Recommendation – Marine Action Plan, Nature Restoration Law and Mapping Shellfish Dredging

AAC 2024-6

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Contents

1. Context

In February 2023, the European Commission communicated an Action Plan for EU fishery. Part of the Action Plan is a call to Member States to present plans to minimise bottom trawling, especially in Marine Protected Areas. On 17 June 2024, the Council adopted[1] the "Nature Restoration Law", opening the way to its publication in the Official Journal of the EU.

This recommendation is meant to map the areas subjected to shellfish dredging activities. It completes a first note of May 2023, which was requested during the biannual meeting of a delegation of the Aquaculture Advisory Council and DG Mare on 21 April 2023.

2. Justification

Shellfish bottom cultivation (blue mussel, oyster, scallops, etc.) is a 150-year-old shellfish growing technique. Very small shellfish are spread on the bottom at a calculated optimal density (max 10/m²). The shellfish then grow over a 2–4-year period to commercial size. During this period, biodiversity in these parcels increases substantially, even more so than in areas outside them.

According to Aad Smaal et al. [1], "*Shellfish reefs are an important habitat for many other species and are therefore considered to be biodiversity hotspots. They promote an increase in the number of benthic animals, which has an attractive effect on fish and birds. This phenomenon does not only apply to wild shell beds; the biodiversity of associated species is also important on the mussel spat collection plots and their rearing on longlines. The beginning of the mussel cycle is mussel spat, which was traditionally caught on wild banks. This fishery is being phased out in the interests of nature restoration and, alternatively, mussel spat are caught with ad hoc facilities (MZI).*"

At the end of the growing period, the adult product is harvested with a dredge. After harvesting, the parcel is used again for new juvenile shellfish, compensating immediately for the damage done by the dredge, and the cycle starts again.

Dredges are "cage-like structures often equipped with a scraper blade or teeth on its lower part, either pulled or towed to dig animals out of substrate and lift them into the cage or bag" [7]. They can be used to target molluscs, e.g. mussels and scallops. Their size is between 1.5 and 3 metres, and they weigh between 150 and 300 kg. Dredging speed is 2.5–3 knots. The dredge used in shellfish cultivation differs from the one used in fisheries: they are smaller (2–2.5 m) and lighter (150–280 kg), and their teeth are smaller (0–5 cm vs 15–30) [2].

Shellfish bottom cultivation is a natural and very extensive production method, not to be compared with the intensive use of dredges for bottom trawling throughout the year.

Geographical extent

The EU countries with shellfish dredging activities are Denmark, Germany, Ireland, The Netherlands, France, and Italy.

In Denmark and Germany, the activity relates to fisheries enterprises. In Italy, the products were mainly clams, but the recent invasion of blue crabs (*Callinectes sapidus*) and the intensive predation of these crabs on clam stock led to its extinction in 2024[2] and to the closure of the corresponding enterprises.

This recommendation thus focuses on cultivation in the following Member States:

1. France,

2. Ireland,
3. and The Netherlands.

Methodology

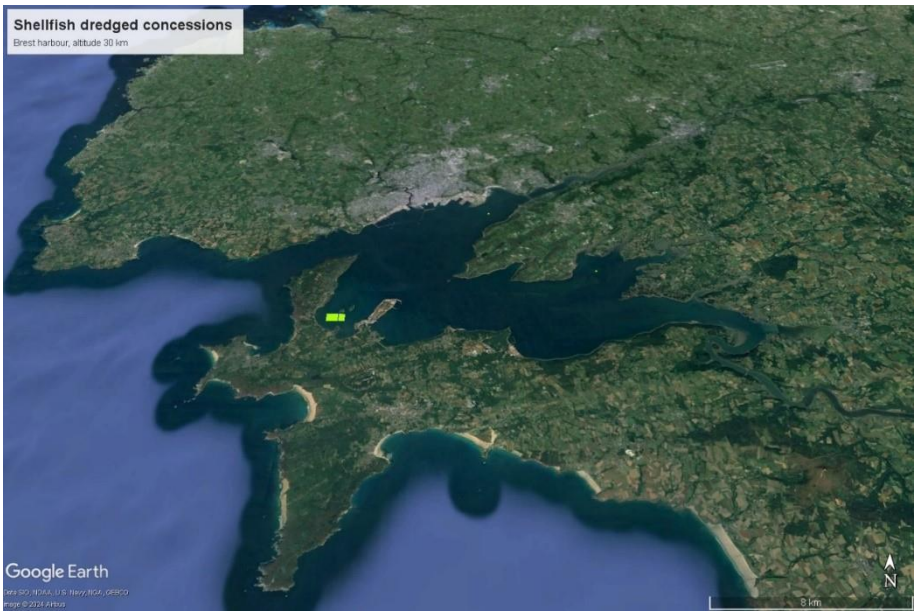
Maps of the shellfish cadastres were collected (sources: national authorities and professional organisations of the three Member States). Parcels with bottom cultivation were identified in these maps. The number of enterprises and dredge vessels corresponding to these parcels were communicated from the sources mentioned above, as was the number of dredging days in a year and the average surface area cultivated.

Results

FRANCE

On-bottom activities take place in Britany, mainly in the Bay of Mont-Saint-Michel and the Bay of Quiberon (Source: SDSIM/CNC 2024)


Shellfish dredged concessions
North Brittany, altitude 30 km
Google Earth
N
8 km


Shellfish dredged concessions
Brest harbour, altitude 30 km
Google Earth
N
8 km

In France, there is no collection of wild spat from salvage beds. Derogation is possible but has not been used since 2009.

Farming activities occupy 5 043.43 hectares on 58 parcels for 92 enterprises/vessels [6]. The average surface of a parcel is 86.96 hectares. The average surface dredged by each vessel is 54.82 hectares. The number of dredging days in a year is 110 in the north of Britany and 78 in the south of the region, in relation to the demand for commercial product to be harvested:

- 1 465.46 ha BZH Nord, 15 dredgers, 110 days/year/vessel
- 3 578.07 ha BZH Sud, 77 dredgers, 77 days/year/vessel

Regulation defines a maximum allowed of 300 kg/day of dredging [2].

767.5 tons of flat oysters are harvested in North Britany, while no cupped oysters are cultivated on-bottom. 170 dredgings of 300 kg by each vessel are necessary for the harvest, with an average of 1.5 dredgings/day/vessel.

6 000 tons of cupped oysters are cultivated and harvested in South Britany, of which 30% is on-bottom in deep waters corresponding to 1 800 tons/year. 78 dredgings of 300 kg by each vessel are necessary for this harvest, with an average of 1 dredging/day/vessel. One hour in a day is sufficient to collect this volume. The intensity of dredging is thus very low.

IRELAND

On-bottom activities are dispersed in the various bays (source: SFPA – IFA 2024).

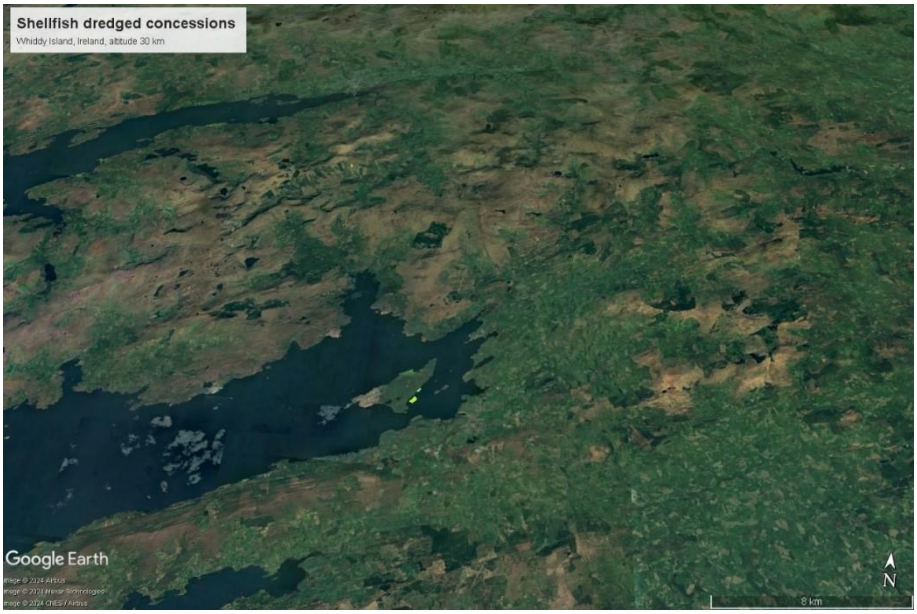

Shellfish dredged concessions
Carrigart, Ireland, altitude 30 km
Google Earth
N
8 km


Shellfish dredged concessions
Dunkineely, Ireland, altitude 30 km
Google Earth
N
8 km


Shellfish dredged concessions
Devlane, Ireland, altitude 30 km
Belmullet
Barnatra
INISHKEA NORTH
Tirraun
Devlane
INISHKEA SOUTH
Ragharc An Tuir
Glosh
FALLMORE
Blacksod
Tallagh
Munhin
Mount Jubilee
Gweesalia
Elly
Ton Na Mara
Doohoma Head
Blenkeragh
Bunmore
Drumslide
Doogort
Google Earth
8 km
N


Shellfish dredged concessions
County Clare, Ireland, altitude 30 km
Doonbeg
Kilmacduane
Kilkee
Moyasta
Tullycrine
Moveen
Derha
Querrin
Kilmurry McMahon
Tullig
Doonaha
Kilcrona
Cappa Upper
Derrynadivva
Cross
Carrigaholt
COUNTY CLARE
Kilbaha
Ail Na Brun
Litlor
Tarbert
Bromore
Ballylongford
Tarmon
Ballybunion
The Greens Holiday Village
Lisseiton
Knockenagh
Moyvane
Muher
Carhoonaknock
Ballyduff
Clieveragh
Knockanure
Feans
Foxfort
Listowel
Google Earth
8 km
N


Shellfish dredged concessions
Cromane & Tullig, Ireland, altitude 30 km
Google Earth
N
8 km


Shellfish dredged concessions
Whiddy Island, Ireland, altitude 30 km
Google Earth
N
8 km

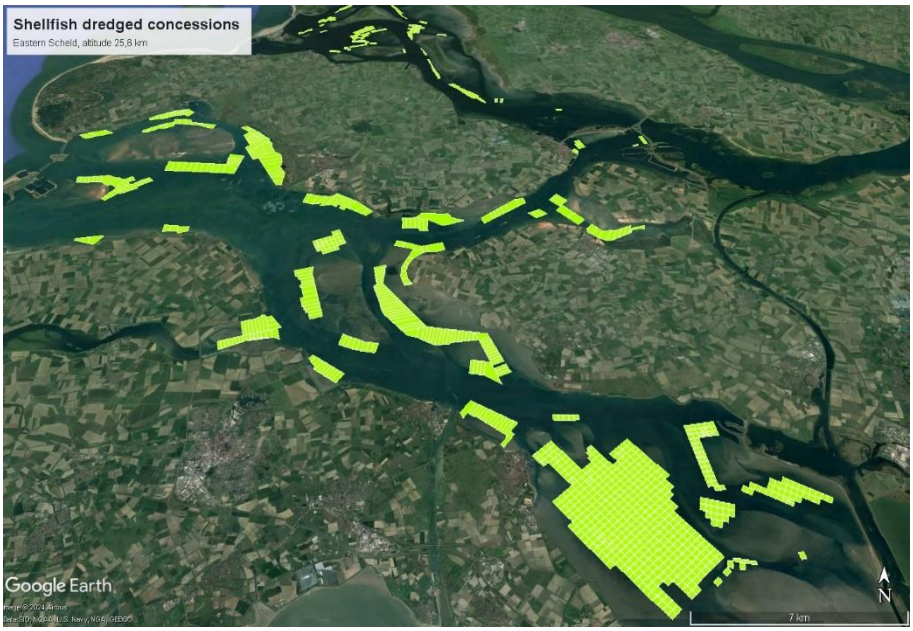
The number of vessels used to collect the spat is 24 over 22 days. This information comes from Fishery Natura Plan (fishingnet.ie). The number includes vessels from both sides of the border, including the Foyle and some from Castlemaine Harbour (IE Bottom Grown mussel – MSC Fisheries).

Farming activities occupy 2 405.21 hectares on 58 parcels for 71 enterprises/vessels from the various bays. The average surface area of a parcel is 41.47 hectares. The average surface area dredged by each vessel is 33.88 hectares.

The number of dredging days is in relation to the demand for commercial product to be harvested (32% of total mussel production in Ireland according to EUMOFA data [5], or 4 800 tons): 80 dredging days/vessel/year. As in France, the time needed to collect 300 kg is limited, and the dredging intensity very low.

THE NETHERLANDS

On-bottom activities occur in different polders and internal seas (source: Rijksdienstdienst voor Ondernemend Nederland – POM 2024).



In The Netherlands, two dredges are used on each side of the vessel. The width of a dredge is 1.90 metres, and the dredging speed is 2.7 knots. They harvest an average of 750 kg in less than 5 minutes.

The number of vessels used to collect the spat and harvest oysters is 25 over a few dredging days in two main zones: Oosterschelde and Grevelingen in Zeeland, near the Belgium frontier [14]. Oyster activity occupies 2 538 hectares on 515 parcels for 25 enterprises/vessels in the two zones. These 25 dredgers need about 20 hours each to collect 2 300 tons [14] every 2.5 years, which is the duration of the oyster cycle in The Netherlands.

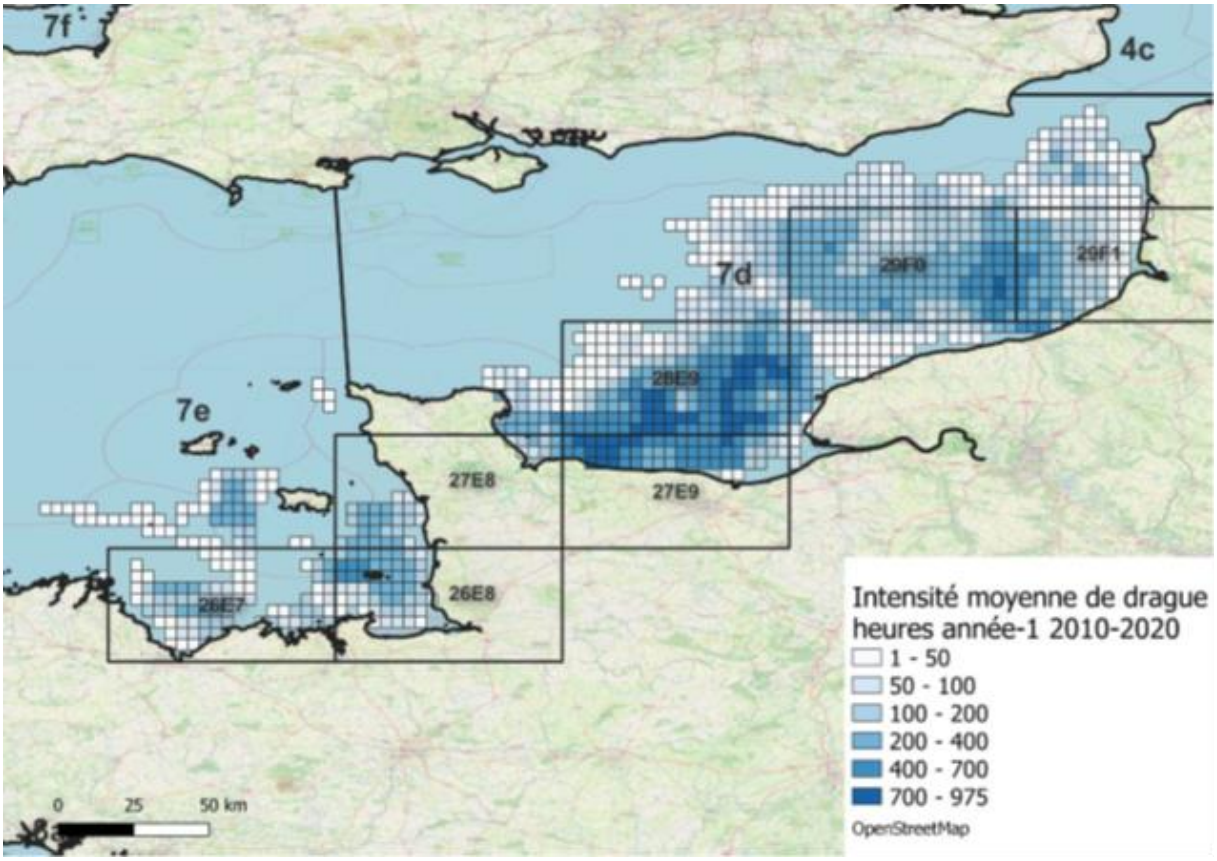
Mussel activity occupies 10 701 hectares on 795 parcels for 55 enterprises/vessels in the various zones. The yearly production of blue mussel is, according to the Marine Stewardship Council (MSC), 39 000 tons (in 2020) [15].

The number of dredging days is in relation to the demand for commercial product to be harvested: about 180 dredging days/vessel/year. The time required to collect 300 kg is identical to that in France, and the dredging intensity very low.

In 2024, both oyster and mussel farming are based on dredging harvest of 98% of the entire Dutch licensed parcels (cultivation on ropes for mussels or bags for oysters is as yet experimental). The recovery programme for flat oysters, associated with better resistance to parasites that usually kill oysters, potentially make new cultivation areas possible in various internal lakes and polders in the future.

Discussion

As illustrated in the following map, the total surface exploited in on-bottom shellfish farming in these three Member States **cannot be compared to the dredging activity in fisheries**. Furthermore, the corresponding SAR (ICES definition, sweep area ratio for a spatial resolution grid of 0.05° × 0.05°) which is comprise for shellfish in the first rank of 0-1 or 1 to 50 hours per year [3][4] is drastically lower:



Source: Dredger fishing efforts in hours.year^{-1}. Data representing French fishing efforts in zones VIIe and VIId at a spatial resolution of 0.05° × 0.05°. DGAMPA 2022 data (personal communication).

One degree of latitude corresponds to 111 km in the Channel (or 69 nautical miles). One minute corresponds to somewhat more than 1 nautical mile. A 0.05° grid corresponds to 5 550 metres. Each cell of a grid of 0.05° thus corresponds to a square of 5.55 km, or 30.8 km^2.

Member State	Surface (km^2)	Cells of 0.05°	Days/vessel/year	Dredging hours/vessel/day	**Hours/year**
Ireland	24.05	0.78	80	0.5	**40**
France	50.43	1.64	82	0.5	**41**
Netherlands	132.29	4.29	180	0.5	**90**

Shellfish dredging thus occupies **less than 7 (6.71) cells, to be compared to the hundreds of cells** in the map above. Medium intensity is less than 50 hours/year and thus falls in the first rank of ICES (corresponding to white cells in the map above). The average intensity is very low.

To complete this analyse of intensity, it is to be noted that shellfish are environmental engineers that have the capacity to build a reef or a bed of shells and increase the biodiversity very quickly [1] [10]. "Places trawled once a year will not really be different from places not trawled at all," Ray Hilborn has emphasised [12].

In addition, the (pseudo)faeces produced by shellfish provide sufficient nutrients for soil animals, which can then also serve as food for other animals. Shellfish therefore play an important role in the food web. At virtually every level of the food web, the number of species in one mussel bed is higher than in areas where no or few mussels are present [8].

Shellfish filter micro-algae and other small particles from the water and then produce (pseudo)faeces. This consists of a larger proportion of organic material compared to sludge and thus enriches the immediate environment of the shellfish bank. Soil animals benefit from this and increase in numbers. This is evident from a study on an oyster bed in the littoral zone of the Wadden Sea, where the biomass of shellfish, ragworms, cockles, and crustaceans increased [9].

Another point in favour of small dredges is the capacity to oxygenate the sediment [13]. On the sediment itself and its micro-fauna, the dredge, like a harrow or a hoe, allows oxygenation of the sediment by mixing it with oxygen-rich seawater. This can prove very beneficial on the seabed in calm areas, which can be hypoxic (deficient in oxygen) and therefore unfavourable to the development of benthic fauna established on the bottom or buried.

Shellfish reefs provide an important habitat for many other species and are therefore considered biodiversity hotspots. They cause an increase in the number of bottom-dwelling animals, which in

turn has an attractive effect on fish and birds. This does not apply only to wild shellfish beds: on cultivation plots and hanging cultures, the biodiversity of associated species is also high [10].

Offshore shellfish farming has been reported as "Other effective area-based conservation measures" (OECMs), a new conservation approach separated from protected areas, where conservation is achieved mainly as a by-product of other management. This definition was agreed at the 14th Conference of Parties of the Convention on Biological Diversity in 2018. "A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values." [16]. Similar line of reasoning can be applied to on-bottom shellfish cultivation areas.

Dutch and Irish mussel seed fishing and farming have been certified as sustainable, well-managed fishing by the MSC. To receive this quality mark, a fishery must demonstrate that the fish stock is healthy, that there are no significant negative impacts on the ecosystem, and that the fishery is managed with clear rules that are followed. The assessment is done by independent certifiers; there are also interim assessments during the term of the certificate.

Furthermore, the European plan for the restoration of flat oyster[3] fully integrates the areas mentioned in the three bays of North Britany (Bay of Brest, Bay of Lannion, Bay of Cancale and Saint-Michel) in the chapter on France [11], all of them within the frame of NATURA 2000.

Conclusion

The very limited dredging intensity on very small areas in the European bays of France, Netherlands, and Ireland and oxygenation of the sediment when dredging, associated with the natural capacity of shellfish to builds reefs and increase biodiversity, seem to be arguments in favour of not considering shellfish dredging activity harmful to the environment, including in protected areas.

Specific knowledge on shellfish dredging is not immediately available. It was necessary to investigate different publications not directly focused on shellfish dredging to draft this recommendation. A specific study could analyse various aspects of shellfish dredging and collect the necessary data for a more in-depth analysis.

3. Recommendations

1. **Shellfish farming dredging should be outside the scope of the Marine Action Plan and the Nature Restoration Law.**
2. **A detailed study should be designed and financed by the Commission to analyse in greater depth the process of shellfish dredging in order to increase knowledge in this field.**

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