Mapping and characterizing eastern oyster (*Crassostrea virginica*) reefs using underwater videography and quadrat sampling

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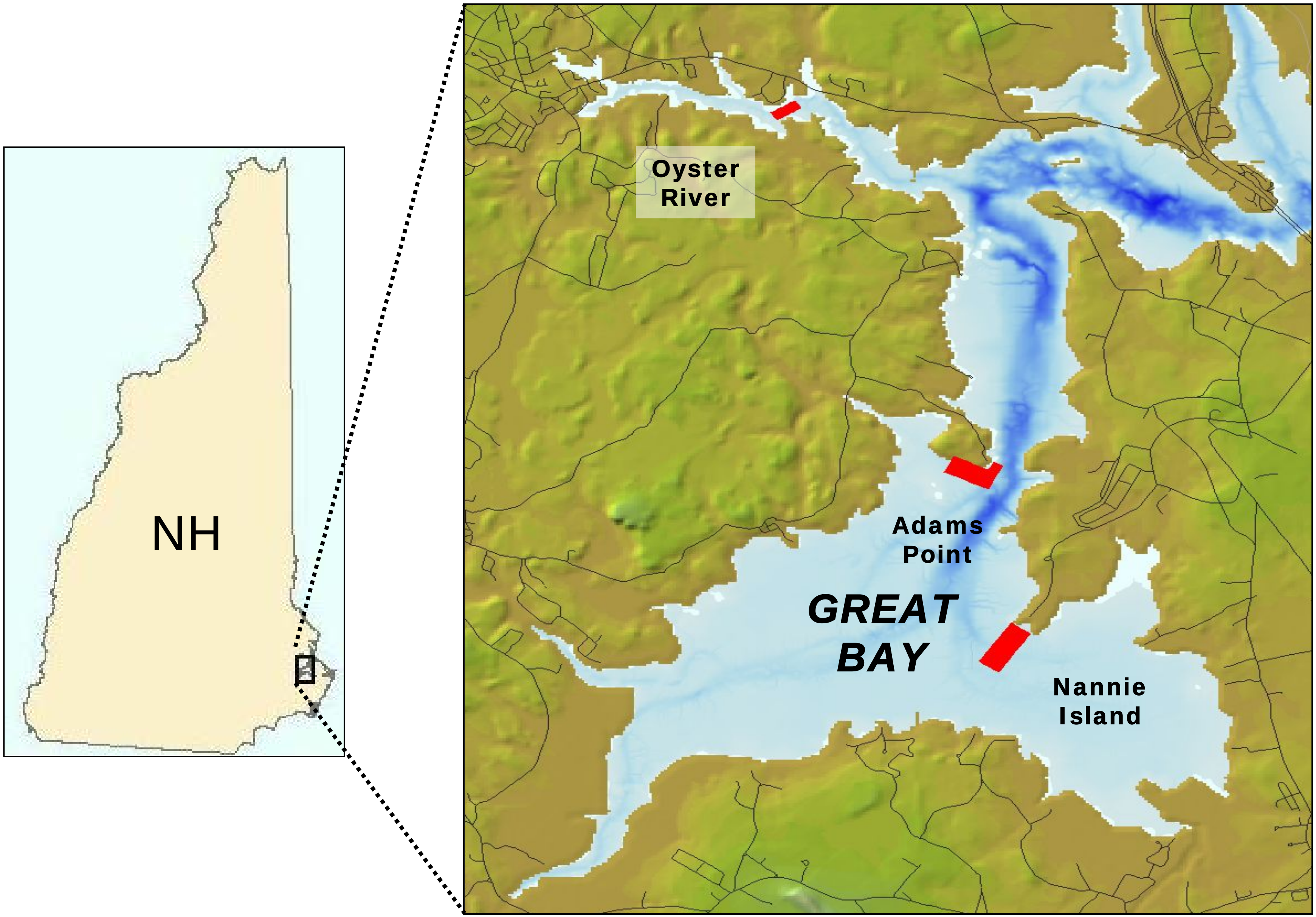
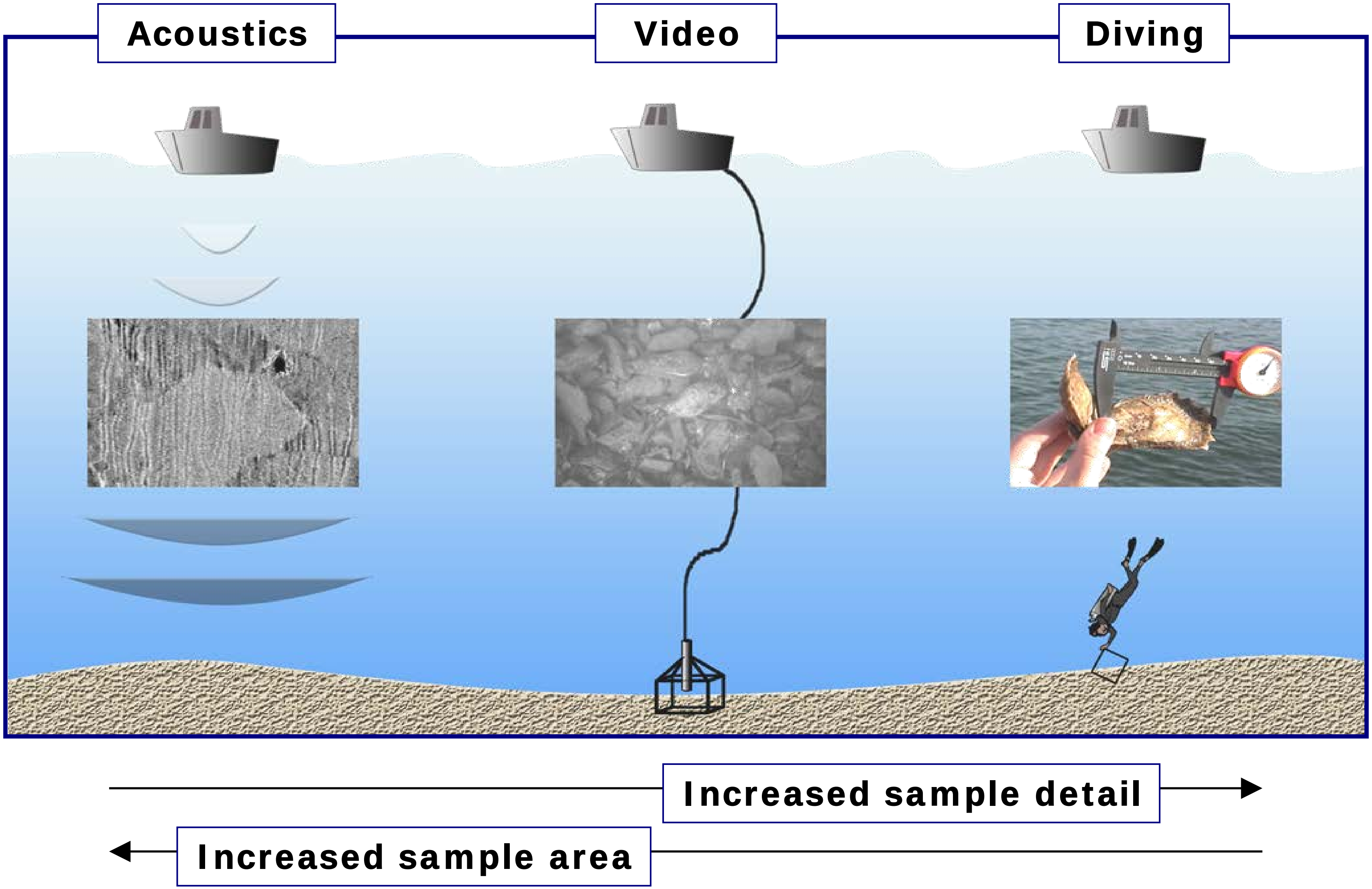
Project Goals

- To develop economical techniques to:
  - Map oyster reef boundaries
  - Describe reef characteristics
- Transfer techniques to local resource managers
- Delineate boundaries of major oyster reefs in Great Bay, NH

Major oyster reefs
Great Bay Estuary, New Hampshire



Comparison of Sampling Techniques

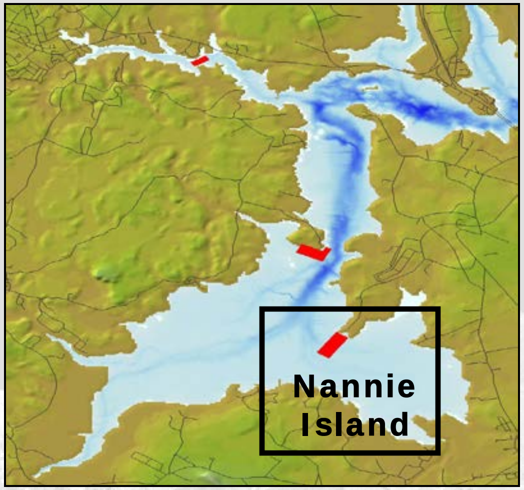


Underwater video system

- ✓ Video set-up includes low-light camera, digital video camera, differential GPS, and laptop PC
- ✓ Can be used as a drop camera (to produce photomontages) or towed at low speeds (for continuous transects)

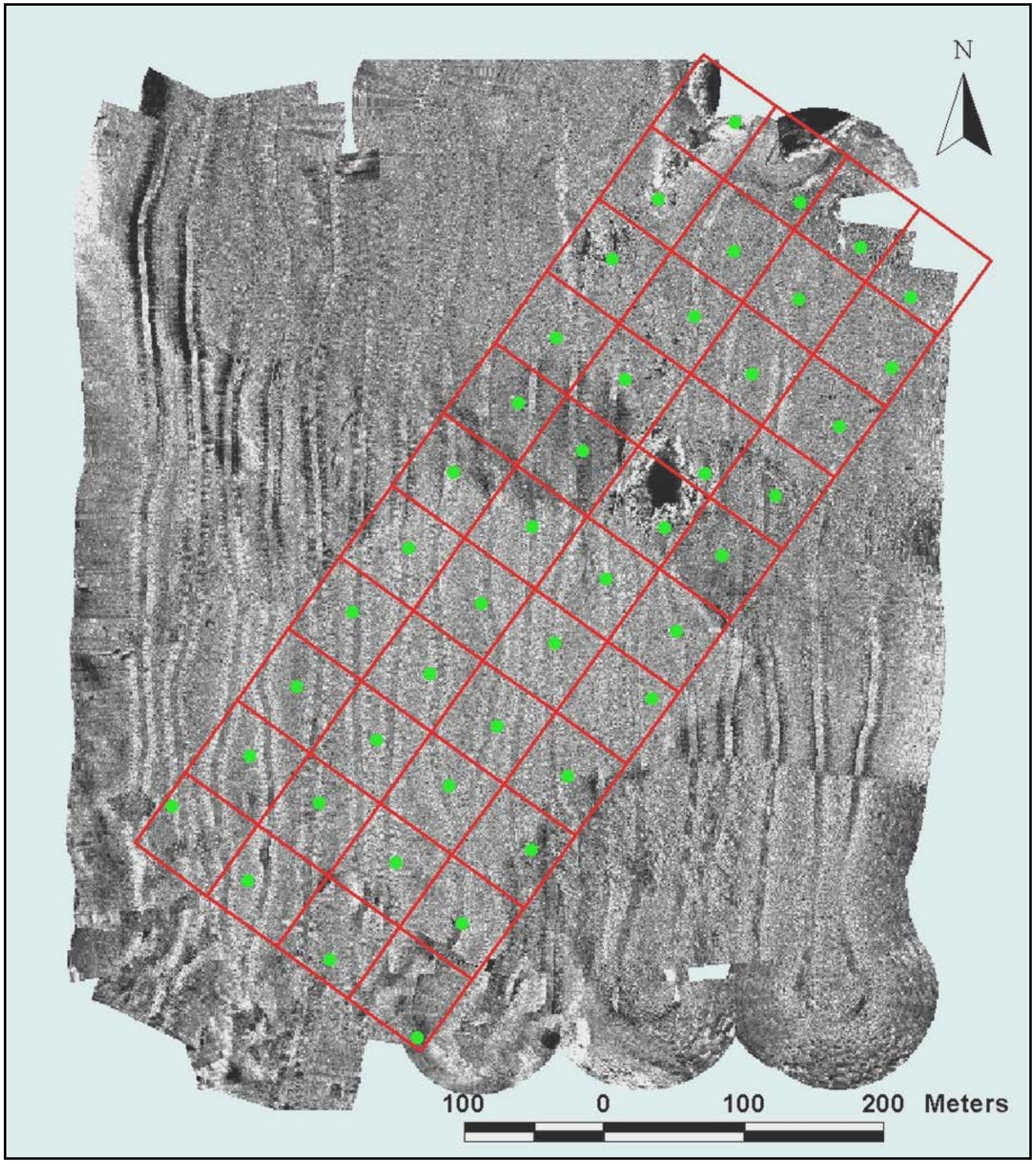
Present Method:

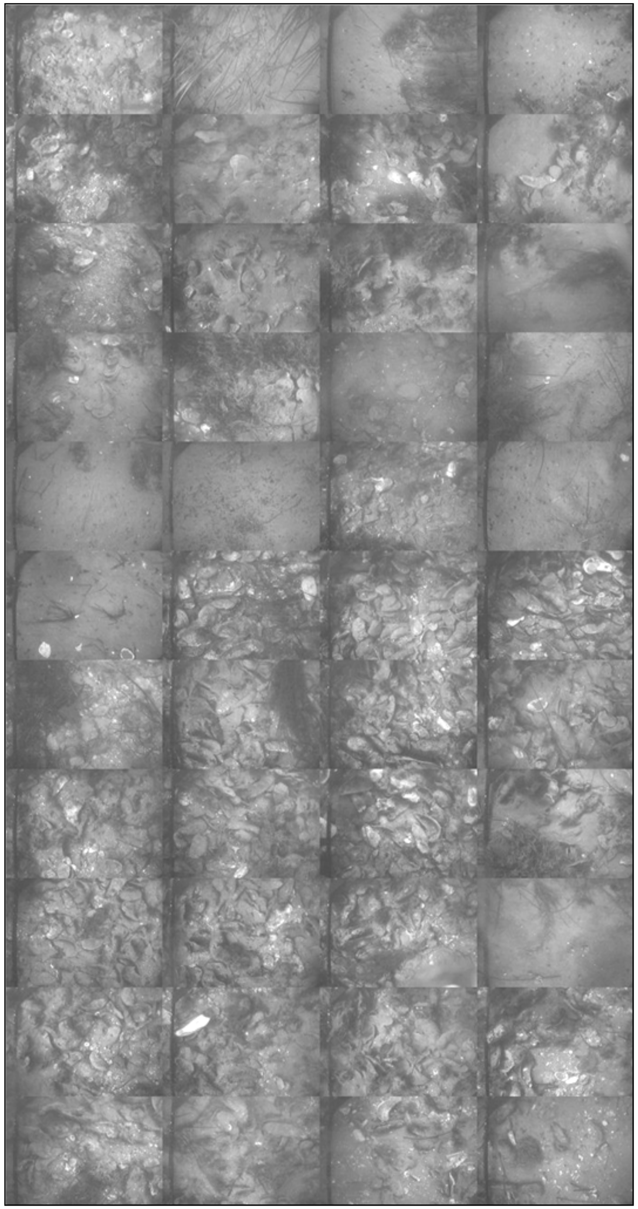
Underwater Videography and Photomontage Creation



Videography Methods

- ✓ Side scan sonar was completed by CCOM (Semme Dijkstra)
- ✓ Resulting sonar data used to create videography grid
- ✓ Video stills were recorded in each grid and assembled into photomontage



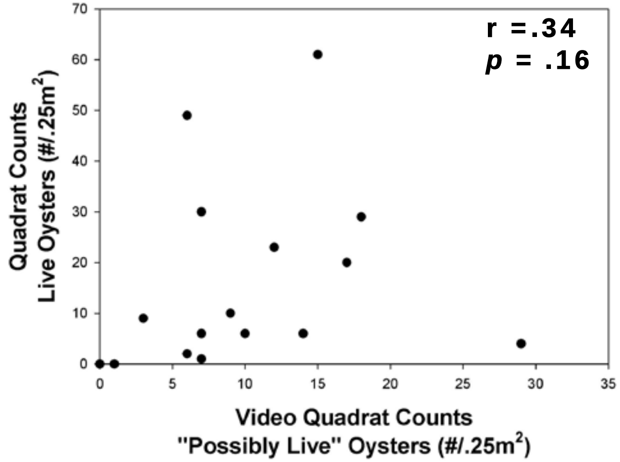


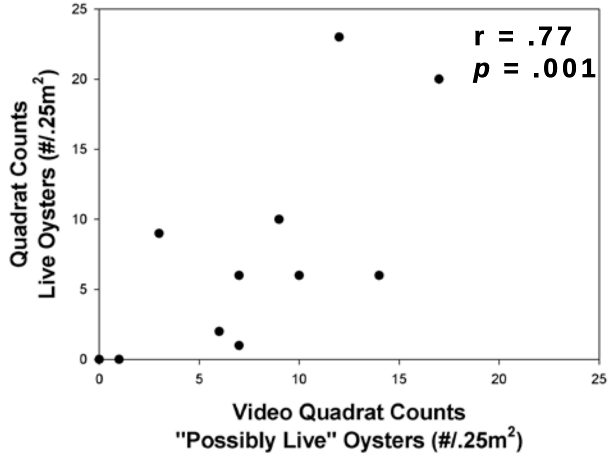
LEFT: Side scan map of Nannie reef; red grid with green dots shows locations of video images.

RIGHT: Photomontage of all video images from Nannie Island oyster reef.

Comparisons

- ✓ As compared to sonar, photomontage provides higher resolution on reef characteristics (e.g. shell cover) but poor resolution of reef boundaries
- ✓ When compared with quadrat sampling, photomontage allows more sites to be sampled but limited inference on reef characteristics; however…





Question…

Can the present video technique (photomontage from stills) be improved upon?

Project Goal

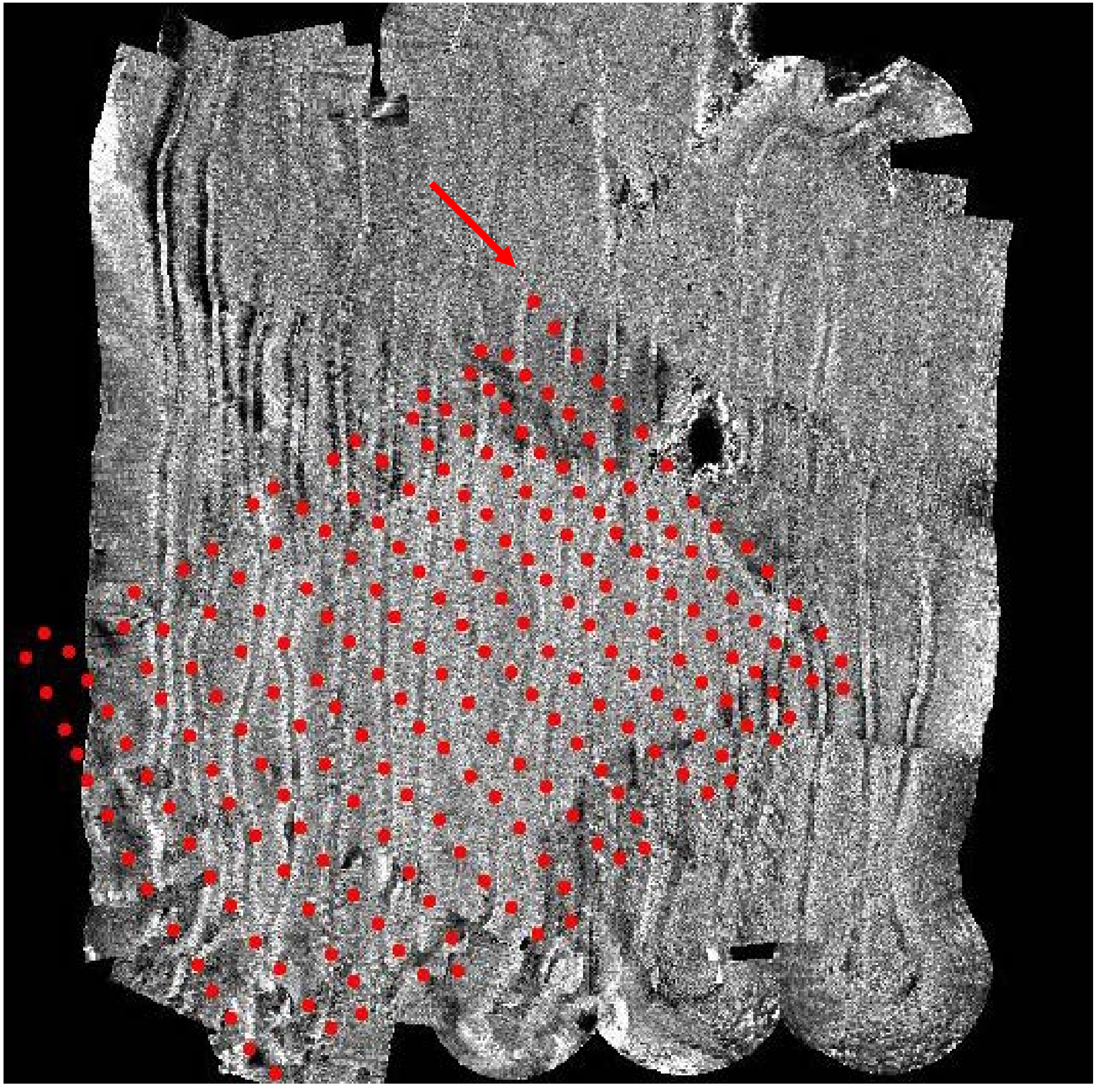
Develop new method to:

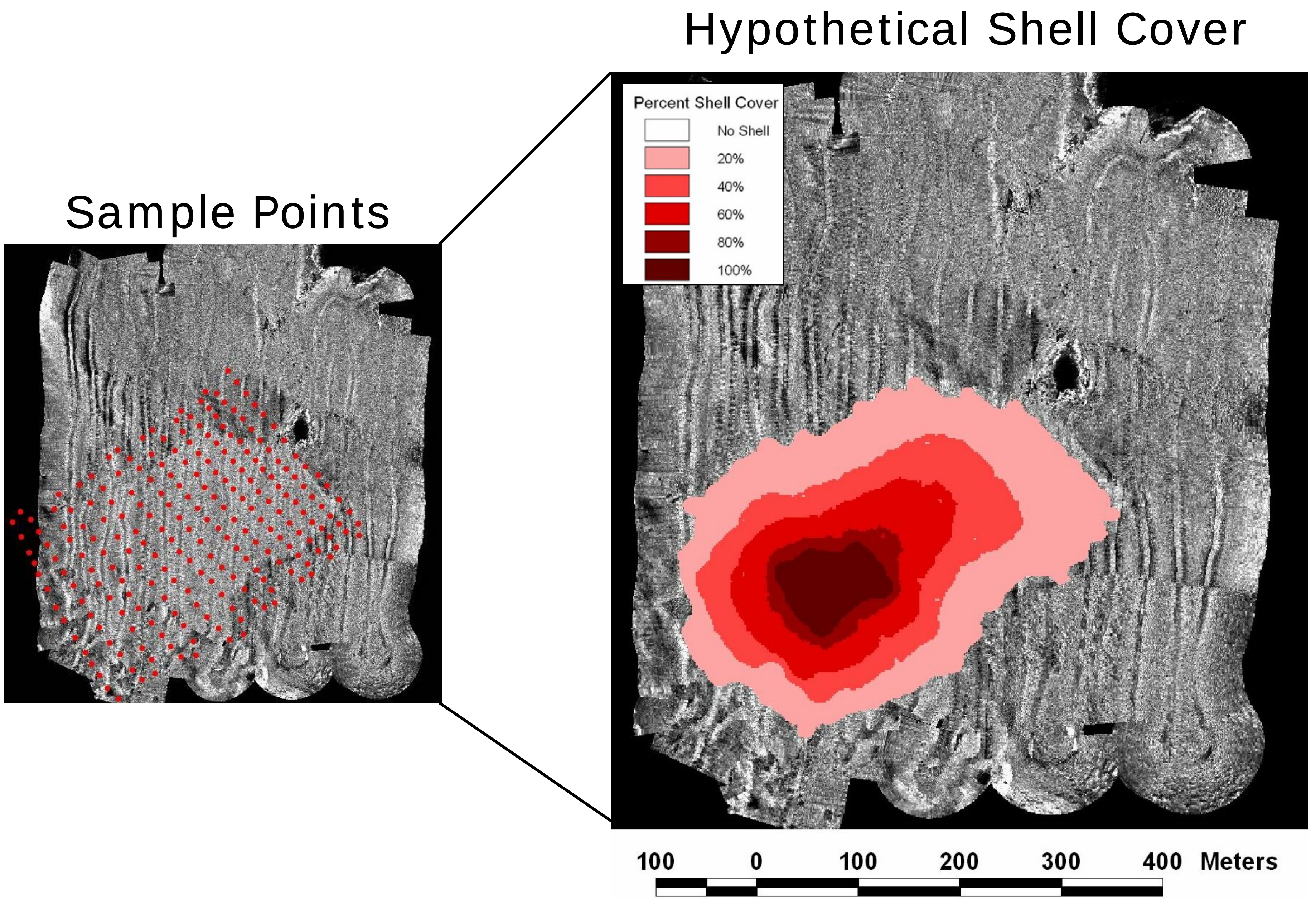
- ✓ Increase boundary resolution
- ✓ Enhance knowledge of intrareef spatial patterns (e.g. % shell cover)

New Method:

Continuous Transects

Continuous Ship Transects with selected sample points




Sample Points
Hypothetical Shell Cover
Percent Shell Cover
No Shell
20%
40%
60%
80%
100%
100
0
100
200
300
400
Meters

Conclusions

What we know:

- ✓ Continuous transect method provides accurate mapping of boundaries of reef
- ✓ Continuous transects with stills provides information on spatial characteristics (e.g. shell densities) of reef
- ✓ Both methods can be combined to construct composite images of reefs

What we don't know:

- ✓ How quantitative can this method be on a sub-meter scale (e.g. counts of live oysters)?
- ✓ What are the water quality limitations (e.g. turbidity) for present system and video in general?

Acknowledgments

Brian Smith, Bruce Smith, John Nelson – New Hampshire Fish and Game

Phil Trowbridge – New Hampshire Estuaries Project

Jonathan Pennock, Holly Abeels – UNH Marine Program

Semme Dijkstra – Center for Coastal and Ocean Mapping/UNH