

ECASA - Ecosystem Approach for Sustainable Aquaculture

DEPOMOD / MERAMOD / TROPOMOD models

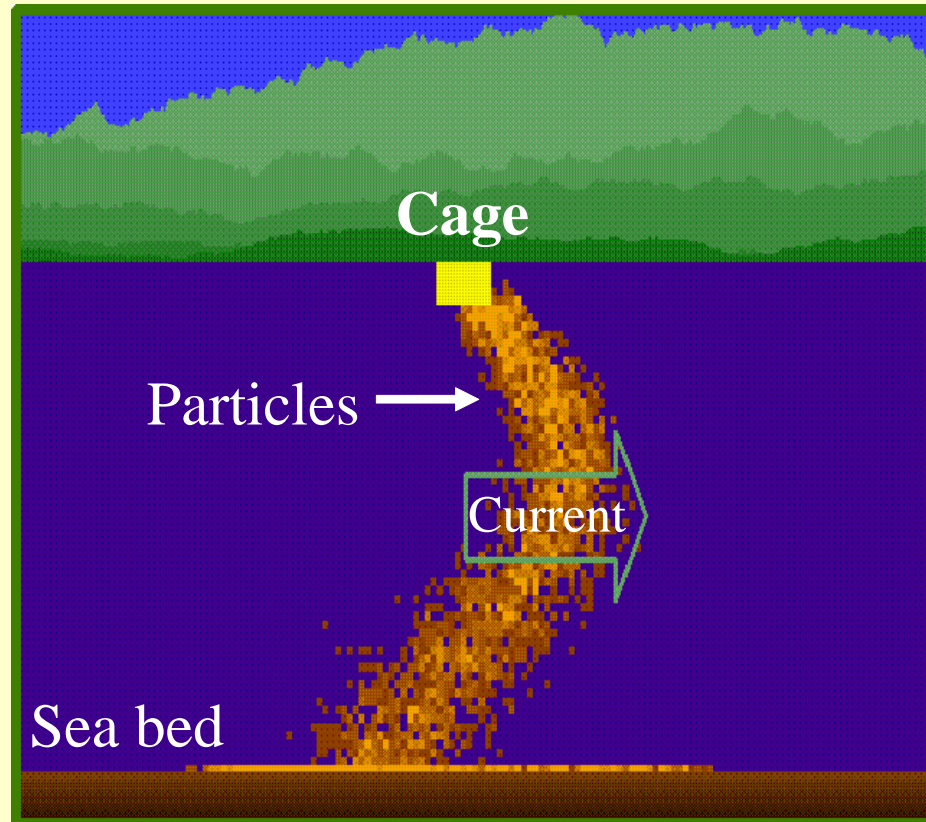
What do these zone A models do?

They predict footprint of waste feed and faeces on sea bed and associated benthic impact

Chris Cromey

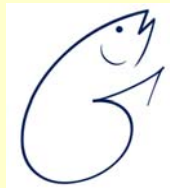
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Scotland

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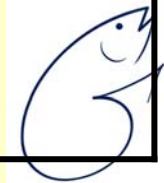


Summary of models and species/environment

Model	Species	Environment	Authors/Project
DEPOMOD (AUTODEPOMOD is regulatory software)	Salmon	North Atlantic	Cromey, Nickell, Black
MERAMOD	Sea Bass, Sea Bream	Eastern Mediterranean	Cromey et al. EUFP5 project (HCMR, IfM-GEOMAR, Akva-plan)
TROPOMOD (in progress)	Milkfish, Tilapia	Philippines/Asia	Cromey, Nickell, Black, White EU FP6 PHILMINAQ



Model	Validation	Current use and user base	Shortcomings	Used in regulation ?
DEPOMOD (AutoDEPOMOD is regulatory software)	12 traps, resuspension tracer study, 40+ benthic sampling stations Other users have validated also	Biomass consent of all new and reapplications in Scotland All sea lice treatment consents 100 + licenses issued in 14 countries	Validation limited at high dispersive sites Steep bathymetry V. coarse sediments	YES
MERAMOD	129 traps 30+ benthic sampling stations	Mostly EIA 10+ licenses issued	Needs more use and feedback from users	NO, but has potential use
TROPOMOD (in progress)	30+ traps Some benthic fauna data, but not much fauna around	Developing guidelines/recommendat ions for rapidly developing industry	More benthic faunal data Needs coupling with larger area zone B model	Advisory/ planning role



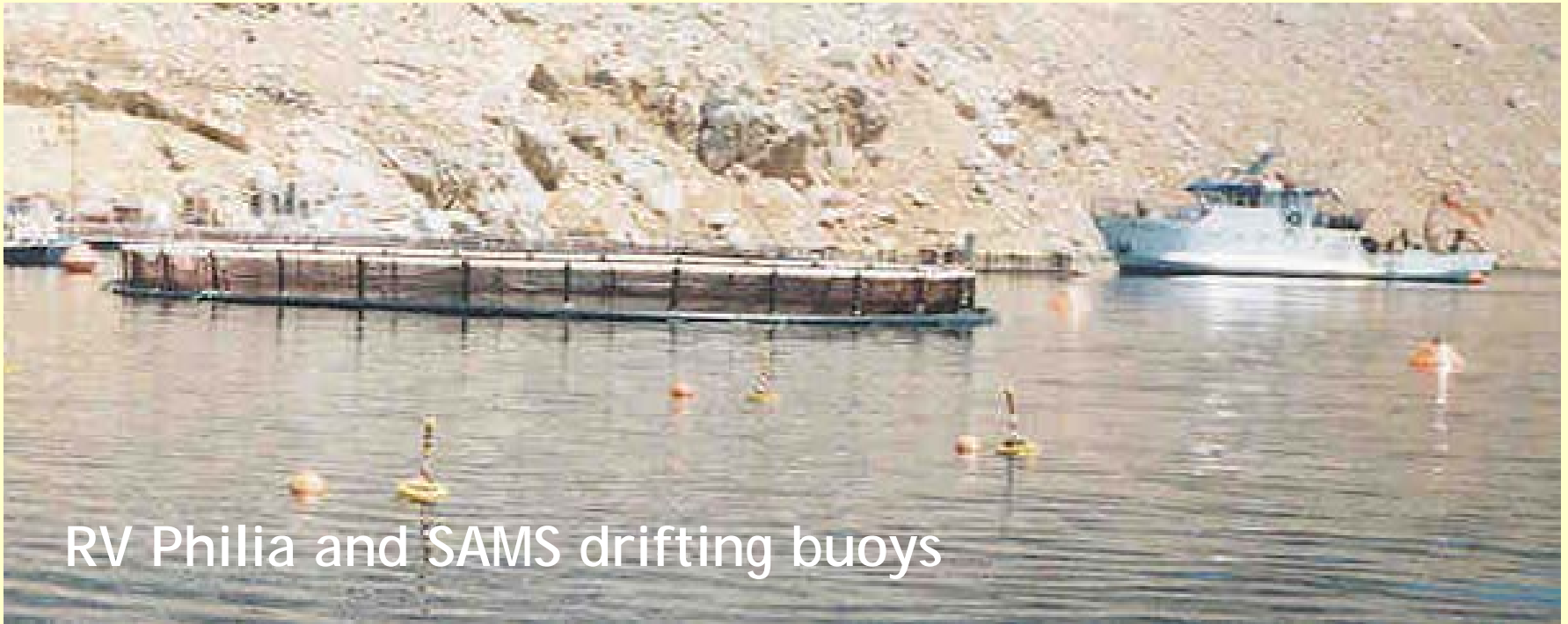
DEPOMOD model

Fish farm by SAMS



MERAMOD model

Agolikos fish farm





Courtesy Akvaplan-niva

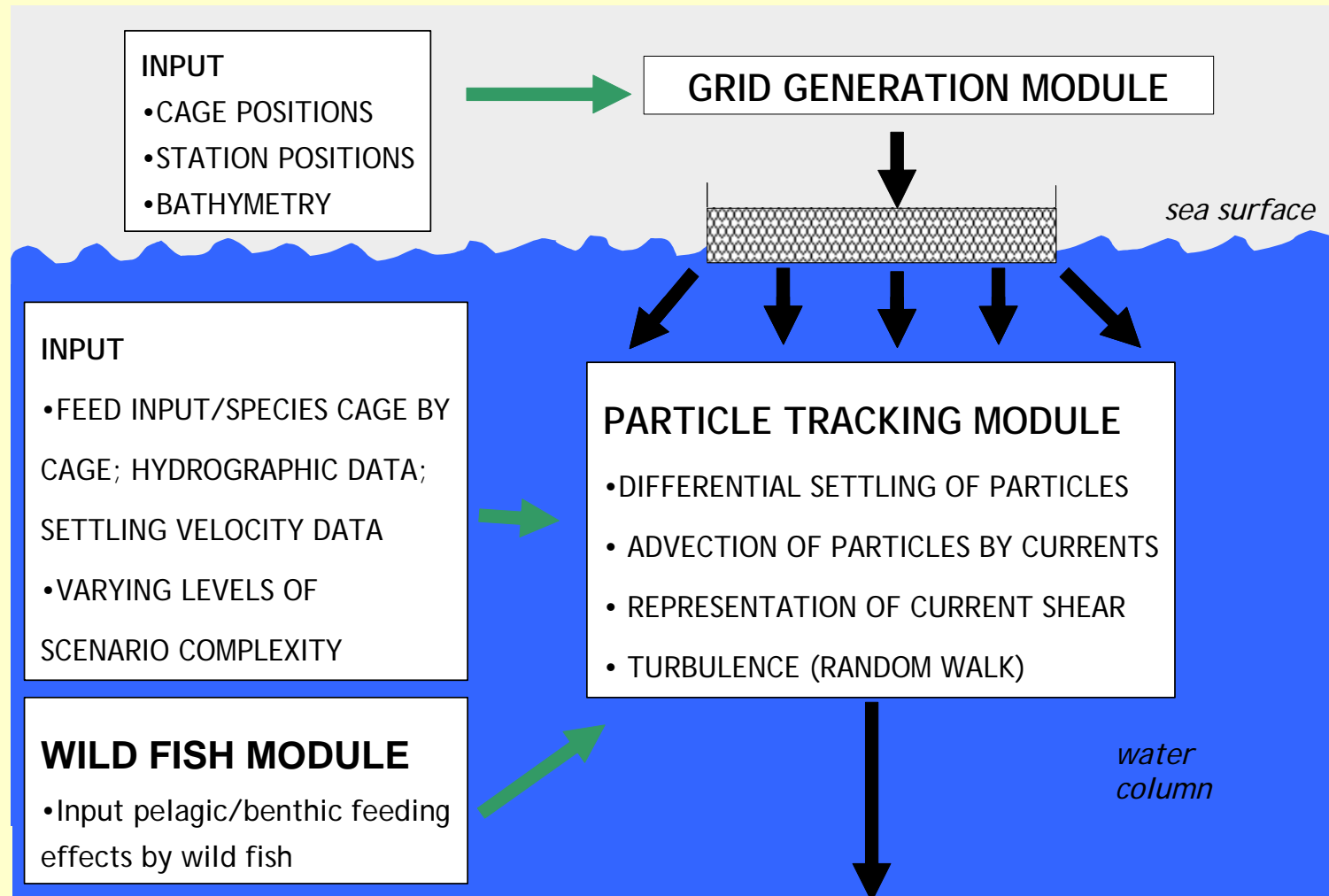
TROPOMOD model

An aquaculture hotspot in Taal Lake, Philippines

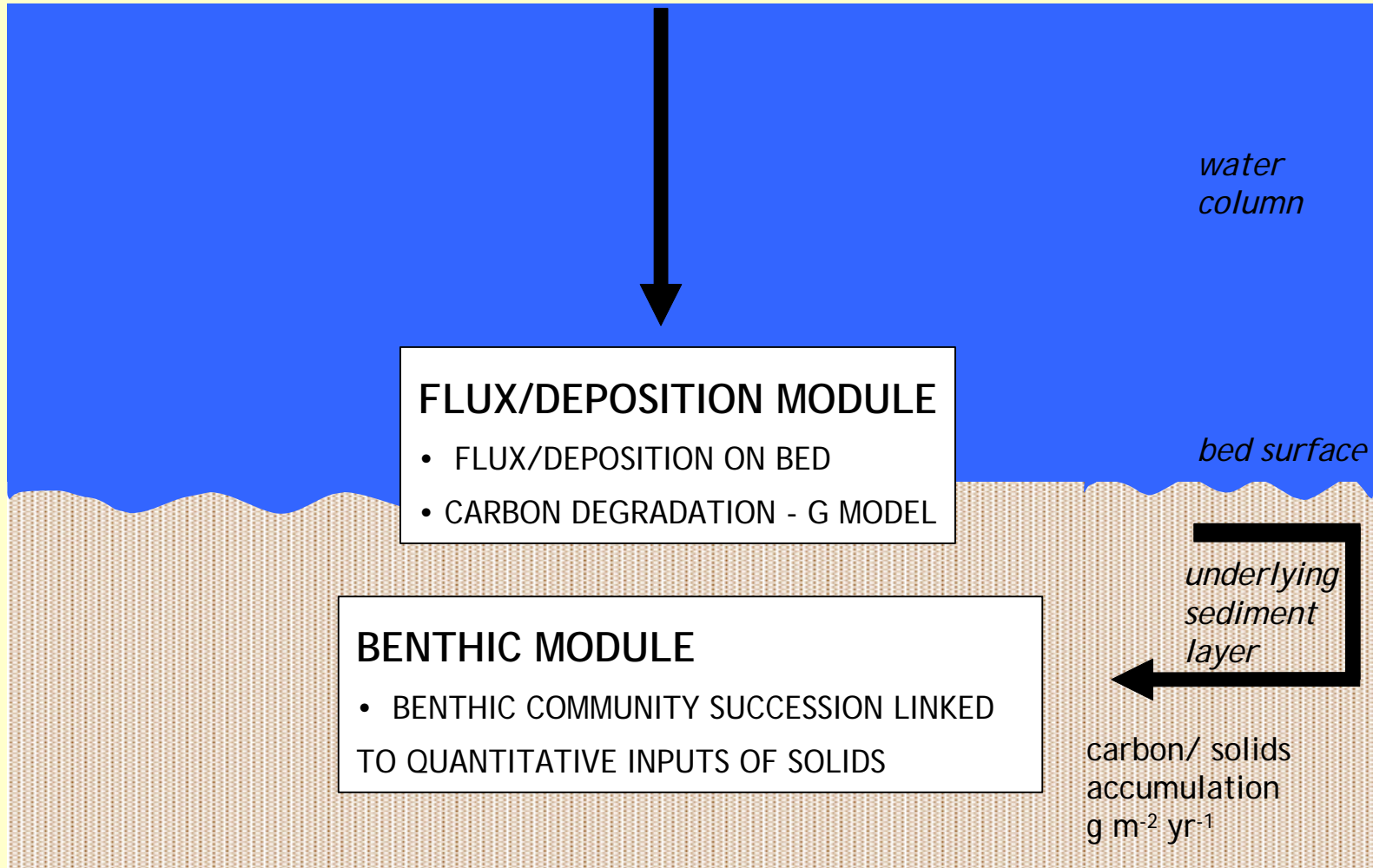


FLOW OF INFORMATION THROUGH MERAMOD

MERAMOD MODULES (I)

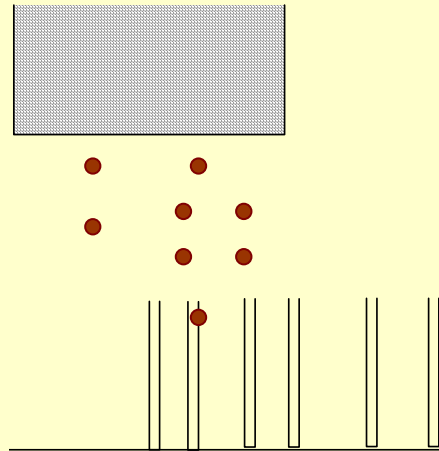


MERAMOD MODULES (II)

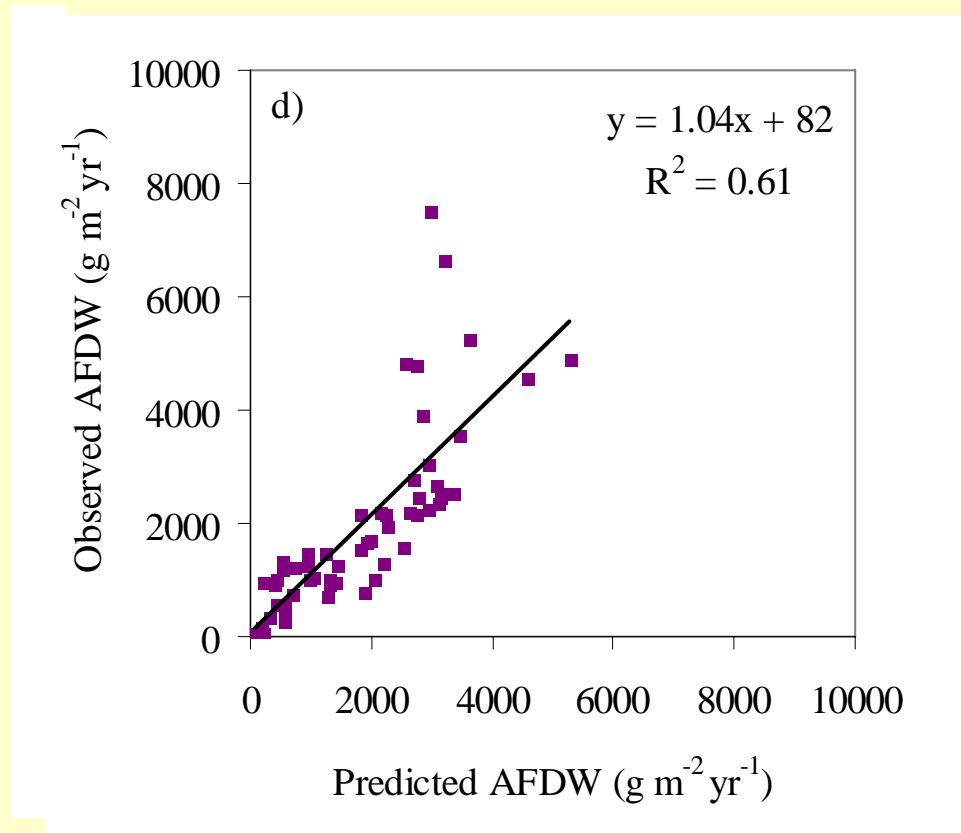


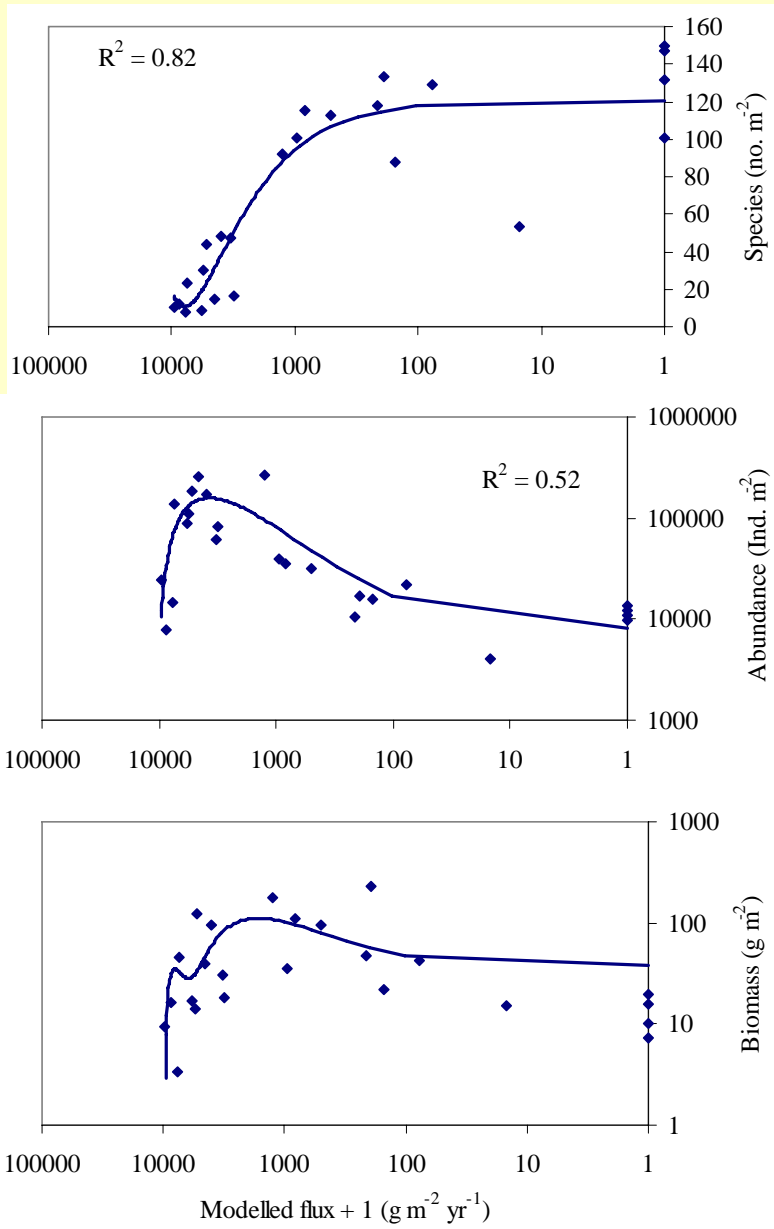
Measurement of waste flux to the sea bed

Flux is grams of waste food and faeces depositing per m^2 sea bed per day, measured with sediment traps



MERAMOD model validation - sediment trap studies





SPECIES

ABUNDANCE

MERAMOD model
validation - predicted
flux correlates with
ECASA indices

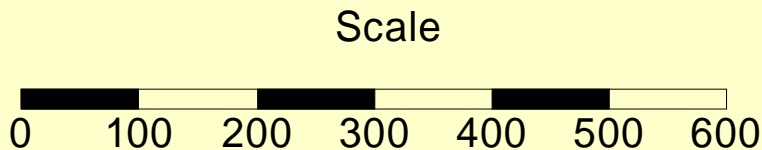
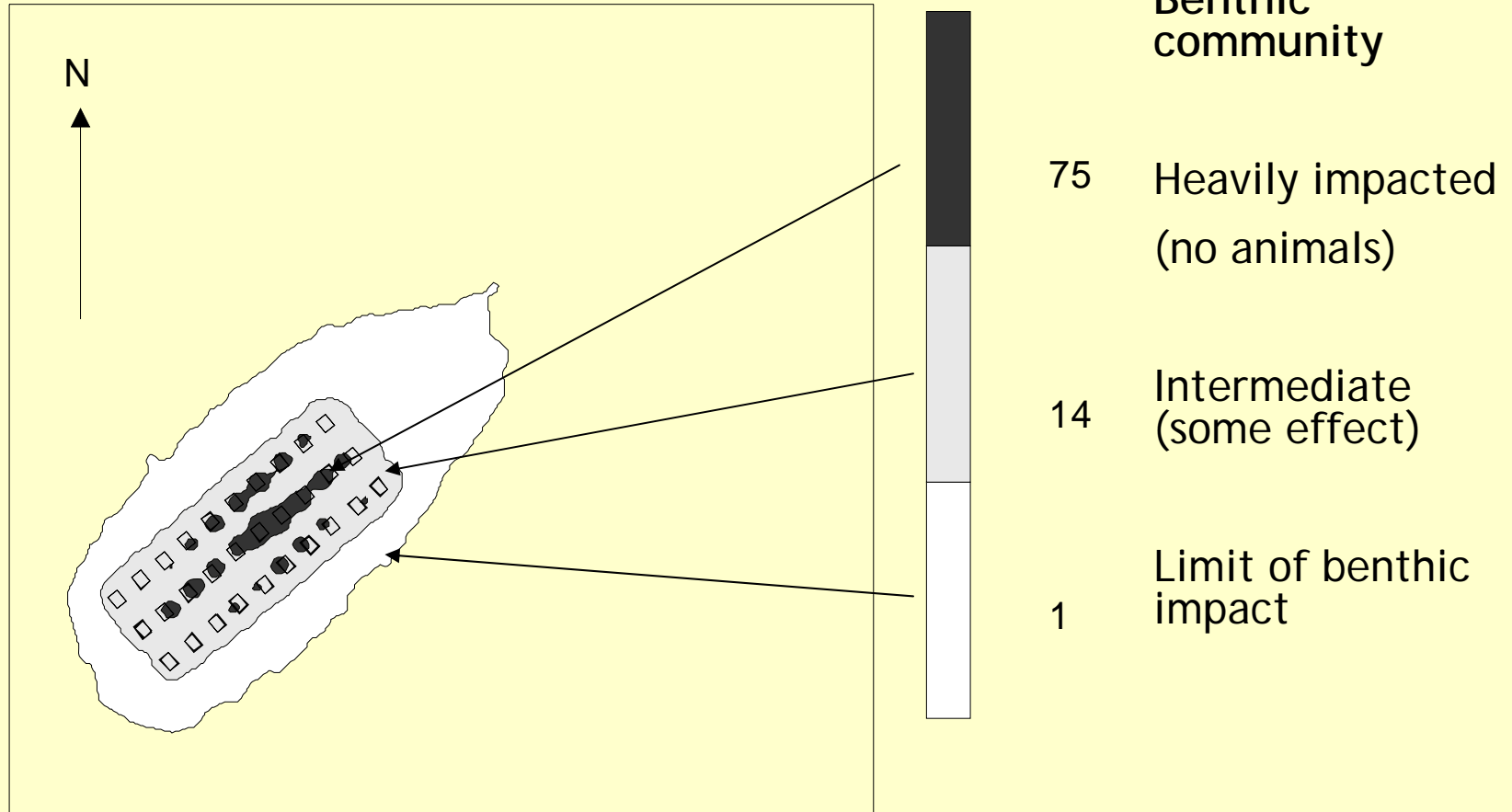
BIOMASS

MODELLED FLUX (g m⁻² yr⁻¹)



TROPOMOD - advice to policy makers and producers on cage spacing/feeding strategy, etc

Contour map of waste flux $\text{grams solids m}^{-2} \text{bed d}^{-1}$

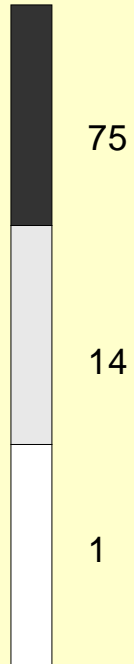
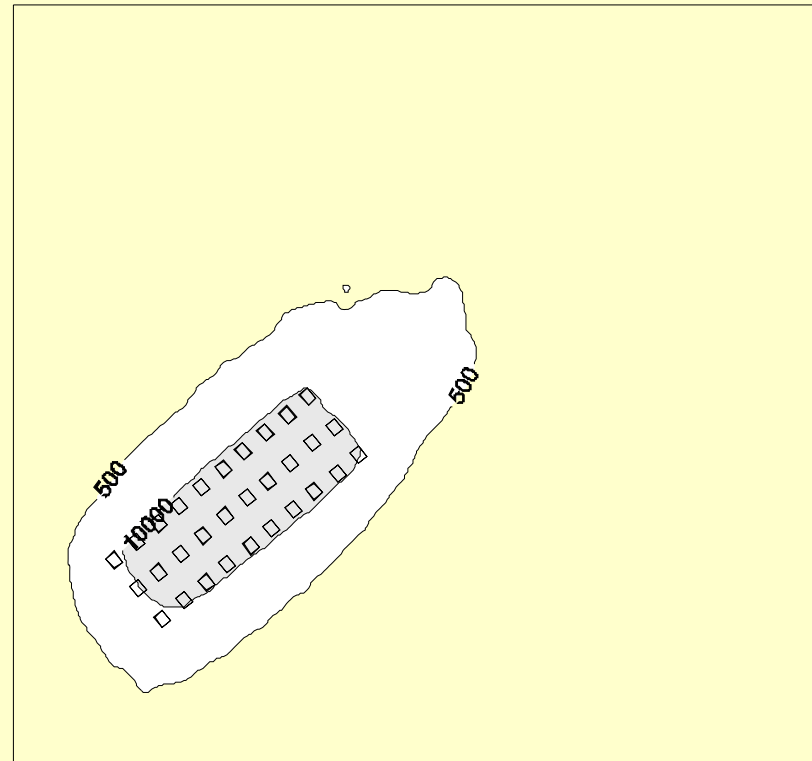
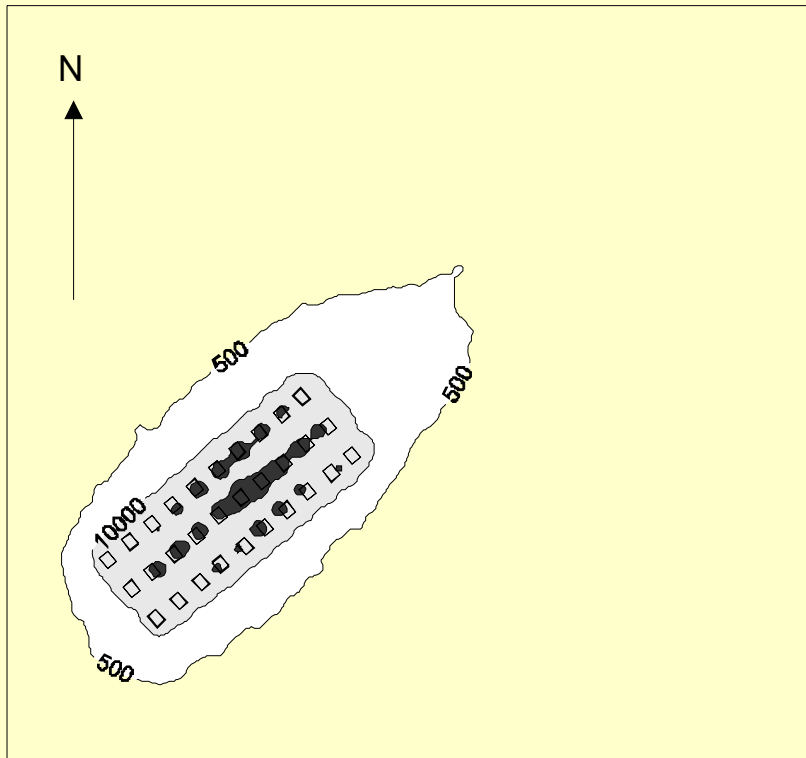


TROPOMOD - Bolinao Narrows - reduction in FCR (less feed wastage) with single lines of cages results in intermediate impact - Good

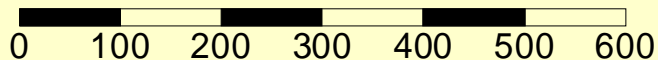
FCR = 2.8:1

FCR = 1.5:1

grams solids m^{-2} bed d^{-1}



Scale



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Data requirements and cost

Data to run model	Farmer has to collect these data as part of consent
Hydrographic data	15 days, 3 depths
Bathymetry	Survey or chart
Cage layout specified	Yes
Cage dimensions	Yes
Feed returns so feed input is known?	Yes, but always hard to get information
Accurate position cages	Yes, from survey
Benthic fauna monitoring	Required
Cost of running model	Depends





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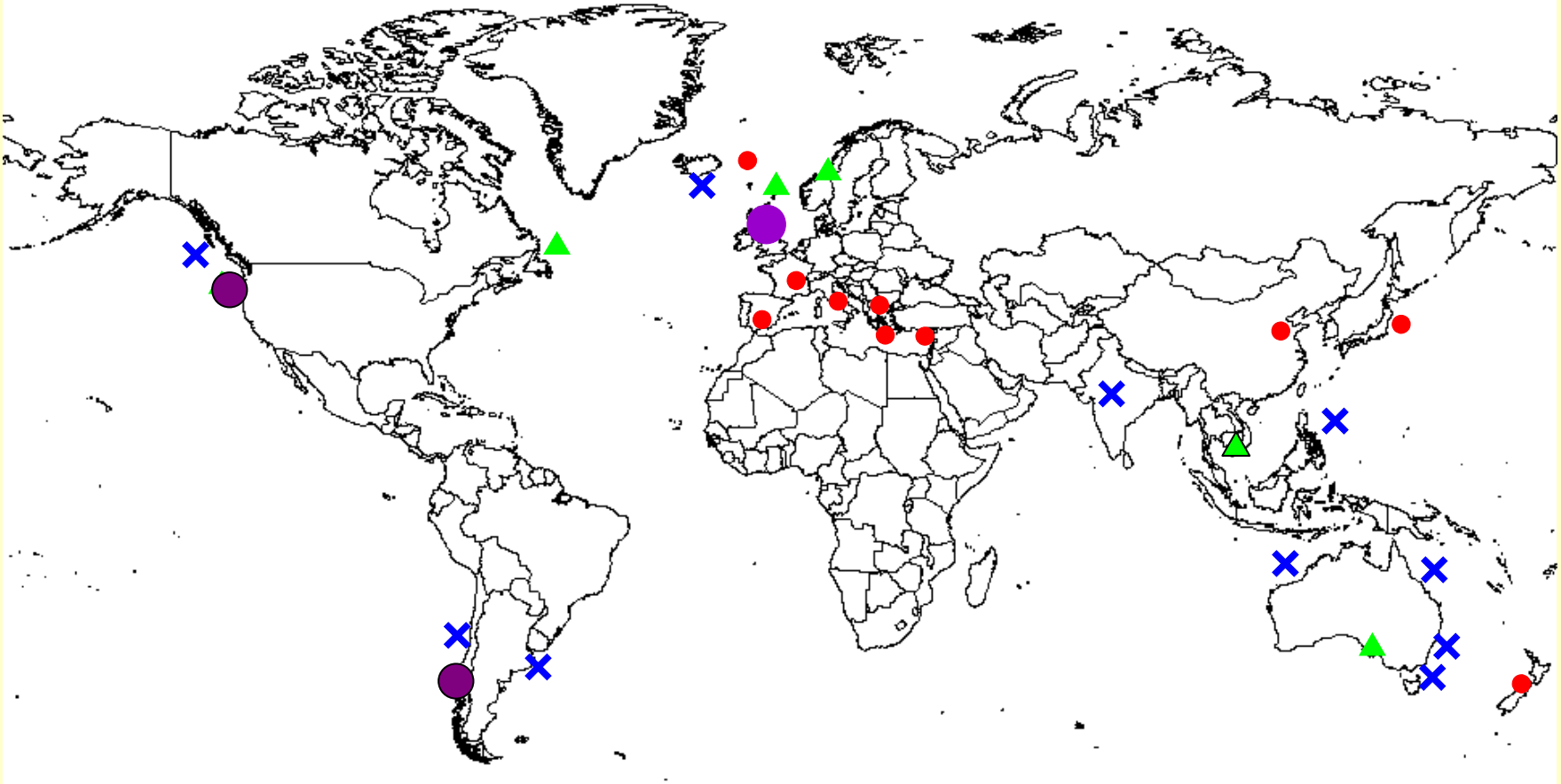




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DEPOMOD / MERAMOD model user base



● <3 licences; ▲ 3-5 licences; ● 5+ licenses; ✕ regular enquiries only

106 licenses in 15 different countries (65 % commercial)

Help line – approx 100 enquiries p.a. (75 % email, 25 % phone)

