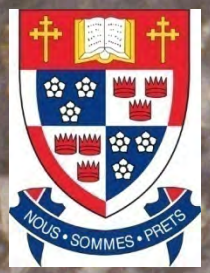
Influence of near bottom mariculture on intertidal diversity



Plans for expansion: based on a 1998 Western Economic Diversification report

Potential to create 1,100 new industry jobs over the next 10 years and generate $100 million annually in coastal communities


Rosewall Creek, Mud Bay


Ship Point


Base Flats


North of Repulse Point, Denman Island
•Predator netting
•Berms
•Vexar netting
•Equipment storage
•Vehicles on beach

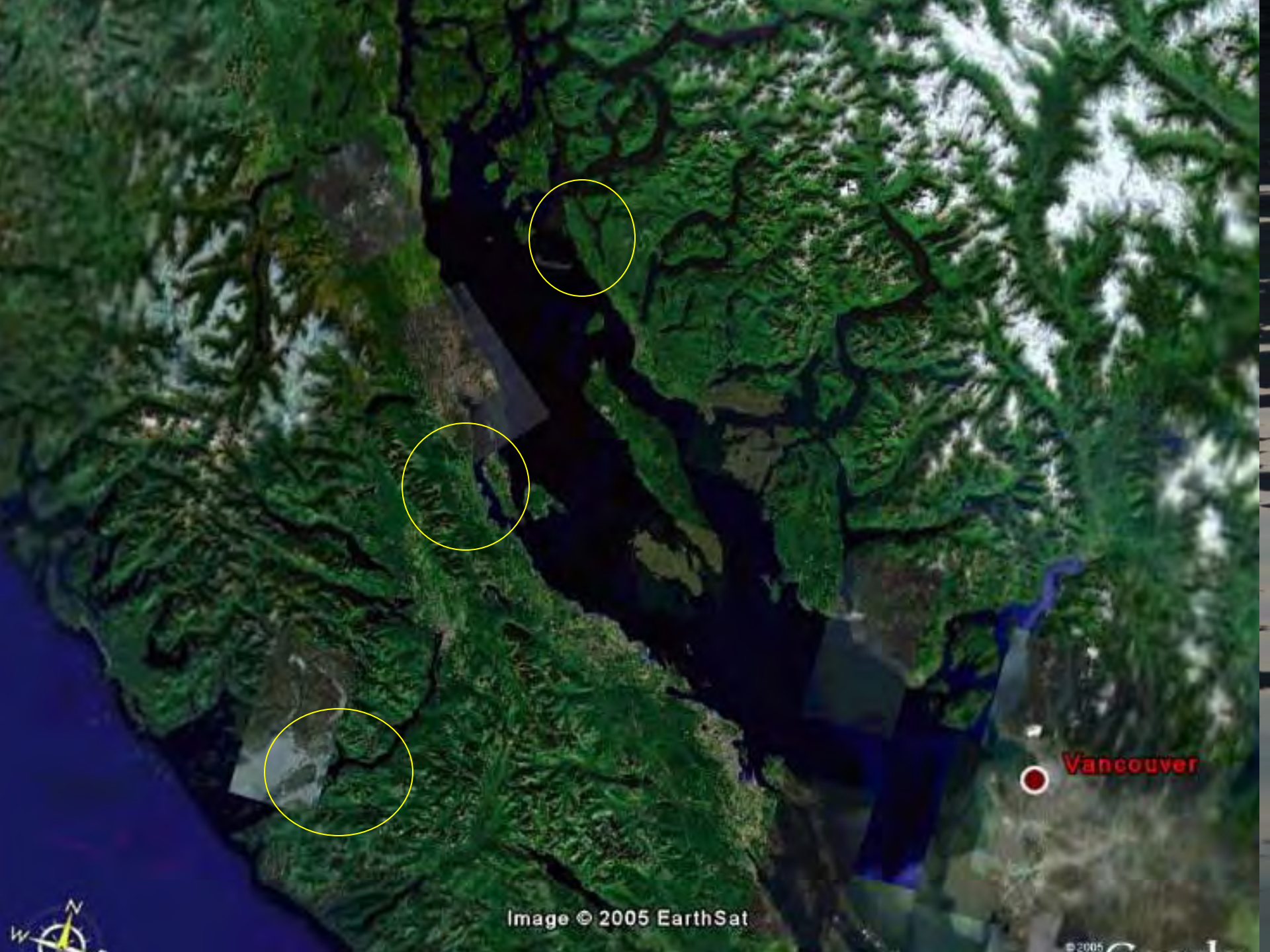
Concerns related to possible impacts on the intertidal community

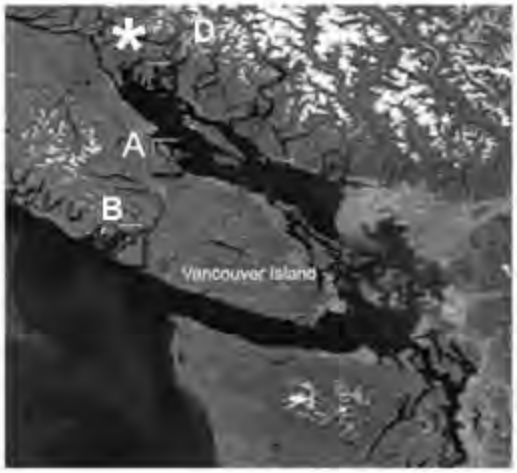
But also the possibility that nets could enhance three-dimensional structure of the intertidal thereby increasing habitat diversity (e.g., artificial reefs)

Objectives

(1)to assess how shellfish aquaculture practices of applying antipredator netting in combination with seeding influenced intertidal diversity of both macroflora and fauna;

(2) to determine whether an increase in the three dimensional structure of the intertidal as afforded by the presence of antipredator netting enhances habitat as measured by increased abundance of macroinvertebrate species.


Vancouver
Image © 2005 EarthSat



A

(site A1a and A1b)

Baynes Sound

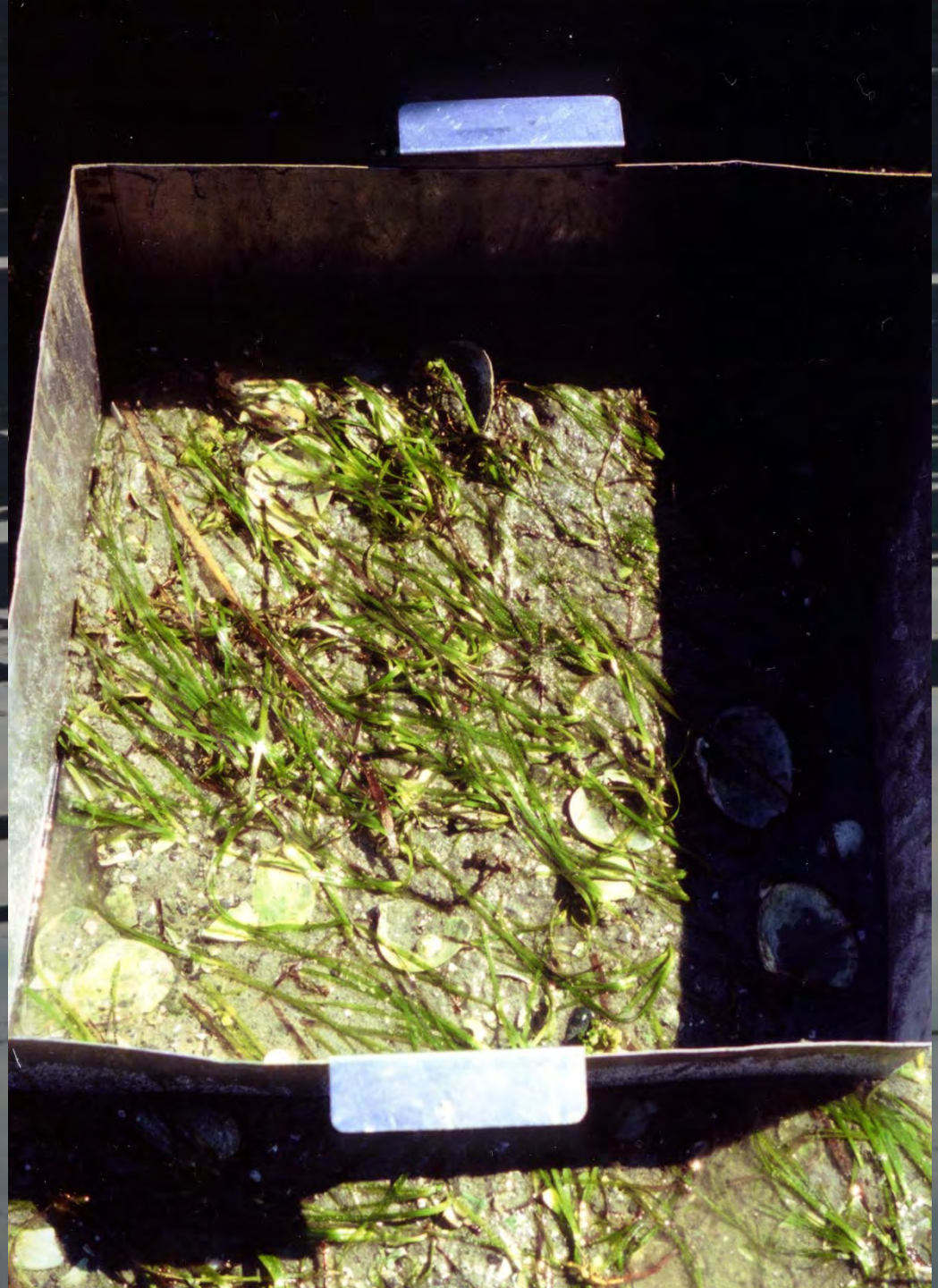
D

Desolation Sound

B

Barkley Sound

Farmed beaches; includes the use of predator netting and seeding



Recorded Variables

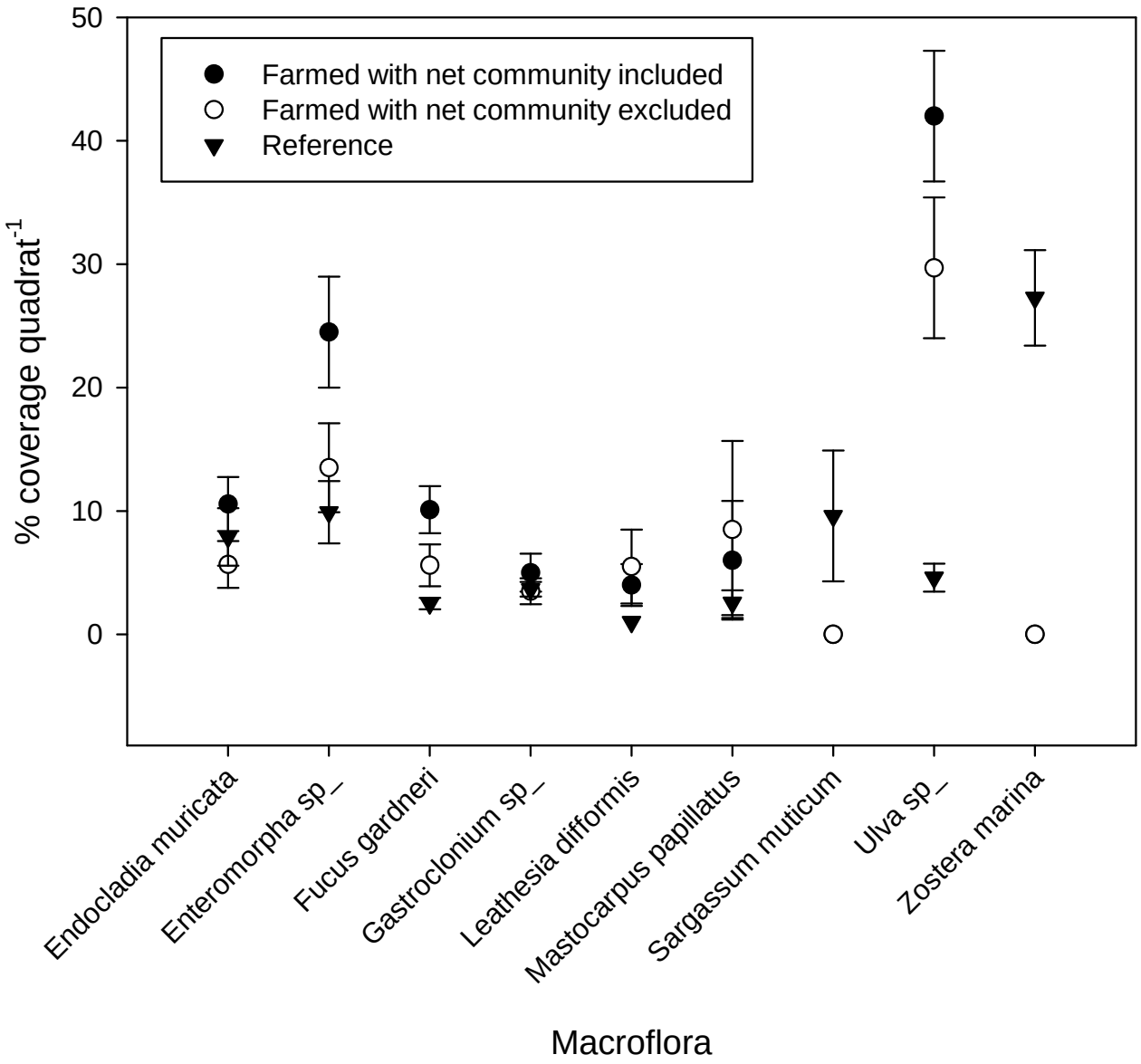
Macrofauna > 6mm;
individuals m/2

% Plant cover

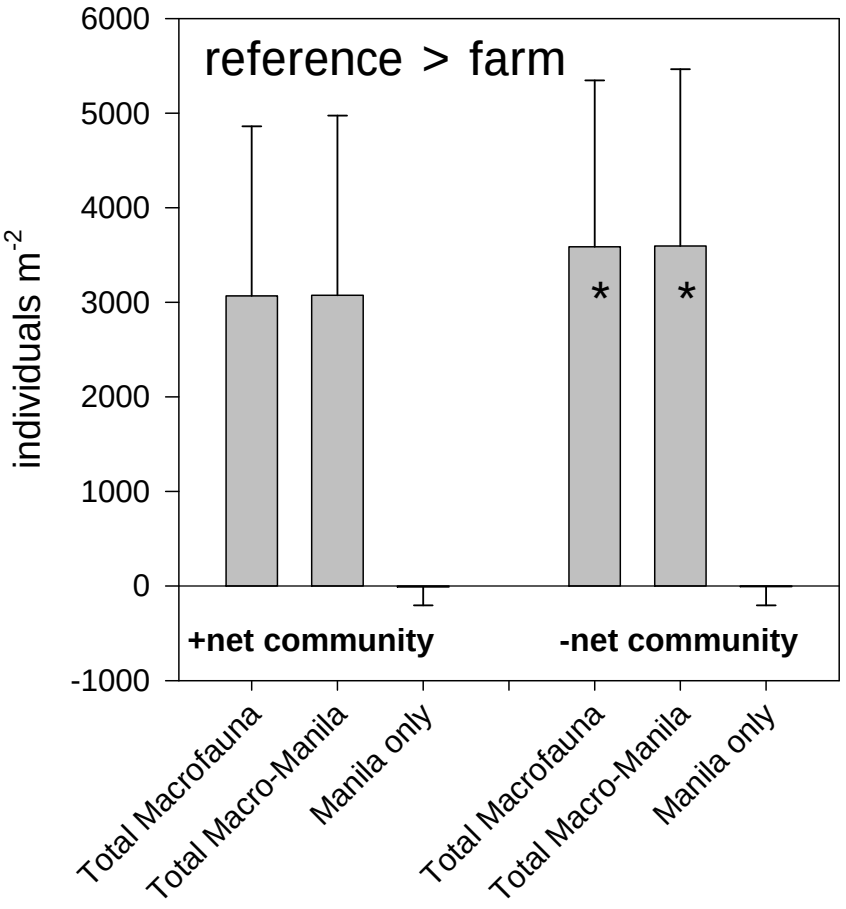
I. Net and intertidal community with farming

II. Intertidal community with farming

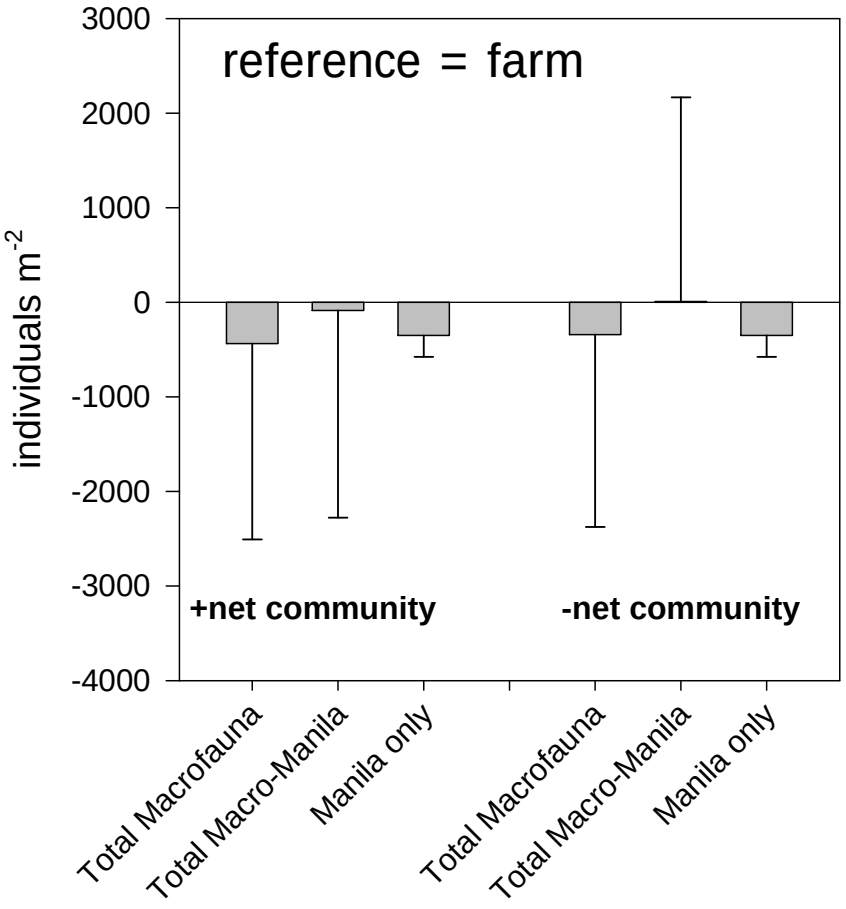
III. Reference (no farming)


Farmed with net community included
Farmed with net community excluded
Reference
% coverage quadrat-1
50
40
30
20
10
0
Endocladia muricata
Enteromorpha sp_
Fucus gardneri
Gastroclonium sp_
Leathesia difformis
Mastocarpus papillatus
Sargassum muticum
Ulva sp_
Zostera marina
Macroflora

Mid-tide

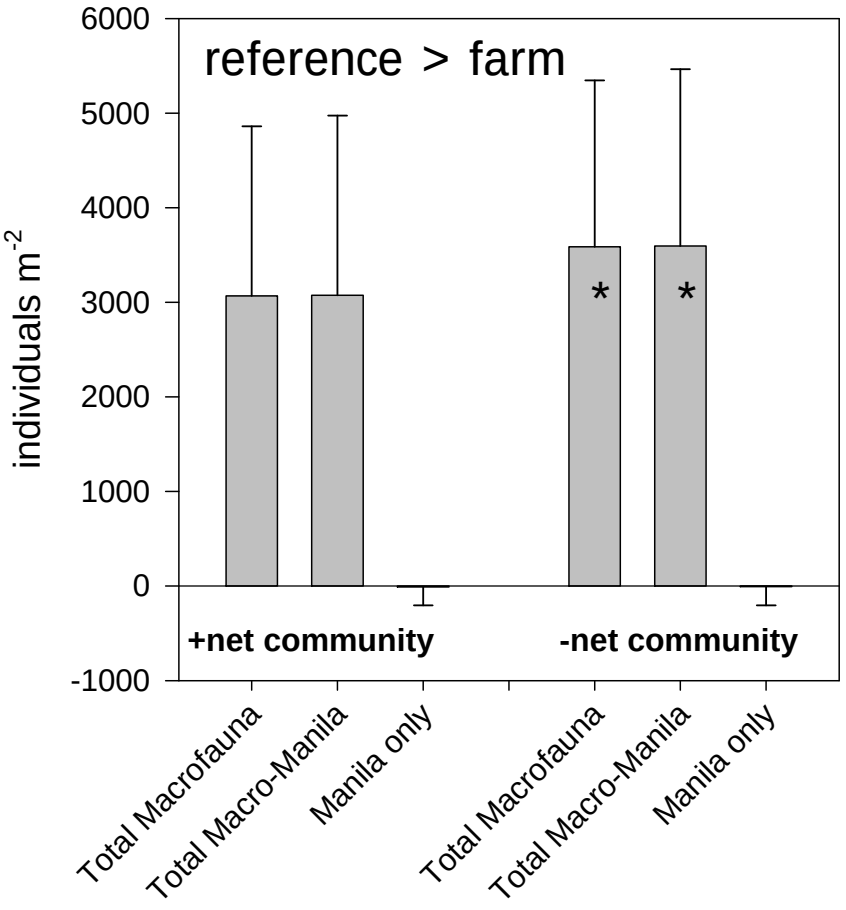


Low-tide

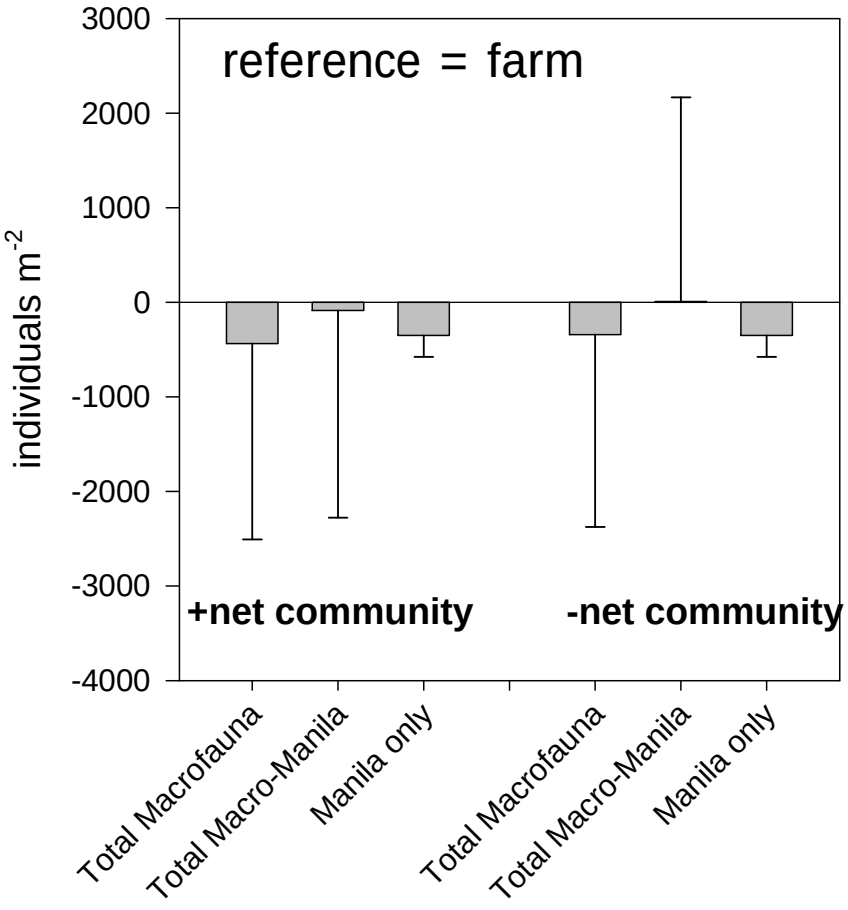


Mean Difference (reference-farm) ± S.E.

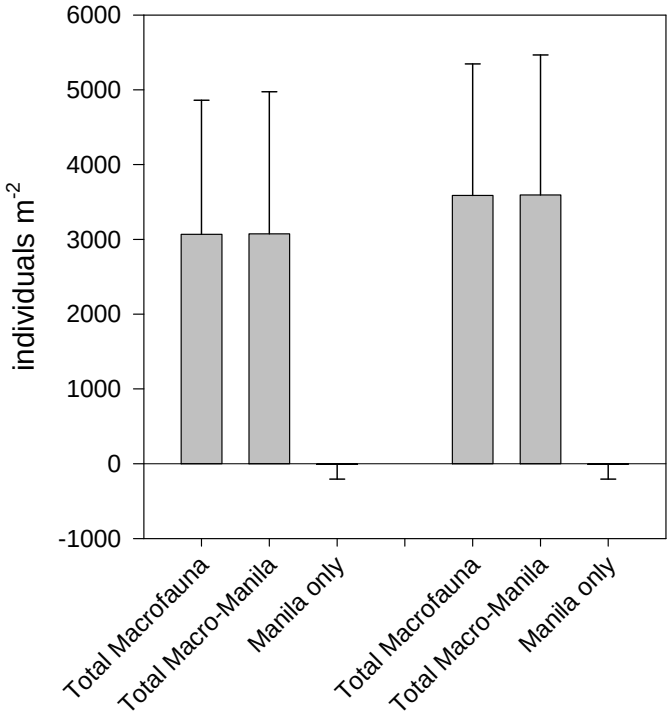
Mid-tide

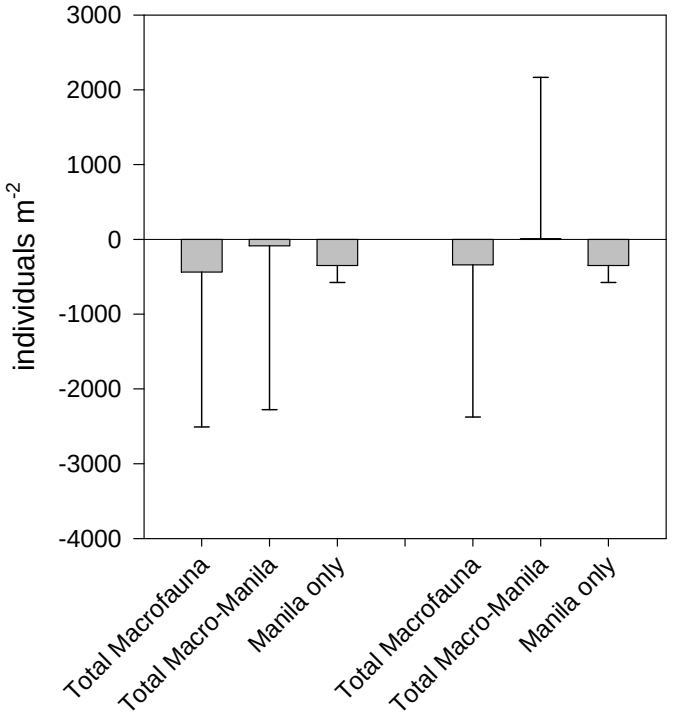


Low-tide



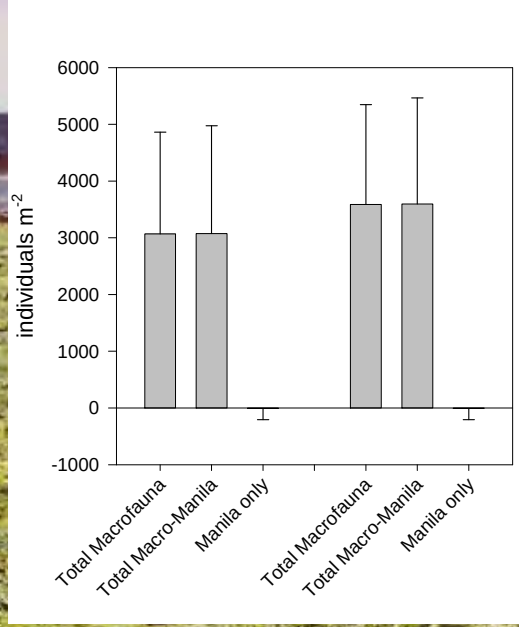
More individuals on reference Mid-tide with significantly greater amounts present when net community excluded.

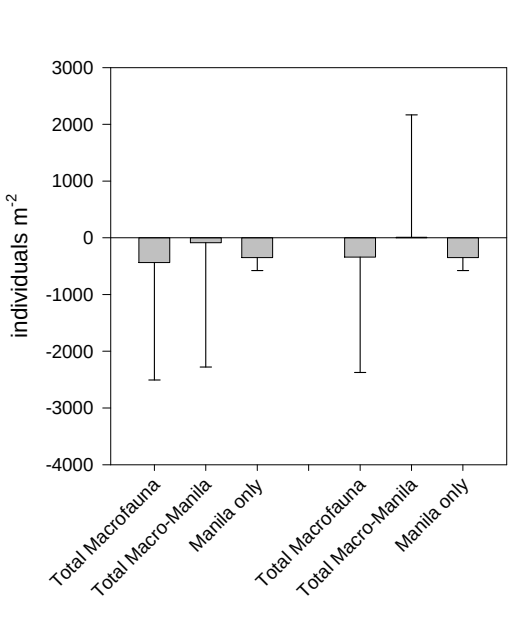




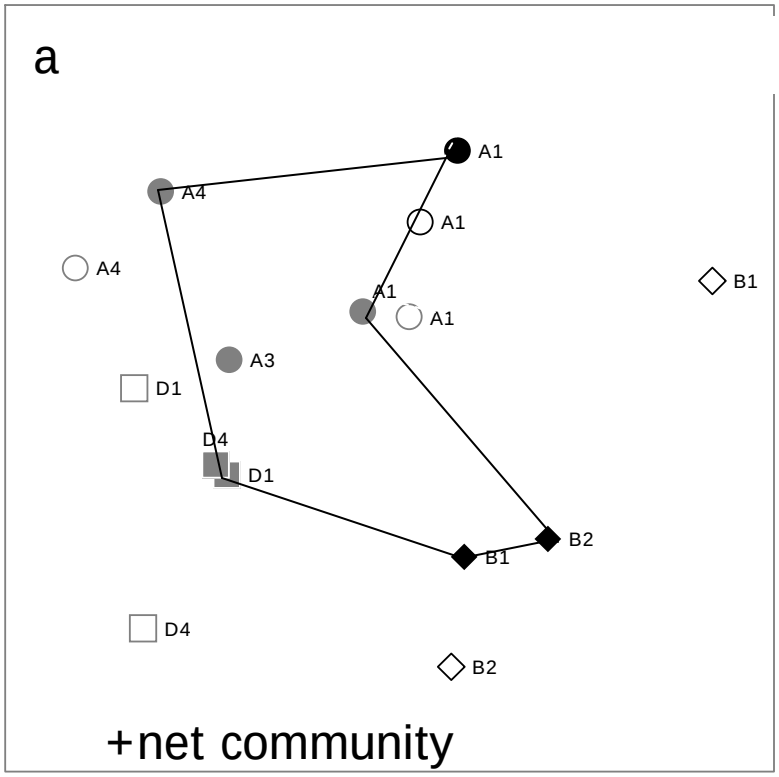
Two reasons:

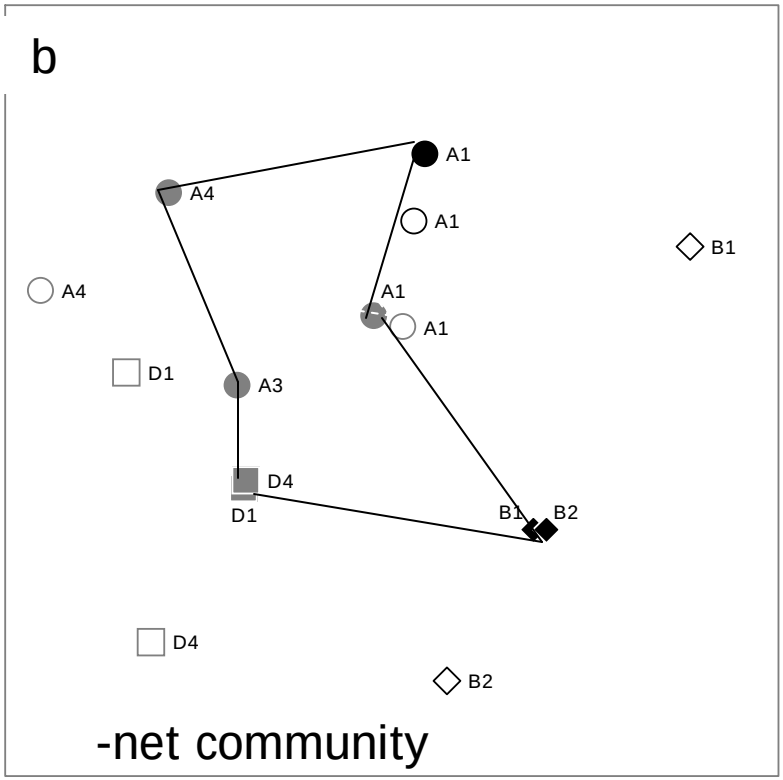
-anaerobic conditions underneath nets (mid-tide)
-predation by small fish and invertebrates (mid and low-tide)





1) Physical barrier; increases in organic matter/silt plus biofouling leading to anoxia
2) Predation by small fish and invertebrates





MDS ordination of 15 of 16 sites based on the abundance similarity matrix including individuals on nets (a, stress = 0.12) and results of the same analysis, with the net community excluded (b, stress = 0.11). Open circles are reference sites, solid are farmed sites.

Farmed sites more similar than reference sites

Conclusions

On the northwest coast of BC antipredator nets in combination with seeding:

1) reduced # individuals at mid-tide
2) increase macroinvertebrate similarity across regions.