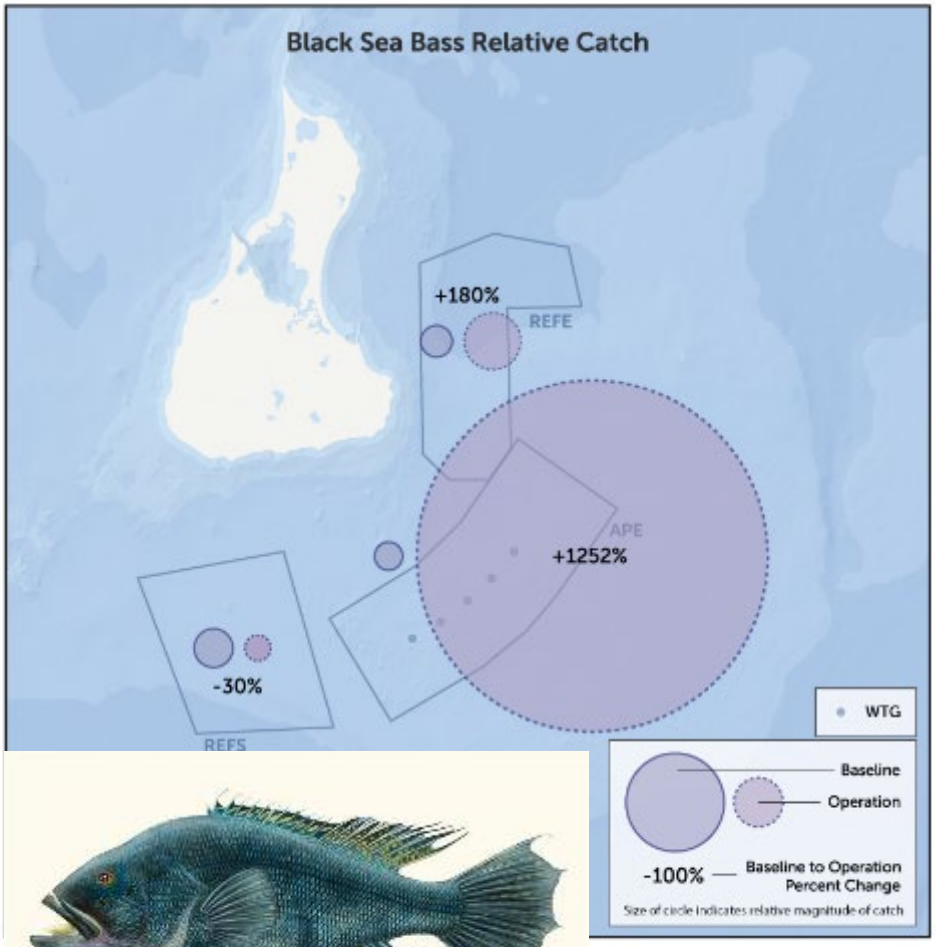
- 497 tows (using regional sampling protocol)
- ~ 750,000 fish and invertebrates collected
- Nine species account for 90% of all individuals
- Numerical dominants:
  - Butterfish
  - Little skate
  - Scup
  - Winter skate
  - Longfin squid

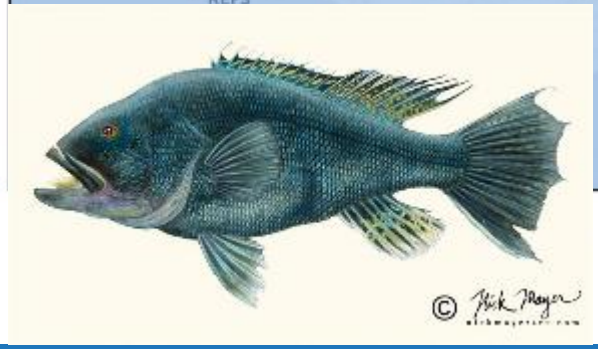
Temporal change consistent with region

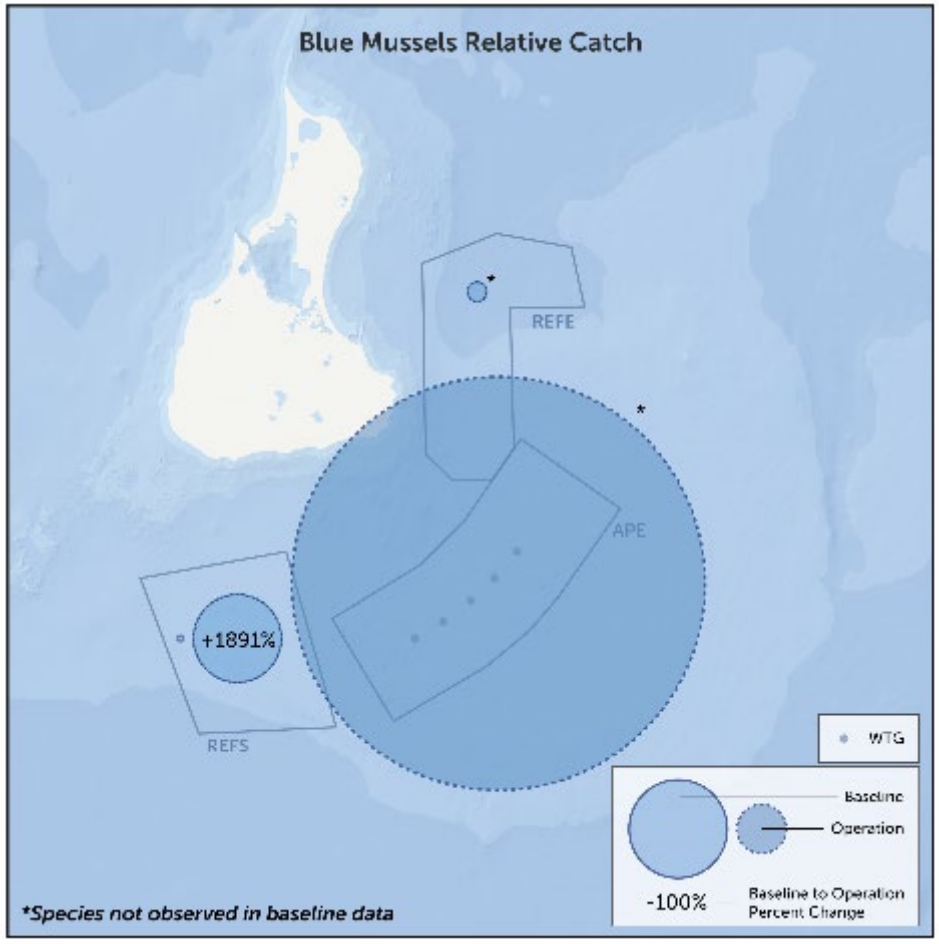


Black sea bass attracted to structure

Blue mussels and spillover effect



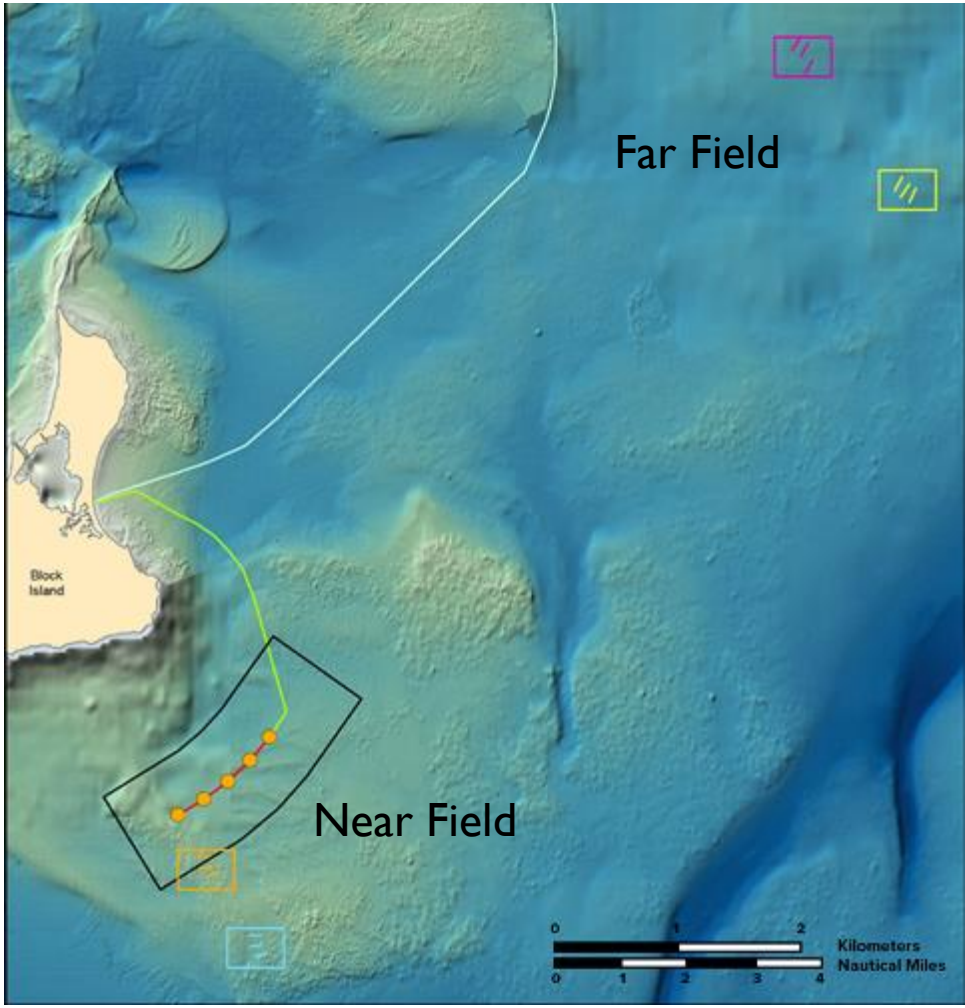




INSPIRE ENVIRONMENTAL

Lobster Trap Survey

- Commercial lobster boats from Pt. Judith and Newport
- Design consistent with other regional studies
- 5 night soak, twice a month
- Vented and ventless traps
- Four Study Blocks
  - 2 Near Field
  - 2 Far Field
- Seven Years of Surveys:
  May – October 2013-2019
  - 2 years before construction
  - 2 years during construction
  - 3 years after construction

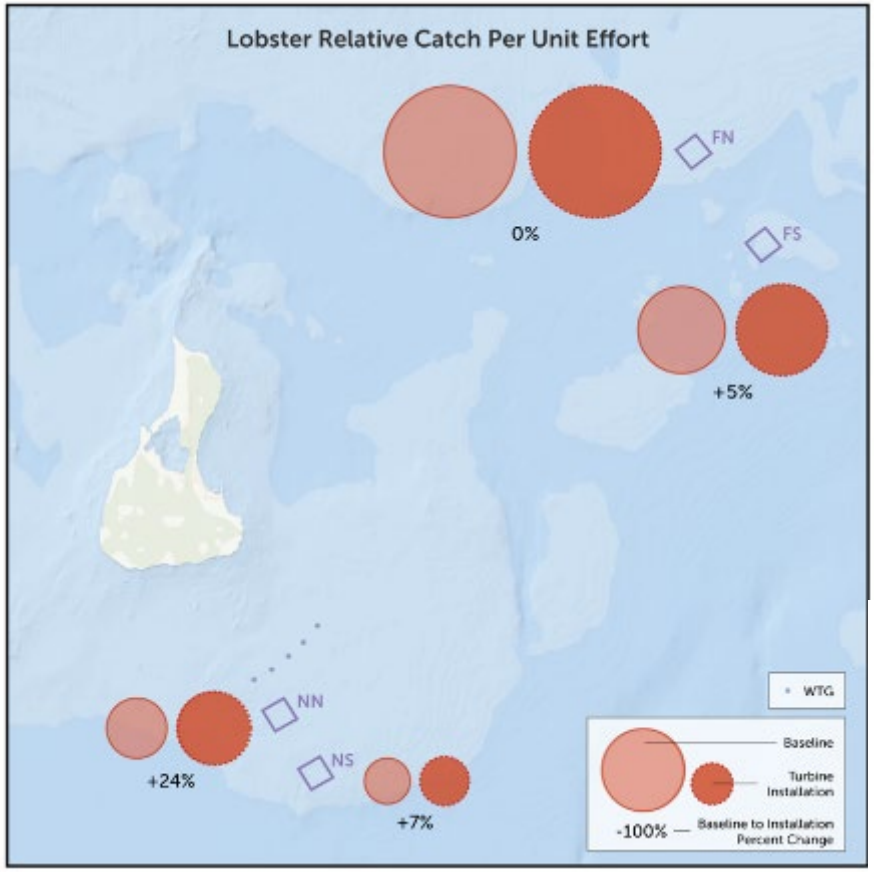


INSPIRE ENVIRONMENTAL

Block Island Wind Farm Ventless Trap Survey
May 2013 – October 2019

- 12,037 traps sampled over seven years
- 44,932 lobsters collected
- Sex: M/F
- Carapace length: nearest 1/10th mm
- Egg status: presence, absence, spent
- Disease prevalence: minor, moderate, severe
- Shell hardness: hard, soft
- Cull status
- V-notch: presence, absence, new
- Shell disease prevalence
- Temperature

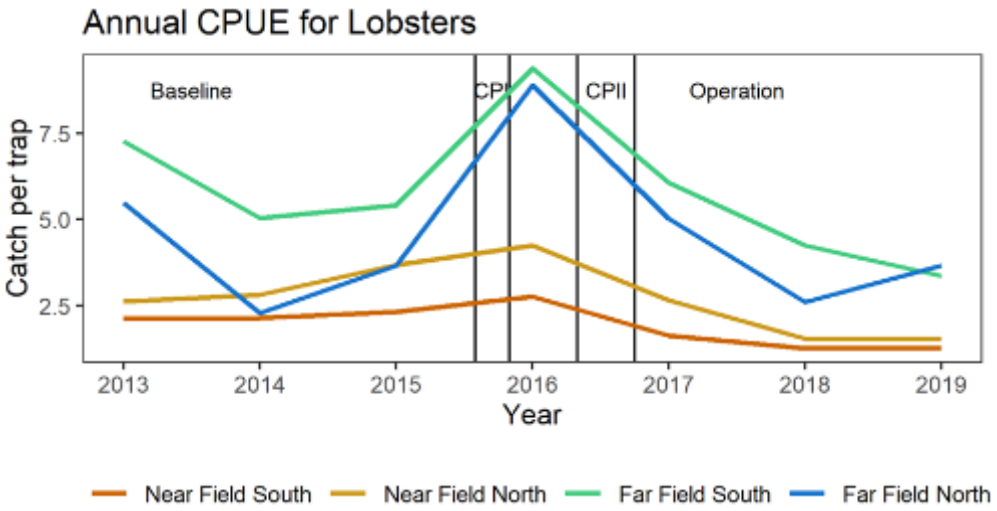
Lobster Trap Survey



Baseline months compared to installation same months

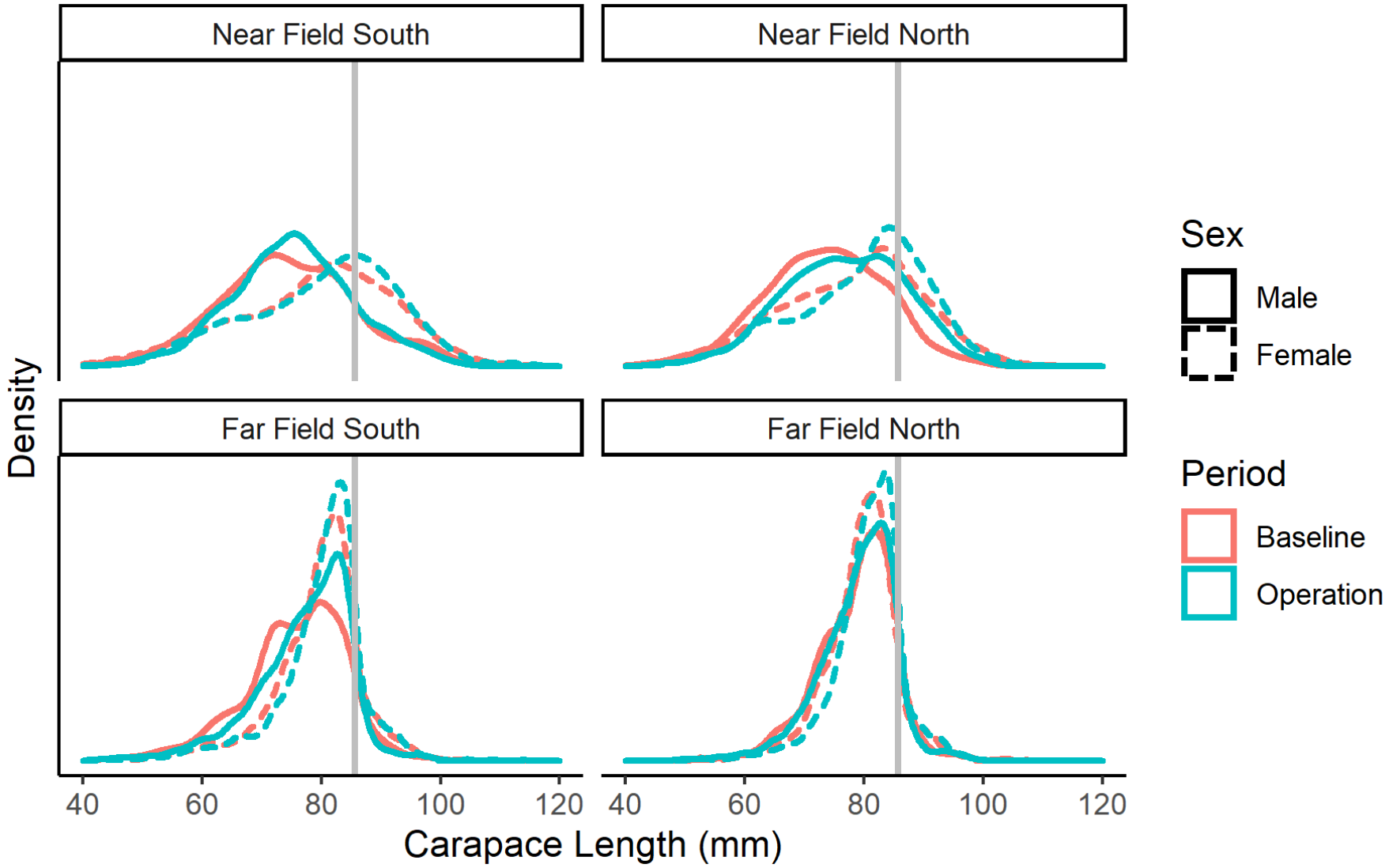
7-24% increase in CPUE near turbine construction activity

0-5% increase in CPUE far away from construction



- Far Field higher catch than Near field
- Catch highest in 2016 at all sites
- Catch lower at all sites during Operation time period

Size Composition of Lobsters by Block and Year and Sex
Minimum Legal 85.73 mm



Findings

- Artificial reef effects are local (800 feet) may take 10 years to fully develop.
- No significant change in fish between the Baseline and Operation time periods in the wind farm area relative to two reference areas consistent with a detrimental impact of BIWF operation.
- Changes in abundance across survey areas were consistent with regional trends.
- Black sea bass, a species attracted to structure, increased by as much as an order of magnitude in the wind farm area following turbine installation.
- Blue mussels colonized the turbine structures and were collected in higher numbers in the trawl survey, thereafter, also occurring in higher numbers in fish diets, especially winter flounder.
- Feeding interactions, i.e., diet composition, fish condition, and stomach fullness, did not indicate a wind farm effect, either positive or negative.

Lessons learned

- Study design should balance fishing community interests and science interests
- What is an ecologically meaningful difference?
- Site-specific designs and results
- Be flexible about timing and duration, projects can change

Apply to future

- Engage as broadly to ensure design meets needs
- Small changes may not be meaningful
- Only large changes may be detectable with reasonable effort because of high natural variability
- Regional data necessary to interpret site-specific data
- Regional funding and cooperation would leverage efforts

www.INSPIREenvironmental.com
Tel: 401.849.9236
INSPIRE Environmental
513 Broadway, Newport, RI 02840

Acknowledgements

Rodman Sykes and the crew of the F/V Virginia Marise
Bill McElroy, Lanny Dellinger
Matthew Griffin, Dara Wilber, Lorraine Read
Brian Jenkins
Jill Johnen, Ellen Bellagamba Fucile

BLOCK ISLAND WIND FARM
America's First Offshore Wind Farm

www.INSPIREenvironmental.com
Tel: 401.849.9236
INSPIRE Environmental
513 Broadway, Newport, RI 02840
INSPIRE ENVIRONMENTAL