Enhancement of the sea scallop fishery

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In collaboration with: Nordic Inc., Empire Fisheries, Quinn Fisheries, Fulcher Trawling, Nordic Fisheries, Viking Village, and O’Hara Corp.
Identifying the Problem

Sea scallop recruitment is unpredictable resulting in boom and bust cycles.

The current rotational management program relies on natural recruitment processes, making it dependent on incoming year class strength.

There is an increase in unpredictability due to climate change and offshore development.
What We Hope to Achieve

_scallop_ Develop scallop seeding as an active management strategy to mitigate unpredictable recruitment
_scallop_ Have this as a viable mitigation strategy ready to be used to combat impacts on recruitment from offshore development and climate change
_scallop_ Use for bed thinning to increase growth and survival in areas with extremely high recruitment (NLSW)
The Seastead Project

1995-1998 - Three year sea scallop enhancement project off coast of MA using existing technologies and the New England fishing industry

Objective: Enhance sea scallop production through development of transport and grow-out methods, management criteria, and identification of potential grow out locations

Collaboration among scientists and fishing industry

First aquaculture research area in US federal waters
The Seastead Project

- ~120,000 scallops moved to grow-out area
- Bottom cages, suspended nets, and loose on bottom
- Monitored with camera sleds and sub sampling
The Seastead Project was in Part Responsible for...

- The formation of a Sea Scallop Working Group in Massachusetts
- The formation of the Aquaculture Committee within the New England Fishery Management Council
- Developing scallop industry awareness of enhancement and area management strategies
- Establishing the first working aquaculture site in federal waters
The Seastead Project

👩‍🕰️ Results indicate bottom seeding of sea scallops into grow out areas is a very viable option for managing scallop production

👧🏻 However, industry focused on the development of area management
Habitat Characterization & Sea Scallop Resource Enhancement

By 2013 we realized area management was not the only solution and received RSA funding to examine feasibility of seeding programs on scallop enhancement on Georges Bank.
Habitat Characterization & Sea Scallop Resource Enhancement

- Moved a large amount of scallops, tagged a subsample
- HabCam noted some tagged scallops but could not quantify them
- Number of different monitoring methods tested and scallop seeding was found to be an economically feasible tool
- Cost analysis showed partial survival would cover seeding cost
Habitat Characterization & Sea Scallop Resource Enhancement- Year Two

Proposed to continue monitoring the seed bed established in CAI during the 2013 RSA scallop enhancement project

Transplanted ~1.64 million scallops from near the NLCA to CAI
Habitat Characterization & Sea Scallop Resource Enhancement - Year Two

(shell) Measured high density of scallops immediately after seeding and observed very little mortality

(shell) Scallop density decreased during post-seeding

(shell) Dispersal rates were higher than expected

(shell) Still did not have ability to track transplanted scallops over time
Habitat Characterization & Sea Scallop Resource Enhancement - Year Three

- Performed additional seeding operation by transplanting seed to the NW section of NLCA
- Monitored transplanted scallops using camera stands
Habitat Characterization & Sea Scallop Resource Enhancement - Year Three

_used new method of transplanting closer to the bottom rather than surface drops_

_overall goal was to track mortality and dispersal, but methodological challenges persisted_
Drivers of Dispersal and Retention in Recently Seeded Scallops

- RSA funded 2016-2018 to develop new technology to examine small scale dispersal after seeding and get more data on mortality
- Replaced drop box with more efficient scallop release system
- Scallop movement was not directional and did not differ significantly between deployments
- Scallops did not react to predators unless physical contact was made
Develop new transplanting methods that maximize efficiency and survival

Compare three trawl net configurations to determine a viable transportation method to transplant seed

Nets could allow for larger volumes and the codend could be kept in water while steaming instead of dumping on deck
The results show two-panel box nets catch the most scallops per tow and cause the least amount of damage to scallops.
Objective: Compare two-panel box net with a scallop dredge to determine most effective method for moving the most scallops with the lowest mortality rate and bycatch.

Will be tagging scallops to examine mortality and dispersal of seeded scallops on a larger scale than previous project.

Monitor using optical surveys and recapture by fishermen.
Future Research

- Evaluating dispersal and mortality of recently transplanted sea scallops on a larger scale using in shore areas to improve monitoring coverage
- Examine the viability of transplanting in inshore areas and conduct an economic analysis of transplanting in inshore areas
- Continue development of tools and technologies to move scallops more efficiently with lower mortality
- Use for bed thinning in areas of very high recruitment as a method to increase growth and reduce mortality from overcrowding and improve harvesting