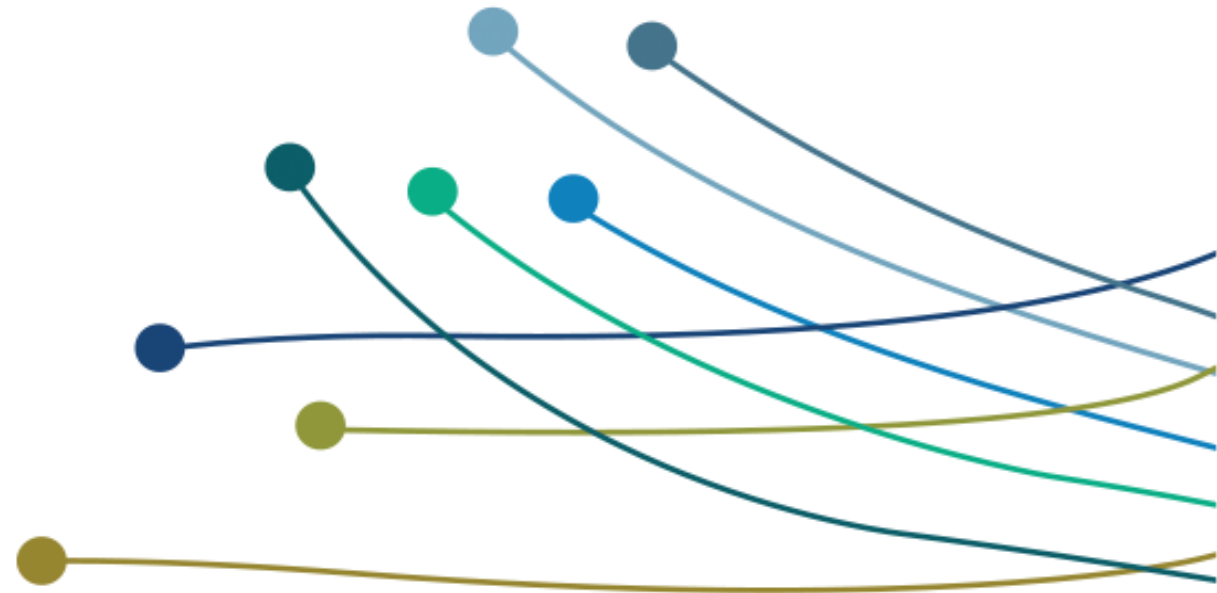


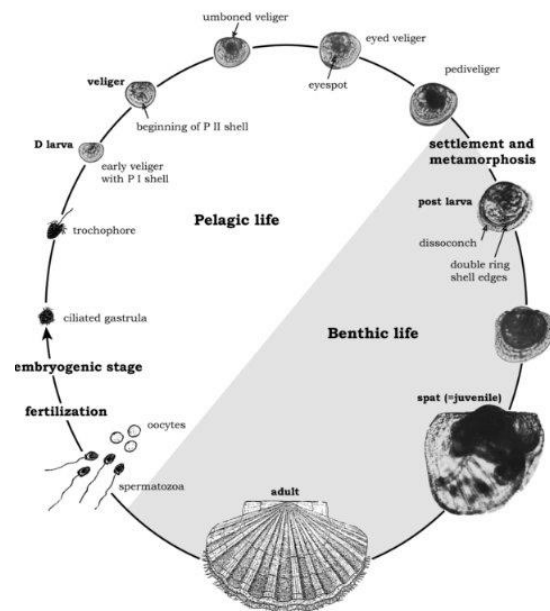
# Current knowledge of scallop fisheries in the Channel

## Irish fleet activity, stock status

Oliver Tully and Guillermo Martin  
Fisheries Ecosystem Advisory Services



# Scallop biology and issues for assessment



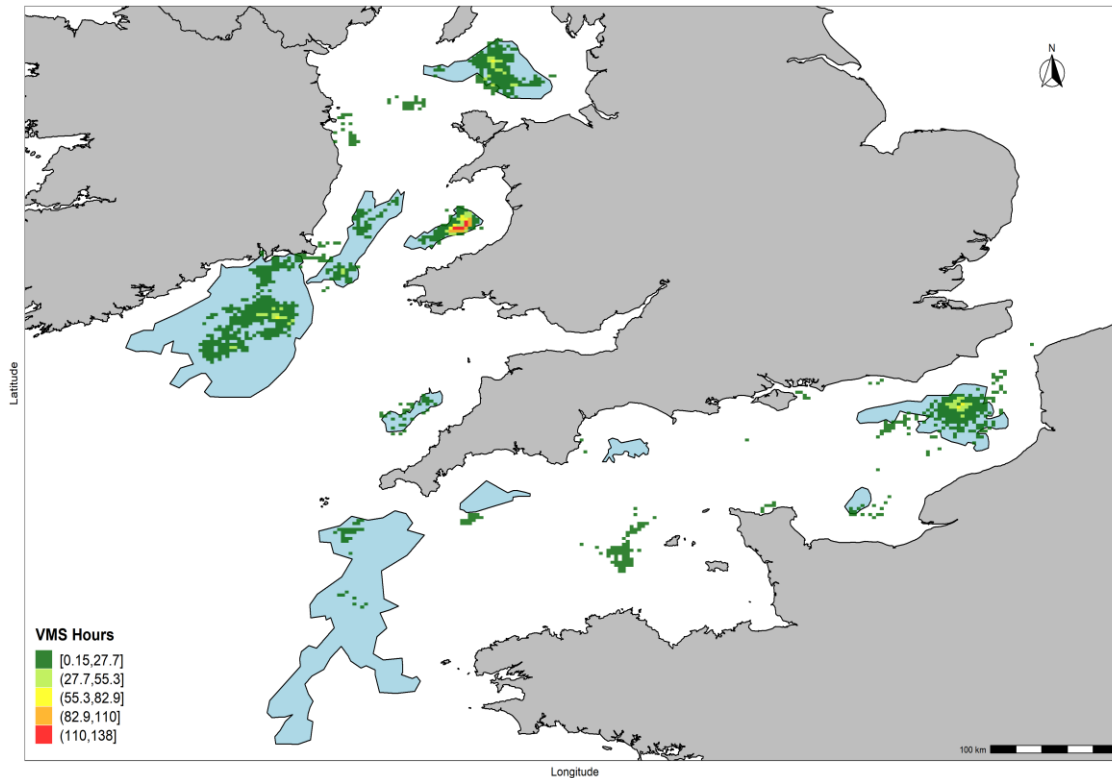
## Life cycle:

- Pelagic and benthic phases in life cycle
- Transition to benthic phase is a critical point and potential bottleneck

## Assessment issues related to biology

- Stock recruitment relationship not demonstrated; reference points?
- Ageing can be problematic in some stocks
- Growth rate varies spatially within stock units
- Scallop may be aggregated on certain substrates
- Recruitment may be episodic leading to biomass hotspots in space and time
- Maintaining adult density is important for good fertilization rates

# Scallop distribution in Irish and Celtic Seas and Channel

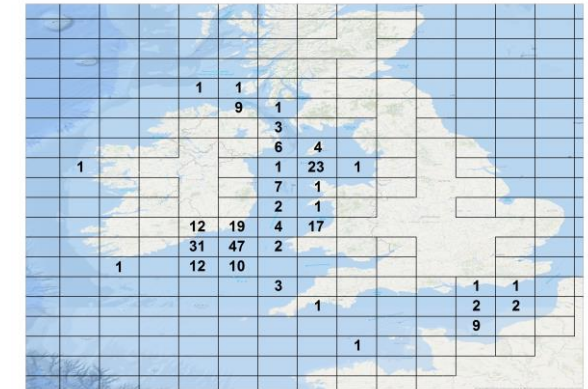


Irish historic scallop VMS data (blue polygons) with a single recent year VMS data superimposed

- Large footprint; relevant to D6 MSFD indicators
- Pragmatically scallop distribution can be estimated from multi year historic VMS data (but some unfishable areas also)
- Not all the distribution is fished in any single year
- Some persistently fished areas with exploration at the edges
- Connectivity across these areas not fully known but genetics and larval dispersal modelling for some.

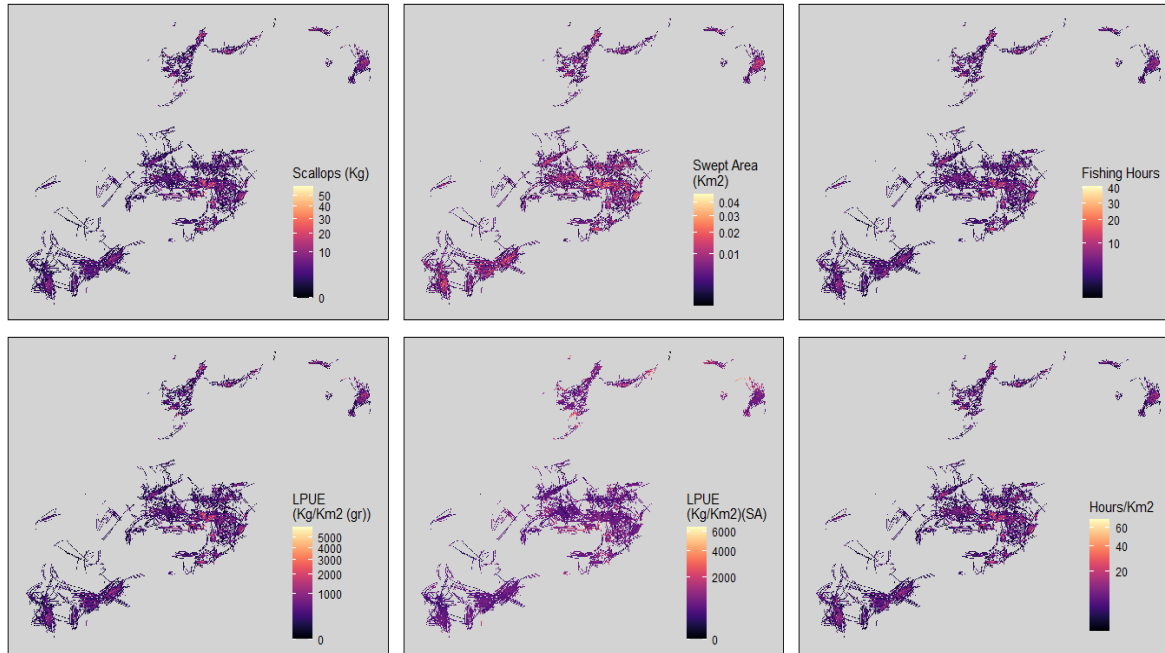
# Data for monitoring and assessment (Ireland)

1. **Port sampling:** size distribution at ICES rectangle level
2. **At sea observer** (limited); size distribution, LPUE, *by-catch*.
3. **VMS-Logbook data;** high volume spatially explicit *census* of activity. *Relative biomass estimation*. A lot of scope.
4. **Surveys;** newly developed in Celtic Sea and Irish Sea.
  - Using seabed acoustic backscatter layer in a spatial model for stock biomass or *relative biomass* estimation
  - Potentially *spatial variability in growth*
  - Estimation of *by-catch*



Port sampling; number of landings by Irish vessels sampled per ICES rectangle over a 3 year period

# Logbook and VMS data: a wealth of information

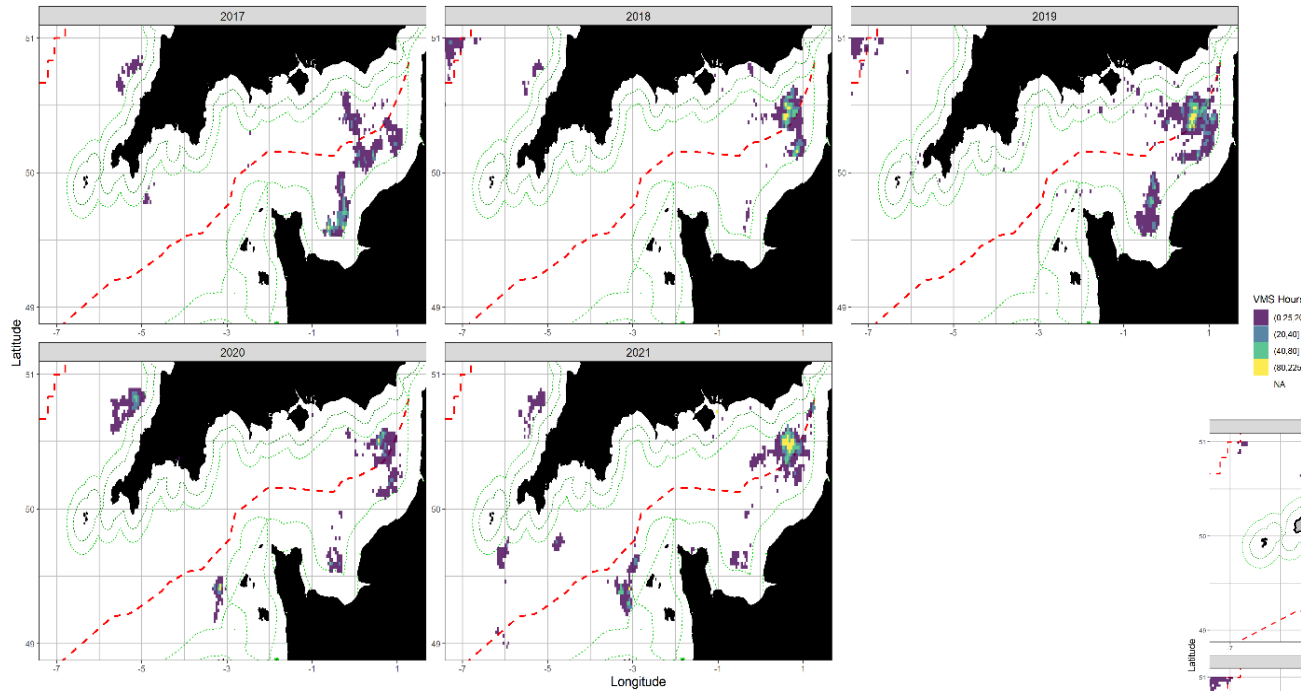


**Celtic Sea:** Deriving various expressions of stock abundance and fishing activity at high resolution

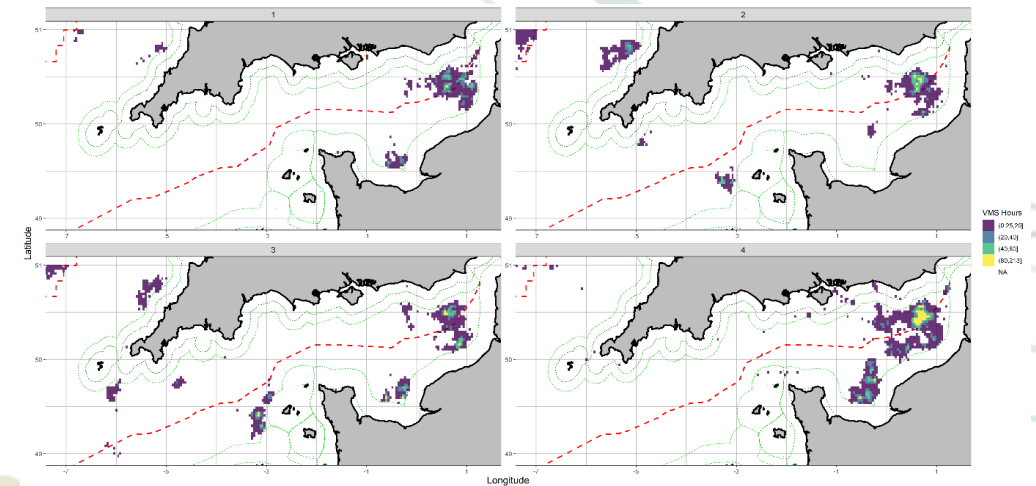
- VMStools and additional algorithms to develop and standardize LPUE indices have potential implications for assessment and also management procedures  
(*Guillermo Martin presentation at Pectinid workshop Isle of Man 2024*)
- Spatially clustered activity at trip level identified using the DBSCAN clustering
- Hotspots of fishing and stock abundance in space and time
- Opens options for different approaches to assessment and management procedure

# Irish scallop fleet fishing in the Channel

Annual 2017-2021: mainly in UK sector and 'squeezed' between UK and French limits

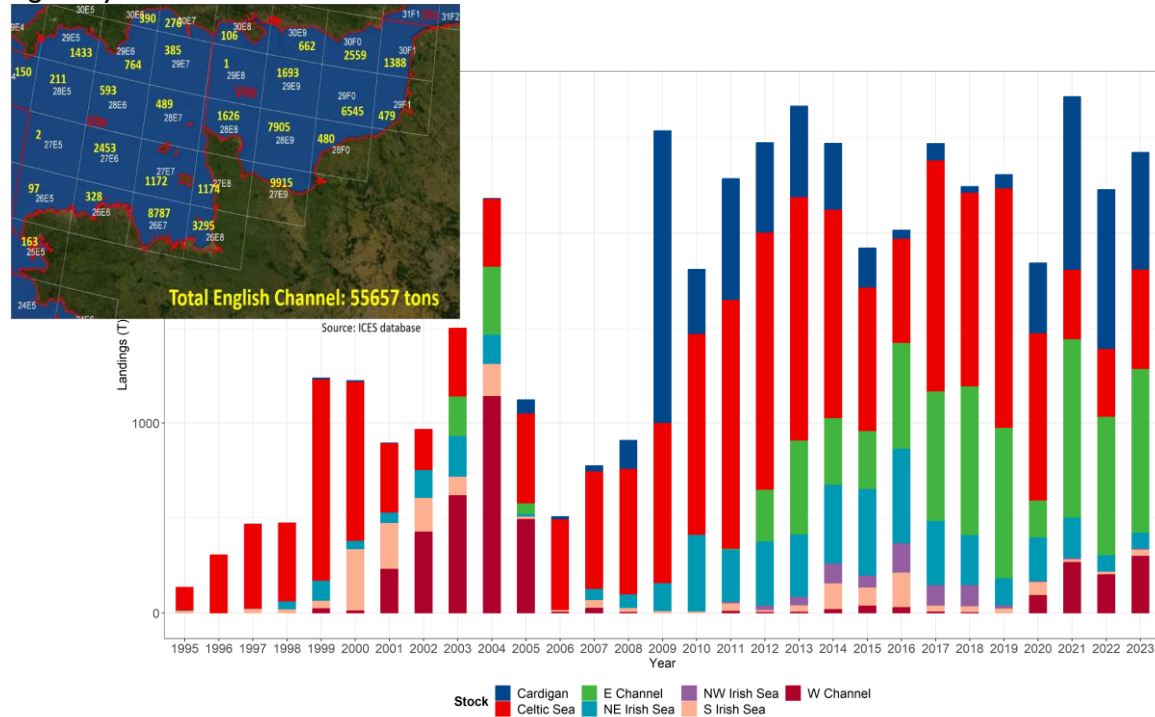


Seasonality: VMS hrs peak in Q4

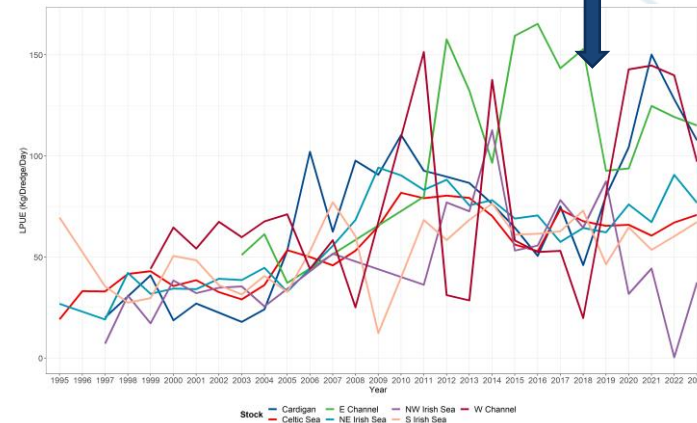


# Irish scallop fleet fishing in the Channel

Figure by Eric Foucher

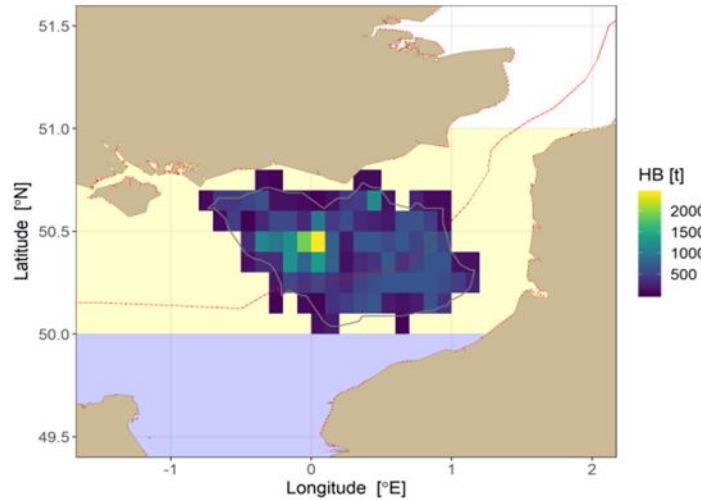


- The Irish fleet accounts for approximately 1-2% of total landings in the Channel
- The east Channel is however increasingly important to the Irish fleet
- Catch rate (kg.dredge.day) is higher in east Channel than elsewhere



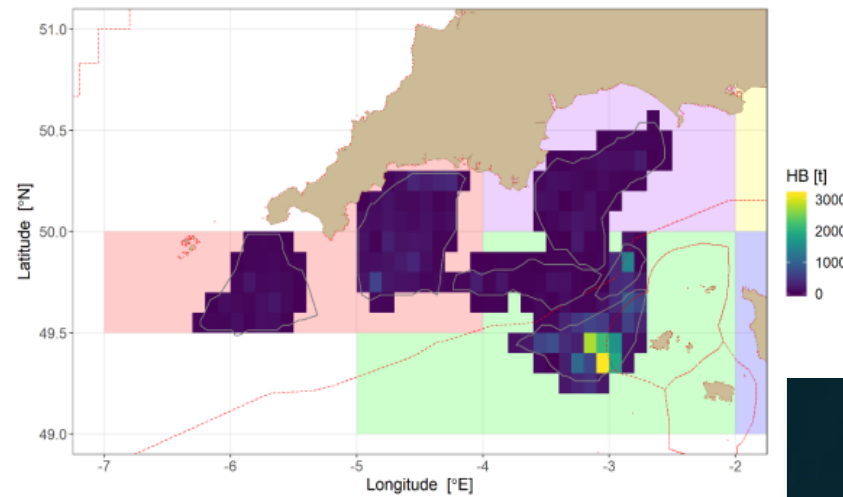
# Surveys of Channel Scallop

1. French Surveys (IFREMER, Eric)
2. UK (CEFAS) Surveys: dredge, UWTV, in areas with VMS and in some cases outside core fishing areas
3. Stratification and spatial resolution important.



Year	Biomass
2017	22981
2018	25047
2019	34612
2020	43216
2021	45278

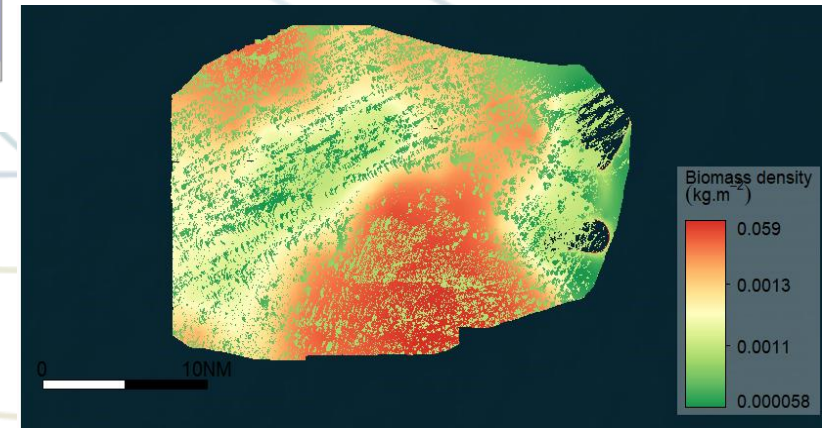
East Channel



Year	Biomass
2017	18646
2018	24253
2019	30892
2020	49914
2021	38225

West Channel

Celtic Sea; fine scale resolution on biomass by incorporating seabed acoustic backscatter





# Assessment of Channel Scallop

1. Reference points proposed in UK assessments
2. Some candidate reference points ignore stock recruitment (SR) ( $F_{0.1}$ ,  $F_{max}$ ) while others include proxies for SR (spr 35%)
3. Different reference points allow for very different harvest rates
4. Actual harvest rates are high in some areas and vary widely between years

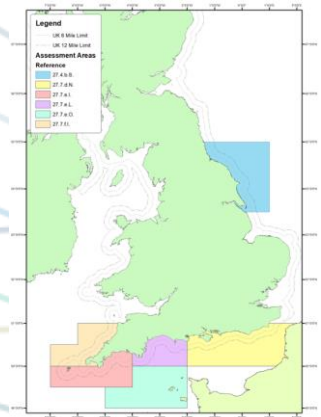
From:

*Assessment of king scallop stock status for selected waters around the English coast 2020/2021 A Defra and Industry Funded Project*  
**Lawler and Nawri 2022**

Reference Point	Fishing Mortality	Harvest Rate (%)	Spawner-per-Recruit	Fbar
<b>F0.1</b>	0.210	18.1	0.392	0.106
<b>FSpR35%</b>	0.252	21.5	0.350	0.127
<b>Fmax</b>	0.680	51.9	0.178	0.342

Reference points for scallop stock in eastern Channel UK survey area.

Annual estimated harvest rates in ICES Divisions				
Year	27.7.e.I	27.7.e.L	27.7.e.O	27.7.f.I
2017	38	55	11	-
2018	17	77	13	8
2019	17	38	11	34
2020	20	43	5	30



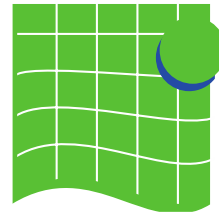
# Assessment of Channel Scallop: some perspectives

1. Can we ignore the risk of recruitment overfishing!? .. but
  - Preserve scallop densities in some areas to ensure fertilization success
2. The assessment question could be limited to 'how to exploit an observed recruitment' (management of growth overfishing); size or age projection matrices for short term forecasts.
3. Survey uncertainty (catchability, spatial resolution) should be addressed if surveys are to be the main source of information for assessment; the problem of noisy survey data!
4. Stock status indicators can be developed from Logbook VMS data at fine spatial scale.
5. Best use of VMS logbook data could enable relative abundance estimates and local or stock depletion estimates (and harvest rates and biomass) to be derived.

# Some conclusions and recommendations re assessment of scallop

1. Different assessment approaches are taken by UK and by different EU member states; no ICES framework as such
2. Need to identify and agree the stock assessment and management units
3. Data integration from all countries participating in the fishery within a given management unit (especially VMS and logbook data).
4. There should be a common survey design within stock units. Survey uncertainty needs to be addressed.
5. Need to identify the management objective, the best approach to management and therefore the scientific assessments required to service the management objective
6. Management to avoid growth overfishing may be sufficient. This would be particularly important in stocks with episodic recruitment.
  - Season management, improved selectivity, spatial management, rotation.

THANK  
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