

# Sampling Fish for the Water Framework Directive

*Transitional Waters 2014*

**Slaney Estuary and  
North Slob Channels**





Water Framework Directive Fish Stock Survey of Transitional Waters in the  
South Eastern River Basin District – Slaney Estuary and North Slob Channels  
2014

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## 1. INTRODUCTION

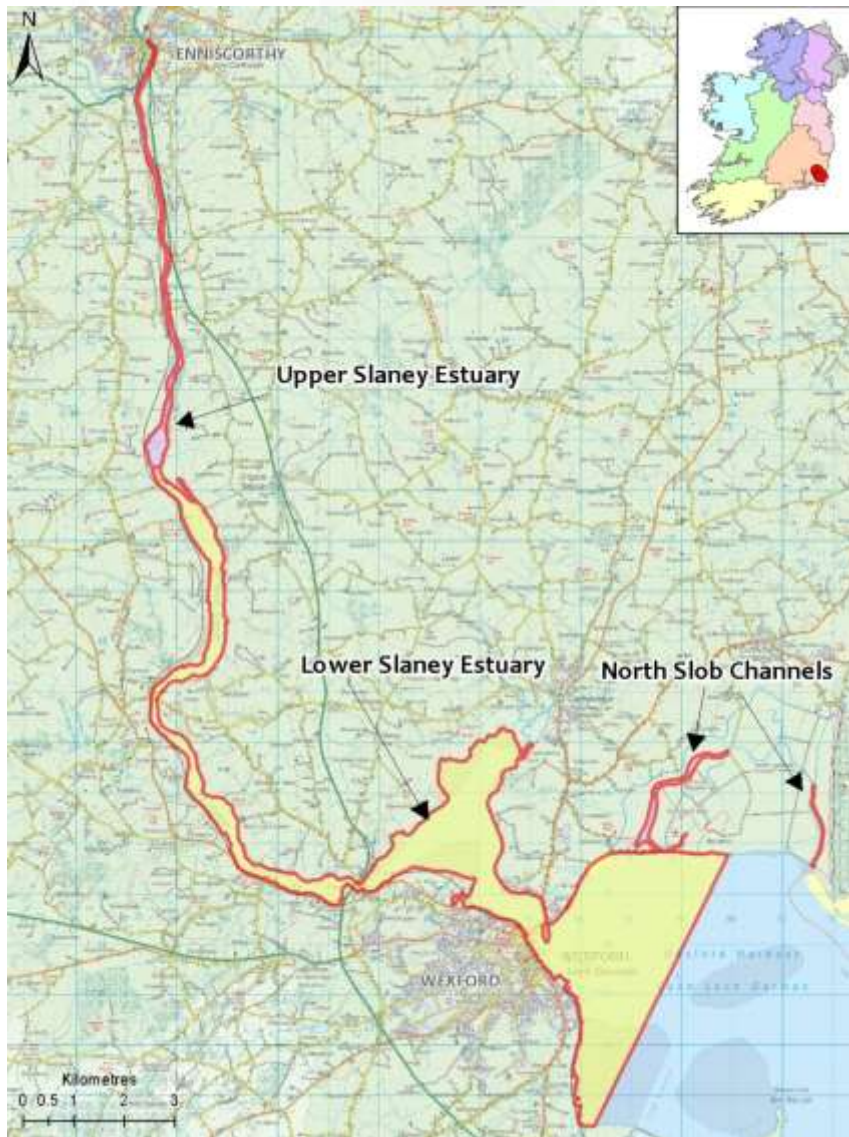
Fish stock surveys were conducted on the Slaney Estuary and North Slob Channels as part of the programme of fish monitoring for the Water Framework Directive (WFD) between the 29<sup>th</sup> of September and the 3<sup>rd</sup> of October 2014 by staff from Inland Fisheries Ireland (Table 1.1, Fig. 1.1).

The Slaney is one of the largest river systems on Ireland's east coast. Its estuary starts in Enniscorthy and continues south into Wexford Harbour. For the purposes of WFD monitoring and reporting, this estuary system has been split into three separate water bodies (Table 1.1), further details of which are given in each individual results section.

**Table 1.1. Transitional water bodies surveyed for the WFD fish surveillance monitoring programme, September/October 2014 (L=lagoon, FT=freshwater tidal, TW=transitional)**

<b>Transitional Water body</b>	<b>MS Code</b>	<b>Easting</b>	<b>Northing</b>	<b>Type</b>	<b>Area (km<sup>2</sup>)</b>
Slaney Estuary, Upper	SE_040_0300	297785	135653	FT	0.80
Slaney Estuary, Lower	SE_040_0200	303790	124978	TW	18.35
North Slob Channels	SE_040_0100	307472	124835	L	0.37





**Fig. 1.1. Location map of the three transitional water bodies in the Slaney Estuary system surveyed for WFD fish monitoring, September/October 2014**



## 2. METHODS

Current work in the Republic of Ireland and United Kingdom indicates the need for a multi-method (beach seine, fyke net and beam trawl) approach to sampling fish in estuaries and these procedures are now the standard IFI methodology for fish stock surveys in transitional waters for the WFD monitoring programme.

Beach seining is conducted using a 30m x 3m net (10mm mesh size) to capture fish in littoral areas (Plate 2.1). The bottom of the net has a weighted lead line to increase sediment disturbance and catch efficiency. Fyke nets (15m in length with a 0.8m diameter front hoop, joined by an 8m leader with a 10mm square mesh) are used to sample benthic fish in the littoral areas. Beam trawls are used for sampling benthic fish in the littoral and open waters, where bed type is suitable. The beam trawl measures 1.5m x 0.5m, with a 10mm mesh bag, decreasing to 5mm mesh in the cod end. The trawl is attached to a 20m tow rope and towed by a boat. Trawls are conducted along transects of 100m in length.

All nets are processed on-site by identifying the species present and counting the total numbers caught in each. Length measurements are recorded for each species using a representative sub-sample of 30 fish, while scales are only collected for certain species, such as salmon and sea trout. Unidentified fish specimens were retained for subsequent identification in the laboratory.

Sample sites are selected to represent the range of geographical and habitat ranges within the water body, based on such factors as exposure/orientation, shoreline slope, and substrate type. A handheld GPS unit is used to mark the precise location of each site.



**Plate 2.1. Beach seining on the Upper Slaney Estuary water body, September/October 2014**



### 3. RESULTS

#### 3.1 Water body surveys

##### 3.1.1 Upper Slaney Estuary

The Upper Slaney Estuary water body is comprised of the Slaney channel from Enniscorthy down as far as King's Island, near Oilgate, Co. Wexford. It covers an area of 0.80km<sup>2</sup> (Plate 3.1 and Fig. 3.1). A significant amount of the land surrounding this water body is within the flood plain and occupied by wetland and scrub. Agriculture is the main anthropogenic activity on the adjacent land while there are also a couple of quarries in the area.

This water body is situated within the Slaney River Valley SAC and Wexford Harbour and Slobbs SPA. A number of important habitats are present within this SAC, including mudflats, sandflats and estuaries, all of which are listed in Annex I of the EU Habitats Directive. Annex II listed species present include lamprey, Twaite shad and Atlantic salmon.



**Plate 3.1. Aerial photo of the Upper Slaney Estuary at Enniscorthy. Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann]**

Four beach seines, six beam trawls and six fyke nets were deployed in the Upper Slaney Estuary in September/October 2014, an increase in netting effort compared to the 2009 survey (Fig. 3.1).

Salinity values taken at beach seine sites ranged from 0.39 ppt to 0.67 ppt. Temperature values taken at beach seine sites ranged from 14.9°C to 15.9°C.



**Fig. 3.1. Location map of the Upper Slaney Estuary indicating sample sites, September/October 2014**

A total of 10 fish species (sea trout are included as a separate ‘variety’ of trout) were recorded in the Upper Slaney Estuary in September/October 2014. Table 3.1 shows a comparison between 2014 and the previous survey in 2009. A number of species were newly recorded in 2014, including sea bass, river lamprey and stone loach. Minnow was the most abundant species, followed by three-spined stickleback and flounder. Flounder was widely distributed throughout the water body being captured using all three netting methods.



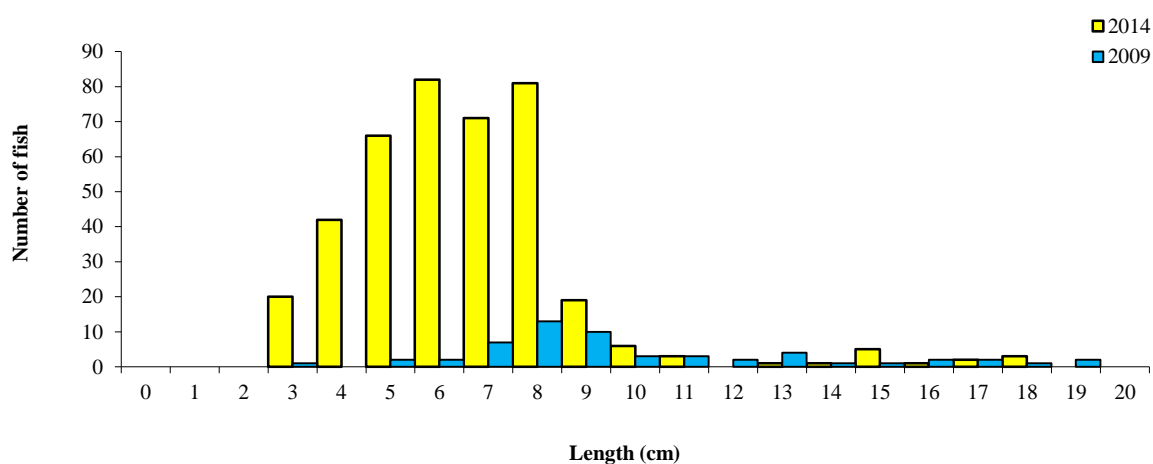
European eel, which is listed as critically endangered in the Irish Red Data Book (King *et al.*, 2011), was also recorded during this survey.

**Table 3.1. Number of each species captured by each gear type in the Upper Slaney Estuary, September 2009 and September/October 2014**

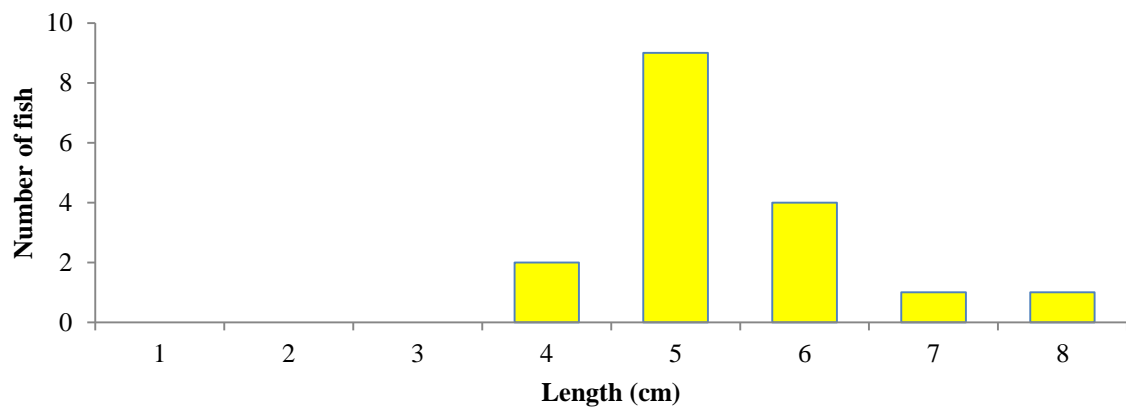
Common name	Beach seine		Beam trawl		Fyke net		Total	
	2009 (3)	2014 (4)	2009 (0)	2014 (6)	2009 (4)	2014 (6)	2009	2014
Minnow	150	2633	-	2	-	2	150	2637
Three-spined stickleback	169	1033	-	512	1	9	170	1554
Flounder	14	129	-	360	42	183	56	672
Sand goby	-	2	-	102	-	-	-	104
European sea bass	-	9	-	3	-	5	-	17
Brown trout	-	-	-	0	2	7	2	7
European eel	1	1	-	0	3	5	4	6
Unident. lamprey sp.	1	2	-	2	-	-	1	4
River lamprey	-	-	-	0	-	4	-	4
Salmon	1	2	-	1	1	-	2	3
Stone loach	-	1	-	1	-	-	-	2

Flounder captured during the 2014 survey ranged in length from 3.1cm to 18.8cm (mean = 7.0cm) (Fig. 3.2). Flounder captured during the 2009 survey were similar ranging in length from 3.9cm to 19.7cm (mean = 10.3cm).

All sea bass that were captured were aged as 0+ and ranged in length from 4.9cm to 8.3cm (Fig. 3.3).



**Fig. 3.2. Length frequency distribution of flounder in the Upper Slaney Estuary, September/October 2014 (sub-sample, n=403) and September 2009 (n=56)**



**Fig. 3.3. Length frequency distribution of sea bass in the Upper Slaney Estuary, September/October 2014 (n=17)**



### **3.1.2 Lower Slaney Estuary**

The Lower Slaney Estuary stretches from King's Island near Oilgate, Co. Wexford down as far as Wexford Harbour. It covers an area of 18.35km<sup>2</sup> (Plates 3.2 and 3.3 and Fig. 3.4). Agriculture is the main activity in the area on the north end, while the southern end has significant urban development.

This water body is situated within the Slaney River Valley SAC and Wexford Harbour and Slobbs SPA (see Section 3.1.1).



**Plate 3.2. Aerial photo of the Lower Slaney Estuary at Wexford Harbour. (Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])**





**Plate 3.3. The Lower Slaney Estuary looking north towards Deeps Bridge, September/October 2014**

Nine beach seines, 12 beam trawls and 11 fyke nets were deployed in the Lower Slaney Estuary in September/October 2014 (Fig. 3.4).

Salinity values taken at beach seine sites ranged from 8.9ppt to 55.7ppt. Temperature values recorded at beach seine sites ranged from 15.1°C to 17.2°C.



**Fig. 3.4. Location map of the Lower Slaney Estuary indicating sample sites, September/October 2014**

A total of 18 fish species were recorded in the Lower Slaney Estuary in September/October 2014. Table 3.2 shows a comparison between 2014 and the previous survey in 2009. Sprat, followed by thick lipped grey mullet, sand goby and sea bass, were the most common fish species recorded during the survey in 2014 (Table 3.2). A number of species were newly recorded in 2014, including sea bass, mackerel, sea trout and smelt. One specimen of red mullet, a relatively recent visitor to Irish shores, was also newly recorded in 2014. Brown trout, cod, herring, long-spined sea scorpion and pollack were previously caught in 2009 but were not captured in the 2014 survey. Flounder was well distributed throughout this water body, being captured using all three netting methods.

One endangered fish species, European eel, listed as critically endangered in the Irish Red Data Book (King *et al.*, 2011), was recorded.



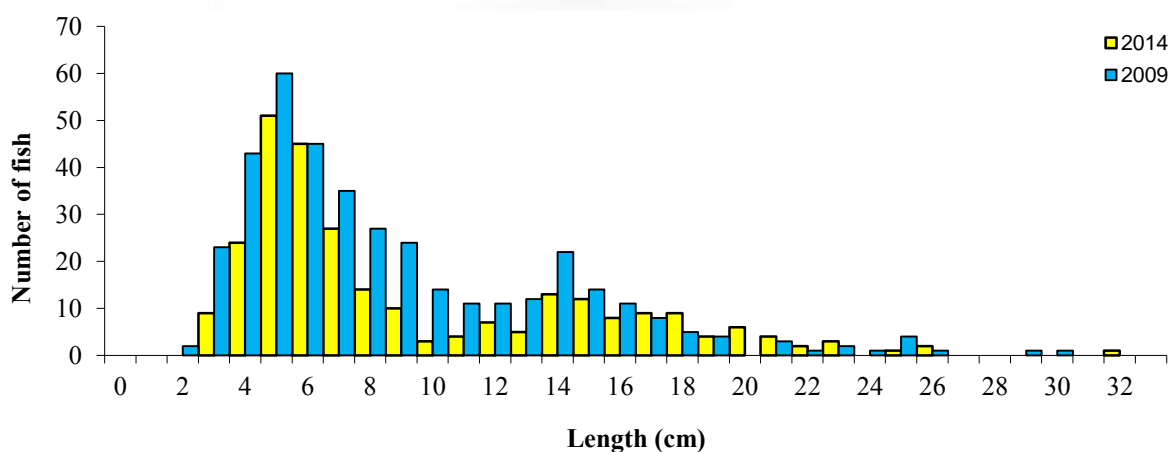
**Table 3.2. Number of each species captured by each gear type in the Lower Slaney Estuary, September/October 2014**

Common name	Beach seine		Beam trawl		Fyke net		Total	
	2009 (9)	2014 (9)	2009 (11)	2014 (12)	2009 (11)	2014 (11)	2009	2014
Sprat	10	4528	-	152	-	-	10	4680
Thick-lipped grey mullet	127	1763	-	-	-	-	127	1763
Sand goby	301	294	156	1219	-	2	457	1515
European sea bass	-	603	-	-	-	4	-	607
Flounder	171	64	112	202	164	82	447	348
Sand smelt	-	37	-	-	-	-	-	37
Three-spined stickleback	346	8	-	4	-	2	346	14
European eel	2	-	-	-	13	13	15	13
Plaice	1	-	86	8	2	1	89	9
Mackerel	-	-	-	-	-	7	-	7
Five-bearded rockling	-	-	-	-	14	3	14	3
Nilsson's pipefish	-	-	-	3	-	-	-	3
Smelt	-	-	-	-	-	3	-	3
Whiting	-	-	-	-	1	2	1	2
Common goby	-	1	-	-	-	-	-	1
Minnow	-	1	-	-	-	-	-	1
Sea trout	-	1	-	-	-	-	-	1
(Striped) Red mullet	-	-	-	-	-	1	-	1
Brown trout	-	-	-	-	1	-	1	-
Cod	-	-	1	-	26	-	27	-
Herring	-	-	1	-	-	-	1	-
Long-spined sea scorpion	-	-	3	-	-	-	3	-
Pollack	-	-	1	-	11	-	12	-
Rock goby	-	-	2	-	-	-	2	-

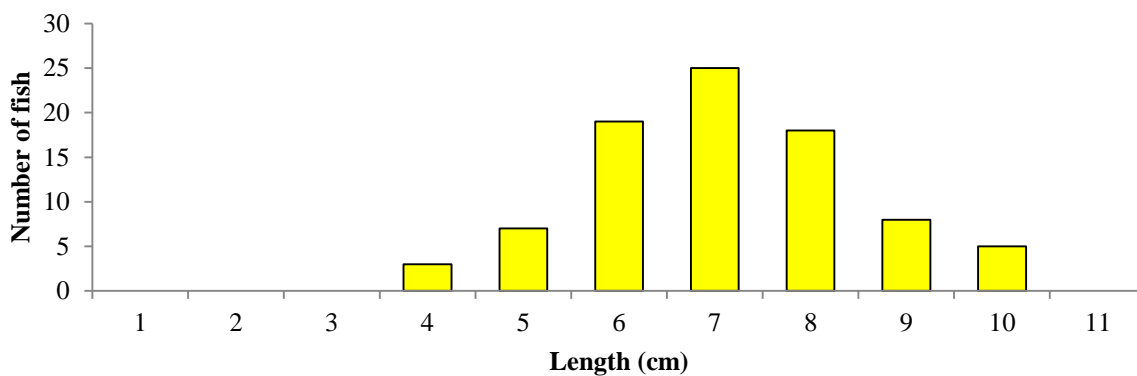
Flounder captured during the 2014 survey ranged in length from 3.1cm to 32.5cm (mean = 9.8cm) (Fig. 3.5). Flounder captured during the 2009 survey ranged in length from 2.3cm to 30.1cm (mean = 9.2cm).

A subsample of sea bass specimens were aged as 0+ and ranged in length from 4.3cm to 10.7cm (Fig. 3.6).

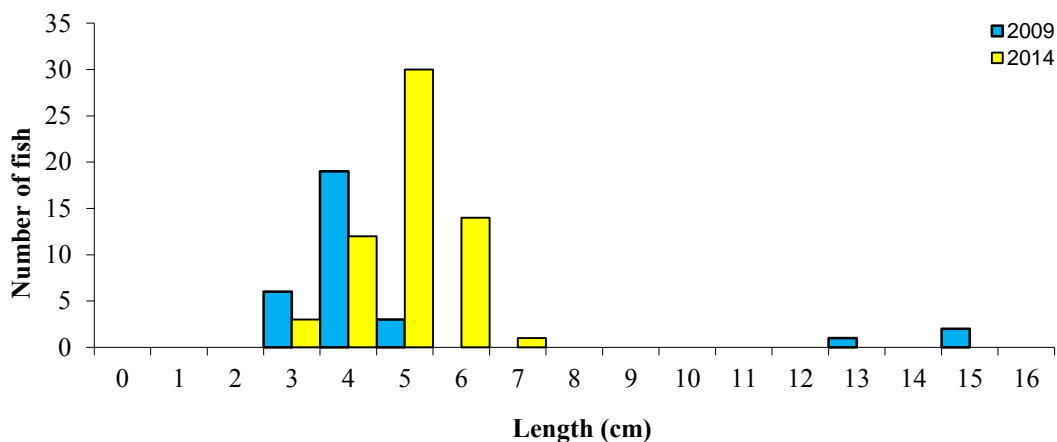
Thick-lipped grey mullet captured during the 2014 survey ranged in length from 3.0cm to 51.0cm (mean = 6.1cm) (Fig. 3.7). Thick-lipped grey mullet captured during the 2009 survey ranged in length from 3.4cm to 15.8cm (mean = 5.4cm).



**Fig. 3.5.** Length frequency distribution of flounder in the Lower Slaney Estuary, September/October 2014 (sub-sample, n=273) and September 2009 (sub-sample, n=385)



**Fig. 3.6.** Length frequency distribution of sea bass in the Lower Slaney Estuary, September/October 2014 (sub-sample, n=85)



**Fig. 3.7.** Length frequency distribution of thick-lipped grey mullet in the Lower Slaney Estuary, September/October 2014 (sub-sample, n=60) and September 2009 (sub-sample, n=31)

### **3.1.3 North Slob Channels**

The North Slob Channels are a number of small channels that drain the land on the northern side of Wexford Harbour. This water body covers an area of 0.37km<sup>2</sup>, with the land surrounding it being primarily used for agriculture and an important wildfowl reserve (Plates 3.4 and 3.5 and Fig. 3.8).

This water body is situated within the Slaney River Valley SAC and Wexford Harbour and Slobs SPA (see Section 3.1.1).



**Plate 3.4. Aerial photo of the North Slob Channels, northeast of Wexford Harbour. Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann]**



**Plate 3.5. The North Slob Channels water body looking south across the wildfowl reserve towards the pumphouse, October 2014**





A total of two fyke nets and three beam trawls were deployed in the North Slob Channel in October 2014.



**Fig. 3.8. Location map of the North Slob Channels indicating sample sites, October 2014**

A total of five fish species were recorded in the North Slob Channel water body in October 2014. Table 3.3 shows a comparison between 2014 and the previous survey in 2009. A similar species list was recorded in both years. Three-spined stickleback, followed by eel were the most abundant species recorded in 2014 (Table 3.3).

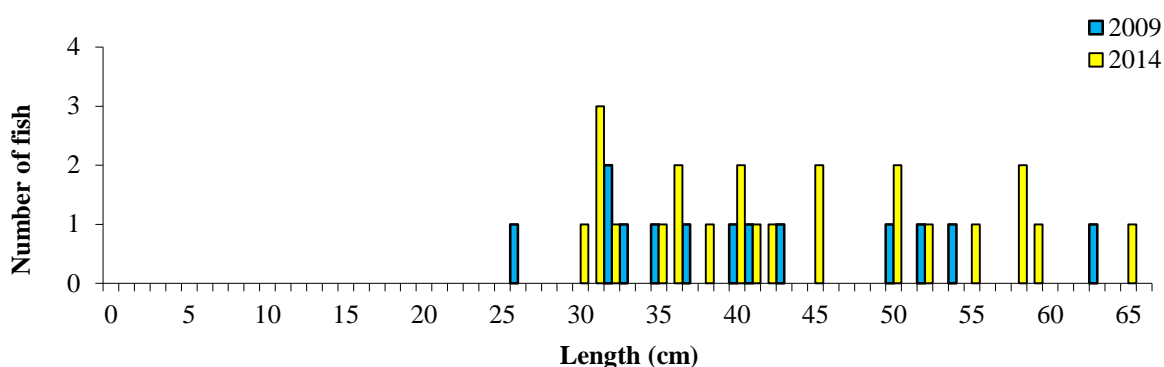


**Table 3.3. Number of each fish species captured by each gear type in the North Slob Channel, September 2009 and October 2014**

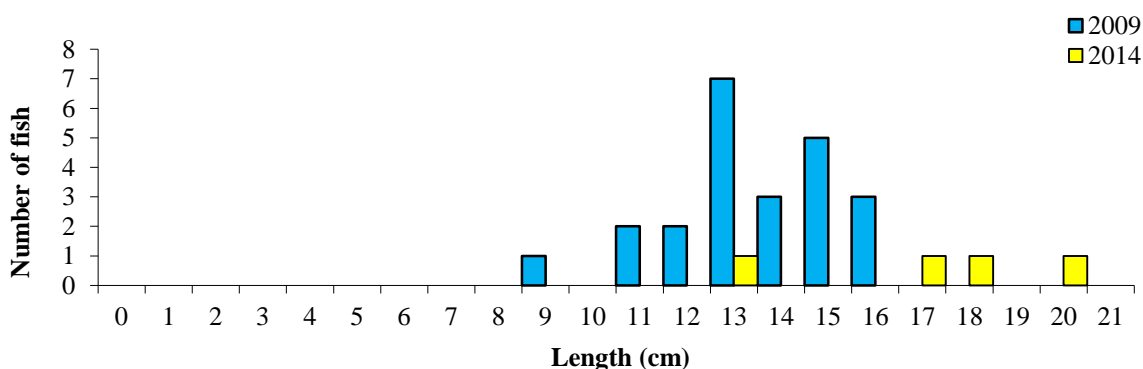
Common name	Fyke net		Beam trawl		Total	
	2009 (1)	2014 (2)	2009 (2)	2014 (3)	2009	2014
Three-spined stickleback	-	-	84	315	84	315
European eel	13	23	-	-	13	23
Rudd	23	4	-	-	23	4
Flounder	1	-	-	2	1	2
Sand goby	-	-	5	1	5	1

European eel captured during the 2014 survey ranged in length from 30.0cm to 65.0cm (mean = 43.6cm) (Fig. 3.9). Those captured in 2009 ranged in length from 26.0cm to 63.0cm (mean = 41.5cm).

Rudd captured during the 2014 survey ranged in length from 9.4cm to 16.8cm (mean = 13.9cm) (Fig. 3.10). Those captured in 2009 ranged in length from 13.5cm to 20.1cm (mean = 17.5cm).



**Fig. 3.9. Length frequency distribution of European eel in the North Slob Channel, September 2009 (n=13) and October 2014 (n=23)**

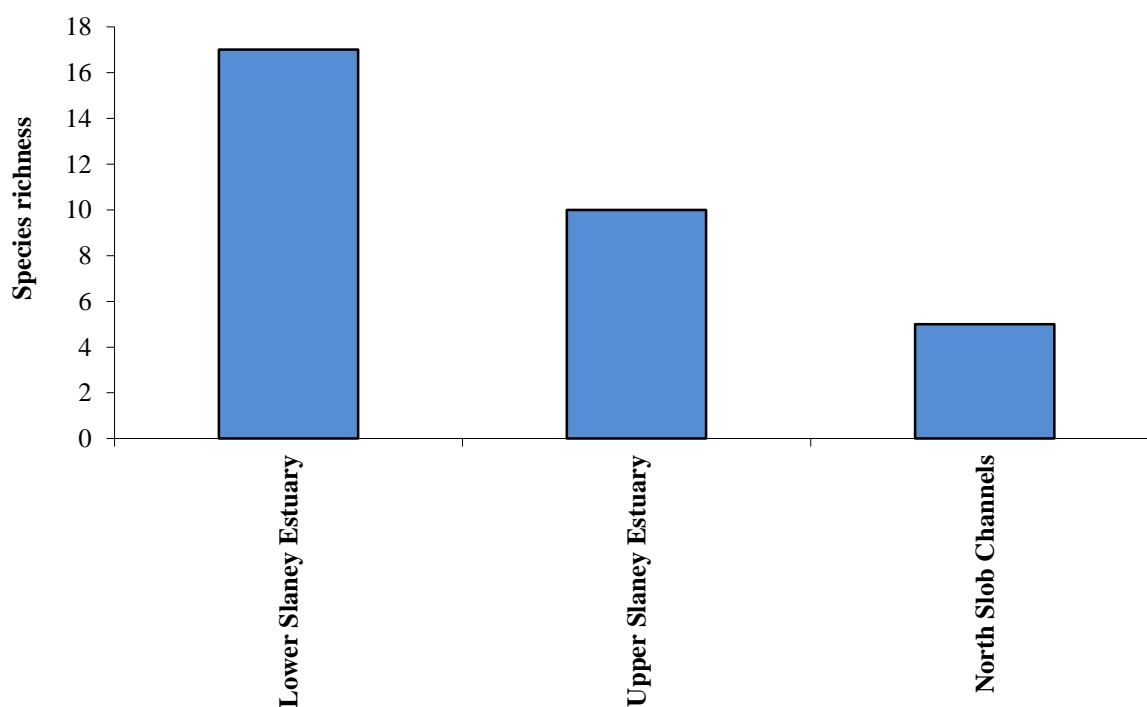


**Fig. 3.10. Length frequency distribution of rudd in the North Slob Channel, September 2009 (n=23) and October 2014 (n=4)**



### 3.2 Species richness

A total of 21 fish species were recorded within the three Slaney and North Slob Channel transitional water bodies surveyed during 2014. The greatest species richness was recorded on the Lower Slaney Estuary (Fig. 3.9) with a total of 17 species being captured. This was followed by the Upper Slaney Estuary (10 species), and North Slob Channels (five species). Four species were captured in all three water bodies, sand goby, flounder, European eel and three-spined stickleback (Table 3.4).



**Fig. 3.9. Percentage of water bodies where selected fish species were recorded in the Slaney Estuary and North Slob Channels for WFD SM monitoring 2014**



**Table 3.4. Number of water bodies where each species was recorded in the Slaney Estuary and North Slob Channels, 2014**

<b>Species</b>	<b>Total</b>	<b>Species</b>	<b>Total</b>
Sand goby	3	Five-bearded rockling	1
Flounder	3	Smelt	1
European eel	3	Mackerel	1
Three-spined stickleback	3	Plaice	1
Brown trout	2	Sand smelt	1
Minnow	2	Thick-lipped grey mullet	1
European sea bass	2	Sprat	1
Rudd	1	Stone loach	1
(Striped) Red mullet	1	Salmon	1
Common goby	1	River lamprey	1
Whiting	1		



#### 4. SUMMARY

The three transitional water bodies comprising the River Slaney Estuary and North Slob Channels vary in size and both environmental and physical characteristics. This is reflected in the fish species composition recorded in each water body. As expected with decreasing salinity levels, higher numbers of freshwater fish were recorded in the Upper Slaney Estuary, while in contrast a higher number of species (mostly marine) were recorded in the Lower Slaney Estuary. This was a trend that was also observed in other transitional water bodies surveyed previously for the WFD surveillance monitoring programme. Sand goby, flounder, European eel and three-spined stickleback were the most widespread species recorded, caught in all three water bodies. Sprat, thick-lipped grey mullet and red mullet were only recorded in the Lower Slaney Estuary but were present in relatively high numbers. A number of economically important species were encountered in the Lower Slaney water body, including European sea bass, mackerel, pollack and whiting. Atlantic salmon and European eel, two vulnerable fish species, were also recorded throughout this estuarine system.

An essential step in the WFD monitoring process is the classification of the status of transitional waters, which in turn will assist in identifying the objectives that must be set in the individual River Basin Management Plans.

A WFD fish classification tool, Transitional Fish Classification Index or TFCI, has been developed for the island of Ireland (Ecoregion 1) using IFI and Northern Ireland Environment Agency (NIEA) data. This is a multi-metric tool based on similar tools developed in South Africa and the UK (Harrison and Whitfield, 2004; Coates *et al.*, 2007). The TFCI has recently completed the intercalibration process.

Using this approach, the three individual SERBD transitional water bodies have been assigned draft ecological status classifications based on the fish populations present (Table 3.5). The Upper Slaney Estuary, Lower Slaney Estuary and North Slob Channels were classed as Moderate, Good and Bad respectively (Table 3.5).

The Upper and Lower Slaney water bodies were also combined together for a more practical whole estuary classification. This combined water body was classed as “Good” (Table 3.5).





**Table 3.5. Draft ecological status classifications for the Slaney and North Slob Channels water bodies, 2014**

<b>Water body</b>	<b>TFCI</b>	
	<b>EQR</b>	<b>Class (&amp; EO)</b>
Upper Slaney Estuary	0.43	Moderate
Lower Slaney Estuary	0.60	Good
North Slob Channels	0.18	Bad
<b>Combined water bodies</b>		
Slaney Estuary	0.73	Good

## 5. REFERENCES

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A dark blue geometric shape, resembling a stylized wave or a folded piece of paper, occupies the lower half of the page. It features several white dashed lines that curve across its surface, creating a sense of movement and depth. The shape is set against a plain white background.

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