

Influence of mussel farms on movements of the American lobster (*Homarus americanus*)

Émilie Simard^{1,2 *} Annick Drouin^{1,2} Chris McKindsey^{1,2} Philippe Archambault¹
Luc Comeau³ Madeleine Nadeau⁴

¹ Institut des Sciences de la Mer (ISMER) ² Institut Maurice-Lamontagne, DFO ³ Gulf Fisheries Centre, DFO ⁴ Centre d'Innovation de l'Aquaculture et des Pêches du Québec (MERINOV)

Introduction

A largely unstudied effect of off-bottom and suspended bivalve culture is how the large amount of physical structure (ropes and anchor blocks) used in the practice affects benthic communities by modifying habitat characteristics, such as physical complexity, currents, sediment dynamics and sedimentation rates¹. Bivalve farming typically occurs above unvegetated soft bottom habitats and the addition of bivalve culture-related physical structures creates a more structurally complex type of habitat that may provide shelter to species that would not ordinarily be present in any abundance (Fig. 1). In addition, mussel fall-off may represent the greatest input of organic matter to the seabed², a habitat in which such a food source is not generally found (i.e., compared to adjacent soft bottom habitats). A previous study done in a protected embayment showed that lobsters (*Homarus americanus*) are more abundant within mussel farms compared to adjacent areas and that their spatial distribution in mussel farms is influenced by both physical (anchor blocks as shelter) and trophic (enhanced feeding opportunities) effects³.

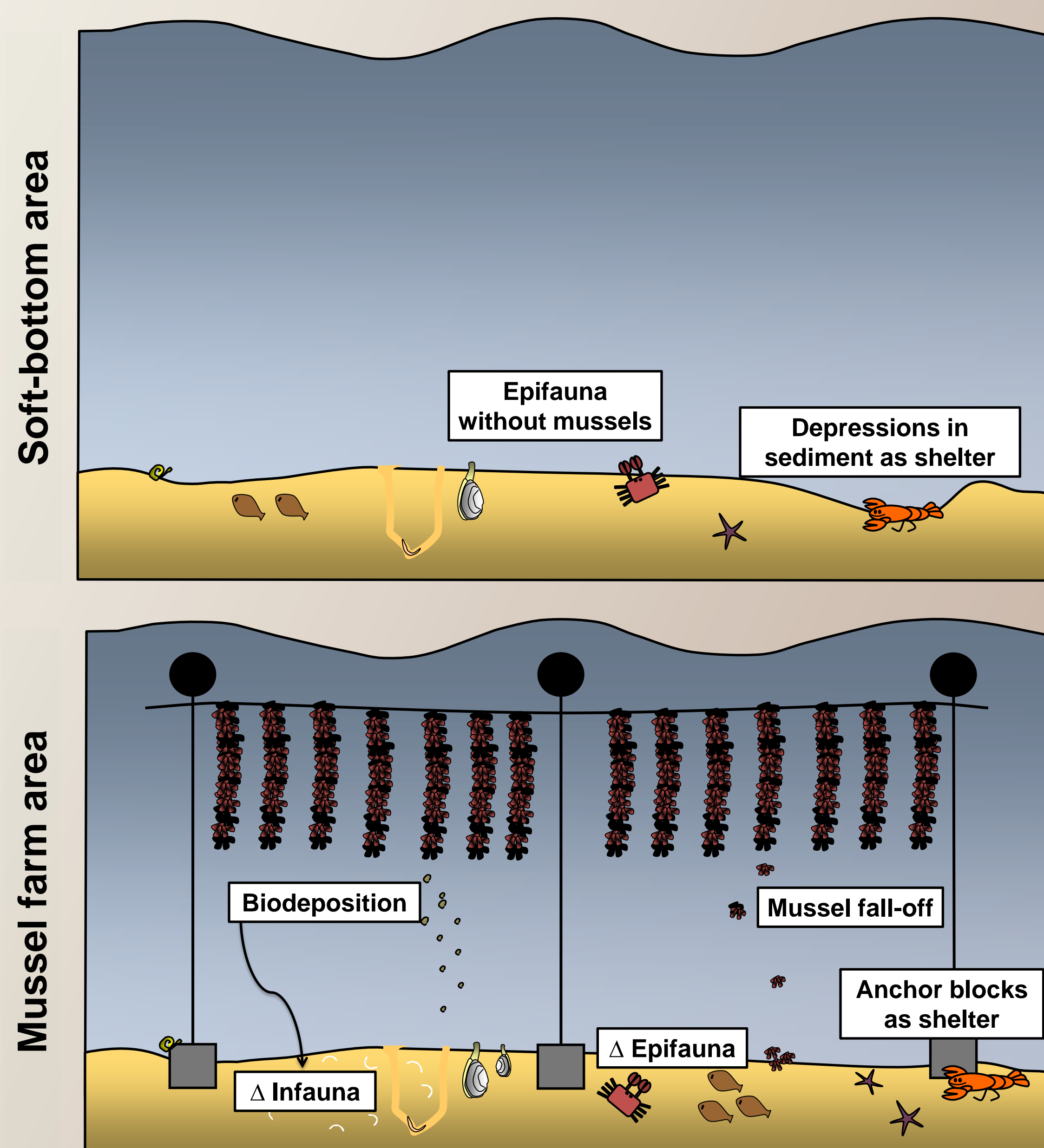


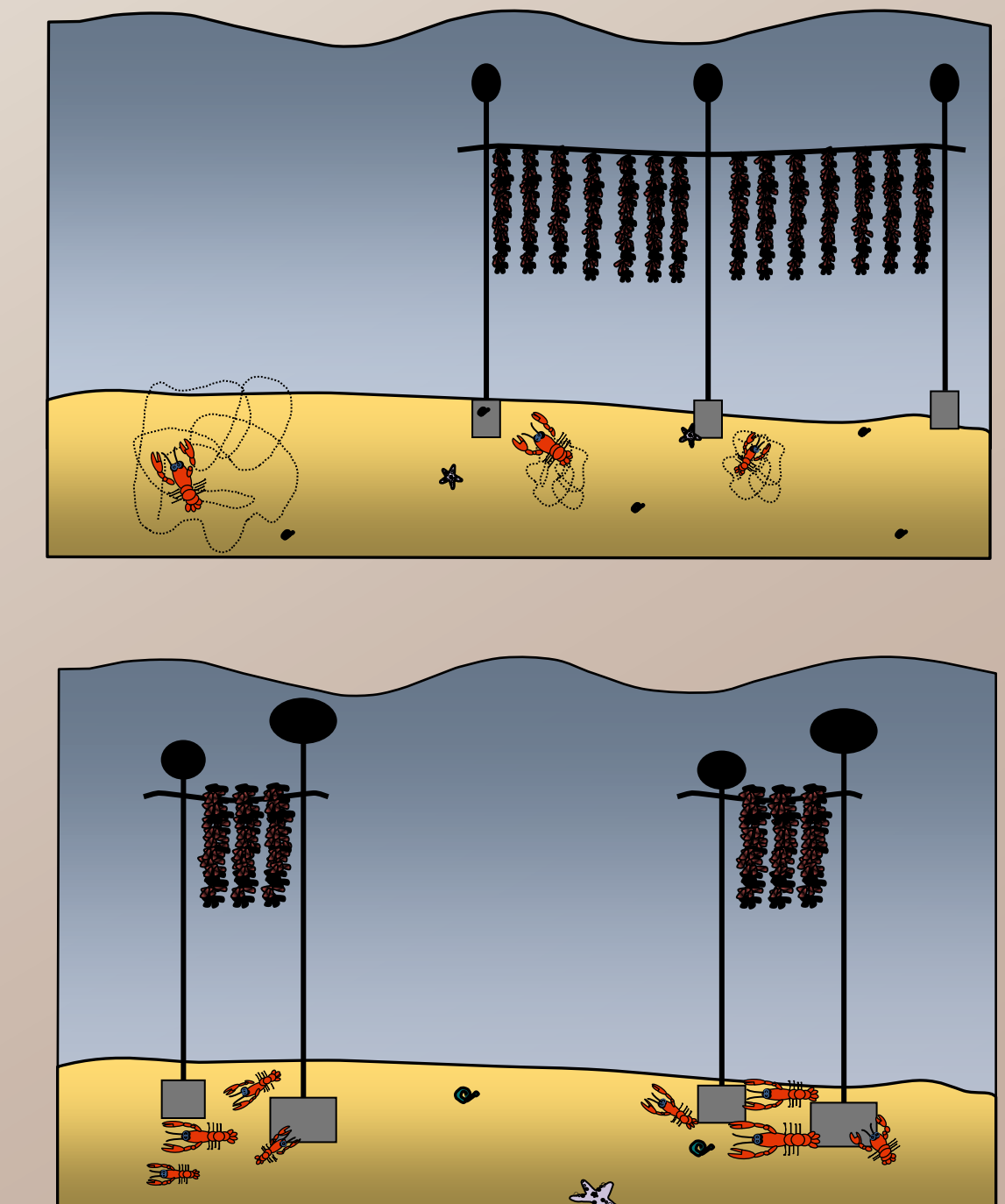
Fig.1. Illustration of how mussel farms influence habitat complexity and trophic web by comparison to adjacent soft-bottom areas.

Artificial reef-like effects created by aquaculture structures may enhance the production of the surrounding (local) population or simply displace individuals. Home range, activity patterns, habitat preference, and the nature and magnitude of movements between mussel farms and adjacent unfarmed areas are unknown. Describing the effect of mussel farms on lobster movements represents valuable knowledge to the development of aquaculture in areas where lobster is the main fishery.

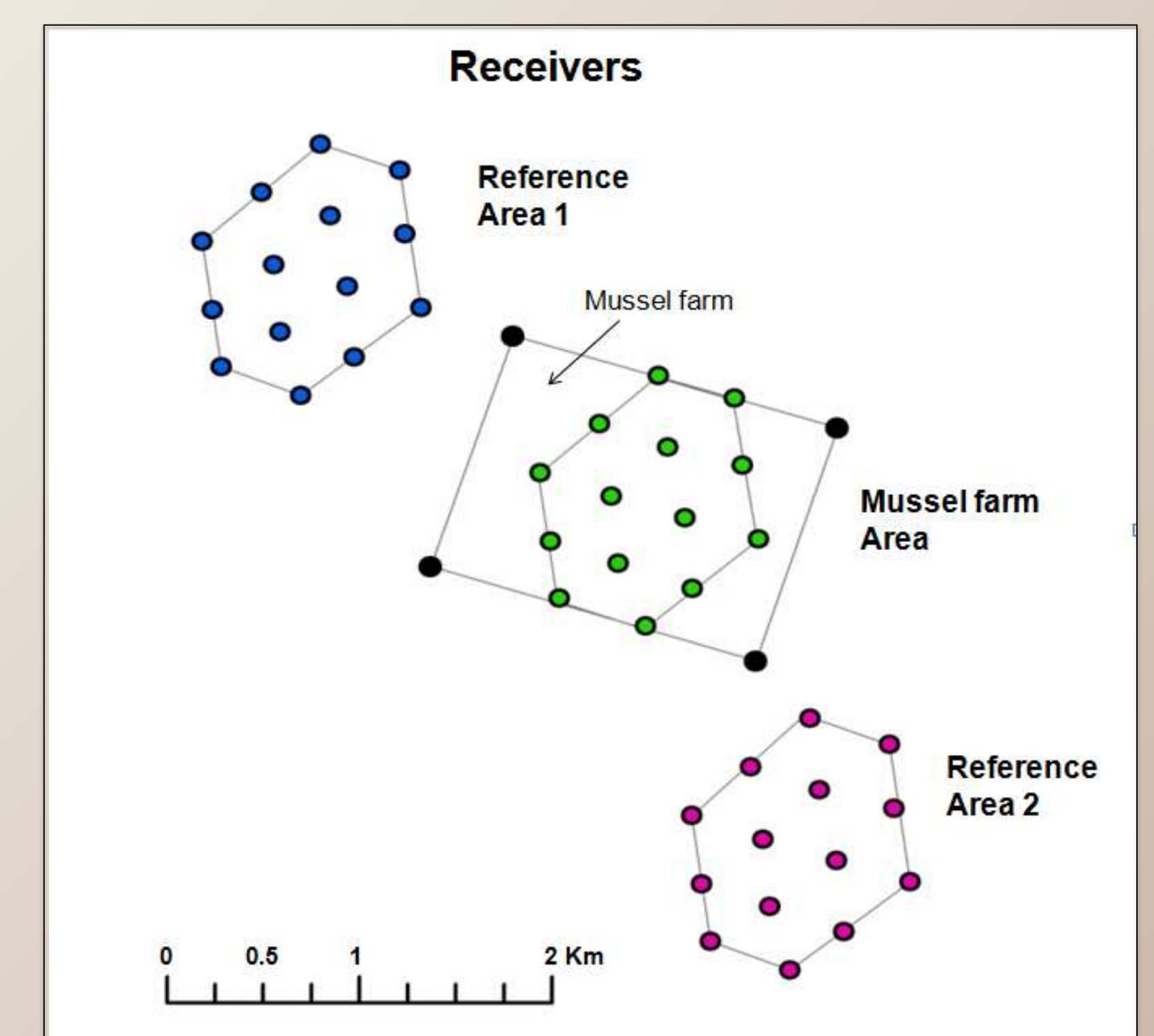
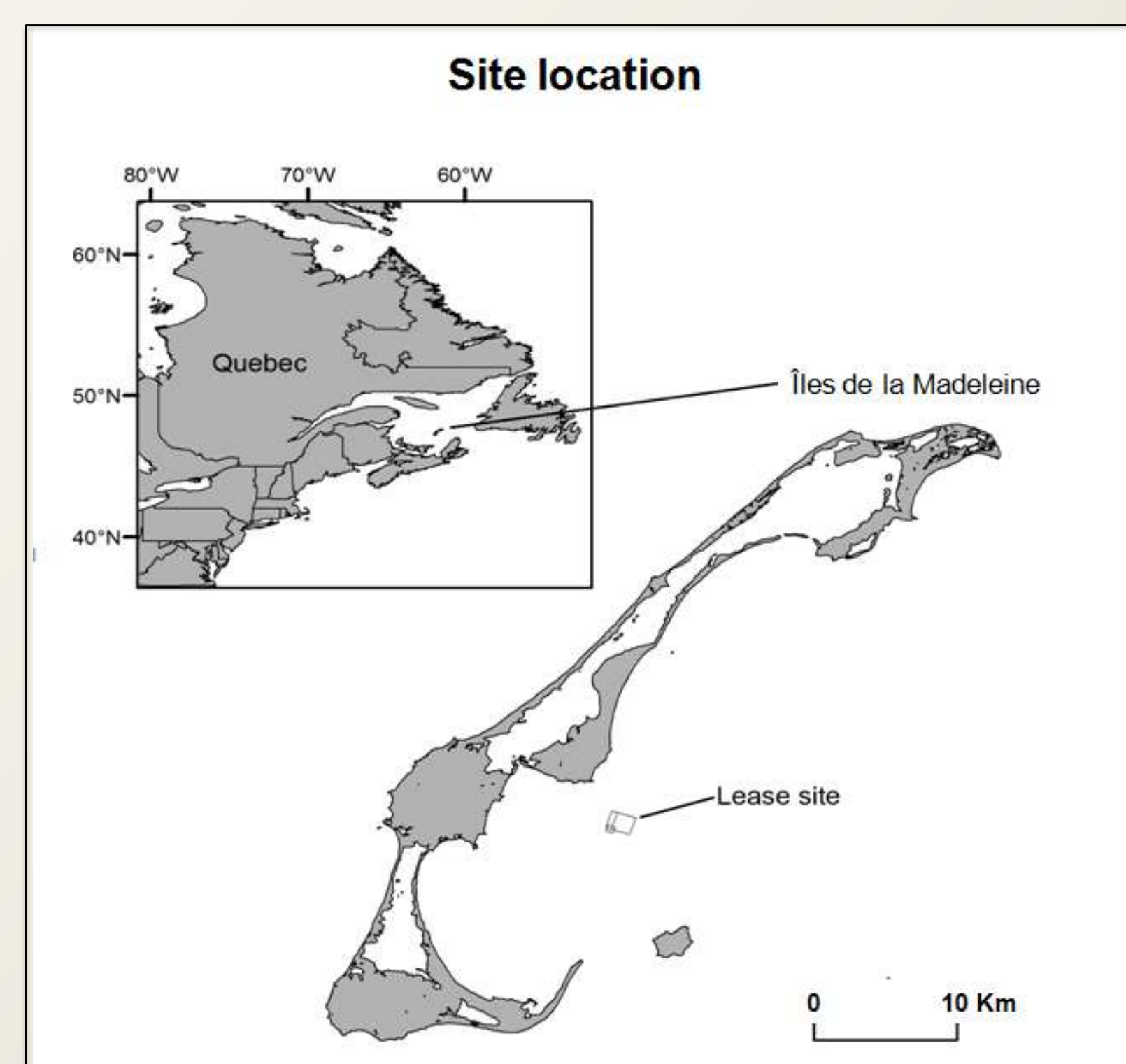
Objective and hypothesis

The objective of this study is to better understand how off-shore mussel farms impact lobster aggregation and movement. This following hypotheses will be tested

- 1) Movements and the home ranges of lobsters are smaller inside of farms than outside of them.
- 2) The majority of lobsters in farm sites are associated with anchor blocks.



Methodology



Characteristics of the study areas

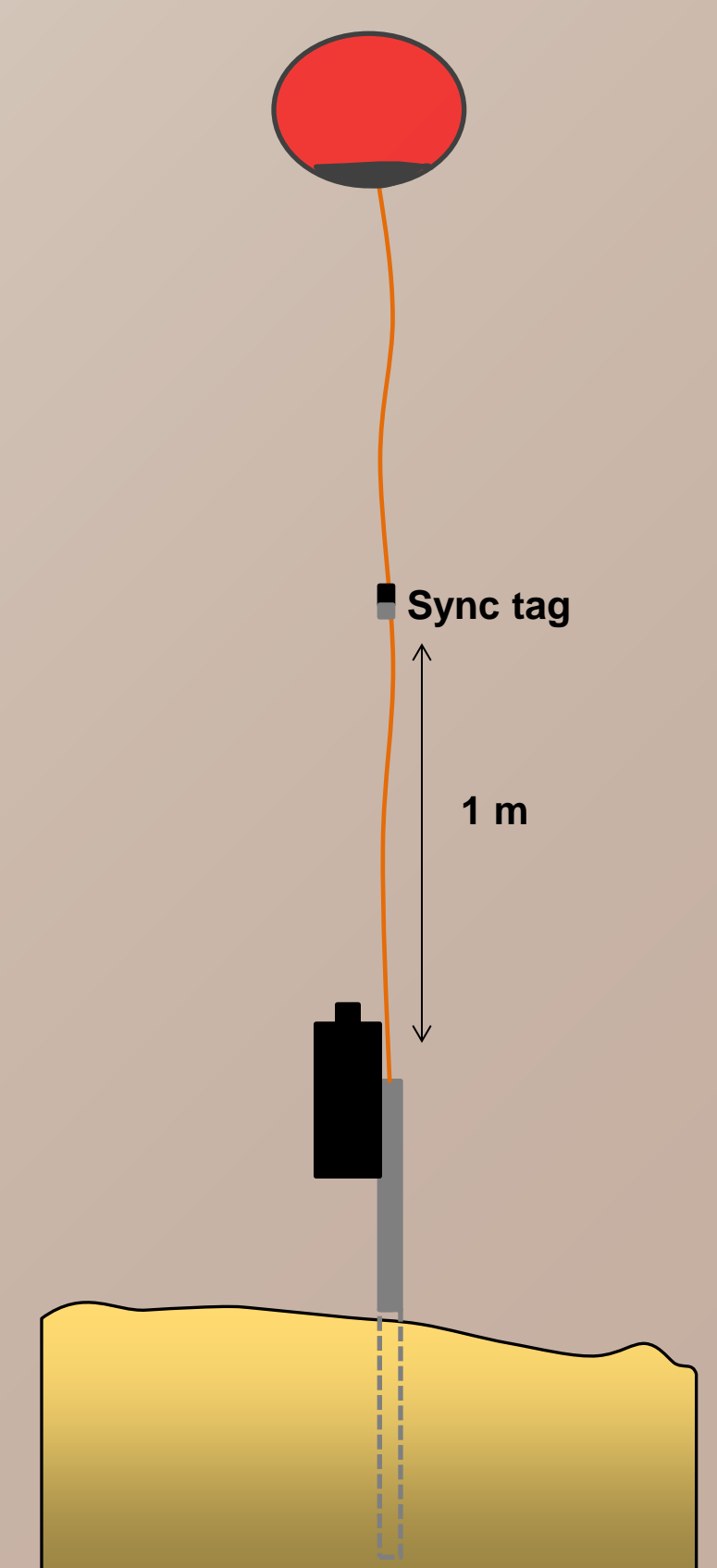
- 20 meters deep
- Unvegetated soft bottom

Characteristics of the telemetry system

- 14 receivers/site
- Each site $\approx 1\text{km}^2$
- Receivers: VR2W; Tags: V13 (Vemco)
- July to September
- American lobster (50mm – 70mm cephalothorax)
- 15 lobsters will be captured, measured, identified by a tag, and released at the location of capture in each site
- 15 additional lobsters will be caught outside of the farm, tagged, and placed within the farm area

Use of the ultrasonic receiver

- To track individual lobster



References: 1) McKindsey, C. W., P. Archambault, M. D. Callier and F. Olivier (2011) Influence of suspended and off-bottom mussel culture on the sea bottom and benthic habitats: a review. *Canadian Journal of Zoology* 89: 622-646, 2) Fréchette, M. (2012) Self-thinning, biodeposit production, and organic matter input to the bottom in mussel suspension culture. *Journal of Sea Research* 67: 10-20. 3) Drouin, A., P. Archambault, B. Clynick, K. Richer, and C.W. McKindsey (Submitted) Variation in the distribution of macrofauna associated with mussel aquaculture in îles de la Madeleine, eastern Canada, with an emphasis on the American lobster (*Homarus americanus*). *Aquaculture Environment Interactions*

* Contact: Emilie Simard <emilie.simard2@videotron.ca>