

KEYZONES



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To Investigate the Sustainable Carrying
Capacities of Key European Coastal
Zones

Contract (Framework 6) COOP – CT-2004 -512664

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WHY DO WE NEED CARRYING CAPACITY RESEARCH?

... When we could....

- Try it and see approach ..(more difficult to do now as sites are harder to get consent)
- Buy a going concern with a production history
- Expand until production per unit area starts to fall..
(Experiential Method!)

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SOME GOOD REASONS.....

- Know the potential (net) capacity of food supply available
- Identify good and poorer sites in the same bay or loch etc
- Don't waste money and resources expanding when there is too little food or flow of food
- Ability to talk in quantitative terms with local and national regulators (who tend to like to use the precautionary principle if data is lacking!)

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Surely it's too expensive to survey every site in detail?

- We could survey –in detail – specific TYPES of growing areas.
- If we have a wide enough cross-section, it is possible to start to build up a picture.
- It may then be possible to produce a generic model for many of the characteristics
- We would then have a good base to add local specific data – without having to look at everything

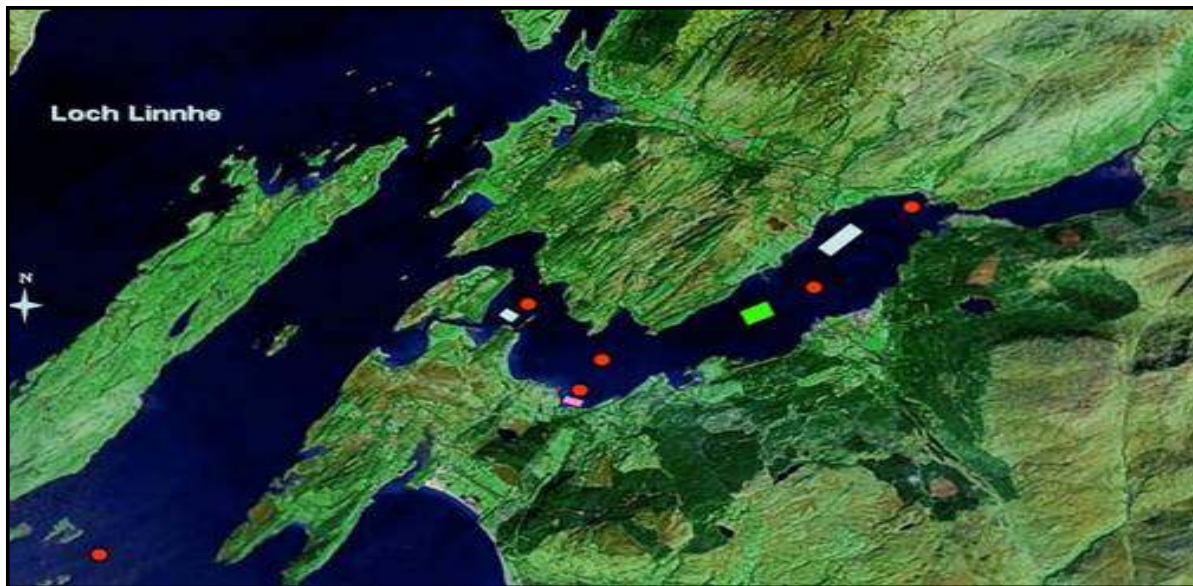
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WHAT COULD BE POSSIBLE AT THE KEYZONES PROJECT SITES?

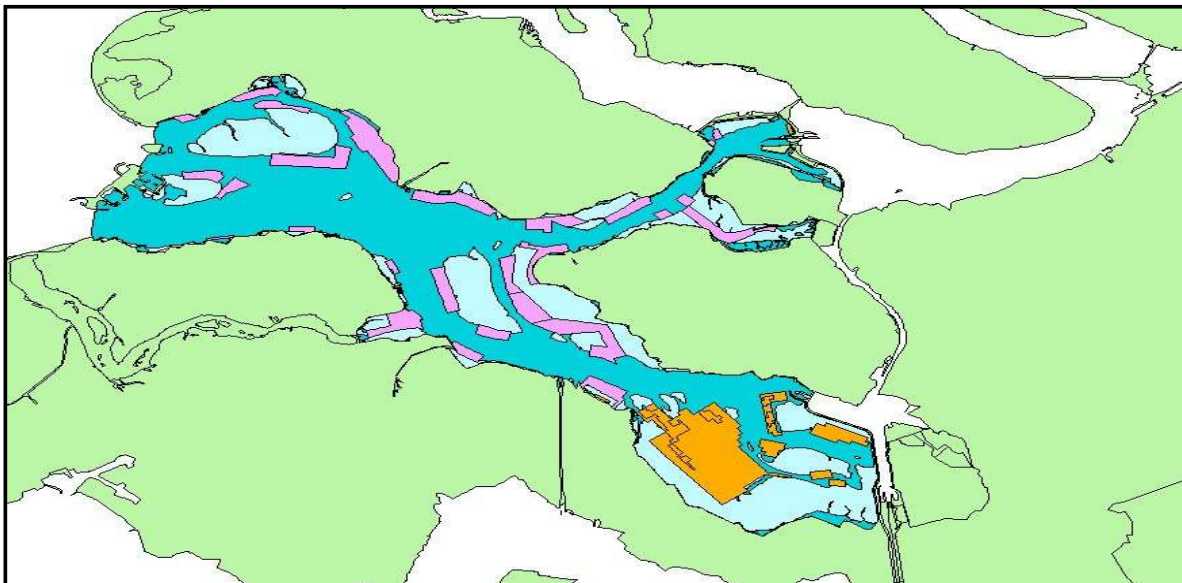
- Shellfish Growers and Harvesters may be able to predict production capacity to a greater degree
- Identify better production areas within the same system
- Perhaps have a better idea of recruitment of seed
- Make better investment decisions
- Have more confidence when dealing with regulators

Loch Creran – Scotland



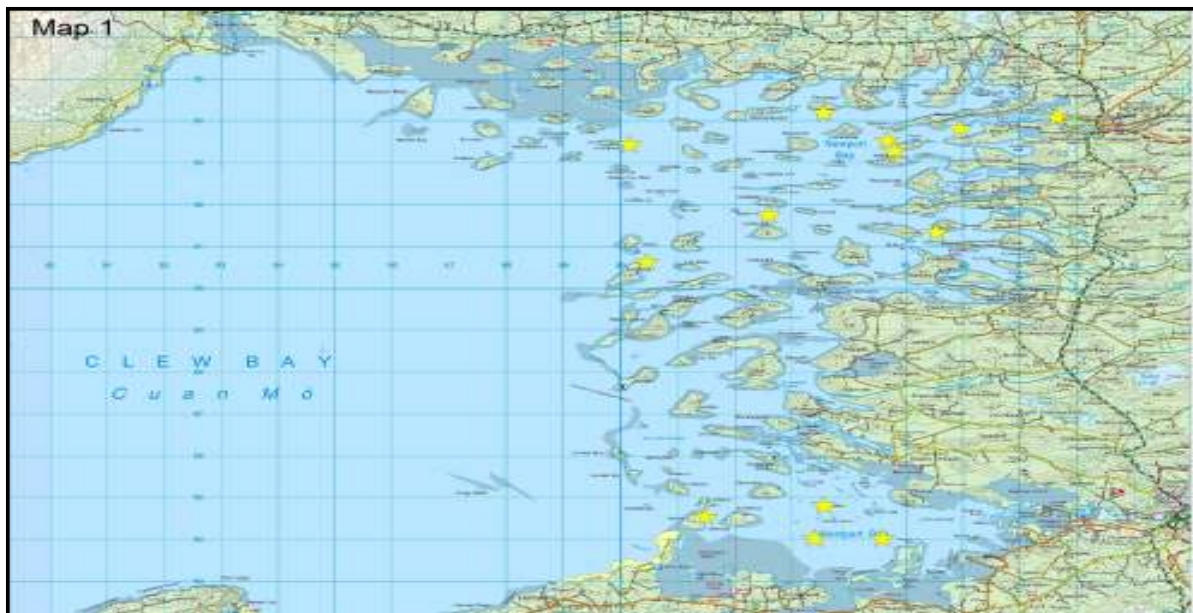
Sample sites (red dots); Aquaculture (rectangles)

Oosterschelde - Netherlands



Showing mussel and oyster cultivation areas

Clew Bay – W Ireland



Showing shellfish cultivation areas (yellow stars)

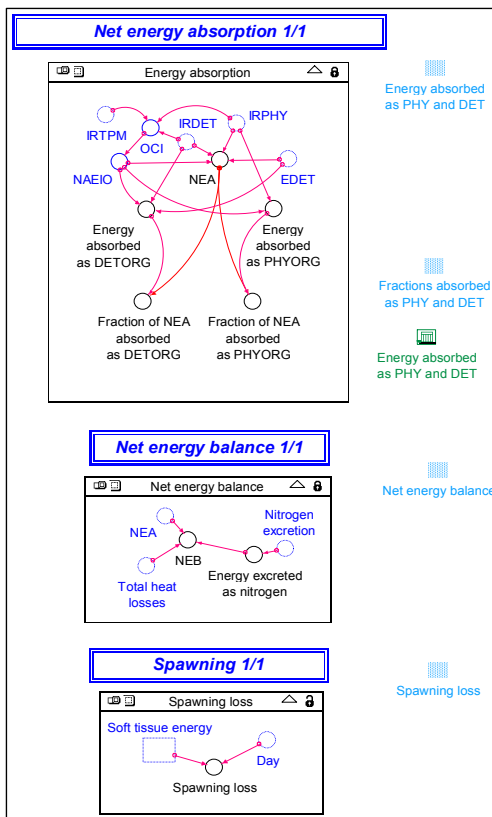
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HOW DO WE GET THERE?

- Model the physiology of the target species (how they absorb and use food energy)
- Look at the background needs of the indigenous species
- Integrate growth data (through growth trials) with:
 - Physiology of the shellfish
 - Historical and newly acquired physical data
 - Models of how bodies of water operate

Modelling of Physiology



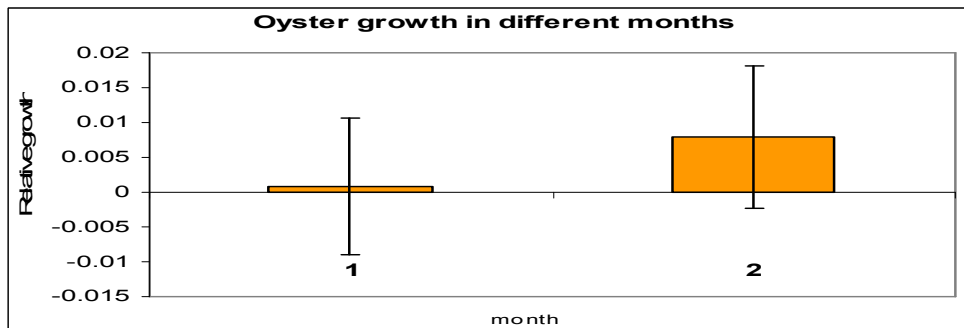
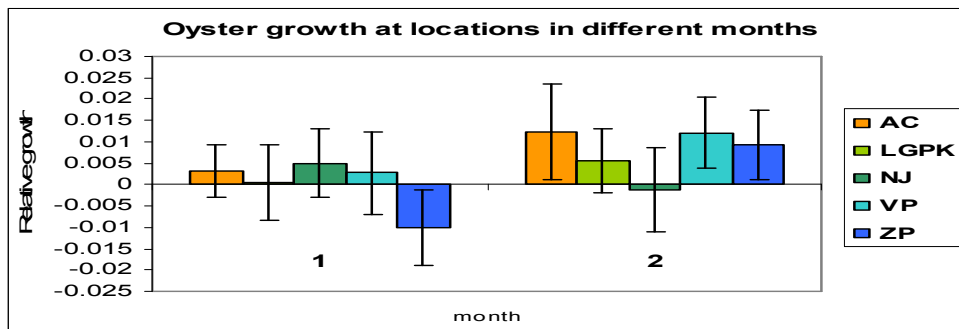
Schematic of Energy Absorption of Oysters and Mussels From organic sources (Phytoplankton and Detritus) From the water column

New Energy Balance in terms of : Energy lost to heat, excretion – Thus available for growth

Energy used in spawning

Work done by Plymouth Marine Lab

Growth Data (example)



Work done by Netherlands Inst for Fisheries Res and SAMS

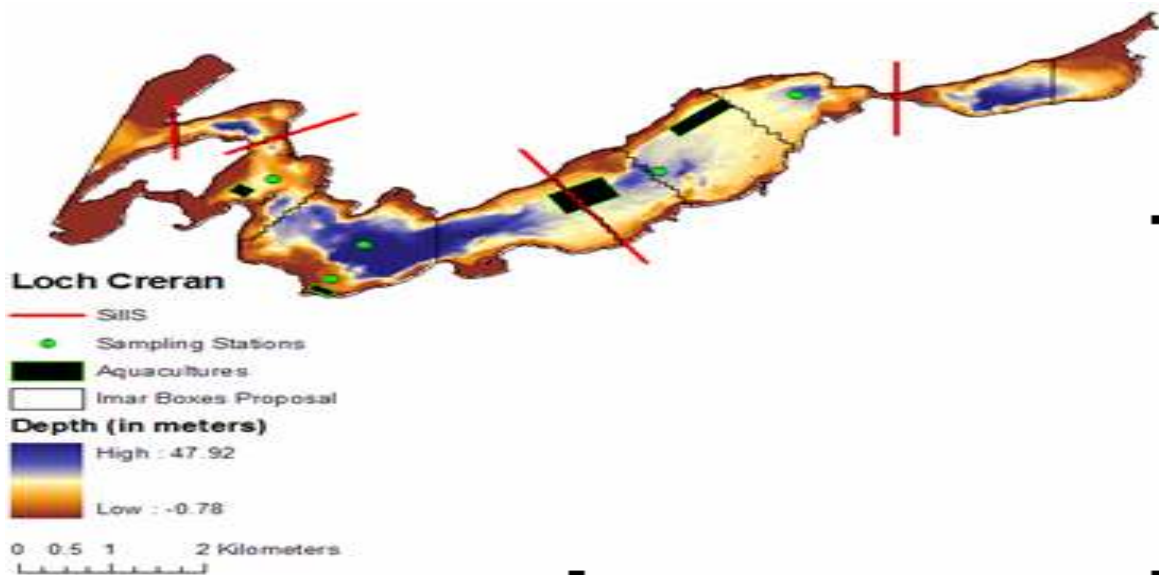
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POTENTIAL END PRODUCT OF THE RESEARCH

- Interactive, dynamic models for the overall studied areas
- Statistically much better chance of predicting production levels and management at site level
- More data to add to the database for generic tools

Schematic multi-layer integration Loch Creran



Work done by Instituto do Mar and DELFT

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FINAL GOAL

SUSTAINABLE AQUACULTURE/FISHERIES

....and healthier bank balances for the growers and
fishers!!