

# Marine Protected Areas: Socioeconomic Impacts and Adaptive Approaches

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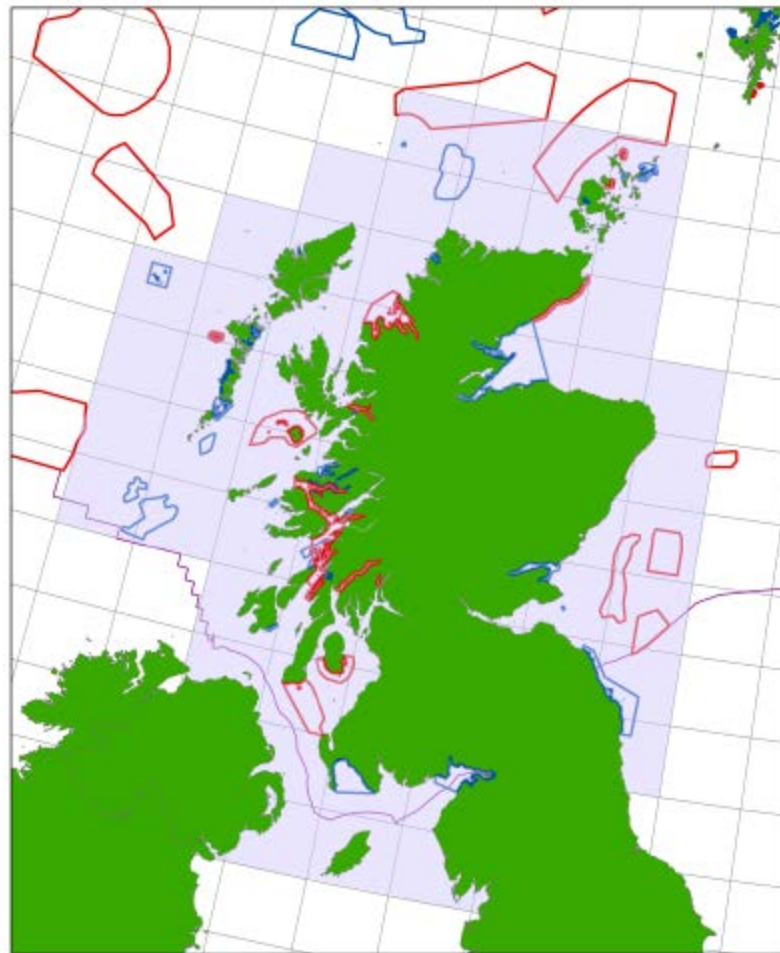
# Outline

- **Background to Scotland's Marine Protected Areas (MPAs)**
- **Assessment of socioeconomic impacts of inshore MPAs**
  - Approaches and key messages
- **Lessons / Key Limitations**
- **Monitoring and adaptive approaches**
  - Addressing some of the limitations
- **Will highlight some of the LIMITATIONS along the way**

# Scotland MPAs – Some Background

- **30 MPAs designated in August 2014**
  - 17 under the Marine (Scotland) Act for **inshore** waters (Inshore MPAs)
  - 13 UK Marine and Coastal Access Act for **offshore** waters (offshore MPAs)
- All about **sustainability**
  - **protecting benthic species and habitats** to maintain a rich diversity of life in the waters around Scotland so that benefits they bring can be enjoyed in the **future**
- **Management measures** were introduced to inshore sites January 2016
  - Restrictions on suction dredging, mechanical dredging, beam trawling, use of demersal static gear, etc.

# Scotland Inshore MPAs

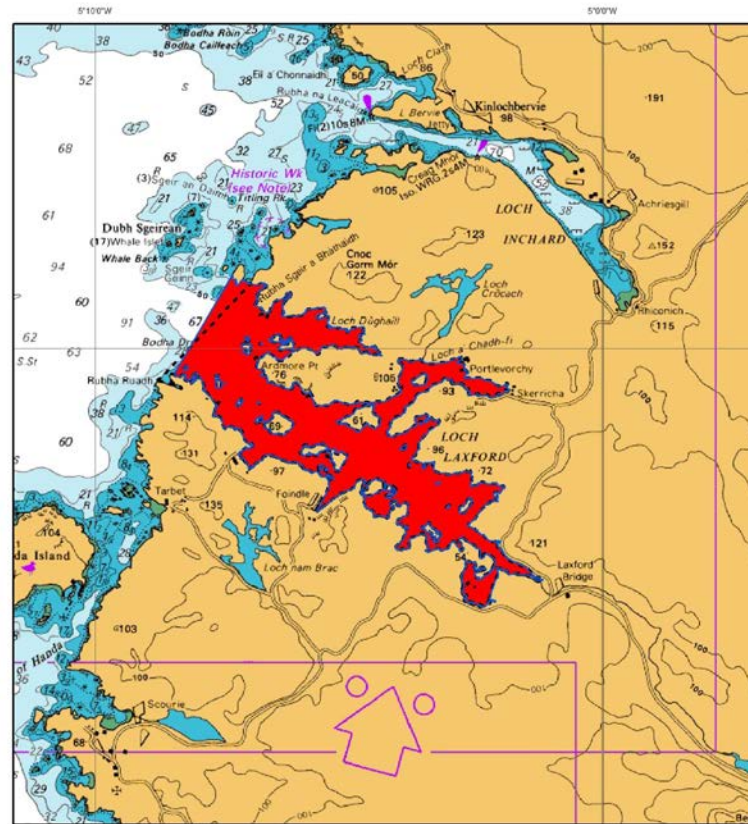


## Area covered by the analysis



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# MPA Site Maps



**Loch Laxford SAC**

- SAC Boundary
- existing seasonal closure
- management area

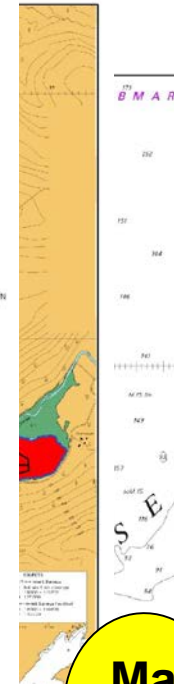
Existing seasonal closure to be revoked

Within the red area no suction dredging, mechanical dredging, beam trawling, or demersal trawling is permitted.

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**Management Measure – focus on gear type**



# Socioeconomic Impacts: The Simple Hypothesis

Limit Fishing Opportunity

Reduce Fishing Activity

Reduce Fish Landings

Reduce Fishing Income

Reduced Economic Impact

## □ Limitations

- Focused on the short-term (static)
- Focused on fisheries sector (limited scope)

## □ But, still important to test hypothesis

- Scottish Marine Scotland and industry wanted to understand immediate socioeconomic impacts arising through the fishing industry

## □ Baseline economic impact of fishing – some numbers

- Value of landings ~ £500 million
- Gross Value Added £181 million
- Employs ~5,000 people

# Socioeconomic Impact: Value of Inshore fishery

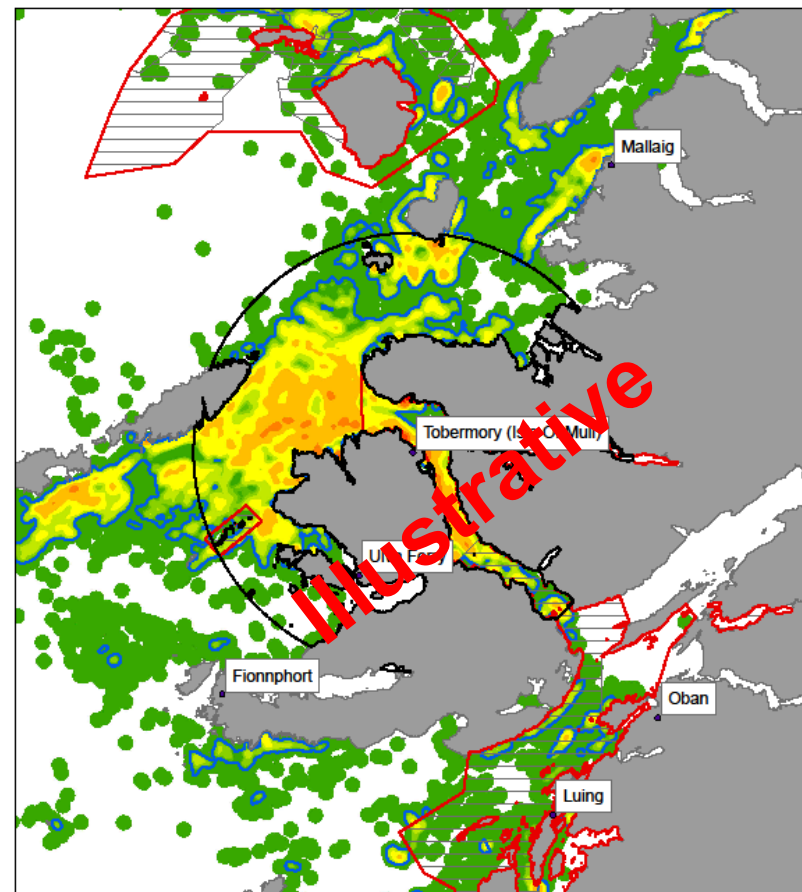
- Value of fish landings into ICES statistical rectangles making up inshore waters
  - Average for 2010-2014

Coast	Under 15m		Over 15m		Total
	Scottish vessels	Rest of UK vessels	Scottish vessels	Rest of UK vessels	
West Coast	34.77	2.70	30.63	11.84	<b>79.93</b>
North and East Coast	22.24	3.02	18.97	1.14	<b>45.36</b>
Total	57.00	5.72	49.59	12.98	<b>125.29</b>

Hence, majority of value comes from offshore

# Value of Fishing in MPAS: Vessels over 15m

- ❑ Data on vessel monitoring system (VMS) reports (pings) and value of fish landings by gear type available
  - ❑ Assigned notional value to each VMS report or ping
- ❑ Allowed us to estimate annual catch value for given areas by gear type
  - ❑ Based on spatial distribution of pings
- ❑ **Limitation:** Equal weight to all VMS reports – need fishing activity data on finer spatial resolution



Dredge fishing grounds within 15nm of Tobermory (Isle Of Mull)

All year round dredge footprint



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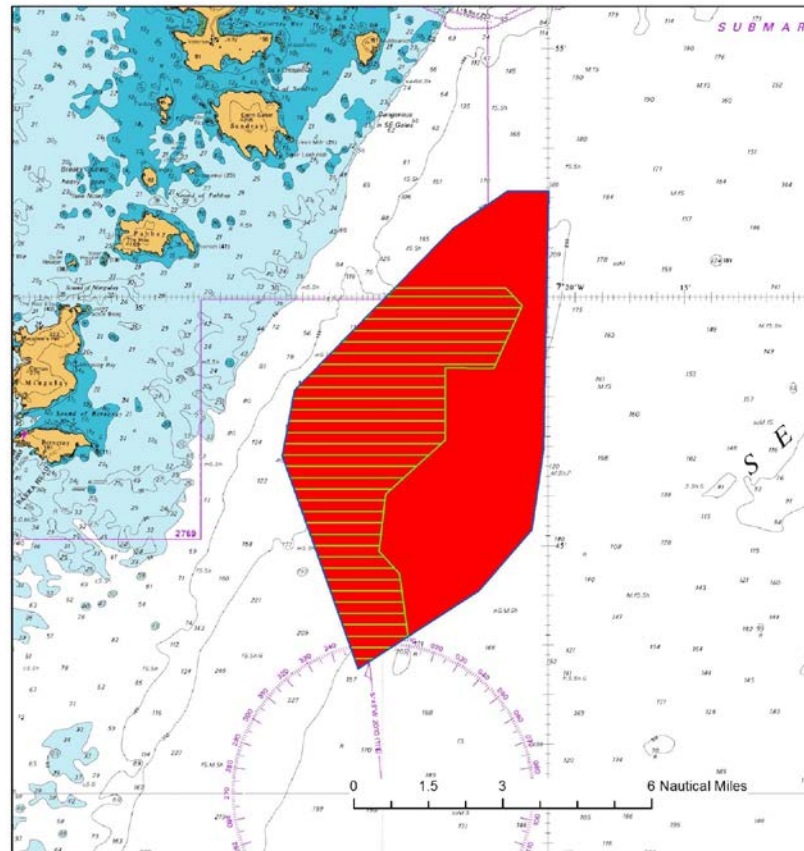
# Value of Fishing in MPAS: Vessels under 15m

- Limited coverage by VMS
  - One year VMS data for 12-15m vessels
- Marine Scotland Scotmap project gives distribution of fishing activity by gear type
  - Based on GIS mapping of information from interviews with fisherman
  - Estimates of value of landings mapped onto 800 (4.2km<sup>2</sup>) Scotmap grids within each ICES rectangles
- Each of the Scotmap grid was divided into 25 smaller grids for finer mapping to MPAs
  - Allowed mapping of activity to MPAs by gear type
- **Limitation**: Assumes activity is evenly spread in each Scotmap grid - need fishing activity data on finer spatial resolution

## Estimates of Fishing Revenue and Gross Value Added in MPAS (£) – All Vessels, Average 2010 - 2014

Site	Revenue	GVA
East Mingulay	14,811	6,469
Loch Creran	709	331
Loch Laxford	1,652	751
Loch Sunart	13,098	5,959
Loch Sunart to Sound of Jura	1,882,346	864,142
Loch Sween	56,215	25,335
Lochs Duich Long and Alsh	82,508	38,102
Luce Bay and Sands	421,348	190,106
Noss Head	8,312	3,818
Sanday	139,075	63,606
Small Isles	1,376,462	581,365
South Arran	930,063	392,755
St Kilda	2,946	1,061
Treshnish Isles	21,043	9,294
Upper Loch Fyne and Loch Goil	45,496	20,200
Wester Ross	1,637,730	725,505
Wyre and Rousay Sounds		
<b>Total</b>	<b>6,696,648</b>	<b>2,957,473</b>

# But not all gears are excluded from all MPAs!!



## East Mingulay SAC

- SAC Boundary
- No demersal static gear
- Management area

Within the red area no suction dredging, mechanical dredging, beam trawling, demersal trawling, or seine netting is permitted.

Within the green hatched area no creels, set nets, or long lines are permitted.

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# Estimated Impacts of MPA Management Measures (£), All Vessels – Adjusting for gears

Site	Revenue impacts	GVA impacts	No. of Vessels affected	% revenue impacts
East Mingulay	10,354	6,139	36	0.12%
Loch Creran	0	0	2	0.00%
Loch Laxford	705	435	10	0.03%
Loch Sunart	330	199	7	0.02%
Loch Sunart to Sound of Jura	208,836	128,261	95	1.00%
Loch Sween	10,891	6,804	28	0.27%
Lochs Duich Long and Alsh	18,526	11,491	38	0.27%
Luce Bay and Sands	59,933	36,742	33	0.54%
Noss Head	1,320	818	16	0.03%
Sanday	4,645	2,629	9	0.30%
Small Isles	248,842	143,935	139	0.70%
South Arran	472,132	279,407	137	2.45%
St Kilda	1,661	749	5	0.02%
Treshnish Isles	13,844	8,304	36	0.18%
Upper Loch Fyne and Loch Goil	3,849	2,304	17	0.15%
Wester Ross	243,995	145,545	108	0.88%
Wyre and Rousay Sound	1,299,862	773,763	374	1.66%
<b>Total</b>				

# Some Key messages

- **Vessel size:** impacts of fishing revenue disproportionately higher for small vessels
  - predominantly operate inshore and limited range
- **Geography:** variations in number of vessels affected and reductions in revenue across sites
  - Size of MPA and management measures
  - Overall impacts highest on Loch Sunart to Sound of Jura, South Arran, Small Isles and Wester Ross
- **Communities:** some communities affected more than others in terms of GVA and landings
  - Ayr, Campbeltown, Mallaig, Oban, Ullapool
- **Gear type:** Nephrops trawls and dredging most affected
  - Reflect management measures

# Lessons / Key Limitations

- **Lacking spatial distribution of activity on a finer scale**
  - VMS reports and Scotmap only provided indicative figures
  - Significant uncertainty on precisely where fish is caught
- **Static framework**
  - Not taking into account how impacts will change over time and habitats effects
- **Only looking at socioeconomic impacts linked to fishing industry**
  - No account of impacts on other marine users
- **No accounting for displacement effects**
  - Some vessels may find alternative fishing grounds, but hard to predict behavioural responses of individual vessels



# Monitoring and Adaptive Policy

- Marine Scotland acknowledges data limitations, dynamic and broad nature of impacts
- Developing a monitoring framework to track impacts over time
  - Changes in marine resource use patterns
  - Changes in competition for resources among marine users
  - Impacts on communities – wider economic development
- Attributing changes to MPAs will always be a problems
- But, will help to identify and respond to undue impacts early – an adaptive approach to MPA policy
- Pursuing other initiatives to improve data for assessing a range of spatial measures
  - MPAs, Marine Planning, Marine Renewables, etc

# Thank You!!

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