BIOFAQs meeting Oban 13-15 Jan 2001

Saturday 12.1.2001 - Afternoon
JOINT SESSION WITH MERAMED

1) Presentation of the partners
2) Overall presentation of MERAMED
MERAMED outline

1. Application of Norway, Scotland monitoring methods to Mediterranean
2. Establish environmental impact of fish farms in Med. specifically Greece.
3. Develop models to predict environmental impact of fish farms at different stocking densities.

3) Summary of MERAMED Work packages
1. Development of protocols, monitoring systems and control techniques
literature review Scotland, Norway (Ireland). Compile information and field data from other WPs

2. Field research programme - Greece
Best descriptors of the environmental condition of the seabed, data for modelling
rapid surveys at 7-8 cage farms, more detailed at 2-3 to validate predictions Sediments only
current meters, CTD, sediment profile index (water content, REDOX) underwater photography, benthos.

3. Fish assemblages around fish farms and their effect on the flux of solid wastes.
wasted pellets (represents the main waste of energy), excess feed and faeces by wild fish (isotope studies), probably less than northern sites where wild fish effectively reduce impact of farm (netting, traps for stomach content)
impact of farms on wild fish assemblages (visual census, towed video/stereo)
indicator fish for impact assessment?
fish attracted by the cage (FAD), food supply, grazing on nets (algae promoted by nutrient excretion)

4. Modelling (Chris)
Scottish fish farming industry farmers/regulators
DEPOMOD
1. Grid generation module - cage positions, station positions, bathymetry
2. Particle tracking module - currents, turbulence, settling velocity of particles
3. Resuspension and carbon degradation module - resuspension from bed, carbon degradation, G-model
4. Benthic module - accumulation carbon/solids g/m2/yr

www.meramed.com
public and private sections

4) Overall presentation of BIOFAQs
BIOFAQs
Demonstration project hard substrate within mariculture
reducing environmental impacts through use of biofilters
effectiveness economically and environmentally pan European
optimise biofilter designs
post-biofilter usage

5) Summary of BIOFAQs WPs

1. Review of current knowledge base, impacts/biofiltration
2. Mariculture impact modelling. extend DEPOMOD-MERAMED with carbon degradation, plus nitrogen/phosphorus fluxes. Box models from mesocosm.
3. Mesocosm studies
4. Field studies Greece & Israel
5. Legal regulatory controls
6. Cost/benfit economics

6) Discussion on overlap and possibilities for integration

Meetings

March/April 2002, Eilat, combine with fieldwork

Sept 2003, end project joint meeting with MERAMED Crete

7) Revision of BIOFAQs Agenda for next 2 days Work packages

Sunday 14.1.2001 - Morning 10.00AM

WP 0 Co-ordination (Kenny Black, coordinator)

1) Introduction Participants

2) Administrative issues (agenda, minutes, etc)

3) Dealings with EC (Formal project deadlines, reporting, deliverables, responsibilities, claims, etc)

Reporting deadlines important. Annual report + 2months to submit

All EU communications go through co-ordinator, Kenny

4) Revised Technical Annex

Revised technical annex (including Portsmouth formerly missed out) agreed by all partners

5) Banking information

DGXII Contract management information, banking information, fax to Kenny

EU funding

40% advance payment start project

45% split end year1&2

15% end of contract payment probably 1 year after end.

Degree of flexibility in use of funds within headings and possible to move funds between headings. Major changes need to inform Kenny who will contact EU.

6) Staffing and project organisation

Report any staff changes to Kenny

EU now require staff time sheet reporting for all directly funded by this project.

7) Web site: info required, links, etc

Web site hosted at DML link to

MERAMED

MARAQUA (concerted action workshops related to aquaculture, impacts, genetics modelling socio economics)

EARRN?

EIN discussion list

public- summarise project, header page by end Feb.

private (password protected for project members)

latest version of key project documents

8) Communication standards (who should get what, how, …)

Communication copy routinely to Kenny but not necessarily to everyone

use PLEASE REPLY note if you want a reply

Allison Black primary contact for management qns.

Kenny - scientific qns

9) QA issues (compilation of manuals, standard forms, etc)

need to be sure of the quality of data provided by partners.

Common methods require a protocol which is summarised in a manual which is part of the reporting to the EU.

Compatible methods between partners.

Issue a pro-forma to describe methods - suggested by Martin & to be circulated to all

technique description, WPs, partners

protocol outline, stage/actions/standard of quality

supporting reference literature

Use a common style of reference format in bibliographies/ project, document to be distributed by Helen

10) Administrative Group communications

Administrative Group (Kenny, Martin & Dror)
communication with groups monthly, simple reply required, identify any likely lags in project

11) Date and place for next SG meeting
Summer 2000 - Steering group this summer combine with fieldwork
MERAMED end of June in Crete possibly combine
March/April 2002 Eilat - every one intense fieldwork/workshop at least 1 week, Dror to co-ordinate

Project Software
Word 97
Excel 97
Endnote 4

SCIENTIFIC OBJECTIVES AND GOALS (Dror Angel, Scientific coordinator)
1) Overall scientific aim
Economic cost of environmental impact of aquaculture? Direct feedback to the productivity of the farm, tourism Eilat would be affected if water quality drops.

Suspended/water column vs benthos debate

suggested strategy
pan-European sites A-D, x - common biofilter design, y/z variations on basic design

A	B	C	D
x	x	x	x
		y	
		z	

All sites will use a common mid-water design.
Eilat will trial a seabed structure as well

Design of simple modular structure, eg panels/units suspended from buoys
Decision on definitive design from Dror by mid Feb. Plastic netting send samples to each other.

Replication
scientific replication at least 2
accidents/sabotage to enable experiment to continue

Control outside area of farm requires extra cost. Fallow sites could provide control
Gradient at increasing distance from farm provides a pseudo-control

Grazing - could protect experimental panels with grazer exclusion nets. Mussels/bivalves good filterers but are vulnerable to fish (Scotland mussels removed by Eider ducks).

2) WPs and how they fit together
3) Interfacing and communication with MERAMED

Sunday Afternoon 14.1.2001 - Afternoon
WP 1 Literature Review (DML: Martin Sayer)
1) Introduction
update existing reviews on environmental impacts of aquaculture, incorporate socio-economic impacts.
Collect mechanical and biological filtration rates, re-circulation technology

2) What we want out of it
bibliographic database, report, will this be publishable?

3) Relationship to other WPs and other programmes
influence biofilter design? Modify experimental design

4) Milestones and deliverables
production of list of report headings by Martin end Jan, circulated for comment
completion by July

5) Who does what and when
table of commitment of time by partners
6) Dissemination and use of results
7) Need for deviation from approved project proposal (contents, timing, deliverables)

WP 4 Field investigations (IOLR, Dror Angel)
1) Introduction
2) What we want out of it
design, construction and deployment of biofilters
share protocols/measurement procedures initially by email.
Replication of 3 (scientifically) increase to account for external risks
sub sampling?
Stable isotope need early measurements to establish if there is a difference in isotope composition between local background levels, control and fish farm(in samples from sediment traps/filtered water, fouling organisms, benthos) of and the fish foods regular samples. Sonya to send out a protocol within next month.

Monday 15.1.2001 - Morning 0900

Year 1 extensive arrays at 4 sites (pan European gradient), review after 1 year
deploy March 2001
plastic mesh cylinder length 40/50cm 25/30cm (DEPOMOD to confirm)
4 arrays (x 8 cylinders/array) 20-40m from cages
4 arrays at control site (each group to discuss control site with DML modellers)
sample 3 out of the 4 only (1 in reserve in case of accidents)
array depth 5m below surface, anchor, mooring line, submerged 2m buoy (tidal problems - Scotland) Paul, Yanni, Timor to discuss design mesh size to be determined.
fixed current meter next to array
Sampling, Apr, Jun, Aug, Oct, Dec, Feb

Ehud procedure visual census method
a. Video record - analyse in lab
    1. general view from 3m away both sides
    2. close up 1m or less, both sides
    3. focussed recordings on grazing events
b. Diver visual census, recording on underwater slate
    1. general view
    2. close-up
    3. focussed observations
teams of 2 (photographers/divers) starting at opposite ends, using a fixed track
Clearly label each array to show up in the video record

Need to aggree this protocol by all 4 deployment labs by mid Feb

Random sampling (3/4 replicates) of inner six cylinders with replacement of removed cylinder. Transport alive in water to lab for mesocosm experiments. Them open cylinders photograph both sides, then undertake community anaylsis:
    drip dry cylinders and weigh (tare)
    pick all known organisms separate - wet biomass
    sub sample for proximate analysis/dry weight/metals/isotope
    scrape off remaining unknown to reach 100%
recycling protocol for cylinders?

3) Relationship to other WPs and other programmes
4) Milestones and deliverables
5) Who does what and when
6) Dissemination and use of results
7) Need for deviation from approved project proposal (contents, timing, deliverables)

WP 3 Mesocosm studies (IMBC, Yannis Karakasis)
1) Introduction
definition volume >1m^3 containing a natural community
expected to provide more sensitive estimates of performance
experimental 4 treatment design:
- control empty
- cylinder only
- cylinder plus fish
- fish only

variables in/out or recirculate and monitor levels
- DIN, PO_4 O_2 POC, PON, ChlA, bacteria, plankton (nano & micro)

assess
- design and performance over different time scales, seasons, loadings
- energy and nutrient fluxes

2) What we want out of it
3) Relationship to other WPs and other programmes
4) Milestones and deliverables
starting March/April 2001
5) Who does what and when
Oban and Crete undertake work, protocol to be decided between 2 labs by end Feb.
6) Field work aspects (timing, mobilisation, equipment, etc)
7) Dissemination and use of results
suggested papers/conferences/articles
8) Need for deviation from approved project proposal (contents, timing, deliverables)
relocation of Crete lab may affect timings

P 2 Predictive modelling development and validation (DML: Kenny Black and Chris Cromey)
1) Introduction
change in direction since originally thought of benthic structures now water column focus
use DEPOMOD to model each of sites
- location, size, bathymetry of sites
- particle tracking module to determine foot print of particulate material
  (food & faeces, settling velocity)
- current data, dispersion coefficient data in area?
- Fish feed input over time required (faeces and food wastage data useful),

Will be making detailed measurements around Crete farms as part of MERAMED

Chris will send out list of required data
confidentiality of farm information important

expect to use DEPOMOD to show effluent plume intersection with biofilter array
- hydrodynamic model - use existing model output?
- fish farm water quality model - use existing model output?
  (Wu et al 1999, dissolved oxygen & nitrogen predictions)
- biofilter model - should represent main effort

Biofilter model development
- data input/measurements/validate
- suspended material levels by biofilter to be measured in situ (filtering rather than sediment traps)

2) What we want out of it
3) Relationship to other WPs and other programmes
4) Milestones and deliverables
5) Who does what and when
6) Field work aspects (timing, mobilisation, equipment, etc)
7) Dissemination and use of results
8) Need for deviation from approved project proposal (contents, timing, deliverables)

WP5 Evaluation of legal issues (UoP, Helen Pickering)
1) Introduction
experimental deployment easier that later operational large scale
does the farm permit enable small addition of biofilter?
control is likely to be outside farm area
- Crete - standard scientific package deployment procedure
- Scotland - security?
- Israel - another farm
- Slovenia - to investigate

Need to consider a commercial design during the project on the basis of our results then feed to legal considerations
emphasis on buoyed floating structures rather than bottom based
macro-algae culture (Maine salmon farms) and mussel rope culture useful starting points

Location of farms and other activities in the area, management plans useful
Helen to produce question list

2) What we want out of it
3) Relationship to other WPs and other programmes
4) Milestones and deliverables
- assist with authorisation of experiments
- review and classification of legal frameworks

5) Who does what and when
year 1 Portsmouth
need help from other countries obtaining legal documents, may need technical help from legal specialists.

6) Dissemination and use of results
7) Need for deviation from approved project proposal (contents, timing, deliverables)
cut in Portsmouth budget means lack of local help by Portsmouth, no translation of documents, no budget for legal specialists (could offer joint authorship attracts legal researchers/students unpaid)

WP6 Economic analysis (UoP, David Whitmarsh)
1) Introduction
environmental impacts generate costs for fish farmers and society as a whole. How significant are these, who incurs them and how can they be mitigated?

2) What we want out of it
information on economic costs of environmental impacts, measures for dreducing theses costs, economic implications on mitigating the environmental damage using biofilters

3) Relationship to other WPs and other programmes
require data on impact of fish farms and benefits of biofilters from partners

4) Milestones and deliverables
- workshops papers and 2 conferences:
- International Institute of Fisheries Economics and Trade
- European Association of Fisheries Economists

5) Who does what and when
- Portsmouth Year 3

6) Dissemination and use of results

see 4

7) Need for deviation from approved project proposal (contents, timing, deliverables)

Cost benefit analysis

assess economic costs of installation/maintenance/disposal of biofilter biomass
vs value of improved water quality

Cost effectiveness analysis

environmental objective vs economic costs
avoids difficulty of value estimating less tangible benefits
who gets the benefits, who incurs the costs, are biofilters the least-cost option?
PR cost estimates offered from Israel and Scotland

Environmental impacts of aquaculture K.D.Black (ed.) (2001) Sheffield Academic Press Ltd. Sheffield, 214pp.
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