Growth versus environment - Danish industry perspective

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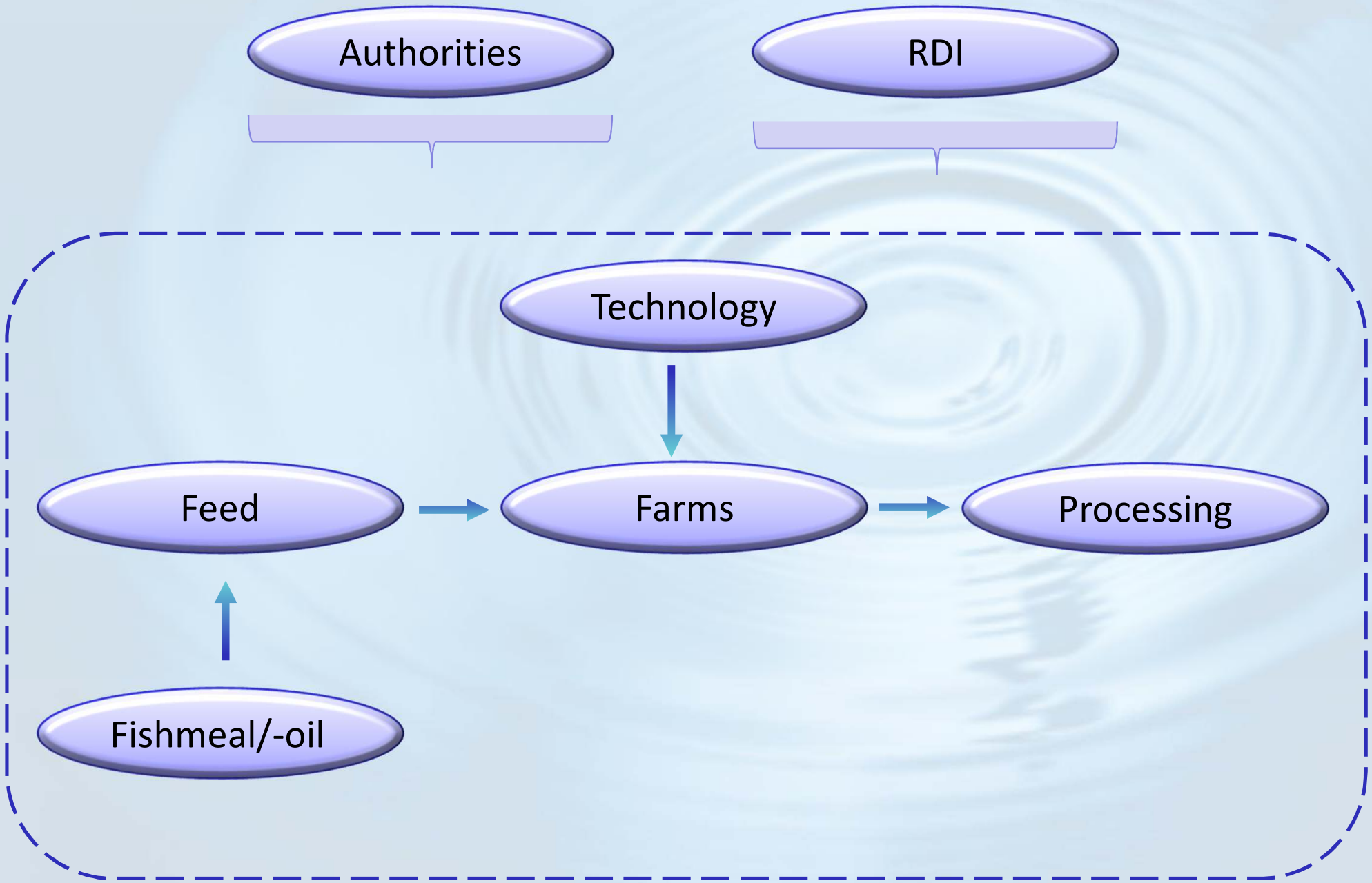


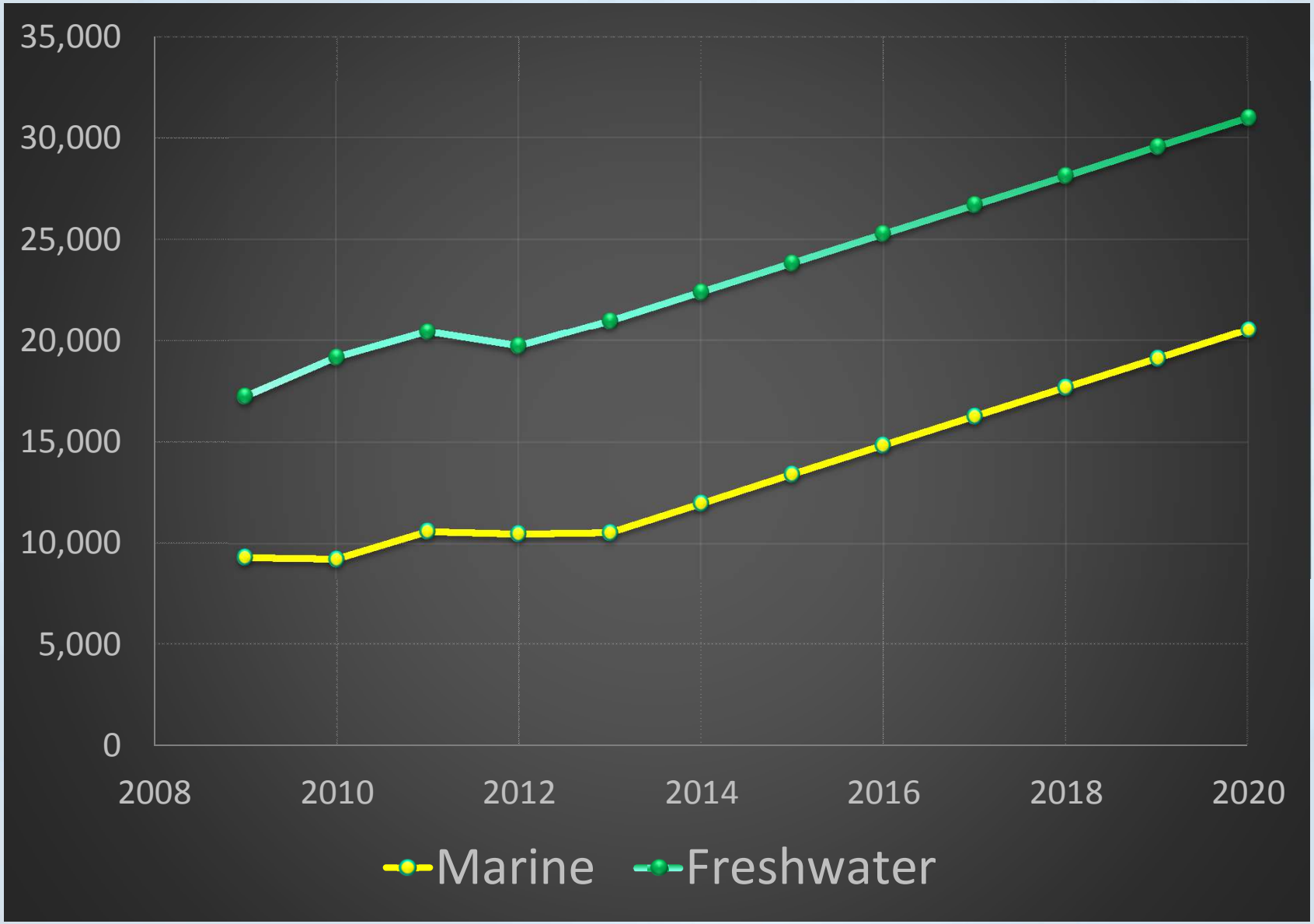
Growth potential

- 1.5 billion Euros
- 1.800 new jobs

Danish government growth strategy:

"Marked conditions for growth are in place, but more raw material and thus increased production is required"

Danish national strategy



Strong headwind

The Norwegian fish-farming industry is **not sustainable**. Along with the production come **great environmental challenges**. The most serious one being **over-fishing**. Other dangers includes **discharge of vast amounts of nutrients, chemicals and metals**, introduction of **escaped salmonoids** to Norwegian watercourses, **parasites and diseases** transferred to the wild stocks, and a threat of inducing **gene modified fish** to Norwegian waters

WWF-Norway, January 2002

Solving three issues

1. The WFD calls for a reduction in total N discharge:
   How to ensure N "neutral" growth?

1. New sites (especially marine farming) requires more space
   How to ensure sufficient space for growth?

2. EU is world leader in R &D, but import of seafood is set to increase from 3 to 12 mil. tons by 2025. Disturbing that our know-how is transferred to other countries and contribute to the sharp increase of their production:
   How to benefit from technological developments?

Finding a growth strategy

Involving stakeholders

Pathways to growth

	Technology	Regulation
Freshwater	RAS	Emission based
Marine	RAS	Emission based
	Off-shore	Zones outside WFD
	Compensatory	Zones inside WFD + emission based

Regulation: Freshwater

Command and control: Feed quota:

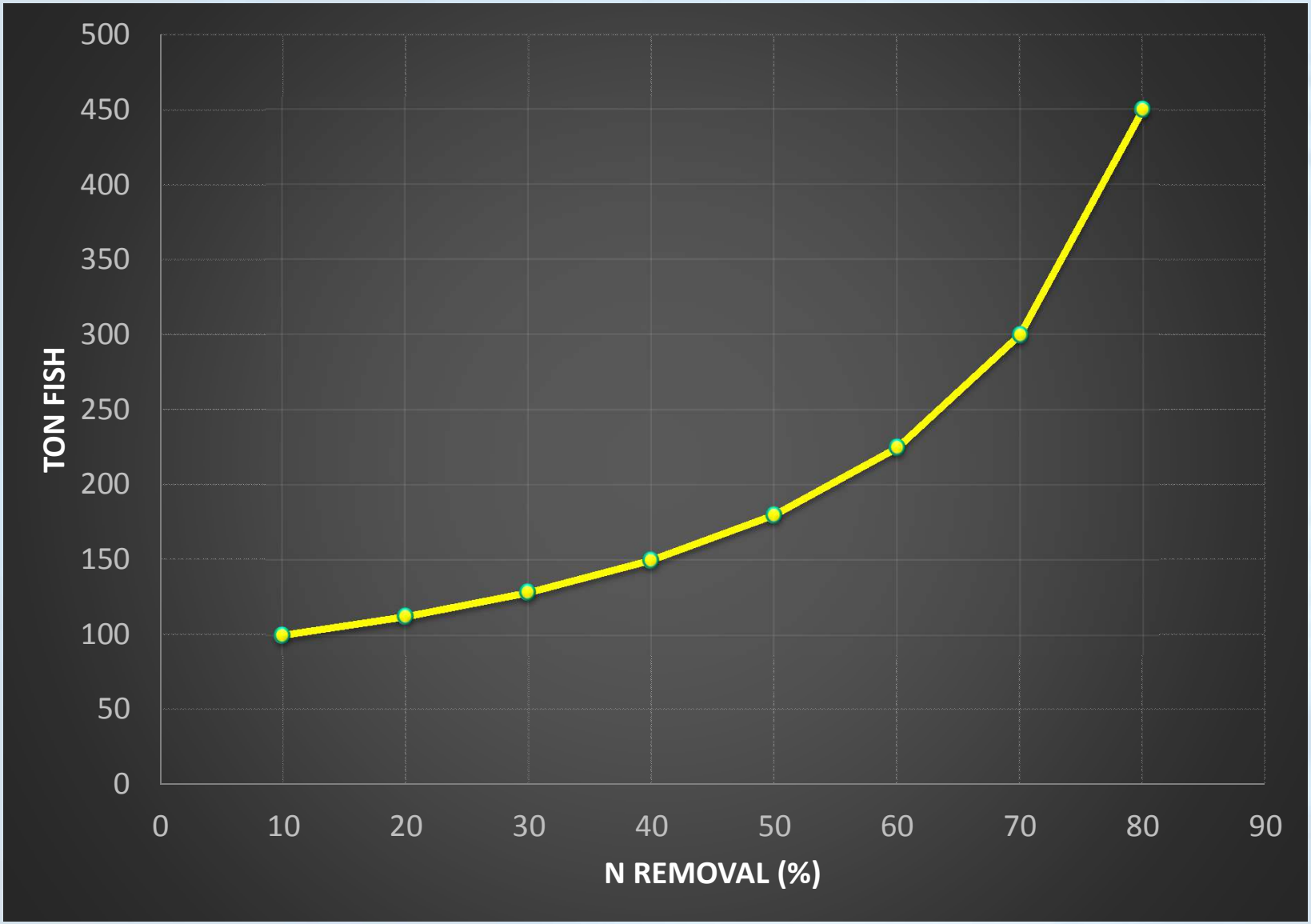
- Inflexible and rigid
- No incentive for improvement

Incentive based system: Emission permits (N):

- Economical optimal allocation of production/pollution
- Flexible
- Strong incentive for improvement

We need innovation in regulation!

The concept of "N-neutrality"

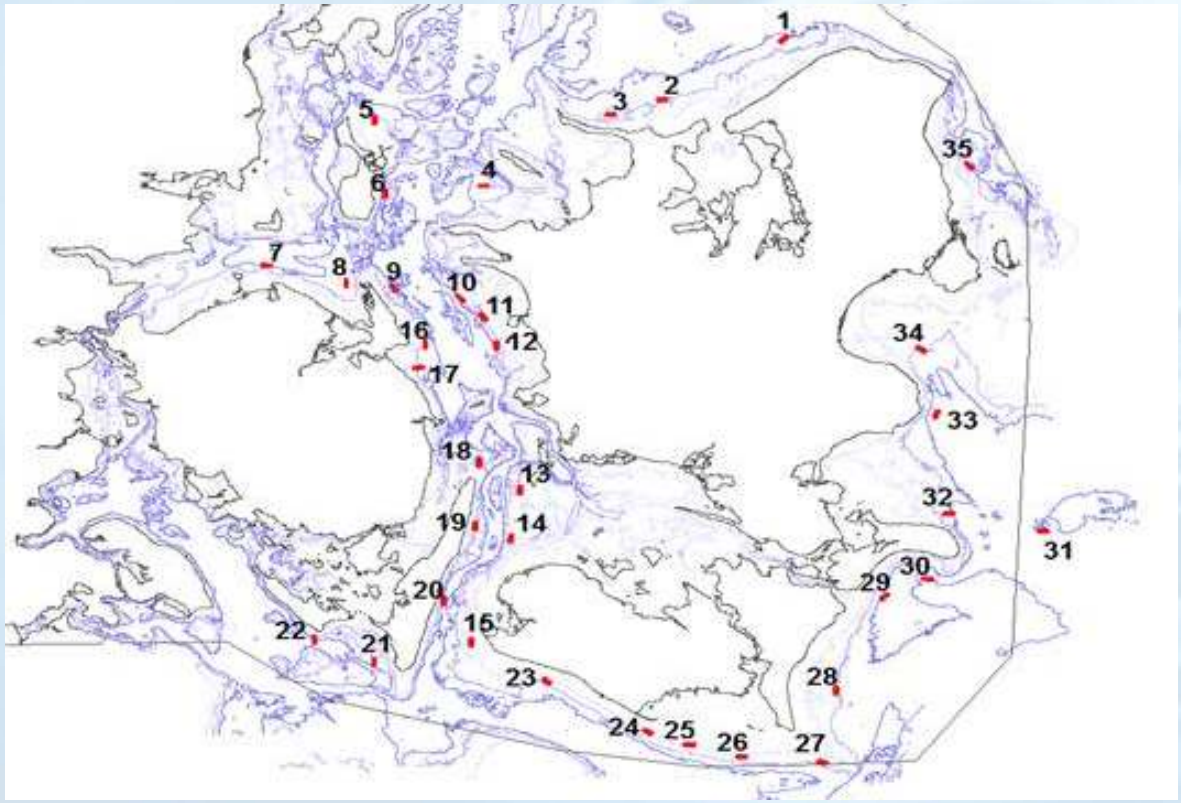


RAS or compensatory farming

RAS technology

Regulation: Marine farming

1. Outside WFD boundaries: 25 zones
2. Inside WFD boundaries: 15 zones (compensatory farming)



Marine technology

Conclusions

Freshwater

1. RAS technology works – but room for improvement
2. Limited to large scale – demand for low scale innovations
3. Regulatory issues not solved (N quotas, “micro-regulation”)

Marine

1. Outside WFD: Large scale test, + 10 new applications
2. Compensatory farming: One business case
3. RAS technology: Two business cases
4. Marine zones not yet in place