

Marine Institute, Rinvilla, Oranmore, Galway, H91R673, Ireland.

**Council Regulation (EC) No 199/2008 of 25 February 2008**

concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy

**Commission Regulation (EC) No 665/2008 of 14 July 2008**

laying down detailed rules for the application of Council Regulation (EC) No 199/2008

**Commission Implementing Decision (EU) 2016/1251 of 12 July 2016**

adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019

# **IRL Work Plan for data collection in the fisheries and aquaculture sectors**

**2017-2019**

Version 1– 2017-2019

Marine Institute Galway 31<sup>st</sup> October 2016

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## SECTION 1: BIOLOGICAL DATA

### **Pilot Study 1: Relative share of catches of recreational fisheries compared to commercial fisheries**

*General comment: This Box fulfills paragraph 4 of Chapter V of the multi-annual Union programme and Article 2 and Article 4 paragraph (3) point (a) of this Decision.*

#### 1. Aim of pilot study

- To access the share of catches from the recreational fishery in relation to commercial catches for Cod , Pollack, Elasmobranches
- To access the catch estimates from the recreation fishery for other species of which there is no commercial fishery: Seabass, Eel and highly migratory fishes

#### 2. Duration of pilot study

The pilot study will be designed in 2017 and will be submitted latest October 31<sup>st</sup> 2017 for evaluation. Data collection will commence in 2018. Preliminary results will be available end of 2018.

#### 3. Methodology and expected outcomes of pilot study

The methodology will take into consideration the recommendations from WGRFS and FishPi project. The scale and methodologies of the survey and will be drawn up in 2017.

Outcomes as yet are unknown.

*(max 900 words)*

## SECTION 1: BIOLOGICAL DATA

### **Text Box 1E: Anadromous and catadromous species data collection in fresh water**

*General comment: This Box fulfills paragraph 2 points (b) and (c) of Chapter III of the multi-annual Union programme and Article 2 of this Decision.*

Method selected for collecting data

#### **National Coded Wire Tagging Scheme**

Tags seaward migrating salmon smolts, detected upon river return as adults. Data include release and recovery locations, dates and sea age.

**Use:** Estimating survival/exploitation rates and straying of wild/hatchery salmon.

#### **Counters and traps**

Counters record returning salmon numbers and dates. Traps monitor fish moving upstream and downstream, enabling full census on wild salmon, released reared salmon and downstream migrating silver eels. Fixed elver ladder traps monitor upstream recruiting juvenile eel.

**Use:** Estimating annual returns of salmon, silver eel production, annual abundance of recruiting juvenile eel and dates. Numbers of fish upstream/downstream, daily number, size, weight and sex ratio of salmon and emigrating silver eels.

#### **Silver Eel mark recapture Escapement**

Programme to estimate silver eel production/escapement and to monitor downstream trap and transport of migrating silver eel using mark-recapture, DIDSON, hydrological profiles and assessment models. Additional sampling (length, silvering characteristics) undertaken at the point of capture.

Use: determines eel escapement.

#### **Electrofishing and fyke net surveys**

Electrofishing (salmon, eel) and fyke net (eel) surveys target juvenile salmon and yellow eel in selected water bodies, all fish identified; weight and length measurements taken.

**Use:** Estimating juvenile salmon (river) and yellow eel (river, lake and transitional water) populations.

Above described programmes contribute to the national salmon and eel monitoring programmes (Eel: Council Regulation 1100/2007), which operate across different Irish agencies and parent departments. National coordination discussions are underway, to ensure contribution of all relevant salmon and eels sampling activities to the national data collection required under EUMAP.

*(max 250 words per Area)*

## SECTION 1: BIOLOGICAL DATA

### **Pilot Study 2: Level of fishing and impact of fisheries on biological resources and marine ecosystem**

*General comment: This Box fulfills paragraph 3 point (c) of Chapter III of the multi-annual Union programme and Article 2 and Article 4 paragraph (3) point (b) of this Decision.*

#### 1. Aim of pilot studies

In Ireland, pilot studies to investigate the level of fishing and impact of fisheries on biological resources and marine ecosystem are conducted under the EMFF marine biodiversity scheme. The thematic objective of the scheme is to preserve and protect the environment and to promote resource efficiency. The two specific objectives are 1.) Reduction of the impact of fisheries and aquaculture on the marine environment, including the avoidance and reduction, as far as possible, of unwanted catch and 2.) Protection and restoration of aquatic biodiversity and ecosystems. Specific projects are submitted annually and measures implemented under the scheme are undertaken for the protection and preservation of marine biodiversity, for the benefit of the industry as a whole, and to contribute to fulfilment of Ireland's obligations under EU Natura Directives.

#### 2. Duration of pilot study

Pilot studies last between 12 and 18 months or are multiannual programmes from 2017 onwards.

#### 3. Methodology and expected outcomes of pilot study

Twelve projects have been submitted for 2017 (subject to approval by the Department of Agriculture, Food and Marine-DAFM) and below are descriptions of the projects that are directly relevant to the DCF requirements to inform on the level of fishing and impact of fisheries on biological resources and marine ecosystem and to inform on future data collection programmes.

##### 3.1. Mapping fishing pressures on habitats (2 projects)

###### 3.1.1. Methodology to map fishing pressure of <12m vessels

Data acquisition will be automated for vessels under 12 m in length, building on the iVMS project operating mainly in the Irish Sea by expanding iVMS to other fleets and adding functionality to enable capture of fishing effort and catch data. Expected outcome will be the acquisition of data to allow mapping of fishing pressures in relation to Natura 2000 sites and for MSFD descriptors; improved fisheries advice, improved data on landings, effort and economic value of the sector as required for ICES; STECF data calls and DCF requirements.

###### 3.1.2. Assessment of fisheries/habitat interactions on Irish offshore reef habitats:

Assessment of fisheries/habitat interactions will be carried out on offshore reefs. Ireland will undertake mapping surveys of offshore reefs with a view to mapping of status and pressures from fishing. Expected outcome is improved spatial data of offshore reefs and their status in relation to spatial distribution of bottom impacting fishing pressure.

### 3.2. Ecosystem fisheries interaction (2 projects)

#### 3.2.1. Species catch composition in fisheries posing a risk to biodiversity

In Ireland, the data collection scheme under EMFF UP 3 monitors the bycatch of endangered and protected species as part of the at sea observer scheme. The sampling effort of this observer scheme is, however, stratified according to commercial fisheries and might not provide adequate resolution for statistically meaningful bycatch data. As part of this project, additional sampling effort will be allocated to fisheries that pose a potential risk to biodiversity through bycatch of PET species. Monitoring of retained and non-retained by-catch including endangered and protected species will be carried out via an at sea observer programme targeting fisheries that have been identified by endusers as a potential risk to the conservation objectives under NATURA, and GES GES for MSFD. These include tangle netting, gill netting, trammel netting and pelagic trawling. Expected outcomes are actual recorded bycatch figures by species per unit of fishing effort; total bycatch estimates by métier for selected métiers, season/month, area fished, vessel size; risk profiling of the observed fisheries; identification of problem areas and/or fishing practices where possible; identification of sources of variability & data gaps; recommendations for ongoing monitoring.

#### 3.2.2. Establishing Maximum Sustainable Yield (MSY) proxies for data-limited stocks for key stone species and species sensitive to the impacts of fishing:

Many of the stocks which are caught by the Irish commercial fishing fleets are considered to be data-limited or are not assessed at all. The reasons for this vary from lack of commercial value to practical difficulties in data collection or problems with ageing. This includes key stone prey species (like sprat, gurnards); key stone predators (saithe, pollack, ling) and species sensitive to the impacts of fishing (like rays and skates, john dory, brill and turbot). For these stocks, the fishing mortality is unknown and MSY reference points are not established. The overall aim of the project is to develop and test a range of assessment models and methods to establish MSY reference points (or proxy MSY reference points) across the spectrum of data-limited stocks for key stone species and/or species sensitive to the impacts of fishing. Expected outcomes are:

- A range of assessment methods and models to establish MSY reference points for data-limited and/or non-commercial stocks which are either key stone species or are sensitive to fishing.
- Estimates of the level of fishing impact of fishing activities, relative to MSY on data-limited or non-commercial stocks which are either key stone species or are sensitive to fishing.
- Cost-benefit analysis of various scenarios of future data collection for these stocks.

For more detail in relation to the Irish EMFF marine biodiversity scheme please see:

<https://www.agriculture.gov.ie/emffoperationalprogramme/>

[www.marine.ie](http://www.marine.ie) (*max 900 words*)

## SECTION 1: BIOLOGICAL DATA

### Text Box 1G: List of research surveys at sea

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

#### Western IBTS 4th quarter(including Porcupine survey) (IBTS Q4)

##### 1. Objectives of the survey:

The main objectives of the Irish Groundfish Survey (IGFS) are to provide a relative index of abundance for commercially exploited demersal fish stocks around Ireland. In particular recruitment indices for tuning ICES stock assessment models. The survey also collects data on non-commercial fish, elasmobranch, cephalopod and invertebrate species; oceanographic data; litter data; and additional international research sample requests where possible.

##### 2. Description of the methods used in the survey.

Methodology is per general IBTS protocols ([IBTS Manual](#)) using the GOV 36/47 otter trawl. More specific details for the Western Area surveys can be found in the [Western Area IBTS Manual](#). The survey is essentially a depth stratified semi-random trawl survey of 30min duration per haul.

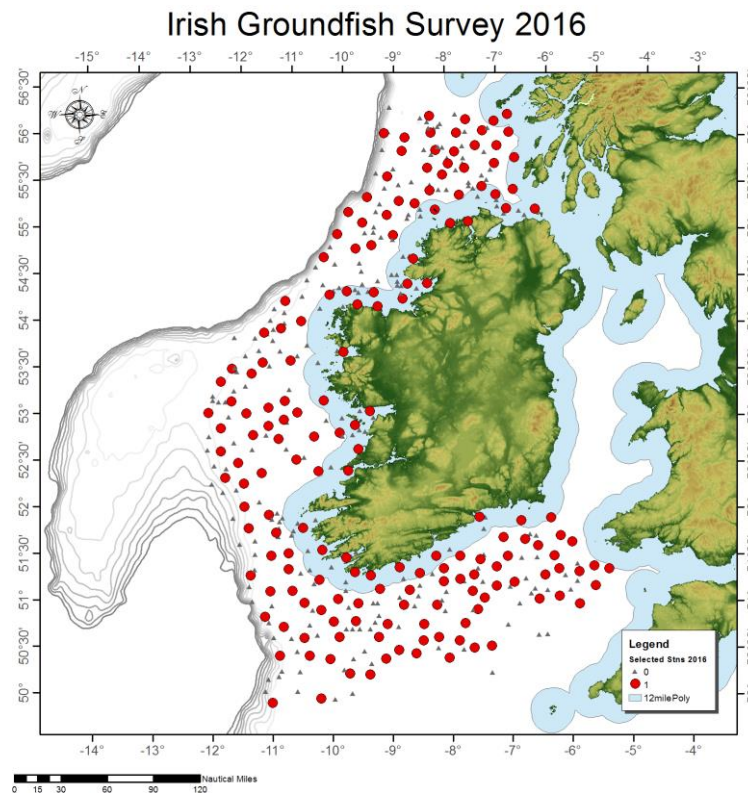


Fig 1. IGFS stations

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

The IGFS is co-ordinated under the ICES International Bottom Trawl Survey Working Group (<http://www.ices.dk/community/groups/Pages/IBTSWG.aspx>). Co-ordination occurs from Norway, Sweden, Denmark, Holland and Germany in N. Sea; to Scotland, Ireland, N. Ireland, England, France, Spain and Portugal in the NE Atlantic.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Main shared tasks are the construction of combined indices for cod, haddock and whiting between Ireland and France for WGCSE.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

*(max 450 words per survey)*

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

## Blue whiting survey

### 1. Objectives of the survey:

The primary objective of the survey is to provide an age stratified abundance and biomass index for pre-spawning /spawning aggregations of blue whiting observed over the survey area and to combine data to produce a global estimate of abundance for this widely distributed stock on the western spawning grounds.

### 2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

Survey methods applied during the survey are provided in the survey cruise report

(<http://hdl.handle.net/10793/1148>) and detailed in the Manual for International Pelagic Surveys

([http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20\(IPS\).pdf](http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20(IPS).pdf)).

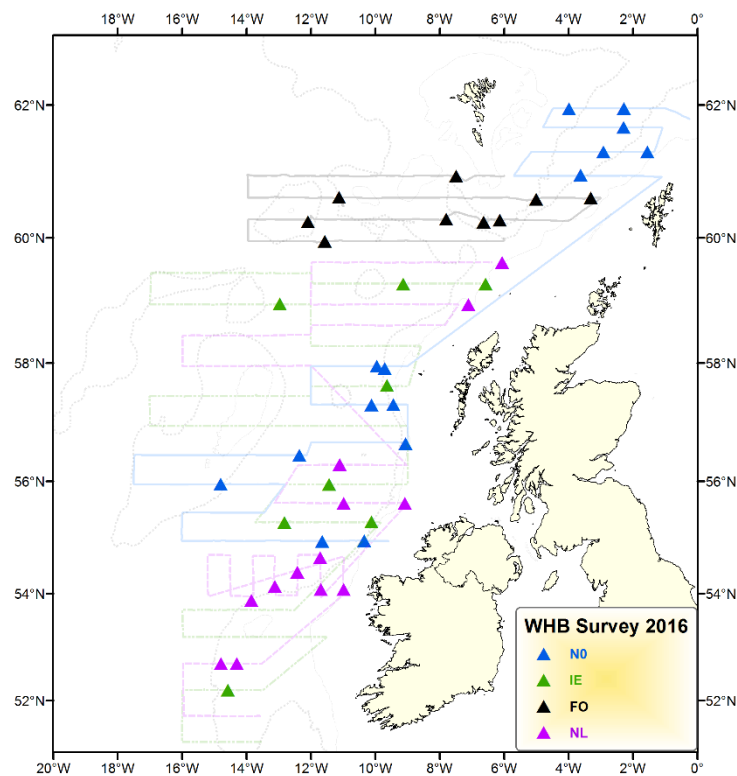


Figure 2. 2016 Blue whiting survey cruise track by nation and trawl stations (triangle).

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey.

The survey is coordinated by WGIPS through by the IBWSS survey coordinator. Details of the IBWSS area, participant countries are latest stock estimate of provided in the WGIPS report.

<http://www.ices.dk/community/groups/Pages/WGIPS.aspx>).

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Data is shared internationally between participant countries. International data is compiled to produce acoustic abundance and biomass for blue whiting. Denmark provides a scientist annually to participate in this survey as part of a cost sharing agreement.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

*(max 450 words per survey)*

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

#### International Mackerel and Horse Mackerel Egg Survey (Triennial) MEGS

1. Objectives of the survey: The surveys are carried out over a six month period every three years and provide the main fishery independent data for the assessment programme. Members collect, count and stage mackerel and horse mackerel eggs from plankton hauls. Fishing tows are also carried out to collect adult fish for fecundity and atresia estimations.

2. Description of the methods used in the survey.

The surveys are carried out over a number of time periods and areas between January and the end of July.

Participants are given time periods and areas within which to work. The survey is adaptive and participants are requested to cover their areas on alternate transects on a first pass, filling in any gaps where time allows.

During each survey double oblique plankton tows are carried out every ICES half statistical rectangle, either to within 5m of the bottom or to a maximum depth of 200m. These plankton tows are sorted and mackerel and horse mackerel eggs are extracted, counted and development stage recorded. Adult fish are collected at various latitudes for histology sample collection. The protocols used on the survey can be found in

[http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%206%20-%20MEGS%20V1.3.pdf#search=sisp%206](http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%206%20-%20MEGS%20V1.3.pdf#search=sisp%206) . Procedures for fecundity sampling can be found in

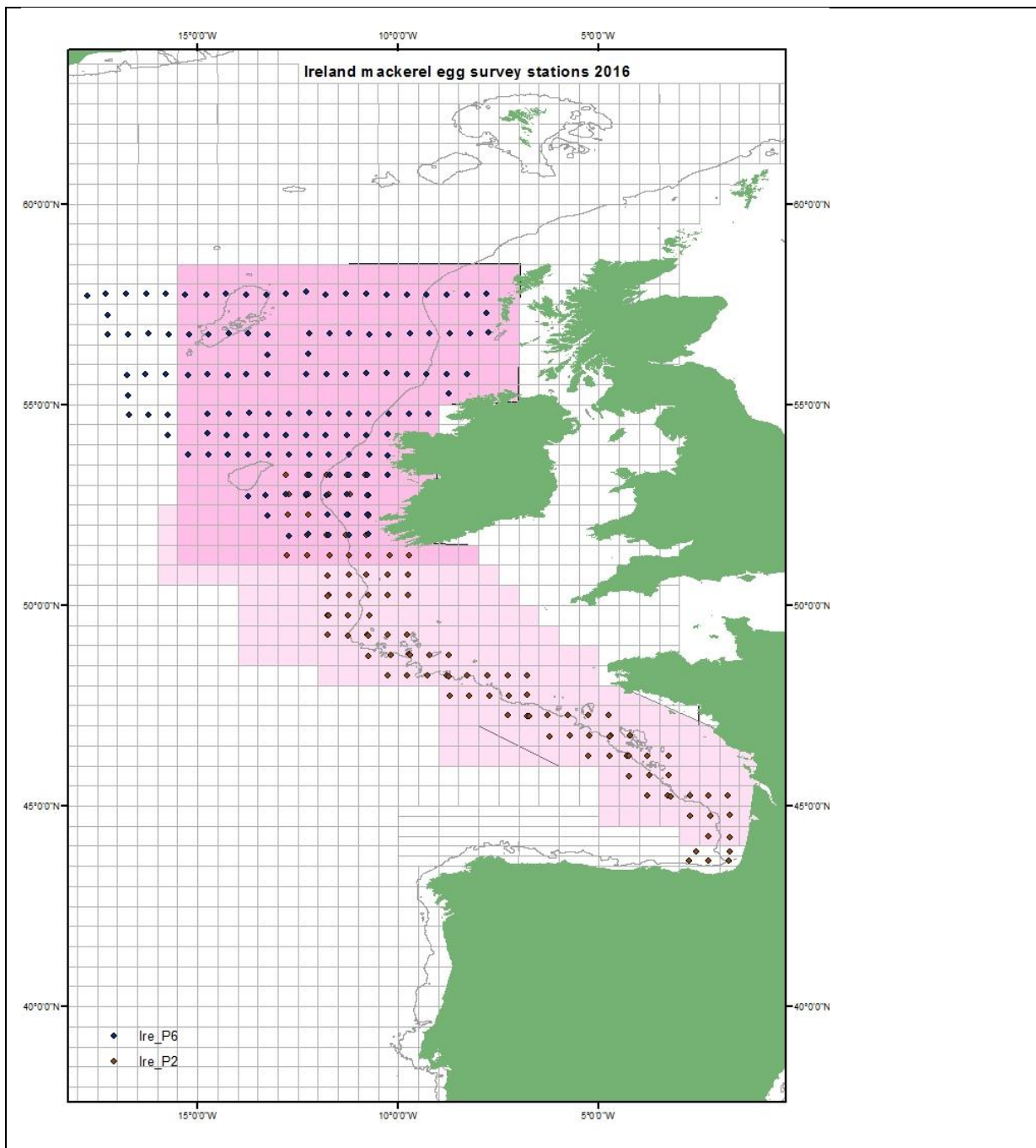


Fig 3 MEGS 2016 stations

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey: The participating states are Ireland, Scotland, Netherlands, Germany, Spain (IEO), Spain (AZTI), Portugal, Iceland, and Faroes, working either on national research or commercially chartered vessels. The survey programme is coordinated by WGMEGS.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used: Participants carry out between one and three surveys. Each member analyses their own egg

samples. Fecundity samples are pooled and analysed by five participants.

5. Explain where thresholds apply:

Share of Union TAC for target species is above 3%

*(max 450 words per survey)*

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

Spawning/Pre spawning Herring/Boarfish acoustic survey (WESPAS component )

1. Objectives of the survey:

The primary objective of the survey is to provide an age stratified abundance and biomass index for target species observed over the survey area. For the WESPAS survey this represents; spawning/pre-spawning aggregations of boarfish and feeding aggregations of Malin Shelf herring. In addition data is collected on the hydrographic conditions encountered over the survey area alongside seabird and marine mammal abundance surveys.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map).

Survey methods applied during the survey are provided in the survey cruise report and detailed in the Manual for International Pelagic Surveys

[http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20\(IPS\).pdf](http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20(IPS).pdf)

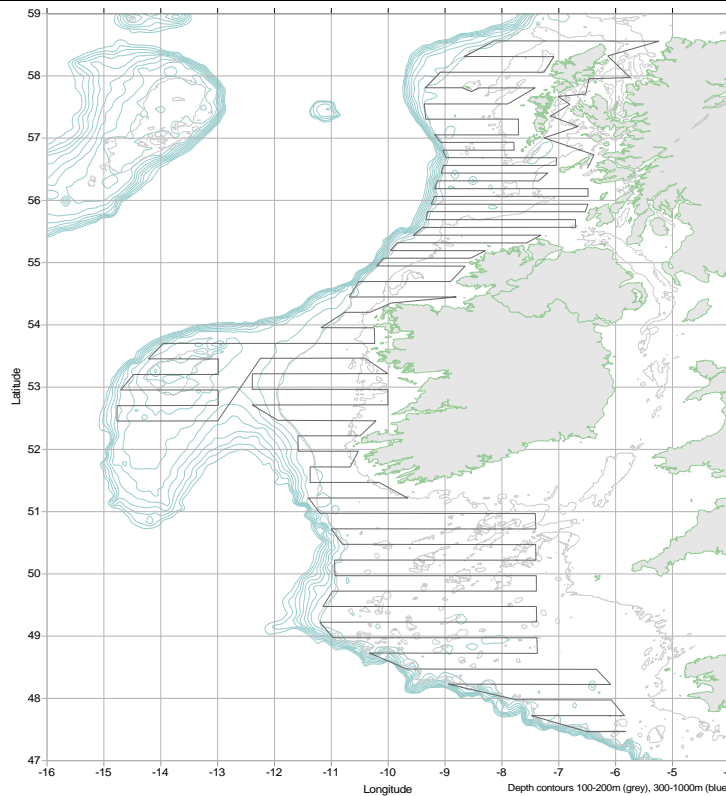


Figure 4 Spawning/Pre spawning Herring/Boarfish acoustic survey (WESPAS component) survey track 2016.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey.

The herring component of the survey is coordinated by WGIPS through by the HERAS survey coordinator. This position is rotated every four years within HERAS member countries. Details of the current HERAS coordinator and latest work schedule is provided in the latest WGIPS report (<http://www.ices.dk/community/groups/Pages/WGIPS.aspx>)

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used.

The herring component of the survey is coordinated by WGIPS through by the HERAS survey coordinator. Data is shared internationally between participant countries. International data is compiled to produce acoustic abundance and biomass for herring. Details of the HERAS area, participant countries are latest stock estimate of provided in the WGIPS report. (<http://www.ices.dk/community/groups/Pages/WGIPS.aspx>)

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

Spawning/Pre spawning Herring/Boarfish acoustic survey: (Celtic Sea Herring Acoustic Survey Component CHAS)

1. Objectives of the survey:

The objective of the survey is to provide an age stratified abundance and biomass index for pre-spawning /spawning aggregations of herring observed over the survey area.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map).

Details of survey methods outlined in the CSHAS cruise report (<http://hdl.handle.net/10793/1143>) and detailed in the Manual for International Pelagic Surveys

([http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20\(IPS\).pdf](http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20(IPS).pdf))

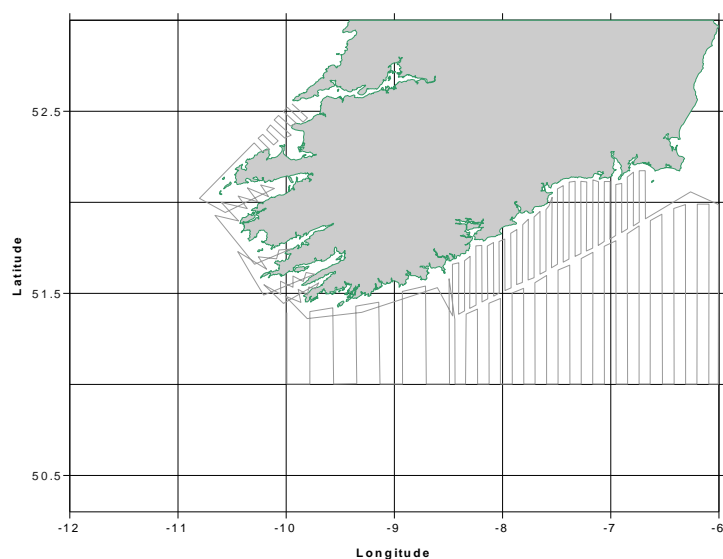


Figure 5 CSHAS survey cruise track 2015.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

NA

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing

agreement used

N/A

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

(max 450 words per survey)

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

Nephrops UWTV surveys-

These are not as described in Annex 1 but are re arranged following the recommendations in <http://oar.marine.ie/bitstream/10793/863/1/SGNEPS12%5B1%5D.pdf> where the Irish survey effort was moved from ICES division VIIa and extended in to VIIbcjk and VIIfgh

1. Objectives of the survey:

- a) To obtain quality assured estimates of *Nephrops* burrow densities for the following Functional Units FU16, 17, 19, 20-21 and 22. The number of random stations should be sufficient to cover adequately the known spatial bathymetric of the stock and should ensure a CV of less than 20% for the total abundance estimate as recommended by WGNEPS.
- b) To collect ancillary information from the UWTV footage collected at each station such as the occurrence of sea-pens, other macro benthos and fish species and trawl marks on the sea bed.
- c) To collect oceanographic data using a sledge mounted CTD.
- d) To opportunistically sample *Nephrops* and macro benthos using a 4 m beam trawls.

2. Description of the methods used in the survey.

Methods used on the surveys is described here: <http://oar.marine.ie/handle/10793/59>

The survey is typically carried out between June and August over 3 legs of 10-12 days each.

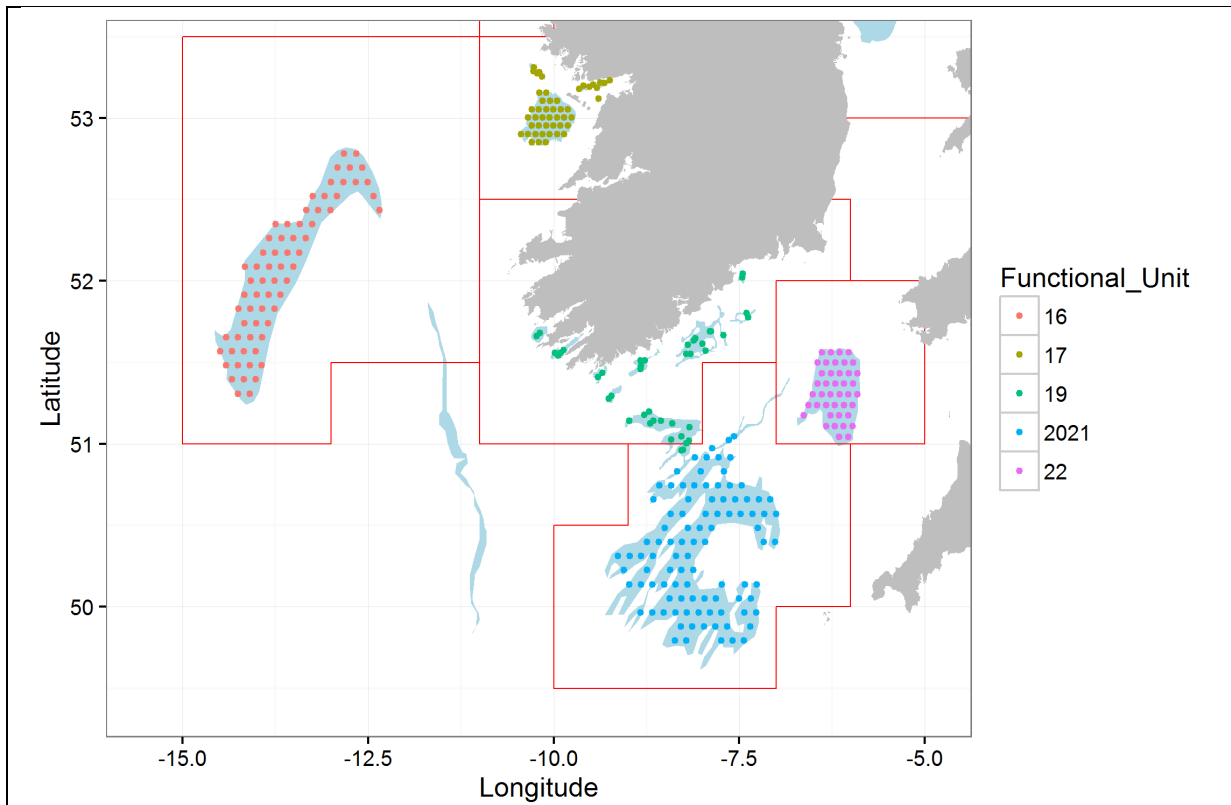


Fig 6 Planned station positions for 2016 Irish UWTV surveys.

4. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

These surveys are co-ordinated internationally by WGNPEPS  
<http://www.ices.dk/community/groups/Pages/WGNPEPS.aspx>

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

The Marine Institute task shares with the UK and France by exchanging staff between Irish UWTV surveys and those in FU14, 15 and 23.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

*(max 450 words per survey)*

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

#### Irish Anglerfish and Megrim Survey ( IAMS)

Not included in table 10.

##### 1. Objectives of the survey:

The main objective of the survey is to obtain biomass estimates for anglerfish and establish an abundance index for megrim in VIa and VII. Secondary objectives are to collect data on the distribution and relative abundance of anglerfish, megrim and other commercially exploited species. The survey also collects maturity and biological information for commercial fish species.

2. Description of the methods used in the survey. The trawl survey takes place in areas VIa and VII at depths from around 150m to 1000m and uses a bottom trawl which is based on commercial monkfish trawls. The survey operates 24 hours per day with 1-hour tows. The sampling protocol is focused on monkfish and megrim but maturity data of other 'commercial' species are also collected. The beam trawl survey extends the existing Cefas Endeavour Q2 Beam Trawl Survey westwards. This survey also operates 24 hours per day using two 4m beam trawls with 30-minute tows.

Station positions, heading and bottom depth were recorded at the moment the gear settled on the bottom and when the gear was hauled back. Tide and wind direction and speed, barometric pressure, heave, pitch and roll were recorded at the mid-point in the tow. Bottom depth and GPS position are also recorded in a SQL database at intervals of approximately 1 per second.

Catch weights, length frequency distributions and biological data (sex, live weight, maturity, age) were captured using the CEFAS Electronic Data Capture (EDC) system and stored into local Access '97 databases before being imported into a central SQL database. The CEFAS software FSS (Fishing Survey System) was used to enter station data and import catch data.

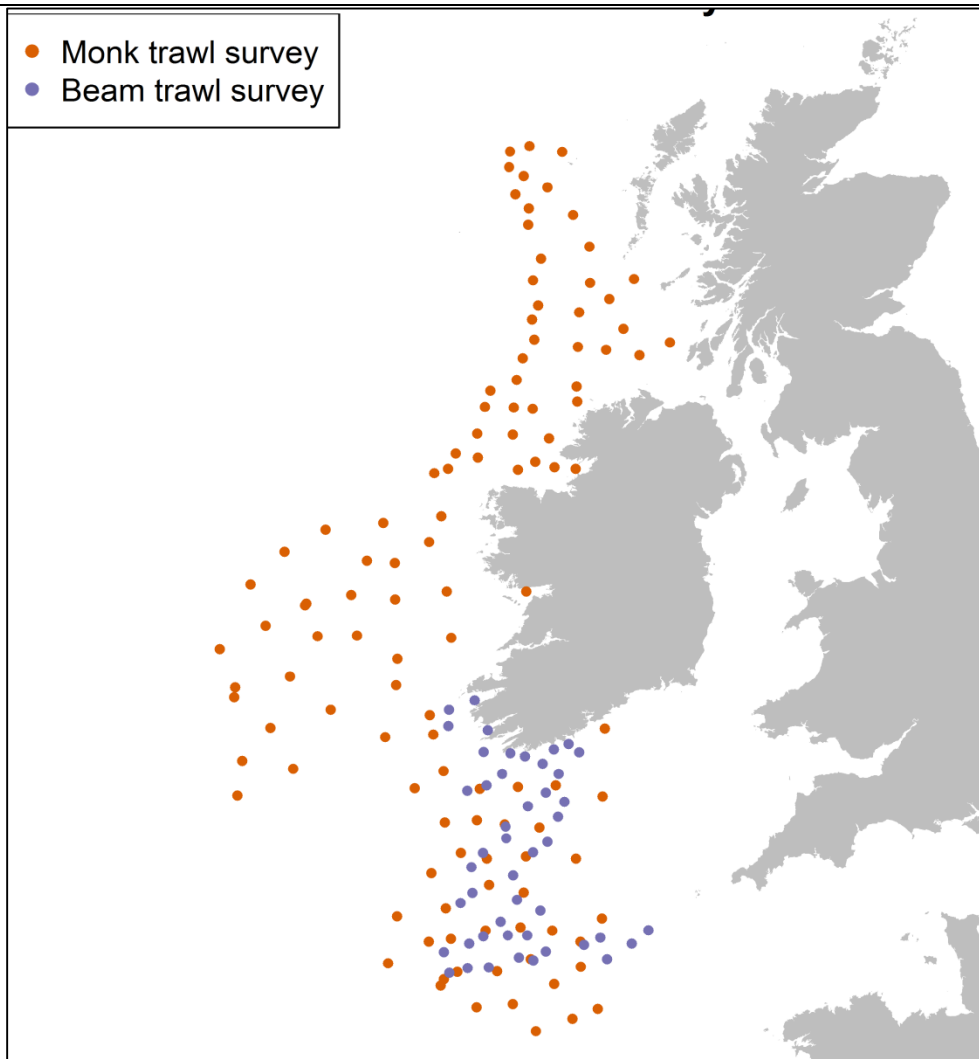


Fig 7. Completed stations from 2016 Irish Anglerfish and Megrim Survey

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey:

The survey is not formally coordinated at present. However the monkfish trawl part of the survey will be coordinated by IBTSWG and the beam trawl part of the survey will be coordinated by WGBEAM in 2017.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used:

The trawl survey will complement the Scottish monkfish survey in IV, VI, completing the spatial coverage in the south of VI. The beam trawl survey will extend the existing Cefas Endeavour Q2 Beam Trawl Survey westwards across the Celtic Sea.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

*(max 450 words per survey)*

*General Comment: This Box fulfills Chapter IV of the multi-annual Union programme and Article 2 and Article 7 paragraph (3) of this Decision. It is intended to specify which research surveys at sea set out in Table 10 of the multi-annual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multi-annual Union programme or whether it is an additional survey.*

**Name of survey: Razor clam Irish Sea (RCIS)**

1. Objectives of the survey

Estimation of biomass to provide catch advice. Monitoring of benthic habitats in the fished area.  
Correspondence between survey estimates and fishery dependent indicators

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

Stratified random based on high frequency iVMS data (Fig 7 ). Hydraulic dredge used for fish hauls. Day Grab for benthic grab samples. Enumeration of target species and other bivalves in by-catch. Size distributions target species. Marine Community assessment.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

NA

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

NA

5. Explain where thresholds apply

NA

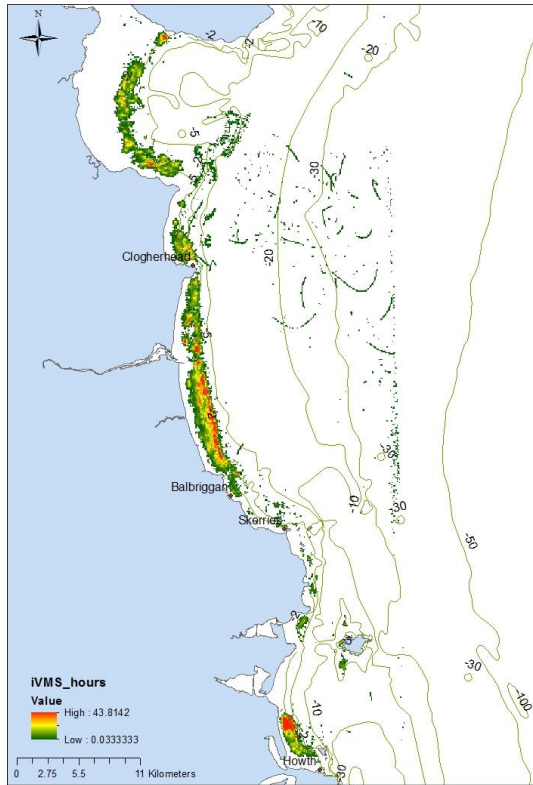


Fig 8. iVMS data showing distribution of Razor clam fishery in the north Irish Sea inside 10m depth contour.

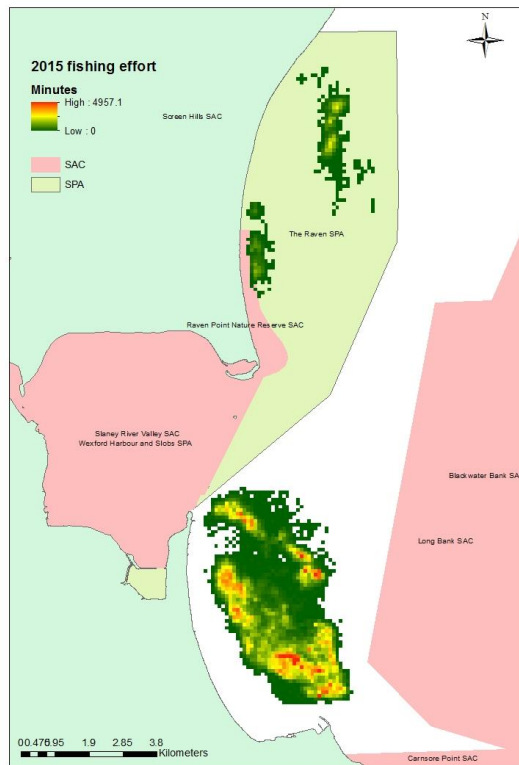


Fig 9. iVMS data showing distribution of Razor clam fishery in the south Irish Sea.

**Name of survey: Razor Clam West Ireland (RCWI)**

1. Objectives of the survey

Estimation of biomass to provide catch advice. Monitoring of benthic habitats in the fished area.  
Correspondence between survey estimates and fishery dependent indicators

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

Regular grid surveys or where available stratified surveys based on high frequency VMS data. Survey areas small <1 square kilometre for a number of locally distributed stocks. Hydraulic dredge used for fish hauls. Day Grab for benthic grab samples. Enumeration of target species and other bivalves in by-catch. Marine Community assessment.

No map available as locations are very local & dispersed

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

NA

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

NA

5. Explain where thresholds apply

NA

**Name of survey: Scallop Inshore (SIS)**

1. Objectives of the survey

Estimation of relative abundance and/or biomass in inshore scallop stocks west of Ireland

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

Regular grid surveys or where available stratified surveys based on high frequency VMS data or benthic habitats (sediments). Scallop dredge tows. Enumeration of target species and by-catch.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

NA

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

NA

5. Explain where thresholds apply

NA

**Name of survey: Cockle North Irish Sea (CNIS)**

1. Objectives of the survey

Estimation of biomass to provide catch advice. Habitat assessment and impact of fishery on designated bird

populations.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

Stratified random. Scientific quadrat sampling. Enumeration of target species and other characterising species of benthic habitat.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

NA

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

NA

5. Explain where thresholds apply

NA

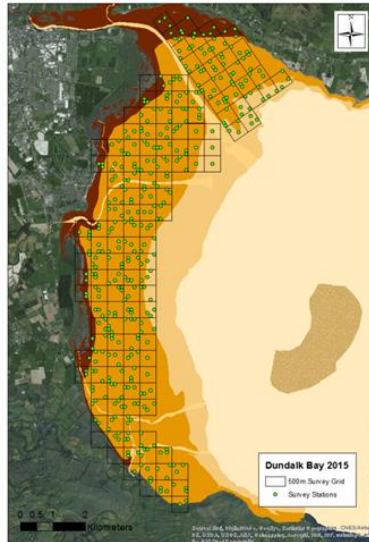


Fig. 12. Stratified random grid for cockle survey in Dundalk Bay SAC/SPA in north Irish Sea

**Name of survey: Oyster West Ireland (OWI)**

2. Objectives of the survey

Estimation of biomass to provide catch advice. Habitat assessment.

2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

Regular grid or random, oyster dredge hauls. Enumeration of target and by-catch. Size distribution data.

No map available as locations are very local & dispersed

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

NA

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

NA

5. Explain where thresholds apply

NA

## SECTION 2: FISHING ACTIVITY DATA

### **Text Box 2A: Fishing activity variables data collection strategy**

*General comment: This Box fulfills paragraph 4 of Chapter III of the multi-annual Union programme and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of this Decision. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under Regulation (EU) No 1224/2009 or where data collected under Regulation (EU) No 1224/2009 are not at the right aggregation level for the intended scientific use.*

#### 1. Description of methodologies used to cross-validate the different sources of data.

The Member State will continue to collect transversal, economic and social parameters, on a daily basis, from vessels < 12 meters in length (LOA) in a national, sentinel vessel programme. This is justified on the basis that it is not currently possible to define quantitative targets for a sampling programme for transversal parameters within metiers containing an inshore component; specifically for vessels <10 metres LOA and where official declarations of their landings are not required.

In accordance with Article 11(4) of Council Regulation (EC) No 199/2008 – defining the eligibility of self-sampling aboard Community fishing vessels – vessel owners participating in the sentinel programme will record their daily landings, effort and price data in a ‘sentinel record book’, specifically designed to capture these data, for a full calendar year.

Additionally, and to enhance the cost-effectiveness of this programme;

- Non-transversal economic parameter will also be collected, again on a daily basis, by vessels < 12 meters (LOA) participating in the sentinel programme;
- Non-operational economic parameters will also be collected at the end of the reference year. These data will be collected using a survey and an exit interview from the sentinel programme;
- Biological (length composition) and discard information will be collected on a weekly basis by vessels participating in the sentinel programme to complement the data on biological variables in these metiers.
- Daily landings and price figures are collected

#### 2. Description of methodologies used to estimate the value of landings.

Buyers and sellers (sales note) data provide estimates of landings by all vessels and value of landings at first point of sale. In addition the sentinel vessel data from the pilot programme provides data on unit value for species landed by these vessels.

#### 3. Description of methodologies used to estimate the average price (it is recommended to use weighted averages, trip by trip)

Daily landed price figures are collected in the logbooks by all vessels. These averages are weighted by segment, species and trip.

#### 4. Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)

The sample population for the sentineal programme is designed to represent the diverse inshore fisheries

sector in Ireland. Specific fisheries are targeted that represent gear usage, target species, and geographical location. The list of participants is reviewed annually to ensure that it remains representative of the small scale fisheries.

Logbooks are provided to participants every January. The logbooks record, vessel details and economic data annually. Daily logbook entries record target species, effort, landings, and economic data (fish prices, fuel prices). Weekly logbook entries record biological data of the catches. Logbooks are collected at the end of the year and data is entered and checked.

Those vessels accepted into the sentinel programme are remunerated to the amount of €1000 per vessel per annum. Remuneration is based on an average of 180 days at sea per year, and an estimated 30 - 40 minutes to record the data in the supplied sentinel record book. When the additional time commitment required from each participating vessel owner for direct contact with survey personnel, to complete the exit interview required at the end of the data collection period and to provide non-operation data are included, the total commitment amounts to 115 hours per year. Using the national minimum wage in Ireland (currently €8.65 per hour for adults over the age of 18) the total annual cost of 115 hours at €8.65 per hour is €1,000. This remuneration is deemed the minimum necessary to attract eligible fishermen into the programme and to ensure accurate and reliable data are recorded.

*(max 900 words per Region)*

## SECTION 3: ECONOMIC AND SOCIAL DATA

### **Text Box 3A: Population segments for collection of economic and social data for fisheries**

*General comment: This Box fulfills paragraph 5 points (a) and (b) of Chapter III of the multi-annual Union programme and Article 2, Article 4 paragraphs (1), (2) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Tables 5(A) and 6 of the multi-annual Union programme.*

#### **1. Description of methodologies used to choose the different sources of data**

The data sources used to collect economic and social data from fleet segments are:

- Sales notes data for landing income for vessels under 10m.
- Logbook data for effort and landing income for vessels over 10m.
- Voluntary questionnaire information returned by vessel owners targeted in the annual economic survey for all economic and social variables.
- Face-to-face/phone interviews with vessel owners to clarify any issues arising with economic and social variables from questionnaire.
- Mandatory economic and social questionnaire information returned by vessel owners applying for EU/National grant aid,
- Data from vessel owners from a national sentinel vessel programme (to collect both transversal and non-transversal economic and social data from vessels in the small scale fisheries where log-book declarations are not mandatory). See table text box 2a for details.

#### **2. Description of methodologies used to choose the different types of data collection**

Data collected through EU register, Logbook and Sales notes is treated as census data.

Given the constraints imposed by the voluntary nature of the current data collection regime, the data collection scheme for all economic variables from all métiers segments is a non-probability sample survey based on a probability sample survey design.

In 2010, a Statutory Instrument (S.I. 132 of 2010) was introduced by the MS requiring all fishery sector operators to collect and maintain economic data as listed in Annex XII of the Commission Decision.

#### **3. Description of methodologies used to choose sampling frame and allocation scheme**

The population shall be all active and inactive vessels registered in the Union Fishing Fleet Register as defined in Commission Regulation (EC) No 26/2004 (2) on 31 December of the reporting year and vessels that do not appear on the Register at that date but have fished at least one day during the reporting year.

The data sources for the national implementation for the fleet target population are:

- EU Fleet register;
- EU Log-book data.

The target population is the “commercial fishing fleet” as recorded in the EU Fleet Register on the last day of the reference year.

Fleet Segmentation: The segmentation of the fleet, will follow the guidelines in Table 5b of Commission Implementing Decision (2016/1251) and is used to stratify the collection of all, non-transversal, economic parameters.

The following data sources will be used to segment the fleet:

- EU Fleet Register on the 31<sup>st</sup> December for the reference year.
- EU log-book activity records for vessels active in the reference year (>10 meters);
- Sentinel Vessel Programme Effort Data
- Recorded fishing activity from previous economic surveys.

Individual vessels are assigned to fleet segments by overall length (LOA) class and the main fishing method engaged in by the vessel, in the previous calendar year. In cases where there is a risk of natural persons and/or legal entities being identified clustering may be applied to report economic variables in order to ensure statistical confidentiality. Such a clustering scheme shall be consistent over time.

The source of information used to distinguish the sampling frame from the target population, will be based on EU logbook data as follows:

- Active Vessels: For vessels greater than 10 meters in overall length, only those with at least one entry in the EU log-book, in the reference year, will be deemed active. This analysis will take place once the log-book data are available for a particular reference year, which is approximately 3 months after the end of the calendar year (March n-1);
- For vessels less than 10 meters in overall length, an estimate of inactivity will be conducted each year using all available sources, including: previous survey responses, the National Inshore Sentinel programme, sales notes data and the fleet register.

Required sampling intensities have been estimated using statistical analysis of the previous year's survey data. The analysis determines required sample size  $n$ , based on the mean of a finite population, to achieve a given level of precision (e.g., a CV of 25% on the sample mean).

$$n = s^2 / \left( \widehat{CV}(\bar{y})^2 \bar{y}^2 + \frac{s^2}{N} \right)$$

Applying the function we can see that for very low CV, all vessels need to be sampled and that the required sample number increases with the standard deviation of the segment. However, due to the finite population function you can never sample more than the full population (census). Some segment have a planned sample rate of 0% as the number of active vessel in the segment are very low ( $n < 5$ ). These segments have been presented in their entirety in Table 3A (Sample Rate 'N') but will most likely be clustered with similar segments which have higher number of vessels for data submission.

#### 4. Description of methodologies used for estimation procedures

Recognising the implications and influences imposed by the voluntary nature of the annual survey on the probability sample survey design, the Horvitz-Thompson estimator along with standard appropriate raising techniques will be used, to derive final estimates for each variable collected. However, this methodology is currently under review and it was not complete by the time the work programme was submitted.

Imputation of non-responses and non-response adjustments: Non-responses to the probability Sample survey design will match the characteristics defined by the fleet segment category and were possible predicted using regression analysis.

In accordance with Appendix VI of Commission Decision (2008/199/EC), the Perpetual Inventory Method (PIM) will be applied to estimate capital value and costs for each of the fleet segments.

Capacity indicators and capital value will be estimated for all vessels on the register, regardless of their activity. The following sources will be used to estimate the input parameters to the PIM model:

- Questions on fixed assets, investments, and depreciation from the annual economic survey,
- EU fleet register,
- EU log-book data
- Sentinel vessel programme,

A harmonised FTE will be estimated for each of the fleet segments. For vessels >10 meters in length (LOA),

operational data from log-book submissions will be used in the estimation of fishing time on a trip-by-trip basis. In addition, there are several questions on the annual economic survey forms that deal specifically with hours worked and the nature of the engagement (full-time, part-time, casual). Questions regarding gender breakdown and age profiles will be added to the survey.

#### **5. Description of methodologies used on data quality**

The sampling intensity is based on an analysis of the variance of historic, operational data, as these have proved to be the most uniform, with the aim of achieving a precision of 25% at a 95% confidence level. Variances within fixed costs have proved much higher than expected and, as such, quality will be measured at a coverage rate, commensurate with the target precision for the non-operational parameters. The Member State is currently undergoing a review of its statistical methodologies.

Data for the 2017-2019 work Programme will be submitted electronically via interactive PDF forms and website interface to a centralised database, with pre-validation necessary before the accountants can successfully submit the forms. A secondary validation process will be performed on the data once received, and any erroneous data will be queried directly with the vessel owners or their accountants, by survey personnel. Similarly, any erroneous data supplied by vessel owners, contracted under the sentinel vessel programme, will be queried and rectified by survey personnel, as and when it arises, or at the exit interview stage of the programme.

Although error associated with bias and variability will effectively be introduced if observed returns do not match those expected, these descriptors will be reported where possible and with appropriate caveats.

The issue of consistency of data coming from different data sources is recognized as being of significant importance. The introduction of bias in this area, is under continual assessment and is currently being addressed by restricting acceptance of data to a small number of official data streams (i.e. data items consistent with fields in annual company returns (provided via accountants), EU logbook data and Sales notes data).

## SECTION 3: ECONOMIC AND SOCIAL DATA

### **Pilot Study 3: Data on employment by education level and nationality**

*General comment: This Box fulfills paragraph 5 point (b) and paragraph 6 point (b) of Chapter III of the multi-annual Union programme and Article 2 and Article 3 paragraph (3) point (c) of this Decision. It is intended to specify data to be collected under Table 6 of the multi-annual Union programme.*

#### **1. Aim of pilot study**

Assess feasibility of gathering data on social variables from the fisheries and aquaculture sector as listed in Table 6 of the EUMAP multi-annual programme.

#### **2. Duration of pilot study**

Three years. Data gathering exercise, where necessary, will be designed and commence in 2017. The first round of data will then be available in early formats in 2018. The data collection methodology can be redefined in 2018 based on the initial data gathering exercise and improved upon for data collection in 2018 with output in 2019.

#### **3. Methodology and expected outcomes of pilot study**

Data will be collected either by direct census or sample survey and by access to indirect sources if these can be identified.

Outcomes of the pilot study are hard to predict without any clear guidance in Table 6 on the metrics to be used for data collection for the variables employment by age, employment by education level, and employment status. Client reaction to questions on education will depend on whether the education level referred to in Table 6 is specific, career related training or primary, secondary, tertiary level formal education. The latter may be a sensitive matter for the client as well as the client's age category, should that data be required in the near future.

*(max 900 words)*

## SECTION 3: ECONOMIC AND SOCIAL DATA

### **Text Box 3B: Population segments for collection of economic and social data for aquaculture**

*General comment: This Box fulfills paragraph 6 points (a) and (b) of Chapter III of the multi-annual Union programme and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Tables 6 and 7 of the multi-annual Union programme.*

#### **1. Description of methodologies used to choose the different sources of data**

The source of variable data are chosen on the basis of quality consistency and accessibility. Business owners are found to be the best source for input-output production data and employment breakdown and operational costs data. Detailed accounts, when these can be obtained, also provide an accurate source of operational costs and accounts data. These data sources are more detailed than the abridged accounts found on-line which are also obtained.

Economic Data is also collected as part of national grants or training applications and must be provided to obtain these grants. Finally local officers can be called on to provide estimates based on their regular visits to non compliant business. Some raw material input data can be sourced from both the census questionnaire survey and from other agency surveys. Bottom mussel seed data taken from landings data for example, is preferred over the in-house Census source, due to greater proximity to real time and close monitoring of activity. Oyster seed input data from the in-house Census can be compared with import data from other sources for quality assessment.

#### **2. Description of methodologies used to choose the different types of data collection**

The type of data collection used follow in order of choice and/or necessity:

Direct:- census survey or sample survey questionnaires to clients,

Indirect:- Online sample survey of Business accounts, aggregated data of other surveys conducted in-house or by other state agencies or a combination of methods where appropriate.

Overall the methods used to collect data for a particular variable are those proven over time to be the most effective in terms of accuracy, continuity of supply and minimum burden on the survey population. Thus production input-output volumes, costs and values and employment breakdown are collected by the direct method of census survey as this approach is a long established practice, easily participated in and appreciated by clients as published results quickly follow the survey. Participation level in the production and employment census is generally about 80% of the total population.

The majority of clients are small operators for whom access to accountants is limited by cost and for many, financial data is sensitive to exposure. Access to full accounts documents from such businesses is limited to those submitted for grants purposes through on-line surveys. Such online data however is limited by exemption law and therefore operational costs data and some accounts data is obtained by direct sample questionnaire.

Sample surveys are non random due to the diverse non-homogenous nature of aquaculture segments and

business size in the Republic of Ireland. They consist of a questionnaire to a rotating 25% sample of the active commercial businesses annually for operational costs variables, some financial variables not found in abridged accounts and the new socio-economic variables. The latter may be collected by access to indirect sources from existing data collection exercises or from other agencies. Each business is requested therefore to fill a sample questionnaire once every 4 years and a census questionnaire annually. A larger sample of abridged accounts is obtained on-line; 33% of the population annually. This allows for the continuous on-line data collection from indicator companies annually in the larger segments as well as gathering sample data.

### **3. Description of methodologies used to choose sampling frame and allocation scheme**

The census is conducted on all commercial businesses of the population. That is, all businesses producing stock for purposes of sale and profit generation. This means that non-profit state owned enterprises and moribund businesses (no stock, no employment during surveyed period) are excluded from the frame. The 25 % sample is extracted from the same frame as the census. The rotating 25% sample was chosen by choosing a profile through the population, based on average turnover from each aquaculture segment. The segments are from the templates provided, populated by businesses based on Species and culture technique

### **4. Description of methodologies used for estimation procedures**

Data for non participants of the census is estimated in order of preferred method thus:

- Estimate of the local officer in contact with the non survey participant is used if available.
- Average historical performance of the business has been used to predict variables in instances of non-compliance with the survey. The % trend of the nearest participating business. ie if the neighbour is up n% or down n%, the 'n' trend is applied to the historical average of the non-participant.

If neither option above is possible, indirect data from other agencies can be applied to obtain scale of production activity such as seed input, while abridged accounts will be available on-line if the business is a company.

For sampled variables, national level data is estimated from sample data by summing up the total turnover value of the sample, where individual turnover values were obtained through Census survey, expressing this sample sum as a % value of the national turnover value, also obtained through Census and ascribing this % to the sum values of other sample variables and extrapolating up to the 100 % equivalent values accordingly.

If feed volume data is not acquired by questionnaire then it is generated by applying the average FCR for the species to the weight gained from input weight to sales weight.

The minimum expected wage was calculated by multiplying the national minimum wage by the FTE of the segment obtained through census. The addition of the new related variables 'number of unpaid' and number of hours worked by them may simplify estimations.

### **5. Description of methodologies used on data quality**

Variable data obtained from both questionnaire and indirect sources such as from other in-house or other agency data or business accounts are compared and the data used will be from the most competent source.

Bottom mussel seed input data is taken from landings data if available rather than from the census due to the formers recording at the point of fishing activity. The census is chosen as the best source for oyster seed input due to its recording of what was actually input over what was intended to be input. Turnover, employment and other variables are comparable between questionnaire and accounts sources depending on the style of accounts presentation. To aid in this, only accounts by calendar years are used to compare with calendar based census to check the quality of the latter data source.

*(max 1000 words)*

SECTION 3: ECONOMIC AND SOCIAL DATA

**Pilot Study 4: Environmental data on aquaculture**

*General comment: This Box fulfills paragraph 6 point (c) of Chapter III of the multi-annual Union programme and Article 2 and Article 4 paragraph (3) point (d) of this Decision. It is intended to specify data to be collected under Table 8 of the multi-annual Union programme.*

**1. Aim of pilot study**

Assess feasibility of gathering environmental data from aquaculture sector in terms of data quality and consistency over a time period.

**2. Duration of pilot study**

Three years, 2017-2019.

**3. Methodology and expected outcomes of pilot study**

Data will be collected by direct census survey and by access to indirect sources if these can be identified and collated. It is not known what level of data quantity or quality will be gathered for Chemical/medicinal inputs. The percentage of mortality should be gathered to a reasonable level of accuracy for intensive mollusc culture such as oysters but it will be more difficult in the case of extensive bottom cultures such as bottom mussels and native oysters.

*(max 900 words)*

## SECTION 3: ECONOMIC AND SOCIAL DATA

### **Text Box 3C: Population segments for collection of economic and social data for the processing industry**

*General comment: This Box fulfills footnote 6 of paragraph 1.1(d) of Chapter III of the multi-annual Union programme, Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Table 11 of the multi-annual Union programme.*

#### **1. Description of methodologies used to choose the different sources of data**

The data collection scheme for all processing sector variables may be collected on a voluntary basis as per Table 11 of Commission Implementing Decisions (EU) 2016/1251. The data source for the target population is the national database of registered processing companies in the seafood sector.

Data in relation to employment will be gathered in an annual employment survey which is sent out to every seafood processing company in the Republic of Ireland. Data collected relates to numbers of employees full-time, part-time and casual including a breakdown by gender.

Data for all other variables will be collected by

- Data submitted voluntarily by processing enterprises via questionnaire
- Abridged Company accounts

#### **2. Description of methodologies used to choose the different types of data collection**

Total population sampling will be by non-probability sample survey for all variables excluding employment data which will be gathered by census method.

#### **3. Description of methodologies used to choose sampling frame and allocation scheme**

Examining the total number employed by each processors in 2015, there were 92 companies in the “≤ 10” category size, 47 in the “11 – 49” category, and 22 in the “50 – 249” category. A survey sampling rate of 10% in the “≤ 10” category, 30% in the “11 – 49” category, and 35% in the “50 – 249” category is deemed sufficient coverage to get a good representative sample of the sector. This represents a total of 31 companies, or 19% of the total population. As the majority of seafood processing companies in Ireland are limited liability (Ltd) companies they are required to publish abridged accounts on an annual basis. The Member State will carry out an analysis of these audited accounts through the Companies Registration Office (CRO).

Although the voluntary nature of the annual survey prevents the practical development of the sampling frame, the development of such innovation will represent a core function of the DCF staff group.

#### **4. Description of methodologies used for estimation procedures**

Recognising the implications and influences imposed by the voluntary nature of the annual survey on the

census survey design the best statistical methods will be utilised to derive final estimates for each variable collected.

An estimation of unpaid labour, in any, by family members or other will be ascertained by using best information available in relation to unpaid labour and using total employment and average wages, or national minimum wage, and salaries as an estimator. In time a question may be added to the questionnaire to gather the information on this variable.

Employment will be collected by total engaged in the sector by enterprise, and a national FTE based on the average industrial working week of 40 hours with 20 days annual leave and 9 public holidays. This equates to 230 working days, or 1840 hours annually. This compares with 2000 hours as recommended for a harmonised EU FTE, as stated in Study No FISH/2005/14 "Calculation of labour including FTE (full-time equivalents) in fisheries.

For all other variables the company questionnaire and the abridged company accounts will be examined to complete these parameters.

#### **5. Description of methodologies used on data quality**

There are no stated precision requirements for collecting data in the processing industry sector. As such, the Member State is using the percentage coverage of the size categories as the measure of quality. For some parameters, a census will be conducted from publicly available sources. These include employment statistics. The format of the abridged accounts of companies vary significantly in the detail supplied, necessitating the Member State to request additional information from those companies selected in the sampling frame where the data are lacking in the published accounts. This is currently run on a voluntary basis, and hence the quality of the data is dependent on compliance within the industry. Certain data collected via questionnaire will be validated, where possible, against their published end-of-year abridged accounts.

*(max 1000 words)*

## SECTION 4: SAMPLING STRATEGY FOR BIOLOGICAL DATA FROM COMMERCIAL FISHERIES

### Text Box 4A: Sampling plan description for biological data

*General Comment: This Box fulfills Article 3, Article 4 paragraph (4) and Article 8 of this Decision and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multi-annual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multi-annual Union programme.*

Description of the sampling plan according to Article 5 paragraph (3) of this Decision  
(max 900 words per Region)

#### **Sampling for population parameters (sex ratio and maturity) of demersal species**

These parameters are generally collected on surveys (sampling plans described in Text Box 1G).

#### **Sampling on shore- demersal and pelagic fish species**

Guidelines: ICES WGCATCH (statistically sound sampling)

Purpose: Length, age, weight data of landings and sex/maturity of pelagic landings

Design: Class C - sites x time

Expected difficulties: Refusals related to landing obligation

Data archiving: Secure SQL database and RDB

Quality assurance: Data entry checks and database validation, visual inspection of outliers

Analysis: Estimation procedure adapted from COST project.

Sampling frame: top 21 ports x time for demersal, and top 7 ports for pelagics

Sample selection PSU: Port-day - random, weighted by landings in previous 2 years.

Sample selection SSU: Stock – ad-hoc, based on target number of samples per stock

Sample selection TSU: Size grade – ad-hoc, at least one box per grade

Coverage: sampled ports receive >95% of landings of demersal and pelagic species into Ireland (3% of demersal landings and 15% of pelagic landings are in foreign ports which are covered under bilateral agreements ( see table 7c); <1% of the total landings are sampled.

Stratification: 5 regions, 4 quarters

Targets: 1) number of port visits; 2) number of samples per stock; 3) number of age structures per sample

Quality: No major bias identified, targets are based on optimising precision for 26 demersal stocks and 9 pelagic stocks

#### **Demersal at-sea Pelagic at-sea**

Guidelines: ICES WGCATCH (statistically sound sampling)

Purpose: Length, age, weight data of discards and landings of demersal species & Pelagics (excluding Nephrops)

Design: Class A - vessels x time

Expected difficulties: Refusals, mainly related to landing obligation; logistics

Data archiving: Secure SQL database and RDB

Quality assurance: Data entry checks and database validation, visual inspection of outliers

Analysis: R code and markdown

Sampling frame: vessels x time

Sample selection PSU: vessel x time – currently ad-hoc, will move to random draw list, weighted by number of trips or landings in previous years

Sample selection SSU: haul – ad-hoc, dictated by rest periods

Sample selection TSU: discard sample – random box

Coverage: around 1% of the total number of trips are sampled.

Stratification: 4 regions, 4 quarters for demersals, 5 regions, 2 quarters for pelagics

Targets: 1) number of observer trips; 2) number of hauls per trip 3) representative amount of commercial fish sampled per haul/trip 4) All discard fish measured per sample unit

Quality: Possible bias due to refusals, precision is determined by number of trips

**Crustacean at-sea Sampling on shore for Nephrops**

Guidelines: ICES WGCATCH (statistically sound sampling), WKNEPH (2013)

Purpose: Length, sex, maturity data of discards and landings

Design: Class A - vessels x time

Expected difficulties: Refusals, mainly related to landing obligation; logistics

Data archiving: Secure SQL database

Quality assurance: Electronic data capture. Quality assurance using NEMESYS software

Analysis: R code and markdown

Sampling frame: vessels x time

Sample selection PSU: vessel x time – currently ad-hoc, will move to sampling a reference fleet.

Sample selection SSU: haul – ad-hoc

Sample selection TSU: discard sample – random box, catch sample – random box, graded landings (FU16)

Coverage: around 1% of the total number of trips are sampled.

Stratification: 6 FUs, 4 quarters

Targets: 1) number of trips

Quality: Possible bias due to refusals, bias due to seasonal variation, precision is determined by number of trips

**Crustacean at-sea Molluscs at-sea (crab lobster, bivalves)**

Guidelines: ICES WGCATCH (statistically sound sampling)

Purpose: Length, weight data of discards and landings of shellfish (except Nephrops), biomass estimates for bivalves

Design: Class A - vessels x time, stratified random or grid sampling for bivalves

Expected difficulties: Refusals, logistics, weather

Data archiving: Secure SQL database

Quality assurance: Data entry checks and database validation, visual inspection of outliers

Analysis: R, Arcmap, spatial analysis

Sampling frame: crustaceans: vessels x time, bivalves: stock distributional extent for bivalves

Sample selection PSU: crustaceans: vessel x time – currently ad-hoc. Bivalves: haul

Sample selection SSU: census, all hauls sampled

Sample selection TSU: random sample or total catch

Coverage: crustaceans: <1% of the total number of trips are sampled (Inshore fleet). Bivalves: full coverage of geographic stock distribution area

Stratification: crustaceans: 5 regions, 3 quarters, Bivalves: none

Targets: 1) number of catch sampling trips; 2) number of hauls per trip

Quality: Crustaceans: Possible bias due vessel selection (mainly larger vessels are sampled)

**Sampling on shore (crab lobster, bivalves, whelks)**

Guidelines: ICES WGCATCH (statistically sound sampling)

Purpose: Length, age (where possible), weight data of landings of shellfish species (Pecten, Homarus, Cancer, Buccinum)

Design: Class C - sites x time

Expected difficulties: Prior grading of landings, time constraints at processing plants

Data archiving: Secure SQL database and RDB

Quality assurance: Data entry checks and database validation, visual inspection of outliers

Analysis: Estimation procedure adapted from COST project where possible

Sampling frame: ports targeted based on location of >80% of landings.

Sample selection PSU: Fishing trip or 'fishing trip x ICES rectangle' or 'bulk landing'

Sample selection SSU: Unit of landing (box, bag, tank)

Sample selection TSU: Size grade – ad-hoc

Coverage: sampled ports receive >80% of landings of Pecten and Buccinum >80% and >20% of landings of Homarus and Cancer. <1% of trips sampled.

Stratification: 3 regions, 6-9 months

Targets: 1) number of port visits; 2) number of samples per stock; 3) number of age structures per sample where possible

Quality: poor identification of origin in bulk landings, bias due to poor spatial coverage