

Identifying the Historical Footprint of the Surfclam *Spisula solidissima* and Habitat Relationships from a Long-Term Dataset of Death Assemblages and Sedimentology



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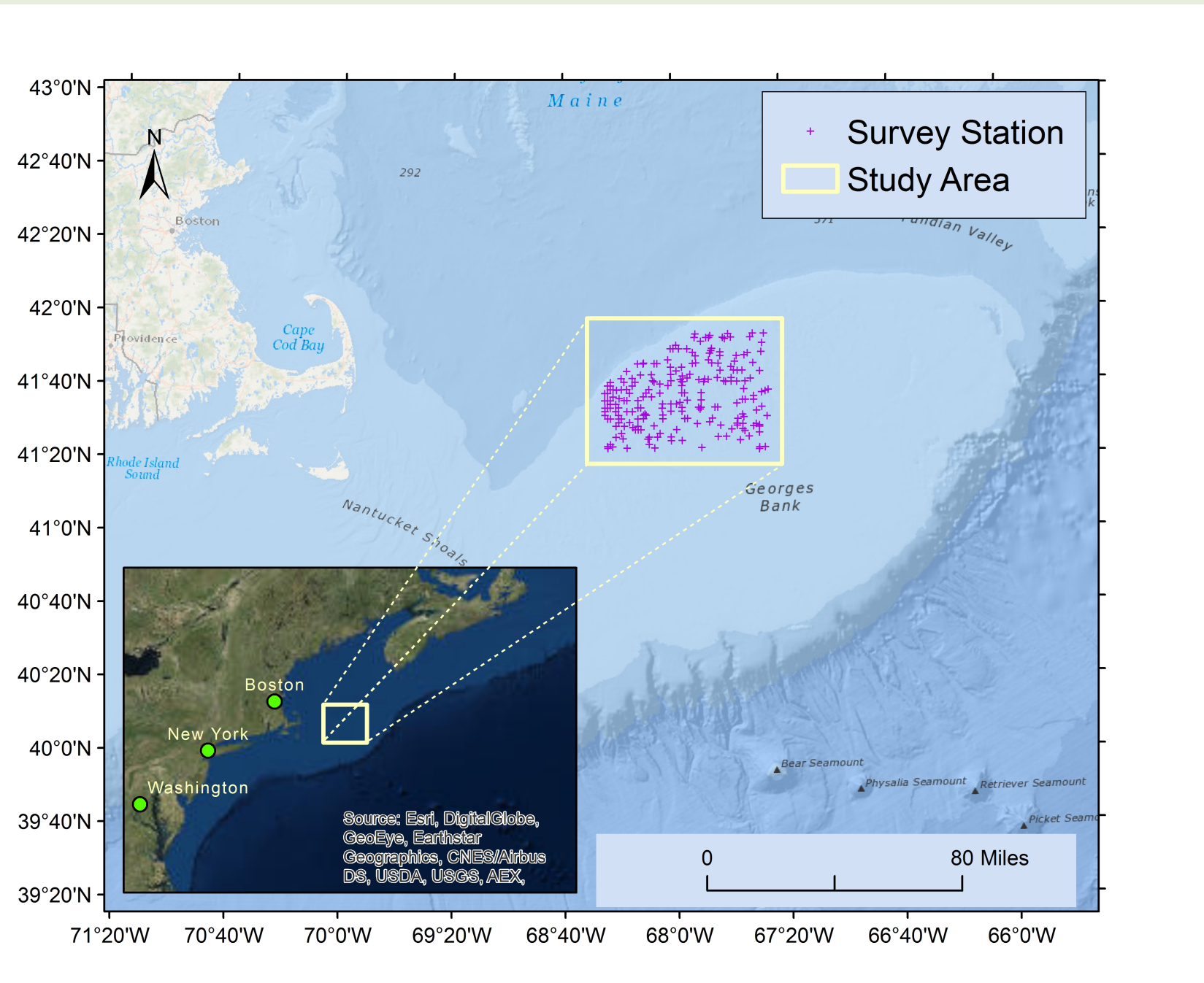
Introduction

The Atlantic surfclam, *Spisula solidissima*, is a commercially important bivalve in the Mid-Atlantic Bight. As a result of rising bottom water temperatures, the range of this species has contracted offshore and towards the northeast. The National Marine Fisheries Service has conducted surveys since 1978 to assess the abundance and location of the stock. Information regarding bycatch including shells of a suite of species, such as the long-lived ocean quahog, *Arctica islandica*, was also logged. The distributions of shells mark the historical footprint of these species. The bycatch data also permit mapping where substrate complexity exists as indicated by cobbles, rocks and boulders. Avoidance of areas where large rocks and boulders exist is desirable for the commercial fishery to reduce damage to fishing gear.

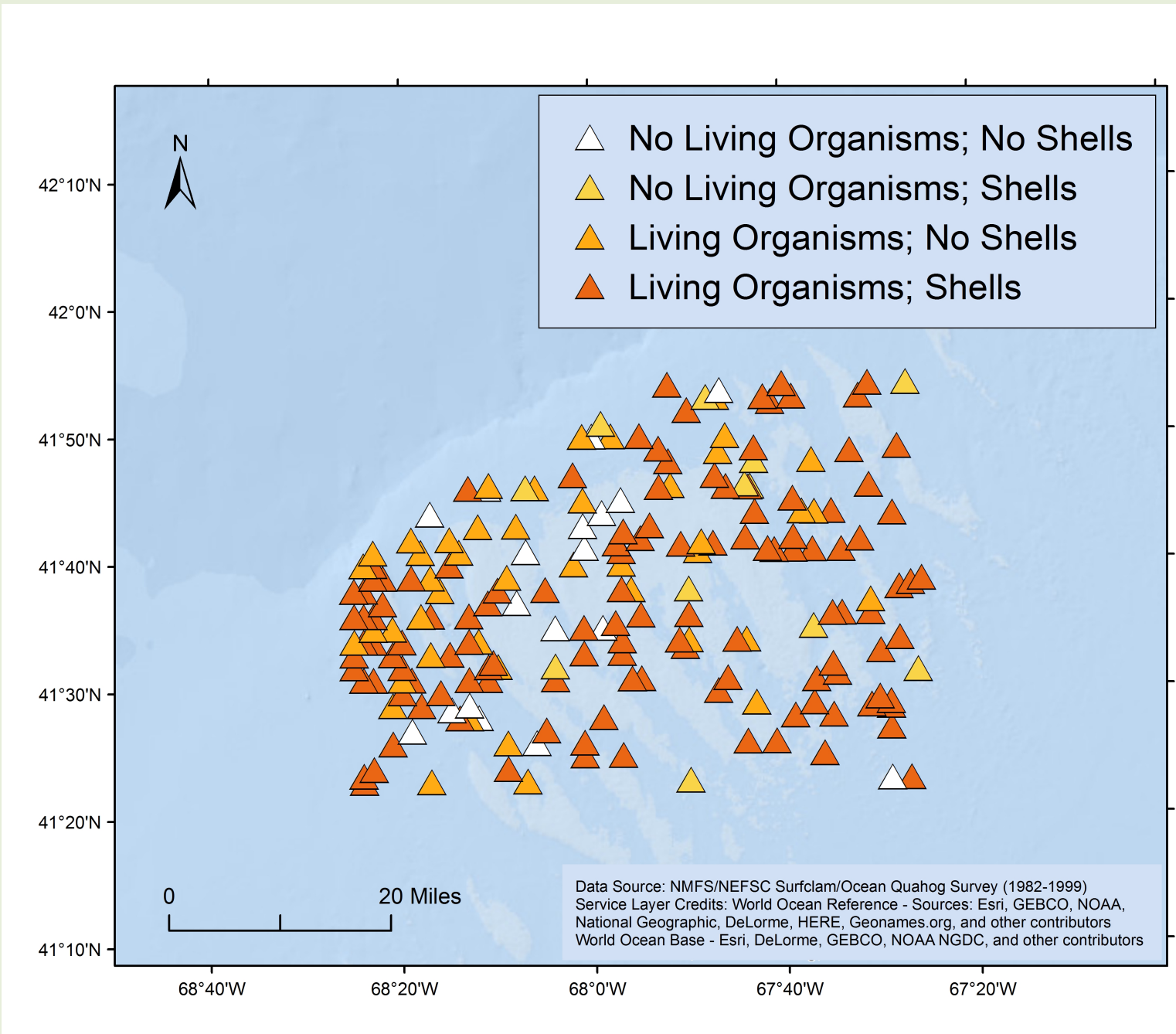
Objectives

- Track shift in range of the surfclam stock using the death assemblage to establish the historical footprint of this and other species
- Determine degree of overlap between Atlantic surfclam and ocean quahog habitat
- Identify areas of increased substrate complexity

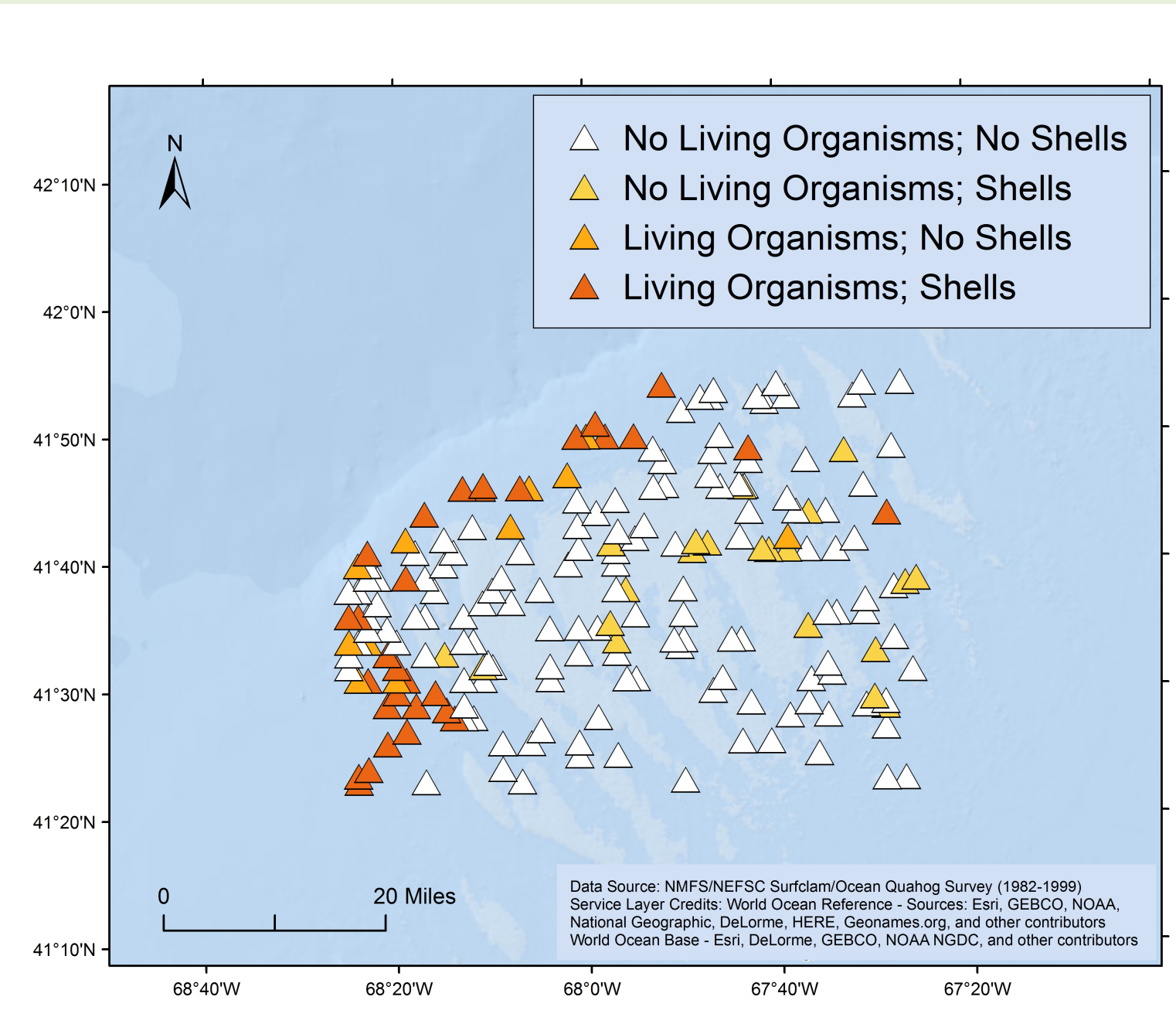
Study Site



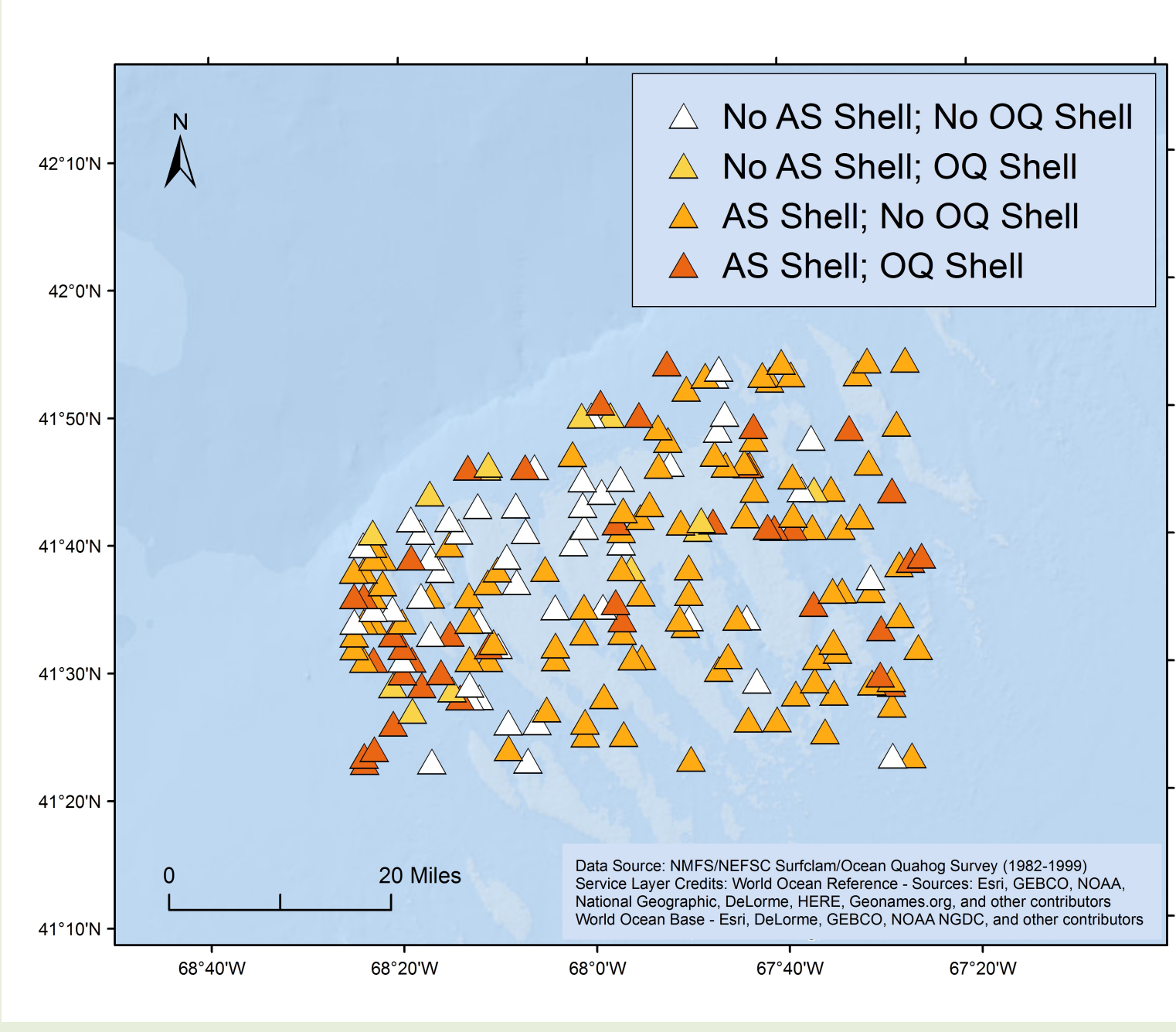
Occurrence of Atlantic Surfclams (AS):
Living Organisms and Shells



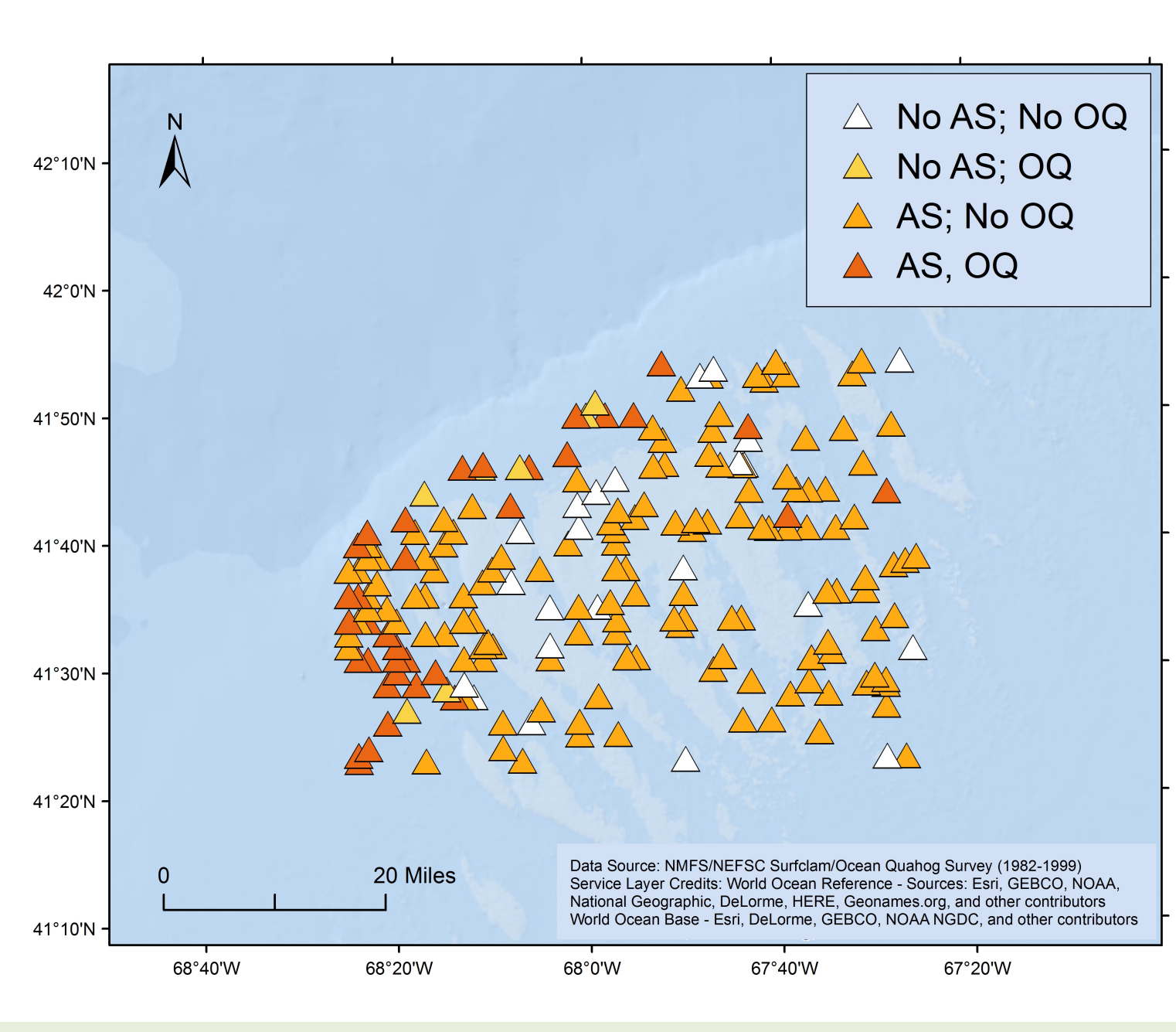
Occurrence of Ocean Quahogs (OQ):
Living Organisms and Shells



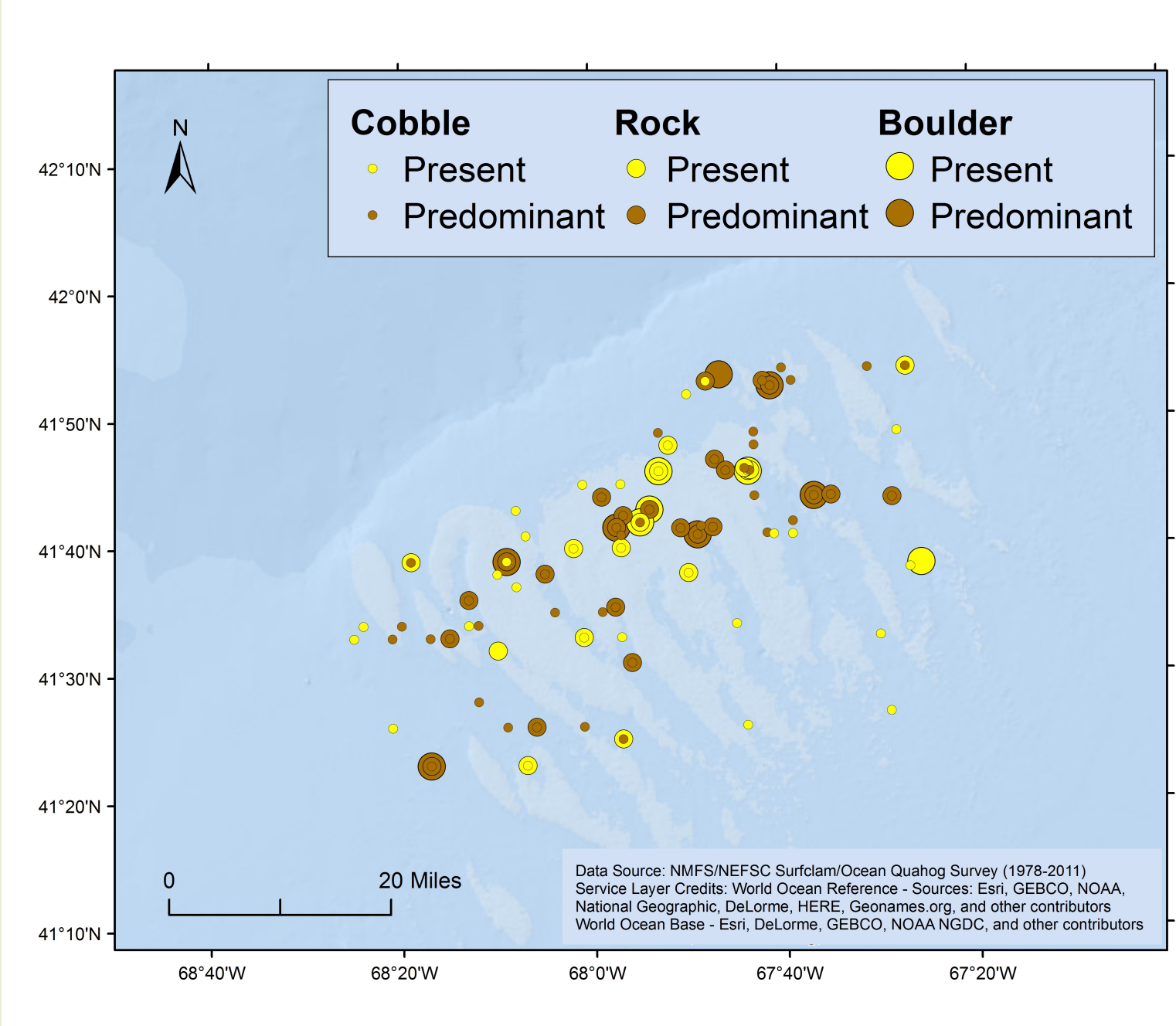
Occurrence of Atlantic Surfclams (AS) and
Ocean Quahogs (OQ): Shell



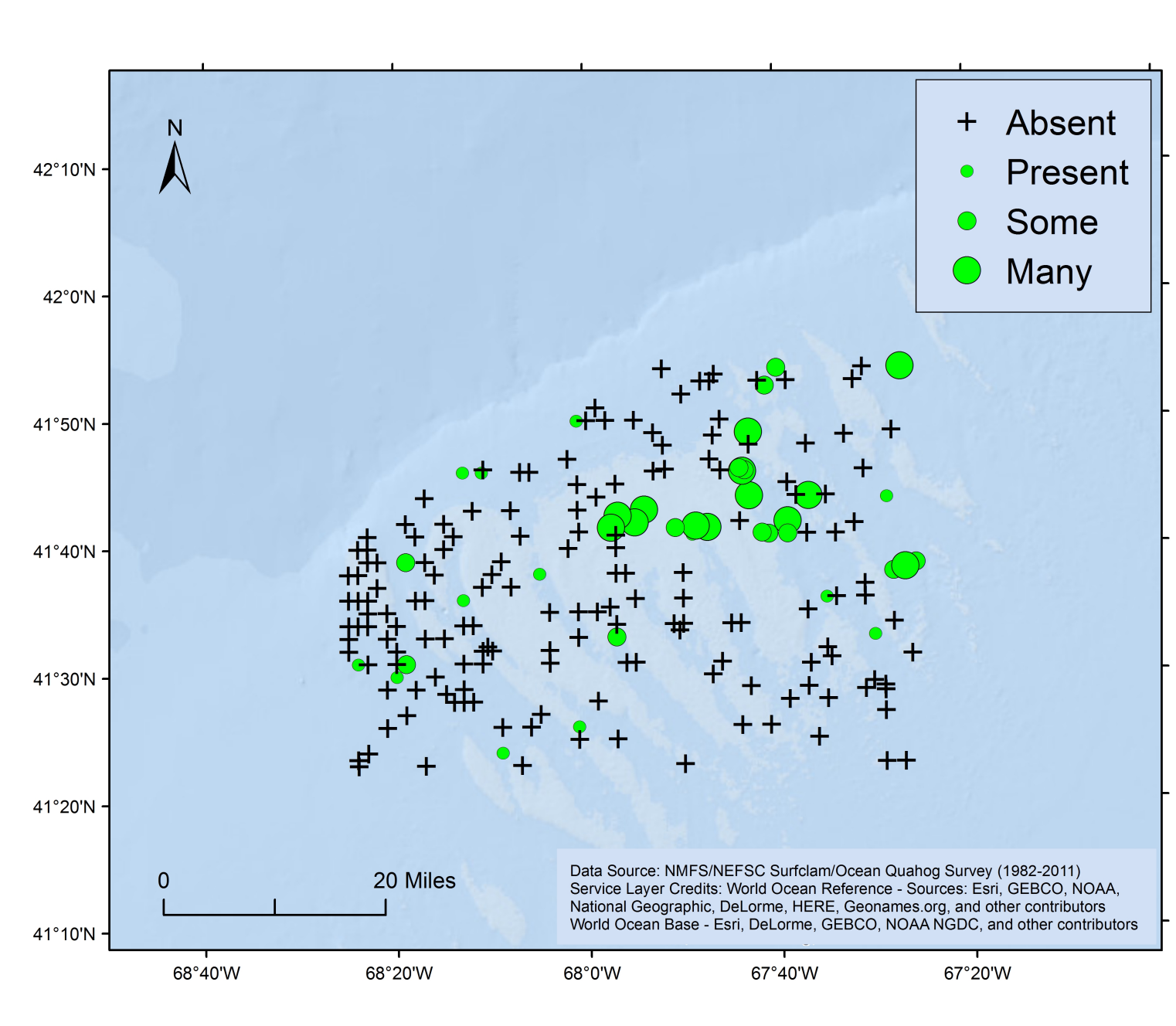
Co-Occurrence of Atlantic Surfclams (AS) &
Ocean Quahogs (OQ): Living Organisms



Occurrence of Substrate



Occurrence of Mussels



Results

- Live surfclams are present in most parts of the region and have been for some time based on the co-occurrence of surfclam shell in most locations.
- Live ocean quahogs are found primarily near the western and northern boundaries of the region with the presence of ocean quahog shell in the central region indicating past occupation by the species when waters were colder.
- Areas in the western region where live surfclams and ocean quahogs co-occur without the presence of surfclam shell indicate recent occupation by surfclams as the species expands into deeper water with increasing bottom water temperature.
- Presence of substrate in the north and northeastern region indicates complex habitat that is noteworthy in supporting habitat for horse mussels (*Modiolus modiolus*).
- Surfclam occurrence in complex habitat indicates intermittent sandy areas between rock and boulder fields.

Conclusions

Evidence suggests ocean quahogs were once present in the central region of the study area, but long ago moved into deeper water with warming bottom water temperatures. Atlantic surfclams have more recently moved into regions occupied by ocean quahogs where both species now co-occur. Both of these shifts are consistent with increasing bottom water temperatures since the end of the Little Ice Age and more recently with global warming.

Acknowledgements

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