

# “Real-Time Incentives (RTI)” Ecosystem-Based Fisheries Management Using 21<sup>st</sup> century technology

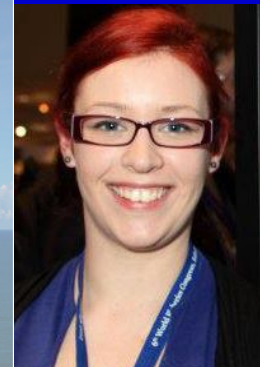
Sarah Kraak, Thünen Institute, Germany

Debbi Pedreschi , Hannes Höffle, Keith Farnsworth , Amos Barkai, David Reid

Co-design, testing and  
stakeholder buy-in of Real-time  
Incentive fisheries management:  
THE CELTIC SEA CASE STUDY

Debbi Pedreschi, Hannes Hoffle, Sarah  
Kraak, Amos Barkai, Keith Farnsworth &  
David Reid

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Marine Institute  
Foras na Mara



Queen's University  
Belfast



# Co-creating Ecosystem based Fisheries Management Solutions

- MareFrame – modelling the trade-offs in EAFM
- RTI – complementary: the practical solution on the ground for how to actually do it

# “Real-Time Incentives (RTI)” Ecosystem-Based Fisheries Management Using 21<sup>st</sup> century technology

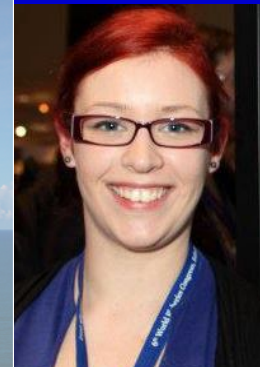
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# What is RTI?

## RTI : Real-Time Incentives

RTI is a holistic, evidence-based, fisheries-management approach that integrates multiple objectives for several commercial species and ecosystem elements such as vulnerable species and habitats into one simple system, using 21<sup>st</sup> century technologies.

Kraak et al. 2012. 21st century fisheries management: a spatio-temporally explicit tariff-based approach combining multiple drivers and incentivising responsible fishing.  
– ICES Journal of Marine Science, 69: 590–601.

# What is RTI?

VMS

eLogbooks

EM-ER

management approach  
21<sup>st</sup> century technologies

# What is RTI?

**MSY**



**MFSD**

Incentives

“fishing for litter”

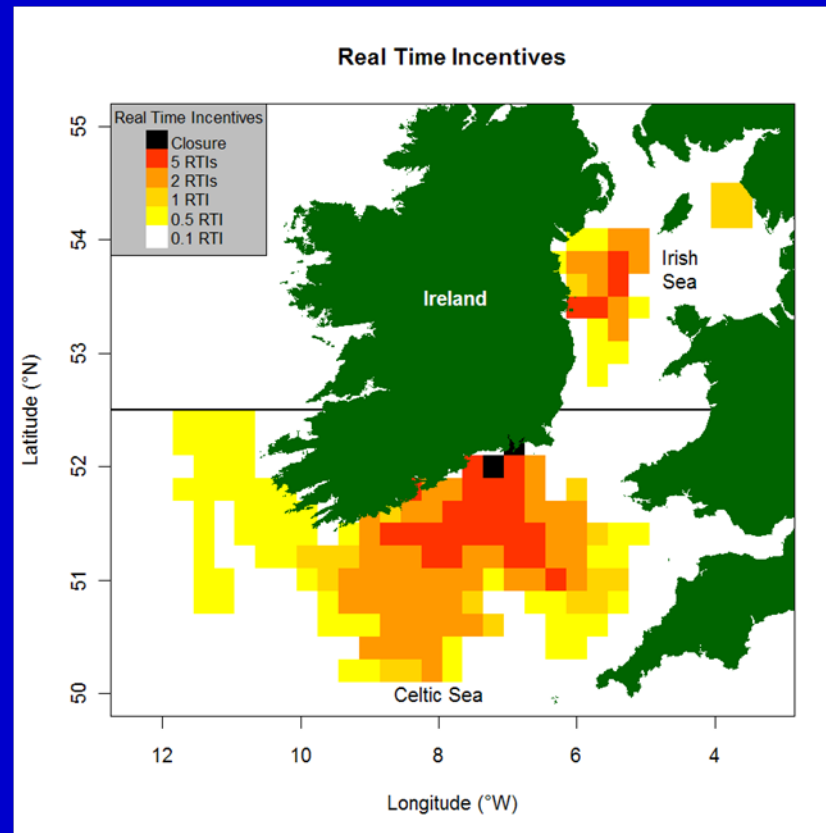
“low-impact and fuel-efficient (LIFE)”

# How does it work?

- RTI replaces
  - catch / landings quotas
  - days-at-sea (or kWdays) limitations
- RTI incorporates
  - closed areas (e.g., permanent, seasonal, real-time)

# How does it work?

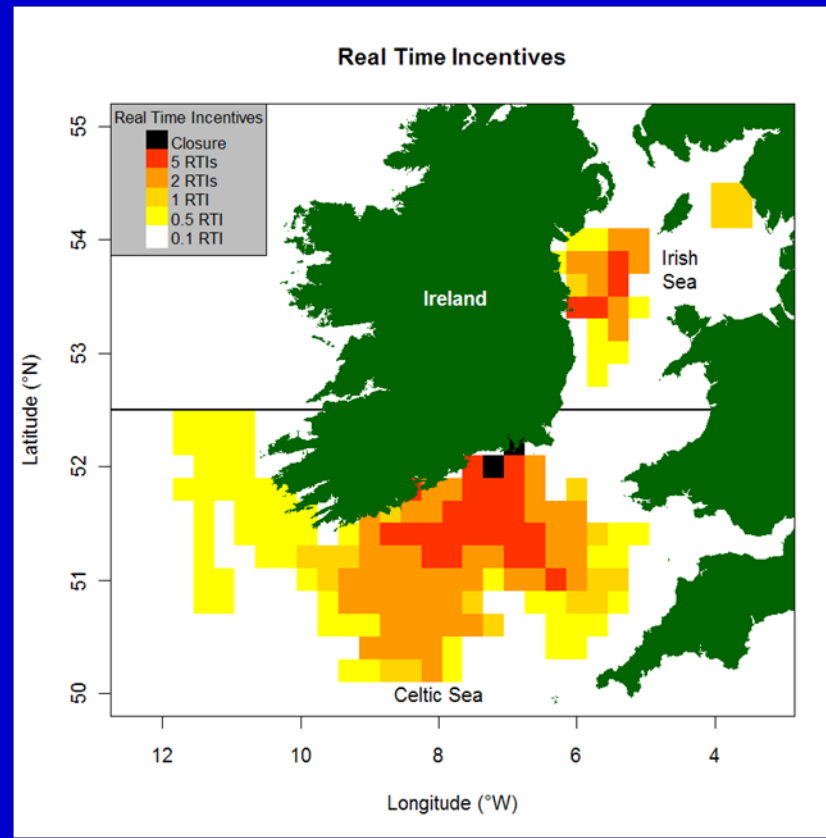
Vessels get allocated fishing-impact credits, 'RTIs'





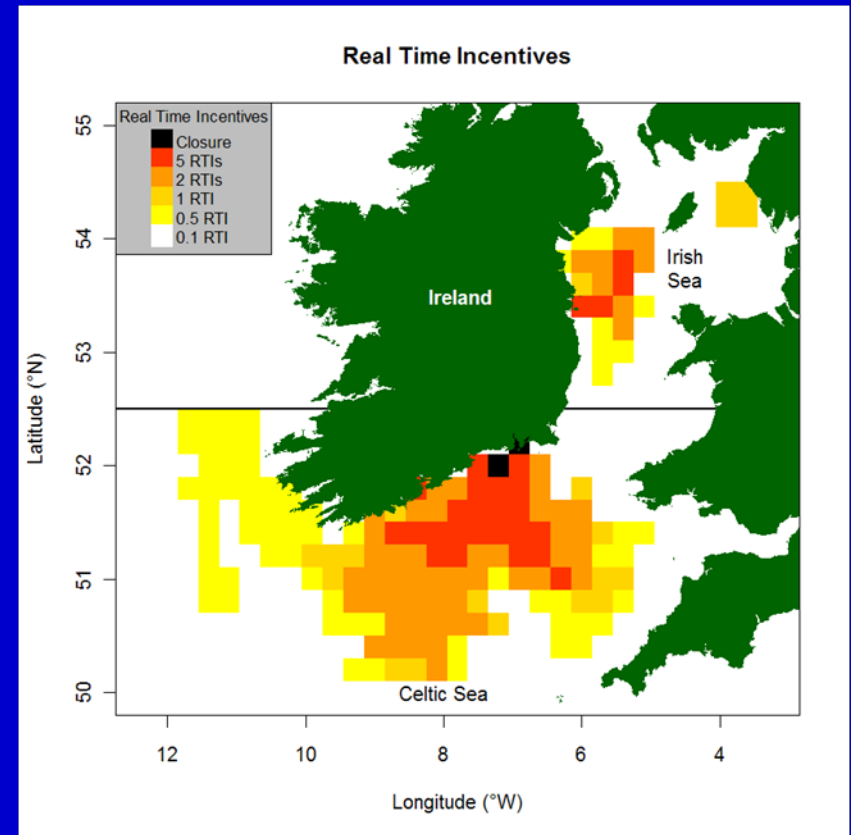
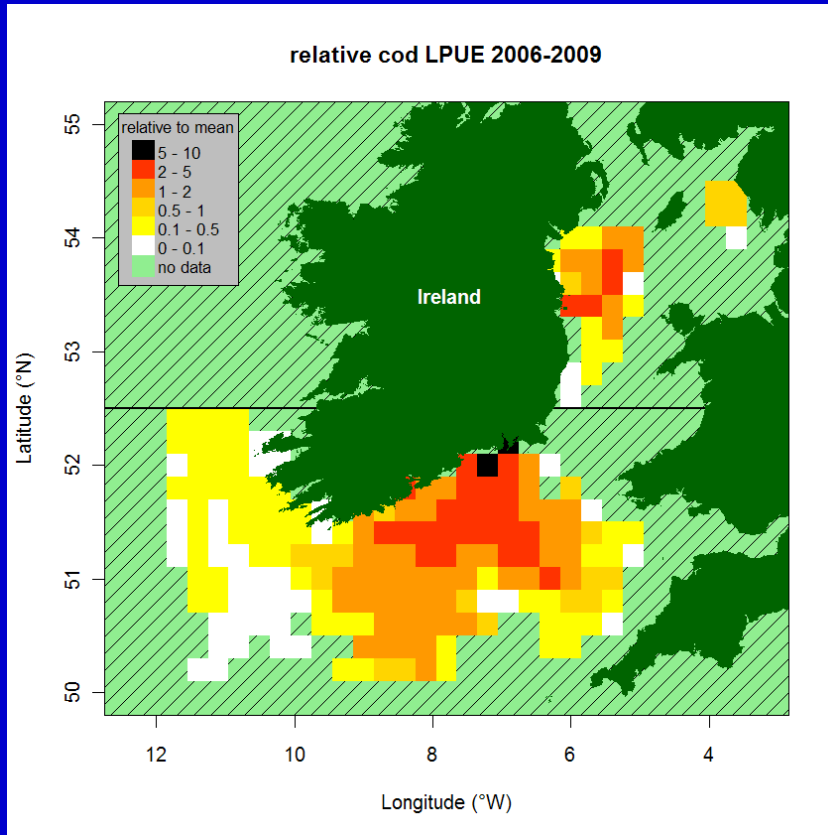
# How does it work?

The fisher is free to fish where and when he wants, given the tariffs...



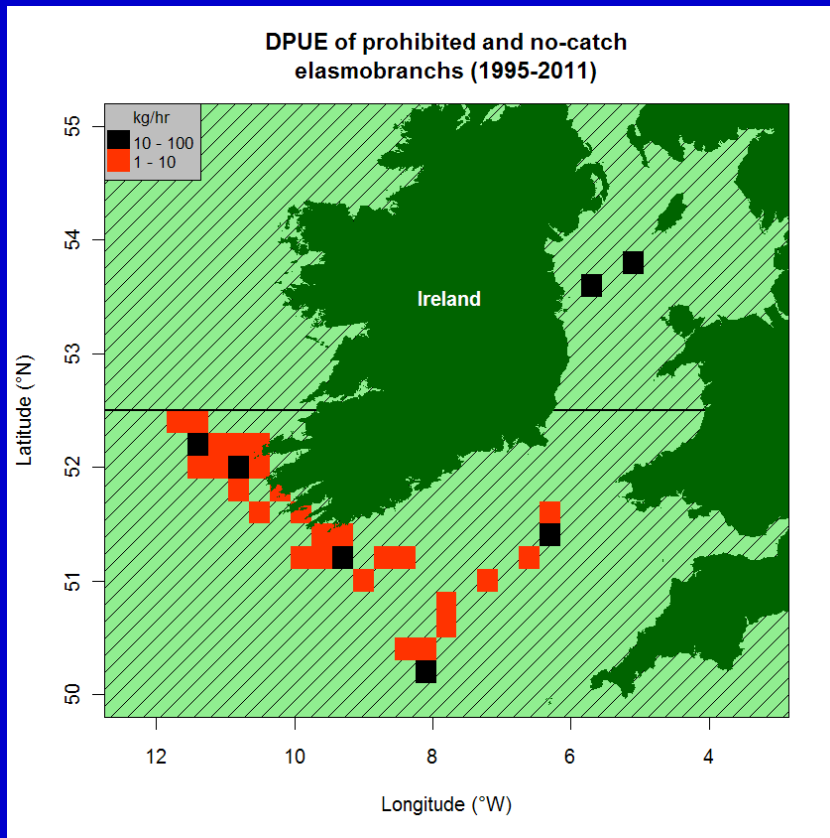
# How does it work?

Managers set the tariffs according to targets and objectives...



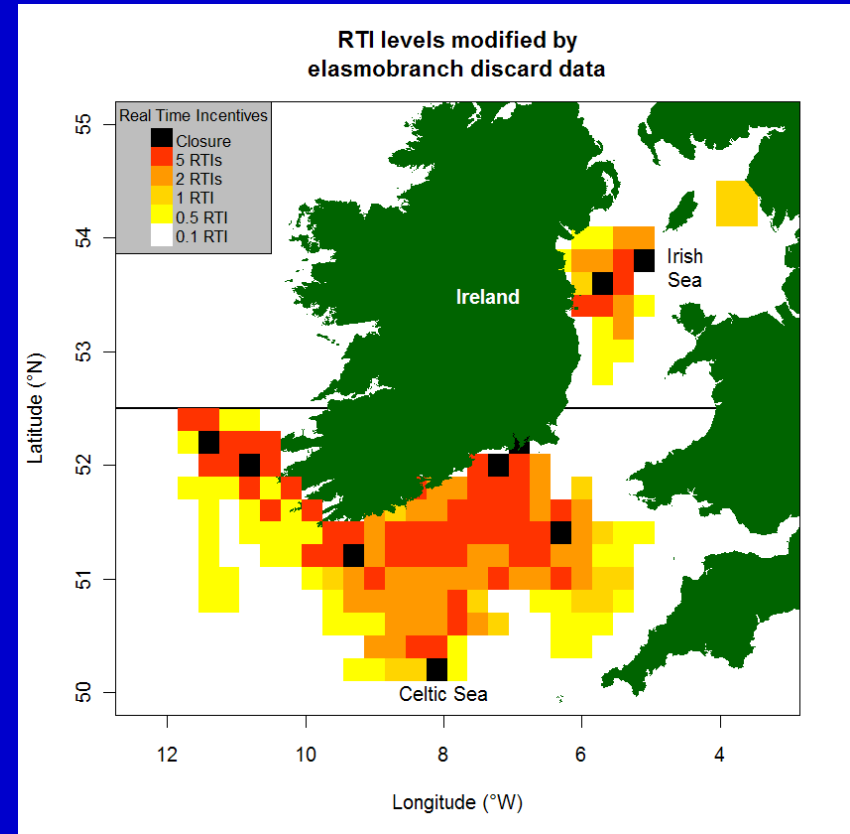
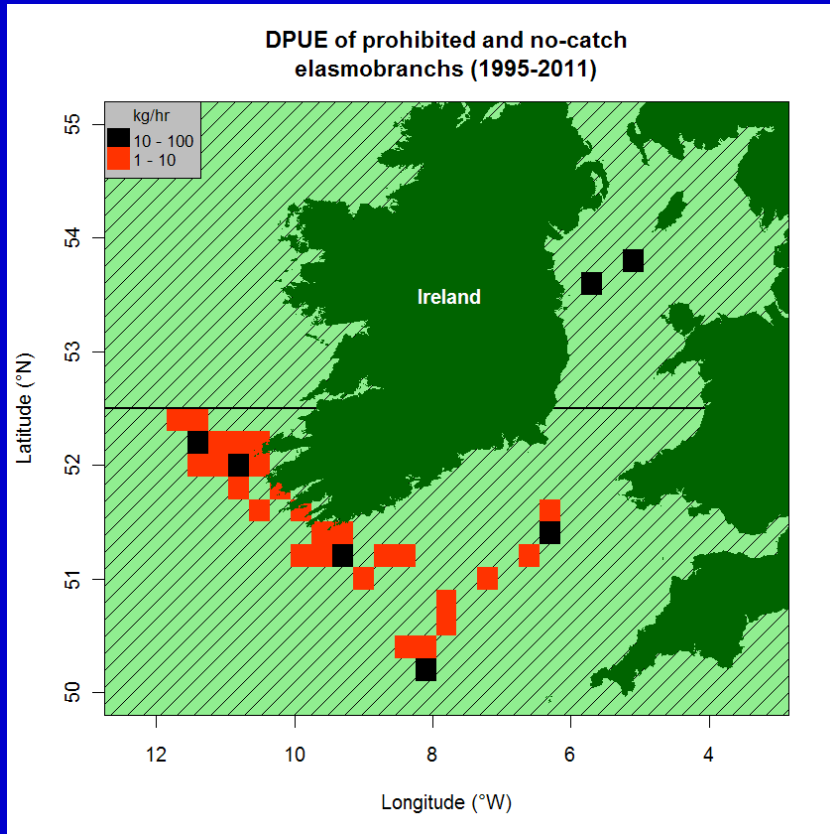
# How does it work?

... not only commercial species targets, but also ecosystem objectives such as seafloor impacts or...



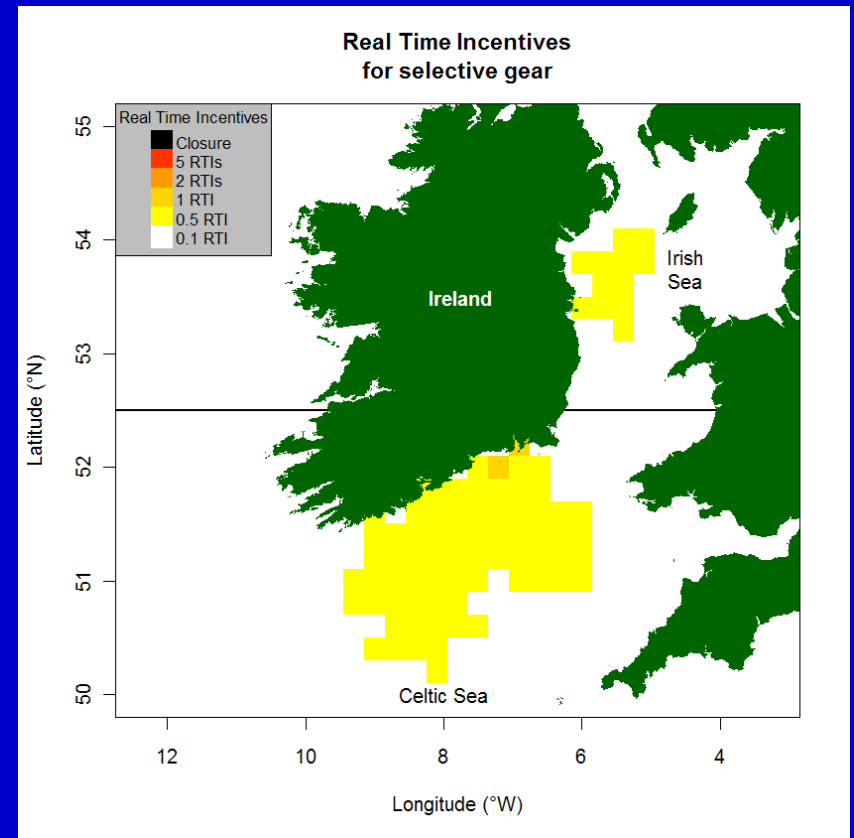
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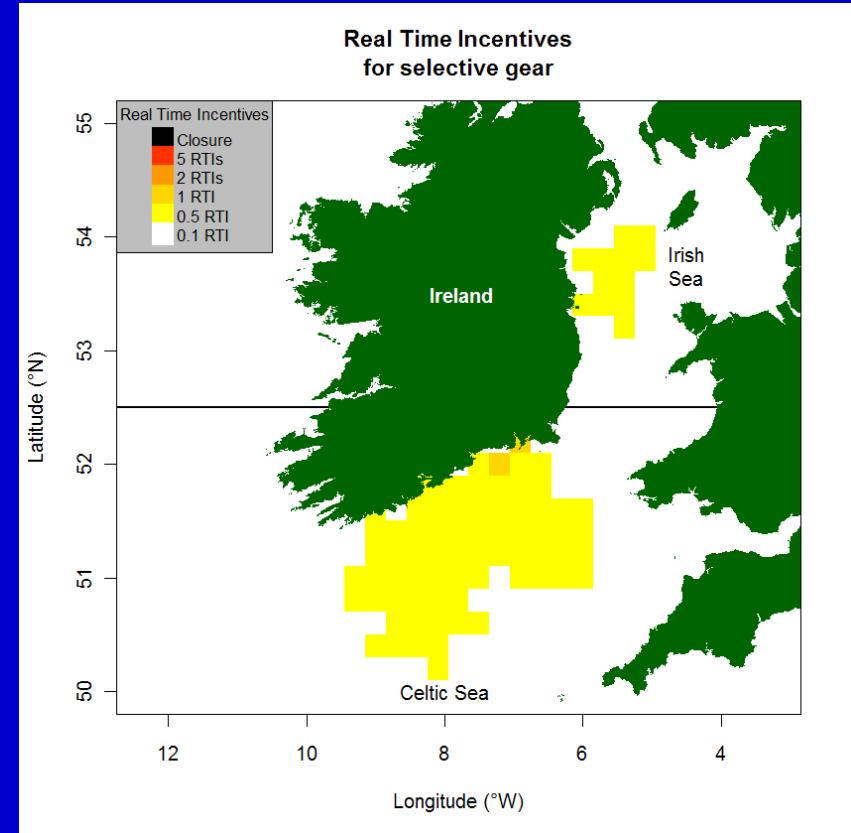
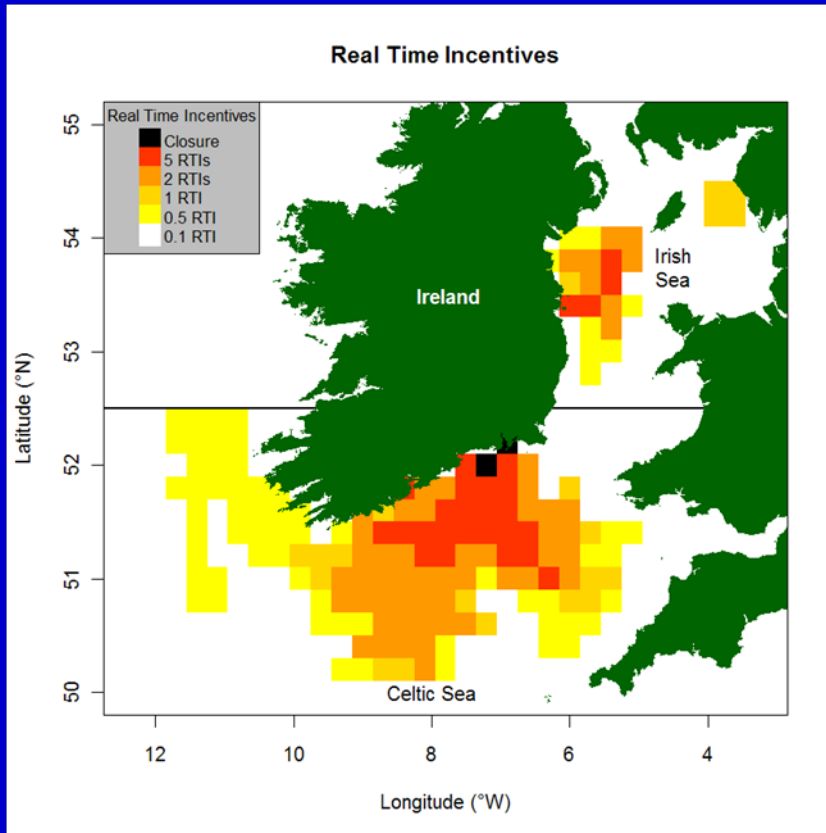
# How does it work?

Different tariffs when fishing with selective gear,  
e.g. for which cod vulnerability is 10% relative to 'default' gear



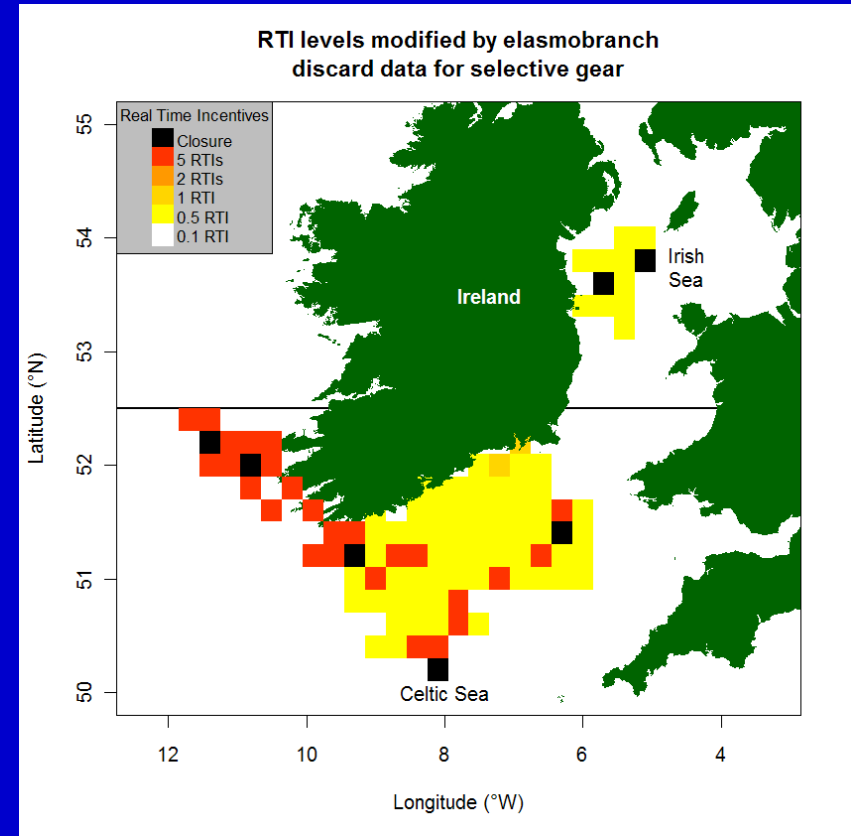
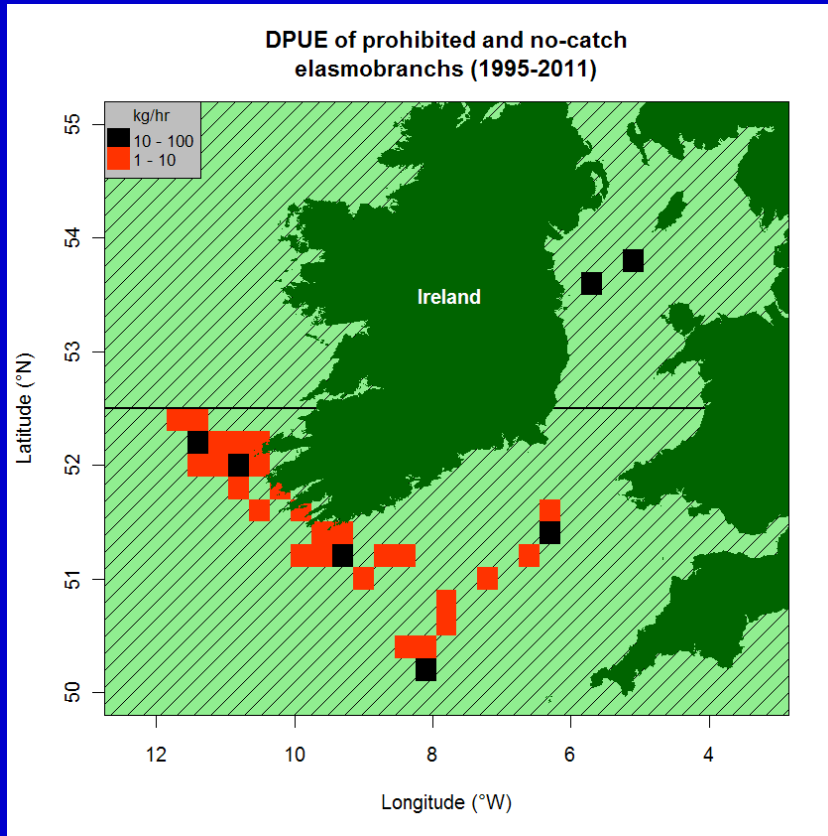
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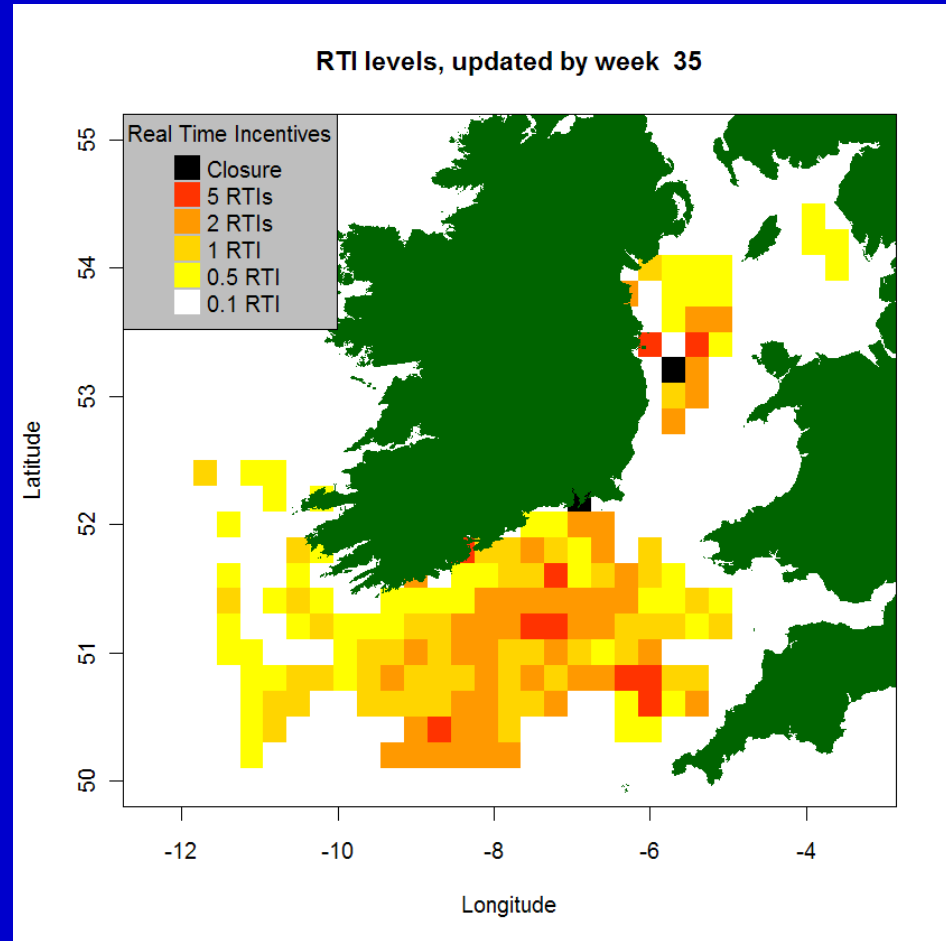
# How does it work?

Different tariffs when fishing with selective gear, e.g. for which cod vulnerability is 10% relative to 'default' gear



# How does it work?

Real-time,  
e.g. weekly,  
updates





# How does it work?

## Olrac-RTI: implementation in software



Barkai et al. 2013. Olrac-RTI: A new and operational approach to holistic management of fisheries for multiple commercial species and ecosystem objectives.

– ICES CM 2011/G:07.

# How does it work?

## vessel unit – DDL – Dynamic Data Logger

Version: RTI-6 (2013-10-28)

RTI Balance: **166.16**  
04 Feb 2014 11:21:15

Current RTI Consumption Rate (RTI / day): 0.1 0.5 1 2 5 Closed

At this rate, zero RTI in: **83** days

RTI Hub messages: 0 messages

Current map: Default Diamond Mesh TBB-80

End Trip (F5)  
Start Daily Activity (F6)

Wind strength (Beaufort): 04: Small waves  
Cloud type: Cirrocumulus  
Cloud cover: 1/8  
Moon phase: Waxing crescent

Multimedia Notes  
Title: Seabirds feeding on net

Catch	Product Code	Juvenile Fish?	# of units	Actual proc. wt (kg)	Calc. proc. wt (kg)
1	HAD-FIL-FRE-PRI-BOX-kg-25	No	45	1125	1125
2	NOP-FIL-FRE-...	No	33	495	495

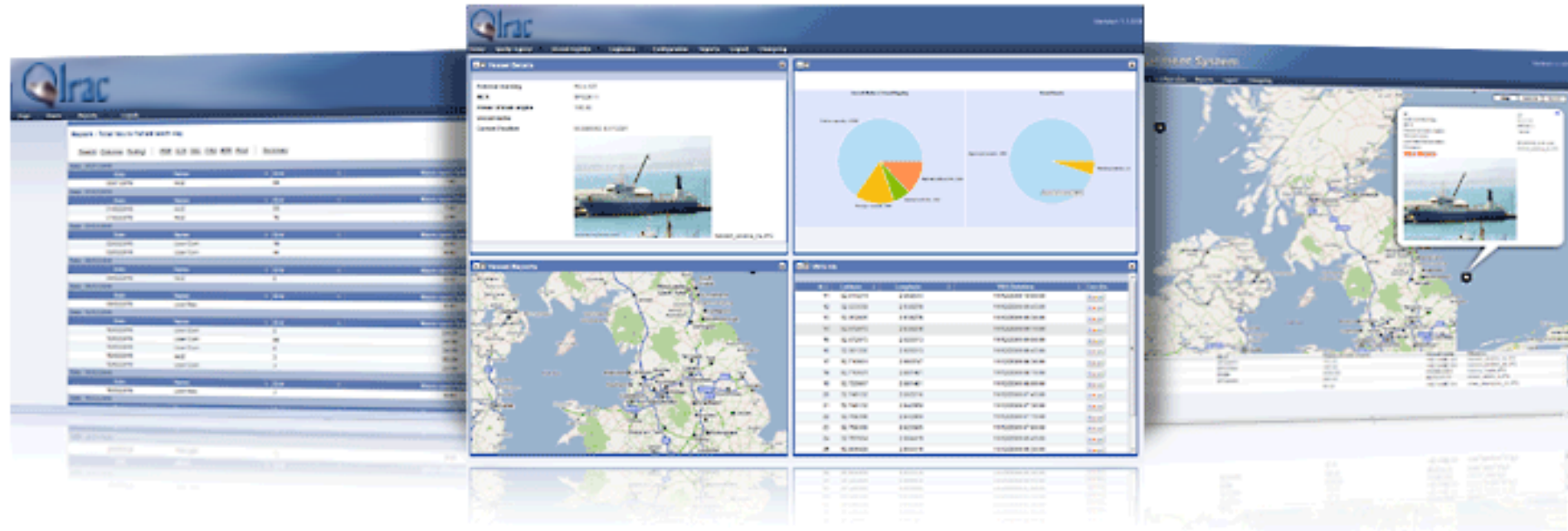
GPS Lat: 51°47.99'N  
GPS Long: 009°16.28'W  
ICCS: IRL 3261

Barkai et al. 2013. Olrac-RTI: A new and operational approach to holistic management of fisheries for multiple commercial species and ecosystem objectives.

– ICES CM 2011/G:07.

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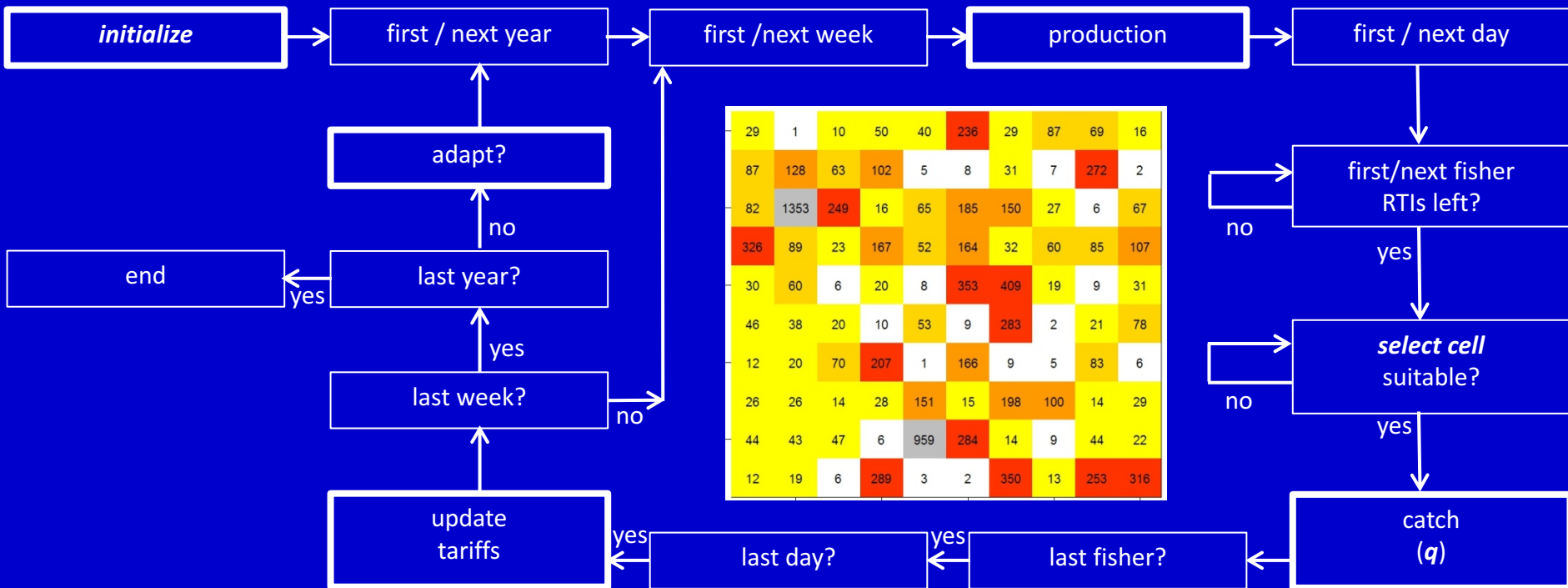
shore unit – DDM – Dynamic Data Manager



Barkai et al. 2013. Olrac-RTI: A new and operational approach to holistic management of fisheries for multiple commercial species and ecosystem objectives.

– ICES CM 2011/G:07.

# Simulation testing



Kraak et al. 2014. Exploring the RTI (real-time incentive) tariff-based approach to single-species fisheries management.  
– Fisheries Research, 155: 90–102.

Kraak et al. 2015. RTI outperforms traditional management in simulated mixed fisheries and cases incorporating protection of vulnerable species and areas.  
Fisheries Research, 172: 209–224.

# RTI advantages

- Costs of overfishing and other costs to ecosystem are internalized: fishers have to take them into account in their business decisions;
- Flexible: Maps can be dynamically updated with any kind of information and information can be weighted according to any objectives/aims;
- The choke-species problem in mixed fisheries is ameliorated;
- Fishers can choose where & when to fish and with which gear;
- Fishers collect the data; not only catch but also sea-floor data.



# RTI interest has expanded



Logos surrounding the central graphic include:

- ILVO
- Consiglio Nazionale delle Ricerche
- CAIU
- DTU
- UNIVERSITE DE NANTES
- THÜNEN
- ifremer
- WAGENINGEN UR For quality of life
- Queen's University Belfast
- Marine Institute Foras na Mara
- Università di Roma Tor Vergata
- azti tecnalia
- hcmr EAKKEE
- NISEA
- The Nature Conservancy
- OLSPS Marine
- roomspace
- fish fix
- ClientEarth
- BIM Ireland's Seafood Development Agency
- oceanDTM Marine Science Services
- marine instruments



*Thanks for your attention*



*Think out-of-the-box*