



Date: 29th of November 2018

Venue: Buswells Hotel, Molesworth Street, Dublin 2.

Agenda

10.00h Registration

10.30h Opening Remarks

- **Overview of the EMFF Marine Biodiversity Scheme - (Leonie O'Dowd, Marine Institute)**

10.45h - 11.45h Natura implementation under EMFF

- **Risk assessment and mitigation of effects of fisheries in Natura sites - (Oliver Tully, Marine Institute)**
- **Appropriate assessments of aquaculture activities in Natura sites and management measures - (Francis O'Beirn, Marine Institute)**
- **SeaRover– Requirements for and outcome of offshore reef survey - (David Lyons, DCHG and David O'Sullivan, Marine Institute - INFOMAR)**
- **Bycatch and cetacean post-mortem scheme - (Oliver Ó Cadhla, DCHG & Jim O'Donovan, DAFM)**

12.00h - 12.45h MSFD support under EMFF

- **Using fisheries surveys as platforms for ecosystem data collection - (Graham Johnston and Fabio Sacchetti, Marine Institute - Fisheries & INFOMAR)**
- **MSY proxies for data-limited stocks - keystone and vulnerable to fishing - (Hans Gerritsen, Marine Institute)**
- **Informatics in support of Ecosystem Based Fisheries Management – short introduction to interactive display - (Deirdre Wall and Shawna Sanfey, Marine Institute)**



Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Agenda *continued*

12.45h - 13.45h Lunch and interactive displays

Interactive displays

- Informatics in support of the Ecosystem Based Fisheries Management
- Automating data acquisition in Small Scale Coastal Fisheries (iVMS)
- SeaRover Survey - ROV video footage of deep water vulnerable habitats
- EMFF Marine Biodiversity Scheme Website

13.45h - 14.45h Species and habitat restoration

- Monitoring for restoration and management of spiny lobster in Ireland - (Oliver Tully, Marine Institute)
- Vulnerable skates and ray species southwest and west of Ireland - (Graham Johnston, Marine Institute)
- Baseline information for the restoration of European native oyster in Galway Bay - (Oliver Tully, Marine Institute)

14.45h A brief look ahead

- 2019-2020 EMFF Marine Biodiversity Scheme projects - (Leonie O'Dowd, Marine Institute)

14.55h Meeting closes





EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Introduction & Background to the Scheme



Information Event, 29th November, 2018

Leonie O'Dowd



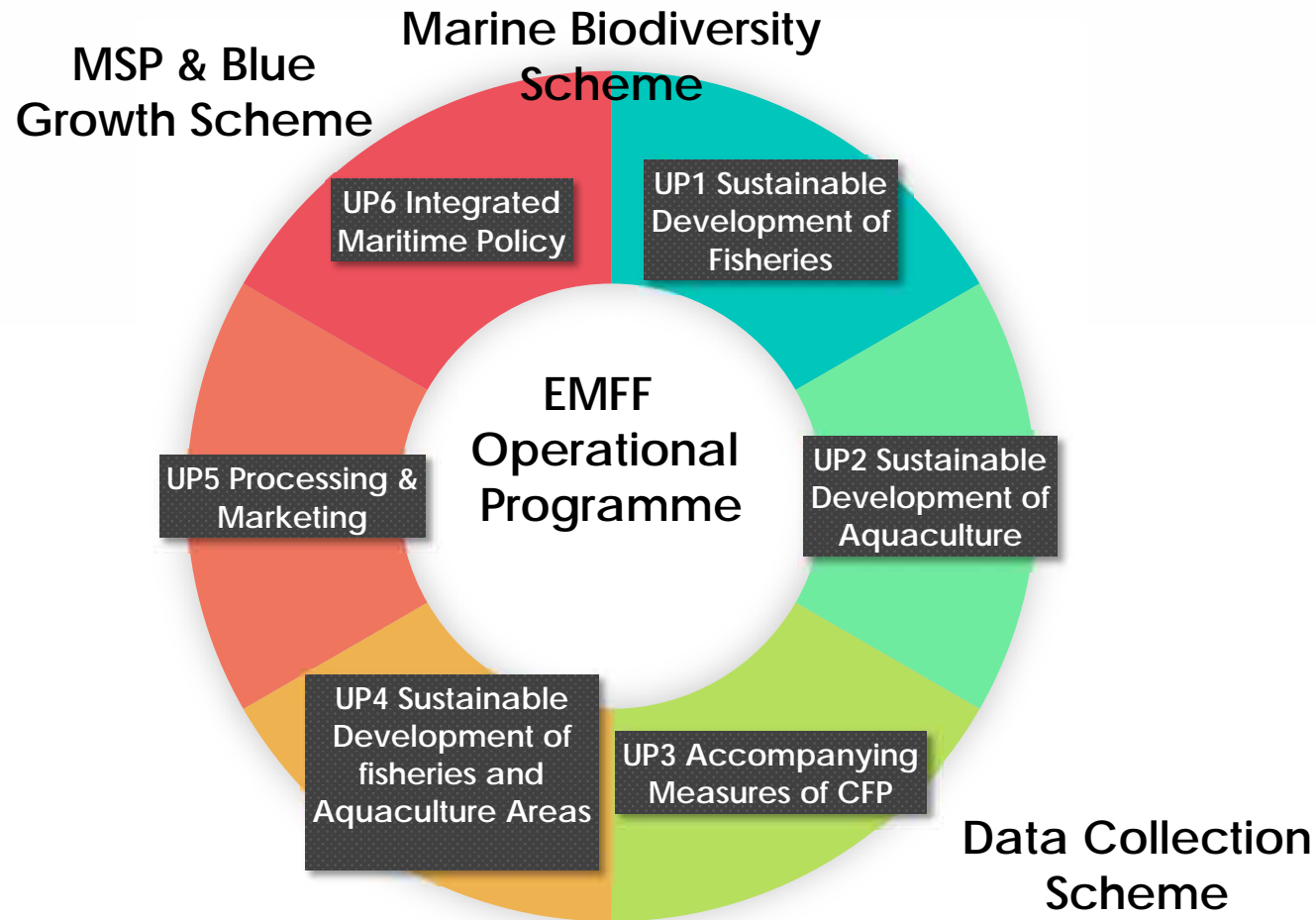
An Roinn Talmhaíochta,
Riagais Mara
Department of Agriculture,
Food and the Marine



EUROPEAN UNION
This measure is financed by the European Maritime and Fisheries Fund



Context: Marine Biodiversity Scheme within the EMFF Operational Programme



EMFF Marine Biodiversity Scheme



**NATURA
Habitats and
Birds
Directives**

**Common
Fisheries
Policy**

**Marine
Strategy
Framework
Directive**

Objective:
to promote good fisheries and aquaculture management and to protect biodiversity in marine habitats.

Measures funded under the Scheme:

- *Support Appropriate Assessments & Risk Assessments*
- *Monitoring and Mitigation of Risks*
- *Improved data provision to assess the impact of Fisheries on Biodiversity*
- *Restoration and management of Habitats and Species*
- *Informatics to support CFP and ecosystem based management*
- *Collection and analysis of data to support biodiversity descriptors in the MSFD*
- *Spatial fisheries management measures*

Marine Biodiversity Scheme: Progress so far



2016-2018: 8 projects completed, 16 projects in progress

Natura Fisheries Interaction

- 4 Projects completed, 4 projects in progress

Natura Aquaculture Interaction

- 4 Projects completed, 4 projects in progress

MSFD Biodiversity Support

- 4 Projects in progress

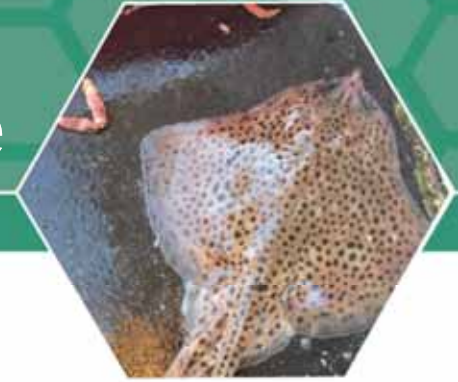
Species and Habitat Restoration

- 3 Projects in progress

Outreach & Dissemination

- 1 Project in progress

Approach: Marine Biodiversity Scheme



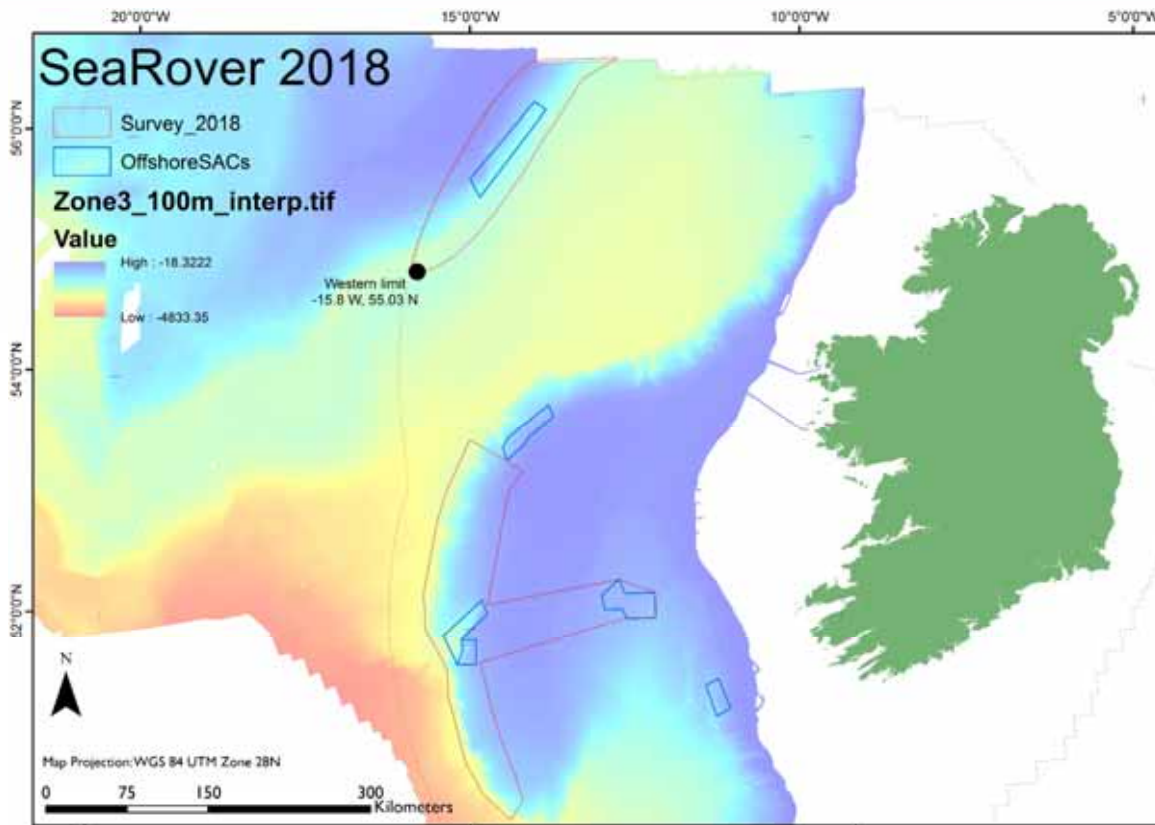
Responding
To Enduser
Needs

Integrating
across
Schemes

Addressing
Data and
Science
Gaps

Maximising
Existing
Programmes

Responding to Enduser needs



- High Priority for DCHG under Habitats Directive
- Assess fisheries habitat interaction in Deepwater reef habitats
- Offshore ROV reef surveys to ground truth reef habitats

Integrating across Schemes



Impact of bycatch protected species:

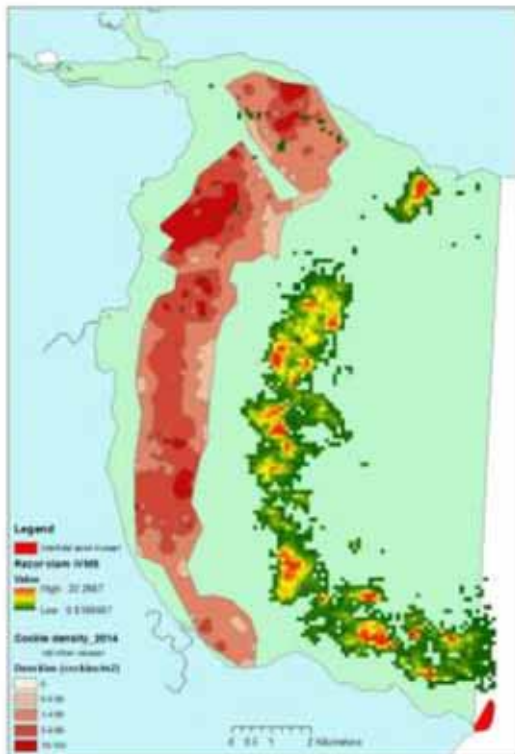
- Data collection on bycatch of protected species as part of the catch sampling at sea.
- Marine Biodiversity Scheme - Pilot study on bycatch of high Risk Fisheries, can inform future data collection.

Addressing Data Gaps



Data provision to assess the impact of fisheries on marine habitats:

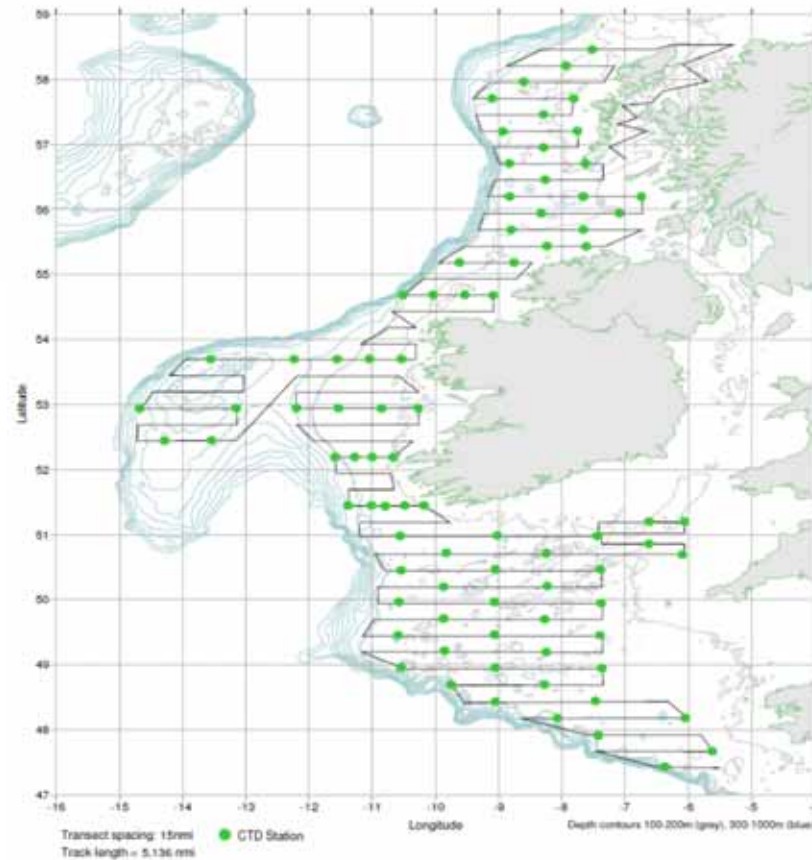
- DCF provides fishing footprint through control regulation for >10m vessels (VMS/logbook)
- Biodiversity scheme provides the data on <10m vessels
- Targeted studies can inform the data collection needs for impact on sea floor under DCF



Maximising Existing Programmes



Ecosystem data collection on Irish fisheries surveys for MSFD



The day ahead:

Promotional photographs will be taken during this event to promote the EMFF Marine Biodiversity projects and website. If you do not wish to have your photograph taken please let one of our team know.



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Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Managing the environmental effects of fisheries in Natura 2000 sites



Appropriate Assessment, Risk Assessment and Mitigation



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Éire agus Mara
Department of Agriculture,
Food and the Marine

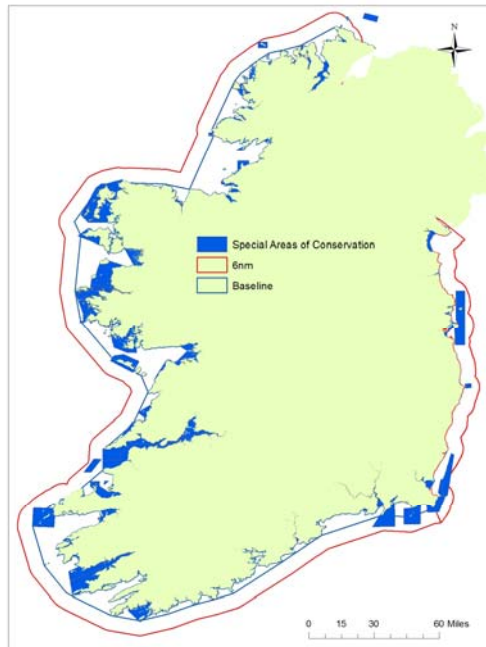


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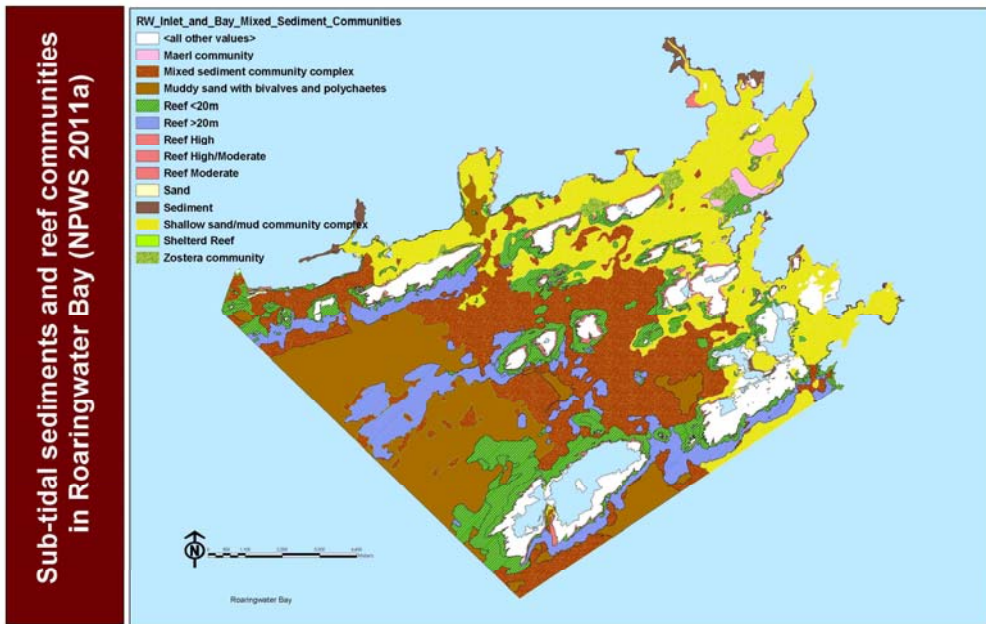
Marine Institute
Foras na Mara

SAC and SPA network (Natura 2000)



- ✓ A network of sites where designated habitats and species receive protection from human impacts
- ✓ Where there are conservation objectives and targets for the designated features.
- ✓ The designations are mandated under the EU Habitats Directive

An example: Habitats of Roaringwater Bay



- ✓ Designated features
 - ✓ Large Shallow Inlet and Bay
 - A mosaic of habitats
 - ✓ Reef
 - Various reef types
 - ✓ Grey Seal
 - ✓ Porpoise

The Habitats Directive: Article 6



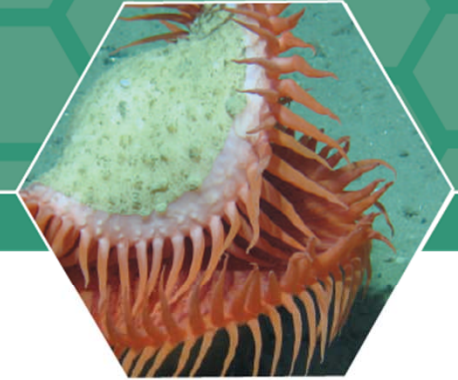
Article 6.2

Member States shall **take appropriate steps** to **avoid** the **deterioration** of natural **habitats** and the habitats of **species** as well as **disturbance** of the species for which the areas have been designated, in so far as such disturbance could be **significant** in relation to the objectives of this Directive.

Article 6.3

In relation to **projects or plans** if their impacts are reasoned to be **significant** i.e. contrary to conservation targets for features in the site ... and cannot be **mitigated** .. then the activity cannot be approved.

Application of Article 6 to Fisheries



Is a fishery a project / plan?

1. Where a fishery is subject to specific authorization from the licencing authority it is considered a project or plan (Article 6.3 assessment)
2. Where a fishery is licenced only through a primary fishing licence it is not considered to be a project or plan. These are also pre-existing activities (Article 6.2 assessments)



Article 6.2: Implementation process

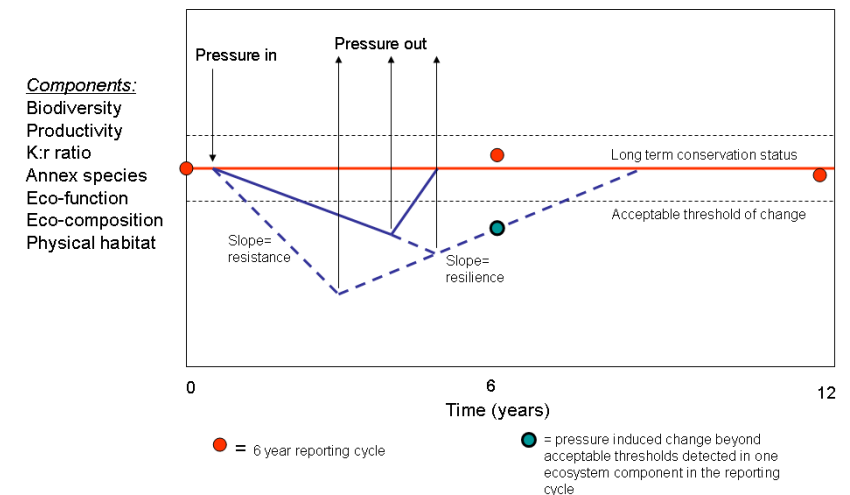


Feature and fishing activity matrix:

Site	Features	Marine Community	Fishery 1 overlap	Fishery 2 ...
Kenmare	Reef	Intertidal	None	5%
		Laminaria	20%	40%
		Sub-tidal	40%	10%
	Large Bay	Seagrass	15%	50%
		Mobile sand	60%	10%
		Maerl	5%	5%
		Muddy fine sands	None	None
			

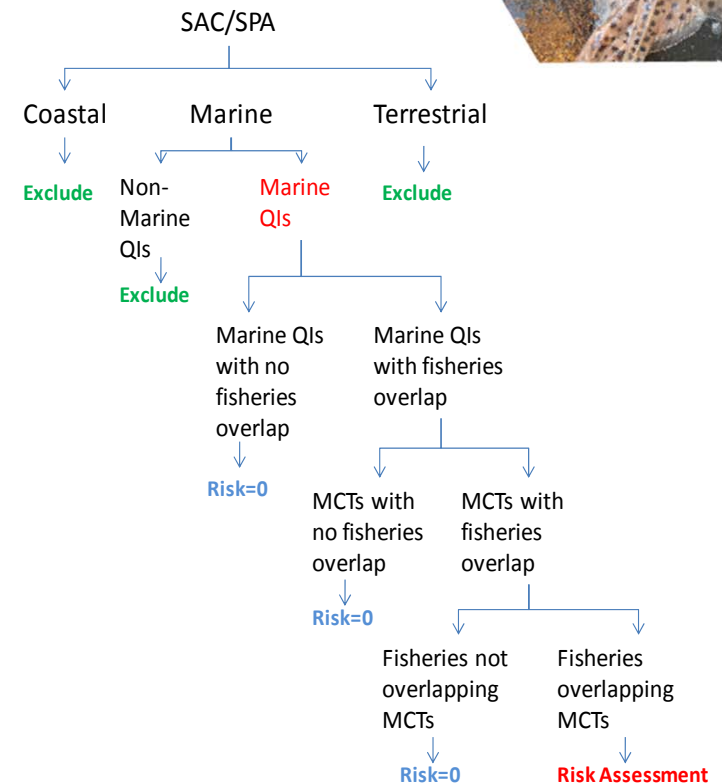
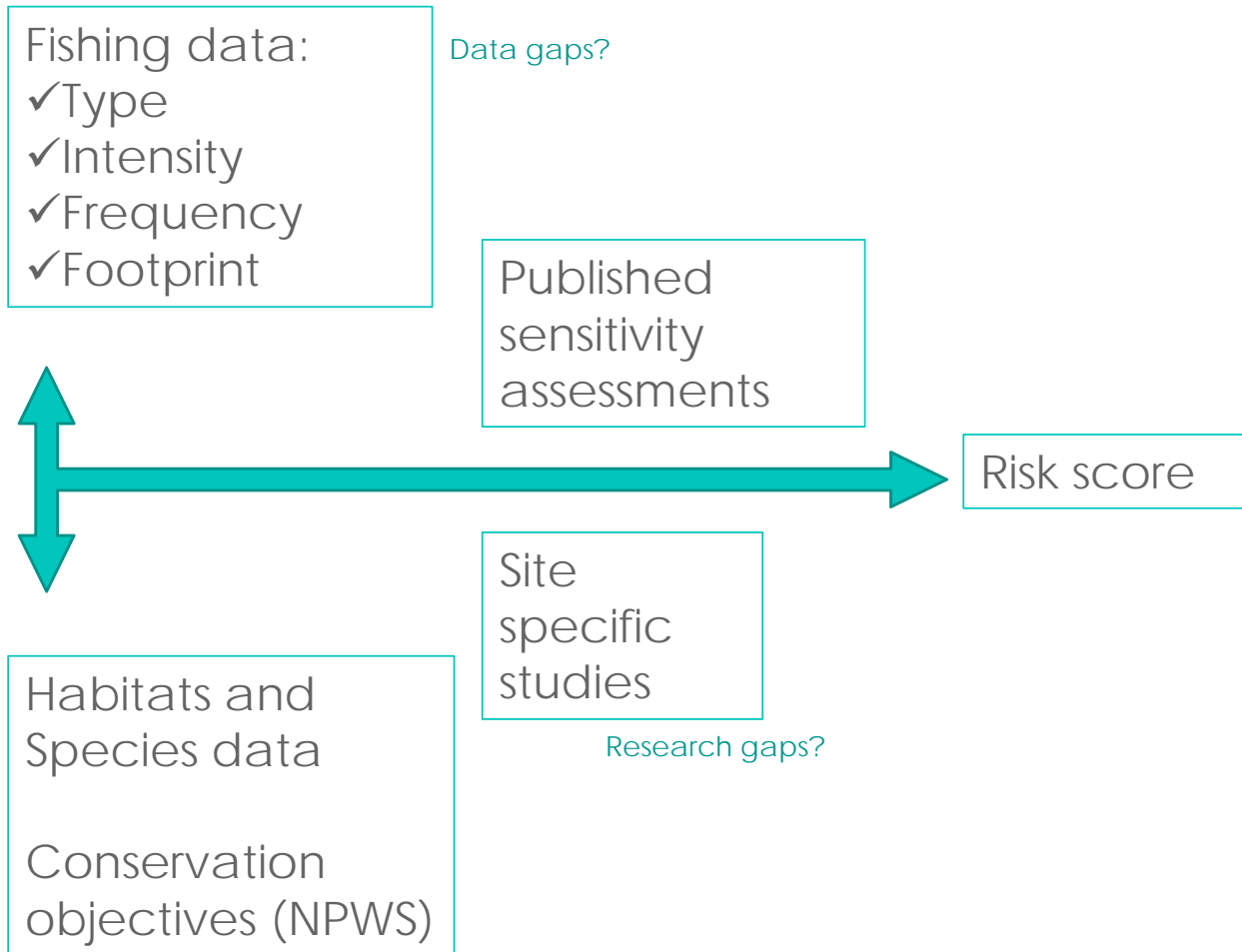
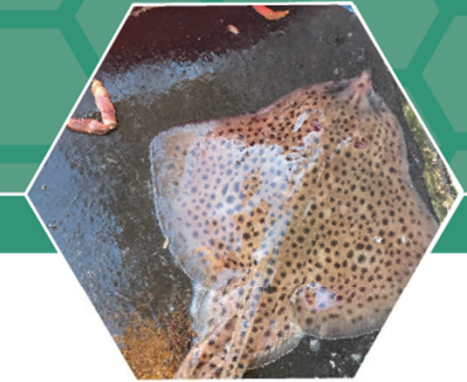
= thousands of combinations to assess

and the SPA network ...



Long term integrity = "capacity for habitat-repair and habitat-renewal"

Estimation of risk



Estimation of risk: Fisheries and Habitats



Scoring Risk in relation to Conservation Objectives and Targets

<http://www.fishingnet.ie/sea-fisheriesinnaturaareas/proceduresandmethodology/>

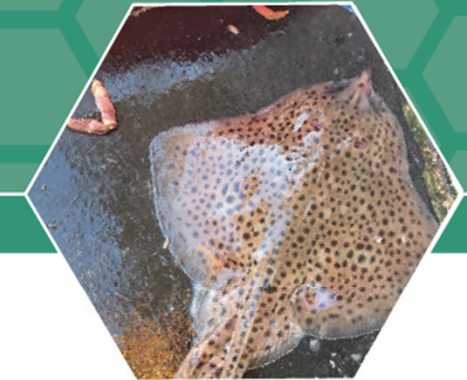
Risk Categories

Habitats	Consequence criteria				
	Activity is not disturbing to habitat	Up to 15% of habitat disturbed seasonally	Over 15% of habitat disturbed	Over 15% of habitat disturbed persistently	Impact is effectively permanent
No change in species	Seasonal change community structure and function	Seasonal change community structure and function	Persistent change structure and function	Biodiversity reduction associated with impact on key structural species	
		Non-cumulative	Cumulative	No recovery	
Likelihood	0	1	2	3	4
Highly likely	5	5	10	15	20
Probable	4	4	8	12	16
Possible	3	3	6	9	12
Unlikely	2	2	4	6	8
Rare or none	1	1	2	3	4

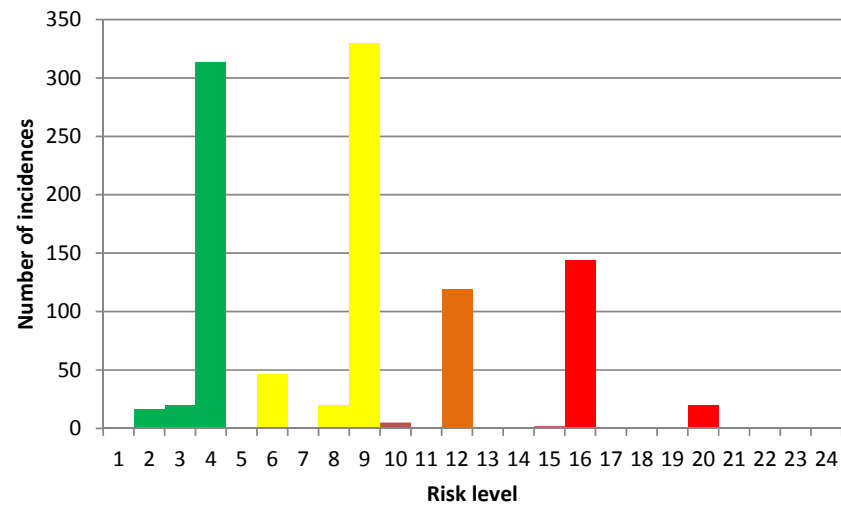
Management Response

	Habitat	Species	
Risk level	Risk scores	Risk scores	Management response
1	0-5	0-5	None required
2	6_10	6_8	Mitigation case by case review
3	11_15	9_10	Mitigation probably needed
4	>15	>10	Mitigation required

Estimation of risk: Outcomes



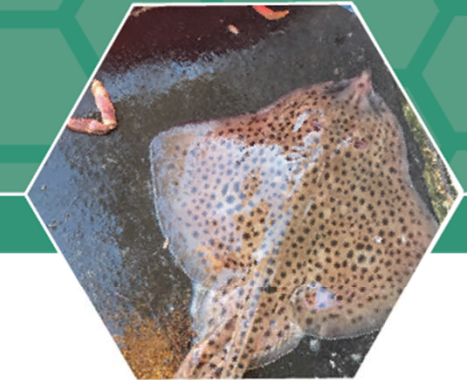
Fishery x Habitat risk scores



Number of fishery habitat interactions likely to require management response

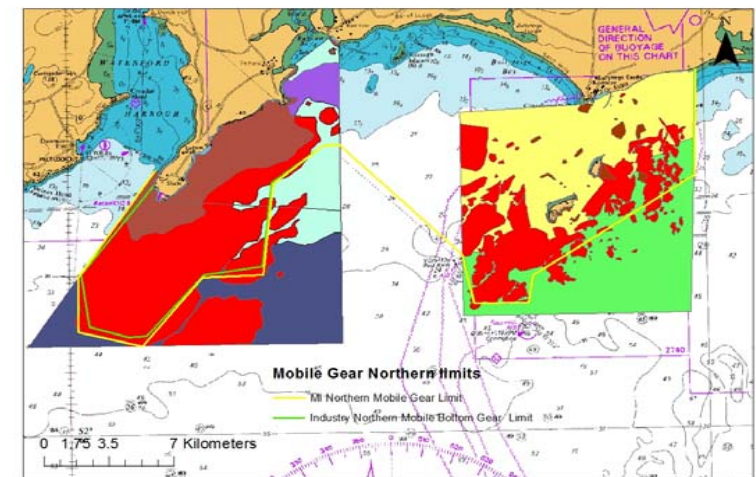
Risk category	Management response	Number of incidences	% of incidences
1	None required	352	34
2	Mitigation case by case review	402	39
3	Mitigation probably needed	121	12
4	Mitigation required	164	16

Mitigating Risk: Implementation



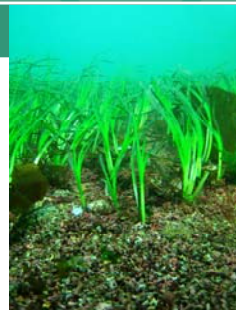
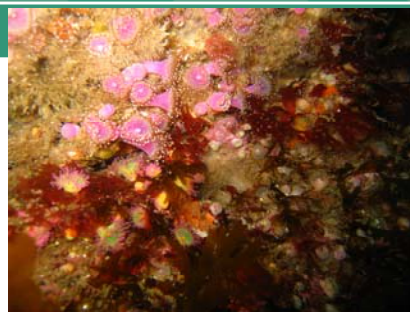
1. Local consultation process fully documented
2. Interactive and explanatory
3. Combining fishery and environmental objectives
4. Mitigation proposals to DAFM
 - Wider consultation process
 - Risk Mitigation Plan published
 - Fishery Natura Declaration published
 - Fishery Natura Permits at vessel level where appropriate

Northern limit lines for mobile fishing gears declared for Hook Hd and Saltee Is SACs in 2016 to mitigate risks to habitats



Implementation of the Habitats Directive, as it applies to Fisheries, involves collaboration and consultation with DAFM, IFI, SFPA, BIM, NPWS the fishing industry and other stakeholders

Acknowledgements





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Risk Assessment Framework for Aquaculture Licencing in Natura 2000 Sites in Ireland

Francis O'Beirn

Marine Institute / (fobeirn@marine.ie)



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Riádas Mara
Department of Agriculture,
Food and the Marine**



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This measure is co-financed
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Fóras na Mara

Aquaculture Production in Ireland - 2017

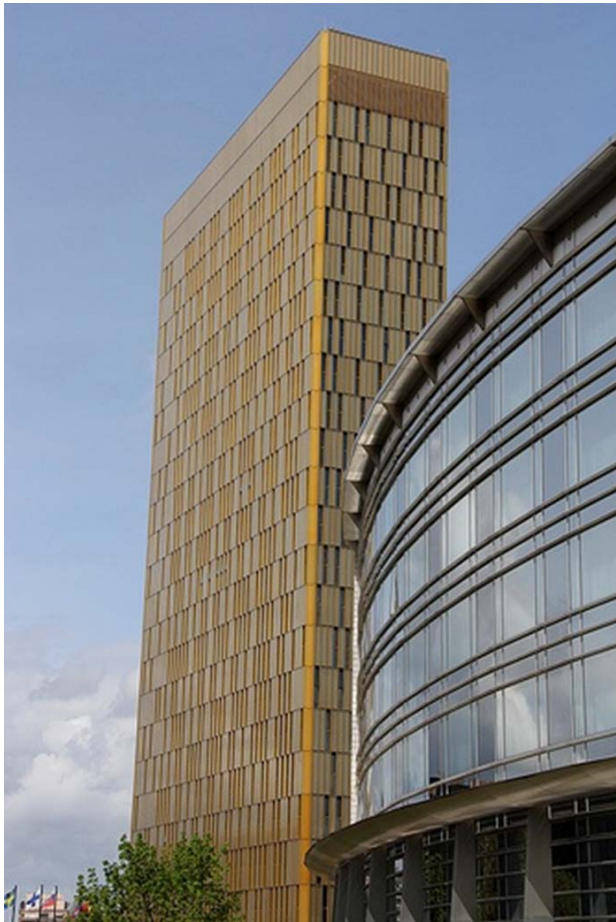
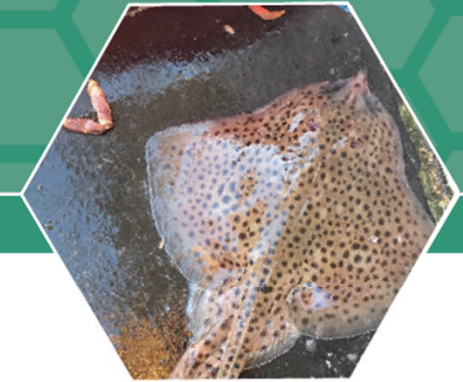
- Salmon – 19,305T - €141 million
- Oyster – 9,879T - €43 million
- Mussel:
 - Bottom = 7,781T ≈ €9.2 million
 - Rope = 8,549T ≈ €5.75 million
- Total Employment in Sector = 1,012 FTE
- Total Value €208 million



Source: 2018 BIM Annual Aquaculture Survey

<http://www.bim.ie/media/bim/content/publications/aquaculture/BIM-Annual-Aquaculture-Survey-2018.pdf>

European Court of Justice ruling (C- 418/04) 13th December 2007



“241: Accordingly, the Court finds that Ireland fails to ensure systematically that aquaculture programmes likely to have a significant effect on SPAs, either individually or in combination with other projects, are made subject to an appropriate prior assessment”

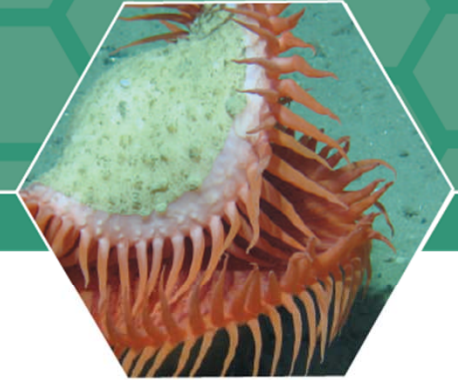
Response to EU CoJ Decision - Coordination



- **Department of Culture, Heritage and Gaeltacht (Lead)**
 - NPWS
- **Department of Agriculture Food and the Marine**
 - Marine Institute
 - Bord Iascaigh Mhara

Goal(s) .. to put a process in place and generate sufficient information in order carry out 'appropriate assessments' of aquaculture and fisheries activities in Natura sites ...

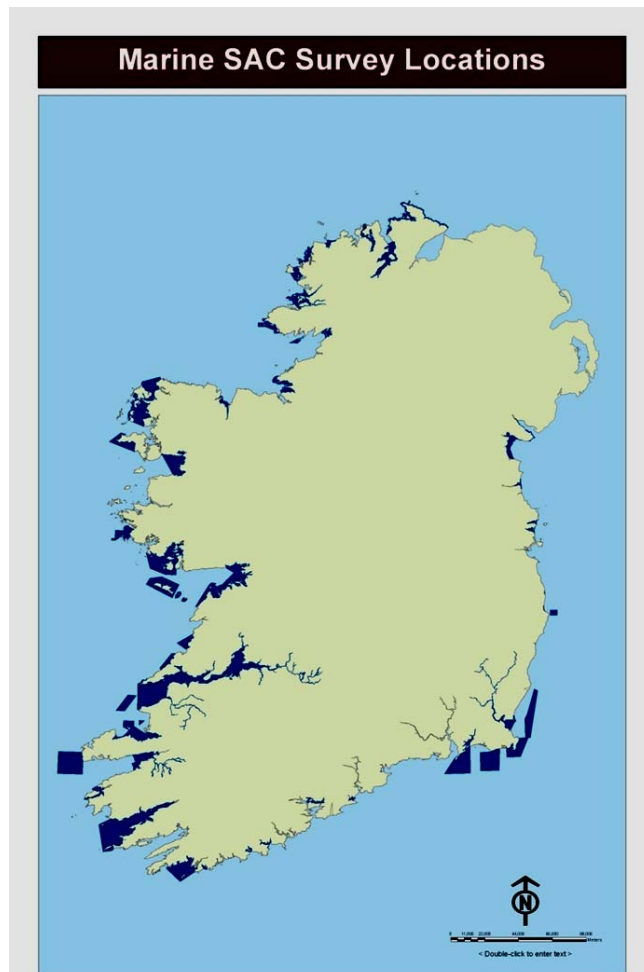
Work Programme



- **Generate Conservation Objectives (NPWS)**
 - **Baseline Data collection (MI)**
- **Basic Research (MI)**
 - **Bird interactions/monitoring**
 - **Habitat interaction reviews**
 - *Various ecological studies*
- **Conduct 'Appropriate Assessments' (DAFM, MI)**
 - **Industry Profile (BIM)**
 - **Risk Framework Development**
 - **Recommendations/mitigation**
 - **Licence Decisions**

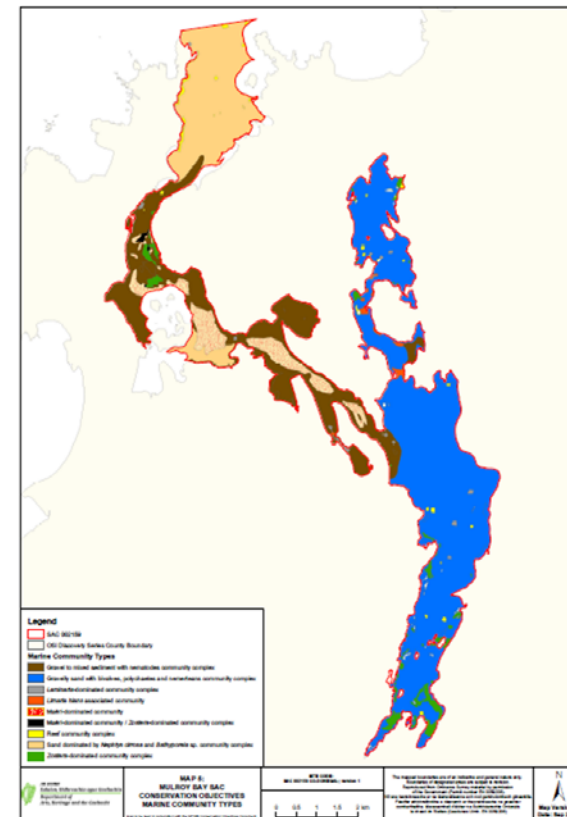
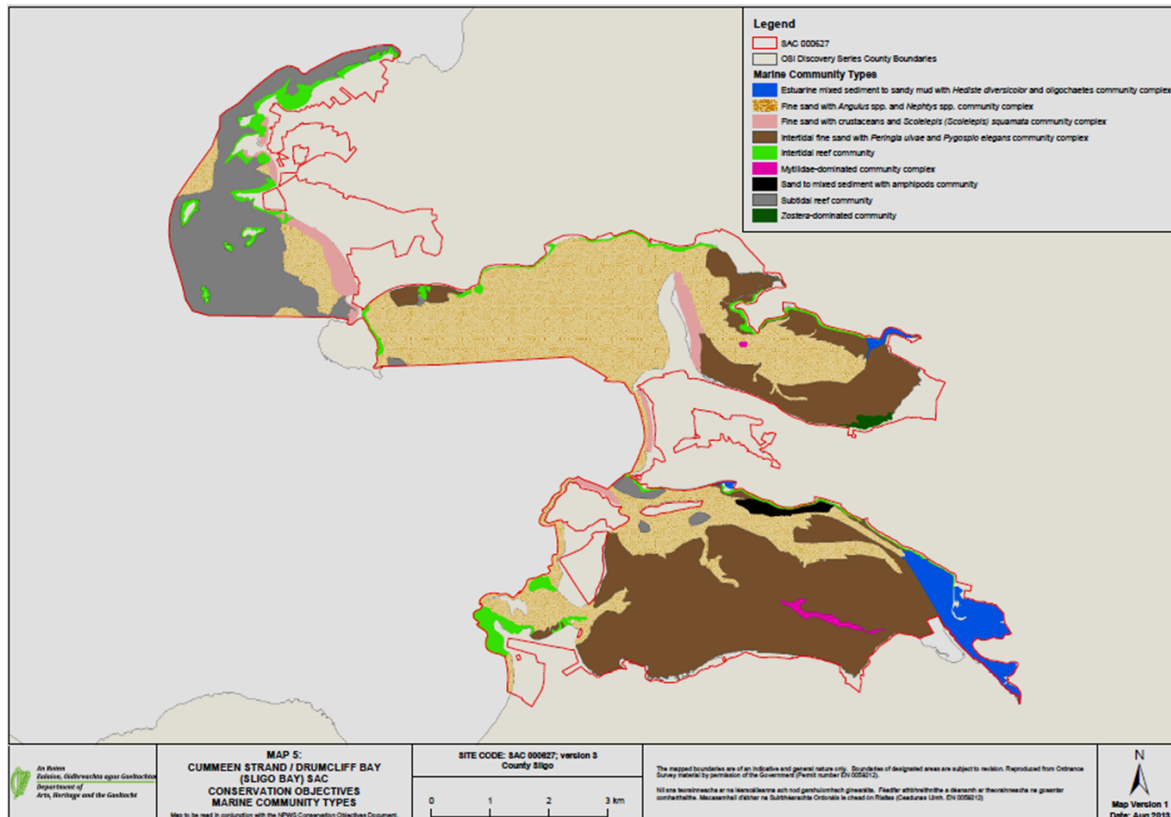


Baseline Data Collection

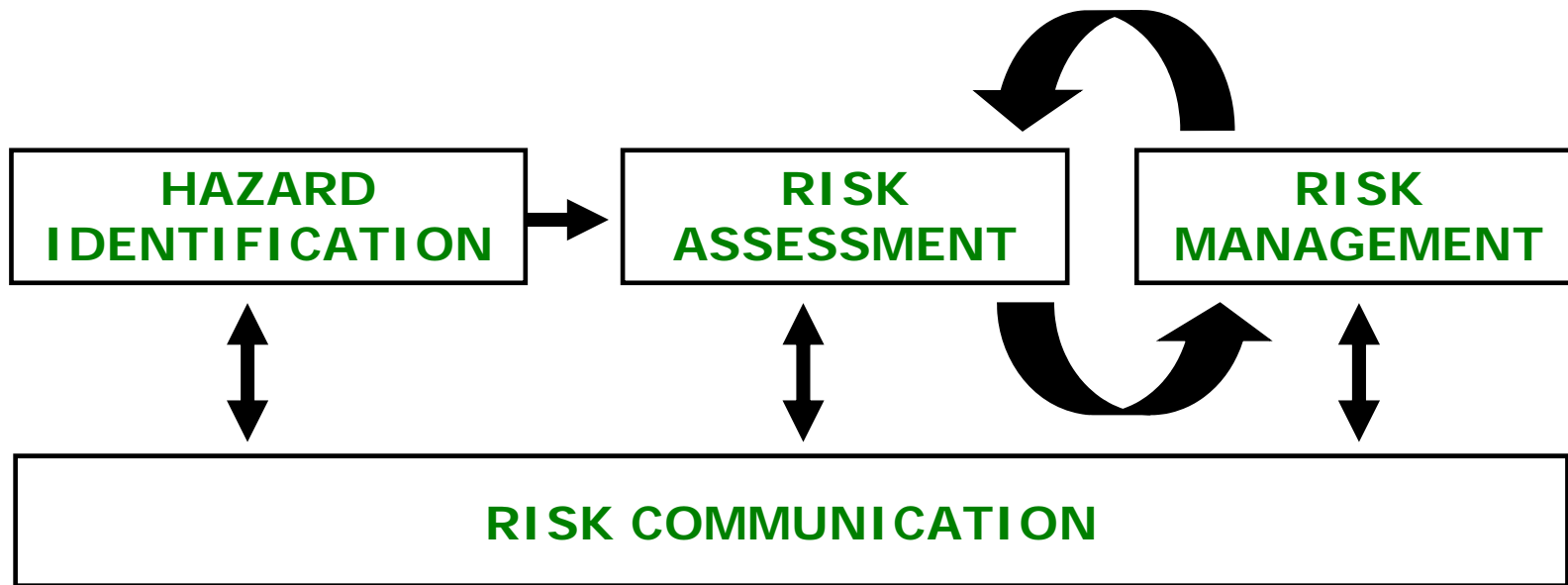


- **2009 - 2012**
- **71 locations**
- **113 different survey events**
- **Parameters:**
 - **Species abundance and distribution**
 - **Habitat extent - Sediments and Reefs (in both Intertidal and Subtidal areas)**

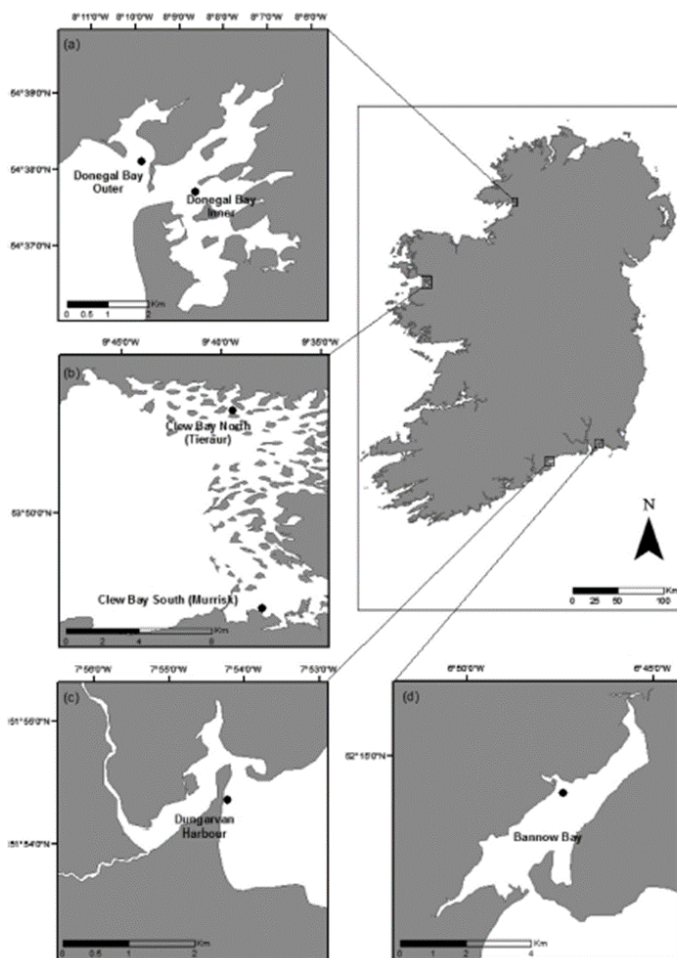
Conservation Objectives



Risk Analysis (after OIE 2003; ICES WGEIM)



Oyster trestle –habitat interaction studies (SACs)



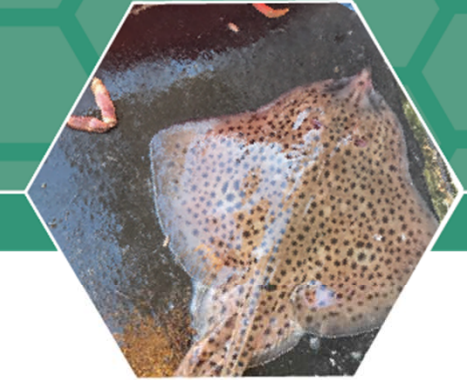
**Results using IQI:
[Reference Sites =
Under Trestles] >
Transport Routes**



Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul



Impact of intertidal oyster trestle cultivation on the Ecological Status of benthic habitats



James Forde ^{a,*}, Francis X. O'Beirn ^b, Jack P.J. O'

^aRPS Group, Lyrr 2, IDA Business and Technology Park, Mervue, Galway, Ireland
^bMarine Environment & Food Safety Services, Marine Institute, Rinville, Oranmore
^cMarine Ecosystems Research Laboratory, Zoology, Ryan Institute, National University of Ireland, Galway



Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul



Impact of prolonged storm activity on the Ecological Status of intertidal benthic habitats within oyster (*Crassostrea gigas*) trestle cultivation sites



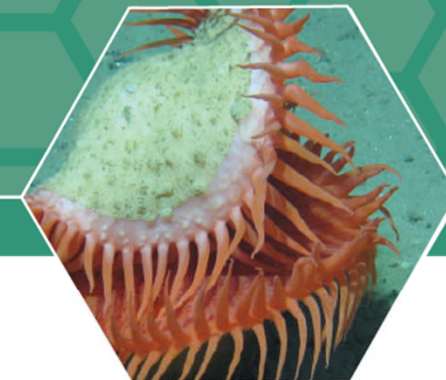
Jack P.J. O'Carroll ^{a,*}, Christina Quinn ^a, James Forde ^b, Adrian Patterson ^a, Francis X. O'Beirn ^c, Robert Kennedy ^a

^aMarine Ecosystems Research Laboratory, Zoology, Ryan Institute, National University of Ireland, Galway, University Rd., Galway, Ireland

^bRPS Group, Lyrr 2, IDA Business and Technology Park, Mervue, Galway, Ireland

^cBenthos Ecology, Marine Environment and Food Safety Services, Marine Institute, Rinville, Oranmore, Co. Galway, Ireland

Bird Interactions



Species	Extensive	Intensive
<i>Light-bellied Brent Goose</i>	Variable	Neutral
<i>Shelduck</i>	Unknown	
<i>Wigeon</i>	(Variable)	
<i>Oystercatcher</i>	(Negative)	Positive
<i>Grey Plover</i>	Negative	
<i>Lapwing</i>	(Negative)	
<i>Knot</i>	(Negative)	
<i>Sanderling</i>	Negative	
<i>Dunlin</i>	Negative	Variable
<i>Black-tailed Godwit</i>	(Negative)	
<i>Bar-tailed Godwit</i>	Negative	Negative
<i>Curlew</i>	Variable	Neutral
<i>Redshank</i>	Neutral	Positive
<i>Turnstone</i>	Positive	Positive
<i>Black-headed Gull</i>	Variable	Variable
<i>Common Gull</i>	Variable	Negative
<i>Lesser Black-backed Gull</i>	(Negative)	
<i>Herring Gull</i>	Neutral	Negative
<i>Great Black-backed Gull</i>	(Negative)	

Oyster trestle/birds
interaction studies
(SPAs)



Marine Institute

The effects of intertidal oyster (*Crassostrea gigas*) culture on the spatial distribution of waterbirds.

2012



Marine Institute
Foras na Mara

ATKINS

Plan Design Enable



research paper *Wader Study* 123(3): xxx-xxx. doi:10.18194/ws.00050

The effects of intertidal oyster culture on the spatial distribution of waterbirds

Tom Gittings¹ & Paul O'Donoghue²

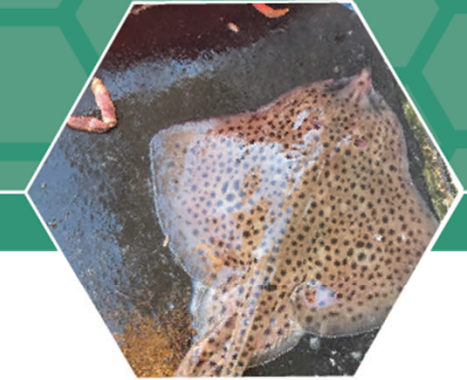
¹3 Coastguard Cottages, Roches Point, Whitegate, Co. Cork, Ireland. tgittings@gmail.com

²Atkins, Unit 2B, 2200 Cork Airport Business Park, Cork, Ireland

Gittings, T. & P. O'Donoghue. 2016. The effects of intertidal oyster culture on the spatial distribution of waterbirds. *Wader Study* 123(3): xxx-xxx.

<http://oar.marine.ie/>

Hazard/Risk Assessment



Aquaculture Profile (BIM)

Species (and source)

Culture Method (Equipment)

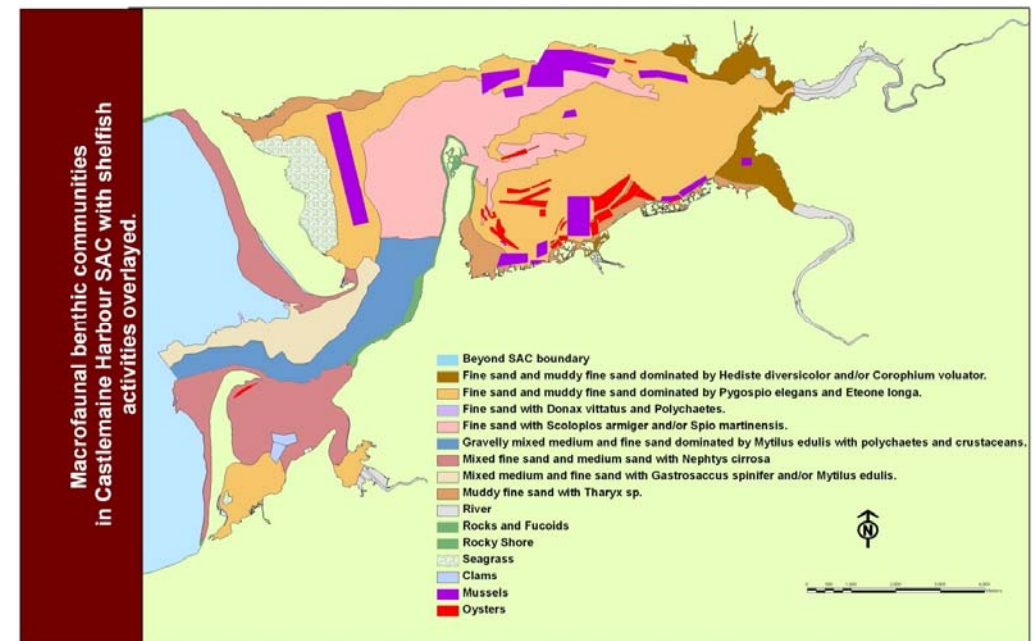
Location (intertidal/subtidal)

Access Routes

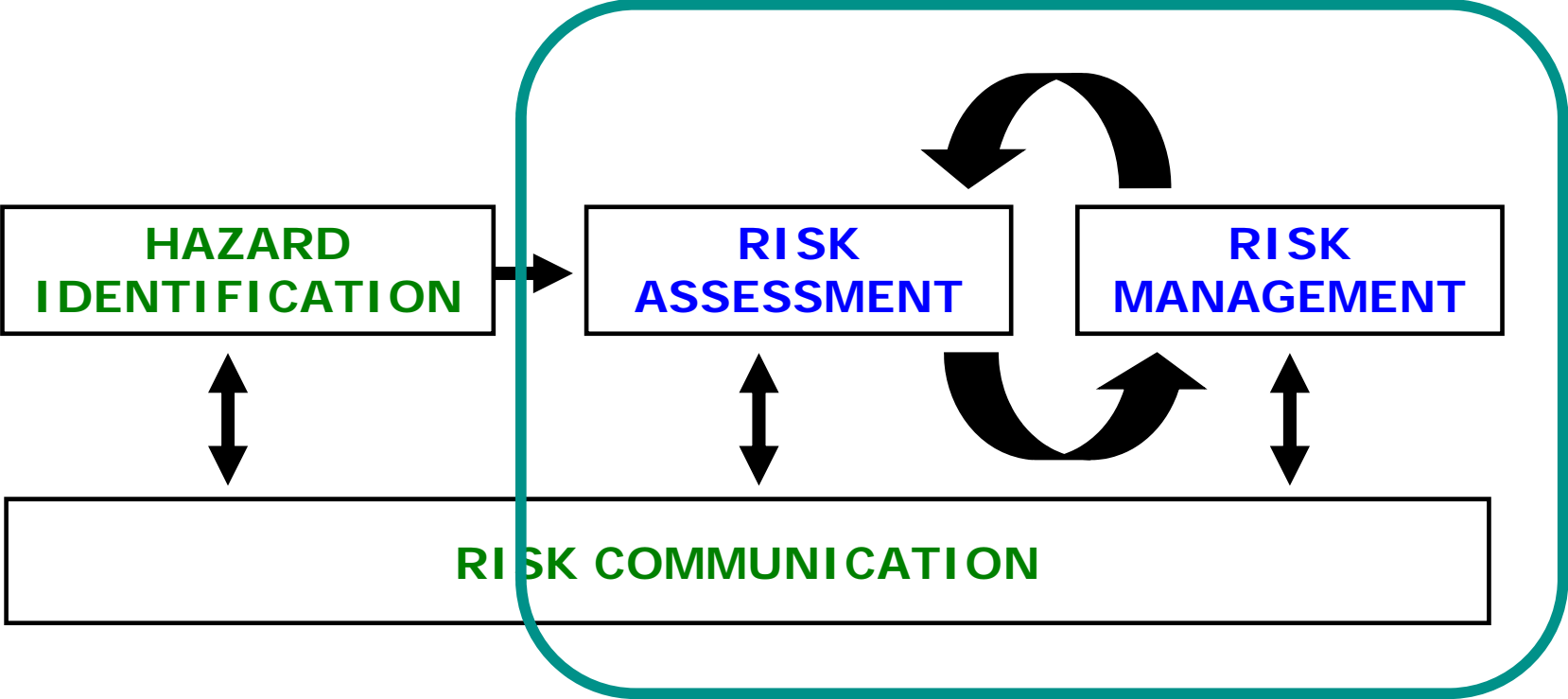
Timing

Sensitivity Analysis (MI)

- *Primary literature*
- *Pro-formas prepared based on broad habitat types*
 - *Mixed Sediment, Sand, Muds, Coarse Sediments, Reefs (rock, non- biogenic)*
 - *Biogenic habitat*
- **Output:**
 - *Activity x Pressure matrix*
 - *Pressure x (Habitat and Species) Sensitivity matrix*



Risk Analysis (Mitigation measures)



Risk Management (Mitigation)



- **(Bird) monitoring tied to specific performance targets with subsequent management actions (and communicated clearly), i.e., adaptive management!**
- **Specific coverage (e.g. trestle density) within licenced areas**
- **Selection of less disturbing activity to habitat feature e.g., oyster trestle cultivation vs bottom culture**
- **Seed screened for Alien Sp. prior to importation**
- **Triploid (3n) stock used (*C. gigas*)**
- **Do not licence!**

Progress to date..



- **Since 2011, risk assessments (full analysis and/or screening) for aquaculture activities have been conducted in 39 bays comprising 50+ Natura 2000 sites**
- **Recommendations have been made for almost 1300 licences**
- **Process is ongoing.....**



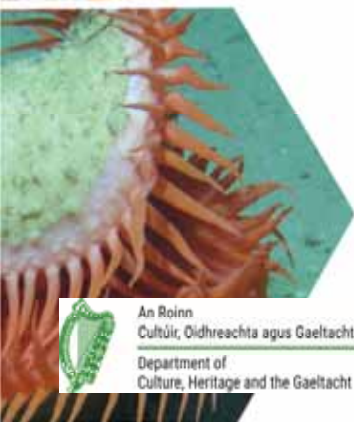
EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

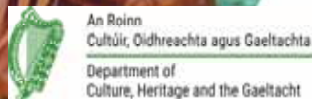
Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Requirements for and outcome of offshore reef survey



David Lyons & David O'Sullivan



An Roinn Talmhaíochta,
Éis agus Mara
Department of Agriculture,
Food and the Marine



EUROPEAN UNION
This measure is financed by the European Maritime and Fisheries Fund



Habitats Directive: Offshore Reefs



Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.

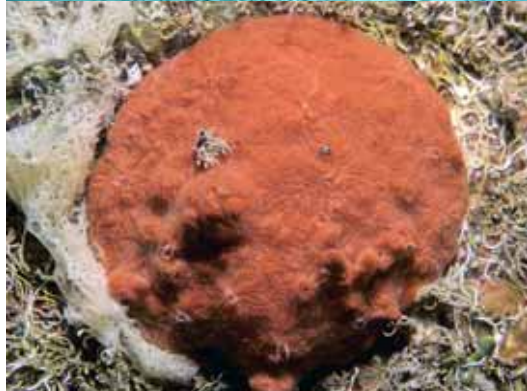
Guidelines for the establishment of the Natura 2000 network in the marine environment. Application of the Habitats and Birds Directives

Clarifications:

- "*Hard compact substrata*" are: rocks (including soft rock, e.g. chalk), boulders and cobbles (generally >64 mm in diameter).
- "*Biogenic concretions*" are defined as: concretions, encrustations, corallogenic concretions and bivalve mussel beds originating from dead or living animals, i.e. biogenic hard bottoms which supply habitats for epibiotic species.
- "*Geogenic origin*" means: reefs formed by non biogenic substrata.
- "*Arise from the sea floor*" means: the reef is topographically distinct from the surrounding seafloor.
- "*Sublittoral and littoral zone*" means: the reefs may extend from the sublittoral uninterrupted into the intertidal (littoral) zone or may only occur in the sublittoral zone, including deep water areas such as the bathyal.
- Such hard substrata that are covered by a thin and mobile veneer of sediment are classed as reefs if the associated biota are dependent on the hard substratum rather than the overlying sediment.
- Where an uninterrupted zonation of sublittoral and littoral communities exist, the integrity of the ecological unit should be respected in the selection of sites.
- A variety of subtidal topographic features are included in this habitat complex such as: Hydrothermal vent habitats, sea mounts, vertical rock walls, horizontal ledges, overhangs, pinnacles, gullies, ridges, sloping or flat bed rock, broken rock and boulder and cobble fields.

Biogenic & Geogenic Reef

Reefs are made of rocks or formed by animals in the sea



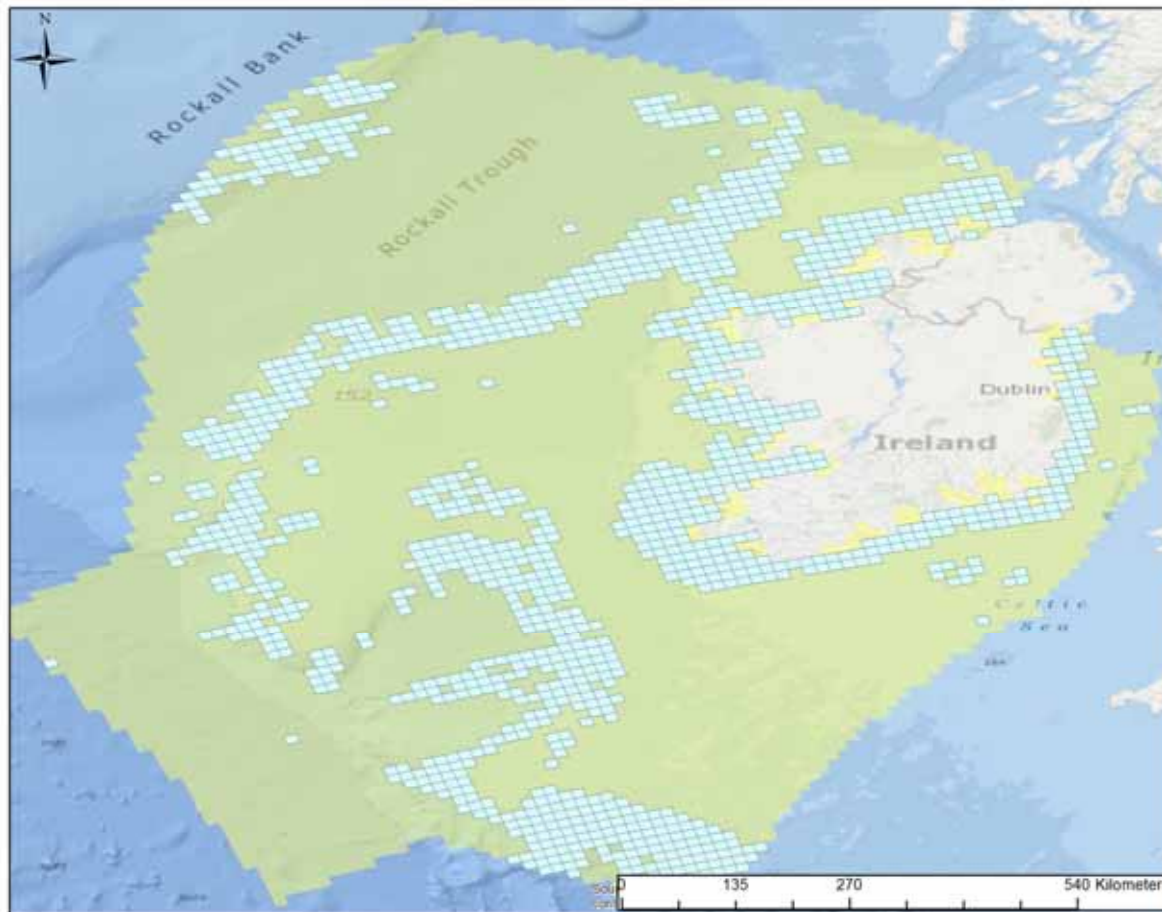
Environmental Status



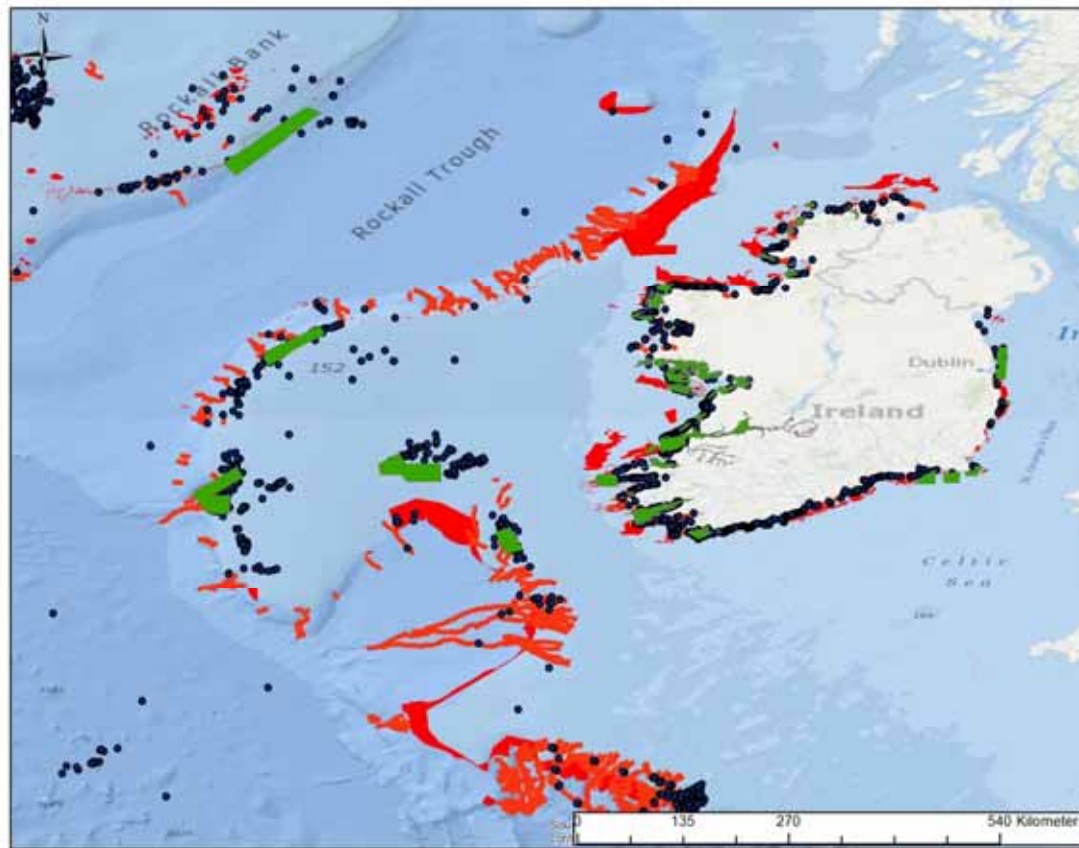
2013 Article 17 report on Reef habitat to the European Commission

Parameter	Future Trend	Future Status	Prospects
Range	Stable	Equal	Good
Area	Stable	Equal	Good
Structure & function	Decreasing	Less than	Bad
Future Prospects			Unfavourable-Bad

SeaRover



SeaRover



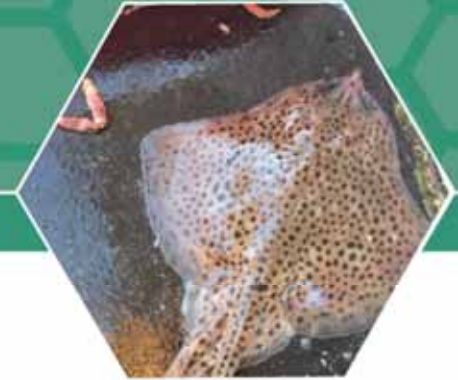
Sensitive Ecosystem Assessment & ROV Exploration of Reef – SEAROVER

Survey targets were based on a review of:

- **INFOMAR / INSS bathymetric DTM for depth variation and spatial discreteness**
- **Areas of low fishing effort**
- **Geomorphological features associated with steep terrain e.g. canyons, escarpments, carbonate mounds**
- **Areas with no records of previous scientific assessment**

ROV *Holland 1*

- SMD Quasar Hydraulic Work class
- USBL - positional information
- Winch drum & A-Frame, Max. depth ~ 3000 m
- 2 'robot' arms, retractable sled, core grabs, slurp gun
- HD TV camera + 5 MP DigiStills camera
- Control & Workshop Containers



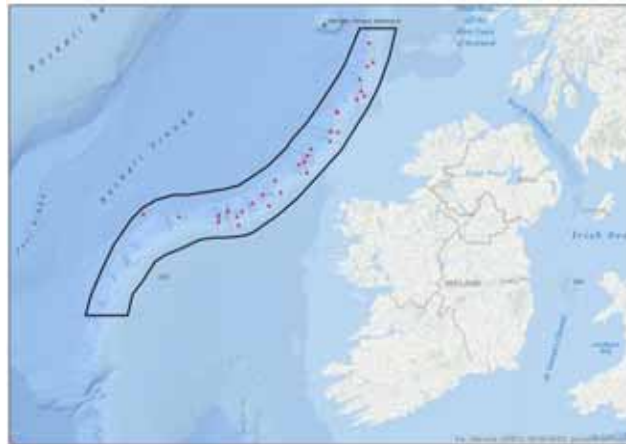
Value-added Collaborations



Modelled predictions of reef presence



Population genetic for DeepLinks project (Plymouth, Oxford, JNCC, BGS)



- INFOMAR ground-truthing programme
- Quantify microplastics at depth (NUIG)



Hexactinellida I.D. & biodiversity -Plymouth

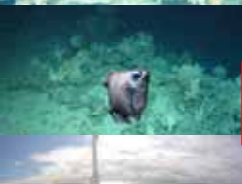


I.D. catalogues (Deep Sea Biology Society)



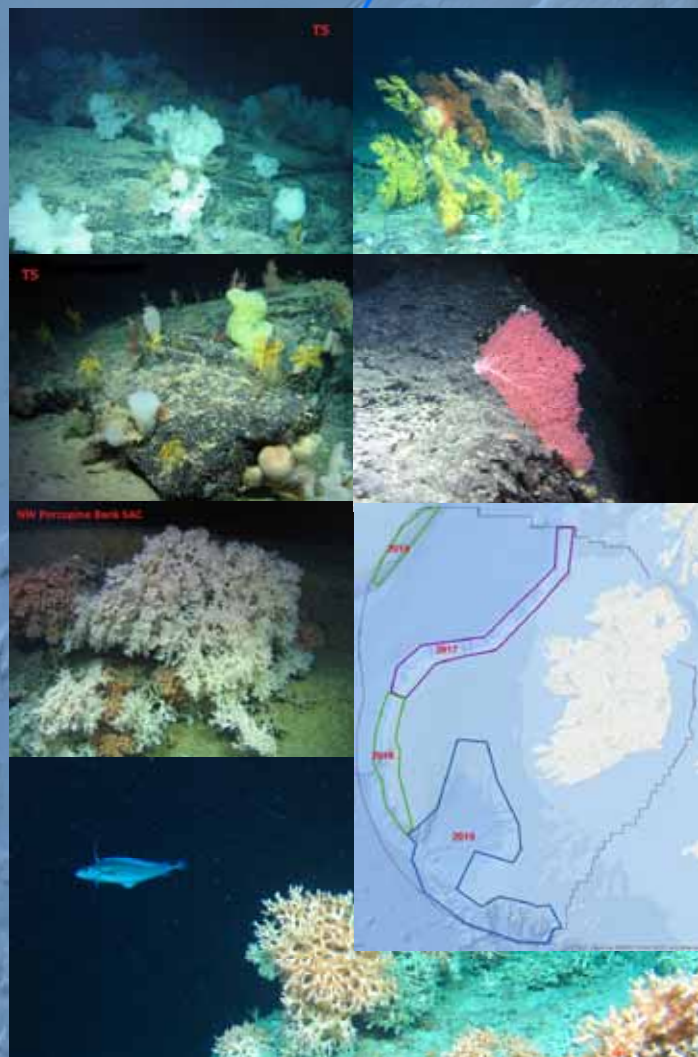
I.D. & Biodiscovery (NUIG) (Demospongia & Octocorallia)

By the numbers



	2017	2018
Focus Area	Porcupine Bank	Rockall & Porcupine
Vessel Days	21	21
Depth Ranges	400 - 2 500 m	200 - 3 000 m
Transects	50	52
Vertical Km	135	142
Biology	147	151
Sediment	49	52
Images	4 935	20 000
HD Video (Hours)	127	119
Data Size	5.75 TB	5.63 TB

SeaRover 2017 / 2018



25°0'0"W

20°0'0"W

15°0'0"W

10°0'0"W

5°0'0"W



56°0'0"N

54°0'0"N

52°0'0"N

50°0'0"N

Acknowledgements



This project is implemented through the Marine Biodiversity Scheme and is part supported by the Irish government and the European Maritime & Fisheries Fund as part of the EMFF Operational Programme for 2014-2020



Ireland's EU Structural and Investment Funds Programmes 2014 - 2020

Co-funded by the Irish Government and the European Union



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Rialtas na hÉireann
Government of Ireland



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Oidhreacht agus Gaeltachta**
Department of Culture,
Heritage and the Gaeltacht



**Roinn Cumarsáide, Gníomhaithe
ar son na hAeráide & Comhshaoil**
Department of Communications,
Climate Action & Environment



Foras na Mara
Marine Institute



INFOMAR
Integrated Mapping for the
Sustainable Development
of Ireland's Marine Resource



Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann



NUI Galway
OÉ Gaillimh



**UNIVERSITY OF
PLYMOUTH**

AQUAFACT



**Commissioners of
IRISH LIGHTS** | Navigation
and Maritime
Services



EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Bycatch and cetacean post-mortem scheme

Oliver Ó Cadhla[^] & Jim O'Donovan^{*}



[^] Science & Biodiversity Section, Dept. of Culture, Heritage & the Gaeltacht

^{*} Dept. of Agriculture, Food and the Marine Regional Veterinary Laboratory, Cork



Introduction: Legislation & parameters



The Wildlife Act 1976 & Amendments

- ❖ Fifth Schedule - protected wild animal species
- ❖ Protection from hunting, injury, wilful interference with or destruction/disturbance of breeding or resting places

EC Birds Directive 1979, Habitats Directive 1992 & national S.I.s

- ❖ *Annex II* species – requiring designation of SACs
- ❖ *Annex IV* species (whales, dolphins, porpoises) – in need of strict protection
- ❖ also *Annex V* species (seals) – taking/exploitation may be subject to management measures to ensure compatibility with maintenance/achievement of FCS

Annex C - Assessing conservation status of a species				
General evaluation matrix (per biogeographical/marine region within a MS)				
Parameter	Conservation Status			
	Favourable ('green')	Unfavourable - Inadequate ('amber')	Unfavourable - Bad ('red')	Unknown (insufficient information to make an assessment)
Range (within the biogeographical region concerned)	Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference range'	Any other combination	Large decline: Equivalent to a loss of more than 1% per year within period specified by MS OR more than 10% below favourable reference range	No or insufficient reliable information available
Population	Population(s) not lower than 'favourable reference population' AND reproduction, mortality and age structure not deviating from normal (if data available)	Any other combination	Large decline: Equivalent to a loss of more than 1% per year (indicative value MS may deviate from if duly justified) within period specified by MS AND below 'favourable reference population' OR More than 25% below favourable reference population OR Reproduction, mortality and age structure strongly deviating from normal (if data available)	No or insufficient reliable information available
Habitat for the species	Area of habitat is sufficiently large (and stable or increasing) AND habitat quality is suitable for the long-term survival of the species	Any other combination	Area of habitat is clearly not sufficiently large to ensure the long-term survival of the species OR Habitat quality is bad, clearly not allowing long-term survival of the species	No or insufficient reliable information available
Future prospects (as regards to population, range and habitat availability)	Main pressures and threats to the species not significant; species will remain viable on the long-term	Any other combination	Severe influence of pressures and threats to the species; very bad prospects for its future, long-term viability at risk.	No or insufficient reliable information available
Overall assessment of CS	All 'green' OR Three 'green' and one 'unknown'	One or more 'amber' but no 'red'	One or more 'red'	Two or more 'unknown' combined with green or all 'unknown'

Operational Interactions: Evidence base

Mass stranding & post-mortem of Common Dolphins (Jan-Feb 2013)

- ❖ At least 15 animals, clear evidence of bycatch incident(s)

BIM-led studies (1990s & up to 2015)

- ❖ Seals and cetaceans caught, primarily in static gears but also pelagic fleet?

Conservation Plan for Cetaceans (DEHLG, 2009)

- ❖ Scientific review & framework for protection; 41 Actions across 5 programmes



EMFF Biodiversity Measure: Bycatch & Necropsy project 2017+

- Tangle netting
- Gill netting
- Trammel netting
- Pelagic trawling



Project Management Structure

Observation at Sea
(# = BYCATCH Data)

Management Mitigation Conservation measures

Observation in Lab
(# = POST-MORTEM Data)

IWDG Cetacean Strandings Scheme



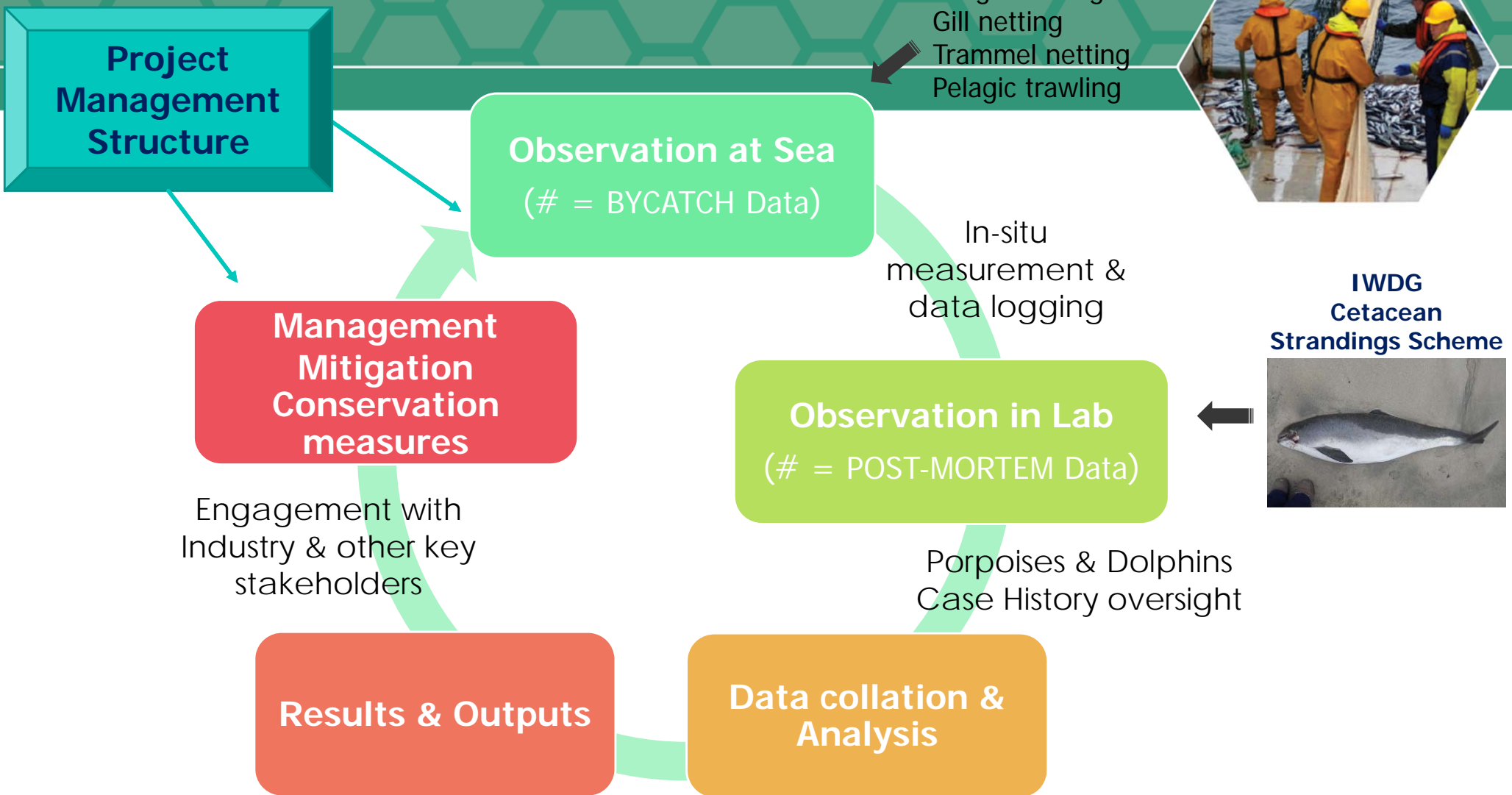
Engagement with Industry & other key stakeholders

Results & Outputs

Data collation & Analysis

In-situ measurement & data logging

Porpoises & Dolphins Case History oversight



Enhanced Sampling at Sea (i.e. DCF+)



Sub-area / Fishing ground	Scheme	Average No. fishing trips during reference years (2013-2015)	Target / Comments	Planned No. of observer trips	No. of observer trips carried out 2018
ICES Area 6a-West of Scotland	Demersal at-sea	264	Targeting all Demersal species off the NW coast	14	11
ICES Area 6a-West of Scotland	Pelagic at-sea	188	Targeting all pelagic species off the NW coast	9	7
ICES Area 7a-Irish Sea	Demersal at-sea	195	Included as this fishery targets cod and elasmobranchs in the East	4	2
ICES Area 7a-Irish Sea	Pelagic at-sea	165	7aS Herring sentinel fishery in the southern part of the Irish Sea	4	0
ICES Area 7fgh-Celtic Sea	Demersal at-sea	1870	Demersal Otterboard Trawlers in the South East	8	7
ICES Area 7fgh-Celtic Sea	Demersal at-sea	462	Demersal Beam Trawlers in the South East	7	5
ICES Area 7fgh-Celtic Sea	Demersal at-sea	327	Demersal Seiners in the South East	8	2
ICES Area 7fgh-Celtic Sea	Pelagic at-sea	217	Herring and other pelagics in the South East	10	4
ICES Area 7fgh-Celtic Sea	Demersal at-sea	716	Gillnetters, trammel and tangle netters in the South East	2	3
ICES Area 7bcjk West of Ireland	Demersal at-sea	1081	Demersal Otterboard Trawlers targeting Gadoids in the W and SW	8	7
ICES Area 7bcjk West of Ireland	Demersal at-sea	703	Demersal Otterboard Trawlers targeting Hake, Monkfish, Megrim, W & SW	8	2
ICES Area 7bcjk West of Ireland	Demersal at-sea	239	Demersal Seiners in the West and South West	8	1
ICES Area 7bcjk West of Ireland	Demersal at-sea	388	Gillnetters, trammel and tangle netters in the W & SW	8	>70*
ICES Area 7bcjk West of Ireland	Pelagic at-sea	70	All LPF in all Areas	2	0
ICES Area 7bcjk West of Ireland	Pelagic at-sea	359	All SPF in the West and South West	6	3
ICES Area IV, VIIId -North Sea	Pelagic at-sea	65	All SPF in the North East West of Shetland	3	2
ICES Area I,II -Eastern Arctic	Pelagic at-sea	7	All SPF West of Norway	1	0

Cetacean Post-mortem Programme



- ❖ Started in April 2017
- ❖ To date 65 necropsies have been carried out (target 70 by end 2018)
- ❖ Primary Aim: Investigate/establish cause of death in carcasses of **Common Dolphins, Striped Dolphins** and **Harbour Porpoises** recovered from S and W coast
- ❖ Secondary Aim: collect samples and data for further studies (e.g. diet, contaminants, genetics)
- ❖ Methods:
 1. Gross observation, dissection of the carcass, measurements and photography
 2. Bacteriology

plus potential for histopathology, virology, toxicology using stored samples

Cetacean Post-mortem Process

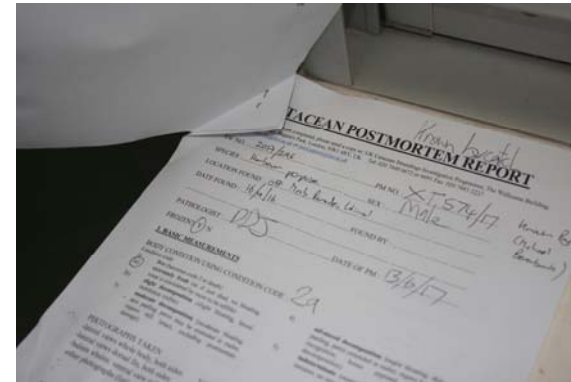
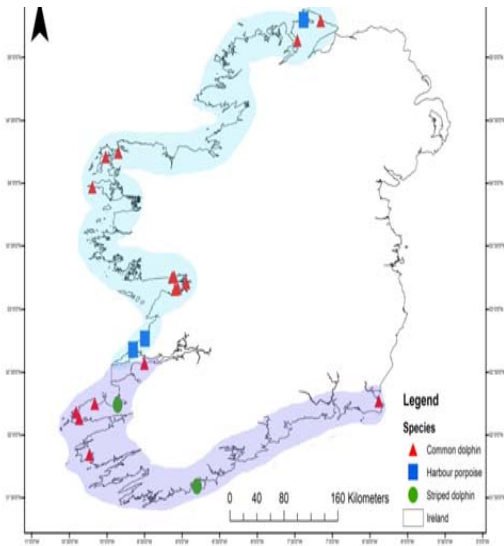


- ❖ Carcass photographed at recovery, ideally when first seen by member of public
- ❖ Carcass visually inspected, photographed and external lesions recorded on charts
- ❖ Weight and measurements
- ❖ Dissection of the carcass:
 - ❑ Gross lesions observed and noted, photography
 - ❑ Samples collected for bacteriology/virology
 - ❑ Organs removed, dissected and inspected
 - ❑ Samples collected for toxicology, histopathology, parasitology and virology **



*** analyses not part of this contract*

Cetacean Post-mortem Outputs



- ❖ Report generated by and reviewed within IWDG/DAFM/GMIT project group
- ❖ Case History docs to Institute of Zoology, London for independent review
- ❖ IOZ comments are reviewed and included in the final Case History reports
- ❖ Post-mortem programme report finalised by project leader
- ❖ **Final project report due for release in Spring 2018**
- ❖ Stored samples for wider research release



Acknowledgements

Dr Leonie O'Dowd, Helen McCormick & Dr Oliver Tully of the Marine Institute
Dr Simon Berrow, Stephanie Levesque, Dr Sinéad Murphy, Mags Daly
Dr David Tierney, Dr Ferdia Marnell, Dr David Lyons of DCHG



Strandings Scheme: Mick O'Connell, network & public who report strandings

DAFM Cork Regional Veterinary Laboratory

Pat Sheehan & Mary-Jane Lynch (Bacteriology), Micheal Casey (Head of Division)
Berni King and Alma Wilson (Administration)



Rob Deaville, Dr Paul Jepson & colleagues



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EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Using Fisheries Surveys as Platforms for Ecosystems Data Collection



Graham Johnston & Fabio Sacchetti, Marine Institute



An Roinn Talmhaíochta,
Riagais Mara
Department of Agriculture,
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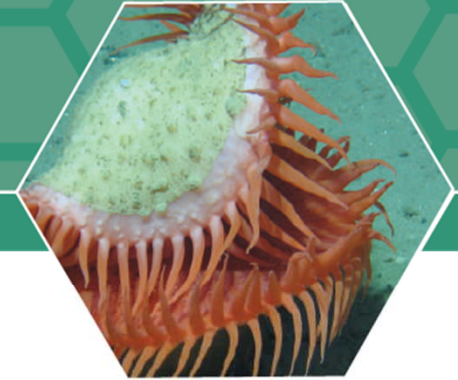
RV Celtic Explorer



- Platform of opportunity
- Room for observers
- Time availability
- Spatial availability
- Change of focus on survey types with increase in berth space



Types of additional observations



- Marine Mammal (human and PAM)
- Seabird
- Plankton
- Jellyfish
- Microplastics
- Multibeam acoustics
- Sediment grabs

Relevant projects



- NPWS Marine Mammal Observer scheme
- Sediment sampling

Marine Mammals



- Was ad-hoc
- Review of surveys
 - Ireland Obligations - Article 17 reporting under Habitats Directive
 - Required to report on Range, Population, Habitat and Future prospects. Traffic-light system.
- EMFF funding
 - Blue Whiting Survey
 - WESPAS
 - Celtic Sea Herring
- Mackerel egg

Species

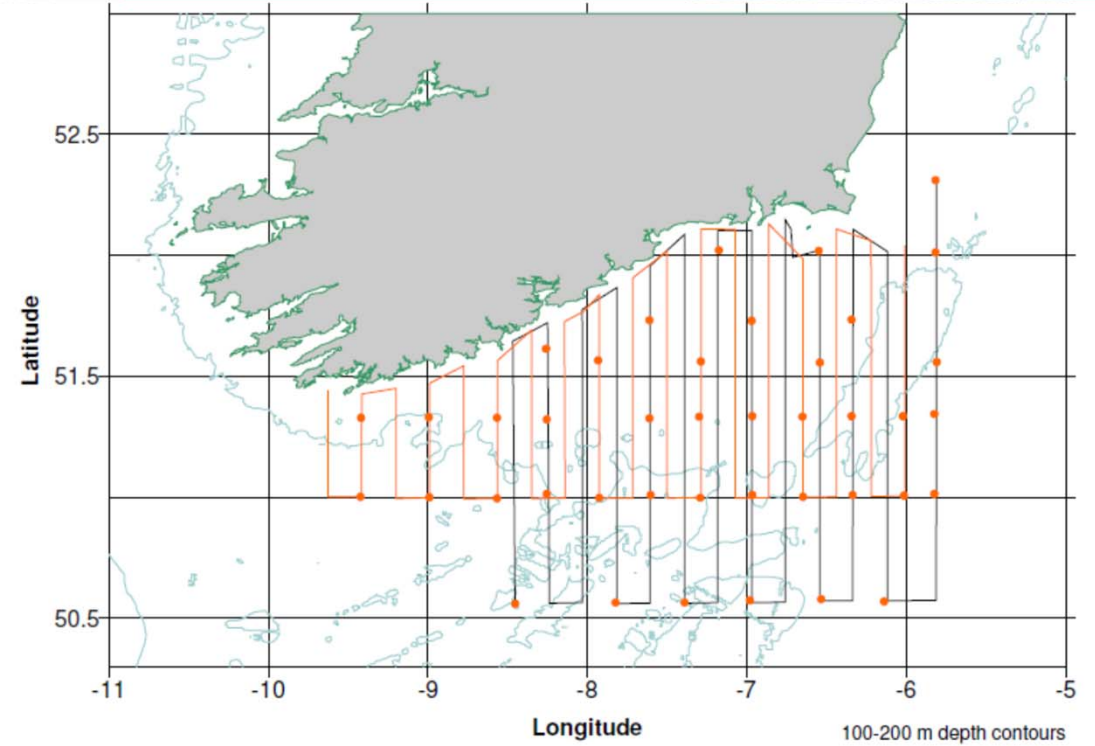
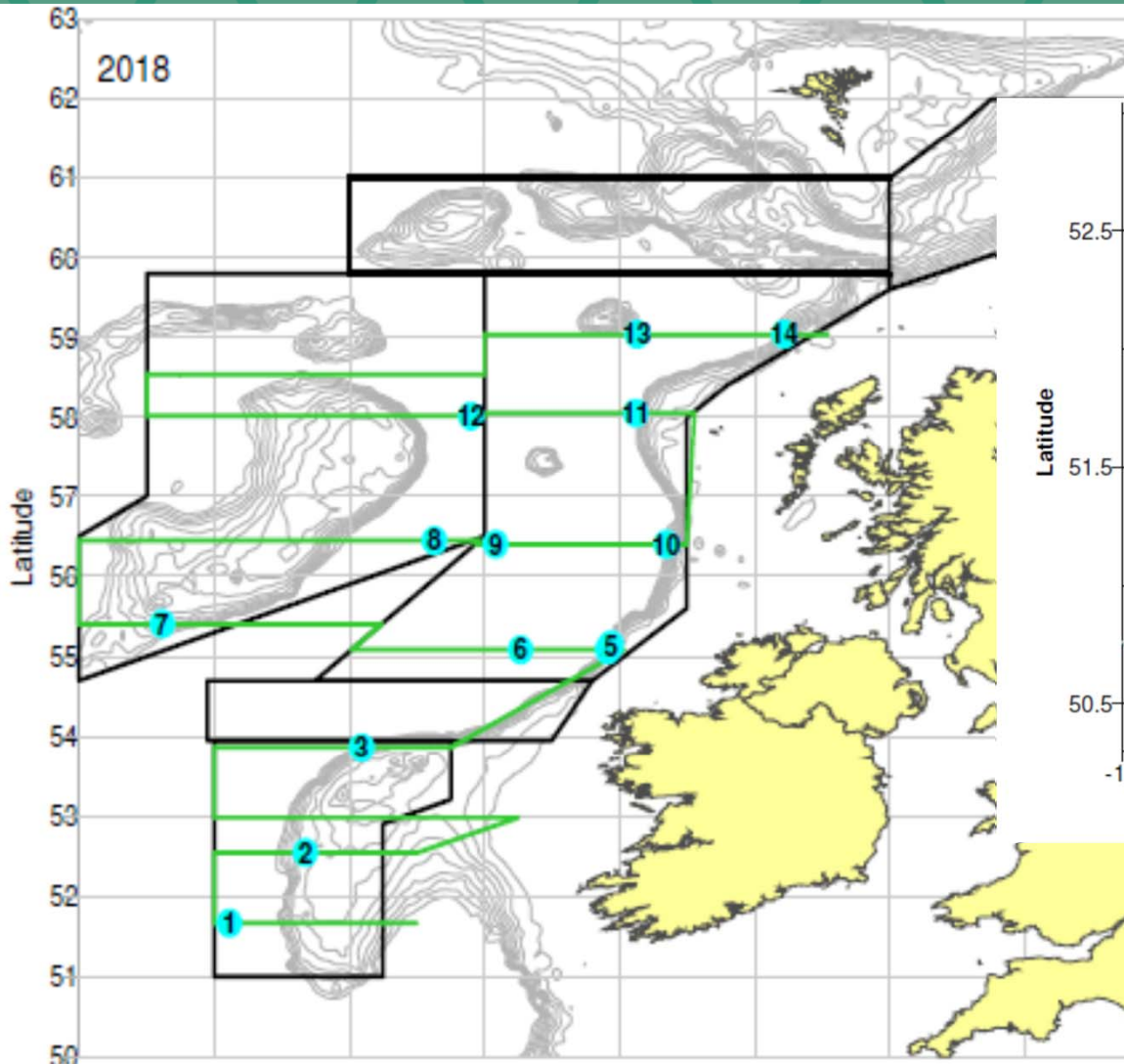


- Common dolphins
- Bottlenose dolphins

- Beaked whales
- Sperm whales

- Baleen whales - CSHAS

Survey coverage

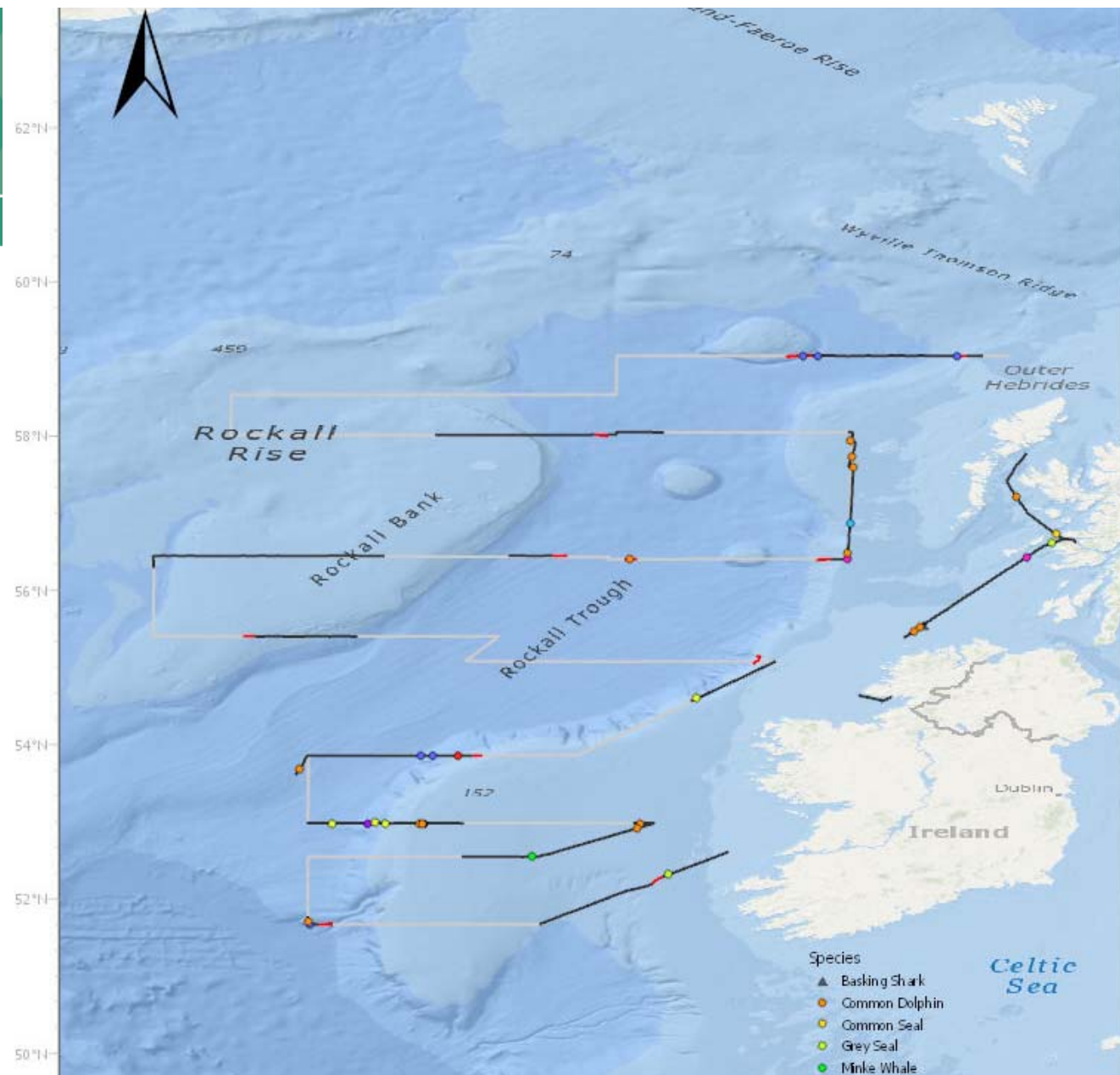


How scheme operates



- Operated by Marine Institute for NPWS
- Requirements, data formatting etc. according to NPWS (international) standards and templates
- Tender scheme – each survey
 - Some flexibility – e.g over 2 legs, number of observers
- Observers working together – must co-operate in the crow's nest!

Some results



Benefits



- Standardised timings
- Use of transects. Allows quantifiable effort and spatial calculations
- Absolute abundance available if encounters are frequent enough
- Repeatable
- Full coverage of EEZ

Future plans



- Next Habitat's Directive reporting cycle starts in 2019
- Addition of seabird sightings
- Possible addition of other surveys e.g. mackerel egg



EMFF Operational Programme 2014-2020


Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



Opportunistic sediment sampling A new strategy toward a better understanding of marine seabed and habitats



- 
- 1. Overview of INFOMAR**
 - 2. Why Sediment maps / Habitat maps**
 - 3. How sediment / habitat maps are created**
 - 4. Broad scale vs fine scale maps**
 - 5. INFOMAR data and product dissemination and sharing**
 - 6. Update on sampling strategy during fisheries surveys**

INFOMAR engagements



Government

Industry

Environment
protection

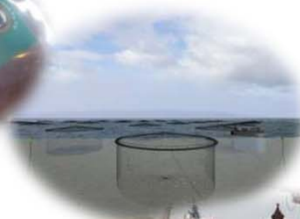
Resource
management

INFOMAR generates opportunities for many different sectors in the national economy.

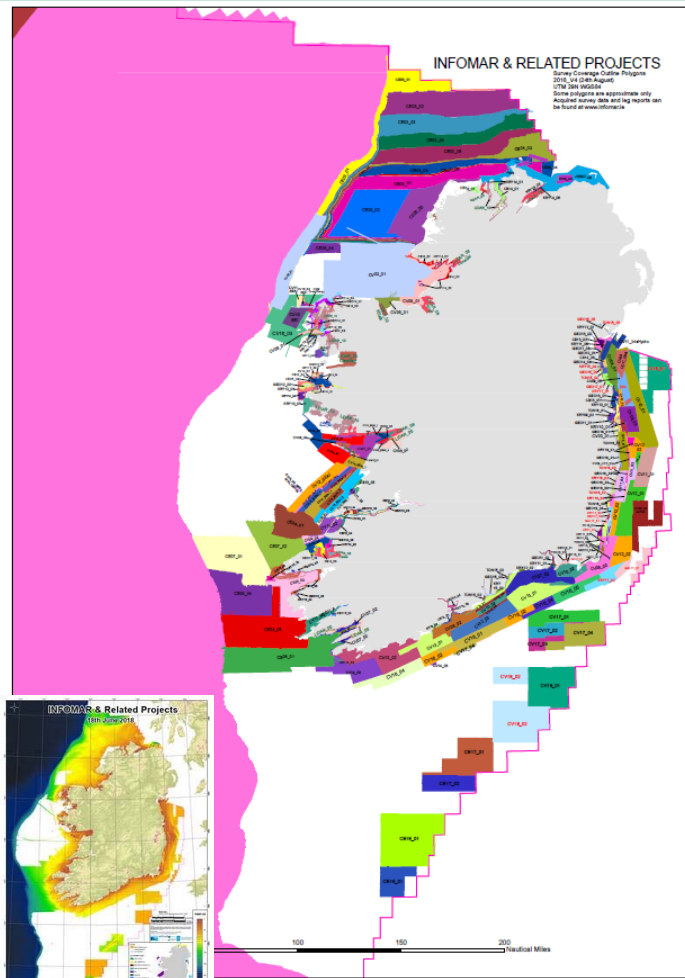
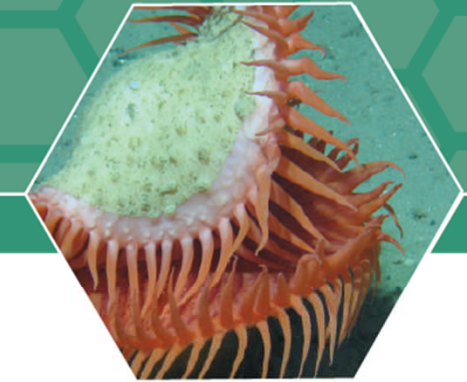
Risk prevention

Research

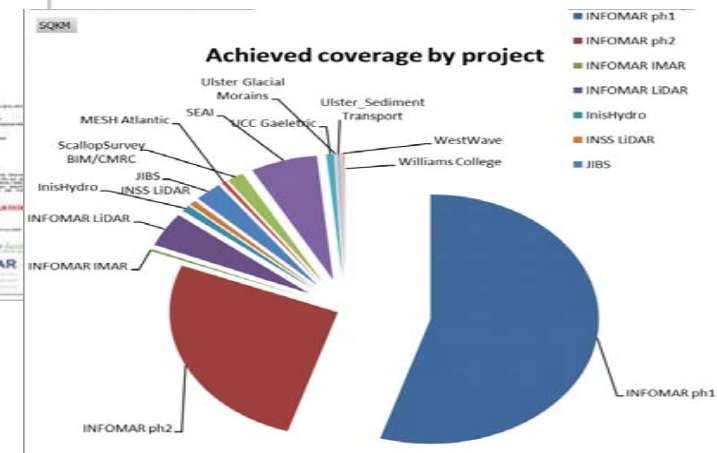
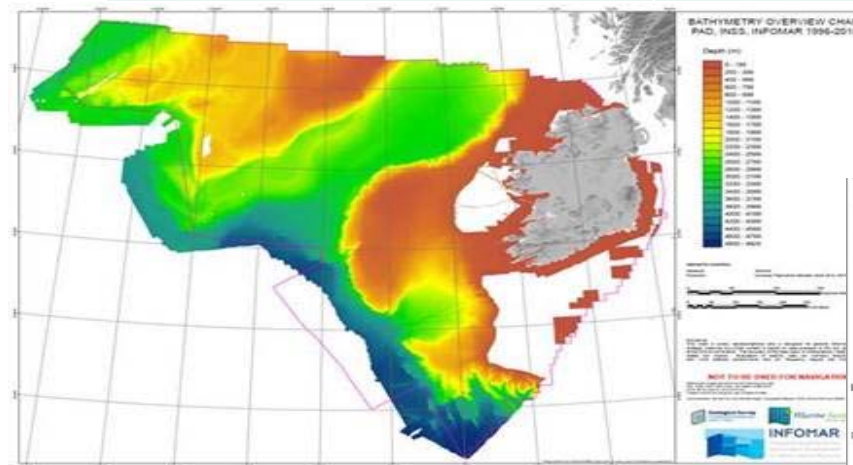
Public



INFOMAR – Survey effort



Total coverage (Km2)	
INSS-PAD	652833
INFOMAR+plus others	47292
Total	700125



WHY Sediment / Habitat maps



- **1. Marine Spatial Planning Tool**

Essential information to aid in the better management of marine environment

- **2. Baseline Map for Habitat Monitoring**

Quantitative data on seabed are required to accurately monitor any changes in the extent of marine habitats

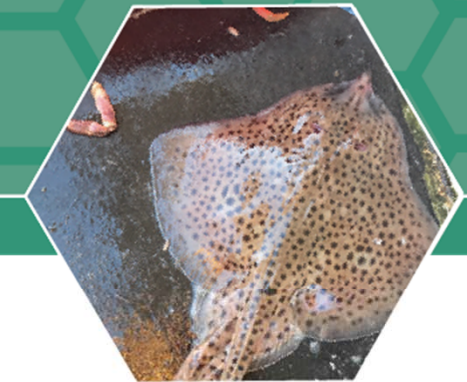
- **3. Facilitate Servicing of EU Water Framework and Habitat Directives**

- **4. Hydrodynamic modelling**

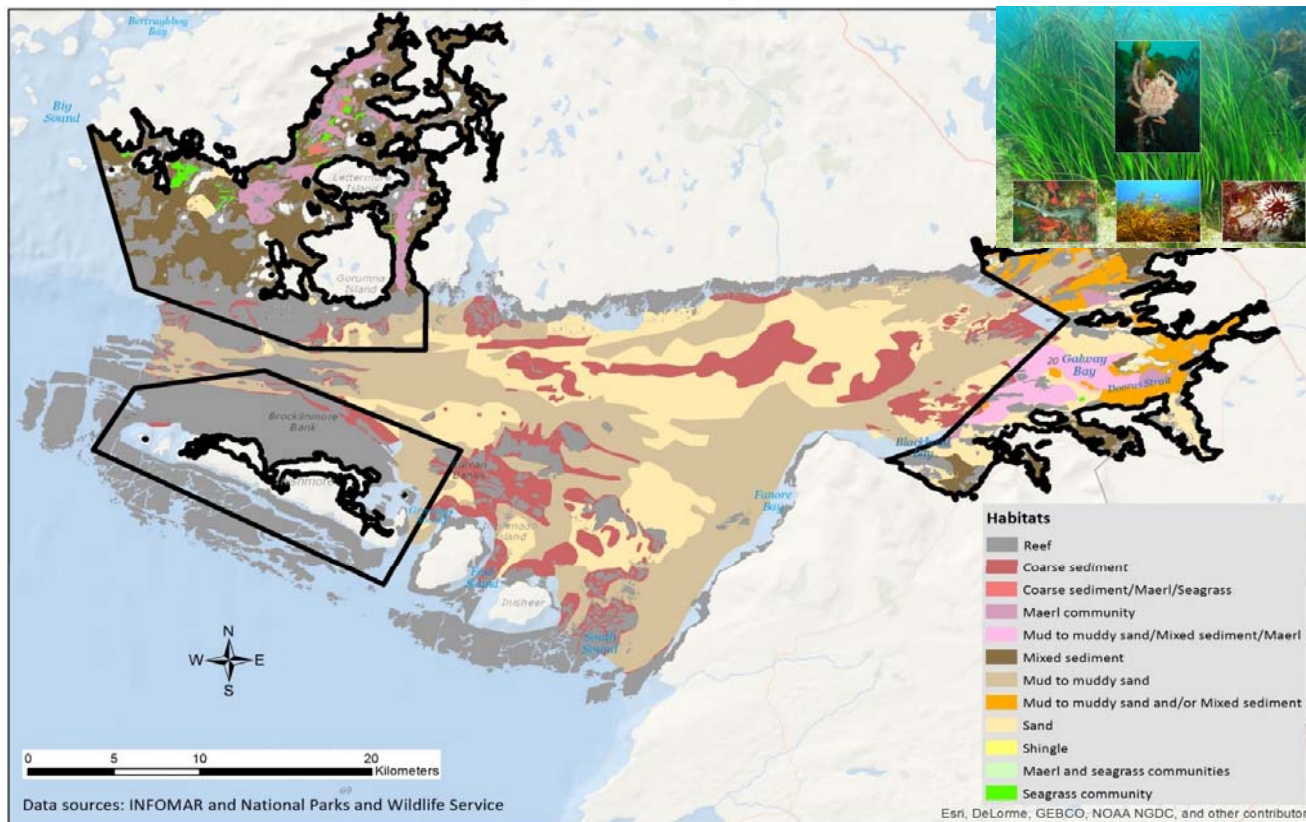
- **5. Support various industries such as cable, oil & gas, renewable**

- **6. Essential for fisheries Management**

How sediment / habitat maps are created



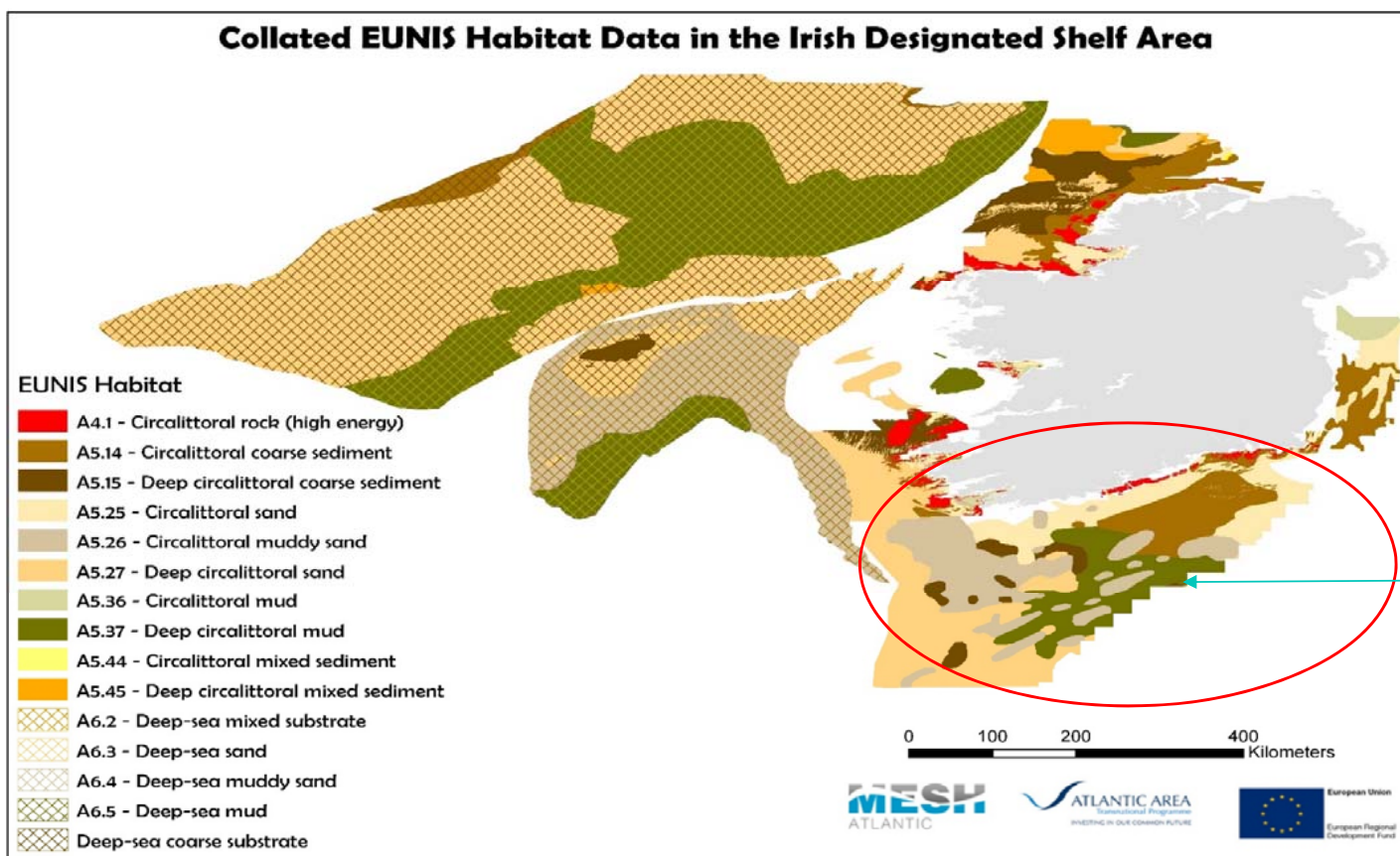
Habitat Map of Galway Bay Marine Special Areas of Conservation



Broad scale sediment/habitat maps

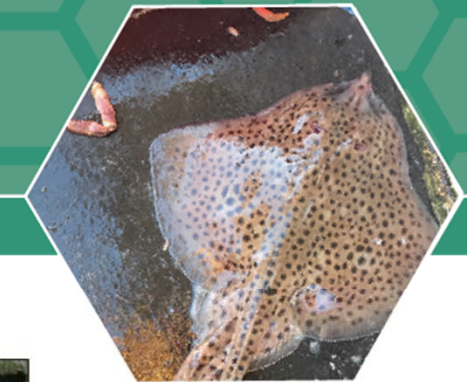


Collated EUNIS Habitat Data in the Irish Designated Shelf Area



**VERY LOW
CONFIDENCE LEVEL**

Fine scale sediment and habitat map – Kenmare River

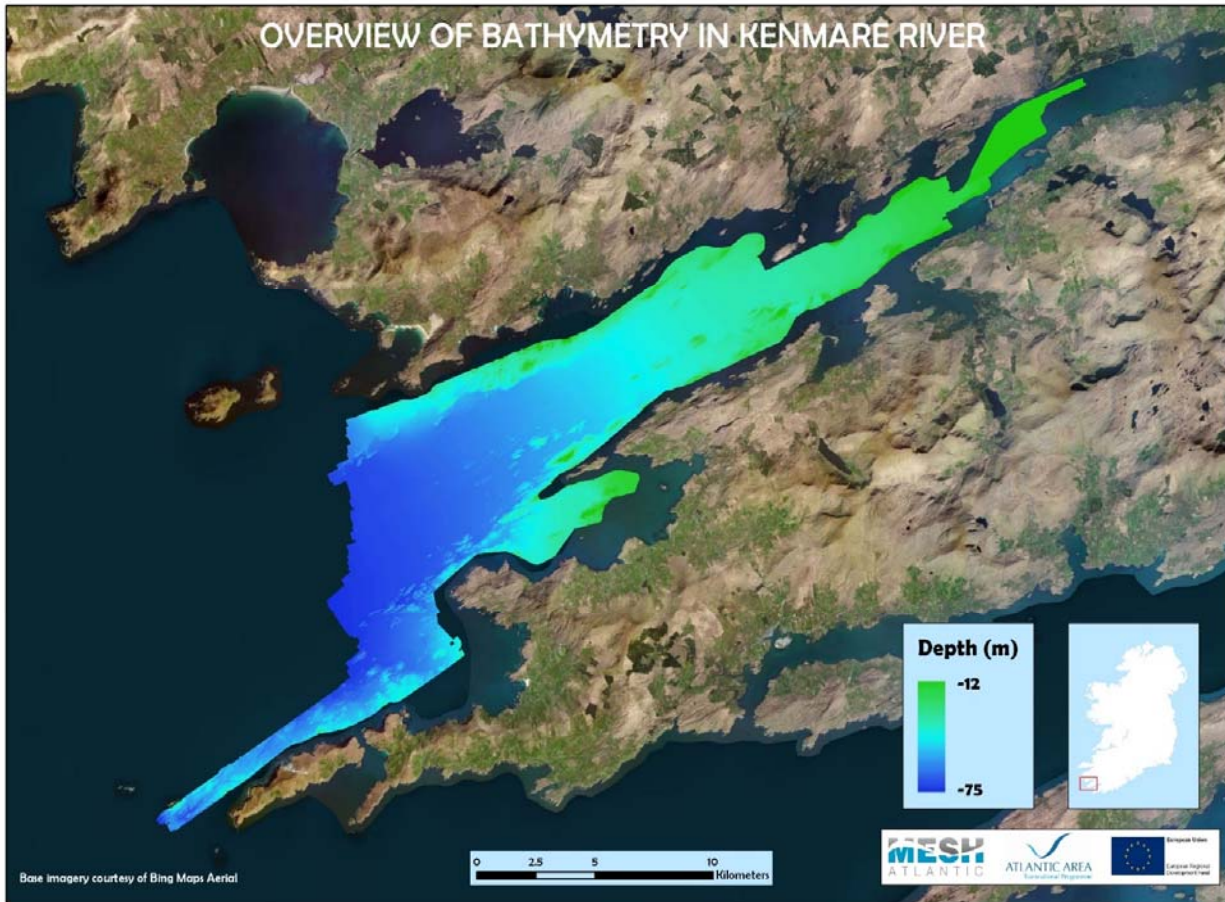
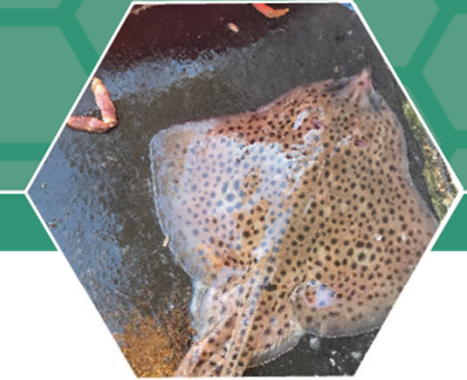


Kenmare River, Co. Kerry, is a long, narrow, south-west facing bay located on the southwest coast of Ireland. It is a deep, drowned glacial valley and the bedrock is mainly Old Red Sandstone, which forms reefs along the middle of the bay throughout its length. **The bay is designated as a Special Area of Conservation (SAC), containing three marine habitats listed on Annex I of the EU Habitats Directive, namely reefs, large shallow bays and caves.**

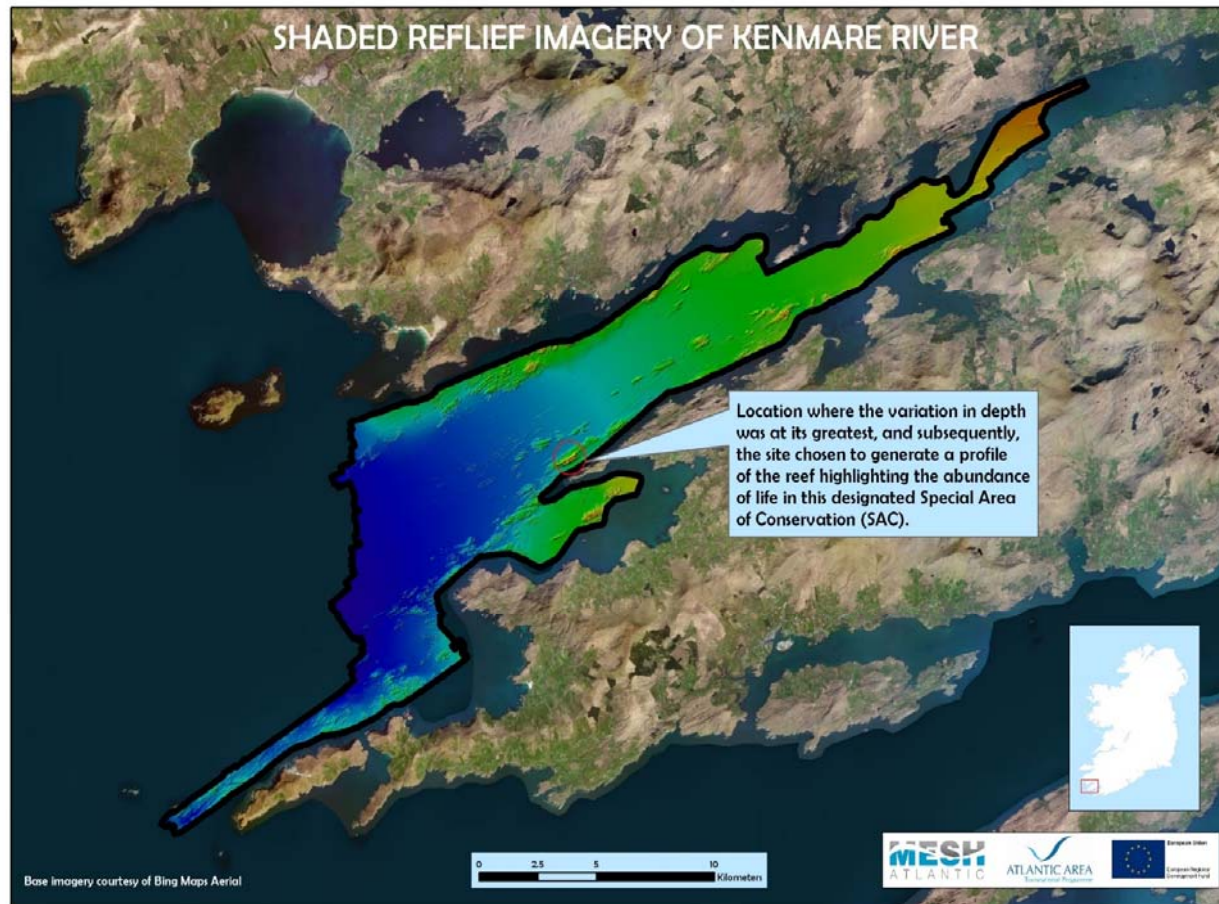
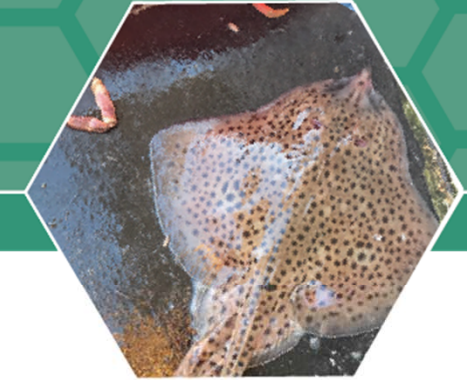
KENMARE RIVER SPECIAL AREA OF CONSERVATION



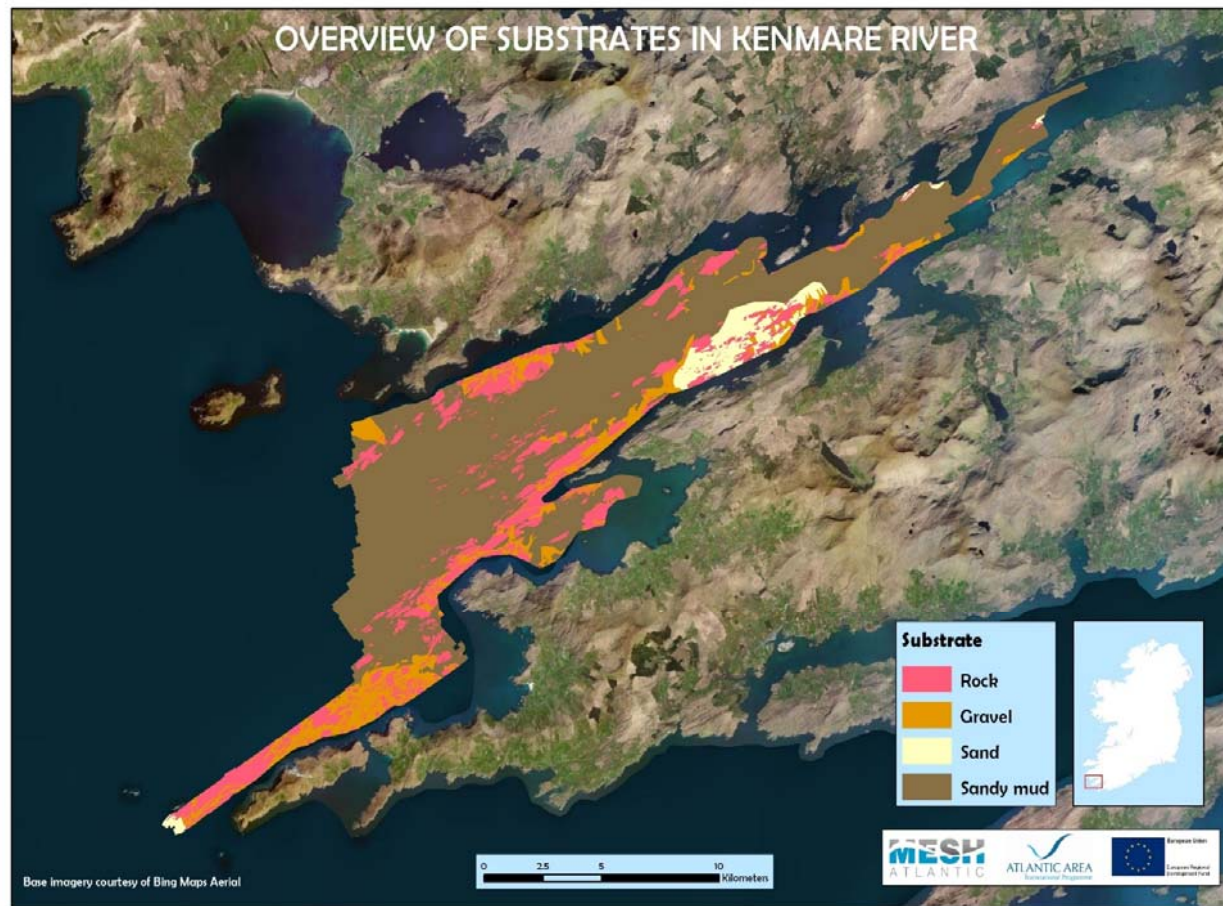
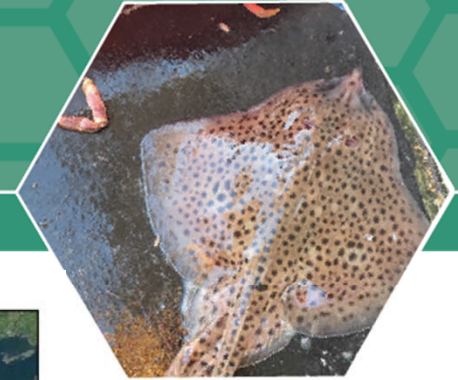
Fine scale sediment and habitat map – Kenmare River



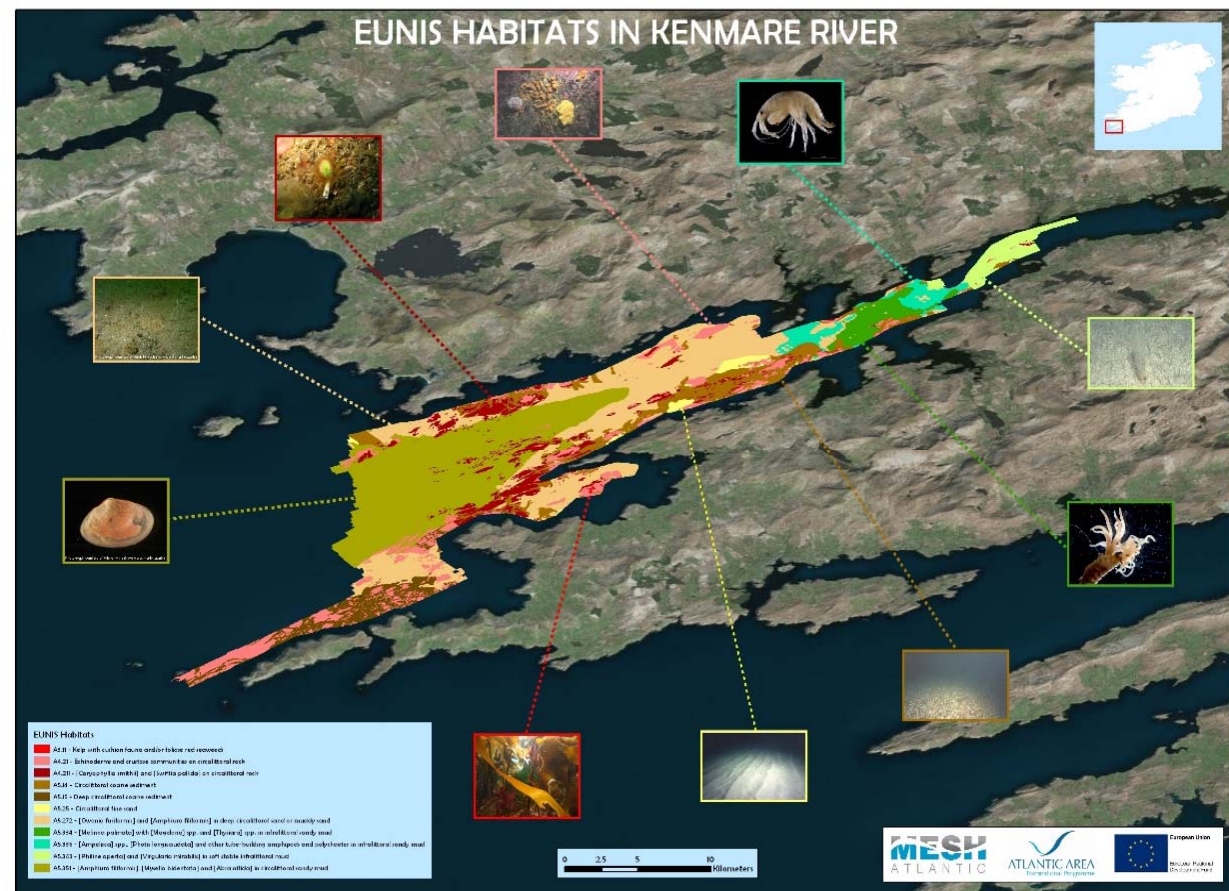
Fine scale sediment and habitat map – Kenmare River



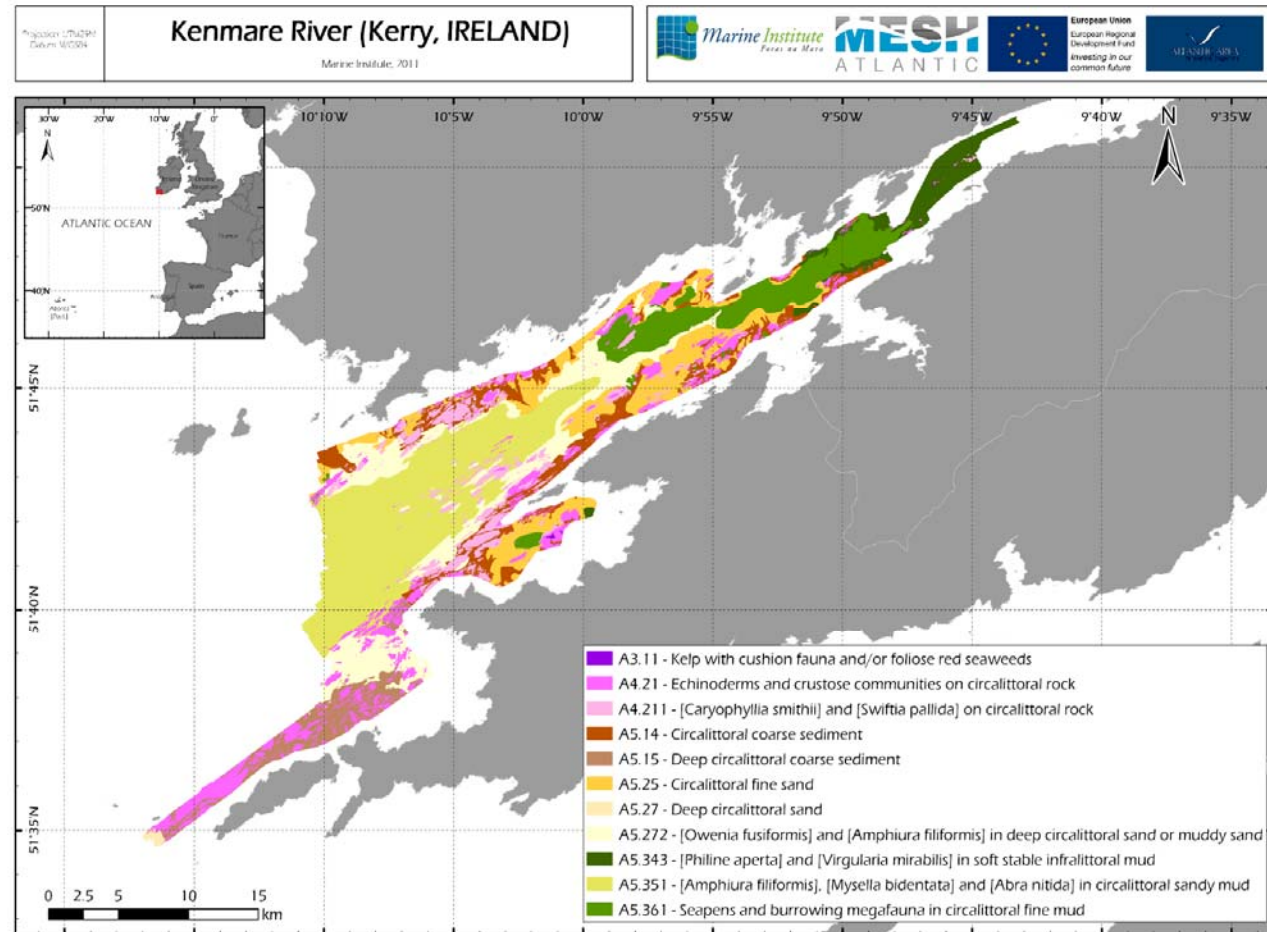
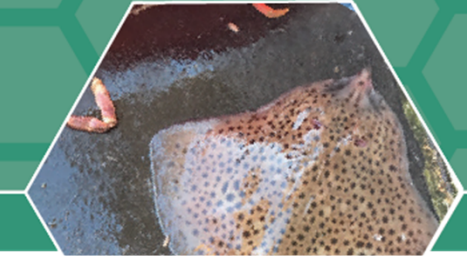
Fine scale sediment and habitat map – Kenmare River



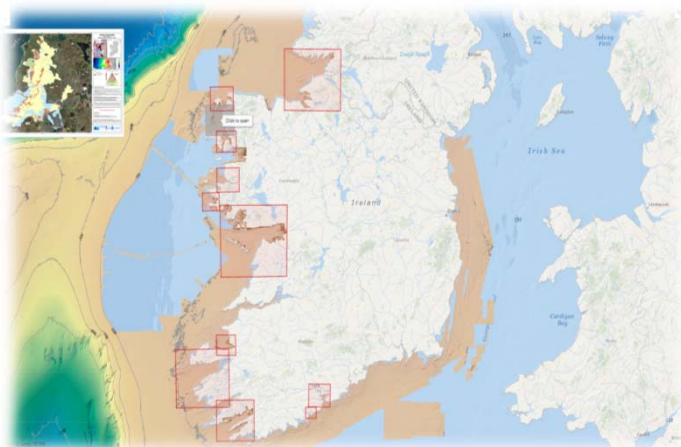
Fine scale sediment and habitat map – Kenmare River



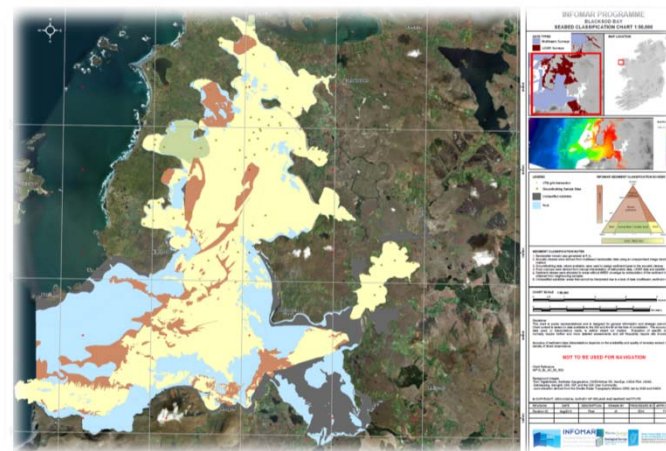
Fine scale sediment and habitat map – Kenmare River



Sediment classification services and charts



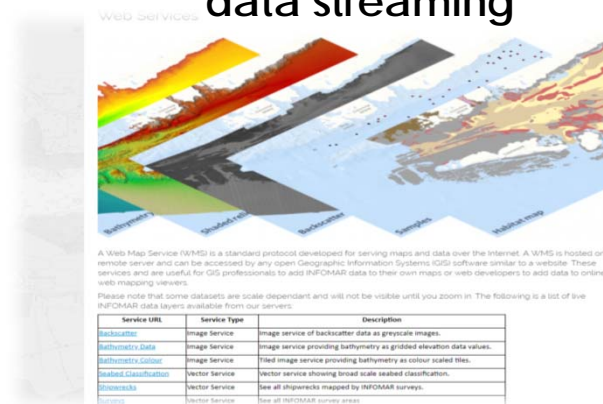
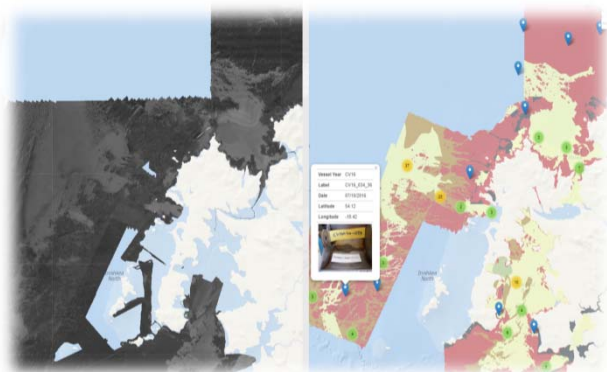
Web Viewer for chart download



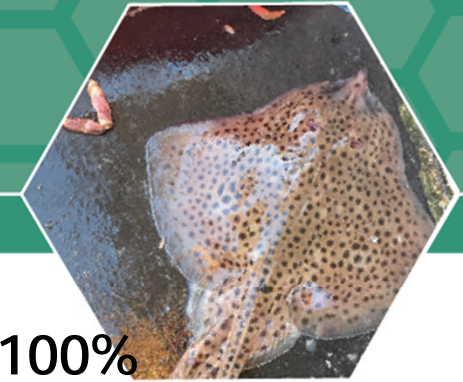
WMS services for GIS data streaming



Web Viewer for data visualisation and query

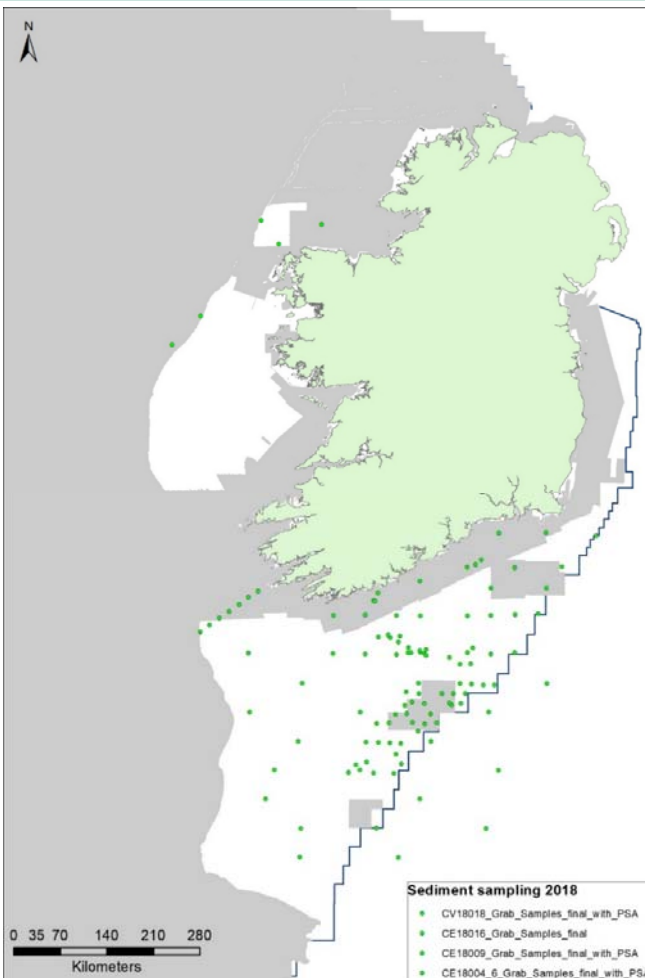


Why sampling and why we need a clever strategy

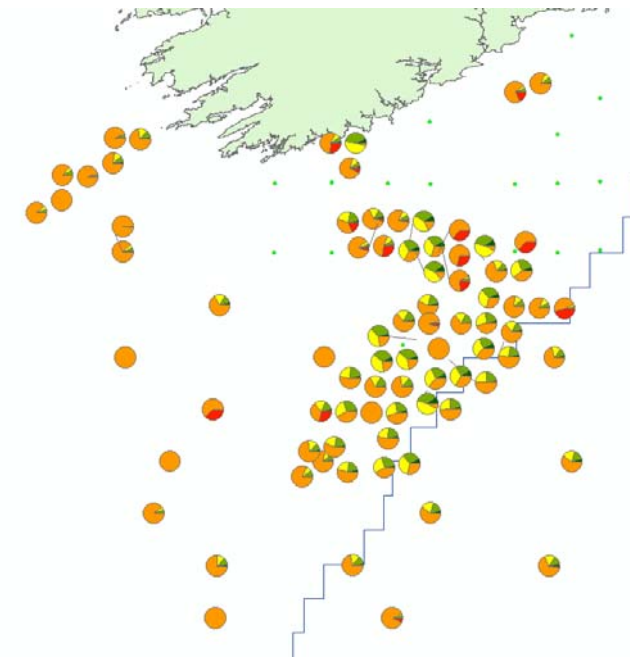


- INFOMAR phase 2 (2016-2026) primary focus is on achieving 100% multibeam coverage of the entire EEZ by 2026.
- Current INFOMAR allocated budget allows for limited ancillary activities such as sediment sampling, video transects, etc, in particular in remote areas such as Celtic Sea/West coast.
- Sediment sampling should be acquired after an area has been surveyed to better target locations.
- Sampling during fisheries surveys have the potential to contribute and augment current sampling density and ultimately support the creation of better sediment and habitat maps.

Progress to date – Sediment sampling



Survey name	Samples collected	Particle size analysis
CE18004_IAMS	12	Processed
CE18009_WESPAS	18	Processed
CV18018_UWTV	56	Processed
CE18016_HERRING	18	Q4-2018
CE18017-IGFS	Ongoing-15	Q4-2018



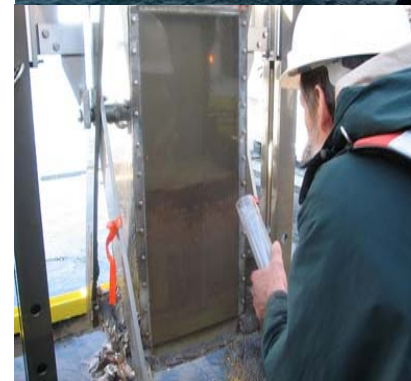
A broader sampling/monitoring strategy?



Small grab sampler
Limited applications: highly disturbed sampled. Ok for PSA and basic seabed info.



Box corer sampler
Multiple applications: minimal disturbance. Good for PSA, sub surface geology, biological, chemical, geochemical. E-DNA, micro plastic, pollution monitoring.





EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



mydas: MSY for **DA**ta-limited Stocks



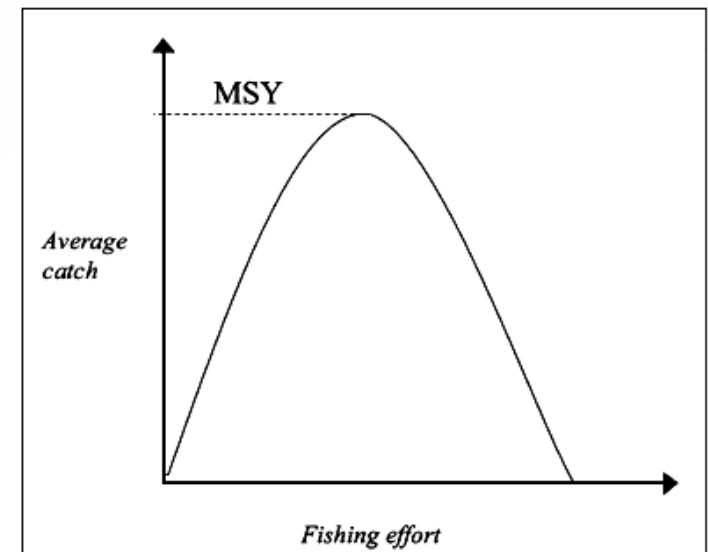
Hans Gerritsen (MI); C oil n Minto, Laurence Kell, Alexander Tidd (GMIT)



Maximum Sustainable Yield (MSY)



- MSY is the optimum catch:
 - Too much and the stock will decline
 - Too little is missed revenue
- Common Fisheries Policy: achieve MSY for all harvested species
- Marine Strategy Framework Directive: Good Environmental Status descriptors D3
- Need to estimate reference points:
 - Which fishing mortality gives the highest long-term yield (F_{MSY})
 - The minimum stock size that is still at full reproductive capacity (B_{lim})
- Data hungry: full analytical assessment

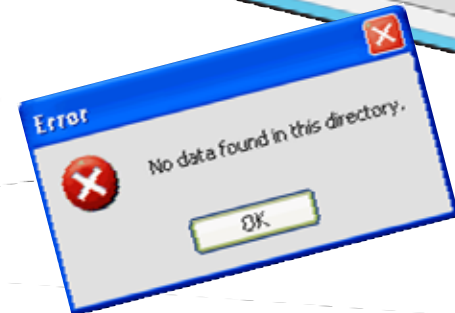
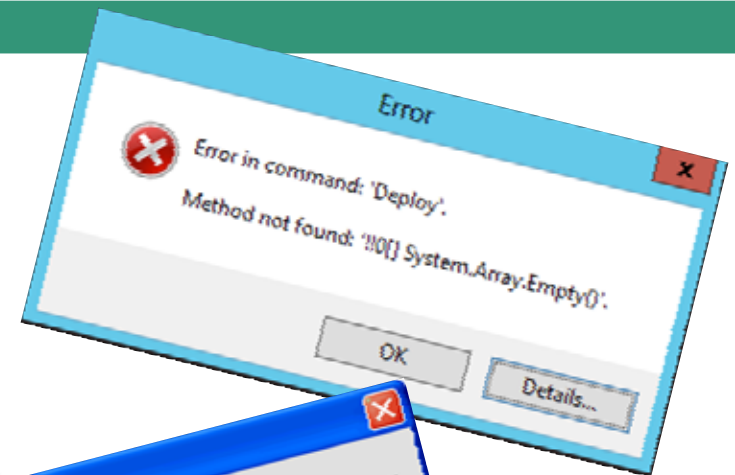


Data-poor stocks

- Ireland has quota for 72 fish stocks; 26 of these have unknown MSY status
- Most of the non-quota stocks also have unknown MSY status
- Many of these are keystone species and/or sensitive to the impacts of fishing

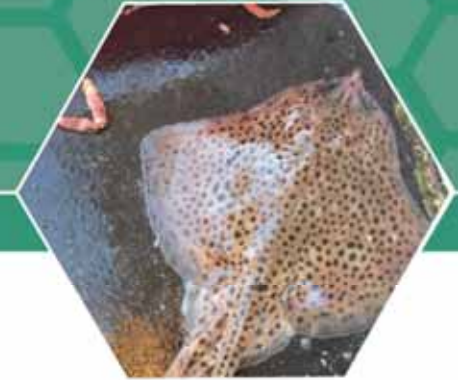


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MSY targets for data-poor stocks



MYDAS project:

- Case studies across the spectrum of data-limited stocks
- Develop methods to assess the status of these stocks relative to MSY reference points
- Develop management strategies
- Test the assumptions and performance of the methods and management strategies
- Build a common framework for modelling and simulation

Where to start?

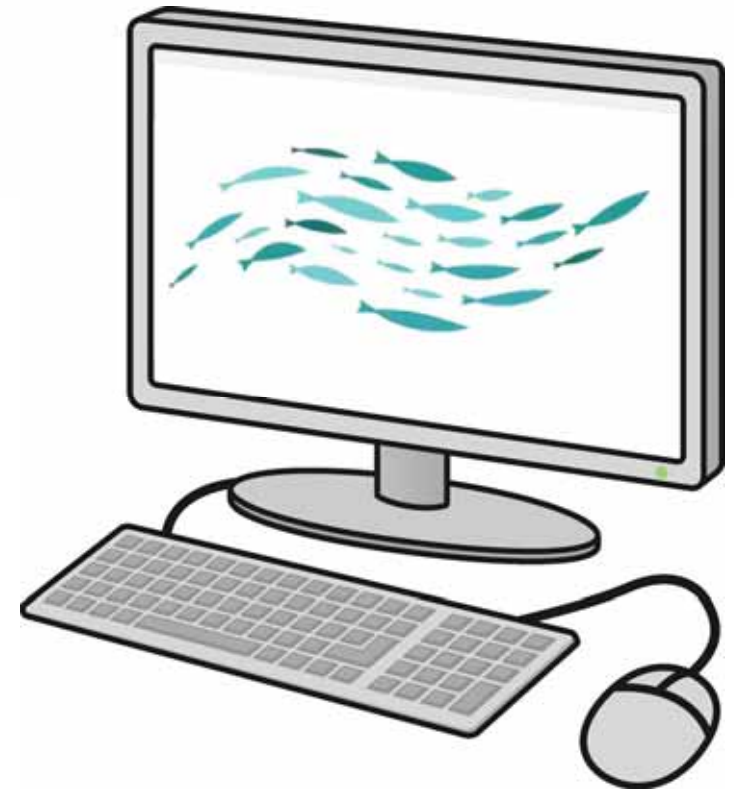
- Robin hood approach: steal from the (data)rich and give to the (data)poor
- Use life-history parameters from neighbouring stocks of the same species



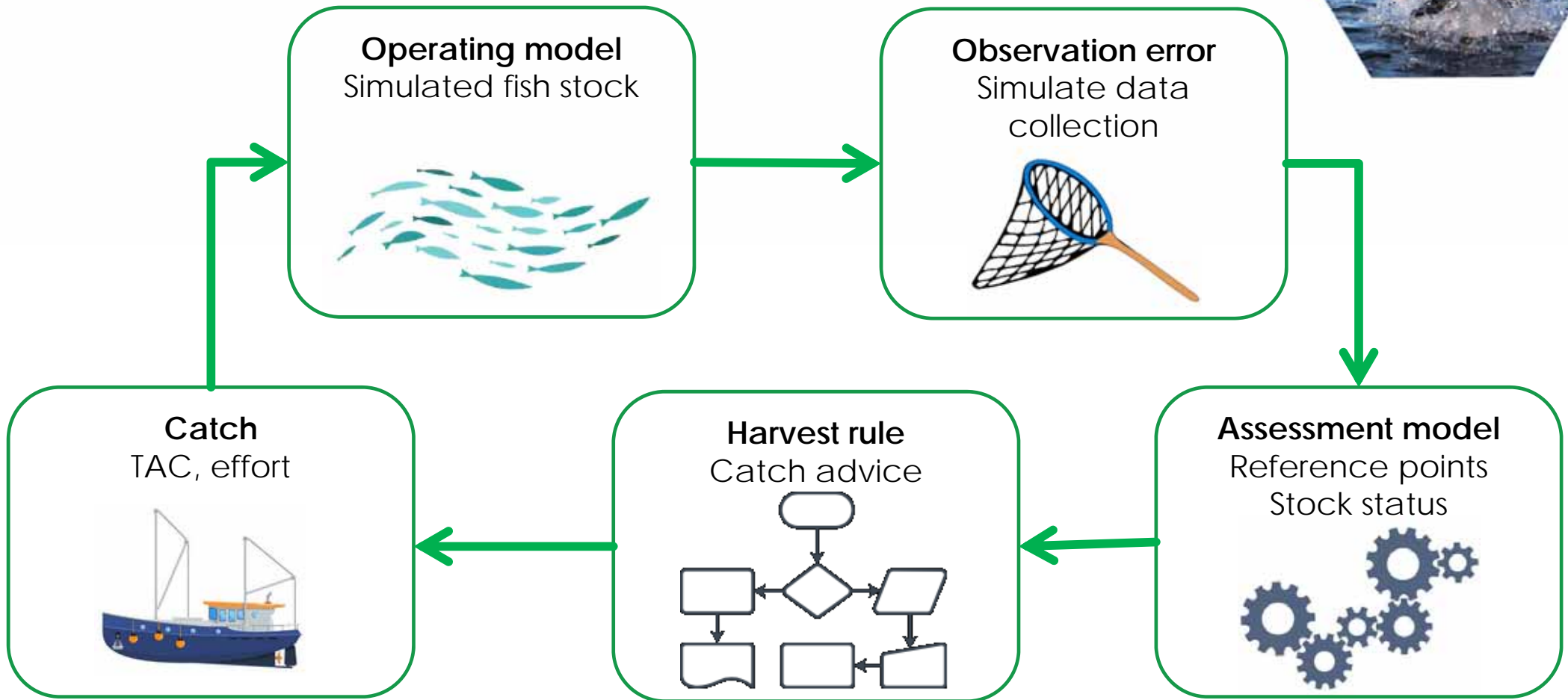
Management Strategy Evaluation



- Estimate (or steal) life-history parameters (growth, natural mortality, maturity, stock-recruit curve)
- Build an operating model: a virtual fish stock
- Management Strategy Evaluation



Management Strategy Evaluation



Management Strategy Evaluation



Management Strategy Evaluation (MSE)

- Which harvest rules (management strategies) work well?
 - Different approaches for different types of stock and data availability.
- What is the most important information? (survey, catch, life-history)
 - Adapt future data collection

Project outputs



Completed:

- Assessment models and tools implemented in one framework
- Methods for estimating reference points and management strategy evaluations
- Contributions to relevant ICES working groups
- Publications

Planned:

- General: which rules work well for which classes of stocks and data availability?
- Specific stocks: proposed reference points and management strategies

Follow-up project:

- Practical implementation

Expected benefits



- Improved metrics to support the CFP and MSFD
- Improved management strategies for data-poor stocks
- Improved knowledge of the dynamics of data-poor stocks
- Improved understanding of the impact of fishing on the wider ecosystem

Where to start?

Robin hood approach

Steal from the (data)rich and give to the (data)poor



Where to finish?

Sheriff of Nottingham approach

Steal from the (data)poor and give to the (data)rich

Some of the data-poor approaches might be more robust than the data-rich approaches





End

Project wiki: <https://github.com/laurieKell/mydas/wiki>



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Fisheries Informatics Project



Deirdre Wall & Shawna Sanfey



An Roinn Talmhaíochta,
Éire agus Mara
Department of Agriculture,
Food and the Marine



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by the European Maritime
and Fisheries Fund



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Fisheries Informatics Project



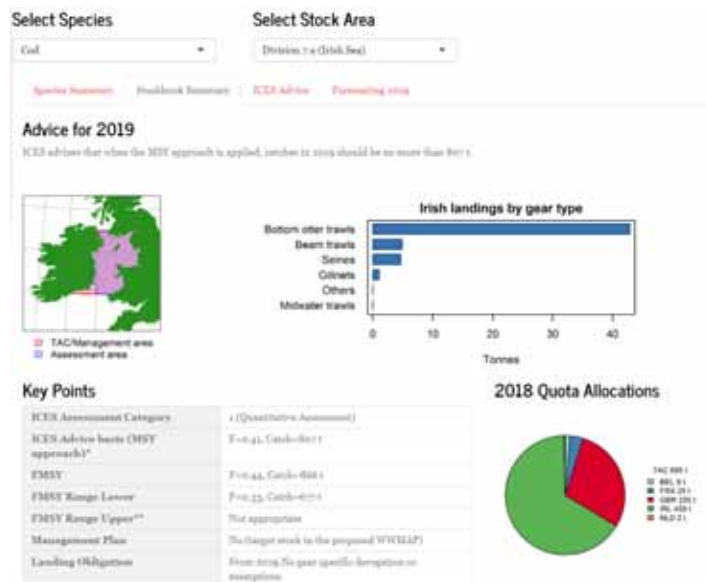
- MI based project aiming
 - to visualize existing fisheries data,
 - increase its usage/utility and
 - make it more easily accessible
- Team:
 - R developers (x2) statistical and biological/environmental background
 - SQL developer
 - MI lead by Colm Lordan and David Currie
 - Project Manager
- Outputs:
 - Species Dashboard <https://shiny.marine.ie/speciesdash/>
 - Digital Stockbook <https://shiny.marine.ie/stockbook/>
 - IGFS data explorer <https://shiny.marine.ie/igfs/>
 - Cod tagging data portal <https://shiny.marine.ie/tagging/>

Digital Stockbook

<https://shiny.marine.ie/stockbook>



- Provides the annual review of fish stocks and the latest scientific advice that informs fishing opportunities for the following year.
- Makes this advice available on-line in an interactive way – for example it includes a forecasting tool that allows users to see the projected impact of different fishing scenarios.

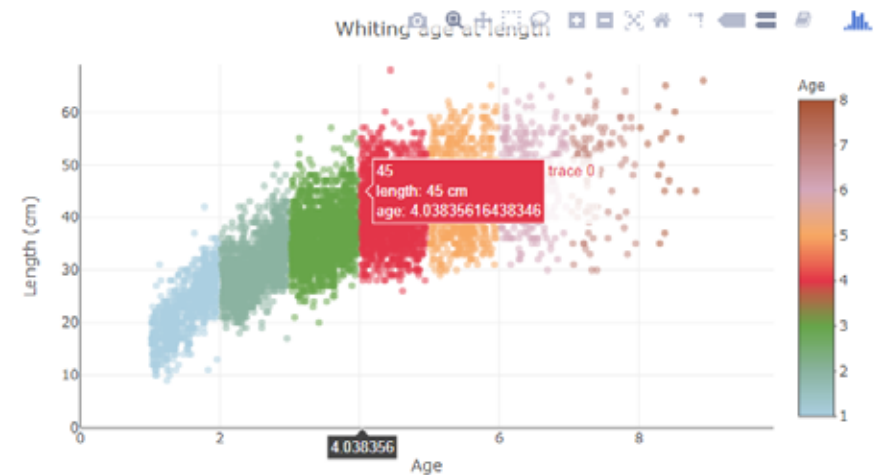
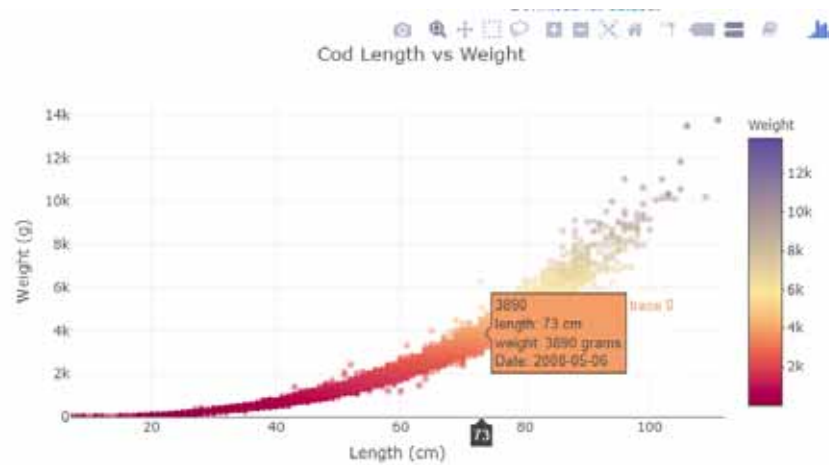


Species Dashboard

<https://shiny.marine.ie/speciesdash>



- Web application that makes biological fisheries data more available
- Allows people to explore the length, weight, and age data of commercial species that are caught around Ireland and allows the effects of factors such as year, sex, area, and gear on the fish to be investigated.

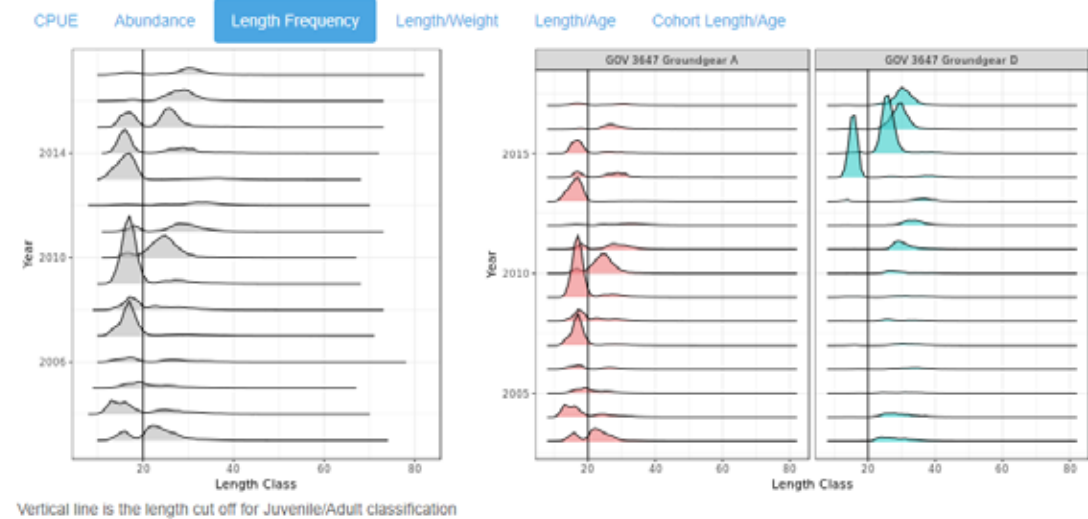
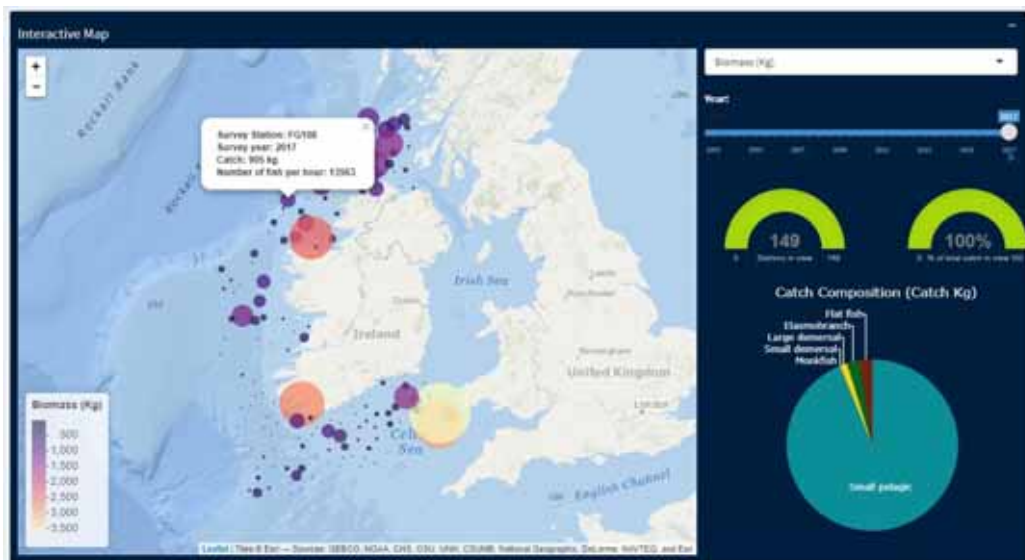


Irish Groundfish Survey Data Explorer

<https://shiny.marine.ie/igfs/>

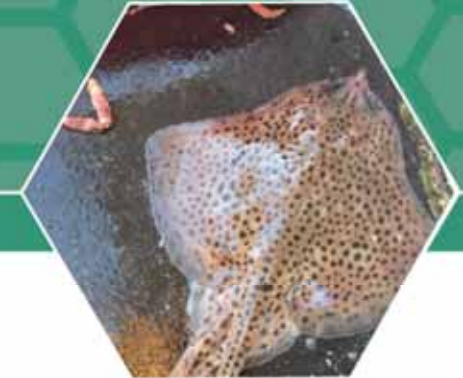


- The IGFS is part of an internationally coordinated series of demersal trawl surveys that provides data on fish stocks
- This app allows users to explore the results of the survey using a number of tools



Cod Tagging

<https://shiny.marine.ie/tagging/>



- The Marine Institute, in partnership with AFBI and CEFAS, are conducting a cod tagging project in the Irish Sea
- Graphical data-driven tool to look at the data collected
 - Recaptures, tagging events and gear of tagging vessel





EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Sustainable Development of Fisheries
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Restoration of Spiny Lobster



Habitat characterisation, population structure, fishery data, fishery management



An Roinn Talmhaíochta,
Riagais Mara
Department of Agriculture,
Food and the Marine



EUROPEAN UNION
This measure is financed by the European Maritime and Fisheries Fund



Marine Institute
Foras na Mara

Spiny Lobster (*Palinurus elephas*)

- Spiny lobster
 - Morocco to Scotland
 - Long lived larval dispersal phase
 - Inhabits reef
 - Migratory?
 - Stocks depleted
 - Fishery off the south west coast of Ireland
 - High economic value
 - High ecological value; keystone reef species
 - Interest in Aquaculture



Spiny Lobster: Stock trends



○ Fisheries

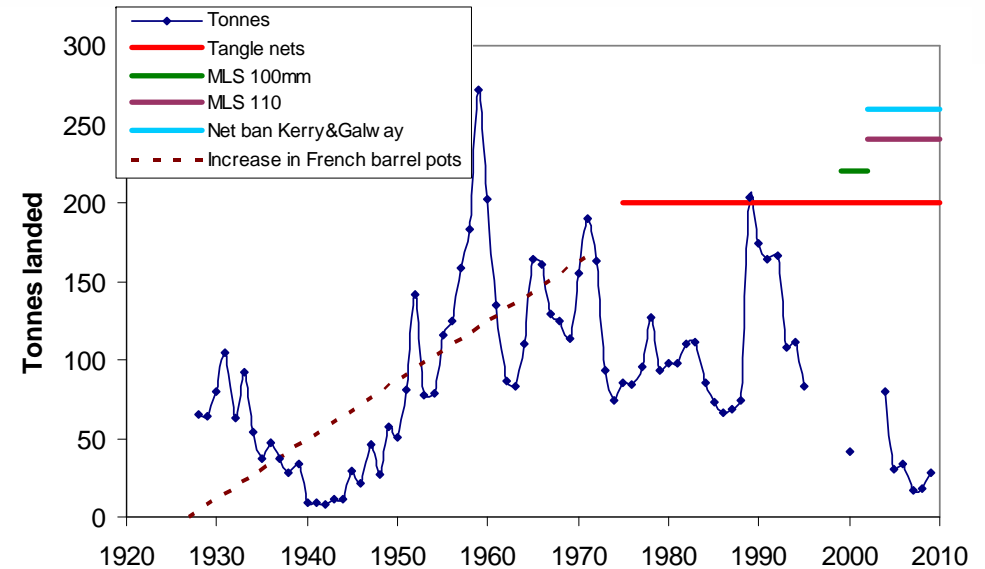
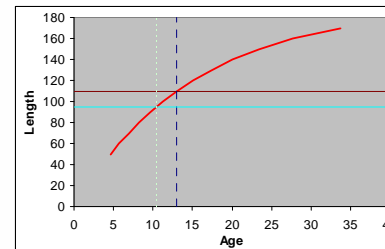
- Irish fishery reviewed in 2011
- Minimum size 110mm
- Main gear tangle nets
- Main gear pots prior to 1970s
- Current landings may be 15-30 tonnes per annum

○ Opportunity

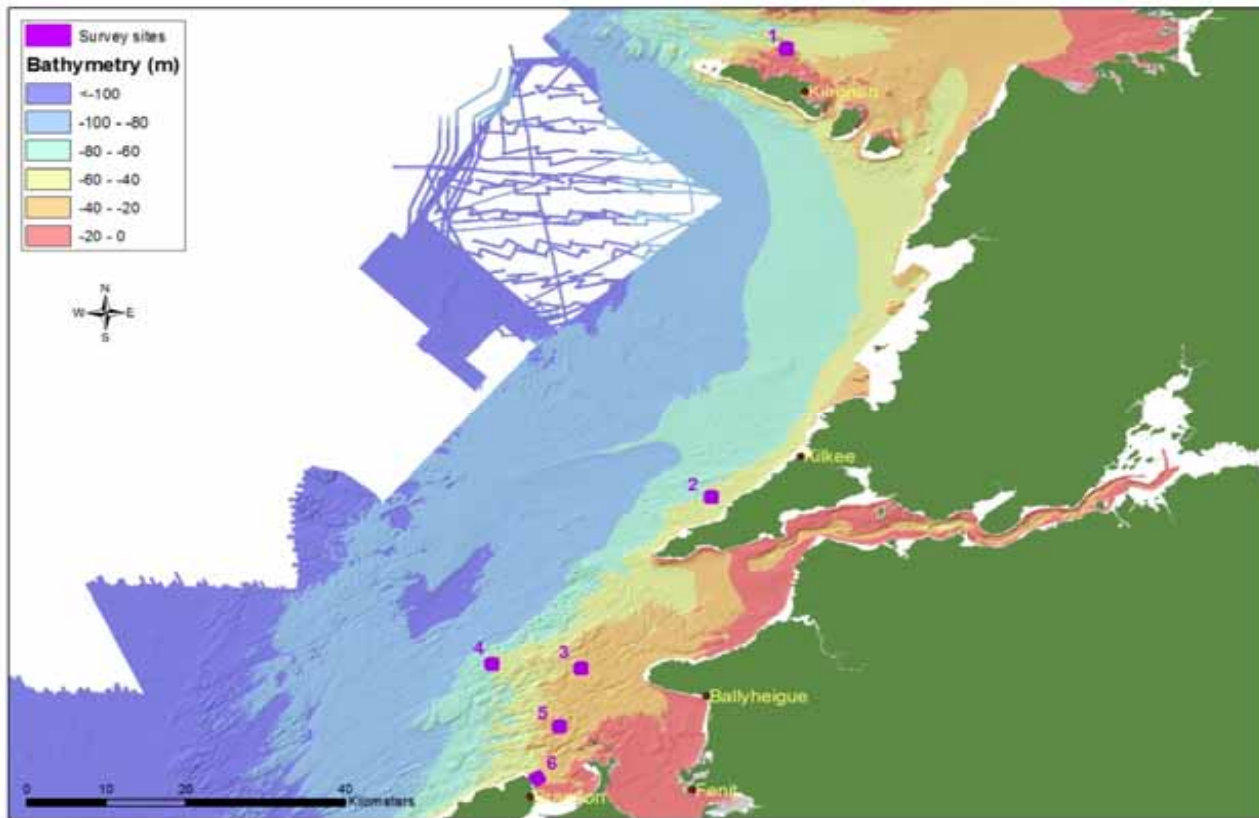
- Very high unit value
- Stocks throughout Europe depleted
- Export opportunity for restored stocks

○ Threats

- Import substitution to Europe of similar species
- No fishery management plan; what are the future prospects
- By catch of protected species
- Reef habitat change in structure and function



Spiny Lobster: Critical Habitat

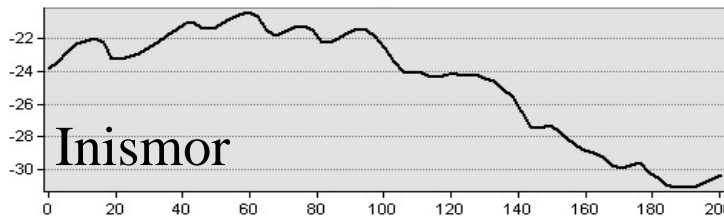
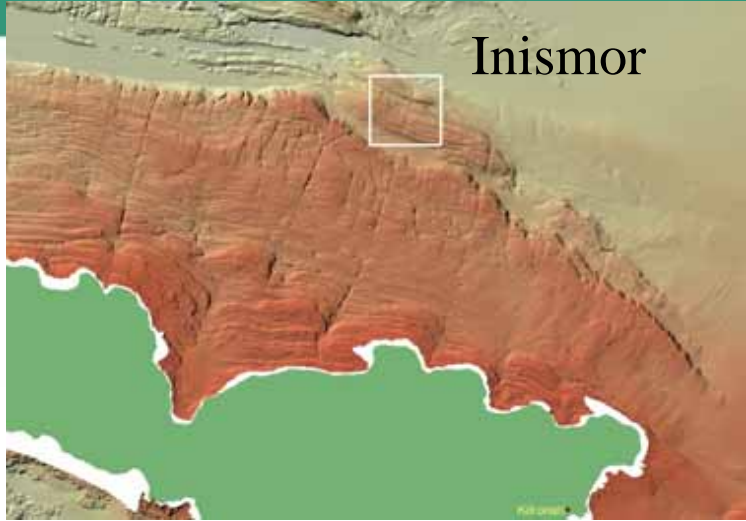


High resolution depth data (INFOMAR) off the south west coast

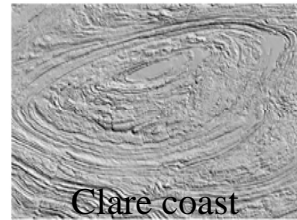
Extraction of reef habitat

Six study sites

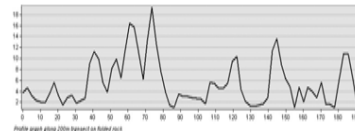
Critical Habitat: Fine scale physical data



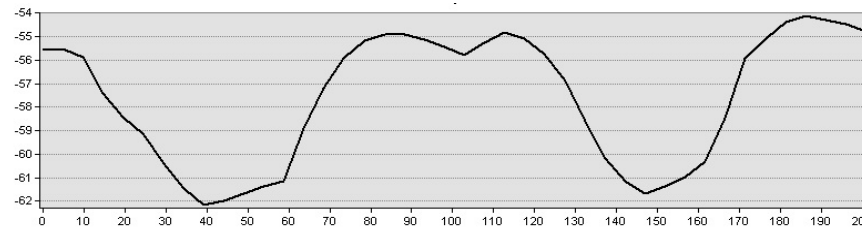
Profile graph along 200m transect on stepped limestone



Clare coast



Profile graph along 200m transect on tilted rock

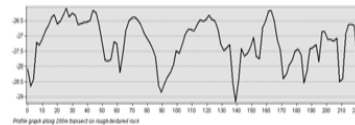


Profile graph along 200m transect on adjacent rock outcrops

Kerry Head



Outer Tralee Bay



Profile graph along 200m transect on rough bedrock

Critical Habitat Modelling and Estimation



1. Physical variables extracted from high resolution acoustic data (slope, relief, depth, texture, fractal structure ...)
2. Biological variables (species distribution at fine spatial scale on reef .. high definition underwater video data)
3. Modelling (predicting distribution) of crayfish habitat; physical and biological data
4. Estimation of how much habitat we have; the opportunity!
5. Larval dispersal from reef habitat to identify population structure

Phyllosoma larva; recently hatched



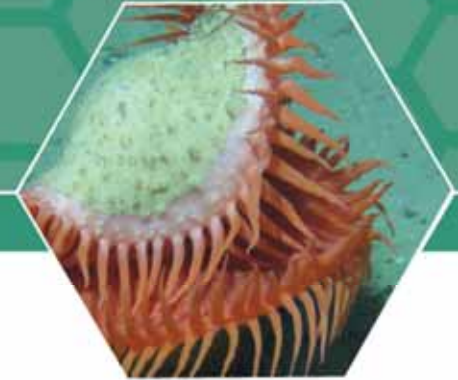
Larval Development data
for dispersal modelling

Future potential of
Aquaculture for restoration
or enhancement

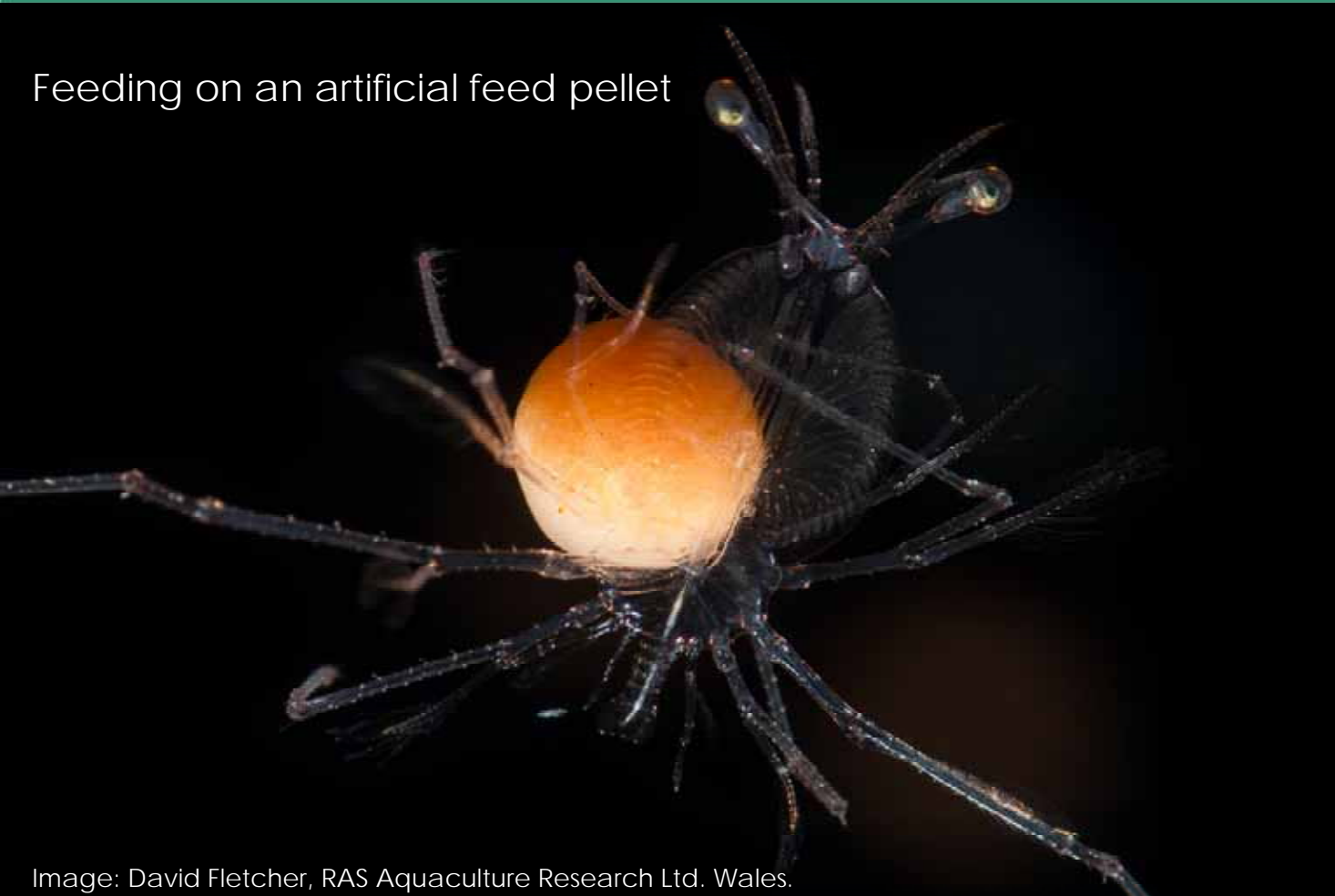
An informal collaboration
with RAS Aquaculture
Wales

RASAR previously funded by EFF. Since
2015 RASAR funded.

Phyllosoma larva; Stage V



Feeding on an artificial feed pellet



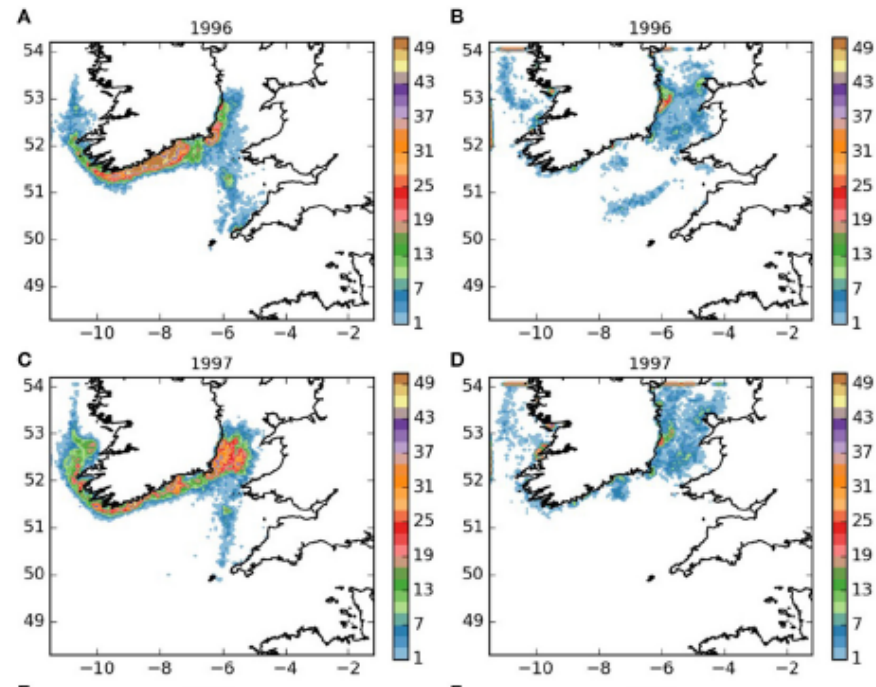
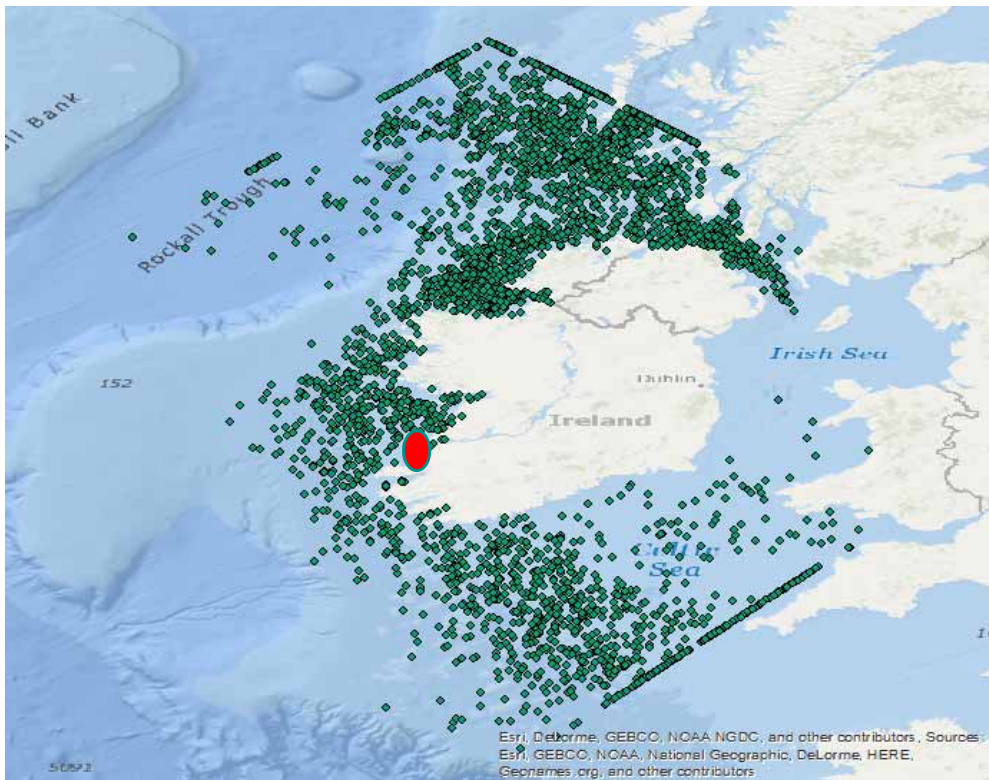
Larval Life:

6-9 months

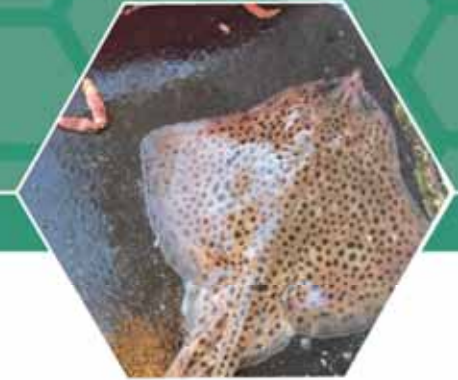
7-11 stages

Expected large scale
dispersal of larvae in
offshore waters

Restoration: a regional European task



Summary and future work



- Next steps
 - Physical and biological mapping of spiny lobster habitat
 - Continue fishery data collection
 - Discussion on future management of the fishery; how does the project help us to plan the future of the fishery
 - Develop actions at regional European scale
 - Assessment of the aquaculture potential; more formal links or separate funding

- ✓ Collaboration with fishermen Michael and Peter Hennessy; fishery data
- ✓ INFOMAR acoustic data provides the background for habitat assessment
- ✓ David Fletcher RAS Aquaculture; informal collaboration on larval development
- ✓ Eimear O Keefe for analysis of acoustic data
- ✓ MERC for Biological Survey work on reef habitats
- ✓ MI Observers working on fishing vessels

Acknowledgements

Thank You



EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

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Vulnerable skates and ray species southwest and west of Ireland



Graham Johnston, Oliver Tully & Maurice Clarke, Marine Institute



An Roinn Talmhaíochta,
Riagais Mara
Department of Agriculture,
Food and the Marine

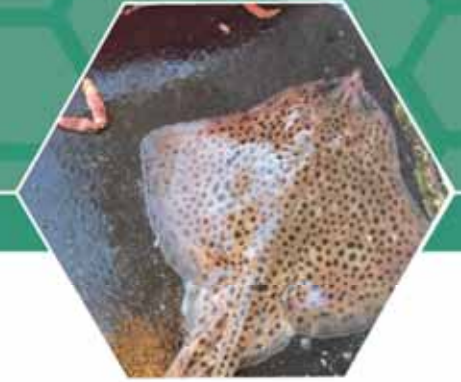


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This measure is financed by
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and Fisheries Fund



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Foras na Mara

Summary



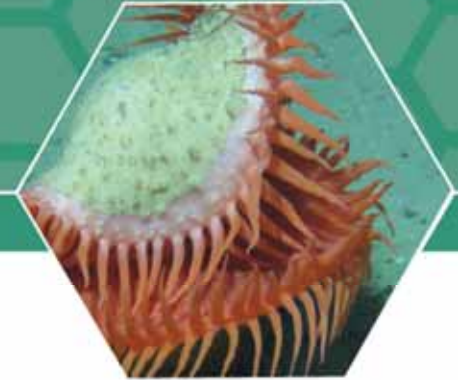
- Background
- Current scientific advice, management and conservation measures
- Policy need: MSFD obligations
- Project work under EMFF-Biodiversity scheme Programme of Species Restoration
- Results to date
- Next steps 2019-2020
- Conclusions

Background



- Irish Redlist highlights that several skate species are endangered:
 - Stingray
 - Undulate ray
- More importantly, a further 4 species are critically endangered
 - Flapper skate
 - Angel shark
 - White skate
 - Blue skate

Policy need: MSFD obligations



- Descriptor 1: Non-commercial fish
 - D1C1: Mortality rate from by-catch is below levels which threaten the species
 - D1C2: Population abundance is not adversely affected due to anthropogenic pressures such that its long term viability is ensured
- Article 8 of MSFD requires a submission by Ireland of assessments of population status in relation to the above.
- Article 9 of MSFD: To achieve Good Environmental Status by 2020 (GES)

Current advice and management



	CFP Prohibited species list	TAC and quota	ICES Advice	IUCN redlist	NEA Redlist	Irish redlist	OSPAR Threatened and declining species	MSFD Decision
Flapper skate	Yes			CR	CR	CR		D1
Blue skate	Yes			CR	CR	CR		D1
White skate	Yes			FN	CR	CR	*	D1
Angel shark	Yes			CR	CR	CR	*	D1
Undulate ray	No	Reserved		EN	EN	EN		D3
Stingray	No			LC	LC	EN		-
Longnose skate	No	Yes		NI	NI	VU		
Thornback ray	No	Yes	xx				*	D3
Spotted ray	No	Yes	xx				*	D3

Main species



Project Work



- Tender to identify spawning, nurseries and essential habitat of endangered skates off the west coast of Ireland:
 - Hotspots in Tralee Bay and Galway Bay
- Intensive gillnet surveys of Tralee Bay

Methodology



- Citizen science – beach walks, recording encounters
- Eggcase photos



Preliminary results



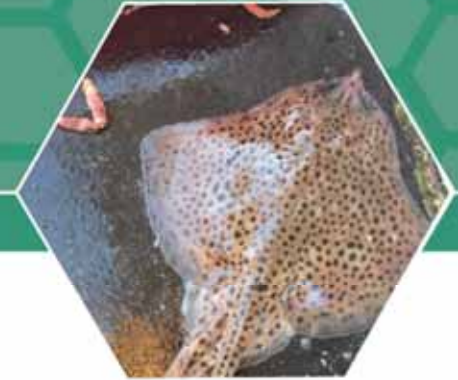
- The most endangered species, white skate confined to a very small area of inner Tralee and inner Galway Bay
- Tangle net surveys and observer work in outer Tralee Bay imply by-catch of the next most endangered species, angel shark and flapper skate
- Preliminary evidence of a peak in bycatch at certain times of year

Results of skate surveys



Species	April	May	June	July	Aug	Sept	Total
Angel Shark	1				1		2
Blonde Ray	11	3	2	1			17
Painted Ray	30	55	33	12			130
Spotted Ray	3	1	1	4			9
Spurdog	7						7
Stingray	96				41	5	142
Thornback Ray	86	119	79	127	39	24	474
Undulate Ray	28		2				30
Tope					1	1	2
Common Skate						2	2
Total	262	178	117	144	82	32	815

Survey results



- Ongoing
- 815 elasmobranchs caught over six months (2 months still to analyse)
- 8 skate species identified and two shark species
- Build-up of photo collection
- Collaborative id skills

- No evidence yet of white skate in the catch

- More sightings of *Dipturus* spp. and undulate ray. Undulate appears to be rebuilding in Galway Bay

What's happening in 2019



- Year-round monthly surveys of the main hotspots to identify temporal patterns in spawning.
- Potential for first-quarter tangle-net surveys in outer Tralee Bay

Next steps - 2020 and beyond



- Can these data be incorporated into MSFD Article 8 submissions under D1C1 and D1C2?
- Also, in doing the above can we align with OSPAR common indicators:
 - FC1 Recovery in the population abundance of sensitive fish species in region 3
 - FC5 (non-priority indicator at present, but promoted by Germany) Conservation status of elasmobranch and demersal bony-fish species (IUCN)
 - OSPAR likely request to ICES in 2020/21 on these species under the Protected Species and Habitats/Biodiversity and Monitoring "SHABAM" process, feeding into OSPAR QSR 2023
 - FC7 and FC8 (distributional indicators being re-engineered towards MSFD D1C4).

Next steps continued



- Recent ICES advice on MSFD D1 suggests that “ICES suggests that an additional mechanism should be developed to alert of a potential extinction risk.”
 - The MSFD criteria do not provide a good tool to assess risk of extinction.
 - A threatened species indicator into the GES integration process presents challenges. Nevertheless, providing the list acts as an alert in itself.
 - One approach could be to follow the paradigm used for Vulnerable Marine Ecosystems (VMEs) which are dealt with separately by CFP and Natura derived closed areas, rather than through MSFD D6
 - Note however that endangered skates are not listed on Natura nor is there a mechanism to list them there

Conclusions



- Trying to meet MSFD requirements
- Can these results and citizen science in general be used to input into OSPAR elasmobranch index development?
- Based on recent ICES advice, and following on from the example of how VMEs are dealt with separately outside the MSFD, we may treat critically endangered fish species in a similar manner.
- Rather than trying to measure abundance trends of these under Article 8, we need to accept upfront that they are already passed this point and need urgent protection.

Summary



- Background
- Current scientific advice, management and conservation measures
- Policy need: MSFD obligations
- Project work under EMFF-Biodiversity scheme
- Results to date
- Next steps 2019-2020
- Conclusions
 - How to incorporate in Article 8
 - How to align with OSPAR common and candidate indicators
 - Or have as ICES suggests, a separate way to deal with threatened species within MSFD



EMFF Operational Programme 2014-2020

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The Restoration of Native Oyster



Ireland's EU Structural and Investment Funds Programmes 2014 - 2020

Co-funded by the Irish Government and the European Union



An Roinn Talmhaíochta,
Ríoga Mara
Department of Agriculture,
Food and the Marine



EUROPEAN UNION

The measure is co-financed
by the European Maritime
and Fisheries Fund



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Ostrea edulis: History of Loss

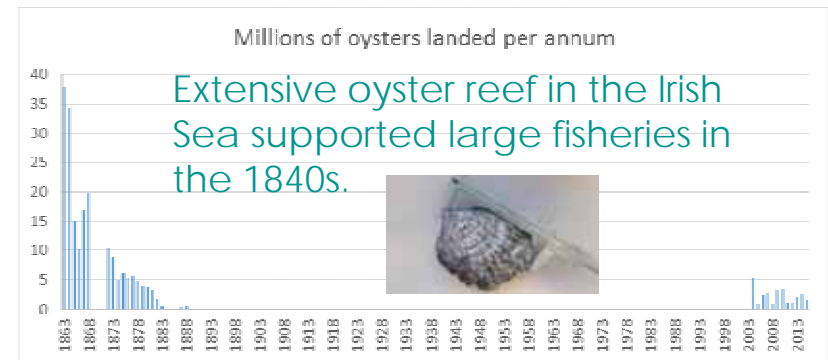


<https://billionoysterproject.org/>

“When Henry Hudson entered New York Harbor in **1609**, he had to navigate the ‘Half Moon’ around *220,000 acres of oyster reefs*, which had sustained the local Lenape people for generations.” By **1906**, New Yorkers had eaten every last oyster!

Around 700 million oysters were consumed in London in 1864. The UK landings fell from 40 million in 1920 to 3 million in the 1960s and never returned to former levels (Edwards, 1997).

The northern ‘coldwater’ population, which used to thrive in areas such as the Firth of Forth, Schleswig Holstein and the Dutch Wadden Sea, is extirpated (Korringa 1976)



Status of Native Oyster in Ireland

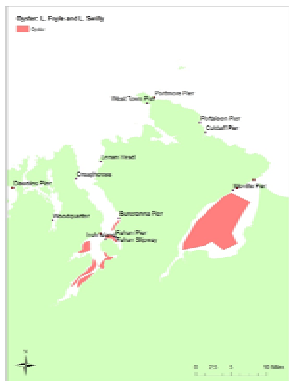


Oyster beds with commercial production

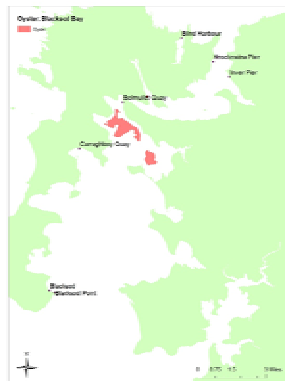
- Lough Swilly
- Blacksod Bay
- Achill
- Clew Bay
- Kilkieran Bay
- Galway bay
- Tralee Bay (75% of national biomass at Fenit)



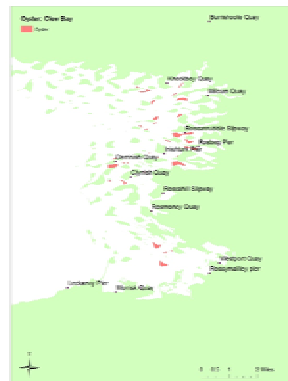
Foyle & Swilly



Blacksod



Clew Bay



Kilkieran Bay



Galway Bay



Tralee Bay



Why is Restoration Important ?



- Ecosystem Services
 - Structural habitat for biodiversity
 - Reef forming in some circumstances
 - Carbon sequestration
 - Water quality maintenance
 - A sentinel species for estuarine water quality?
- Culture and Heritage
 - Very long tradition
 - Unique fishing methods and vessels
- Economics
 - Lost production and productivity;
 - 100s of part-time jobs in some coastal communities
 - Loss of hundreds of tonnes of production annually
 - An important cog in the wheel of the coastal rural economy
- Habitats Directive
 - Oyster as a characterising species of sedimentary habitats and potentially reef forming
 - Oyster fisheries subject to Appropriate Assessment (Projects or Plans)



Renewed Interest in Restoration



- Native Oyster Network UK and Ireland
 - Projects in Essex, Blackwater closed areas, Solent, Lough Ryan, Mumbles
- Native Oyster Restoration in Europe (NORA)
 - Habitat restoration objectives
- Recent initiatives in Ireland
 - Native Oyster Workshop 2017 (NOW 2017) Clarinbridge Galway hosted by Cuan Beo
 - The Association of Oyster Co-ops formed
 - BIM Commission report on Cultch availability
 - EMFF Biodiversity Scheme Project 2018-2020
 - Engagement with Co-ops
 - Raising public awareness
 - Scientific support and evidenced based actions

CUAN BEO... RE-CONNECTING THE LAND AND THE SEA...

Native Oyster Workshop 2017



**OYSTER FESTIVAL MARQUEE
CLARINBRIDGE GALWAY**

5TH OCTOBER 2017 9AM-5PM

THE WORKSHOP WILL COVER:

- The cultural and historic significance of native oyster fisheries
- Review of current status of Native oyster stocks in Ireland
- Regulation, licensing and governance of fisheries
- Review of disease, water quality, interactions with non-native oysters
- Theme session on stock restoration methods and possibilities.
- Case Studies of Best Practice in Native Oyster Fishery Management
- Open Forum and Formation of Native Oyster Working Group
- A Detailed Agenda and Registration details to follow soon

**NATIVE OYSTER
INDUSTRY EVENT 2017**

ATTENDANCE IS FREE

Have your say on the future of the native oyster fisheries at this National event

Be part of a National Group working to restore the Native Oyster

Meet the agencies and bodies regulating Native Oyster Fisheries

Networking & Social Event for Native Oyster Fishermen & other Stakeholders

FOR MORE INFORMATION PLEASE CONTACT
CUAN BEO
Main St - Kinsvara - Co. Galway
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ALFRED WEGENER INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR-
UND MEERESFORSCHUNG

**Native oyster restoration in Europe -
current activities and future perspectives**

Workshop from 01 - 03 November 2017
Bremer Landesvertretung, Hiroshima-Straße 24, 10785 Berlin

The EMFF Oyster Restoration Project

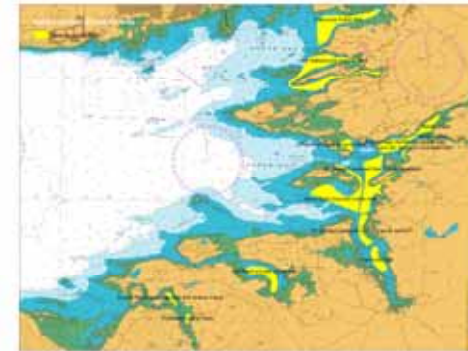


○ Focus on Galway Bay in 2018

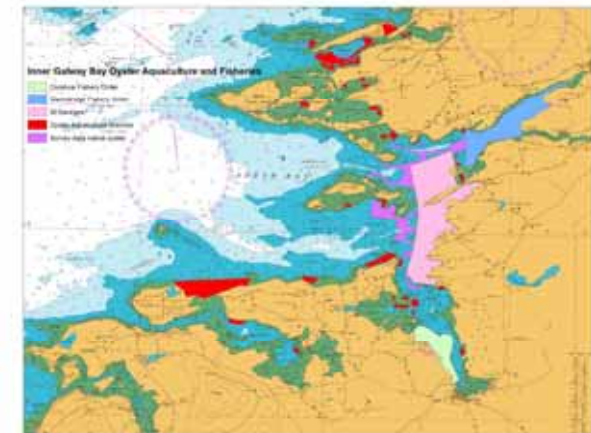
- Facilitated through Cuan Beo
- Fishermen and Oyster growers work on the project
- Marine Institute provide scientific support

○ Work programme

- Intertidal and sub-tidal baseline survey for native oyster and other shellfish
- Ocean modelling; salinity, larval dispersal (future planning)
- Testing tolerance to low salinity (future planning)
- Enhanced disease monitoring (risk to restoration)
- Small scale trials on increasing spat fall (cultch)
- Advice on fishery outtakes (fishery management)
- Advice on habitat protection (Compliance with Habs Directive)
 - Seagrass, Maerl, Native Oyster

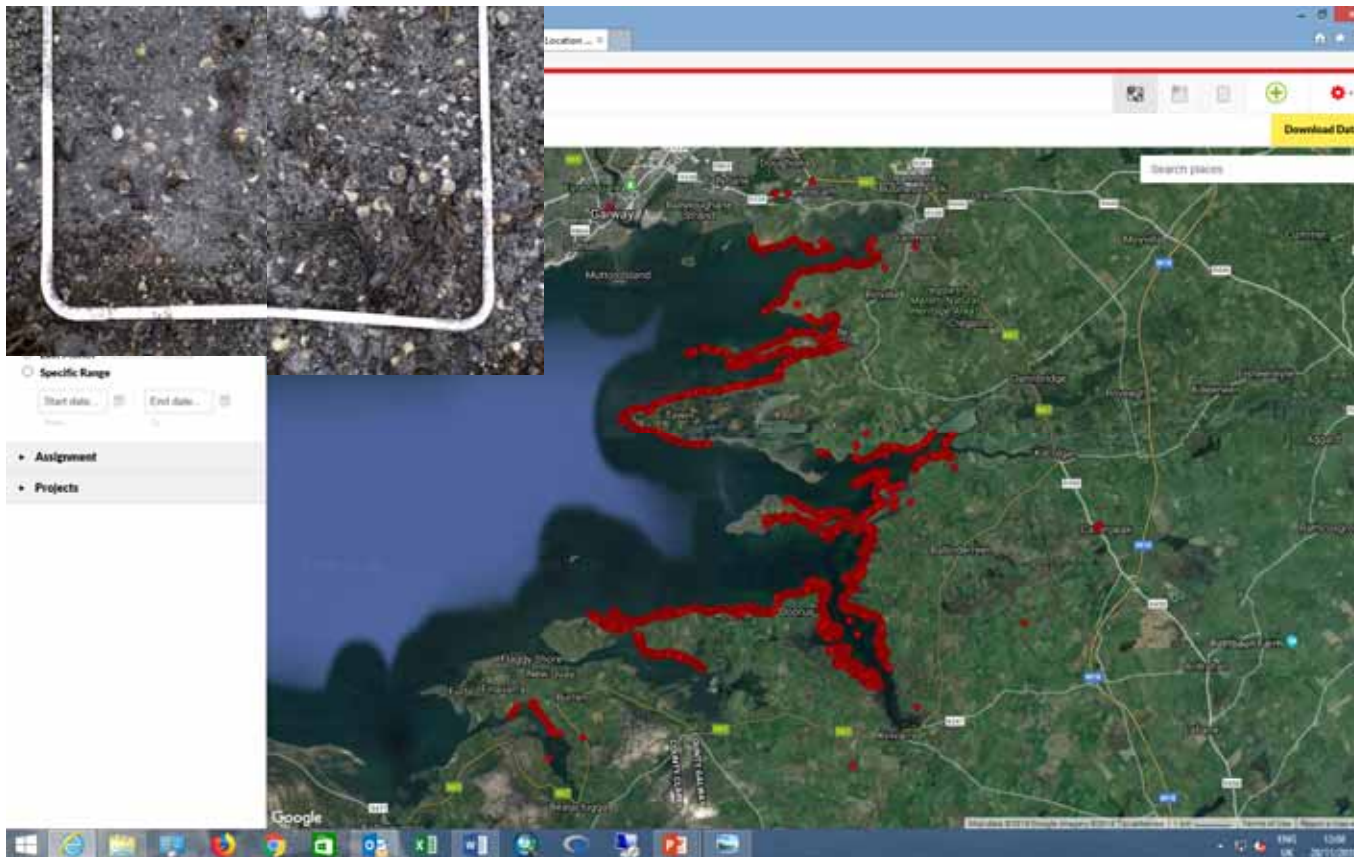
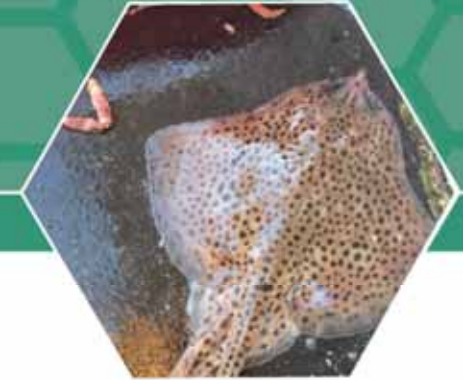


Historical



Current

Intertidal Survey in Galway Bay 2018



- Mobile phone app
- Images and Data
- 3400 records submitted
- Six teams; fishermen, growers
- Over 300km of shore transect

Monitoring Oyster Settlement: Cultch

- ✓ Five sites
- ✓ Stacked configuration
 - ✓ 100 stacks
- ✓ Three shell types
 - ✓ Pacific Oyster Shell
 - ✓ Mussel Shell
 - ✓ Razor clam shell
- ✓ Deployment July to Oct

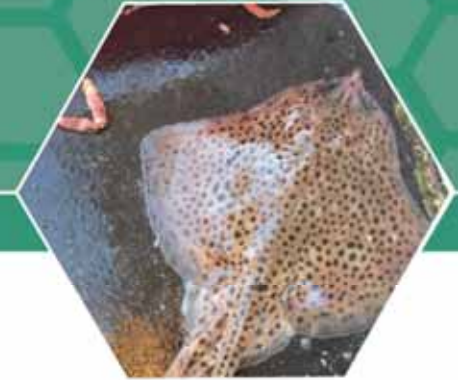


Habitat Management for Restoration

- Clean (devoid of silt) substrate is need for larval settlement
- Provision of clean substrate
 - Harrowing / Dredging
 - Cultching (increase shell)
 - Cultch configuration; seabed, vertical, scale up
 - Fallowing (no actions)
- Habitat effects (dredging and harrowing)
 - Homogenisation of sediments and shell material
 - Reduction in small scale relief at the seabed
 - Effects of dredging on seabed are very well documented



2019-2020



- Assessing risk to restoration
- Outreach to other sites
- Learning from approaches elsewhere
- Scaling up habitat management
- Streamlining Governance



- ✓ Fishermen and oyster producers James, Sean, Enda Linnane, Cyril Kane, Tommie Connolly, Mattie Larkin, David Krause, Fergal Langley, Gary Harty, Pat Joe Bannon
- ✓ Diarmuid Kelly, Gerry O'Halloran, Colm O'Dowd of Cuan Beo

Acknowledgements

Thank You



EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Sustainable Development of Fisheries
Fostering the Implementation of the Integrated Marine Policy



A Brief Look Ahead 2019-2020 Projects



Information Event, 29th November, 2018

Leonie O'Dowd



An Roinn Talmhaíochta,
Éire agus Mara
Department of Agriculture,
Food and the Marine



EUROPEAN UNION
This measure is financed by the European Maritime and Fisheries Fund



Marine Institute
Foras na Mara

Marine Institute EMFF 2014 - 2020

Home About Projects Database Programme Outputs




Image Gallery for the Management and Restoration of Endangered Skate Stocks project.

Read More

Marine Biodiversity

The Marine Biodiversity Scheme is established under Union Priority 1 (Sustainable Fisheries) and Union Priority 6 (Integrated Maritime Policy) of Ireland's Operational Programme (OP) under the EMFF and is co-funded by the Irish Government and the EU.

Objective

<https://www.emff.marine.ie>

Projects 2019-2020

2018

2019

2020

Operation 3

Restoration of native Oyster Stocks

Aerial inshore surveys

Microplastics in Nephrops

Operation 4

Restoration of crayfish stocks

I-VMS

Restoration of endangered skate stocks

Bycatch in fisheries posing a risk to biodiversity

Fisheries/habitat interaction on offshore reefs

Appropriate assessment of aquaculture in SPAs

Appropriate assessment of aquaculture in SACs

Mitigation aquaculture in Natura sites

MSFD data collection fisheries surveys

MSY proxies for data-limited stocks

Informatics to support Ecosystem approach

Monitoring the recovery of over exploited deep-water species

MSFD Indicator assessment D1 and D4 fish biodiversity

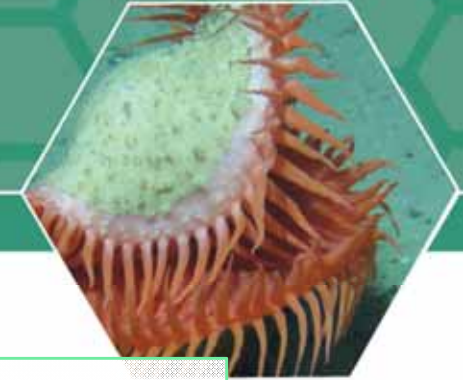
Biodiversity and habitat mapping in the Biologically Sensitive Area (BSA)

Outreach

Phase 2



New Projects 2019-2020



Monitoring the recovery of over exploited deep-water species

- Linking onto existing Fisheries Survey, surveying deep water community, supporting MSFD

MSFD Indicator assessment D1 and D4 fish biodiversity

- Using fisheries data to assess biodiversity descriptors

Biodiversity and habitat mapping in the Biologically Sensitive Area

- Assessing the BSA, addressing data gaps

Outreach

- Disseminating results, raising awareness



Thank you for listening!