

# Real-time spatial management approaches to reduce bycatch and discards: experiences from Europe and the United States

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# Spatial management to mitigate bycatch

- Range of spatial management tools adopted to mitigate bycatch and discards
  - Permanent, seasonal or temporary closures
  - Regulatory , voluntary or private agreements
- **Europe**
  - Real-time area closures (regulatory)
- **United States**
  - Private fishing agreements (US west coast)
  - Voluntary spatial management schemes (US east coast)

# FISH and FISHERIES



FISH and FISHERIES

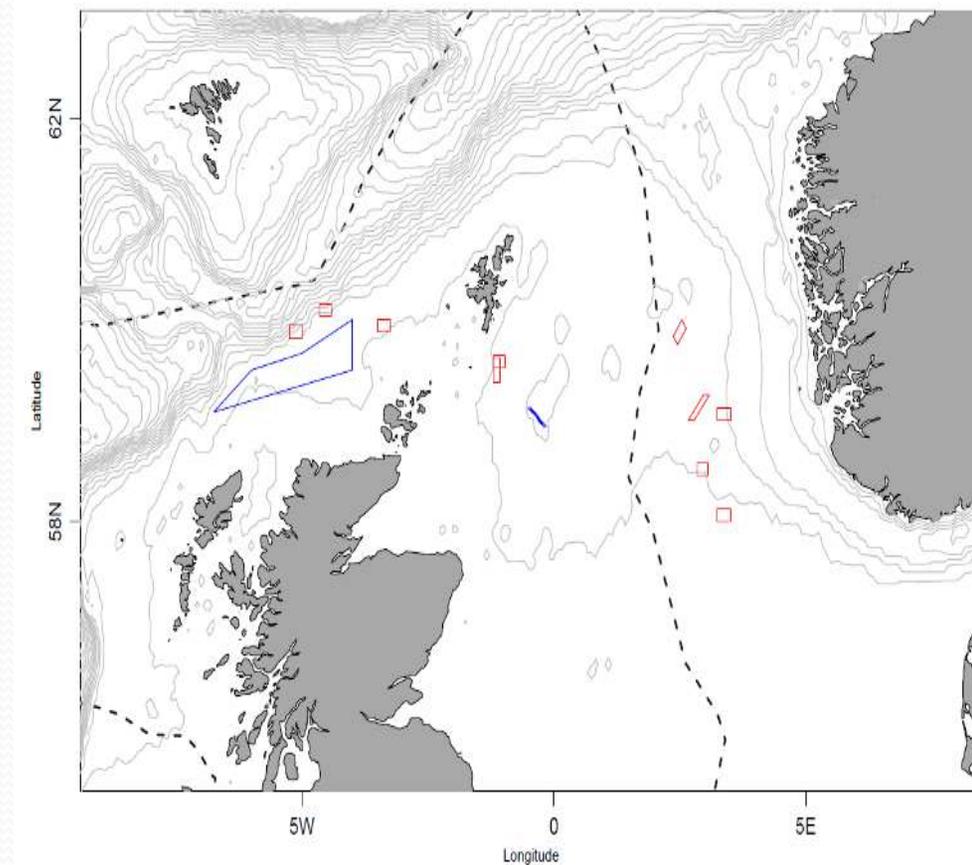
## Real-time spatial management approaches to reduce bycatch and discards: experiences from Europe and the United States

*Alyson S Little<sup>1</sup>, Coby L Needle<sup>2</sup>, Ray Hilborn<sup>3</sup>, Daniel S Holland<sup>4</sup> & C Tara Marshall<sup>1</sup>*

- **Ten case studies but will focus on three cases studies:**
  1. Scottish demersal fishery: real-time closures
  2. US non-whiting fishery: spatial risk zones
  3. US Atlantic scallop fishery: yellowtail flounder bycatch avoidance programme
- **Impending discard ban can learn lessons from Europe and US in how best to manage discarding**

# 1. Scottish real-time area closures

- Objective: Reduce fishing mortality on North Sea cod
- Voluntary in 2007 then became regulatory
- Co-management
- At-sea inspections or fish landings data
- 225 nautical miles<sup>2</sup>
- 21 days



01/07/2010

<http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/Regulation/closures/closed>

# 1. Scottish real-time area closures

- Implemented midnight after sample taken
- Scottish government website / emailed
- Good compliance
- Penalty: fishing effort
- Needle and Catarino (2011)
  - Displacement of fishing effort to areas having lower abundances may be reducing cod mortality
- Holmes et al (2011)
  - Savings in catch of cod was less than predicted

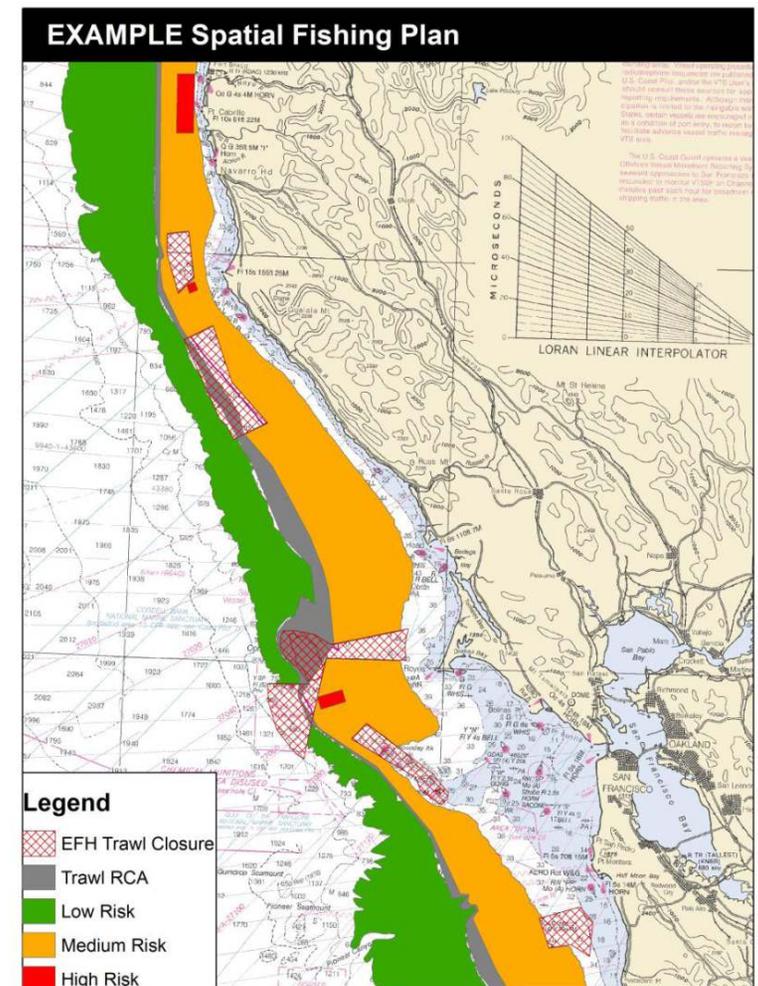
## 2013 CLOSED AREAS

*Please note that, unless otherwise specified, all closures commence at 0001 hours on the "date from" and expire at 2359 hours on the "date to" given in the table below.*

Closure No	Date from	Date to	Latitude/Longitude	Reference: Sample ID
010/2013	0001 hours on 31/01/2013	2359 hours on 20/02/2013	60 45.0N 001 30.0E 60 45.0N 002 00.0E 60 30.0N 002 00.0E 60 30.0N 001 30.0E	Based on landing per unit effort data
009/2013	0001 hours on 31/01/2013	2359 hours on 20/02/2013	60 45.0N 000 15.0E 60 45.0N 000 45.0E 60 30.0N 000 45.0E 60 30.0N 000 15.0E	Based on landing per unit effort data
008/2013	0001 hours on 31/01/2013	2359 hours on 20/02/2013	58 52.5N 001 45.0W 58 52.5N 001 30.0W 58 45.0N 001 30.0W 58 45.0N 001 45.0W	Based on landing per unit effort data
007/2013	0001 hours on 31/01/2013	2359 hours on 20/02/2013	59 15.0N 000 00.0E 59 15.0N 000 30.0E 59 00.0N 000 30.0E 59 00.0N 000 00.0E	Based on landing per unit effort data
006/2013	0001 hours on 31/01/2013	2359 hours on 20/02/2013	59 45.0N 000 30.0W 59 45.0N 000 00.0W 59 30.0N 000 00.0W 59 30.0N 000 30.0W	Based on landing per unit effort data

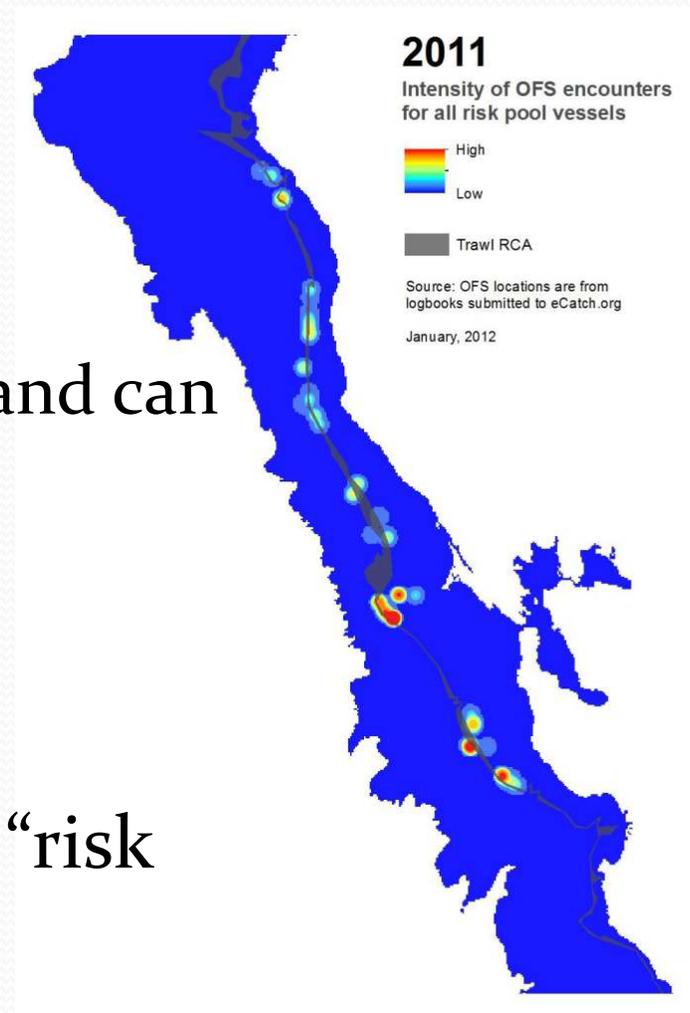
# 2. US Pacific non-whiting fishery overfished stock risk zones

- Objective: Minimise catch of overfished species
- First implemented in 2011
- Private agreement, Self-governance
- “Risk pool” arrangement: pool individual quota for target and over-fished so if overfish they are covered by co-operative
- Daily catch and bycatch reported
  - Low risk areas: fishers judgement
  - Medium risk areas: fishers judgement
  - High risk areas: no fishing



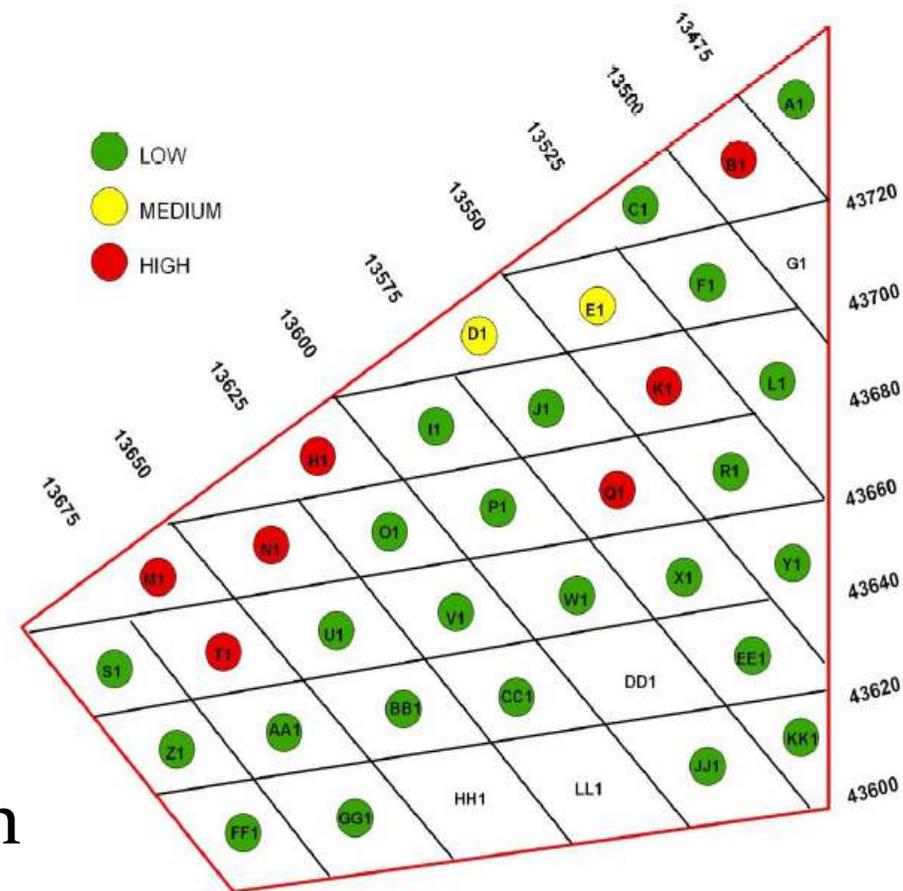
## 2. US Pacific non-whiting fishery overfished stock risk zones

- eCatch
  - Low cost web-based information management system
  - Fishers submit catch data
  - Fishers view catch data in real-time and can avoid aggregations
- 100% at-sea observer coverage
- Good compliance
- Low uptake of overfished species by “risk pool” compared to rest of fleet



# 3. US New England scallop fishery: yellowtail flounder bycatch avoidance

- Objective: Minimise the discard of yellow tail flounder
- 2010
- Voluntary
- Co-management
- Fishers report daily catch
- Low, medium, high hotspots
  - Fishers judgement
- Days to weeks
- Website / email communication



# 3. US New England scallop fishery: yellowtail flounder bycatch avoidance



- No penalty structure, but good compliance
- Voluntary: participation increased 35% to 70%
- ~10% at-sea observer coverage
- Full uptake of scallop quota, only 30% of yellowtail flounder allocation harvested
- SMASTs have no long-term funding

Governance

Fishery manager

Third party

Government agency

- Co-management
- Not legally binding
- No enforcement

- Self governance
- Private legal contract
- Private enforcement agent

- Co-management\* or top-down\*\*
- National fisheries legislation
- Government enforcement

Voluntary scheme

Private risk pool

Regulatory

- Haul-by-haul catch/discard data collected
- Fleet catch/discard data disseminated

- Haul-by-haul catch/discard data collected
- Individual catch/discard data disseminated to fishers

- Catch/discard data collected
- Fleet landings data disseminated

Incentivising at *fleet* level

Incentivising at *individual* level

Incentivising at *fleet* level

Days



Month

Grid



Polygon

**Example fisheries**

- US northwest Atlantic mid-water haddock fishery

**Example fisheries**

- US Alaskan eastern Bering Sea haddock fishery

**Example fisheries**

- Barents and Norwegian Seas cod and haddock fishery

# Conclusions

- US schemes truly more real-time
- Contractual agreement vs. voluntary schemes
- Real-time management can incentivise better collective decision-making
- Good fishery observer coverage
- Technology and infrastructure to support collection and dissemination of data
- Third party fishery manager



A large fishing vessel named "OCEAN FISH" is docked at a pier in the foreground. The vessel has a white cabin with the name "OCEAN FISH" written on it. In the background, a harbor filled with many other fishing boats is visible, along with a city skyline under a cloudy sky. The text "Any questions?" is overlaid in a large, bold, blue font in the upper right quadrant.

# Any questions?

Little et al. 2014. Real-time spatial management approaches to reduce bycatch and discards: experiences from Europe and the United States. *Fish and Fisheries*