



CHARM

CHANNEL INTEGRATED APPROACH
FOR MARINE RESOURCE MANAGEMENT





Action 11.4:
Modelling of benthic food web in the Eastern Channel and
the southern bight of the North Sea

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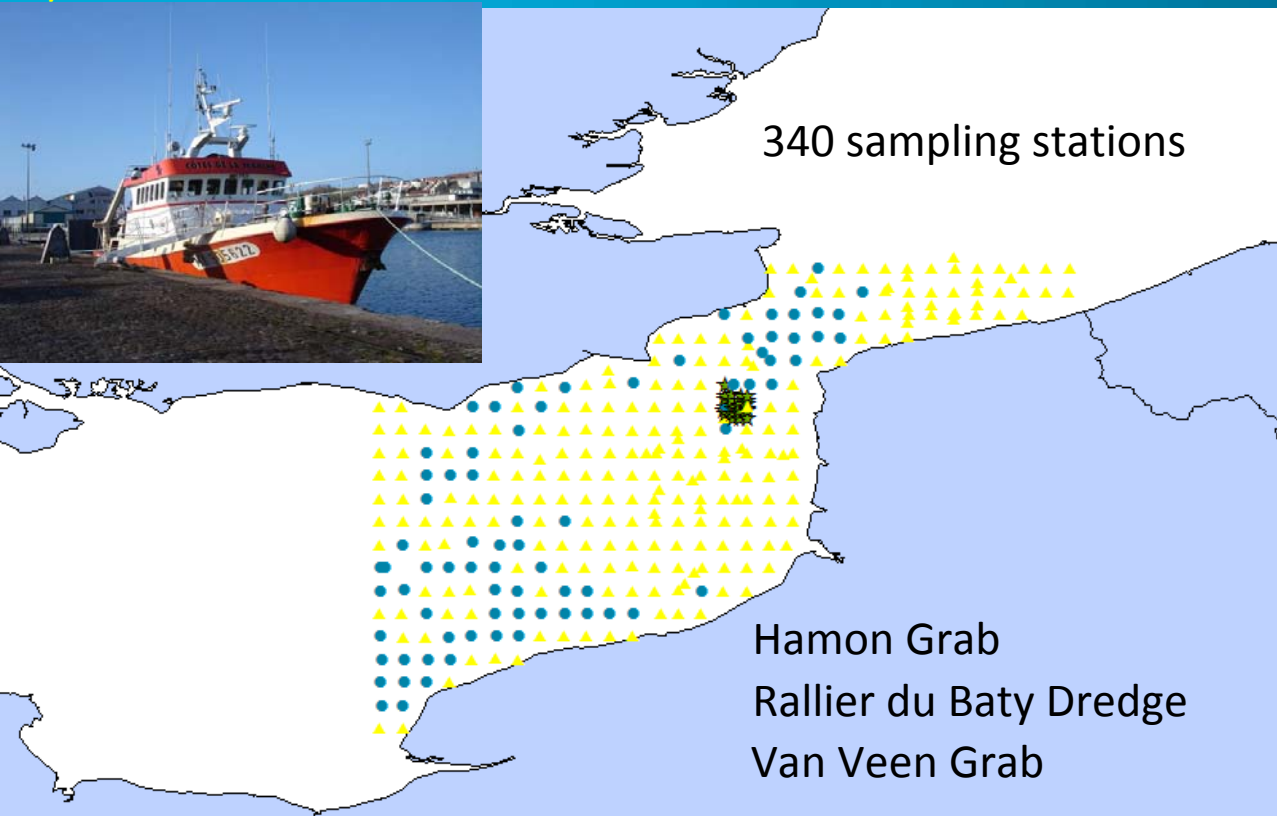
²Laboratoire Ressource Halieutique, IFREMER, Boulogne-sur-mer

Introduction: problematic & dataset

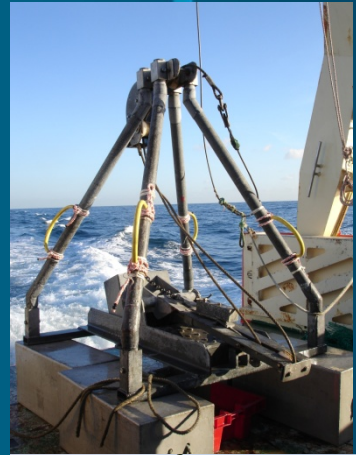
Main problematic of the subaction 11.4:

- Benthic trophic web functioning (relationships between benthic species and description of carbon and energy)
- Can the benthic community be considered as one single entity in the eastern English Channel?

R/V Côtes de la Manche



Hamon Grab



Van Veen Grab



Rallier du Baty Dredge





Macrofauna sample



Sorting Table (1&2 mm)



Organisms sorted from sediment



Identifying Species until the most precise taxonomic level

On board

Laboratory

Benthic invertebrates database:



Abundance



Species richness



Biomass (Ash Free Dry Weight)



Trophic Guilds (Litterature)



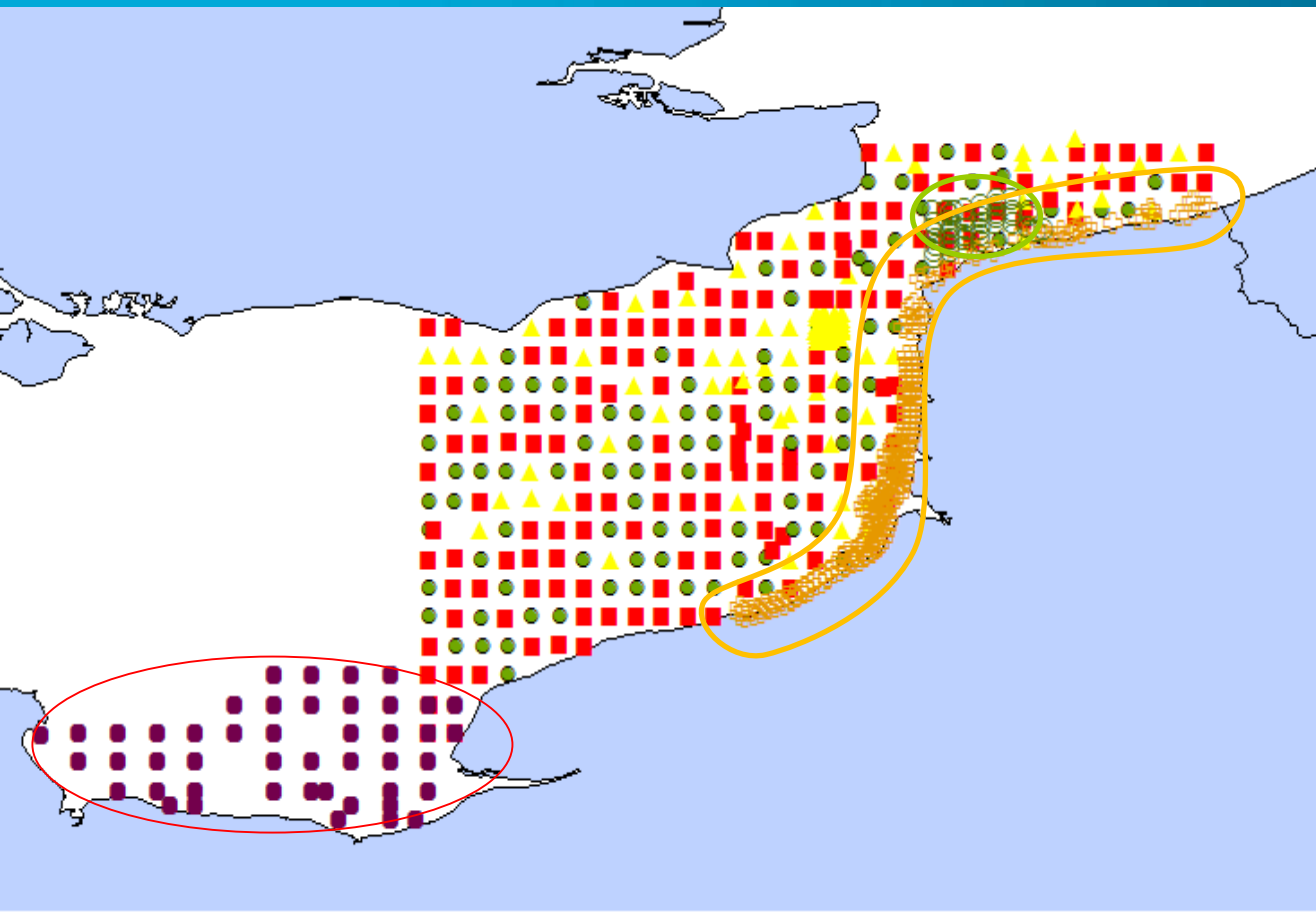
Plus previous available data :

1/Bay of Seine data, 2002
Benthoseine: 46 St.
Ghertsos K.

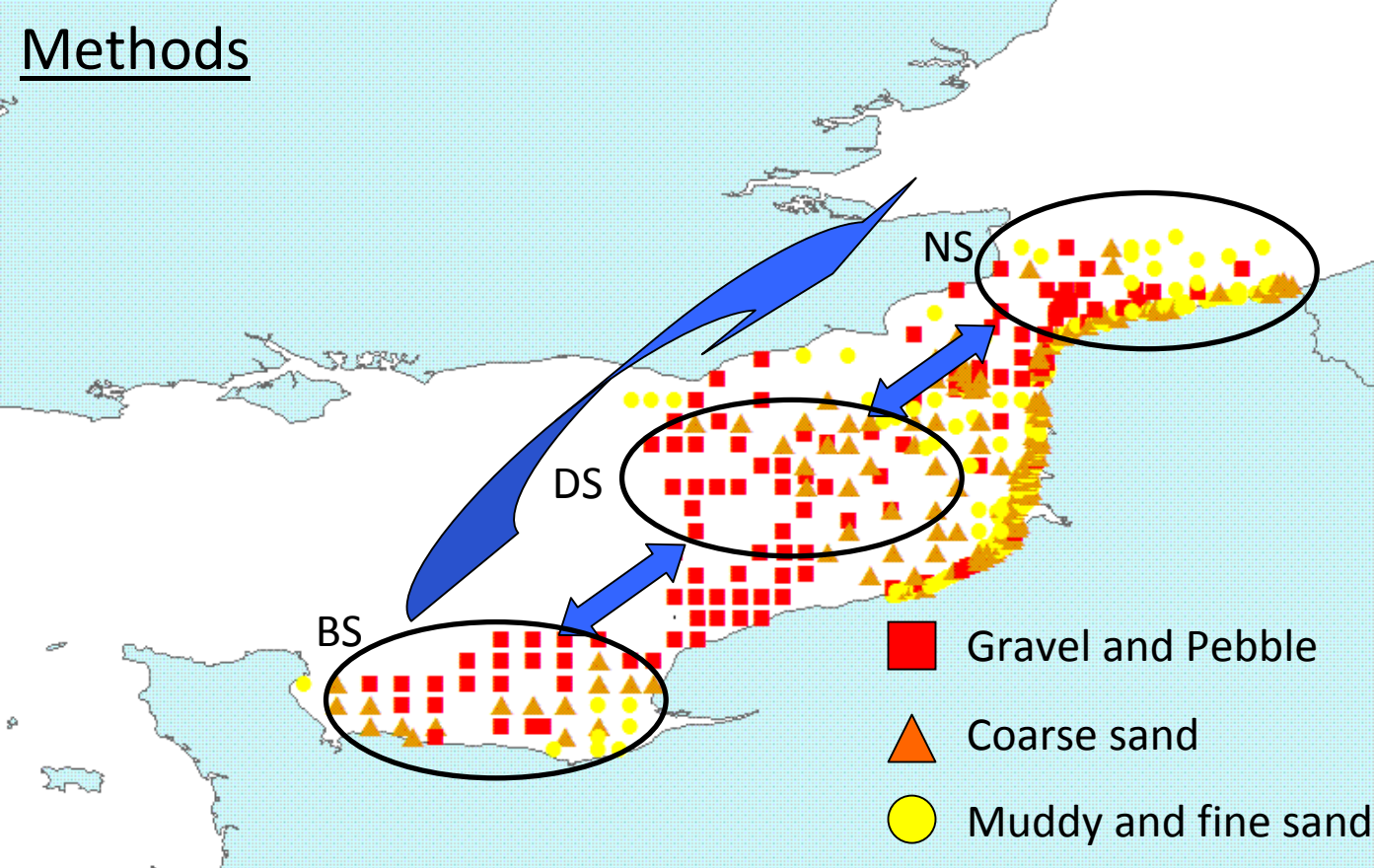
3/Modioles, 2004, 46 St.
Dewarumez, J.-M., Foveau
A., Alizier S.

2/Copale Auties: 1999/2000
Warembourg C., 190 St.

Total: 403 quantitatively-sampled Sites



Methods



-Geographical subdivision

- Bay of Seine (BS)
- Dover Strait (DS)
- Southern bight of the North Sea(NS)

-Community subdivision

- Gravel & Pebble (G&P)
- Coarse sand (Cs)
- Fine sand (Fs)

Community structure comparison performed:

Large

Scale

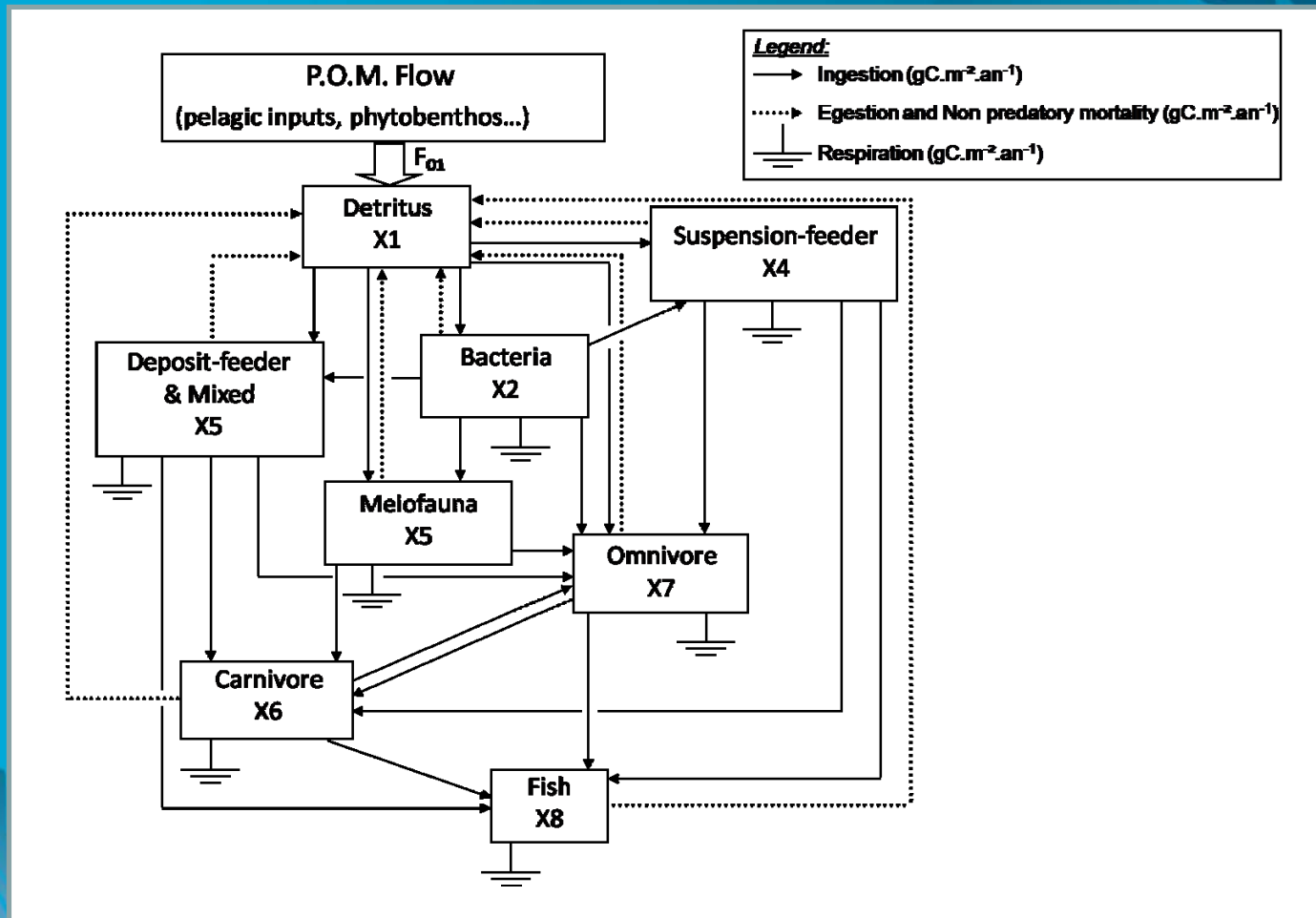
Small

Between three different areas (BS, DS & NS)

Between communities (G&P, Cs & Fs) on the whole area

Between the same community in different areas

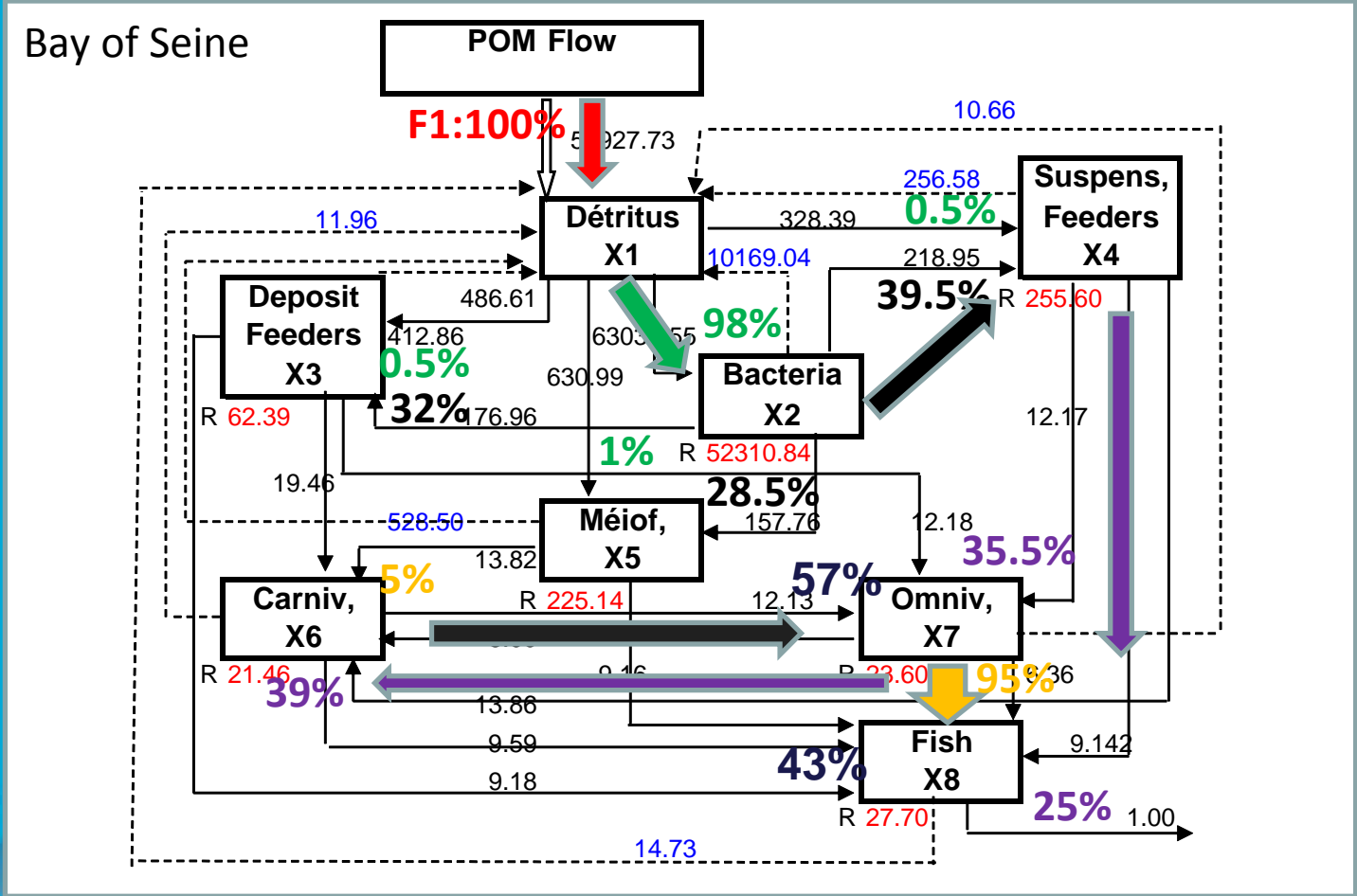
Trophodynamic inverse model (Vezina & Pratt, 1988)



Functional diagram

Results: the « between geographical area » model outputs:

Trophic pathway:



TP1: The « suspension-feeder/carnivore » trophic pathway

Coupling and comparison of geographical sites and communities

a) N°	Preferential Trophic Pathway			
TP1	Detritus-Bacteria-Suspension-feeder-Omnivore-Fish			
TP2	Detritus-Bacteria-Suspension-feeder-Carnivore-Fish			
TP3	Detritus-Bacteria-Deposit-feeder & Mixed-Carnivore-Fish			
b) Sediment\Site	Bay of Seine	Dover Strait	North Sea	Whole
Gravel & Pebbles	TP1	TP2	TP3	TP2
Coarse sand	TP1	TP1	TP1	TP1
Fine sand	--	TP3	TP3	TP3
Whole	TP1	TP2	TP2	TP1

a) Compartments concerned for each of the three preferential trophic pathways identified.

b) Preferential trophic pathway of each divisions and sub-divisions of the eastern English Channel and the southern Bight of the North Sea.

Except a few cases, trophic pathways follows the pattern of the community to which it belongs

Inverse model (Vezina & Platt)

ECOPATH

Lower compartment: 3 units

- Detritus
- Bacteria
- Meiofauna

Lower compartment: 5 units

- Phytoplankton
- Detritus
- Bacteria
- Meiofauna
- Zooplankton

Macrobenthic compartment: 4 units

- Deposit-feeder & mixed
- Suspension-feeder
- Carnivore
- Omnivore

Macrobenthic compartment: 6 units

- Selective deposit-feeder
- Non-selective deposit feeder
- Benthic suspension-feeder
- Suprabenthic suspension-feeder
- Carnivore
- Omnivore

Top predators: 1 units

- Fish

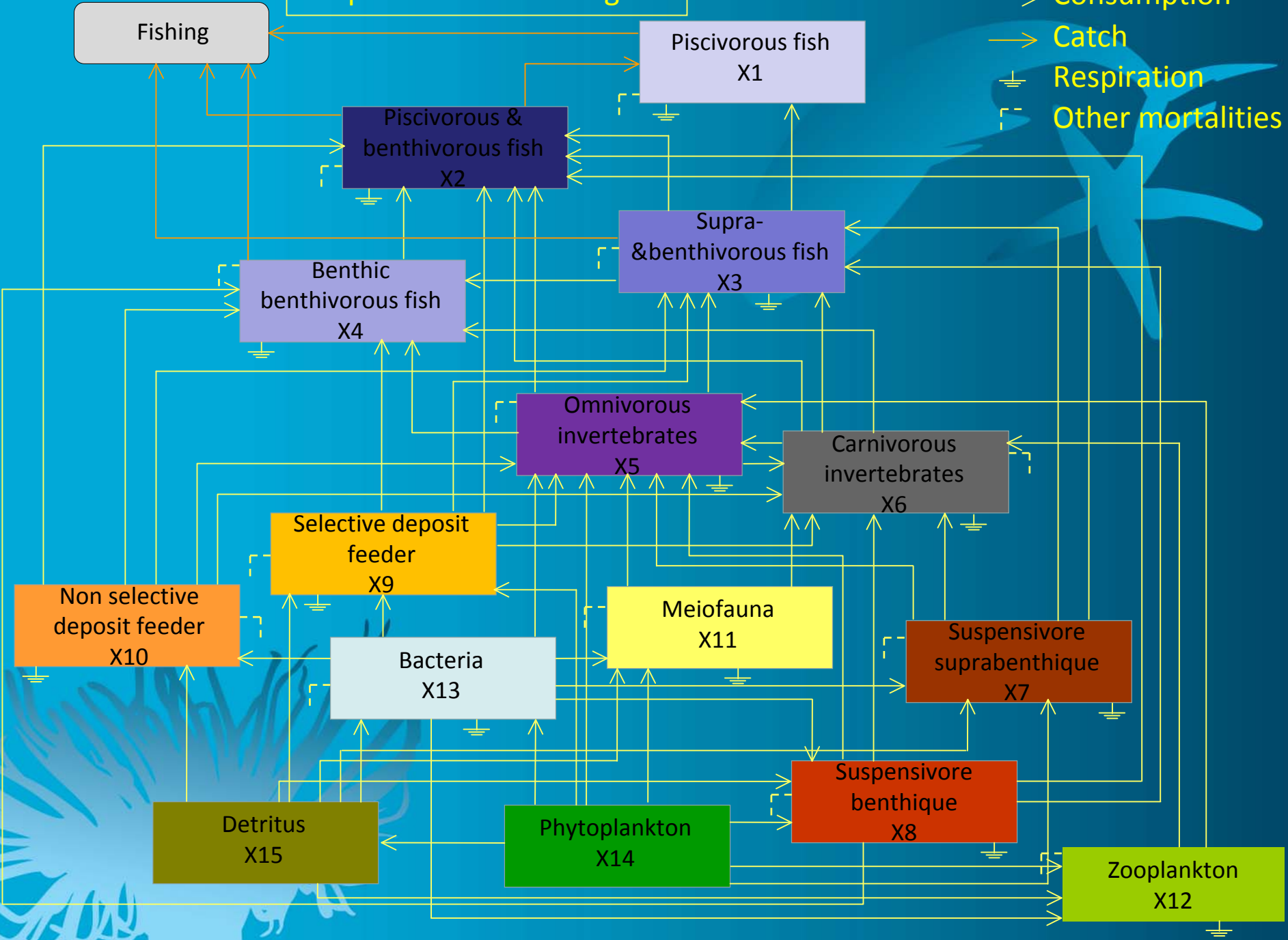
Top predators: 4 units

- Benthic benthivorous fish
- Benthi & suprabenthivorous fish
- Piscivorous & Benthivorous fish
- Piscivorous pelagic fish

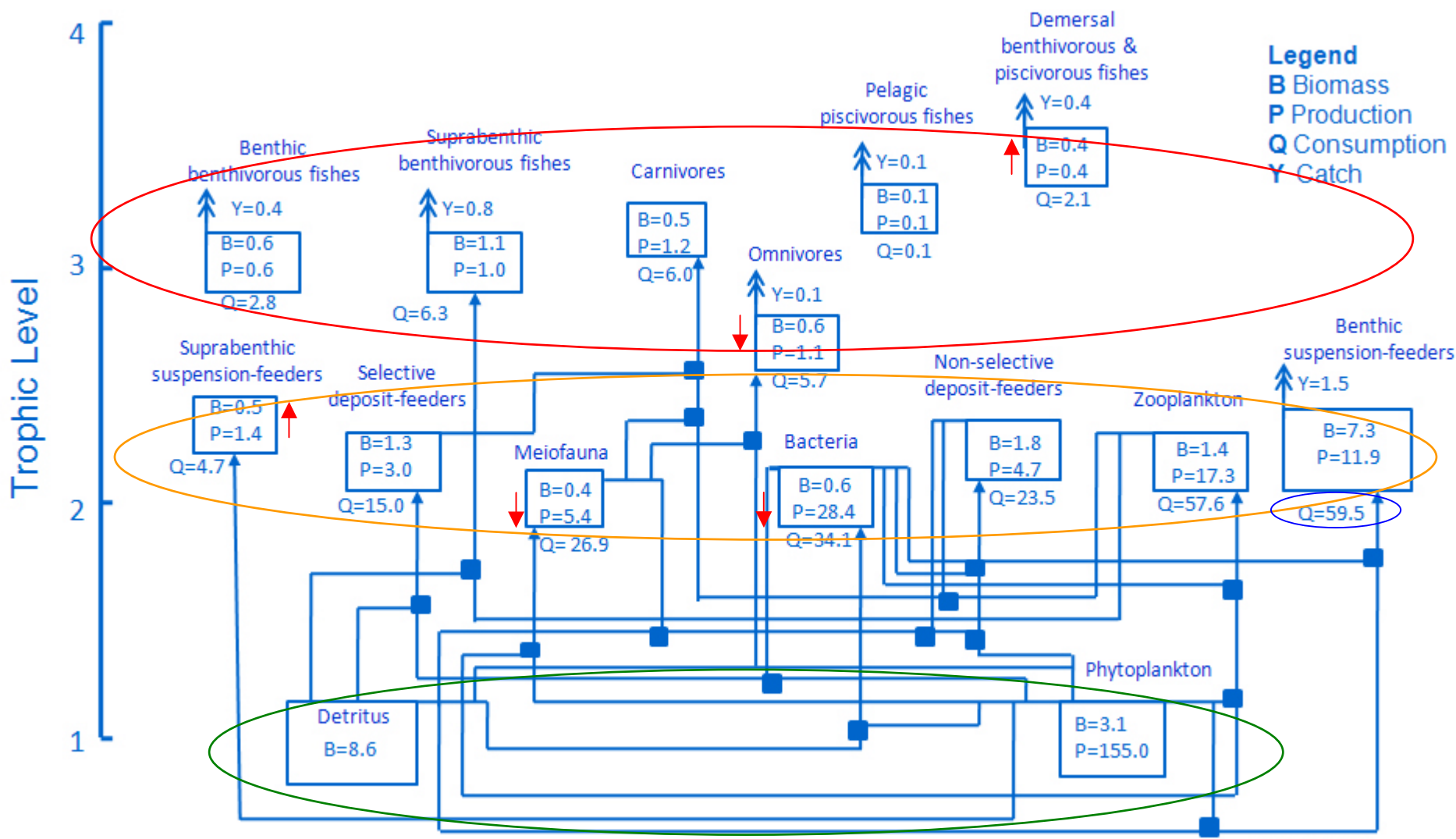


Ecopath Functional diagram

- Consumption
- Catch
- ⊥ Respiration
- - - Other mortalities



Preliminary Ecopath Results: Output of the whole-area model



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