

US EPA ARCHIVE DOCUMENT

***Juvenile Bay Scallop
(Argopecten irradians
irradians) Habitat
Preferences***

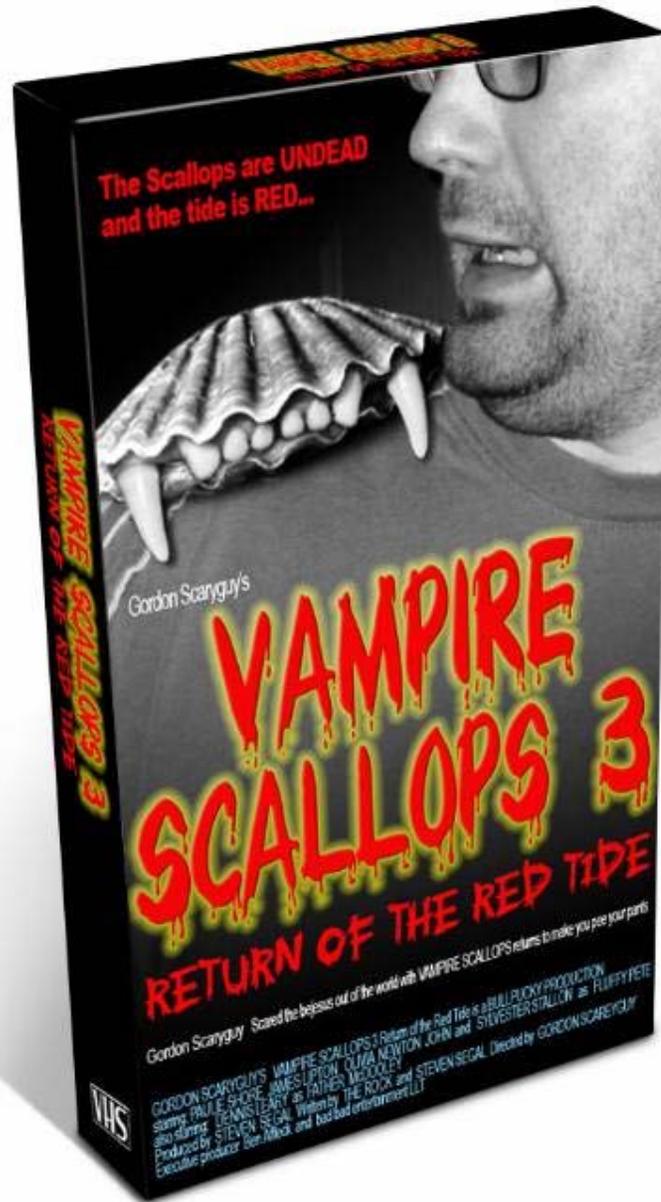
Marnita Chintala, Elizabeth Hinchey,
Timothy Gleason, and
Walter Berry

National Health and Environmental
Effects Research Laboratory

Atlantic Ecology Division

Narragansett, RI

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EPA Research Goal:

Develop Methods for Predicting
Biological Effects of Habitat
Alteration

How do populations of fish,
shellfish, and aquatic dependent
wildlife respond to habitat
alteration?



Why examine how changes in habitat affect populations of bay scallops?

- Bay scallops are a high priority species
- Estuarine wetlands are priority ecosystems
- Scallop dependence on submerged aquatic vegetation (SAV) is well demonstrated
- In order to model scallop habitat relationships, we must be able to assign "values" to habitat types



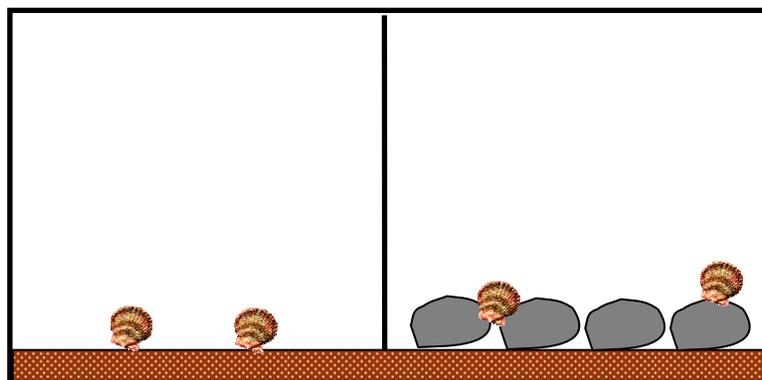
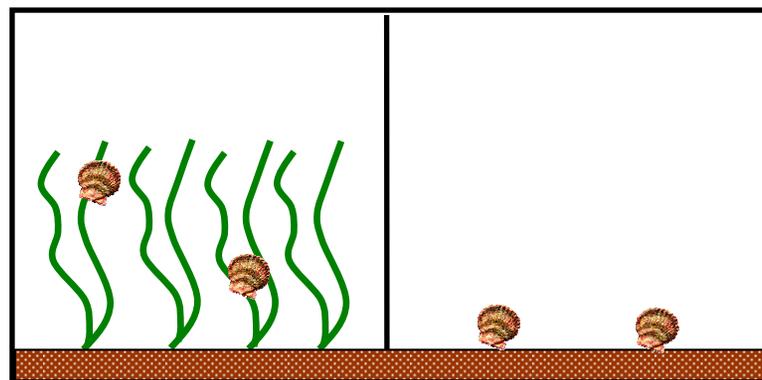
Laboratory experiments

Which habitats do scallops prefer?

- eelgrass
- cobble
- macroalgae
- bare sand

Paired habitats:

- eelgrass + sand
- cobble + sand
- macroalgae + sand



Methods

Experiment Series 1:

- 5 experiments
- Scallop sizes ranged from 6 to 16 mm



Experiment Series 2:

- 3 experiments
- Scallop sizes ranged from 28 to 50 mm



Methods

Experiment Series 1:

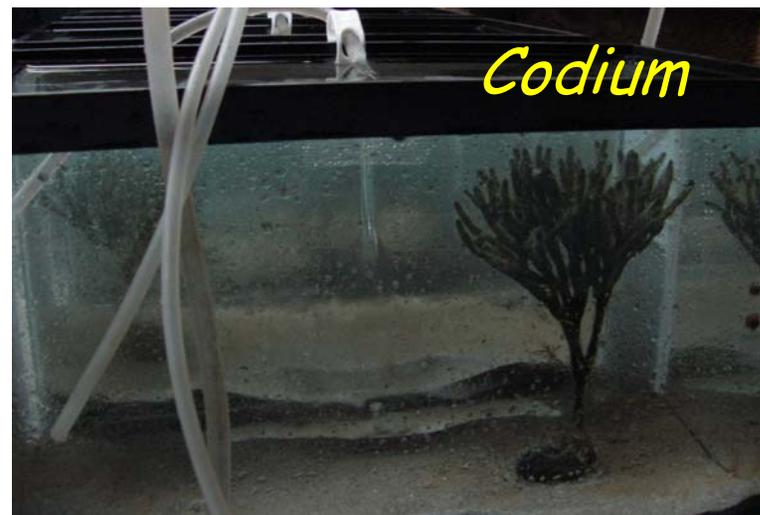
- 5 replicate 5 gal tanks; 10 scallops per tank
- Treatments were sand + eelgrass, sand + *Codium*, and sand + cobble
- Scallops placed between habitats

Experiment Series 2:

- 2 replicate 40 gal tanks; 20 scallops per tank
- Treatments were sand + eelgrass, sand + *Codium*, and sand + cobble
- Scallops placed between habitats



Methods



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Methods

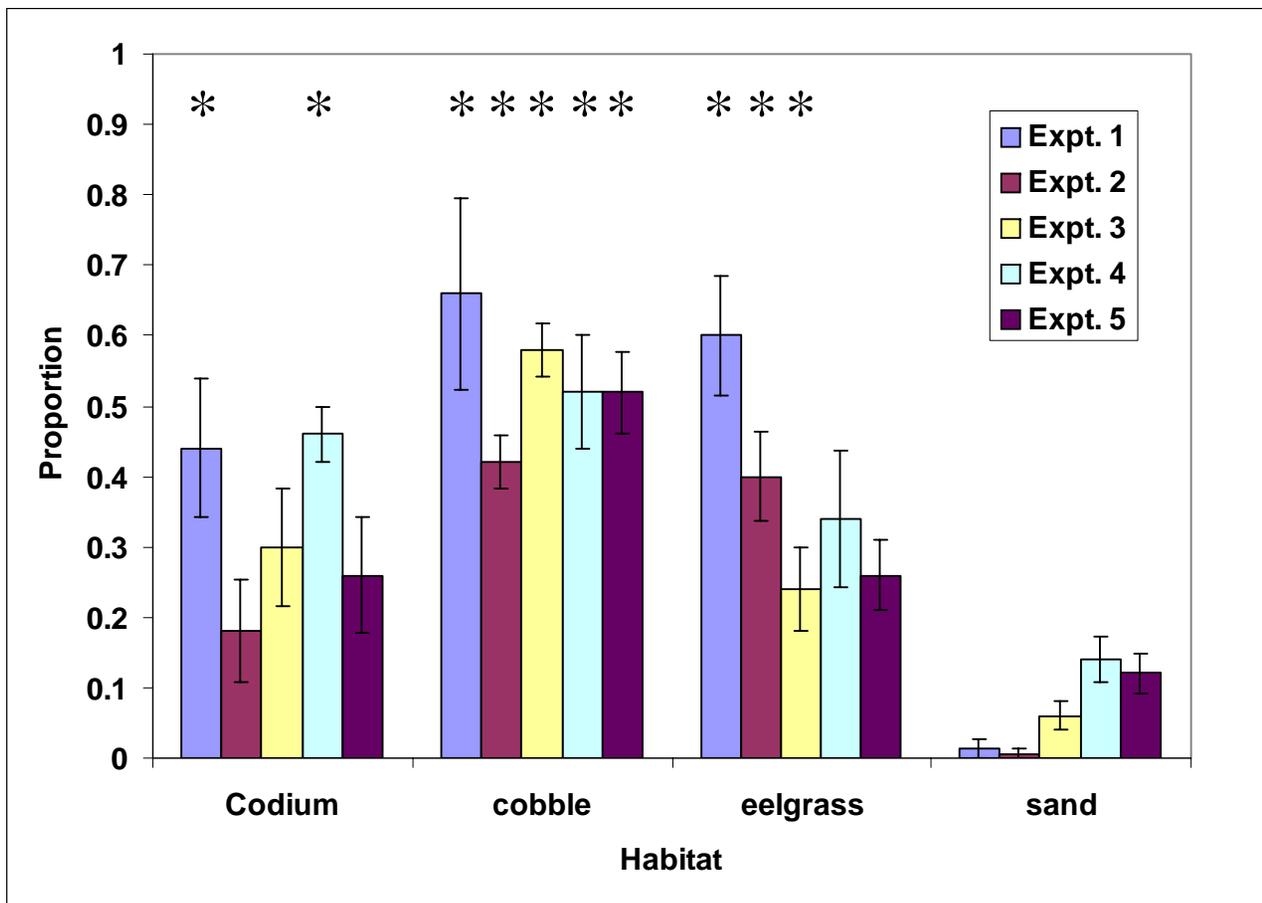


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Scallops Within Habitats

Experiment Series 1: Scallops < 15 mm shell length



- Significant Experiment effect ($p = 0.003$)
- Significant Treatment effect ($p = 0.0001$)
- cobble separated from eelgrass and *Codium*
- Significant differences between cobble and sand, eelgrass and sand, and *Codium* and sand (*)

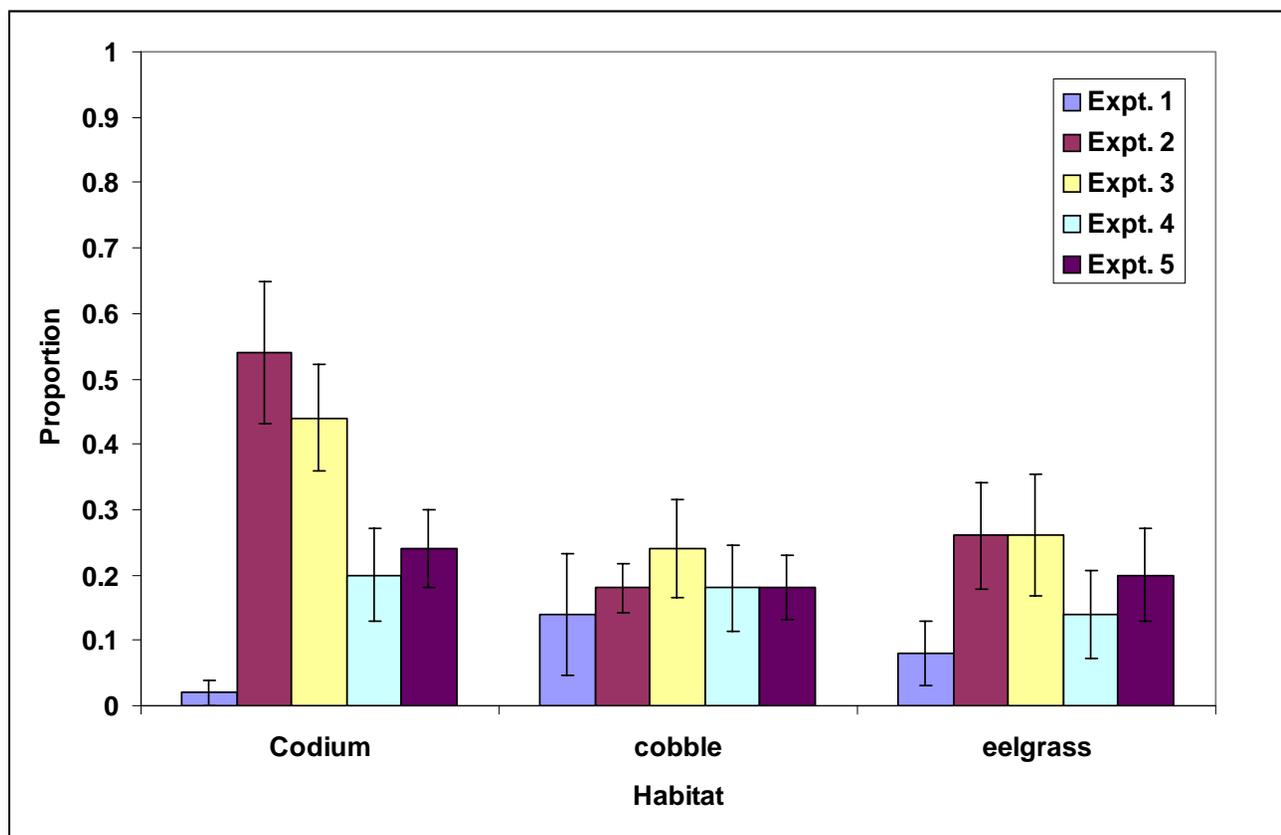


Scallops Within Habitats:
Scallops at 6 h



Scallops In Flow Area

Experiment Series 1: Scallops < 15 mm shell length



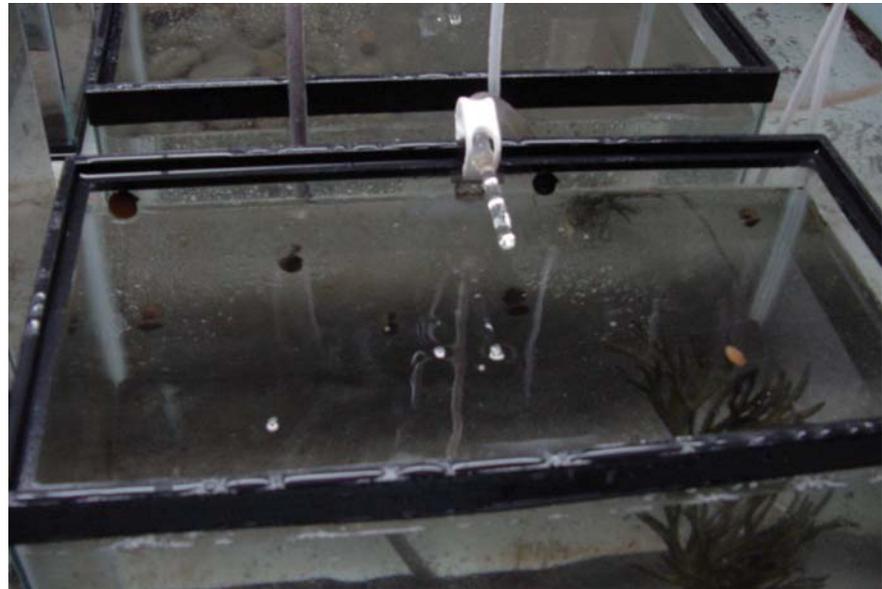
- Significant Experiment effect ($p = 0.0005$)
- Significant Treatment effect ($p = 0.05$)
- *Codium* separated from cobble and eelgrass





Scallops In Flow
Area:

Scallops at 24 h

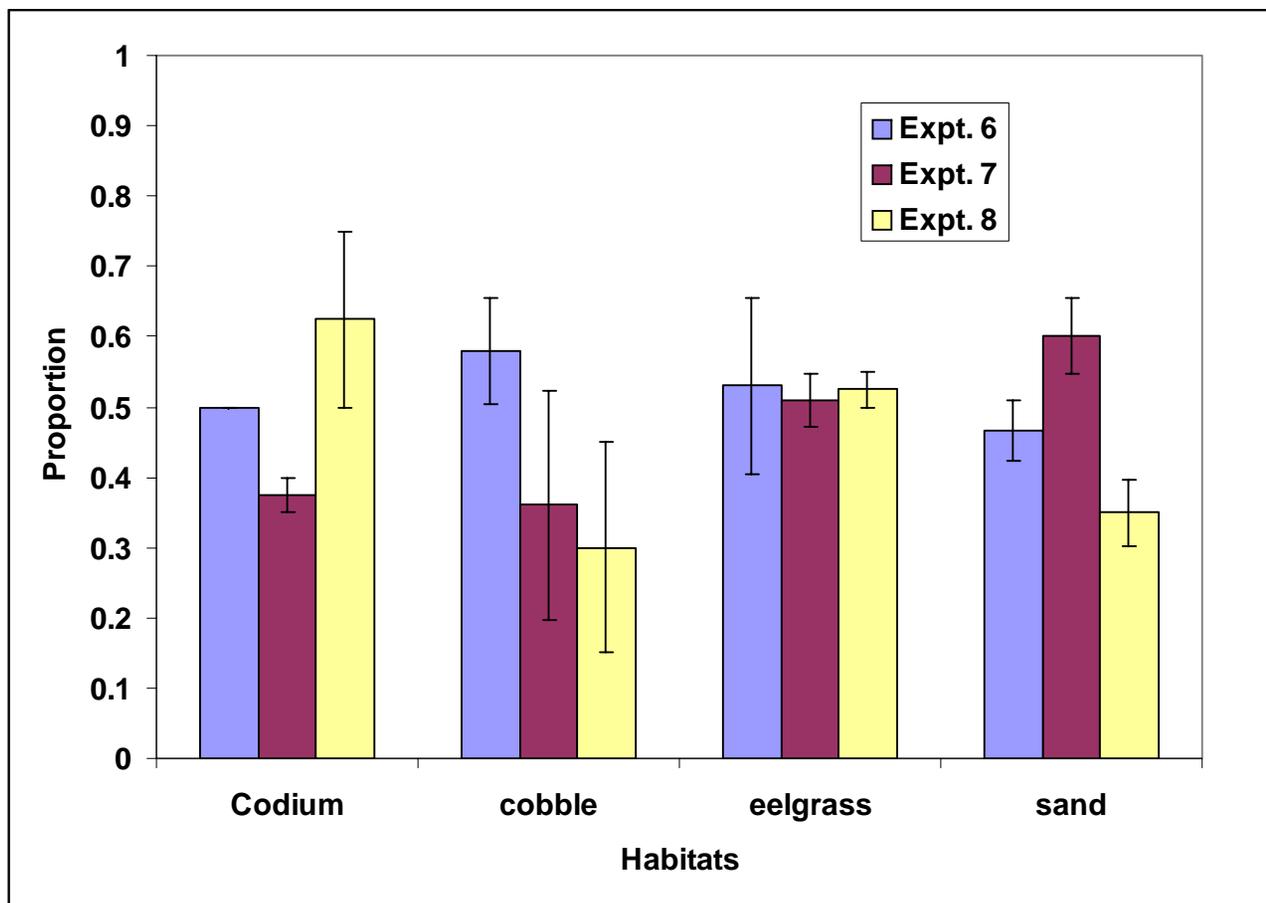


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Scallops Within Habitats

Experiment Series 2: Scallops > 25 mm shell length



- No significant Experiment effect ($p = 0.41$)
- No significant Treatment effect ($p = 0.43$)
- No significant differences between sand and other habitats





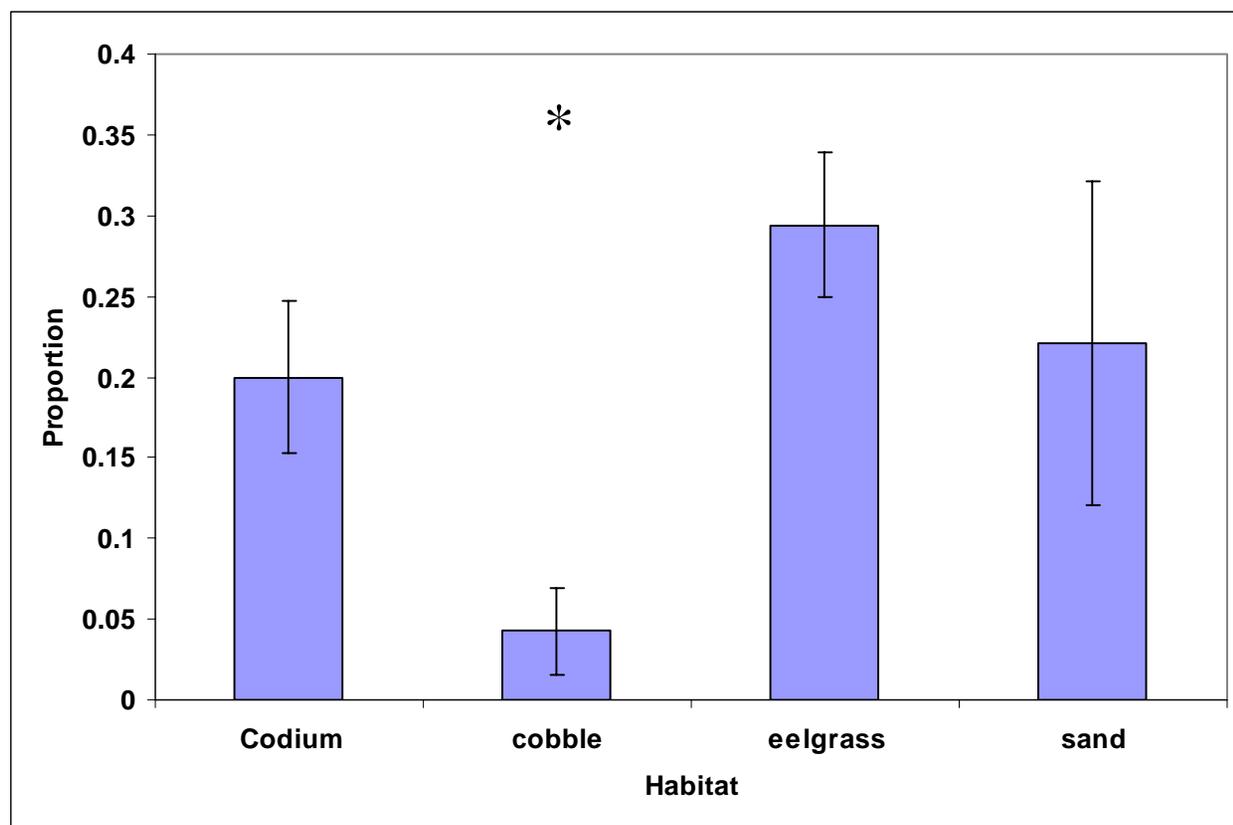
Scallops Within Habitats:

Scallops at 24 h



Scallops Buried in Sand

Experiment Series 2: Scallops > 25 mm shell length



- No significant Experiment effect ($p = 0.53$)
- Significant Treatment effect ($p = 0.025$)
- Significant difference between cobble and sand





Scallops Buried
in Sand:

Scallops at 24 h



Summary

-  Small scallops (< 15 mm) prefer structured habitat over sand.
-  Small scallops prefer flow areas 30-40% of the time.
-  Larger scallops (> 25 mm) do not prefer structured habitat over sand.
-  Larger scallops prefer to bury about 25% of the time.



Future laboratory experiments

- Predation:

Scallop habitat choice and survival as a function of habitat type (eelgrass, bare sand, cobble, macroalgae)



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www.dive-rite.com



InfoZone at Museum Victoria



Applications of Research



Use data in three models:

- Habitat Suitability Index
- Demographic Population Model
- Systems Model



Combine models with habitat mapping techniques



Acknowledgments

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