Draft Fishery Natura Plan

Castlemaine Harbour Seed Mussel Fishery

***for the years* 2024-2029**

Date of submission of the FNP:

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1.0 Legal Basis

Seed mussel fishery in Castlemaine Harbour occurs in areas designated as both Special Areas of Conservation (SAC's) and Special Protected Areas (SPA's). This draft Fisheries Natura plan relates exclusively to mussel seed fishing in the area over the five-year period 2024-2029, subsequent husbandry practices are considered in another specific assessment.

The Minister for Agriculture, Food, and the Marine, as a public authority under regulation twenty-seven of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), must exercise his functions so as to ensure compliance with the requirements of the Habitats Directive, the Birds Directive and the 2011 Regulations.

The European Union (Birds and Natural Habitats) (Sea-Fisheries) Regulations 2013 (SI 290 of 2013) as amended provide for the submission of a draft fisheries Natura plan and the appropriate assessment of a plan to identify where sea-fisheries may be allowed to proceed within appropriate guidelines to address risks to protected species and habitats (Regulation 5 assessment) to enable the fulfilment of the Minister's obligations.

The Minister for Agriculture, Food and the Marine also must exercise his functions so as to ensure compliance with the requirements of the Common Fisheries Policy (Regulation (EU) No. 1380/2013), with an emphasis on the article 2 objectives of aiming for the environmental sustainability of fisheries in the long term and applying the precautionary approach to fisheries management.

The plan was drafted by the Secretariat of the Bottom Grown Mussel Consultative Forum (BGMCF) in consultation with Bord Iascaigh Mhara (BIM), and industry members of the Bottom Grown Mussel Consultative Forum (persons affected by the designation).

The draft plan covers fishing in the period 1st February 2024 to 31st December 2029.

2.0 Rationale for Mitigation

The potential generic ecological effects on the qualifying interests of the site relate to the physical and biological effects of dredging shellfish species which overlap with invertebrate communities found in inter-tidal and sub-tidal.

Bird populations may also be affected by these habitat changes and by disturbance caused by fishing vessels and by changes in the availability of prey species as a result of changes in habitat brought about by shellfish production.

Using the mussel seed sustainably, to ensure a continuing and prosperous fishery, is in line with Government and EU policy.

3.0 Seed Mussel Fisheries

3.1 Introduction

In the context of this plan "Seed fishing" refers to the sub-tidal and inter-tidal collection of mussels for relaying on aquaculture sites, seed mussel is not suitable for direct human consumption. The plan covers all areas of suitable substrate for seed mussel fishing within the protected sites under consideration.

Seed mussel is fished from the sub-tidal seed areas identified in the surveys and either transferred for hardening on an intertidal nursery site in the mussel order area for 6 to 12 months, placed directly onto subtidal growing areas within the order or directly onto aquaculture sites within the harbour. Depending on the state of the tide, relaying on the nursery area may extend eastwards towards deeper water but will be restricted to the intertidal. Different strategies are adopted in line with the condition and size of the seed, with intertidal relaying providing protection from crabs.

If seed is placed on the nursery area it is subsequently transferred to sub-tidal plots and licenced sites for on growing until harvest. Generally, seed is moved to the subtidal between June and August but the duration and timing of stock movements from the nursery area to the subtidal is dependent on a number of factors such as market conditions, growth rates, and the size of the original seed.

In response to unusual events such as an extended biotoxin closure seed may remain on the nursery area for a longer period. If such an event is likely to occur the Marine Institute will be notified.

The bottom grown mussel industry relies on a consistent settlement of mussel spat to provide seed which is then relayed and on-grown on sheltered inshore and licenced beds. Settlement of mussel seed varies (volume, location & exact time of settlement) annually (Figures 1 and Map 1).

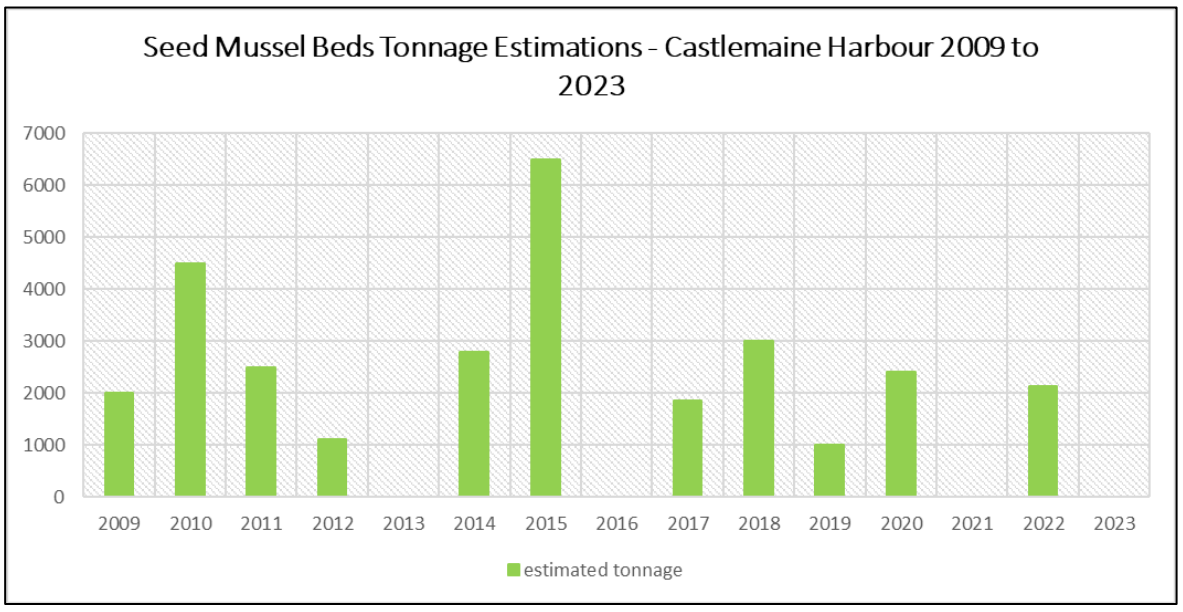


Figure 1: Historical estimated seed mussel biomass for Castlemaine Harbour from 2009 to 2023

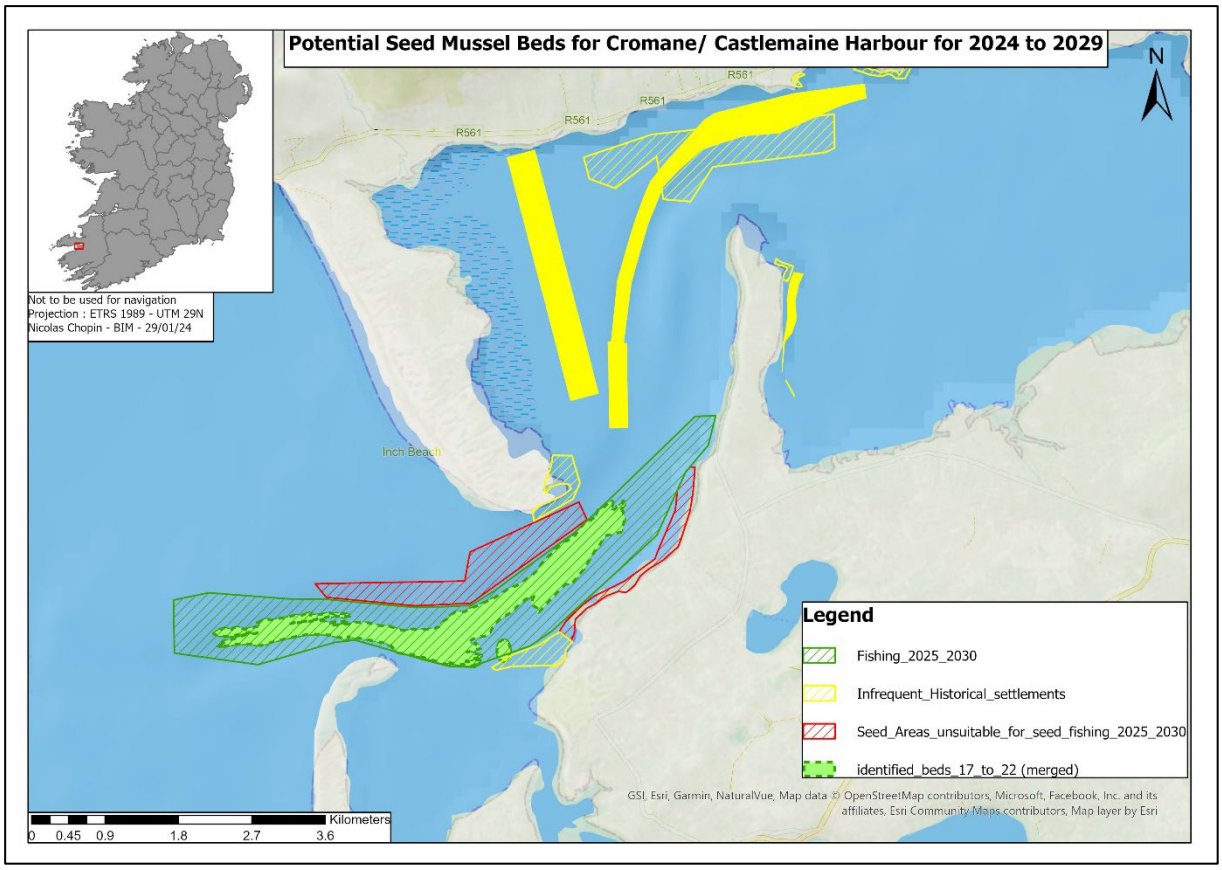
3.2 Spatial Extent

The location, timing and volume of Mytilus edulis seed settlement varies from year to year in Castlemaine Harbour (map 1). Historically seed settlements have been documented as occurring at five sub-tidal areas at the mouth of outer Castlemaine Harbour near the southern end of Inch Point and North of Rosbehy Point, as well as at a number of sites in the inner harbour. Given the dynamic nature of the area[1], seed settlements may shift from the current known locations, such changes if identified will be notified to the Marine Institute in the annual survey reports for their consideration. Further survey data indicating topographical changes have been included in Appendix 1.

Settlements on areas mapped as having infrequent settlements (in yellow in Map 1) have historically been reported to occur once every 10-15 years. Given the low frequency of occurrence of these settlement events, settlement in these areas may not occur over the lifetime of the plan. Thus, it does not formally include a specific planning element for such a fishery although the local fishermen wish that such a possibility be kept open to cover the eventuality, however remote. In the case of such settlements the Marine Institute would be notified through the annual survey reporting arrangements. At that point a determination could be reached, depending on the size and extent of the 'infrequent' seed spatfall, as to whether or not a further appropriate assessment for the purposes of opening that bed to fishing should be pursued.

The actual area to be fished, which will be a fraction (typically less than 50%) of the historic extent of the main bed, will be mapped and a permitted fishing area established and permitted by DAMF annually. The area shall be derived from the actual location of the seed mussel spatfall within the 'fishable ground' in a given year and shall also be determined so as to take account of safety considerations to allow proper vessel operations and safe navigation. It shall be kept as compact as possible consistent with the above requirements

[1] O'Shea, M. P. (2015). *Monitoring and modelling the morphodynamic evolution of a breached barrier beach system*. Retrieved from https://cora.ucc.ie/handle/10468/3359



Map 1: Suitable and historical seed mussel bed's location in Castlemaine Harbour

3.3 Temporal Extent

Fishing takes place on suitable neap tides (≤7m as predicted in the Llanelli tide tables) subject to seed availability, allocation and suitable weather conditions.

The Co-op requests that the Castlemaine Fishery be managed in line with seed fisheries elsewhere on the Island of Ireland, i.e. a spring and autumn fishery subject to seed availability. Also, in line with the management of other seed areas on the Island, the force majeure clause may be initiated, and a request made to the Minister through the Bottom Grown Mussel Consultative Forum to have the area opened at an earlier date, if the bed is subject to high predation pressure.

Maximum permitted fishing days in a given year is seventy and fishing is only conducted from 6.00 to 18.00.

3.4 Vessel Numbers

Mussel dredgers which are licensed to fish mussel seed for aquaculture purposes operating in Castlemaine Harbour. The operators are members of the Castlemaine Harbour Co-operative Society Ltd. which holds the Mussel Fishery Order from 1979. In addition, all mussel dredgers fishing seed are registered and licensed as Aquaculture fishing vessels or work boats. The vessels also require annual authorisations to fish mussel seed from DAMF along with the relevant movement authorisations.

Currently in Castlemaine Harbour, 5-6 large vessels will access the seed using 2-4 single dredges each. The types of dredge used are 2m mussel dredges with a flat bar that is designed to skim the surface of the substrate and separate mussel seed from the underlying sediment of the substrate and remove the mussel seed. There is the potential for large boat infrastructure to increase to 9-10 vessels; however, this would be subject to sourcing significant investment, and appropriate licencing.

Currently a number of smaller vessels (9-10) using single handheld dredges may also access the seed beds subject to licensing, safety and appropriate tracking equipment requirements. There is the potential for small boat infrastructure to increase to 18-20 vessels; however, this would be subject to sourcing significant investment, and appropriate licencing.

Dredging of mussel seed by Irish registered vessels and reseeding of the seed for the purposes of on growing within the exclusive fishery limits of IE may take place only on issue of a licence under the Mussel Seed (Conservation of Stocks) Order 1987, (S.I. No. 118 of 1987) as amended by the Mussel Seed (Conservation and Rational Exploitation) Order 2003 (S.I. No. 241 of 2003).

3.5 Harvest Volume

Harvesting of seed mussel will be licenced through volumes dictated in the seed fishing authorisations and the Natura permits which effectively legislate a total allowable catch (TAC) for the fishery. The harvest rule of thumb is to reserve 33.33% of the biomass as prey for waterbirds with the remaining 66.66% being fished and relayed in the inner harbour where on growing stock may act as an additional prey source and as a source of future recruitment. It should also be noted that the seed mussels occurring in the areas ‘unsuitable for fishing’ will also act as a substantial reserve of prey source for the diving birds over and above the other reserved sources already described.

3.6 Other seed sources

Seed may also be sourced from the Irish Sea to supplement co-op re-seeding activities between 2024 and 2029. This activity is not intended to increase the seed volume relayed in Castlemaine above historical levels but rather to replace the resource that is sometimes not available locally. The proposal therefore will not contribute to coverage levels in the relay area above that previously regarded as acceptable.

Previously DAHG expressed concerns with the fact that this activity had not been appropriately assessed (2011). Industry members in Castlemaine recognise the control system in the Irish sea, specifically the alien species sampling undertaken since 2013, and contend that following the agreement of the AA in the Irish Sea and the submission of results from Alien species sampling (Assuming that no species of concern are identified), that movements should be permitted in order to ensure the survival of their businesses.

Industry members wish to have the option to source seed from rope collectors deployed around the Island of Ireland.

3.7 Seed Surveys

Seed surveys seek to identify seed areas in advance of the fishing season. Seed may not be fished outside the permitted tides and all surveys conducted by industry members must be notified in advance to the SFPA. If seed is found this is also reported to the SFPA.

Surveys are conducted by industry members using ground discrimination software onboard the vessels and commercial fishing equipment to "ground truth" results. Surveys are generally conducted on 1-2 available tides in advance of the defined opening periods in May and August. Surveys will only be conducted in areas of suitable substrate.

BIM surveys are conducted from May to September (inclusive) and are divided into three steps. The first step consists of surveying previously known beds to assess potential remaining stock following the winter or recently settled spat. This survey yields acoustically generated imagery from a side scan sonar system which identifies relevant features which are then ground-truthed using a 1 meter dredge. The second step consists of estimating the available seed mussel biomass. The extent of the settlement is mapped using acoustic imagery analysed on GIS. Random sampling points (approximately forty per bed) are generated within the bed and samples are collected using a Day grab with a 0.1m^2 footprint. Position and weight of mussel per grab is recorded and a density map is produced using IDW interpolation[2]. Estimated biomass is then calculated, providing the extent of the bed in hectares and an estimated tonnage for the area. The final step consists of carrying out a post fishery assessment using the methodology detailed above. Seed survey reports are published on the BIM website as they become available.

Given the large areas of the potential fishery and the ephemeral nature of the resource, not all beds are identified by a formal survey in advance of fishing. Beds may be discovered and exploited during the fishing season by industry members, however all seed fishing locations are reported via logbook and SMS returns as per the management measures discussed in section 4.0 below.

3.8 Harvesting

Mussels are harvested by industry members in compliance with the management measures presented in section 4.0 below. Mussel seed fishing is conducted using a variety of equipment types. By far the most commonly used dredge is the modified Dutch design.

Depending on size, vessels deploy four dredges at a time. The dredge is composed of a fixed bar (of between 2 and 4 meters in length, the bar is round and without teeth) and a frame with a net bag attached, which is 2-3 meters in length to retain the seed mussel catches. The dredge is designed to skim the surface of the substrate and separate mussels from the underlying sediment. This mud bar in effect 'peels' the overlying seed mussel 'mat' away from the underlying substrate and in doing so removes the mussel seed which is caught in a bag which follows the bar.

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[2] Hervas, A., Tully, O., Hickey, J., Keeffe, E. O., & Kelly, E. (2008). *Assessment, Monitoring and Management of the Dundalk Bay and Waterford Estuary Cockle (*Cerastoderma edule*) Fisheries in 2007*. *Fisheries Resource Series* (Vol. 7).

The bottom part of the bag is a made up of either a chain link matrix or a nylon mesh. The upper part is made of nylon mesh. In the case where a chain link matrix is used on the lower part of the bag it is common practice for a rubber mat or rope dollies (bits of chafed ropes) to be attached to the belly of the dredge to minimize disturbance of the substrate. The dredge is towed with a steel cable. The length of this cable during fishing operations is usually three times the water column depth, although this varies according to the speed of the current and the seed mussel bed type.

3.9 Husbandry

General

Due to the fluctuating seed input, the output from the licensed sites varies but generally ranges from 2,000 to 5,000 tonnes per annum. Annual returns are submitted by industry members to BIM documenting ground usage, tonnages and the quality of harvested product.

Mussels are on grown on the mussel fishery order area (which is licensed in perpetuity) and on licensed aquaculture sites in the inner harbour (ten year renewal period).

In general, the details of production rotation are as follows, though it may vary slightly with individual operators:

- Seed placed directly on subtidal plots within the order or on licenced sites remains there until harvest (2-3 years).
- Seed placed in the nursery area remains therefor 6 to 12 months depending on market conditions, size of seed and growth rates, seed is transferred from the nursery to sub-tidal plots and licenced sites for on growing until harvest, the subtidal grow-out phase lasts for a further 12 to 18 months, however if there is a seed shortage in a following year some operators hold back stock to ensure cash flow in poor years,

Harvesting takes place from late September until mid-March.

The nursery and on growing areas are currently subdivided into plots determined by the Co-op and allocated on a ten year permit to the 57 permit holders who are members of the Co-op. Permit holders tend to work in groups consisting of one to seven members. The footprint of the nursery and on growing areas will not change over the 2024-2029 period however subdivisions within the areas may change

Nursery area

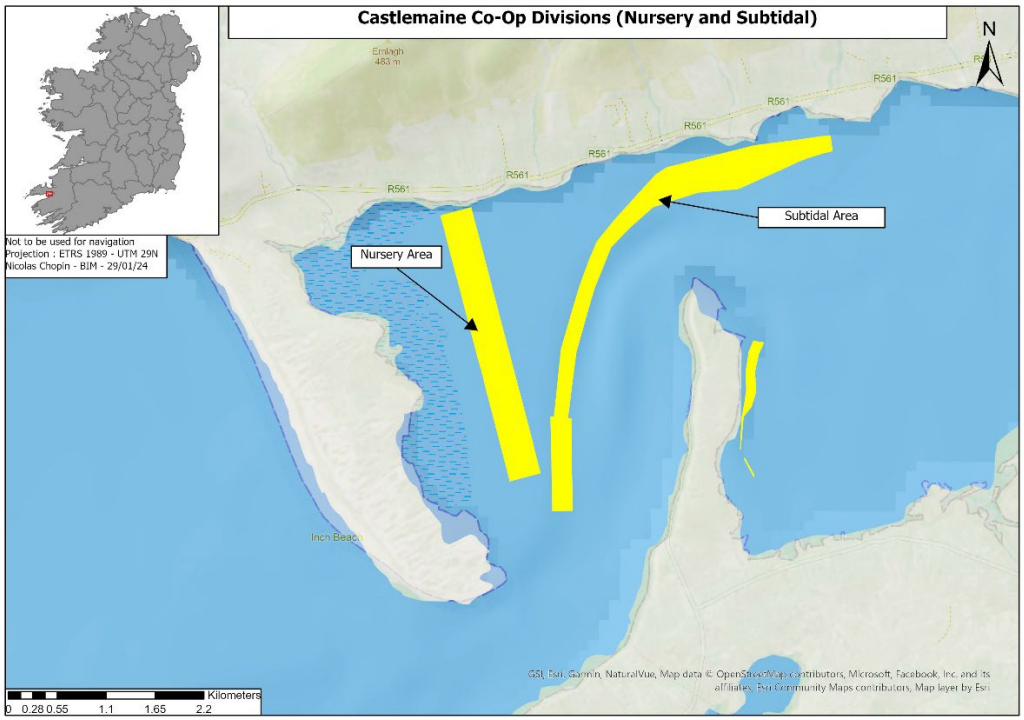
Vessels involved in transplantation of mussels from the seed fishery to the intertidal area will be appropriately licensed and equipped. Larger vessels transplant the seed by pumping it mixed with seawater from the boats hold onto the nursery and grow out plots. The pattern of relaying is characterised by the vessels moving across the plots during pumping in an effort to achieve an even distribution of mussel on each plot. This will maximise survival and growth.

Smaller vessels ‘punts’ operate a broadly similar seed fishing approach using single dredges to access the resource.

Within a few hours of seed being fished, the seed will be relayed in the nursery area (Map 2).

Mussel cover within the nursery plots typically varies between 12-42%. The nursery used for relaying seed represents only a small proportion of the intertidal area in the Fishery Order (approximately 30%). The nursery area is located on the low intertidal, with all the seed being exposed on extreme low water spring tides

Generally, the nursery area is cleaned of stock by dredging through the mussel mud that has built up underneath the stock. However due to the nature of the harvesting activity some residual patches will remain within the nursery plots particularly in the southern plots where smaller vessels operate and seaweed has become attached to mussel clumps.



Map 2: Intertidal nursery ground and growing out subtidal areas

Grow out

Licensed mussel vessels and licensed punts relay the stock on the subtidal area (Map 2). The licensed mussel vessels do this by pumping the seed mixed with seawater from the boat's hold onto the grow out plots. This pattern of relaying is characterised by the vessels moving across the plots during pumping in an effort to achieve an even distribution of mussel on each plot in order to maximise survival and growth.

The punts collect the seed using beet forks/pikes and then deposit it on the sub-tidal over the side of the vessels. Again, the pattern of relaying is characterised by the vessels moving across the plots in an effort to achieve an even distribution of mussel on each plot.

Relaying is generally at a density of 35-40t per hectare. Return rates of a minimum of 1:1 are expected and the final product is harvested to order by vessels, from the subtidal plots and licenced sites. All harvesting and sales activity is monitored by the SFPA staff by a variety of mechanisms, gatherers documents, VMS plotting, establishment licensing, and depuration centres.

No waste is generated as the harvested product is placed directly into one tonne bags for export, via refrigerated truck from Cromane.

Predator Control

There is a green crab predator control programme associated with the sub-tidal plots, generally focusing on the channels entering the inner harbour. Up to 10 boats using up to 100 pots each are involved in the potting of the area for green crab, using waste from white fish processing establishments as bait. Currently only 5/6 boats are operating in this fishery. No bycatch has been detected in this fishery.

4.0 Management Measures

The fishing of seed mussel and the operation of mussel dredgers is controlled primarily by the following legislation: the Sea-Fisheries and Maritime Jurisdiction Act 2006 (No 8 of 2006); the Mussel Seed (Fishing) Regulations 2006 (S.I. No. 311 of 2006); the Molluscan Shellfish (Conservation of Stocks) Regulations 2006 (S.I. No. 345 of 2006); the European Communities (Health of Aquaculture Animals and Products) Regulations 2008 (S.I. No. 261 of 2008); the European Communities (Natural Habitats and Birds) (Sea-fisheries) Regulations 2013 (S.I. No. 290 of 2013).

Working from this legislative base and from a fishery conservation point of view, and in the interests of minimising any possible adverse environmental impact, the following are the general terms and conditions that will apply to all vessels involved in the sub-tidal fishery in the areas under assessment 2024-2029:

- Surveys will be conducted by BIM and by industry members following notification to the SFPA. In conjunction with industry members and BIM, the BGMCF advises the Department on decisions to open or close seed mussel beds on conservation grounds, i.e., if the seed is too small or fragile to transport. Mortality of seed would prevent the relayed stock contributing to the spawning stock in the Irish Sea.

- All vessels participating in the fishery will hold a Mussel Seed Authorisation particular to that vessel. The vessel must have the correct authorisations and licences on board at all times of operation.

- Prior to the issuing of seed allocations, hull markings and tracking systems will be certified by an authorised officer. All vessels will have each side of the stowage hold marked in 0.5m segments from the bottom to the top; 0m being the bottom or floor of the hold to facilitate estimation of catches on-board.

- Operators will nominate for the Department's approval which vessels will be fishing the seed allocation on their behalf. The vessels will be registered and licensed to fish mussel seed and

the authorisations to fish and move seed are linked to the aquaculture operators.

- Mussel vessels over 15m in length are required to have the EU Vessel Monitoring System ('Blue box'). This system allows the vessels to be monitored and tracked on a more continuous basis and allows detailed tracks and locations to be recorded

- Reg 1224/2009, article 10, requires that all vessels exceeding fifteen meters shall be fitted with and maintain in operation AIS. This is an autonomous and continuous vessel identification and monitoring system used for maritime safety and security which allows vessels to electronically exchange with other nearby ships and authorities ashore the vessel identification data, position, course, and speed.

- Member States may use AIS data for monitoring and control purposes.

- All vessels fishing seed mussels will maintain EU logbooks as required.

- The seed fishing authorisation further requires that "In addition to the requirement to keep the EU fishing logbook, the master of the authorised boat shall keep and record all catch in a mussel spat book, which shall be submitted to a sea-fisheries protection officer at the end of each tide, or on request."

- In line with SI311/2006 the master of a vessel must "inform a sea-fisheries protection officer at least 4 hours in advance of his or her intention to fish for mussel seed and give the officer the name of the holder of the authorisation on whose behalf he or she intends to fish".

    - The authorization states also requires that the "The Master of the authorised boat or his agent shall give to the Fisheries Monitoring Centre not less than 4 hours' notice of his intention to transplant mussel seed" and that "A sea-fisheries protection officer may direct that the authorised boat proceed to a specified port for inspection prior to mussel seed being transplanted on any licensed aquaculture site".

    - The authorisation holder shall send a record on each day of fishing via SMS to 0035387 9885116 in the format: The name of the authorised boat; The source of the seed; The destination of the seed, including aquaculture licence number and bay; Gross tonnage; Net tonnage; the number of the Mussel Seed Authorisation"

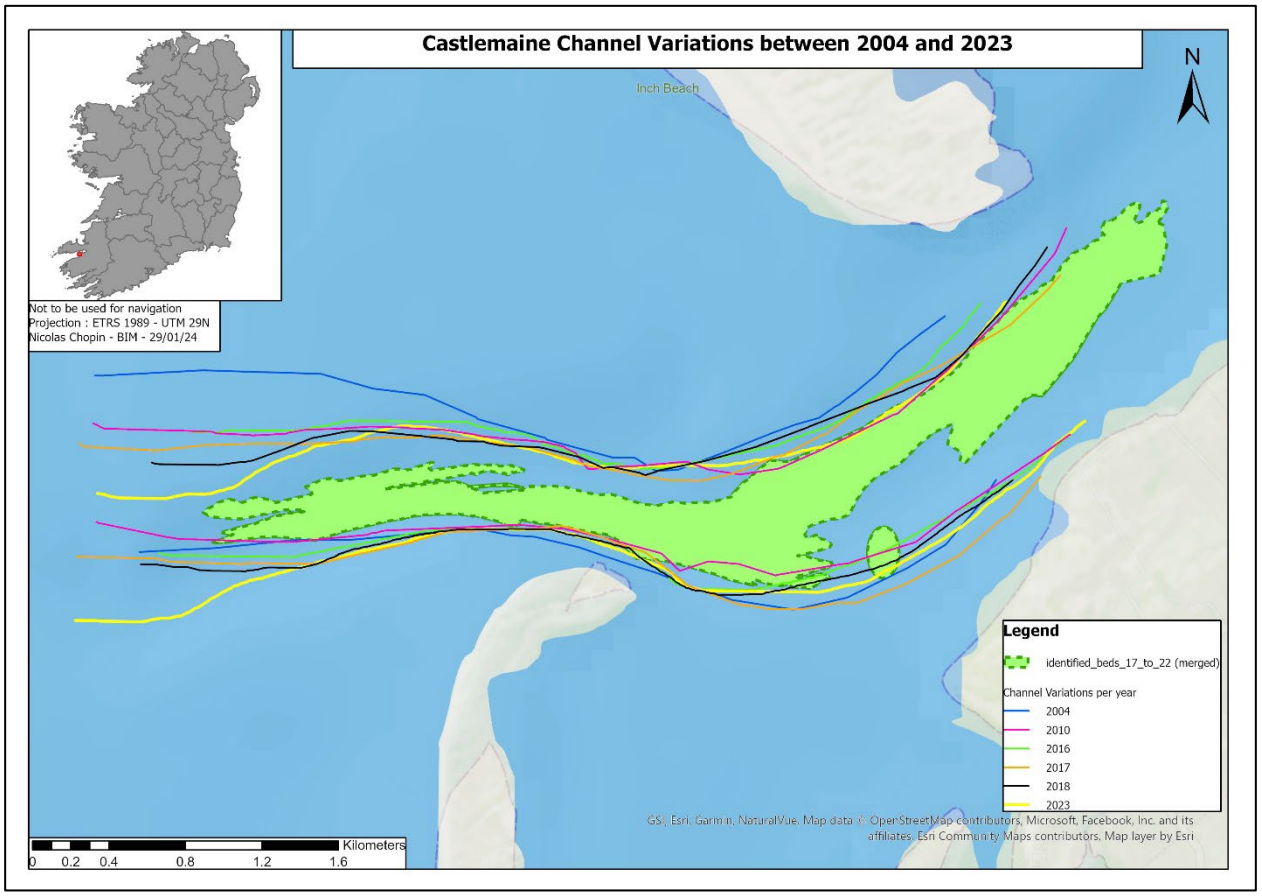
    - Operators recognise that under the Health of Aquaculture Animals, S.I. No. 261 of 2008 European Communities (Health of Aquaculture Animals and Products) Regulations 2008, that authorized officers have the authority to prevent the movement of animals if they feel there will be unresolved increases in mortality.

    - Fishing will only be taken place between the hours of 06.00 and 18.00

    - Fishing will only take place on defined tides

Appendix 1: Visualisation of topographic variations of the channel between Inch Point and Rossbeigh Point from 2004 to 2023

Significant topographic variations have been observed in the channel between Inch Point and Rossbeigh Point since 2004 (Map 1), noticeably after storms during the 2009/2010 winter (O'Shea, 2015). Those variations are visible on historical satellite imagery from Google Earth (Google, n.d.). Although, Google Earth images do not indicate at what stage of the tide the pictures were taken, they do provide some information on the topographical changes of the channel through the years. Those topographical changes may also affect the hydrodynamic of the channel (Franzen *et al.*, 2021).



Map 1: Channel variations between 2004 and 2023 (from Google Earth images).

References

Franzen, M. O., Fernandes, E. H. L., and Siegle, E. 2021. Impacts of coastal structures on hydro-morphodynamic patterns and guidelines towards sustainable coastal development: A case studies review. Regional Studies in Marine Science, 44: 101800. Elsevier B.V. https://doi.org/10.1016/j.rsma.2021.101800.

Google. (n.d.). Google Earth Pro historical satelitte imagery - 11/11/2022. https://earth.google.com/web/@52.15442615,-9.81782722,21.8439337a,39244.68801102d,35.0000563y,0h,0t,0r.

O'Shea, M. P. 2015. Monitoring and modelling the morphodynamic evolution of a breached barrier beach system. https://cora.ucc.ie/handle/10468/3359.

Details imagery for each year:

2003

2009

2010


Dooks Strand
Stookisland
DOOAGHS
DOOAGHS COMMONS
Dooks Mountain
KNOCKAUNROE
ROSSBEHY
REENNANALLAGANE
Caragh Bridge
Google Earth

2017


Dooks Strand
Stookisland
DOOAGHS
DOOAGHS COMMONS
Dooks Mountain
KNOCKAUNROE
DOOLAHIG
ROSSBEHY
REENNANALLAGANE
Caragh Bridge
Google Earth

2018


Dooks Strand
Stocksland
DOOAGHS
DOOAGHS COMMONS
Dooks Mountain
KNOCKAUNROE
DOOLAHIG
ROSSBEHY
Caragh Bridge
Google Earth

2019


Dooks Strand
Stocksland
DOOAGHS
DOOAGHS COMMONS
Dooks Mountain
KNOCKAUNROE
DOOLAHIG
ROSSBEHY
Caragh Bridge
Google Earth

2021


Dooks Strand
Stookisland
DOOAGHS
DOOAGHS COMMONS
Dooks Mountain
BALLINTL
KNOCKAUNROE
DOOLAHIG
ROSSBEHY
REENAVALLAGANE
Caragh Bridge
Image © 2024 CNES / Airbus
1732 m
Google Earth

2023


Dooks Strand
Stookisland
DOOAGHS
DOOAGHS COMMONS
Dooks Mountain
BALLINTL
KNOCKAUNROE
DOOLAHIG
ROSSBEHY
REENAVALLAGANE
Caragh Bridge
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