Assessement of environmental Monitoring methods for Integrated Management of Aquaculture in open sea: A MASS BALANCE MODEL APPROACH

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A MASS BALANCE MODEL APPROACH

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Integrated Multri-Trophic Aquaculture (IMTA)

⇒ Sustainable aquaculture

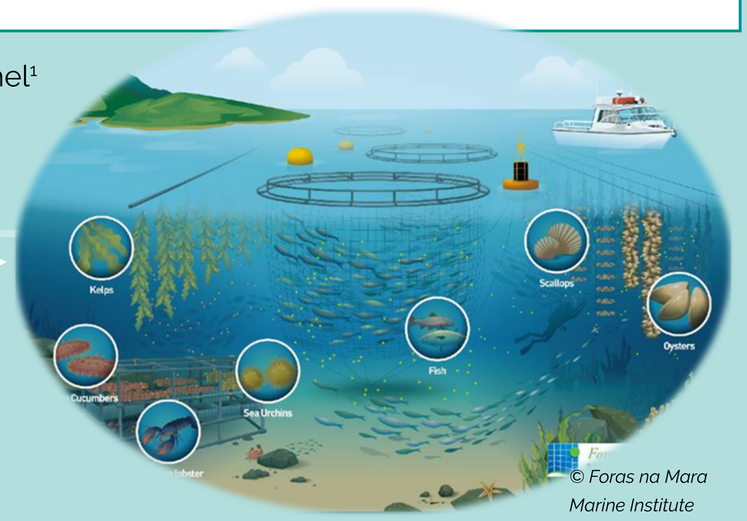
⇒ Trophic interactions : ensure (if possible) a mitigation of impacts of culture species
(Chopin et al., 2012; Buck et al., 2018)

IMTA development at **sea ⇨ promising BUT** Requires **demonstration** of trophic interactions

AMIMA Project

Proposal of a methodology to identify and characterize trophic interactions between aquaculture compartments and with the natural environment

Tools ?



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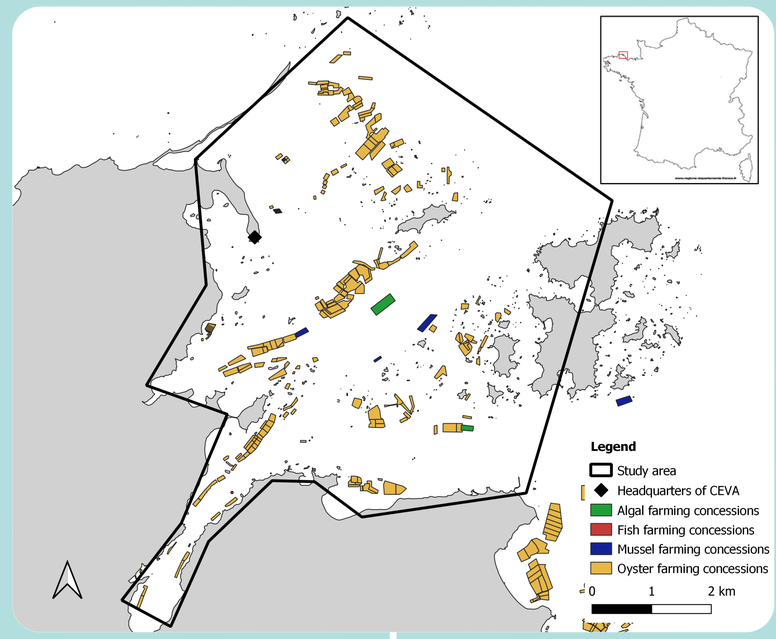
Direct approach: identification of trophic links by tracking markers

Analysis in progress ...

Indirect approach: application of mass balance (nitrogen (N) and phosphorus (P)) models for each aquaculture compartment

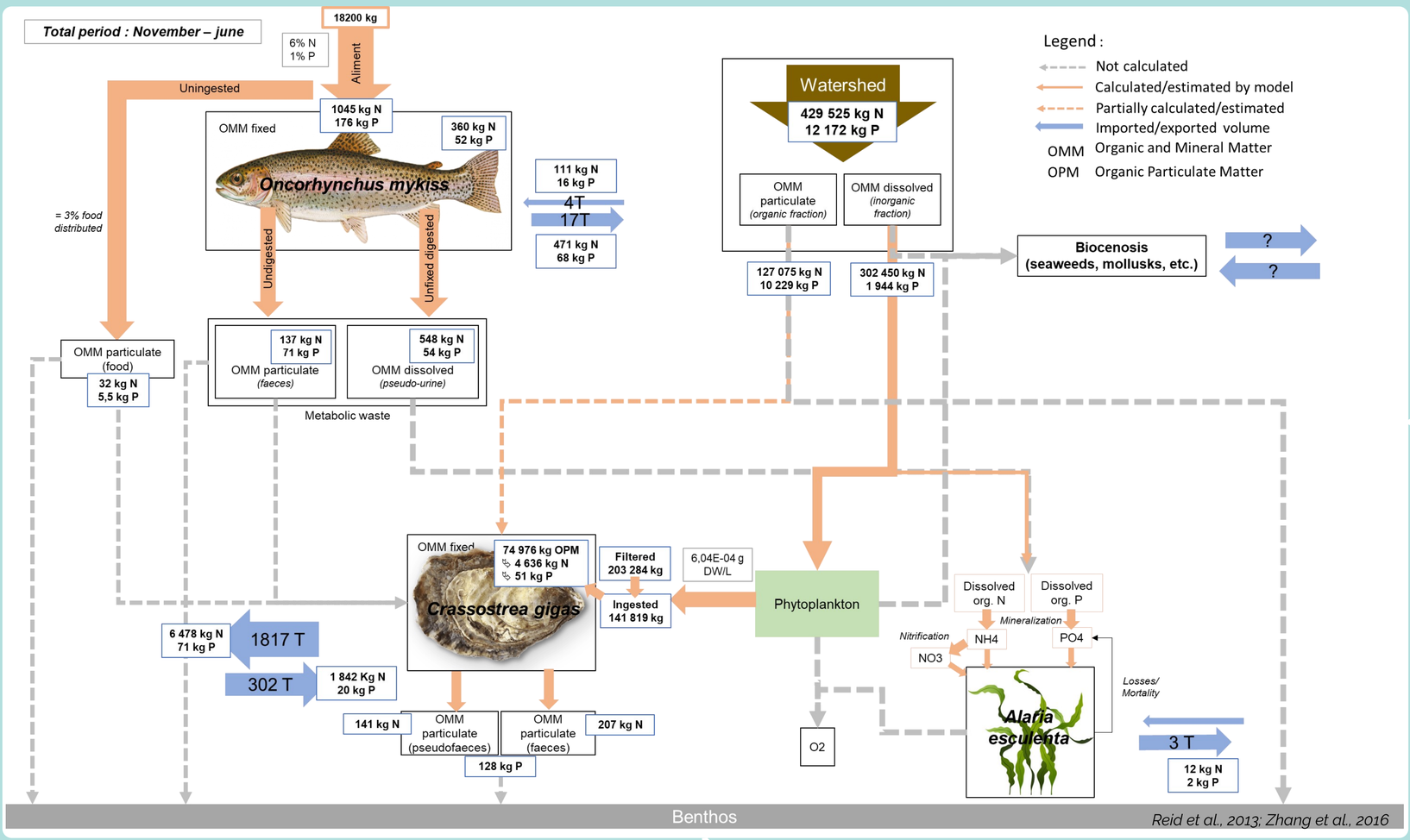
Materials & methods of indirect approach

- Application of mass balances to aquaculture compartments in a specific period and study area: november to june in the Trieux estuary (Côtes d'Armor, France)
- Recovery of production data (oyster farmers, fish farmers, seaweed farmers)
- Use of growth models: evolution of biomass in each compartment



Results of indirect approach

- Estimation of N, P flux quantities of the different aquaculture compartments
- Importance of material flows from the watershed



Final balance of each compartment
(kg/T produced)

	Rainbow trout	*Pacific oyster*	*Atlantic wakame*
N	+ 27,46	- 2,83	- 4,00
P	+ 6,04	+ 0,05	-0,67

Conclusion

Positive outcomes

Quantification of aquaculture biomass in the estuary, discharge and extraction

Potential total remediation of fish emissions by oysters

Meeting with interested producers

Negative outcomes

No trophic links between aquaculture sepcies in a large estuary

Missing data (production, environmental)

Perspectives

⇒ Development of sustainable partnerships with local actors/producers: monitoring of breeding by periodic measurements (1 year or more)

⇒ Collection of environmental data at various spaces and times & use of others models (consideration of sedimentation and resuspension): better understanding of matter flow, the impacts and interactions of each aquaculture production on the environment and the potential interactions between them

⇒ Application of the method to another field with more aquaculture actors

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References

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