

Department of Agriculture, Fisheries and Food (DAFF) Discussion Document

Options for Improving the Selectivity of Demersal Trawl And Seine Net Fisheries in the Celtic Sea

(Version 6 @ 15th February 2011)

This discussion document is intended to promote discussion between DAFF, industry and science on ways to improve selectivity (i.e. reduce discards) in the Celtic Sea. It represents an initial response by Ireland to the 2010 December Council statement that Member States commit to apply improved gear selectivity in conducting fisheries for haddock and whiting in the Celtic Sea. Following on from earlier consultations ((7 February 2011), this document provides guidance on the potential impacts that altering selectivity in three main fisheries could have on discard levels and landed catch. The options presented in this discussion document are based on modeling work carried out at the Marine Institute by Dr Norman Graham.

Background

During the December Council of 2010, as part of the agreement to increase the TAC of haddock and whiting by 15% due to strong recruitment in both stocks, Member States committed to reduce the level of discarding associated with fisheries catching these species in the Celtic Sea.

Identifying the Fisheries

Almost exclusively, discarding of both haddock and whiting is due to poor size selectivity of the gear relative to the minimum landing size (MLS) and market demands. There is evidence of high levels of discarding of fish above minimum landing size for example.

In the Celtic Sea, the current minimum mesh size depends on the catch composition. Where a vessel retains >35% *Nephrops*, it is permissible to use a mesh size in the range of 70-79mm; whereas, mesh sizes in the range of 80-99mm must be used when targeting mixed demersal species contained in annex I list (850/98). Where whitefish (cod and haddock) exceed 30% of the catch, 100mm must be used. Unusually, there is no requirement to use a square mesh panel in any fishery in the Celtic Sea. The majority of EU trawl fisheries using mesh sizes <100mm must have a square mesh panel inserted.

Three broad fisheries were identified during the previous consultation meeting (7th Feb, 2010), namely a directed *Nephrops* trawl, mixed finfish/*Nephrops* fishery and a targeted whitefish trawl and seine fishery.

Information collected from observers show that substantial quantities of haddock and whiting are discarded each year in the Celtic Sea. Based on the data collected between 2003 and 2009, on average, 51% and 36% of catches by weight and 70% and 52% by number of the annual haddock and whiting catch is discarded. While the *Nephrops* fishery has the highest discard rate, ranging from 73 to 84% for haddock and whiting, in terms of absolute weights discarded, the otter trawl (VIIg) and Scottish Seine (VIIgj) demersal fisheries contribute to 72% of the total haddock discards and 79% of the total whiting discards.

Improving Selectivity and Associated Impacts

Having refined the specification of the fisheries and the specification of the gears currently being used, a subsequent analysis has been undertaken to assess the potential catch (landings and discards) impacts of the following:

- Nephrops fishery (trawl): Inserting a **3m** long **110mm** square mesh panel into the existing trawl (80mm cod-end, 5mm single twine, 120 meshes in circumference with a lifting bag) **9 to 12m** from the codline
- Mixed finfish (trawl): Inserting a **3m** long **110mm** square mesh panel into the existing trawl (90mm cod-end, 5mm single twine, 100 meshes in circumference with a lifting bag) **9 to 12m** from the codline
- Whitefish (trawl and seine): Inserting a **3m** long **100mm** square mesh panel into the existing trawl/seine (100 mm cod-end, 4mm double twine, 100 meshes in circumference with a lifting bag) **9 to 12m** from the codline
- Whitefish (trawl and seine): Inserting a **3m** long **110mm** square mesh panel into the existing trawl/seine (100 mm cod-end, 4mm double twine, 100 meshes in circumference with a lifting bag) **9 to 12m** from the codline

Estimating the Impact

The approach taken here differs slightly from the previous work. Here I have generated a 'virtual' population of fish. Using data collected from at sea samplers and an estimate of the electivity of the gear used during the trip, an approximation is made of the total number of fish and size that entered the gear. I then apply selectivity data of the current gear to obtain an estimate of landings and discards. I then compare by estimating the landings and discards if a square mesh panel had been used. The percentage change (in weight) in landings and discards between the 'current' and the 'new' gear is compared to assess what the potential impact would have been on catches.

Table I shows the estimated percentage change in landings and discards by weight for haddock and whiting of the 'new' gears. It is important to note that these represent relative changes and are dependent on the population of fish. It is important to note that the length structure of the population has significant bearing on the impacts, if for example the area fished has more 'large' fish and 'less' small fish then the impact on catches will be reduced as will the estimated discard rate.

<i>Fishery</i>	<i>Species</i>	<i>Change Landings</i>	<i>Change Discards</i>	<i>Old Discard Rate</i>	<i>New Discard rate</i>
Nephrops	Haddock	0%	-16%	41%	37%
	Whiting	-10%	-48%	62%	51%
Finfish	Haddock	-1%	-37%	37%	27%
	Whiting	-29%	-55%	52%	41%
Whitefish 100	Haddock	-1%	-29%	33%	26%
	Whiting	-19%	-35%	46%	40%
Whitefish 110	Haddock	-1%	-44%	33%	22%
	Whiting	-28%	-48%	46%	38%

Table I. Estimated percentage change in landings and discards by **weight** for the three 'fisheries' identified if a more selective gear had been used. The table also shows the estimated percentage of fish discarded associated with the current and 'new' gears.

Fishery	Species	Change Landings	Change Discards	Old Discard Rate	New Discard rate
Nephrops	<i>Haddock</i>	0%	-35%	75%	66%
	<i>Whiting</i>	-18%	-42%	62%	51%
Finfish	<i>Haddock</i>	-1%	-45%	67%	53%
	<i>Whiting</i>	-36%	-56%	70%	61%
Whitefish 100	<i>Haddock</i>	-1%	-33%	61%	51%
	<i>Whiting</i>	-24%	-36%	64%	60%
Whitefish 110	<i>Haddock</i>	-3%	-49%	64%	59%
	<i>Whiting</i>	-34%	-49%	46%	38%

Table 2. Estimated percentage change in landings and discards by **number** for the three 'fisheries' identified if a more selective gear had been used. The table also shows the estimated percentage of fish discarded associated with the current and 'new' gears.

Table 1 shows that for haddock, the impact on the weight of landings is minimal for all gears and discards are reduced from between 16 and 44% depending on the fishery. The overall discard rates (the proportion of the total catch discarded) are estimated to have reduced by 6 to 10% depending on the gear option selected, but discard rates are still considerable in all fisheries. By number (table 2) the impacts on both landings and discards are greater.

As seen in the previous consultation document, the impact on whiting discards and landings are considerably higher than observed for haddock. However, the impact is less for the 'whitefish' trawl and seine fleets shown in the earlier work. This is because the assumed 'current' mesh size in the earlier work was 90mm, whereas here, based on industry consultations, we consider that the starting mesh size is 100mm.

The use of a 100mm panel as opposed to the 110mm in the whitefish fishery limits the loss of marketable whiting to 19%, it does negate the impact on haddock discards. Even with the proposed changes in selectivity through the use of a 100mm panel, the overall discard rate is still very high for whiting. It is estimated that between 40 and 50% of the catch will still be discarded.

It should be noted that all the marketable losses of both haddock and whiting as associated with lower grade size fish and that the short term losses are compensated for in the medium term as these 'lost' fish grow and will contribute to increased yield from the fishery and spawning potential.

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