

# Irish Fish and Fisheries Monitoring Programme

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(14.09.14)

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# 1 IRISH FISH AND FISHERIES MONITORING PROGRAMME

## 1.1 OVERALL APPROACH OF THE MONITORING PROGRAMME

The Irish monitoring programme for Descriptor 3 “Commercial fish and shellfish” and fish biodiversity (D1, D4 and D6) is based on the monitoring required under the obligation of the Data Collection Framework Directive (EC 665/2008; 2010/93/EU) for the implementation of the Common Fisheries Policy and for additional stocks/species of national importance. There are two main sources of data collected as part of Ireland’s monitoring programme; fishery independent and fishery dependent data. The first involves monitoring the temporal and spatial changes in the fish populations using fisheries surveys on research vessels and commercial vessels. Fishery dependant data involves collecting and analysing biological data (age, length etc.) of the fish caught, together with data on the quantities of fish caught and the fishing effort. The fish and fisheries monitoring programme includes the evaluation of the fishing sector using capacity and activity, pressure monitoring of contributing activities in terms of distribution and intensity of effort, landings and discards of fish and shellfish and accidental bycatch of other species. Pressure on habitats is partially monitored based on the spatial and temporal distribution of bottom contacting fishing gear within mapped habitats. The monitoring programme also covers status monitoring through the use of dedicated scientific fish and shellfish surveys which estimate the distribution and relative abundance of different fish and shellfish species and the collection of biological parameters.

Integration of monitoring programme

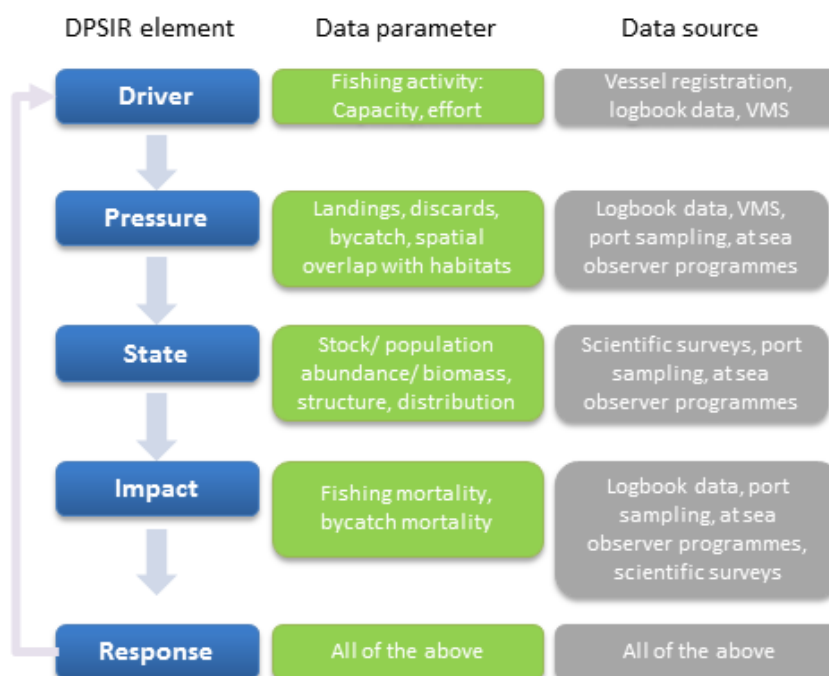


Figure 1. Parameters monitored under the Irish fish and fisheries monitoring programme and how it relates to the DPSIR approach

## 1.2 ADAPTING TO NEW AND EMERGING ENVIRONMENTAL PROBLEMS IN RELATION TO FISH AND SHELLFISH POPULATIONS

In addition to depleted stocks resulting from periods of overfishing, fish and shellfish populations are potentially affected by a number of new and emerging environmental problems, including climate change, ocean acidification, loss in biodiversity. Fisheries are additionally implicated by the increased usage of the marine space by other sectors such as renewable energy development, shipping, tourism & leisure, aquaculture, oil and gas exploration. The fish and fisheries monitoring programme addresses potential effects of climate change by monitoring the distribution and productivity of fish and shellfish populations, while the monitoring of changes in recruitment for commercial stocks allows to detect responses of fish populations to environmental variability, including suboptimal conditions. Populations are monitored for their status in relation to fishing allowing an assessment of whether populations are overfished, depleted or recovering while the evaluation of population diagnostics and condition allows detection of biological responses to environmental and or anthropogenic pressures.

## 1.3 ASSESSMENT NEEDS

### 1.3.1 For Descriptor 3 Commercial fish and shellfish in relation to targets

Descriptor 3 requires the assessment of commercial fish and shellfish stocks with respect to criteria 3.1 fishing mortality in relation to maximum sustainable yield (MSY), criteria 3.2 of reproductive capacity and criteria 3.3 of population size and age distribution. The monitoring programme provides the data required to compute the primary and secondary indicators to evaluate the progress towards MSY targets for the main commercial species. Note that fully developed assessments methodologies to determine fishing mortality and biomass against MSY reference points are not yet in place for all commercial species.

### 1.3.2 Provision of data/information to support assessment of the Descriptor (or particular biodiversity component programme for D1, 4, 6);

The data collected as part of the fisheries monitoring programme does not only feed into the assessment of Descriptor 3, but also into the assessment of other Descriptors in particular the biodiversity Descriptors 1, 4 and 6 as summarised in Table 1 below.

**Table 1. Activities under the Irish fish and fisheries monitoring programme and how they support assessments of biodiversity Descriptors 1, 4 and 6.**

Monitoring Sub-programme	Parameters/indicators*	Criteria	Descriptor/Sub-Programme
Other fish surveys (e.g. trawl, acoustic, underwater TV, egg, abundance/biomass)	Distributional range; Distributional pattern; Population size; Population condition of commercial and non-commercial fish species including prey species	1.1; 1.2; 1.3; 4.3.	D1- Biodiversity- fish and cephalopods D4- Foodwebs

Monitoring Sub-programme	Parameters/indicators*	Criteria	Descriptor/Sub-Programme
Irish Groundfish survey	Distributional range; Distributional pattern; Population size; Population condition of commercial and non-commercial fish species including preyspecies and top predators; Proportion of large fish; Mean maximum length of fish community; Quantity of Litter on the seafloor per swept area.	1.1; 1.2; 1.3; 1.6; 4.1; 4.2; 4.3; 10.1.	D1- Biodiversity- fish and cephalopods D4- Foodwebs
Sampling at Sea Programme	Bycatch of marine mammal and seabirds; PET and non-commercial fish species/cephalopods; Discarding rates	Pressure monitoring D1,D4	D1 - Biodiversity marine mammals; D1- Biodiversity, seabirds, reptiles, fish and cephalopods D4- Foodwebs
VMS, Logbook data	Spatial and temporal distribution of fishing effort, by gear and country for over 12m vessels; Spatial footprint of <12m inside NATURA sites; Spatial catch information for Irish vessels >10m.	Pressure monitoring for D1,4,6	D1- Biodiversity- fish and cephalopods D4- Foodwebs D6- Seafloor integrity

\* Provisional/potential

### 1.3.3 Determining the distance from GES and trends in status:

Under Descriptor 3, the distance from GES can be directly determined for stocks with full stock assessments (ICES data category 1 stocks), by calculating fishing mortality and biomass and comparing these to stock specific MSY reference points (or in the absence of MSY, reference points corresponding to the precautionary approach). Data can be aggregated across stocks, within the same category and across criteria 3.1 and 3.2. Trends in status for criteria 3.1 and 3.2 can be determined for all stocks in ICES data categories 2 and 3. Trends in status for criteria 3.3 can be determined for all stocks which have length distributions from surveys; this includes most stocks in ICES data categories 1, 2 and 3. Descriptions of the data categories are found in the ICES introduction to advice (ICES 2014a), while a breakdown of stocks in the Celtic Seas assessment area by data category is given in ICES (2014b). Under biodiversity Descriptors 1 and 6 trends in status can be determined; however appropriate reference levels have not been defined for all indicators. For D4, surveillance indicators are proposed to monitor whether food webs are inside or outside previously observed ranges and attribute changes to natural variability and/or human pressures.

### 1.3.4 Natural and climatic variability vs. effects of anthropogenic pressures:

In relation to Descriptor 3, fish stock assessments for stocks in ICES data category 1 and 2 differentiate between natural /climatic variability and anthropogenic pressures, by assessing the mortality of a fish stock due to natural causes (M) and mortality due to fishing (F). Determination of fishing mortality allows evaluating the underlying causes for the fluctuation in biomass, population structure and variability in recruitment, which in turn is influenced by early survival/mortality due to

natural causes and the size of the spawning stock biomass. Currently, natural and climatic variability is being accounted for in stock assessments, but it is not being included as determining factors. For stocks in ICES data categories 3-6, there is no direct differentiation between natural variability and anthropogenic pressures, i.e. fishing mortality; but the variation in status is evaluated against the change in pressure by using F proxies such as catches over biomass. This allows a qualitative evaluation of natural and climatic variability vs. fishing effects. As part of the precautionary approach, ICES applies buffers of uncertainty to its management targets and the size of the buffer reflects the level of uncertainty.

For most fish indicators under biodiversity Descriptors D1, D4 and D6 the relationship between pressure and state is indirect and more complex than for D3 and the fluctuations of indicators are strongly influenced by natural variability. The biodiversity Descriptors are sensitive to climate change as the changing climate superimposes shifts onto prevailing natural conditions, affecting the potential to achieving GES. It is envisaged that the monitoring programme will be linked to a suite of environmental variables (e.g. physico-chemical parameters collected under Ireland’s monitoring programmes for D1, 4 Water Column Habitats) and cover several trophic levels in order to track prevailing physiographic and climate conditions of the region. Natural variability will be reflected in the definition of “acceptable ranges”.

### 1.3.5 Response to risks of not achieving GES

For Descriptor 3, a decline of indicators below reference levels or negative trends of indicators without reference levels will trigger corrective management actions (e.g. change in TACs, introduction of technical measures, effort control). Monitoring will follow the response of status to the management measures which are put in place. If status fails to respond to corrective measures, management action is adjusted. However, if stocks are depleted and fisheries are closed as a result, monitoring can be restricted to pressure monitoring (catches including bycatch and/or discarding). For closed fisheries, there will be no fisheries dependent data (i.e. sampling and effort data from commercial fisheries) and the recovery of stock biomass can only be detected if the stock is sufficiently covered by a scientific survey, which provides fisheries independent data.

## 1.4 MAIN GAPS OF THE MONITORING PROGRAMME AND FUTURE PLANS TO ADDRESS THEM

The following table shows the main gaps of the monitoring programme and plans how the gaps are addressed.

**Table 2. Gaps in monitoring programmes**

Gap	Gap category	Plan to address gap
Lack of MSY reference points for ICES data limited stock categories	Data assessment methods, Capacity	Participation at ICES WGNEW, WKLIFE, gap addressed in EMFF proposals* to increase capacity in development of assessment techniques for data limited stocks.
Pressure monitoring of <12m vessels	Data collection	Pioneer project on the way, gap addressed in EMFF proposals*

Gap	Gap category	Plan to address gap
International assessment and advisory framework for selected shellfish stocks (e.g. scallops, brown crab, lobster)	Data assessment methods, Capacity	ICES study groups set up, advice needs to occur at policy level
Compilation of international VMS/logbook data	Data assessment methods	Improved data sharing through data calls and ICES WG such as WGSFD
Interaction between demersal fishing gear and different benthic habitats, for fisheries which pose a risk to seafloor integrity	Data collection; Data assessment methods, Capacity	Collection of benthic habitat data on the IGFS, EMFF proposals* to increase capacity in the development of assessment methods
Enhanced monitoring of fisheries which have a high bycatch of marine mammals, seabirds, and or PET species	Data collection	Possible re-stratification of observer programme with increased sampling programme in identified high risk fisheries, addressed in EMFF proposal*
Status monitoring under D1,4 for fish species spatially not covered by current survey programmes including deep water, coastal fish and pelagic elasmobranchs and any other species with small scale spatial distribution not currently covered.	Data collection	Unknown
Application of fisheries datasets for the status assessment of GES under D1,4 Fish and Cephalopods and seafloor integrity under D1 and D6	Data assessment methods, Capacity	Unknown
Lack of adequate reference levels for target setting	Data collection; Data assessment methods, Capacity	Indicators for D1/D4 for fish and cephalopods can be calculated based on data provided by the fisheries monitoring programme. Setting of reference levels is problematic due to the short time series in relation to the historic exploitation pattern of the fish community. Hindcasting of reference levels based on F/SSB time series using the methodology such as outlined in Modica et al (2014) are currently being explored.

\* Final EMFF proposal is subject to national and EU approval

## 1.5 ACTIVITIES

### 1.5.1 Nature of activity and/or pressure monitoring (e.g. addressing spatial distribution, intensity and/or frequency of the activity)

The fish and fisheries monitoring programme is measuring the capacity and activity of the Irish and international sea-fishing sector in the Irish assessment area and the pressure that it exerts on the resource and the marine ecosystems. Fishing capacity is measured using the number of vessels, their length, tonnage and engine power. Data is grouped into gear type and is linked to métiers up to level 6<sup>1</sup>. Capacity data from Irish vessels is obtained from the Irish vessel register/logbook system. Data for other Member State's vessels is obtained from the European fleet register. Fishing activity, including effort, spatial distribution, intensity and frequency is measured with logbook data and VMS data. Logbook data of daily fishing operations are available for Irish vessels over 10m, at spatial

<sup>1</sup> See 2010/93/EU for métier definitions

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resolution of 1 ICES statistical rectangle. High resolution temporal/spatial distribution of fishing activity of vessels >12m for all fishing vessels in the Irish EEZ is derived from VMS data, by applying speed filters corresponding to particular fishing techniques (i.e. trawling, longlining etc). For international vessels, primary and secondary gear codes are used from the European vessel register. For Irish vessels, VMS data is linked to logbook data, to obtain near real time distribution of catches and fishing operations. For the under 10m Irish vessels there is no currently no comprehensive data collection on the spatial and temporal distribution and intensity of fishing effort. Data is derived from fleet register information, sentinel logbooks, and expert opinion. Some vessels less than 12 m in length will, from 2015, be reporting VMS data if these vessels are fishing within or close to *Natura* 2000 sites and where their activity is thought to pose a risk to designated features in these sites.

### **1.5.2 Adequacy of programme to assess which activities and/or pressures causing environmental change and help identify possible new measures**

The programme is adequate to monitor the spatial and temporal distribution of fishing effort for Irish vessels >12m at high resolution. There are some limitations to the application of VMS data to foreign vessels (i.e. cannot be linked to logbook data). The resolution of spatial effort distribution of 10 – 12m vessels is restricted to 1 ICES statistical rectangle. There is limited data available on the fishing effort of < 10m vessels. Pressures are monitored in terms of catches including bycatch and discards. These gaps are addressed in Table 2.



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## 2 REFERENCES

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ICES. 2014b. Report of the Workshop to draft recommendations for the assessment of Descriptor D3 (WKD3R), 13-17 January 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:50. 151 pp.

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