Annex 8 – Country Reports: Eel stock and fisheries reported by country – 2008

In preparation to the Working Group, participants of each country have prepared a Country Report, in which the most recent information on eel stock and fishery are presented. These Country Reports aim at presenting the best information, which does not necessarily coincide with the official status. This Annex reproduces the Country Reports in full detail.

Participants from the following countries provided an (updated) report to the 2008 meeting of the Working Group:

- Norway
- Sweden
- Finland
- Estonia
- Latvia
- Lithuania
- Poland
- Germany
- Denmark
- The Netherlands
- Belgium
- Ireland
- The United Kingdom of Great Britain and Northern Ireland
- France
- Spain
- Portugal
- Italy
- Canada

For practical reasons, this report presents the country reports in electronic format only, available at:
http://www.ices.dk/reports/ACOM/2008/WGEEL/Country_reports_2008.pdf In the printed version, these can be found on an enclosed CD-ROM.

Report on the eel stock and fishery in Finland 2007

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Reporting period: This report was completed in June 2008, and contains data up to 2007.

FI.B. Introduction

In Finland eels are on their North-Eastern limits of natural geographical distribution. Natural eel populations have probably always been very sparse, and the overall importance of the species has been low. In fresh waters only in few areas in Southern parts of the country eel has been a target in the recreational fisheries. According to old fishers the catch and the importance of eel to local fisheries were still high in 1940–1960 in some parts of the Gulf of Finland, mainly in the estuary of the river Kymijoki and east of the city of Kotka. Also in Finnish Archipelago eel was a common species at that time. Almost all rivers running to the Baltic are closed by hydroelectric power plants. Natural eel immigration is possible only in few fresh water systems near the coast and in the coastal areas of the Baltic. Eel populations and eel fisheries in Finnish inland waters depend almost completely on introductions and re-stockings (Table FI 1). Until now the most numerous introductions were made in the sixties and 1970s. Some 8 000 000 glass eels (originating France) and 700 000 elvers (Denmark, Germany) were introduced in 250 inland lakes and coastal waters (Pursiainen and Toivonen, 1984). During the years 1979–1988 it was not allowed to import eels because eel was detected to be a possible carrier of some viral fish diseases. For this reason it was decided in 1989 to carry on re-stockings only with glass eels reared in a careful quarantine. Since then 1 452 000 glass eels originating in River Severn in the UK have been imported through a Swedish quarantine and re-stocked in almost one hundred lakes in Southern Finland and in the Baltic along the South coast of Finland.

FI.C. Fishing capacity

There is no exact data available but for the professional fisheries eel is of no importance. Some semi-professional fishers may have minor income from eels mainly as a bycatch. Therefore the recreational fisheries mainly catch the eels. The number of recreational fishers in Finland is high (1.9 million out of 5 million) but only a very small portion of those catch eels as a main target (with fykenets, longlines, angling, spears, etc.). For most of the people eel is a surprising bycatch.

FI.D. Fishing effort

There is no exact data available.

Table FI 1. Eel stockings in Finland in 1961–2007 (number of individuals).

	GLASS EELS	QUARANTINED GLASS EELS	ELVERS
1961			53 000
1962			143 000
1963			
1964			83 000
1965			114 000
1966	1 077 000		53 000
1967	3 935 000		
1968	2 803 000		4 000
1969			35 000
1970			30 000
1971	no	introductions	allowed
1972	no	introductions	allowed
1973	no	introductions	allowed
1974	no	introductions	allowed
1975			38 000
1976			19 000
1977			30 000
1978	368 000		12 000
1979			75 000
1980-88	no	introductions	allowed
1989		9 700	
1990		58 840	
1991		108 515	
1992		102 450	
1993		105 000	
1994		103 500	
1995		216 600	
1996		74 580	
1997		82 200	
1998		77 550	
1999		62 500	
2000		61 015	
2001		45 500	
2002		55 000	
2003		0	
2004		63 500	
2005		64 000	
2006		55 000	
2007		107 000	
2008		120 000	

FI.E. Catches and landings

The re-stockings in the late sixties and in 1970s gave a catch of 60–80 tonnes a year at the end of 1970s and the beginning of 1980s (Pursiainen and Toivonen, 1984). Introductions and re-stockings ceased in 1979, which caused a radical reduction in the annual eel catch (Table FI 2). After the year 1986 the catch decreased to less than 20 tonnes a year. Therefore the eel was not detected as a species in the official statistics, but included into the group "other species". There is no data available on the present catch. Pursiainen and Toivonen, 1984 find out that 1000 stocked individuals/year in fresh waters in Southern Finland gave a catch of 90 kg/year about ten years later. Using the same figures the re-stockings in 1990s probably give nowadays a catch between 5–10 tonnes/year.

Table FI 2. Eel catches in Finland 1975–1987 (2005), x 1000 kg. The statistical data are collected and published by the FGFRI. The figures after 1987 are rough estimates by the writer.

	Marine fisheries		Freshwater fisheries		
Year	Professional	Recreational	Professional	Recreational	Total catch
1975	0	0	0	0	0
1976	4	15	2	7	28
1977	2	14	2	45	63
1978	1	14	2	60	77
1979	2	14	2	59	77
1980	2	14	3	60	79
1981	1	8	2	28	39
1982	1	8	1	28	38
1983	1	8	1	28	38
1984	1	4	1	22	28
1985	1	4	1	22	28
1986	1	4	2	22	28
1987	0	?	1	?	<20
1988-					<20 (?)
2007					<10 (?)

FI.F. Catch per unit of effort

There is no exact data available.

FI.G. Scientific surveys of the stock

No scientific surveys are carried out today.

FI.H. Catch composition by age and length

There is no exact data available.

FI.I. Other biological sampling

During 1974–1994 over 2000 eels were collected in thirty lakes and in some lake outlets in Southern Finland. Length, weight, eye diameter, colour of the sides and belly, sex and weight of the gonads (not always) were determined and after 1986 also swimbladders were examined for *Anguillicola*. Age and growth were also determined.

The aim of the study was to evaluate the biological outcome of eel stockings made in 1960s and 1970s and to estimate the yield to fishery and the proportions of eels escaping the lakes. The results were published mainly in 1980s (Pursiainen and Toivonen, 1984; Pursiainen and Tulonen, 1986; Tulonen, 1988; Tulonen, 1990; Tulonen and Pursiainen, 1992). The concentrations of radionuclides ^{134}Cs and ^{137}Cs and PCB in eels were also investigated (Tulonen and Saxen, 1996; Tulonen and Vuorinen, 1996).

There were no routine biological sampling programmes or eel research projects during 1994–2005. Some occasional samples were taken in few lakes on the author's personal interest. Also in some small water systems silver eel escapement has been monitored since 1974 (one place), 1980 (two places) and 1989 (two places) with eel boxes in the outlets. Eels in the lakes have been re-stocked there in 1967, 1978 and 1989 respectively. One sample of "natural" elvers has been collected in 2002 in South-West Finland and on the coast of the Bothnian Bay. One third of the elvers were infected with *Anguillicola*. This was the first time *Anguillicola* had ever been found in Finland (Tulonen, 2002).

In 2006 a four year study on the biological and economical outcome of eel stockings made since 1989 and on the state of natural eelstocks was established in FGFRI. In that study sampling is done in ten lakes in southern Finland and in eight areas in the Baltic along the coasts of Gulf of Finland and Bothnian Bay and in the rivers running into them. Due to sparse populations the sample sizes are still only in few cases big enough (>100 individuals) to make any scientific evaluations. Considering eel's low status for fisheries and low economic value in Finland, it is obvious that collecting data more effective is difficult.

FI.J. Other sampling

No other sampling is carried out at the moment.

FI.K. Stock assessment

There is no routine assessment of the stock.

FI.L. Sampling intensity and precision

There is no exact data available.

FI.M. Standardisation and harmonization of methodology

Nothing to report.

FI.N. Overview, conclusions and recommendations

1. In the ongoing study the present natural distribution of eel in Finland is going to be examined, and suitable "unused" growing areas are to be determined. These areas could be used as some kind of refuges for the European eel (slow growth, high survival, long period before silvering phase).
2. *Anguillicola* infection level should be investigated in the natural and introduced eel populations. Eel populations in Finnish fresh waters over the hydroelectric dams are probably mostly still uninfected. If *Anguillicola* is one factor in decreasing the number of spawners in the Sargasso Sea, these uninfected eels might have extra value in the future.
3. Stock surveys are carried out to find out the biological outcome of the stockings conducted since 1989. Natural and fishing mortality and espe-

cially recruitment of yellow eels to silver eels and the possibility of silver eels to reach the sea undamaged are going to be studied.

FI.O. Literature references

Pursiainen M. and Toivonen J. 1984. The enhancement of eel stocks in Finland; a review of introduction and stockings. EIFAC Technical Paper No. 42, Suppl., 1:59–67.

Pursiainen M. and Tulonen J. 1986. Eel escapement from small forest lakes. Vie Milieu 36 (4): 287–290.

Tulonen J. 1988. Ankeriaan ikä, sukupuolijakaumat ja kasvu eräissä eteläuomalaisissa järvissä. (Age, sex ratio and growth of eels in some lakes in southern Finland). Rktl, Monistettuja julkaisuja 81: 1–106.

Tulonen J. 1990. Growth and sex ratio of eels (*Anguilla anguilla*) of known age in four small lakes in southern Finland. Abstract in: Int. Revue ges. Hydrobiol. 75: 792.

Tulonen J. and Pursiainen M. 1992. Ankeriasistutukset Evon kalastuskoeaseman ja kalanviljelylaitoksen vesissä. (Eel stockings in the waters of the Evo State Fisheries and Aquaculture Research Station) Suomen Kalatalous 60:246–261.

Tulonen J. and Saxen R. 1996. Radionuclides ^{134}Cs and ^{137}Cs in eel (*Anguilla anguilla* L.) in Finnish freshwaters after the accident at Chernobyl nuclear power station in 1986 Arch. Ryb. Pol. 4:267–275.

Tulonen J. and Vuorinen P. 1996. Concentrations of PCBs and other organochlorine compounds in eels (*Anguilla anguilla*, L.) of the Vanajavesi watercourse in southern Finland, 1990–1993 The Science of the Total Environment 187 (1996): 11–18.

Tulonen J. 2002. *Anguillicola crassus* tavattu ensikerran Suomessa (*Anguillicola crassus* found in Finland). Suomen Kalastuslehti 4(2002):36–37.

Report on the eel stock and fishery in Ireland 2007/2008

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Reporting Period: This report was completed in August 2008, and contains data up to December 2007 and some provisional data for 2008. The recruitment trends and catch statistics have been updated for all years.

Contributors to the report:

- Eastern Regional Fisheries Board
- Southern Regional Fisheries Board
- South Western Regional Fisheries Board
- Shannon Regional Fisheries Board
- Western Regional Fisheries Board
- North Western Regional Fisheries Board
- Northern Regional Fisheries Board
- Marine Institute
- Central Fisheries Board
- Electricity Supply Board, Ardnacrusha and Ballyshannon
- Galway Fishery
- Dept. of Zoology, National University, Galway
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IR.B. Introduction

This report continues the sequence of reporting annual national eel data to the ICES/EIFAC Eel Working Group. In line with the requirements of the EU Eel Recovery Plan (Action Plan; COM 2003, 573: Regulation; COM (2005) 472) and the EU Data Collection Regulation for fisheries (Council Regulation 1543/2000 and Commission Regulations 1639/2001, 1581/2004) the National Eel Reports have now been restructured under the standard headings of the DCR. The EU has also recommended in the proposed regulation (COM (2005) 472) that Eel Management Plans be established and implemented on a Waterframework Directive River Basin District level and this report includes reporting catch data by Fisheries Region and by River Basin District.

IR.B.2 The Irish National programme

The Irish National Programme is conducted in close cooperation between the following organizations, although the details in relation eel and inland fisheries have yet to be established.

Department of Communications Energy and Natural Resources (DCENR)

DCENR is the main governmental department with responsibility for inland fisheries policy, management, control and enforcement.

Department of Environment, Heritage and Local Government (DEHLG)

DEHLG is the main governmental department with responsibility for core functional areas of environment, water and natural heritage, built heritage and planning, housing, local government and meteorological services and implementation of the Habitats and Waterframework Directives.

The Marine Institute (MI)

The MI is a semi-state marine research organization with national responsibility for the provision of scientific advice on eel and the collection of scientific data on the fisheries sector and the implementation of the module on evaluation of inputs, fishing capacities and fishing effort and the module of evaluation of catches and landings as defined in the Application regulation of EU Council Regulation 1543/2000.

A Bord Iascaigh Mhara (BIM-The Irish Sea Fisheries Board)

BIM is a semi state sea fisheries development agency charged by DCMNR with the collection of economic data on the marine fisheries sector.

The Central (CFB) and Regional Fisheries Boards (RFBs)

The CFB is a statutory body, established under the Fisheries Act 1980, operating under the aegis of the DCMNR. The principal functions of the CFB are to advise the DCMNR on policy relating to the conservation, protection, management, development and improvement of inland fisheries and sea angling, and to support, coordinate and provide specialist support services to the RFBs. The seven statutory RFBs are responsible for maintaining and improving environmental quality and developing and protecting the fisheries resource in their regions (Figure IR.1). Eel fishing licences and authorizations are issued on a Regional basis.

Electricity Supply Board (ESB)

ESB has a statutory role in preserving and developing the Shannon fishery, because the establishment of a hydroelectric scheme on the river when the government handed over all fishing rights to the company in 1935.

The Loughs Agency

The Loughs Agency aims to provide sustainable social, economic and environmental benefits through the effective conservation, protection, management, promotion and development of the fisheries and marine resources of the Foyle and Carlingford Areas.

IR.B.3 The Irish eel fishery

IR.B.3.1 Introduction

Glass eel and elver fishing in Ireland is prohibited by law (1959 Fisheries Act, Section 173) and its current government policy that fishing for juvenile eel may only be carried out under Section 18 authorization from the Regional Fisheries Boards for the purposes of stock enhancement. Capture of juvenile eel for supply to eel farms or export requires a Section 14 Authorisation from the Dept. of Communications, Marine and Natural Resources. Capture of glass eel did not take place in Ireland until the 1990s. This is a tidal activity using a variety of techniques such as anchored nets (tela), fykenet, trawl and dipnet. Upstream migrating elver have been captured since 1959 under statute, for transfer upstream around barriers; first on the Shannon and more latterly on other rivers under the control of the Electricity Supply Board (ESB).

This is usually carried out using fixed elver traps incorporating elevated ladders and collecting boxes. All juvenile eel captured are released upstream for enhancement. There is no National sampling programme for the glass eel/elver fishery.

The commercial eel fishery involves harvesting both brown and silver eel in fresh water and in estuarine or tidal waters. Brown eel are fished using a variety of techniques, the most common of which are baited longline, fykenets and baited pots. When silver eel are migrating downstream in autumn they are caught in fykenets and stocking-shaped nets called "coghill nets" which are attached to fixed structures in the river flow, often at "eel weirs".

The declared commercial eel catch (not including mortalities) in the Irish Republic, 2001–2007, ranged from 86 t to 120 t involving about 150–200 part-time fishers, but inadequate reporting and illegal fishing makes this difficult to quantify accurately and it may be a substantial underestimate. The value of the reported catch was therefore in the order of €0.5 million to 0.75 million. A total maximum of 278 licences were issued in 2006 and a maximum of 182 licences were actively fished in 2005. In all 265 licences (brown and silver) were issued in 2007, of which 259 were reported on and 204 were actively fished.

Recreational eel fishing is only carried out by a minority of anglers and there is no legal, or voluntary, declaration of catch. Some "recreational" fishing using fykenets and baited pots takes place and this is authorized under the commercial legislation.

Currently, there are no statutory instruments for the coordinated management of the European eel stock, its exploitation or other impacts. Management of the Irish eel fishery is currently (2007) hampered by a number of factors, such as no national closed season, size limit, policy on estuarine and coastal fishing and a lack of accurate information on stock, catch returns or sales. There is no register of fishing effort, landings or sales and illegal fishing and unreported catches are believed to be considerable.

Byelaws were introduced in 2008 limiting the fishing season for both yellow and silver eel and setting a national size limit of 30 cm.

IR.B.3.2 Fisheries byelaws 2008

Byelaw No. C.S. 297

In May 2008, the Minister for Communications, Energy and Natural Resources introduced a byelaw (Conservation of Eel Fishing (Annual Close Season) Byelaw No. C.S. 297, 2008). This Byelaw prohibits the taking or fishing for brown eel under 30 cm in length. The Byelaw also provides for a close season for brown eel, from 1 September to 31 May of the following year. The Byelaw also provides for a close season for silver eel from 1 January to 30 September in any year.

Byelaw No. 838, 2008

In May 2008, the Minister for Communications, Energy and Natural Resources introduced a byelaw (Conservation of Eel Fishing (Restriction on Issue of Licences) Byelaw No. 838, 2008). This Byelaw caps the number of eel fishing licences which may be issued in each Fishery District in 2008 or any year thereafter.

IR.B.4 The catchment approach

IR.B.4.1 Introduction

The coast of Ireland is covered by ICES Areas VI and VII (Figure B.1), which is in the

single NE Atlantic category.

The EU has proposed (COM (2005) 472) that Eel Management Plans be established and implemented on a Waterframework Directive River Basin District level. The WFD subdivides the Republic of Ireland into four River Basin Districts and three International River Basin Districts (Figure B.2). Full descriptions of each RBD are given in the individual RBD Eel Management Plans.

Inland and estuarine eel fisheries in Ireland are managed by seven Regional Fisheries Boards, which are divided into Fisheries Districts (Figure B.2) and the Loughs Agency. Fisheries District boundaries largely conform with the arrangement of river catchments, although coastal boundaries may also relate to prominent coastal features such as headlands.

In general, eel fisheries managed on a Fisheries District basis fall naturally within the boundaries of the RBDs. In some cases individual catchments may differ on the boundaries as to which District and RBD they are in but in all cases, none of these contain active fisheries. (FigureB.3).

There is relatively little information on eel stocks in transitional and tidal waters in Ireland. Eels are known to inhabit extensive areas of estuaries and tidal lagoons (Arai *et al*., 2006; Harrod *et al*., 2005; Moriarty, 1988; Poole and Reynolds, 1996; Poole, 1990). The amount of habitat utilized by eel in tidal and transitional waters is unknown and the escapement of silvers is also unknown. The eel fisheries in tidal and transitional waters are managed under the Inland Fisheries legislation and management structures.

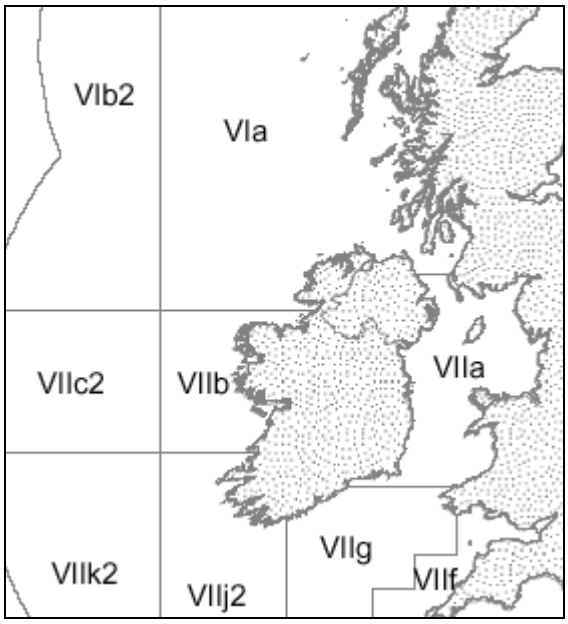


Figure B.1. Map indicating ICES areas around Irish shorelines (Source: ICES).

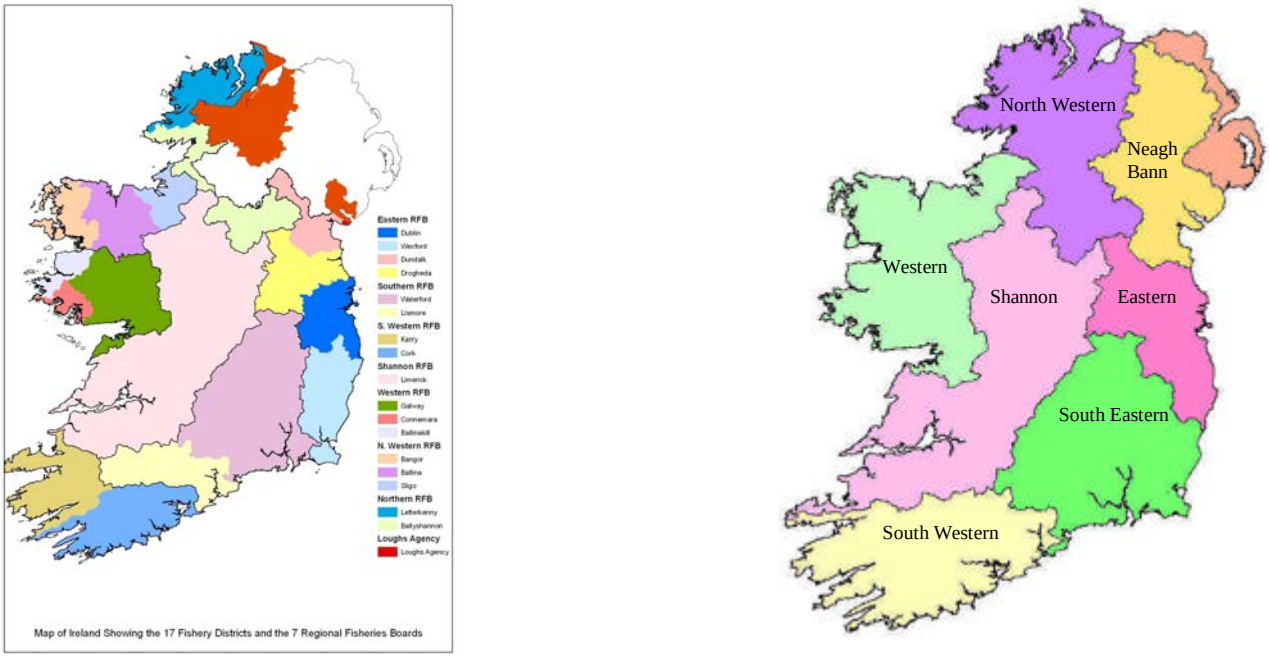


Figure B.2. Map of Ireland on the left showing the seven Regional Fisheries Boards and the 17 Fishery Districts and on the right, showing the Waterframework River Basin District.

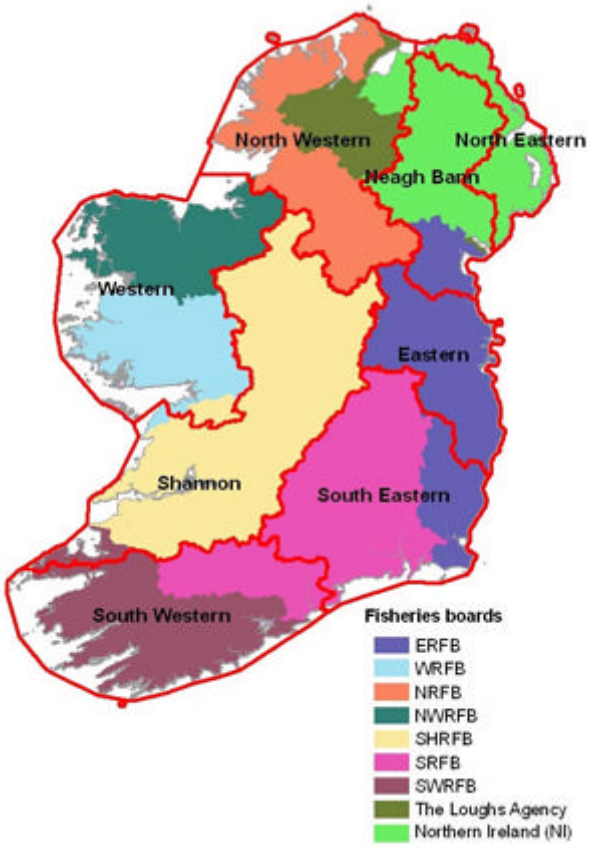


Figure B.3. Map showing the Waterframework River Basin Districts and Regional Fishery Board areas.

IR.B.4.2 River inventory

For the past number of years management of migratory species, salmon and sea trout, has been at the catchment level and it is therefore logical to expand this to encompass the management of eel.

A series of datasets (including river catchment topography, riverine gradient, lakes, catchments and Fisheries Districts) with national coverage (RoI) were acquired for the development of an integrated, G1S based, data model for the quantification of the fresh-water salmon habitat asset and for the determination of the quantity of habitat available to migratory salmonids. 261 discrete migratory salmonid 'Fishery Systems' were identified nationally of which 173 are recorded as being 'salmon and seatrout' and 88 as being 'seatrout only' (McGinnity *et al*., 2003). An additional three Northern Ireland catchments have been included in the quantification in support of the NWIRBD transboundary management plan. It is likely that eels are present in the majority or all of these systems although commercial fishing probably only takes place in 4.6% of them accounting for 71% of the total wetted area. It is also possible that this number of 264 catchments may change in the future as more information becomes available.

The estimated total wetted area[1] of the 264 lake, river and stream habitat accessible to migratory fish (including first order streams) in Ireland (including the Northern Ireland part of the Erne and the Loughs Agency Rivers in the Foyle and Carlingford ar-

[1] Data supplied by Central Fisheries Board, Compass Informatics, the Loughs Agency and EHS Water Management Unit, Northern Ireland.

eas) is 153 881 ha (Table B.1). The 264 "migratory" systems were estimated to contain 132 275 ha of lake habitat, 21 606 ha of fluvial habitat, of which 2826 ha is estimated to be first order stream (calculated at a nominal width of 0.8m). The ShRBD, WRBD and NWIRBD are clearly dominated by lacustrine habitat (Figure B.4).

It is intended to refine this database in the future, adding in additional information such as obstacles to migration and natural barriers and ground-truthing the potentially productive area with the presence/absence of eels.

Habitat quality data using the Amiro (Amiro, 1993) and Rosgen (Rosgen, 1994) gradient classification systems are available. For example, in the Kerry Fisheries District 48% of the potential salmon producing habitat has a gradient of < 0.5% (Amiro Class 1; McGinnity *et al.*, 2003).

Table B.1. Total wetted areas (ha) for lake, first order fluvial and greater than first order fluvial habitat for each River Basin District, including Northern Ireland (Erne, Drowes, Foyle, Roe and Faughan).

	LAKE	>FIRST ORDER FLUVIAL	FIRST ORDER FLUVIAL	TOTAL WETTED AREA
EEMU	4861	1920	262	7043
SERBD	178	3626	412	4216
ShRBD	40 241	4487	590	45 317
SWRBD	7534	2714	419	10 666
WRBD	46 602	2869	473	49 944
NWIRBD	32 859	3165	670	36 694
Total	132 275	18 780	2826	153 881

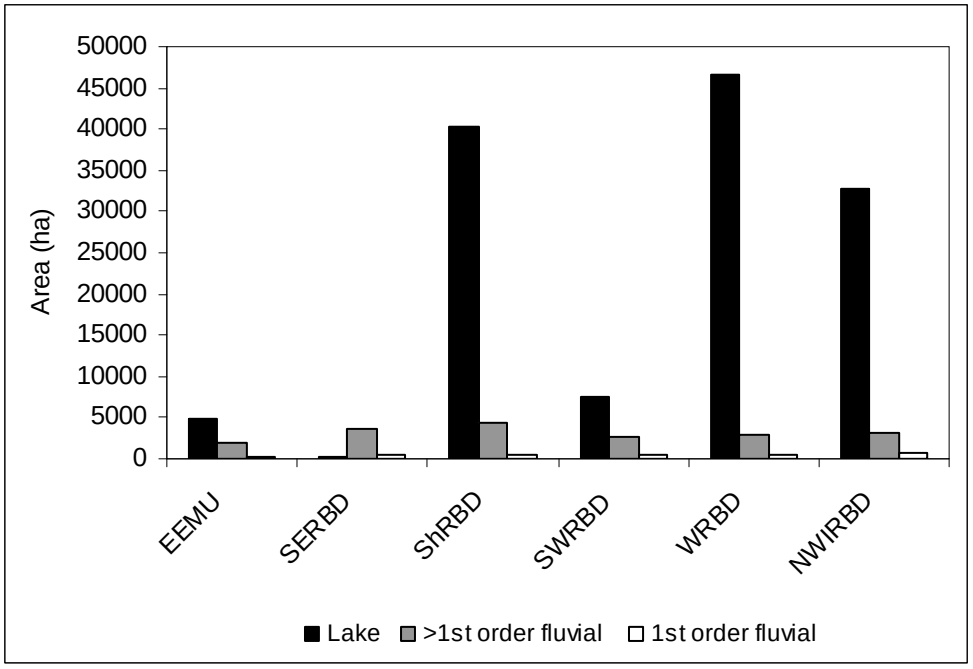


Figure B.4. Total wetted areas (ha) for lake, first order fluvial and greater than first order fluvial habitat for each River Basin District, including Northern Ireland (Erne, Drowes, Foyle, Roe and Faughan).

IR.B.4.3 Habitat types-national overview

Overview on methodology for descriptions at the River District Level, of the nature of catchments-Alkaline/ acidic, Oligo/ Meso/ Eutrophic.

Potential productivity

In Article 2, of the Regulation, it states:

4. The target level of escapement shall be determined, taking into account the data available for each eel river basin, in one or more of the following three ways:
   a) use of data collected in the most appropriate period prior to 1980, provided these are available in sufficient quantity and quality;
   b) **habitat-based assessment of potential eel production**, in the absence of anthropogenic mortality factors;
   c) with reference to the ecology and hydrography of similar river systems.

In support of this approach, the total catchment areas have been classified on the basis of their underlying geology into calcareous and siliceous (non-calcareous) types. Following on from this classification, the wetted areas have been nominally assigned as either calcareous or siliceous waters based on this catchment ratio (Table B.2; Figure B.5). This broad scale classification will allow for rough categories of eel productivity to be calculated which can be used in the assessment of potential production in the absence of sufficient eel data. More detailed information on catchment productivity using water chemistry (pH, Conductivity, alkalinity) might improve this system in the future and this will be done during the final phase of the NDP Eel project.

The dominance of lacustrine habitat is also evident for ShRBD, WRBD and NWIRBD in Figure 3.5, although there is a change in proportion between the ShRBD and the WRBD, with more siliceous area in the WRBD than in the ShRBD.

Table B.2. Total wetted areas (ha) for lake, first order fluvial and greater than first order fluvial habitat for each River Basin District, separated by catchment geology.

	WETTED AREA		%
	Calcareous	Siliceous	Calcareous
EEMU	5557	1486	79
SERBD	2480	1736	59
ShRBD	42 104	3213	93
SWRBD	2893	7774	27
WRBD	35 376	14 569	71
NWIRBD	27 659	9035	75
Total	116 068	37 813	75

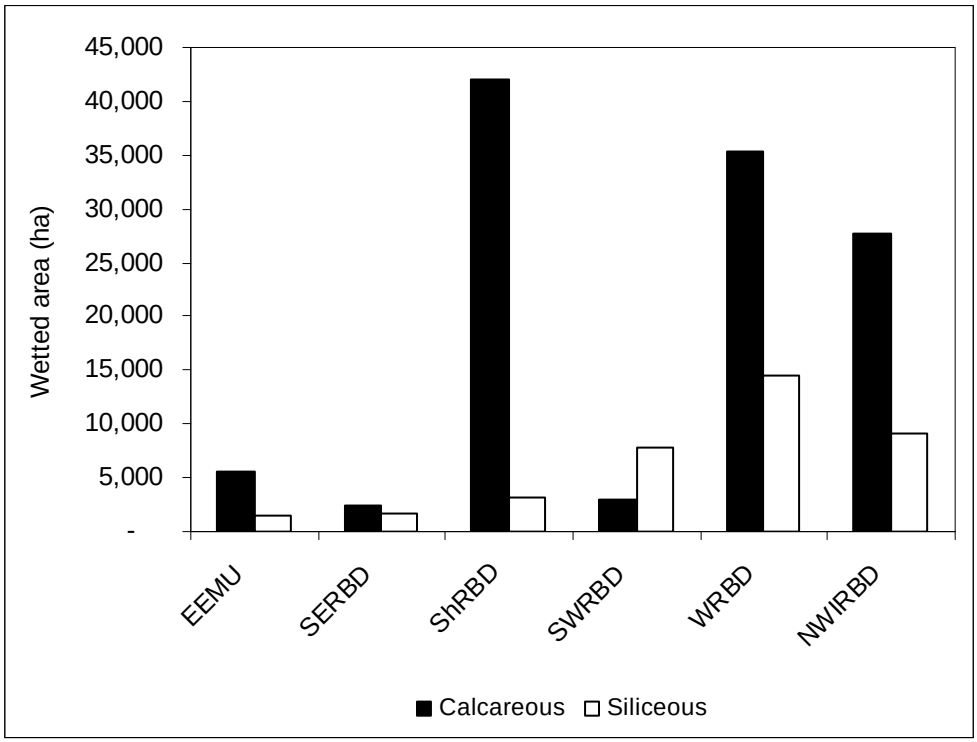


Figure B.5. Total wetted areas (ha) for lake, first order fluvial and greater than first order fluvial habitat for each River Basin District, separated by catchment geology.

IR.B.4.4 Water quality

Ireland is generally in a good position to implement the Waterframework Directive. Irish legislation provides (since 1977) for water quality planning on an integrated basis (i.e. to include surface and ground waters, including estuarine and tidal waters) and for inter-authority planning.

Since 1997 Ireland has promoted a catchment-based, national strategy to combat eutrophication in rivers and lakes. Major catchment-based initiatives have been carried out in respect of Loughs Derg, Ree and Leane and the Rivers Suir, Boyne and Liffey, linked to a major programme of investment in sewage infrastructure in these catchments. The work done in the context of these projects will be carried forwards and developed in the context of River Basin Management Projects.

Water quality in Ireland is generally good and compares very favourably with other Member States. The main challenge for water quality is to deal with eutrophication arising from excess inputs of phosphorous from all sources. The extent of eutrophication in the river system has been increasing persistently since the 1970s and has been identified by the EPA as probably the most serious environmental pollution problem in Ireland.

Poor water quality impacts on the potential for rivers to produce salmon. It is unknown at this point whether similar water quality levels that affect salmon have an affect on eel. The Environmental Protection Agency monitor water quality at over three thousand sites nationally from which a preliminary estimation of the area of channels with inadequate water quality which has been made.

Nationally (RoI), the water quality in 82.7% of the habitat available for salmon production is unpolluted, a further 12.8% is considered slightly polluted, and the remaining 4.5% is considered to be moderately or seriously polluted. Recent studies carried

out by the Central Fisheries Board (Kelly *et al.*, 2007) suggest that salmon distribution and productively are significantly impaired in both of the latter categories. The EPA has recently updated the 2002 data to cover the period up to 2006.

River by river water quality data are available from the EPA and these will be integrated into the eel habitat GIS database by May 2009. Ground-truthing of the impact of water quality on eel stocks will be required in the future.

IR.C. Fishing capacity

NOTE: To date, the collection of inland fisheries data has not been managed, organized or presented under the WFD structure. In the following report, the national data will be subdivided by RBD, but the catch will also be reported by Fisheries Region to allow comparisons. IRBD reports only include Rep. of Ireland data.

IR.C.1 Gear types

Fykenets

Fykenets come in many shapes, sizes and configurations, but all operate on the principle of a leader net which guides fish into a hoop net trap with a tapering codend. Many fykenets have double leaders which funnel the catch towards the trap and are staked out. The fykenet type authorized for use in Ireland is known as a small Dutch fyke, or summer fykenet (Moriarty, 1975; Poole, 1990). These consist of two funnel shaped traps facing each other, joined by a leader net, which usually has a mesh size of 16 mm. Each trap consists of two chambers and a codend with knot to knot mesh sizes of 16, 12 and 10 mm and the entrance is usually 50–60 cm in diameter. The standard fyke has a leader length of about 8.2 m and each trap end is 3.4 m long, giving an overall length of about 15 m when set. There may be variations in mesh size and length dimensions and these are not stipulated in the legislation. These fykenets are usually joined end to end and fished in trains of multiple nets, often 5 or 10 in a train. Other fykenet designs with one metre diameter hoops and leader net height require special authorization.

Coghill nets

Coghill nets are used to capture downstream migrating silver eels in rivers and at the outlets from lakes. They come in a variety of shapes and sizes, but essentially all operate on the same principle, similar to a stationary trawlnet either stakes instream or mounted on a frame, often at a bridge, which can be lifted by a winch to allow for passage of boats, migration of other fish species and servicing of the nets. The codends are either lifted and emptied into a shute or are emptied by boat. Major coghill fisheries occur at Killaloe (Shannon) and Corrib (Galway). The Galway Fishery coghill nets have dimensions overall Length 11.8 m. Mouth-4.5 m Length with 5 cm knotted mesh. Middle Section-6 m length with 3 cm Knotless Mesh. Codend-1.3 m length from Ring with 1 cm fine mesh.

Silver eel are fished in the upper and middle Shannon catchment using instream coghill nets, similar to single chamber fykenets with "v" configuration wing leader nets. These vary in shape and size depending on local conditions, ranging from 20 m wings (3 m high) and 15 m chamber to 5–10 m wings (1–2 m high) and 5 m chamber.

Longlines

Baited (earthworm, mealworm, fish, shrimp) longlines are used to catch brown eel in lakes. In most Regions the maximum licenced number of hooks is 1000. Longline fishing is highly skilled and labour intensive. Matthews *et al.*, 2001 describes the prepara-

tion of a typical longline of 300 hooks which includes arranging of hooks and droppers in sequence on trays, replacing droppers which have been cut off following capture of an eel, can take 1 to 1.5 hours depending on the amount of eel (and therefore removed droppers) caught on that line the previous day). Lifting of a longline of 360 hooks takes between 1 hour and 1 hour and 15 minutes depending on catches. Baiting and setting of one longline of 360 hooks takes on average 1 hour to 1 hour and 15 minutes. Fishing of a series of longlines requires 3–5 hours for lifting, removal and storage of eel. Lines are normally set again that afternoon or evening. The later that longlines are set, the smaller the bycatch of coarse fish will be as they are mostly visual predators, while eel are most active just after dusk and before dawn. Daily lifting of longlines is essential to minimize mortalities of captured eel.

Baited pots

Until the 1960s the pot used in Waterford was a wicker basket about 1 m long and 50 cm in diameter. These were made in Carrick on Suir. In the late 1960s a visiting Dutch fisher introduced gear known locally as the 'beck', a trap made from nylon mesh supported on plastic hoops. These must be baited with freshly caught small estuarine fish such as herring.

Fixed traps

Fixed traps are rigid structures in rivers for capture of downstream migrating silver eel. There are a variety of structures fished including modified smolt wolf type traps. Smolt traps are also used for sampling silver eels and for the Burrishoole the entire run is trapped and monitored.

IR.C.1 Licensed capacity

Little data are available as reporting of effort is not a national requirement.

Fishing effort was not monitored in the Irish eel fishery. There was no logbook or compulsory recording system for fishers and there is no eel dealer register or regular monitoring of eel dealers. There is also no registration of fishing boats in the eel fishery. Efforts have been made to improve on the data collection by circulating an agreed catch reporting form (Figure C.1) which may lead to data discontinuity.

The Management of Eel Fishing Byelaw No.752, 1998 capped the number of longline licenses that a Regional Fisheries Board may issue for longline fishing for eels in any district. In addition, the Fisheries (Amendment) Act 1999 delegated authority to the Regional Fisheries Boards to issue authorizations for the use any fishing engine for the capture of eels including any longline, as it sees fit.

Each Regional Fisheries Board has a policy on the number of fykenets permitted for each licence and in some cases the locations where they are permitted to fish. It is difficult to convert the number of licensed nets in Tables C.1–C.2 into an actual fishing effort, as many licensed fishers either don't fish at all or only fish for a limited period of the year. In some areas for example, such as in the southeast, fykenets are used during the weaker tides and baited pots are used when the tides are too strong for fykenets.

A preliminary analysis of the number of licences issued the number of end of year catch reports submitted and from that, the number of licences that fished and submitted a catch record was undertaken. The number of "actively fished" licences, grouped by gear type and by RBD, was examined as a proxy for "effort". This has been presented for the national catch in Section IR.D but the data were not suitable for analysis at a smaller scale.

Brown eel effort

Brown eels are fished for using either standard or deeper ("other") fykenets, usually 20 per licence, longlines, usually limited to 1000 hooks per licence or baited pots (17 per licence?; Table C.2). The total numbers of licences, for Ireland, issued and fished are shown in Figure 4.3. No data are available for the effort of each licence about nights fished or comparisons between gear types or amounts.

Since 2001 there has been an increase in the number of licences issued and in the number being actively fished for brown eel (Figure C.2).

Silver eel effort

Silver eels are fished using fykenets, fixed v-wing nets and coghill nets (Table C.2), although standard fyke licences are only listed in the table for brown eel (Table C.1). Effort is often targeted at short time windows in autumn and winter during optimum conditions, such as dark moon and high water. The total numbers of licences (not including fykenets), for Ireland, issued and fished are shown in Figure C.3. No data are available for the effort of each licence about nights fished or comparisons between gear types or amounts. (Note: coghill nets above Killaloe in the Shannon have been grouped under "v-wing fykes").

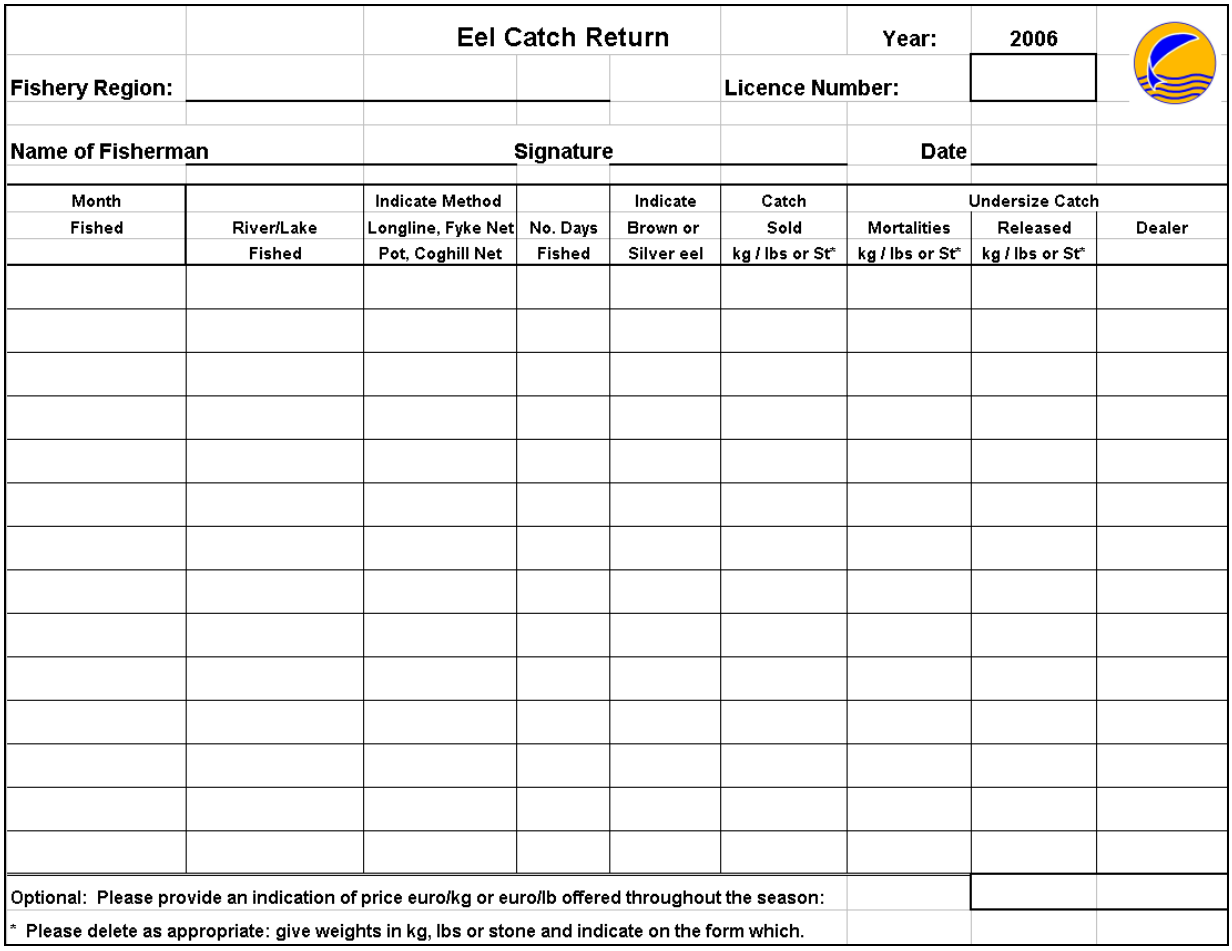
Since 2001 there has been an increase there has been an increase in the number of licences issued and in the number being actively fished for silver eel (Figure C.3) with a steadying in 2007.

Shannon IRBD

The ESB are issued a single licence for the R. Shannon for brown and silver eel and they have authorized crews who partake in the survey/fishery using longline, fykenets and coghill type nets (Tables C1–C2). The collection of glass eel, elver and other juvenile eels for lake-stocking is supervised by staff from the Shannon Regional Fishery Board and researchers from the National University of Ireland, Galway, and daily records are available.

Brown eel fishing involves authorized fishing crews, two persons per boat, entitled to use one or other of two methods (decided by fishery management, on biological advice); i.e. up to 50 fykenets or earthworm baited longlines, not exceeding 1000 hooks. Authorizations are issued by the ESB subject to weekly provision by crews of data on: Fishing locations, fishing effort, eel catch, bycatch and some environmental data (daily logbook records, analysed at end of season, and checked by fishery-independent monitoring). At present no records of fuel consumption, other than by research crews, are maintained.

Silver eel fishing, at ESB eel weirs (coghill nets) and sites fished by authorized crews (coghill and fykenets) is also monitored by means of daily logbook records and fishery-independent surveys. An annual, end of season report is compiled.



Eel Catch Return

Year: 2006

Fishery Region: _____ Licence Number: _____

Name of Fisherman _____ Signature _____ Date _____

Month Fished	River/Lake Fished	Indicate Method Longline, Fyke Net Pot, Coghill Net	No. Days Fished	Indicate Brown or Silver eel	Catch Sold kg / lbs or St*	Undersize Catch Mortalities kg / lbs or St*	Undersize Catch Released kg / lbs or St*	Dealer

Optional: Please provide an indication of price euro/kg or euro/lb offered throughout the season:

* Please delete as appropriate: give weights in kg, lbs or stone and indicate on the form which.

Figure C.1. Catch declaration form issued with each licence from 2005 onwards.

Table C.1. Table of brown eel licences for each Eel Management Unit, 2001 to 2007.

MANAGEMENT	YEAR	LONGLINE			STANDARD FYKE			BAITED POT			TOTAL		
Unit		I	R	A	I	R	A	I	R	A	I	R	A
NWIRBD	2001	32	10	10	15	4	4				47	14	14
(ROI)	2002	30	11	11	18	8	8				48	19	19
	2003	30	0		16	0					46	0	0
	2004	24	8	8	13	2	2				37	10	10
	2005	25	14	14	18	18	8				43	32	22
	2006	24	20	19	21	15	13				45	35	32
	2007	27	25	16	19	17	11				46	42	27
SERBD	2001				8	0		27	0		35	0	0
	2002				32	13	13	27	0		59	13	13
	2003				16	14	14	20	19	14	36	33	28
	2004				16	16	16	20	10	9	36	26	25
	2005				15	7	5	20	13	10	35	20	15

MANAGEMENT	YEAR	LONGLINE			STANDARD FYKE			BAITED POT			TOTAL		
	2006				13	9	7	20	10	9	33	19	16
	2007				16	12	10	20	13	6	36	25	16
EEMU	2002		7	7		4	4				0	11	11
	2003	4	4	4	3	3	3				7	7	7
	2004	5	5	5	5	5	5				10	10	10
	2005	3	2	2	3	2	1				6	4	3
	2006	4	2	2	3	2	1				7	4	3
	2007	3	3	2	3	2	2				6	5	4
SHIRBD	2001		14	11		13	13				0	27	24
	2002		19	16		18	15				0	37	31
	2003		13	12		15	13				0	28	25
	2004	24	16	16	23	15	15				47	31	31
	2005	22	18	16	21	19	19				43	37	35
	2006	22	17	2	21	10	1				43	27	3
	2007	22	21	17	21	13	10				43	34	27
SWRBD	2001	4	4	0	5	3	3	1	1	1	10	8	4
	2002	4	4	0	7	3	3	1	1	1	12	8	4
	2003	5	0		7	1	1	2	0		14	1	1
	2004				4	1	1	1	0		5	0	0
	2005				10	3	1	1	1	1	11	4	2
	2006				5	2	2	1	0		6	2	2
	2007				4	0		1	0		5	0	0
WRBD*	2001	15	0		24	19	14				39	19	14
	2002	8	5	5	25	23	20				33	28	25
	2003	16	15	15	25	20	13				41	35	28
	2004	14	15	11	28	24	20				42	39	31
	2005	15	13	13	28	28	25				43	41	38
	2006	32	13	12	29	22	21				61	35	33
	2007	32	26	19	28	21	18				60	49	39

I = number issued, R = number reporting catch and A = the number that actively fished.

*** WRFB Standard Fykes includes 3 "other fykes" issued, reported and fished in each year.**

Table C.2. Gear, not including fykenets, licensed for silver eel fishing in each Management Unit, 2001–2007.

Management	Year	Coghill			Fixed trap			V-wing fyke*			Total		
Unit		I	R	A	I	R	A	I	R	A	I	R	A
NWIRBD	2001	0									0	0	0
(ROI)	2002	0									0	0	0
	2003	0									0	0	0
	2004	4	0		1						5	0	0
	2005	1	0		1	0					2	0	0
	2006	3	1	0	1	0					4	1	0
	2007	1	1	0							1	1	0
SERBD	2001										0	0	0
	2002	2	0								2	0	0
	2003	2	2	2							2	2	2
	2004	2	2	2							2	2	2
	2005	2	2	0							2	2	0
	2006	2	2	2							2	2	2
	2007	2	2	0							2	2	0
EEMU	2002		7	7		2	2				0	9	9
	2003	8	6	6	2	2	2				10	8	8
	2004	7	8	7	3	2	2				10	10	9
	2005	7	5	5	0	0	0				7	5	5
	2006	7	7	7	2	2	2				9	9	9
	2007	6	2	2	0						6	2	2
SHIRBD	2001		0						19	13	0	19	13
	2002		20	20					19	17	0	39	37
	2003		0						19	16	0	19	16
	2004	26	20	20				21	21	20	47	41	40
	2005	22	21	21				23	23	19	45	44	40
	2006	22	20	20				23	21	19	45	41	39
	2007	2	0					23	21	19	25	21	19
SWRBD	2001										0	0	0
	2002										0	0	0
	2003										0	0	0
	2004										0	0	0
	2005										0	0	0
	2006										0	0	0
	2007										0	0	0
WRBD	2001	28	19	18	1	0					29	19	18
	2002	27	21	21	1	0					28	21	21
	2003	27	23	19	1	0					28	23	19
	2004	27	27	24							27	27	24
	2005	24	24	17	1	1	1				25	25	18
	2006	26	22	22	1	0					27	22	22
	2007	26	18	18	1	0					27	18	18

*** V-wing fykes includes instream coghill nets.**

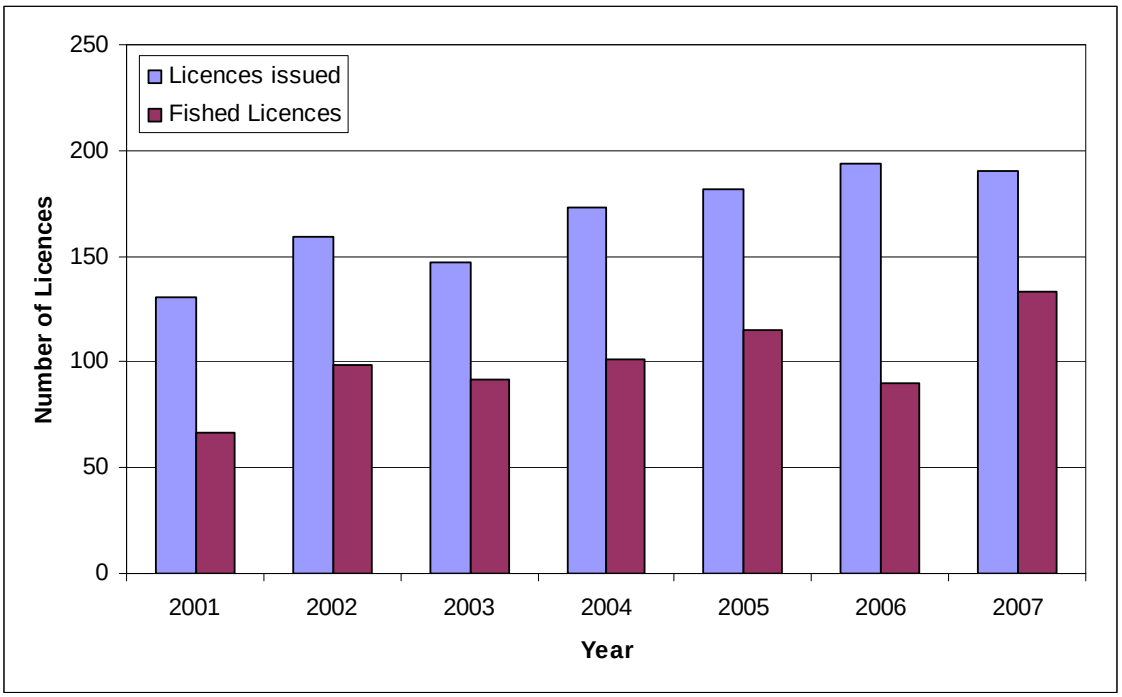


Figure C.2. The total number of brown eel licences issued in Ireland and the number actively fished, 2001 to 2007.

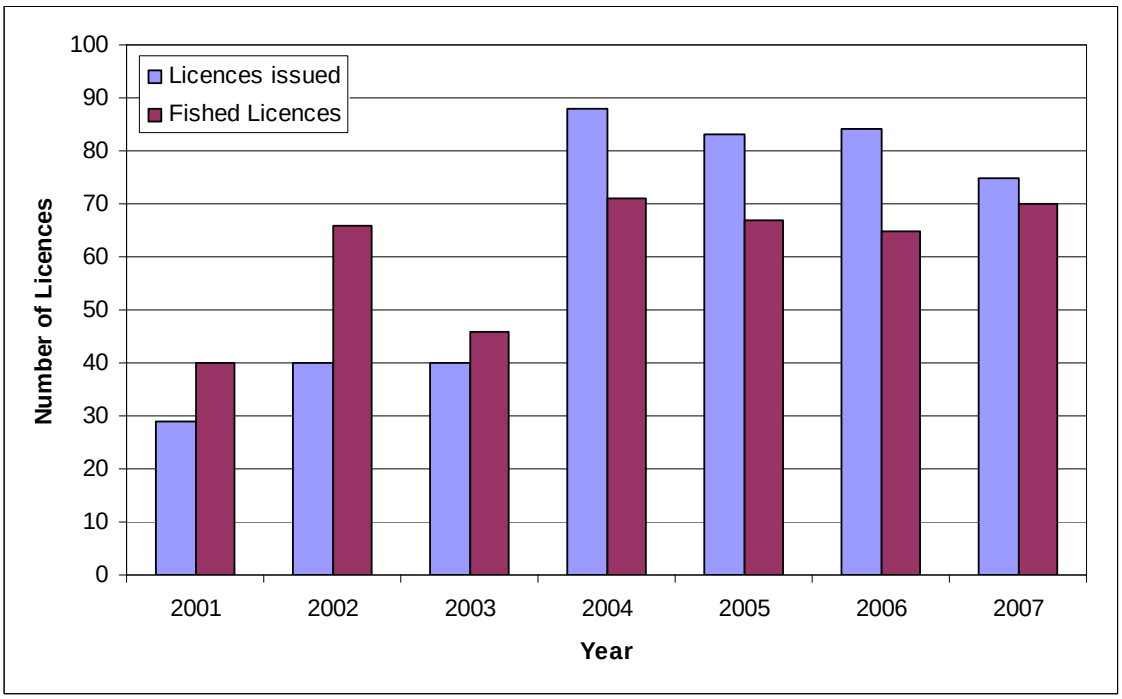


Figure C.3. The total number of silver eel licences (coghill, v-wing fyke and fixed trap) issued in Ireland and the number actively fished, 2001 to 2007.

IR.D. Fishing effort

IR.D.1 National synopsis

DCR Requirement for Eel, specific effort must reach Threshold 1-30% of the catch in a day.

Little data available as reporting of effort is not a national requirement.

Fishing effort is not generally monitored in the Irish eel fishery. There is no logbook or recording system for fishers and there is no eel dealer register or regular monitoring of eel dealers. There is also no registration of fishing boats in the eel fishery.

It is difficult to convert the number of licensed nets in Tables C1–C2 into an actual fishing effort, as many licensed fishers either don't fish at all or only fish for a limited period of the year. In some areas for example, such as in the southeast, fykenets are used during the weaker tides and baited pots are used when the tides are too strong for fykenets. A preliminary analysis of fishing effort was carried out using the number of days fished as the standard unit, regardless of the gear type used, fykenet or longline. This analysis was undertaken for brown and silver eels separately.

IR.D.2 Brown eel effort

Brown eels are fished for using either fykenets, usually 20 per licence, or longlines, usually one line of 1000 hooks per licence. In 2006, there was a close relation between the number of days fished and catch and it is hoped that over time this analysis will allow cpue to be used as a proxy indicator for changes in stock level.

IR.D.3 Silver eel effort

Silver eels are fished using fykenets, fixed v-wing nets and coghill nets. Effort is often targeted at short time windows in autumn and winter during optimum conditions, such as dark moon and high water.

IR.E. Catches and landings

As stated in Section IR.B, Ireland falls entirely into the NE Atlantic Area, VI and VII. Landings data are required separately for glass eel, brown eel and silver eel, by Quarter, by Gear Type for the Minimum Programme, and Monthly by ICES Statistical Rectangle (catchment for eel) by Gear Type.

One of the main components of the Eel Recovery Plan is the development of Eel Management Plans for each River Basin District. To facilitate proper implementation and monitoring of each plan, landings data will need to be reported for each River Basin District, and, if possible, at the individual catchment level.

IR.E.1 National commercial catch

IR.E.1 .1 Catch of glass eel/elver

There is no authorized commercial catch of juvenile eel in Ireland and some fishing has been authorized in the past under Section 18 of the Fisheries Act for enhancement of the fisheries.

Monitoring of elver migrating at the impassable hydro-barriers at Ardnacrusha (Shannon) and Cathleens Falls (Erne) is undertaken by the ESB (Figure E.1). Indications are that recruitment remains low. Catches in 2004 for both Erne and Shannon were the second lowest recorded. Numbers in 2005 were more unpredictable, with good catches of elvers recorded in the Erne (45% of the 1979–84 mean) and a poor

catch in Ardnacrusha (1.4% of the 1979–1984 mean).

A new dataset has come to light which extends the Shannon series back from 1977 to 1959. There are some discrepancies in the overlap data as shown on Figure E.1. It is hoped that these can be resolved.

The Erne elver dataset has also been double checked and the presented data has now been agreed by DCAL and AFBINI, the ESB, NRFB and MI. Any discrepancies were not major and the data trend and pattern has not changed.

IR.E.1.2 Restocking

All of the catches reported in Section IR.E.1.1 are used for restocking, primarily in the Erne and Shannon catchments.

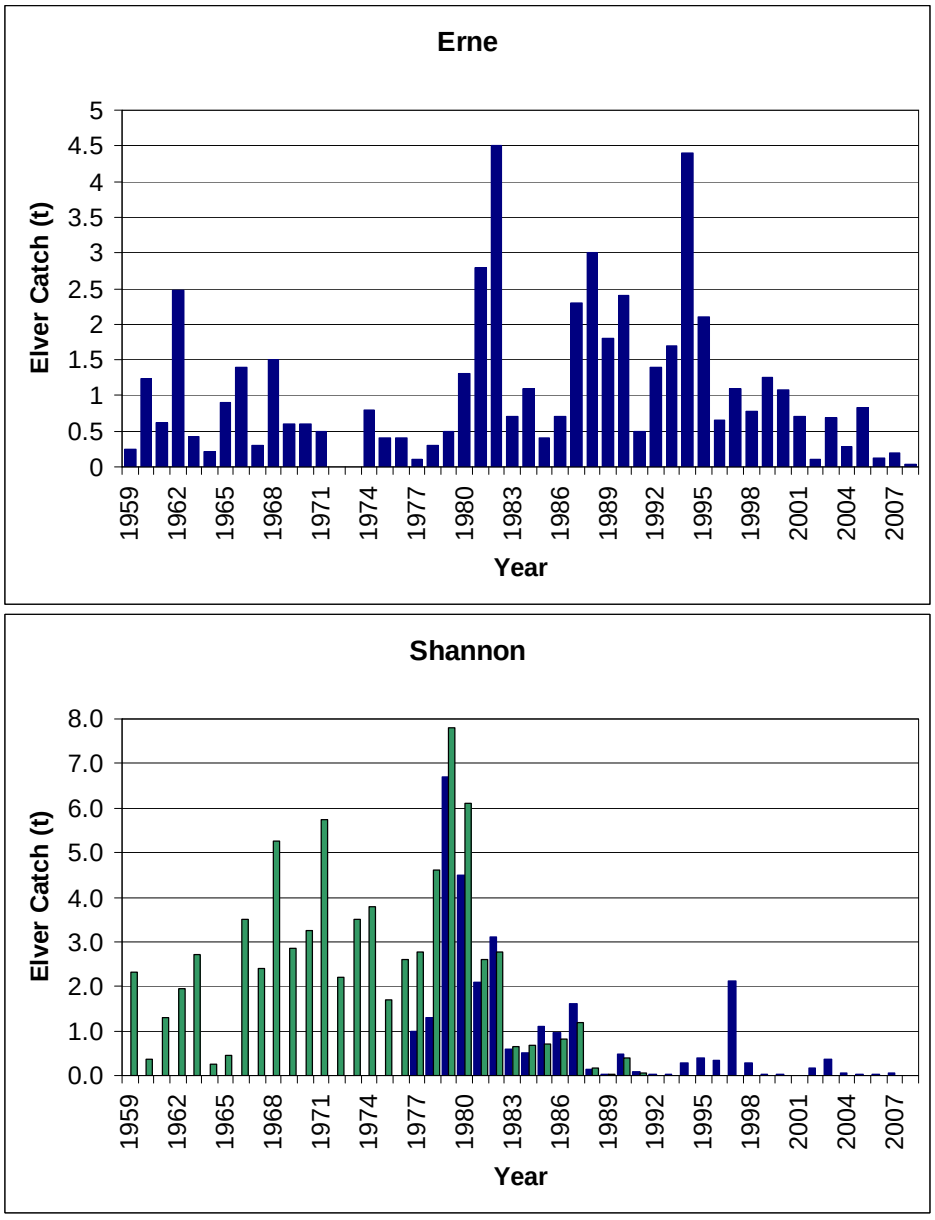


Figure E.1. Annual elver catches (kg) in the traps at Ardnacrusha (Shannon) and Cathleens Falls (Erne)-data from ESB. The green bars in the Shannon graph are for a historical dataset that differ from the current dataset.

IR.E.1.3 Catch of brown and silver eel

There is no compulsory declaration of eel catch in Ireland and in many Regions, declarations of catches are not complete and underreporting is probably widespread. Currently, reported catches are available on an annual basis at the Fisheries Regional Level, with most RFBs reporting on a District basis. The introduction of the new catch reporting form has led to considerable improvement in the system since 2005.

For the Eel Management Plans, catches (RoI) of brown and silver eel have been collated from the District returns and are presented in Table 4.5 for 2001 to 2007 for each Eel Management Unit (RBD). Also included in Table E.1 are the catches for N. Ireland on the Erne supplied by DCAL and AFBINI.

Mortalities in the catch have not been consistently reported and the data have only been requested since 2005. Therefore, the landings reported here are for the declared up to 2005 and for the catch, not including mortalities, after 2005. Mortalities in 2006 and 2007 were 0.3% and 1.3% respectively.

Since 2001 the ESB has embarked on a programme of transporting a proportion of the silver eels captured in the Shannon silver eel fishery around the dams and releasing them for onward migration to the sea. These released eels are included in the data presented in Table E.1 and this has ranged from 5% to 22% of the total silver eel catch on the Shannon.

There has been no discernible trend in the reported catch of either brown or silver eel (Figures E.2 and E.3).

Reporting of silver eel in the NWIRBD ceased after 1997 although it is understood that fishing has continued though the following years.

Also presented, in Tables E2–E5, are the catch data sorted by Fisheries Region as originally presented in the Country Reports and also updated with the confirmed data as included in the Irish Eel Management Plans and with the 2007 data. The differences were relatively minor in most cases.

Table E.1. Declared catches of brown, silver and total catch for each management unit, 2001–2007. [1]The catch released below the dam on the Shannon is also listed separately with the (%). *RoI part of RBD only, **N. Ireland part of RBD only, * total RBD. NR = no report.**

Brown eel

	2001	2002	2003	2004	2005	2006	2007
EEMU	305	7806	6060	5420	841	703	1487
SERBD	8555	13 027	9786	7753	5569	3327	4413
SWRBD	552	960	70	35	22	250	NR
SHIRBD	15 983	18 116	22 196	21 535	18 736	17 591	24 635
WRBD	22 126	15 043	23 415	21 142	17 851	18 276	17 922
NWIRBD*	4743	8911	NR	6793	7311	16 865	9 929
NWIRBD**	12 300	15 300	16 160	15 700	13 600	15 700	19 600
NWIRBD***	17 043	24 211	16 160	22 493	20 911	32 564	29 529
Total RoI	52 264	63 863	61 527	62 678	50 330	57 012	58 503
Total	64 564	79 163	77 687	78 378	63 930	72 712	77 986

Silver eel

	2001	2002	2003	2004	2005	2006	2007
EEMU	127	2360	2460	1810	396	364	90
SERBD	0	2004	1218	800	260	840	0
SWRBD	0	0	0	35	22	250	0
SHIRBD	24 107	25 248	17 075	37 116	21 535	34,478	18 122
1Catch rel.	1300 (5)	3900 (15)	1600 (9)	2900 (8)	1500 (7)	7700 (22)	3665 (20)
WRBD	9581	14 386	12 596	17 849	14 624	23 971	16 541
NWIRBD*	28	31	NR	NR	NR	564	947
NWIRBD**	NR	NR	NR	NR	NR	NR	NR
NWIRBD***	28	31	NR	NR	NR	564	947
Total RoI	33 843	44 029	33 349	57 610	36 837	60 467	35 700
Total	33 843	44 029	33 349	57 610	36 837	60 467	35 700

Total catch

Total RoI	86 107	107 893	94 876	120 288	87 167	117 479	94 203
Total	98 407	123 192	111 036	135 988	100 767	133 179	113 686

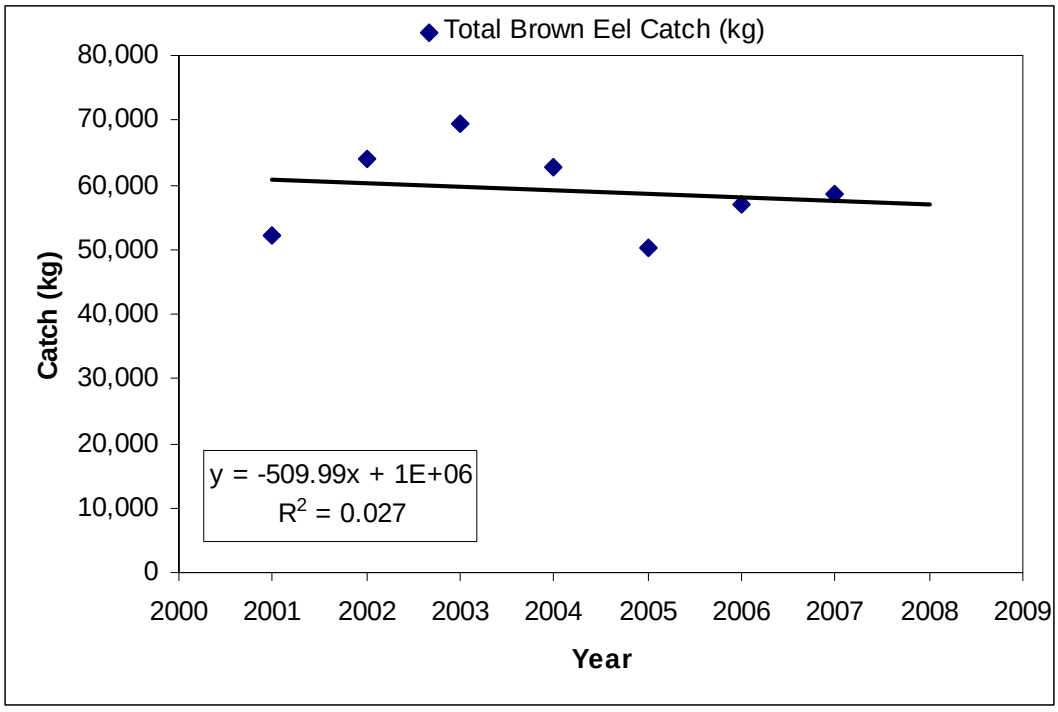


Figure E.2. Total (RoI) brown eel declared catch for the period 2001 to 2007. Trend not significant.

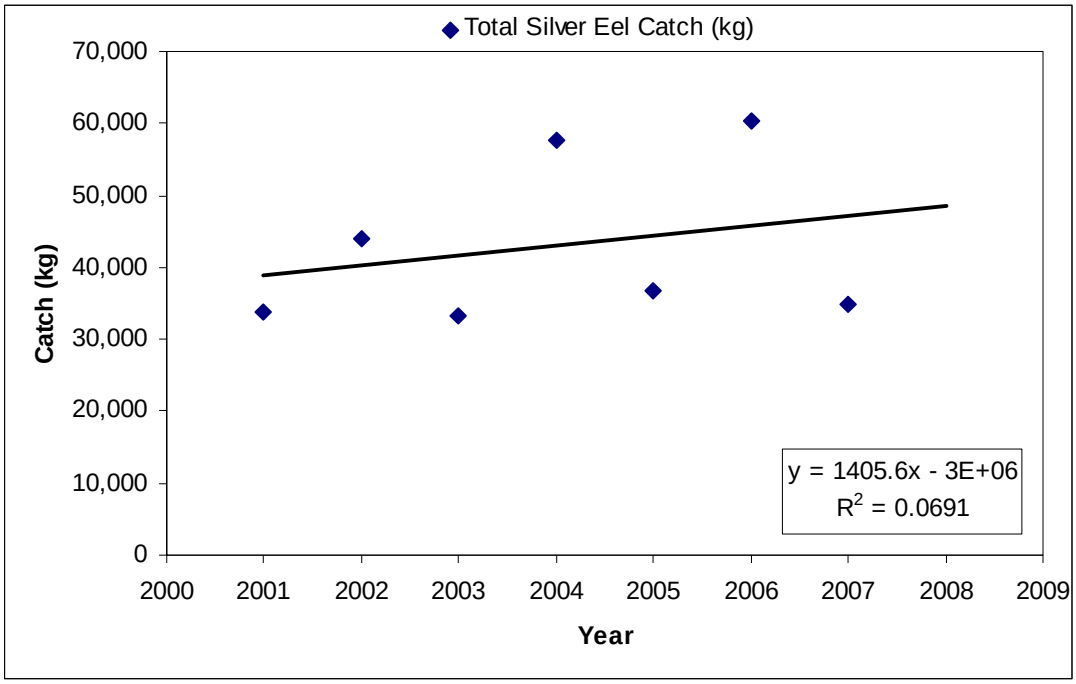


Figure E.3. Total (RoI) silver eel declared catch for the period 2001 to 2007. Trend not significant.

Table E.2. Declared regional catches (t) of brown eel for 2001–2006 OLD DATA.

Fishery Region	2001	2002	2003	2004	2005	2006
Eastern	14.0	16.0	10.7	9.0	1.3	1.0
Southern	8.5	4.8	4.7	3.6	5.3	2.7
South Western	0.6	1.0	0.1	0.1	0.1	0.5
Shannon	16.1	15.8	21.9	21.5	18.7	17.6
Western	8.9	3.9	12.4	9.8	7.9	13.3
North Western	13.9	11.0	12.5	12.1	10.5	6.7
Northern	4.7	8.9	-	4.5	6.6	18.1
Total	66.7	61.4	62.3	60.6	50.4	59.9

Table E.3. Declared regional catches (t) of brown eel for 2001–2007 NEW DATA. Changes are *high-lighted*.

Fishery Region	2001	2002	2003	2004	2005	2006	2007
Eastern	14.0	16.0	***11.3***	***9.6***	***1.1***	1.0	2.0
Southern	8.6	4.8	4.6	3.6	5.3	***3.1***	3.9
South Western	0.6	1.0	0.1	0.1	0.1	0.5	0.0
Shannon	***15.9***	***18.1***	***22.2***	21.5	18.7	17.6	24.6
Western	8.9	***4.1***	12.4	9.8	***8.1***	***11.9***	8.0

North Western	***13.2***	11.0	***11.0***	***11.3***	***9.7***	***6.3***	9.9
Northern	4.7	8.9	-	***6.8***	***7.3***	***16.9***	9.9
Total	***66.0***	***63.9***	***61.5***	***62.7***	50.4	***57.3***	58.4

Table E.4. Declared regional catches (t) of silver eel for 2001–2006. * total catch including a proportion released below hydroelectric dam, ** amount released and (% of catch). OLD DATA

FISHERY REGION	2001	2002	2003	2004	2005	2006
Eastern	2.5	4.3	3.2	2.7	0.6	0.9
Southern	-	0.1	-	0.2	0.0	0.3
South Western	0.0	0.0	0.0	0.0	0.0	0.0
Shannon Region					21.5	
Shannon System *	24.1	25.3	17.1	37.1	20.8	34.5
Shannon Released **	1.3 (5%)	3.9 (15%)	1.6 (9%)	2.9 (8%)	1.5 (7.3%)	7.7 (22.3%)
Western	9.4	13.0	10.6	13.9	13.4	22.4
North Western	1.4	1.2	2.0	4.0	1.5	2.4
Northern	0.1	0.1	-	-	0.0	0.0
Total	37.5	44.0	32.9	57.9	37.1	60.5

Table E.5. Declared regional catches (t) of silver eel for 2001–2007. * total catch including a proportion released below hydroelectric dam, ** amount released and (% of catch). NEW DATA. Changes are *highlighted*.

FISHERY REGION	2001	2002	2003	2004	2005	2006	2007
Eastern	2.5	4.3	***3.6***	***2.5***	***0.7***	0.9	0.1
Southern	0.0	0.1	***0.1***	0.2	0.0	0.3	0.0
South Western	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shannon Region					21.5		

Sh'n System *	24.1	25.3	17.1	37.1	20.8	34.5	18.1
Sh'n Released **	1.3 (5%)	3.9 (15%)	1.6 (9%)	2.9 (8%)	1.5 (7.3%)	7.7 (22.3 %)	3.7 (20.4 %)
Western	9.4	***13.2***	10.6	13.9	***13.2***	***21.6***	13.4
North Western	1.4	1.2	2.0	4.0	1.4	2.4	3.1
Northern	0.1	0.1	-	-	0.0	***0.6***	1.0
Total	37.5	44.0	***33.3***	***57.6***	***37.7***	***60.3***	35.7

Shannon Catchment

The annual downriver migrations of silver eels have traditionally been exploited in the River Shannon and the three commercial eel weirs, owned by ESB since 1937, have continued this practice with varying success (Figure E.4). In many respects the overall pattern of change, with steadily declining silver eel catches at Killaloe/Clonlara, but relatively steady catches at Athlone, mirrors the results obtained by monitoring the Lough Derg fykenet cpue brown eel catches vs. those in upper catchment lakes.

The silver eel catch in 2004/05 in Killaloe was 5.02 t and upstream of Killaloe it was 32.09 t, giving a total silver eel catch for the river of 37.12 t. This was more than double the catch recorded in 2003/04.

The silver eel catch in 2005/06 in Killaloe was 1.53 t and upstream of Killaloe it was 19.27 t, giving a total silver eel catch for the river of 20.80 t.

The silver eel catch in 2006/07 in Killaloe was 7.87 t and upstream of Killaloe it was 26.61 t, giving a total silver eel catch for the river of 34.48 t. This was almost as high as the catch recorded in 2004/05 and may have been helped by relatively high water levels throughout the early winter period.

The silver eel catch in 2007/08 in Killaloe was 4.1 t, upstream of Killaloe it was 14.0 t, giving a total silver eel catch for the river of 18.1 t. 3.7 t were released downstream of the turbine.

Corrib Catchment

The Galway Fishery comprises a weir with 14 coghill nets. These are fished throughout the dark moon phases and may be lifted during periods of very high water. The fishery was purchased by the state in 1978 and has been fished consistently since then. Fishing effort may have increased in later years. The downward trend in silver eel catch (Figure E.5) therefore probably reflects the decreasing stock in the greater Corrib catchment and falling silver eel escapement. The catch in 2004 was 5.83 t, in 2005 it was 7.2 t and in 2006 it was 9.2 t-the highest catch since 1990. The catch in 2007 was 9.3 t.

Burrishoole Catchment

The Burrishoole System in the West of Ireland is a relatively oligotrophic river and lake system with a catchment area of 8,949 ha. The eel population is unexploited and

the total fresh-water silver eel production is trapped in downstream Wolf type traps. The silver eel catch is not included in the National commercial catch as the entire catch is released downstream. The Burrishoole silver eel migration is equivalent to approximately 1% of the National silver catch, by weight, but is indicative of eel production from a considerable number of low productivity Irish river systems where eel densities are relatively low and growth rates are slow, often <2 cm.yr^{-1}.

Total catches of silver eel in the trap between the years 1971 (when records began) and 1982 averaged 4400 individuals, fell to 2200 between 1983 and 1989 and increased again to above 3000 in the 1990s (Figure E.6). There was an above average catch in 1995, possibly contributed to by the exceptionally warm summer. The catch in 2001 of 3875 eel was the second highest recorded since 1982. The catch in 2005 was 2590 and in 2006 it was 2180 individual eels. Unusually high water levels in 2006 made trapping particularly difficult and some losses may have occurred.

Recreational eel

Recreational eel rod catches were not recorded in 2004, 2005, 2006 or 2007, but these were thought to be relatively low. Recreational net and trap eel catches were also low and were included in the commercial catch returns.

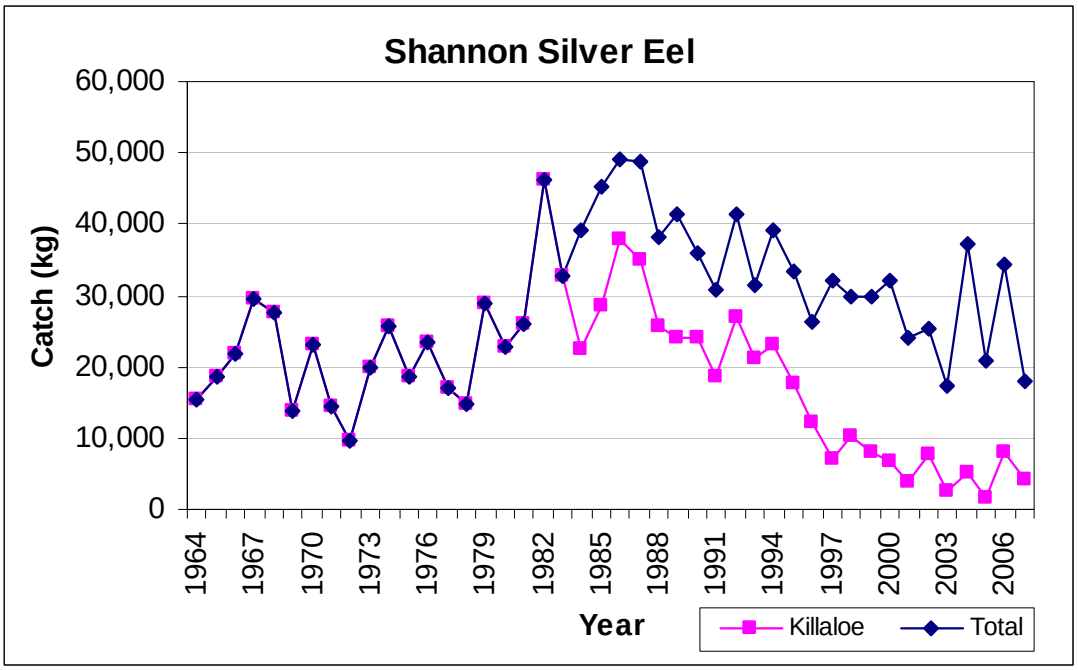


Figure E.4. Silver eel catches from the Killaloe eel weir and the Shannon system (1964 to 2007).

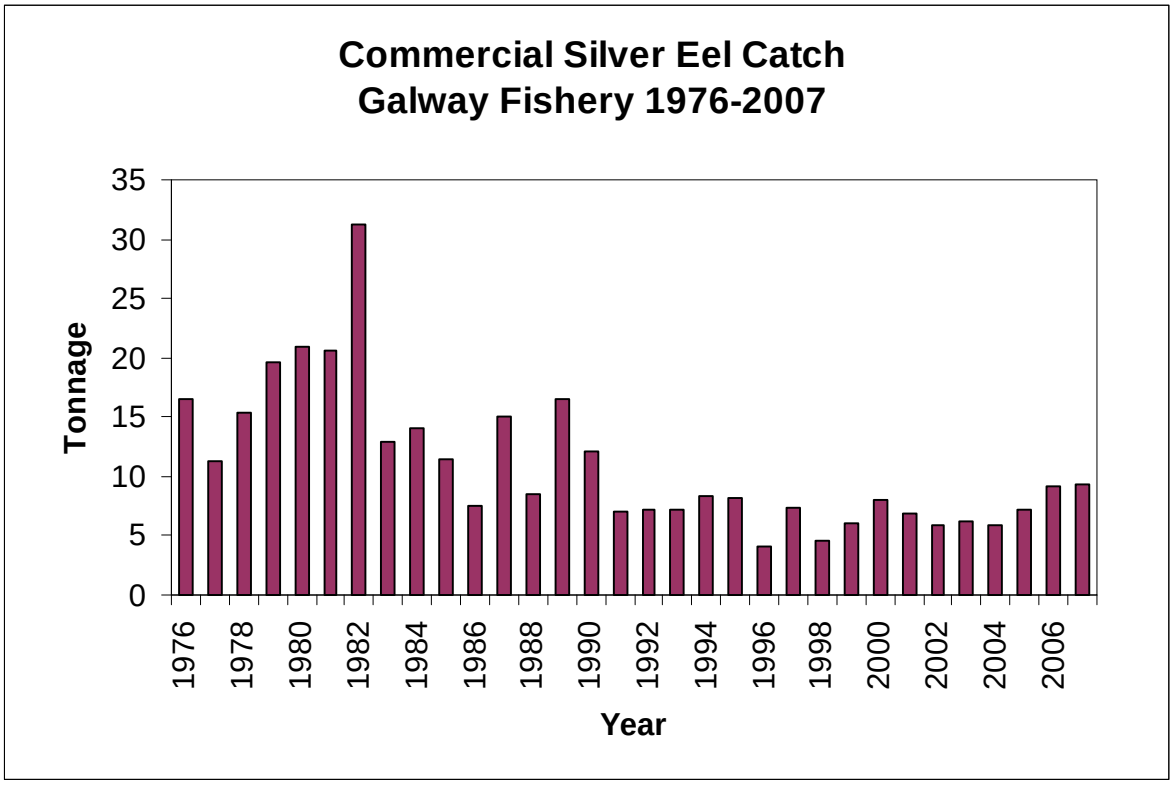


Figure E.5. Annual silver eel catch (t) in the commercial Galway Fishery, Corrib System, for 1976 to 2007.

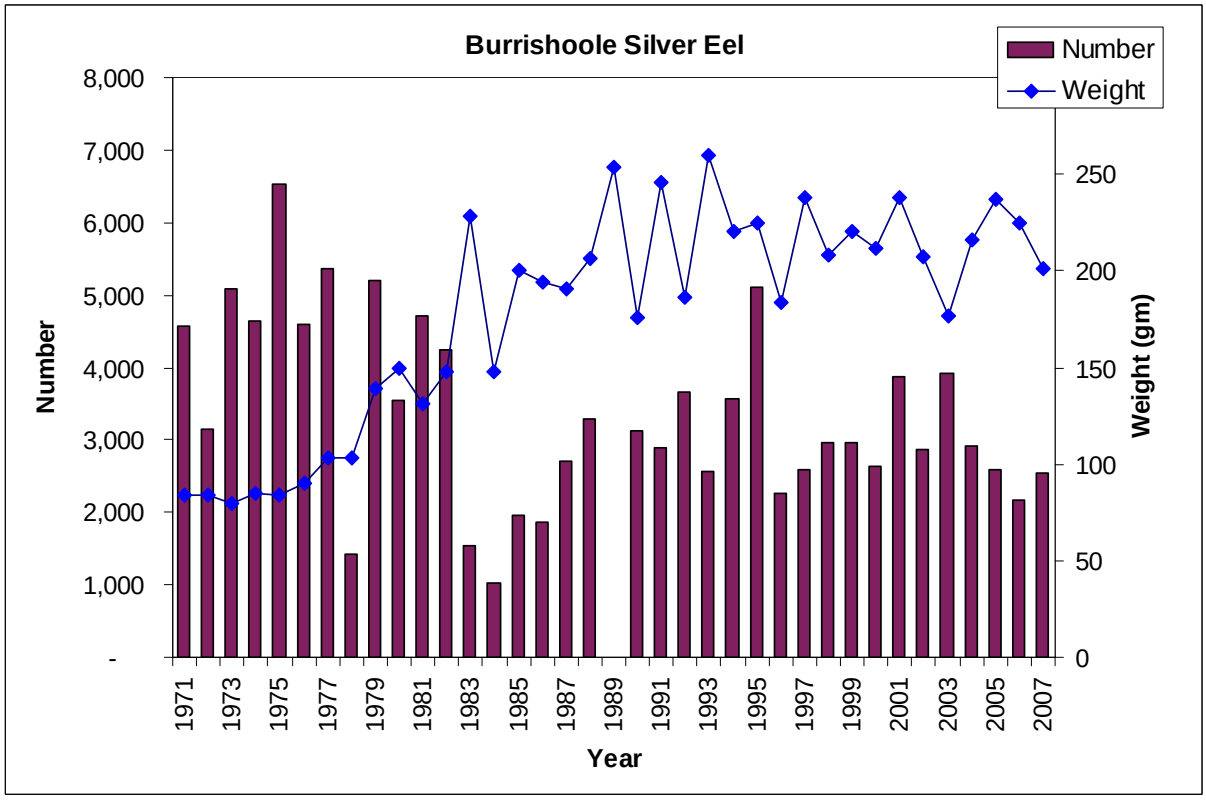


Figure E.6. Annual silver eel catch, and mean weight (gm) in the Burrishoole System for 1971 to 2007.

IR.F. Catch per unit of effort

IR.F.1 Trends in catch, effort and cpue

Trends in catch for a given fishing effort may be used to indicate changes to the stock. If fishing effort is precisely monitored, as in a scientific survey, the catch returns are a good proxy for stock. Such precise information is not available for the commercial eel fishery in Ireland. The best available information allows effort to be quantified as the number of licences actively fished and reported. This is a coarse proxy for effort, as catch returns for each licence ranged from a few kg to several tonnes (depending in large part on the number of nights and nets fished). This information is too coarse for examining trends in stock at the regional level. However, it is useful for examining national trends in stock because of the large number of licences involved. Catch per active licence is indicative of a declining stock of brown eels over the last 7 years at least (Figure F.1). Previous data were not available to allow this analysis prior to 2001 when cpues were likely to be higher.

Given the lack of logbooks or fishery register there is little cpue information available for Irish eel fisheries. Some data are available from selected individuals, fisheries or research teams and these are summarized here. Cpue depends on the amount of gear, such as the number of fykenets or the number of hooks per length of longline, and the number of nights that these are fished. Assumptions made here are that the number of nets or hooks fished remained constant. Figure F.2 cpue for different gear types for each river basin district, 2001–2007.

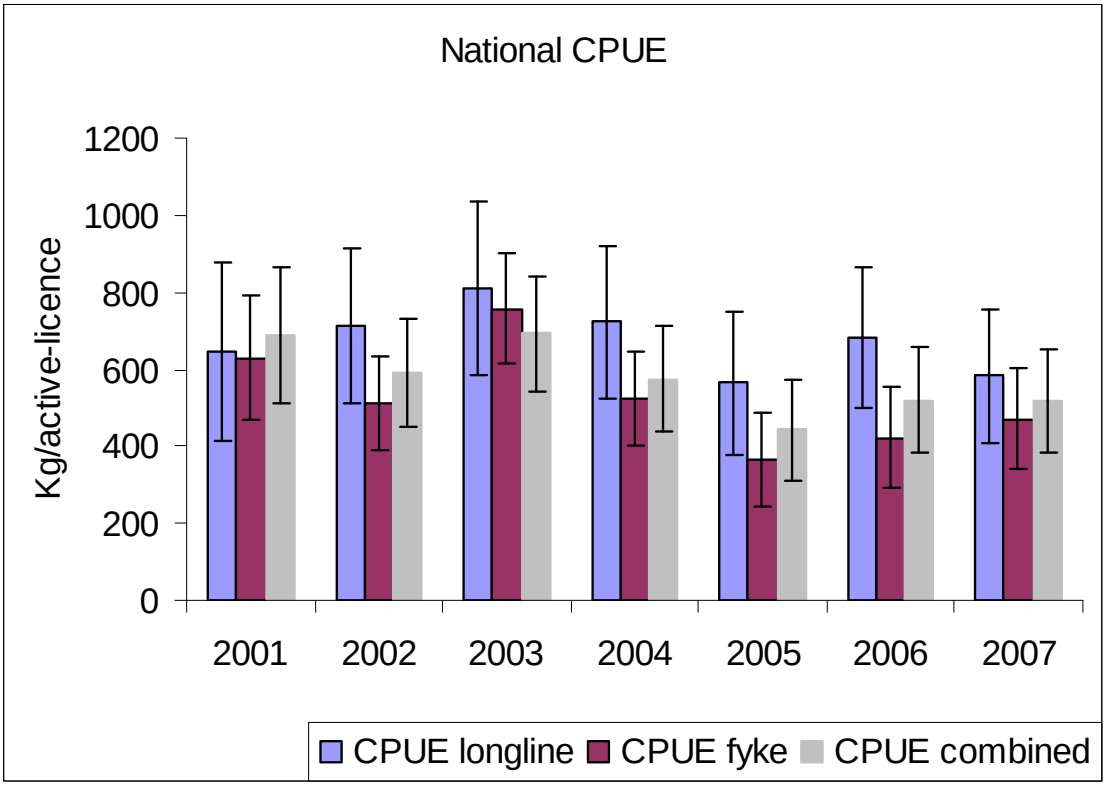


Figure F.1. Brown eel catch per unit of effort for longline, fykenet and combined gear types for the using the national reported catch based on reported actively fished licences.

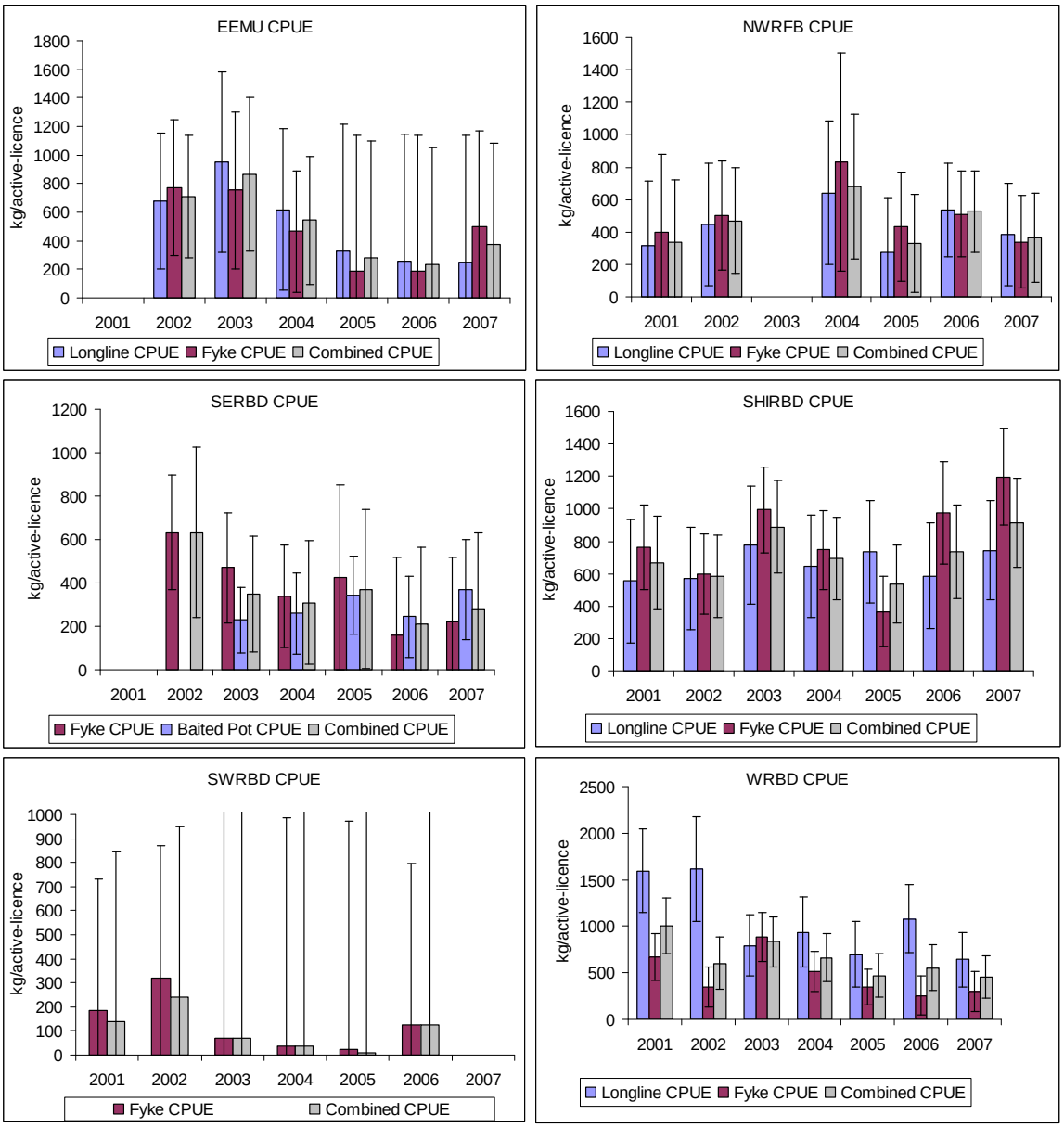


Figure F.2. Cpue for different gear types for each river basin district, 2001–2007. Bars are 95% CI.

IR.G. Scientific surveys of the stock

IR.G.1 National synopsis

There are no national surveys of eel currently taking place-these are not specifically required for eel by the DCR. A small number of research programmes are ongoing and data have been incorporated into the relevant sections of this report. Probably the most important datasets are the recruitment index data for the Shannon and Erne and the long-term silver eel datasets for the Shannon, Corrib and Burrishoole (presented elsewhere in this report).

Since 1992 there has been a comprehensive series of stock assessment surveys and sampling of the River Shannon eel fishery. This Shannon Eel Management Programme has included an extension of the brown and silver eel fishing, the experimental development of glass eel fishing and the improvement of the elver trapping. The focus of the River Shannon study undertaken by NUIG was changed in 2005 and

much effort has been devoted to evaluation of alternative sampling protocols. This was done with a view to getting more accurate estimations of brown eel densities in lakes and to establishing the quantity, and quality, of silver eels migrating from selected lakes and through the lower section of the river system.

IR.G.2 Recruitment surveys-glass eel

Monitoring of elver migrating at Ardnacrusha (Shannon), Cathleens Falls (Erne) and for the Feale, Inagh and Maigue Rivers and monitoring of bootlace eel migrating at Parteen Dam (Shannon). Monitoring is carried out at six fixed stations by the ESB and fishing is also undertaken by the ESB/Shannon Regional Fisheries Board in the Shannon Estuary for glass eels (Table G.1). Indications are that recruitment remains low. Catches in 2004 for both Erne and Shannon were the second lowest recorded and although there is no effort data available, the total catch for all stations in 2004 was the lowest yet recorded (Table G.1). Elver and bootlace catches in 2005 were much more unpredictable, with good catches of elvers recorded in the Erne (45% of the 1979–1984 mean) and a poor catch in Ardnacrusha (1.4% of the 1979–1984 mean). The bootlace catch in Parteen was relatively good, almost equal to the mean (641 kg) for the last 20 years. Figure E.1 presents the historical elver monitoring for the Erne and the Shannon (Ardnacrusha).

Elver numbers reported to date for 2008 have been particularly poor and the bootlace numbers for Parteen were the highest since 1988.

All catches reported in Table G.1 are transported upstream and used in restocking.

IR.G.3 Adult eel surveys

There were no coordinated national surveys carried out in 2004, 2005 or 2006. A number of surveys were undertaken by the National University of Ireland Galway and the Electricity Supply Board, the Marine Institute and Trinity College Dublin and the Central Fisheries Board in the NSSHARE project- INTERREG IIIA Programme for Ireland/Northern Ireland. The majority of these are projects in progress, but will yield data compatible with Eel Management Plans and the DCR. See 2007 Country Report for details of the locations sampled.

Table G.1. Glass eel, elver and bootlace (Parteen) catches (kg), 1985 to 2006 (nf = not fished).

		Erne	Moy	Shannon	Shannon				Sh. Estuary
Year	Erne	Estuary	Estuary	Ardnacrusha	Parteen	R Feale	R Maigue	Inagh R	Glass Eels
1985	400			1093	984	503			
1986	700			948	1555				
1987	2300			1610	984				
1988	3000			145	1265				
1989	1800			27	581				
1990	2400			467	970				
1991	500			90	372				
1992	1400			32	464				
1993	1700			24	602				
1994	4400			287	125	70	14		
1995	2100			398	799	0	194		
1996	647			332	95	0	34	140	

Year	Erne	Erne Estuary	Moy Estuary	Shannon Ardnacrusha	Shannon Parteen	R Feale	R Maigue	Inagh R	Sh. Estuary Glass Eels
1997	1087			2120	906	407	467	188	616
1998	723	46		275	255	81	8	11	484
1999	1246	441		18	701	135	0	0	416
2000	1074	188		39	389	174	0	120	43
2001	699		13	27	3	58	2	18	1
2002	113		21	178	677	116	5		37
2003	580		36	378	873	36	72	111	147
2004	269		0	58	320	0	0	24	1
2005	836		13.5	41.4	612	0	1	0	41
2006	118		0	41.5	467	1	0	4	3.1
2007	182		0	45.4	789	0	0	38.5	11.5
*2008	38.7		0	5.80	1256	0	0	82.5	2.31

*** data provisional**

IR.H. Catch composition by age and length

IR.H.1 National synopsis

There is no national sampling programme for age and length of commercial eel catch in Ireland.

IR.H.2 ShRFB Shannon Catchment Programme (Shannon IRBD)

Length measurements are taken annually.

Shannon-Brown eel

Annual surveys undertaken by National University of Ireland, Galway, (1992 to date) involve measurement of subsampled catches of authorized fishing crews, representative of all major lakes in the catchment, and the length frequency distributions are statistically analysed at lake and total fishery levels. Total length data typically involve over 2000 eels per year, and further data are available from fishery-independent and research sampling. Weight and age data, which vary s from year to year, are available for selected zones. Changes in population demography have been recorded. These are mostly as a consequence of poor recruitment but the overall size frequencies are mostly determined by fishing gear selectivity (i.e. fykenet mesh size, longline bait/hook size).

Shannon-Silver eel

Annual surveys, by NUIG (1992 to date), at ESB fishing weirs and of authorized fishing crew catches provide length data for a series of sites located through out the river system. Annual length measurements involve 1500–2000 eels. Sub-samples are used for calculation of length/weight relationships and 200–250 are used for age determinations. Sex ratio changes, reflected in length, weight and age data have been detected. A recent increase in the percentage of males at Killaloe, representing a reversal of a trend noted since around 1985, seems to be as a consequence of changes in fishing intensities in upper vs. lower catchment and selective stocking of the lower part of the catchment.

IR.H.3 NWRFB Burrishoole Catchment (Western RBD)-Silver eel

Monitoring of length of silver eel in the Burrishoole has taken place since 1958, with total trapping since 1970 (Poole *et al*., 1990). Table H.1 gives the length and weight data since 1987 for both the total annual run, and where available for the separate sexes. Age data are presented in Table H.2. The silver eel lengths clearly fit into a bi-modal distribution consistent with males and females (Figures H.1 and H.2). There is a normal distribution of females between 40 and 60 cm with a small proportion of longer females up to 100 cm. Burrishoole eels are generally considered relatively old and slow growing, typical of oligotrophic Irish waters. Growth rates in the more productive waters in Ireland are generally faster than in Burrishoole.

Table H.1. Length and weight for migrating silver eel, Burrishoole. St Er given in brackets.

Year	Sample Type	Sample Size (Lt)	Mean Length (cm)	Min/Max Length	Sample Size (Wt)	Mean Weight (g)	Min/Max Weight (g)
1987	Total	849	44.5 (0.26)	29.7–98.8	849	190.5 (4.6)	48–2523
1988	Total	3003	45.6 (0.14)	28.9–92.9	2996	205.9 (2.3)	37–2240
	Male	1120	37.3 (0.10)	28.9–46.0	1116	97.7 (0.93)	37–210
	Female	1883	50.5 (0.11)	40.5–92.9	1880	270.2 (2.7)	90–2240
1995	Total	1547	46.4 (0.22)	29.1–100.0	263	225.3 (18.1)	45–2700
1997	Total	1022	48.9 (0.27)	25.3–95.0	-	-	-
2001	Total	850	48.9 (0.31)	24.4–95.6	72	208.6 (20.8)	60–1295
2002	Total	732	46.2 (0.35)	24.2–86.1	60	191.1 (16.3)	57–671
2003	Total	649	45.1 (0.37)	29.2–93.9	60	190.4 (15.1)	46–393
2004	Total	382	48.2 (0.45)	31.1–81.7	144	248.0 (11.2)	57–1399
2005	Total	587	48.8 (0.40)	27.3–99.6	581	237.0 (9.1)	35–2545
2006	Total	493	48.0 (0.39)	29.5–87.6	158	242.8 (13.6)	45–1770
2007	Total	571	45.7 (0.39)	27.6–95.2	571	201.4 (13.6)	35–2260

Table H.2. Length and age for migrating silver eel, Burrishoole. St Er given in brackets.

Year	Sample Type	Sample Size (Lt)	Mean Length	Sample Size (age)	Mean Age	Age Range Min/Max
1987	Total	80	48.6 (1.0)	58	28.6 (1.1)	12–57
	Male	21	38.9 (0.7)	14	21.5 (1.9)	12–33
	Female	59	52.0 (1.0)	44	30.9 (1.2)	21–57
1988	Total	128	49.2 (1.0)	97	29.0 (0.98)	8–55
	Male	37	39.2 (0.6)	31	21.8 (1.3)	10–41
	Female	91	53.3 (1.2)	66	32.4 (1.1)	8–55
2001	Total	72	45.5 (1.3)	61	23.4 (1.1)	9–45
	Male	36	36.1 (0.4)	28	17.7 (1.4)	9–45
	Female	36	54.9 (1.1)	33	29.1 (1.1)	12–44

2002	Total	60	45.2 (1.4)	54	24.4 (1.2)	7–41
	Male	30	36.1 (0.4)	25	18.0 (1.5)	7–41
	Female	30	54.3 (1.3)	29	30.0 (1.1)	21–41
2003	Total	60	46.1 (1.4)	56	27.5 (1.0)	11–46
	Male	27	35.0 (0.4)	24	22.9 (1.4)	11–33
	Female	33	55.3 (0.5)	32	30.9 (1.1)	20–46
2005	Total	122	48.4 (1.0)	116	27.6 (0.8)	8–58
	Male	44	36.5 (0.6)	42	22.4 (1.5)	8–58
	Female	78	55.0 (0.9)	74	30.5 (0.8)	16–45

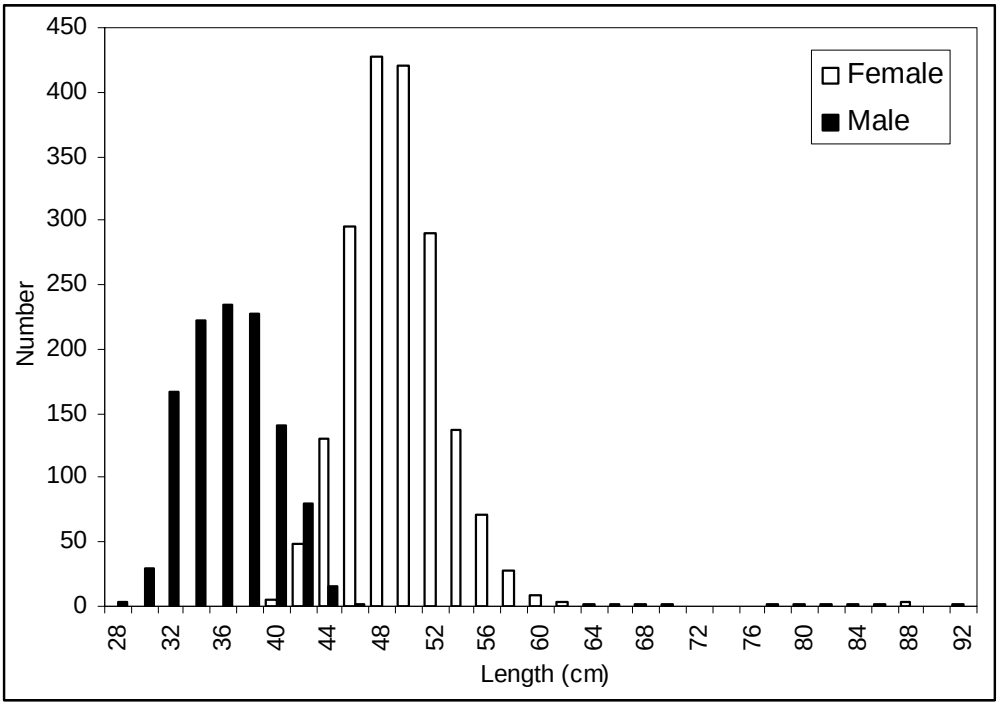


Figure H.1. Length frequency distribution for male and female silver eels in the Burrishoole system, 1988 (n = 3003).

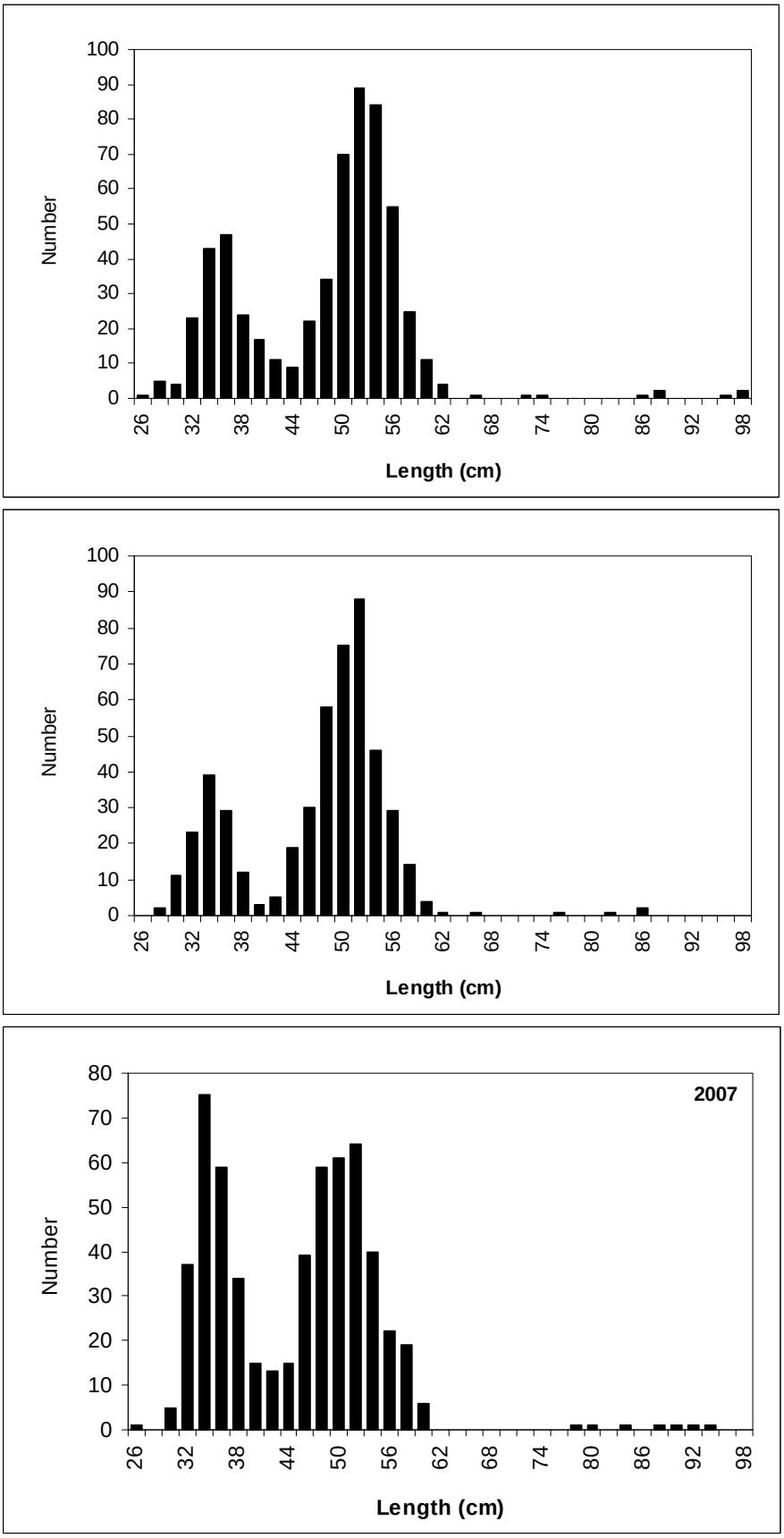


Figure H.2. Length frequency distribution for male and female silver eels in the Burrishoole system, 2005 (n = 587), 2006 (n = 493) and 2007 (n=571).

IR.I. Other biological sampling

IR.I.1 National synopsis

DCR requirement: Samples of length and weight are to be taken every three years for compliance with the DCR.

There is no national programme for sampling other biological aspects of eel in Ireland. A number of catchment based research programmes collect data which may be informative.

IR.I.2 Parasites

Anguillicola crassus was first recorded in Irish eels in the Waterford area in 1997. They were subsequently recorded in the Erne (see below) and this invasion probably occurred between 1997 and 1998, as they were apparently absent in 1996 (Copely and McCarthy, 2005). *Anguillicola* has now also spread to the R. Shannon (McCarthy and Cullen, 2000). A summary of the known distribution of *Anguillicola* in Ireland was compiled in 2003 (McCarthy *et al*., in press) and the database is currently being updated, following discovery of the species in small and reputedly unexploited western Irish catchments. Current information would indicate that Anguillicola is now present in approximately 50% of the wetted area in Ireland, see map and Figure I.1.

Investigations of parasites assemblages of eels in marine, mixohaline and fresh-water habitats in the Shannon and other Irish rivers are being undertaken by the National University of Ireland, Galway, as part of a research project funded by the Higher Education Authority (HEA PRTLI- 3).

Annual surveys of brown and silver eels in the Shannon fisheries, undertaken since 1992, demonstrate that *Anguillicola* was first detected in 1998 at Killaloe and that since then it has become well established in the lower catchment and that it has more recently spread to lakes further up in the river system.

Eight parasitic endohelminth worm species (2 Cestoda, 3 Nematoda and 3 Acanthocephala) were found in the intestines of 1089 brown eel examined from throughout the Erne system, 1998–2001. Of greatest concern was the discovery of the pathogenic blood-sucking nematode *Anguillicola crassus* in the swimbladder of brown and silver eel from the Erne.

Initially detected in the R. Barrow in 1997, the parasite has since spread to the lower reaches of the R. Shannon and was first recorded from brown eel in southern Lower Lough Erne in 1998 (Evans and Matthews, 1999). By 1999 the parasite was detected as far upstream as L. Garadice with 90% of brown eel from the Narrows, Lower L. Erne infected.

Anguillicola has not been recorded to date in Burrishoole.

Preliminary analysis of information available on the presence of *Anguillicola* in different catchments would indicate that approximately 50% of the wetted area is now potentially infected by the parasite (Figure I.1). Catchments included are:

- Fane
- Slaney
- Barrow
- Nore
- Suir
- Shannon
- Corrib
- Screebe
- Moy
- Ballysadare
- Durnish L., Donegal
- Erne

Map supplied by NUIG

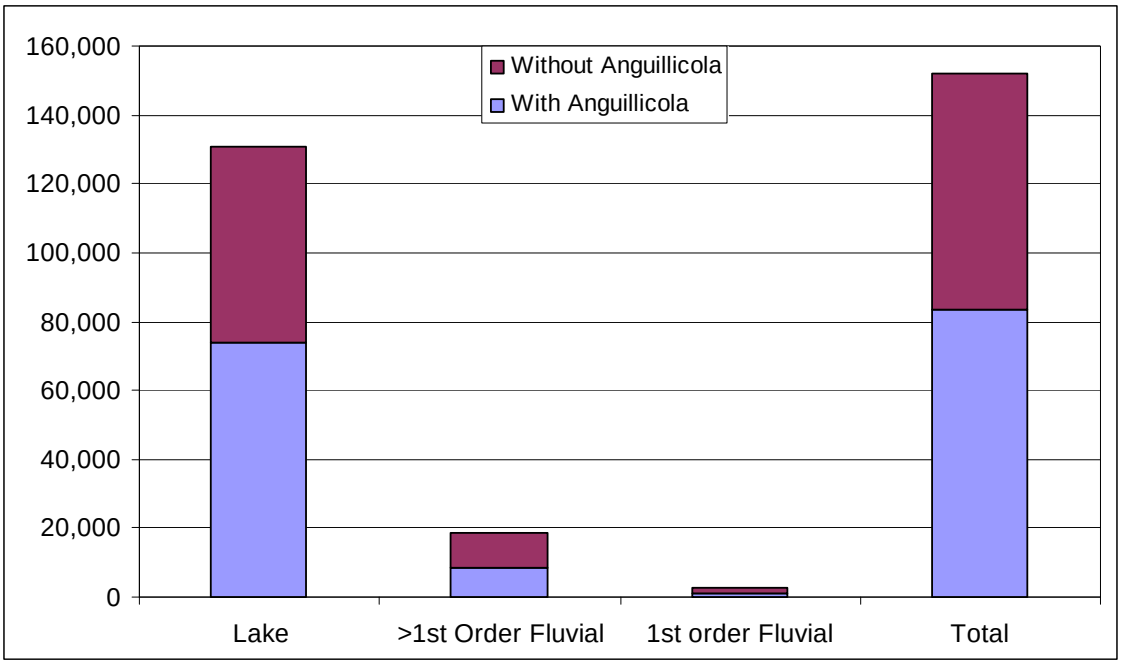


Figure I.1. Proportions of wetted area potentially infected by the *Anguillicola* parasite.

IR.I.3 Burrishoole catchment (Western RBD)-Silver eel

Length and weight are measured for Burrishoole silver eel on an annual basis (Table IR.10). The average weight of the silver eels in the catches has been steadily increasing from 95 g in the early 1970s to 215 g in the 1990s (Figure E.6). The increase in average weight has been caused, at least in part, by a change from a predominantly male sex ratio to more than 60% females in the more recent years (Poole *et al*., 1990).

IR.J. Other sampling

No other sampling for such issues pertinent to eel has taken place in Ireland up to 2004. Some samples have been taken in 2005 and 2007 and these have been analysed for contaminants (PCBs, dioxins, BFRs) and presence of *Anguillicola* (in the EEQD). Further samples have been taken in 2007 and 2008 and these will be analysed for length, weight, sex, age and *Anguillicola*.

IR.K. Stock assessment

There is no nationally coordinated eel stock assessment programme in Ireland and there is also no coordinated use of stock assessment data for the estimation of exploitation or % SPR.

Individual stock assessments are used to inform local fisheries management decisions, such as the R. Shannon Eel Fishery Programme run by the ESB and NUIG.

Waterframework directive surveys-Central Fisheries Board

Stock assessment surveys are being carried out by the CFB and Regional Boards at specified locations in a three year rolling cycle. Seventy-three lakes, 179 sites in rivers and 54 estuaries will be surveyed for fish. The surveys are being conducted using a suite of European standard methods; electric fishing is the main survey method used in rivers and various netting techniques are being used in lakes and estuaries. All fish species are being targeted during the survey and every effort is being made to release fish back to the water, however a subsample of fish is removed for laboratory analysis.

The sampling programme planned for 2008 is extensive and involves surveying 31 lakes, 120 river sites and 43 estuaries. To date 40 river sites and 11 lakes have been surveyed; 10 819 fish were recorded on rivers (732 of which were eels) and 5941 (172 of which were eels) on the lakes. All fish were counted, and a representative sample was measured, weighted and had scales removed for aging purposes. Some fish were retained for further analysis in the CFB laboratory.

The factual information compiled will be of value to the fisheries sector, as it will be used (with other data) to evaluate the effectiveness or otherwise of the pollution control measures in the River Basin Management Plans. The information will also be incorporated into a database and fish species distribution maps will be made available to the public through the WFD website (www.wfdfish.ie).

IR.L. Sampling intensity and precision

Data on sampling intensity, precision, catch composition, etc have not been analysed or compared. Any analysis would have been restricted to the research programme under which the data were collected.

IR.M. Standardisation and harmonization of methodology

IR.M.1 Survey techniques

Fyke Nets

Standard summer fykenets (Matthews *et al*., 2001; McCarthy *et al*., 1994; Moriarty, 1975; Poole, 1990, 1994; Poole and Reynolds, 1996a) have been widely used in eel surveys around Ireland since the early 1970s. The nets used have been generally similar in all the surveys, normally fished in chains of five or ten nets. A "typical" summer fykenet consists of two traps (each 3.3 m in length), facing each other, joined by a leader net (8m in length), mesh size 16–18 mm. Each trap consists of two chambers and a codend with knot to knot mesh sizes of 16, 12, and 10 mm respectively. The diameter of the trap entrance was 58 cm and the outer ring of each trap was 'D' shaped.

Catch per unit effort (cpue) data are normally reported in number of eels, or weight, per net (pair of traps) per night fished.

Longlines

Longlines have not been extensively used as a survey tool in Ireland. On the Shannon (McCarthy and Cullen, 2000) longlines have been standardized and the bait is restricted to earthworm allowing some comparisons to be made between fishing areas and years.

River Surveys

In deeper rivers and estuaries, fykenets have been the standard survey tool. In smaller rivers electrofishing is generally employed, despite being fraught with difficulties when applied to eel, with a variety of back-pack portable and bankside generator gear being used. Single pass and three fishing depletion methods are used, but often eel assessments are carried out as a "by-product" of other surveys, in particular salmonid surveys.

IR.M.2 Sampling commercial catches

There is no National programme for sampling commercial catches.

Erne

The survey of the Erne catchment 1998–2001 was carried out using a semi-commercial research team of crews (Matthews *et al*., 2001). An observer was placed with each crew at least once a week to ensure standardization. Eels were stored in keep nets or boxes similar to those used by commercial fishers. Eels were graded and sold to eel dealers at the lake shore. The entire catch was sampled prior to grading and the fishers were paid full price for undersized eel, before their release.

Shannon

Commercial crews authorized by the ESB sell to eel dealers at lakeside locations on designated dates. ESB staff and NUIG researchers attend at sales points, to monitor catches and to obtain samples for length, weight, age and parasitology analyses. Dealers are required to provide advance notice of their collection schedules. Comparisons are made annually between sales statistics and cumulative catches, reported in logbooks, by the fishing crews. Dealers are required to disinfect truck tanks, monitored by ESB staff, before collections begin and to ensure that no water/potential pathogens are introduced to the river system.

IR.M.3 Sampling

Catch sampling is normally carried out on anaesthetized eel, although some samples may be taken from either freshly sacrificed or frozen samples.

IR.M.4 Age analysis

Age analysis of eel in Ireland has generally followed the methodology of burning and cracking (Christensen, 1964; Cullen and McCarthy, 2003; Hu and Todd, 1981; Moriarty, 1983; Poole and Reynolds, 1996b; Vollestad *et al*., 1988). Otoliths are extracted as described by Moriarty, 1973, stored dry and prepared by burning in either gas or spirit flame. There is no formal validation or quality control in Ireland. Some cross validation and double reading has been carried out between projects and this has ensured some degree of continuity between samples and surveys, (i.e. Moriarty, 1983; Poole *et al*., 1992; Matthews *et al*., 2001; Matthews *et al*., 2003; Maes, unpublished). Comparisons have also been made between age derived growth (back-calculations) and tag/mark recapture determined growth, thereby validating the use of burning and cracking otoliths for age and growth determinations in slow growing Irish eel (Poole and Reynolds, 1996a; Moriarty, 1983).

IR.M.5 Life stages

Glass eel/elver life stages are determined the pigmentation classification using that published by Elie *et al*., 1982.

Brown eel and silver eel are categorized by a combination of capture method and season, colouration and eye size. Silver eels are generally captured during their downstream migration, or can be recognized in the brown eel catch by the enlarged eyes and onset of coloration change.

IR.M.6 Sex determinations

Brown eel <25 cm are problematical to sex and >25 cm up to 45 cm are sexed by dissection. Silver eel are sexed by length and some studies have carried out dissections on eels between ~38 cm and 48 cm in order to determine the length overlap between the sexes.

Histological verification has not been used to any extent in Ireland.

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Report on the eel stock and fishery in Spain 2008

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ES.B. Introduction

In Spain, almost all the eels are fished in estuaries, lagoons, deltas, beaches and rivers. They all belong to different river basins. The river basins are the natural geographic and administrative units for water management. The autonomous regions of Spain (Figure ES.1) are in charge of the management of these water units when they extend only over one of them. The general administration of Spain on the other hand, manages through 8 hydrographical confederations, 8 inter-communitarian basins. Each one included inside various Autonomies (Figure ES. 2).

In this context, the Autonomies are allowed to establish its own regulation concerning eel fishery. Some of them have already developed a regulation in this sense but others not. This fact creates great differences among the Autonomies (Table ES.a.):

- The amplitude of the historical dataseries is variable among the autonomies. It depends on the date in which the regulation of each Autonomy was issued.

- In some Autonomies, the same regulation is applied to all the river basins although in others, each basin or even a particular zone within the same basin has its own regulation. Additionally, even in the same autonomy the fishery is regulated in some river basins but not in others.
- In some Autonomies, fishers are professional and have to sell the catches to the fish market, although in others they are non-professional. In this sense, the precision of the information of the catches and landings differs greatly among those Autonomies.
- Each Autonomy, has its own way of managing the stock: different fishing techniques are allowed and so, some of them use quotas, although others control the effort.
- In the same Autonomy, in many cases, the organizations that are involved in the management of the eel could differ depending on the eel development stages.

TableES.a. Eel fishery regulation of Spanish coastal Autonomies.

	GLASS EEL					YELLOW AND SILVER EEL					
	Control system	Fishing season	Allowed fishing gears	Effort or Catches control	Professional/ Recreational	Control system	Fishing season	Allowed fishing gears	Effort or Catches control	Professional/ Recreational	Observations
Basque Country	L. Only to be used in one river basin.	New moon October– New moon March.	Sieve and Hoe. Boat trawling allowed.	No.	R	L	March 18th– January 31st.	Rods.	From sunrise until sunset. Fishing forbiddden on Tuesdays. 2 rods per fishers. Eels >20 cm	R	Regulation for glass eel issued in 2003. It is obligatory to fill in the Daily Catches report with effort and catches.
Cantabría	L.	October 10th –March 31st.	Squared sieve (Max.:1. 2 m2)	Fishing forbi-dden between Saturday 14:00 and Sunday 18:00. At least 10 ms between fishers. Catches <250 gr in recreational.	R and P (Catches <250 gr).		March 17th–July 21st.	Rods.	Max: 20 eels/ fisher/day	R	
Asturias	L. Fishermen from the Nalón River can fish just in the Nalón River, and the rest of fisher-men can fish in all the rivers except from in the Nalón river.	Fishing season: November 2nd–March 31st. During last seasons it has been shortened.	Squared sieve (Max. : 200 x 60 cms). Boat trawling allowed only in Nalón river basin.	No fishing during week-end. In Nalón river number of licences: 70 from land and 50 from boat.	P	L	End of summer and autumn.	Eel traps.	From sunrise until 1 hour after sunset. Not allowed during the weekend.	P	Glass eel and eel recreational fishery forbidden since 2000 and 2006 respectively.

	GLASS EEL					YELLOW AND SILVER EEL					
	Control system	Fishing season	Allowed fishing gears	Effort or Catches control	Professional/ Recreational	Control system	Fishing season	Allowed fishing gears	Effort or Catches control	Professional/ Recreational	Observations
Galicia	L	Five days before and after the new moon from November until March.	Boat fishing is forbidden and the only allowed gear is a Max. 70 cm opening sieve.	No.	R and P	L	March 19th– August 21st.	Creels. Fixed gears are forbidden.	During all the day. Max. Of 10 creels.	R and P	The glass eel fishing normative can change during the fishing season depending on the evolution of the fishing season.
Galicia Miño*	Land-L from the country where the land is. Land. Boat-L rom eiher Spain or Portugal	Revised three yearly	Wire sieve of 1 to 1.5 m diam. joined to a stick. 2 to 5 mm mesh. conic fishing tackle. 8 m heightx 2,5 m mouth, x10 m length>2 mm mesh. until 2010.	Fishing boats a least 25 m apart from each other to draw the tackle	R and P	L	Revised three yearly	Anchored net with>30 mm mesh, 2 m length x 80 cm width.	Professional from o to 24 h of Sundays forbidden. >20 cm.	R and P	
Andalucía	L	All the year.	Squared sieve (Max. : 0. 80 x 0. 80 m^2)	No.	Catches sale allowed.	L	All the year.	Rods and 5 ring creel. First, second and third mesh size of creel 12, 8, and 6 mm respectively.	From 1 hour before sunrise until 1 hour after sunset. 2 rods/fishers. Eels >35 cm.	Catches sale allowed.	
Murcia	No specific legislation					L	All the year	2 rods per fishers.	From 1 hour before sunrise until 1 hour after sunset. Eels >20 cm.	R	

	GLASS EEL					YELLOW AND SILVER EEL					
	Control system	Fishing season	Allowed fishing gears	Effort or Catches control	Professional/ Recreational	Control system	Fishing season	Allowed fishing gears	Effort or Catches control	Professional/ Recreational	Observations
Autonomous region of Valencia	L	October (variable depending on the year) March 31st.	Fyke nets (Mouth max 1. 5 m^2 and mesh size 1 mm).	From sunset to sunrise of Sunday, Monday, Wednesday and Thursdays. Tuesdays are reserved to take glass eels for restocking and experimentation. The Fyke net can not take up more than a third of the river width.	P*		In waters with trouts from March 21st to August 31st. In waters without trouts all the year.	Rod, with and without hook in recreational and fykenet in professional. Albufera lacuna: fixed place fishing and travelling fixing.	Rod with hook: from 1 hour before sunrise until 1 hour after sunset. Rod without hook: all the day. 1 rod /fishers. Eels >25 cm in recreational.	R and P*	Very dynamic, fishing season changes every year.
Catalonia	L	October 20th– March 10th.	Fyke nets.	Max. 340 Fyke nets and at least 50 m between them.	P	L	Changes every year.	Rods.	During all the day. No light sources allowed. 2 rods per fishers. Eels >35 cm.	R	

L: Licence; L*: Fishermen must be member of a fishers guilt to obtain the professional fishing licence; P: Professional; R: Recreational.

*** International stretch of Miño River between Spain and Portugal.**

Figure ES.1. Autonomies of Spain and their territorial area.

The River Basin Demarcations (RBDs) of Spain are not definitively defined yet. However, the Environmental Ministry of Spain made a proposal, publicized in the Official Bulletin of Spain as the Royal Decree 125/2007 that will be used in the present report (Figure ES.2). Some characteristics of these RBDs are listed in the Table ES.b.

Figure ES.2. Spanish RBDs. The RBDs of Norte, Duero, Ebro, Tajo, Júcar, Guadina, Guadalquivir and Segura are inter-communitarian. Galicia Costa, Basque Country, Catalonia Inner basins, Canary Islands Basins, Balear Islands Basins and South river basin are responsibility of the Autonomies where they flow.

In Spain the glass eel fishery exists in all the RBDs. In the Atlantic, the most important glass eel fishery river basins are the Miño (North I RBD), the Asturian basins (North II), the Basque river basins (Basque inner rivers), and the Guadalquivir. In the Mediterranean, the most important glass eel fishing points are the Delta of the Ebro River (Ebro RBD) and the Valencian Albufera (Jucar RBD). Besides, in Galicia, Valencia and Cataluña, there is an important yellow and silver eel fishery.

For the reasons explained above, the available information from each Autonomy is variable. There is not a national fish stock management plan for eel. Therefore, the compilation of all the data from the different Autonomies, in order to give a national overview of the eel fisheries in Spain, is a very complicated task. For the present report, eel fishery information has been obtained from the following Autonomies:

Basque country

There is not a professional yellow or silver eel fishery, and the catches of recreational fishery are insignificant. On the contrary, the glass eel fishery is a very traditional fishery in the Basque Country and affects to zones associated to river mouths, including beaches, estuaries and river banks. Glass eel fishery is located in most of the river basins of Bizkaia (Artibai, Lea, Oka, Butrón and Nervión-Ibaizabal) and Gipuzkoa (Bidasoa, Oiarzun, Urumea, Oria, Urola, and Deba). Although the glass eel fishery was very traditional, there was not any managing plan for the glass eels until 2001, when the Basque Government, with the advice of AZTI, launched a fisheries monitoring plan. In 2003, a new regulation for glass eel fisheries was issued. It stated that there must be only a license per person and fishing basin and that it is obligatory to fill in the Daily Catches report with data regarding catches and effort. Basque fishers can not sell the catches and therefore should be classified as non professional. The Basque Government collects the information regarding catches, and charges AZTI to analyse this information. In the Basque Country, there is a discrepancy between the issued licenses and the received catches reports. Besides, some of the received catches reports are empty. This is probably because until the 2006–2007 season, the license was free and some people obtained it, although they were not really interested in the glass ell fishing. Besides, there was not a requirement to deliver the old license to obtain the new one, and probably some fishers fish although they did not deliver the catches report. For the 2007–2008 season onwards, the Basque Government has started to charge the license, to avoid that people that are not interested in the glass eel fishing get the license. On the other hand, the government has required the old license and catches report to obtain the new one. In this way, the quality of the data will improve from now on. Finally, some fishers have delivered the catches report after the deadline, and these data have been updated in the present report, and this fact explains the discrepancies between that and the 2007 WGEEL report in data before the 2006–2007 season (ICES, 2007). In the Basque Country there are a lot of little river basins. The river mouths of those basins are included in the Basque Inner river basins RBD, but the upper parts of some of these rivers are included in North II and North III RBDs (Figure ES.2).

Asturias

There is not a professional yellow or silver eel fishery in Asturias, and the recreational fishery was forbidden in 2007. As glass eel is concern, the glass eel fishery is a very traditional fishery in Asturias and affects to zones associated to river mouths, including beaches, estuaries and river banks. The Fisheries General Direction of the Rural and Fishery Department of the Principality of Asturias has provided the data concerning the number of issued licenses and the glass eel sales data in Asturias using fish auctions. There are 18 fishers' guilds in Asturias; in the San Juan de la Arena fishers guild data are available since 1952 and for the other 17, data are available since 1983. In the report from 2006 (ICES, 2006), all the catches from Ribadesella fishers guild were attributed to the Sella River which is the closest one. However, fishers from other eastern rivers of Asturias sell their catches in Ribadesella also, and therefore it is not correct to attribute all the sales of Ribadesella to the Catches of the Sella. In fact, until now, the origin of the sold glass eel must be identified only in the fishers'

guilds corresponding to the Nalón River (San Juan de la Arena and Cudillero). Besides, the catches of the Nalón are sold only in the San Juan de la Arena and Cudillero fish markets. So, it is perfectly possible to identify the glass eel from the Nalón. For that reason, from the 2007 report on, the fishery data are split into the Nalón and the "Other Rivers" from Asturias. Moreover, in the Nalón River, there is a specific exploitation plan for glass eel since 2004 that limits the number of licenses to 70 for land fishing and 50 for boat fishing.

Additionally, there is a specific control in this basin, and thanks to this control, information regarding fishing days is available since the exploitation plan started. The rest of fishers guilds are asked to record the glass eel catches of the free zone. It will allow comparing catches and sales as in the exploitation plan. In Asturias there are many little river basins and all of them are included in the North II RBD (Figure ES.2).

Galicia

Both, the glass eel and the yellow and silver fisheries, exist in Galicia. Both are either recreational or professional. The recreational fishery has not been evaluated, neither for eels (angling in fresh water and coastal waters) nor for glass eel (in the estuaries of Lugo province: Masma-Landro-Ouro, and in some rivers of Coruña province: Anllóns). The Miño River is the most important fishing point. The lower part of the Miño River delimits the border of Spain and Portugal and for that reason the permanent International Commission of the Miño is responsible for the management of this part of the river. In the present report, the information collected by the Galician Autonomy is included together with the data from the Miño River. The catches are established using auctions data from the different fishers' guilds, which are assigned to a determined river basin. In this way, the rivers listed below contain catches data from the following fishers' guilds:

- Arousa River: Cambados, Carril, O grove and Rianxo fishers guilds.
- Eo River: Coruña and Ribadeo fishers' guilds.
- Landro River: Barallobre, Celeiro, and Ferrol fishers' guilds.
- Lérez River: Pontevedra and Marín fishers' guilds.
- Verduxo River: Arcade and Vigo fishers' guilds.

On the other hand, the catches from the Ulla River and Miño River are collected by Ximode centre for fishing preserve and Miño River command respectively.

In the Galician fishers' guilds, yellow and silver eel catches are not split up. The information belongs to the Galician Coast RBD and it is obtained from the web of the Galician Government (www.pescagalicia.com) and UTPB (Unidade Técnica Pesca Baixura). The web service is free, and offers statistical and commercial information of several fisheries.

The other river basin mentioned in this report is Miño Basin (Figure ES.2). Almost half of the river basin drainage area is located inside the autonomous region of Galicia. The rest of the area is located among Asturias and Castilla-León Autonomies of Spain, while a little part of the lower basin belongs to Portugal. Eel fishing is regulated according to the autonomous region where fishing is realized. There is an international stretch of Miño between Spain and Portugal. There, the eel fishing is professional and can not be done from land, with exception of those professional fishers that using sieves, fish the glass eel from land (of the country they belong to). The conic tackle is allowed only for 2 years after the publication of the regulation of the international stretch of Miño and until the sand barrier of the Miño estuary is

dredged that will facilitate the entry of the migratory species.

Autonomous region of Valencia

The glass eel fishing is only professional although the yellow and silver fishing is either processional or recreational. There are six professional associations of glass eel fishing distributed between the province of Valencia and Castellón; 2 of them are fishers' guilds (El Perellonet and El Molinell). There are two types of professional yellow/silver fishing depending on the province. In the province of Valencia, there are 4 fishing associations: Palmar, Silla, Catarroja and Molinell. First three associations exercise their rights to exploit the yellow and silver eel around the Albufera which is a 738 km^2 costal lacuna between Turia and Jucar rivers. Molinell association fish in Pego-Oliva fen which constitutes an agrarian landscape with a traditional economic activity that supports the surrounding population. It is conceded one license per association. On the other hand, in the province of Alicante, professional fishing is realized in 7 fishing preserves for commercial exploitation. These preserves are located between the wetlands El Hondo (Elche) and the salt flats of Santa Pola, both inside the Natural Park of Albufera.

The eel fishery in the Albufera has its own regulation and it considers both types of fishing, the fixed place fishing (named "redolins") and the traveling fishing. The fishers' community of El Palmar is the fishing organization with the mayor tradition and number of members, and the only one that is allowed to fish in fixed places in the lacuna.

In each fishing preserve of Alicante, a maximum number of fishing tackles (named "mornells") are allowed to those to own a fishing license.

These fishers' guilds gave their catch data to the territorial service of each province, responsible for the continental fishing. Then, Ricardo Garcia, from the Government of the Autonomous region of Valencia, provided this information for the report.

Catalonia

In Catalonia there are two RBDs; the Catalonia Inner river basins, which include small and medium rivers and the Ebro RBD, which is the second large river basin in Spain. Particularly, the delta of the Ebro River is the most important eel fishing point in Catalonia regarding the number of active fishers with license and eel catches.

The data presented in this report was obtained from the fishers guilds belonging to the delta of the Ebro River (province of Tarragona) in one hand, and Muga, Fluviá and Ter Rivers (province of Gerona) on the other. Although the fishery of glass eel is a professional activity, yellow and silver eel fishery are recreational nowadays.

Although the information given in each year report has increased thanks to the contribution of some Autonomies, data from many Autonomies is still missing. Therefore, the total catch of eel in Spain is not given in this report.

Table ES.b. Coordinates of the river basins included in the present report.

AUTONOMY	RBD	RIVER BASIN	LATITUDE (N°)*	LONGITUDE *	DRAINAGE AREA (KM2)	RIVER LENGTH (KM)
Basque	B. Inner basins	Bidasoa	43º19'	1º58'W	700	69
	B. Inner basins	Oria	43º16'	2º06'W	882	77
	B. Inner basins	Urola	43º17'	2º14'W	342	65
	B. Inner basins	Deba	43º19'	2º26'W	530	60
	B. Inner basins	Artibai	43º21'	2º29'W	104	26
	B. Inner basins	Lea	43º22'	2º35'W	99	26
	B. Inner basins	Oka	43º21'	2º40'W	183	27
	B. Inner basins	Butrón	43º23'	2º56'W	172	44
	B. Inner basins	Nervion-Ibaizabal	43º19'	3º00'W	1798	72
	B. Inner basins	Barbadun	43º17'	3º07'W	128	27
Asturias	North II	Nalón	48º17'	5º23'W	2692	142
Galicia	G. Coast	Landro	43º4'	7º04'W	268	42
	G. Coast	Eo	43º4'	7º05'W	819	78
	G. Coast	Verduxo	43º2'	8º04'W	176	40
	G. Coast	Lérez	43º2'	8º04'W	594	57
	G. Coast	Arousa	43º4'	8º05'W	2964	132
	Miño	Miño	41º5'	8º52'W	9775	308
Valencia	Jucar	Albufera	39º22'	0º18' E	738	497
Catalonia	Ebro	Delta	40ª41′	0º44′E	85362	910

***The coordinates correspond to the river mouth**

N.D.: No data available.

ES.C Fishing capacity

See Table ES.a. for information regarding fishing gears.

As aforementioned, in the **Basque Country,** there is a discrepancy between the issued licenses and the received catches reports. For that reason, only those licenses that have been received by the Basque Government with the full catches reported are included. It is assumed that the fishers, who have not delivered the catches report, have not gone fishing. Probably, this will underestimate the results. However, if all the issued licenses are included, the error of the overestimation will be bigger than of the underestimation. Most of the licenses in the Basque Country are for land fishing. Boat fishing is concentrated in a few rivers.

The number of fishers has varied from season to season since the glass eel regulation was established. In the 2005–2006 and 2006–2007 seasons 474 and 446 licenses were granted respectively. There is not data available for 2007–2008 yet, because the catches books from the fishers are still arriving. Hence, it cannot be concluded neither an increasing nor a decreasing trend in the number of licenses since 2005.

However, the oldest fishers assert that there has been an important decline in the number of fishers since 1970s to nowadays. This decline has conditioned fishers' activity; some fishers have given up their activity. Other still keep fishing but have re-

duced the fishing nights.

In the Basque Country, in Aginaga (Oria river basin) there are 6 companies dedicated to the commercialization. One among them is dedicated to the growth of glass eels. The glass eels are bought to the local fishers, then they are transported to the hatcheries in Aginaga. These companies also have hatcheries in Asturias, Valencia, Catalonia, and the Atlantic coast of France where they maintain the glass eels.

The number of licenses in **Asturias** in lower than in the Basque County, but it must be kept in mind that the fishery in Asturias is professional while in the Basque Country is recreational. In Asturias boat fishing is only allowed in the Nalón River, and a maximum of 50 licenses can be issued according to the Nalón exploitation Plan. In this way, the boat licenses are around 50 during last three fishing season (Table ES. c). Although the number of land licenses demonstrated an increase during the previous season, it decreases significantly during the present season.

Table ES.c. Number of glass eel fishing licences per basin and fishing gear in the last three fishing seasons.

			2005–2006				2006–2007				2007–2008			
	RBD	RB	Boat	Land	Ns	Total	Boat	Land	Ns	Total	Boat	Land	Ns	Total
Basque C.	B. Inner	Barbadun	-	6	1	7	-	14	2	16	SC	SC	SC	SC
		Nervion Ibaizabal	-	77	7	84	1	63	4	68	SC	SC	SC	SC
		Butron	5	55	6	66	2	52	10	64	SC	SC	SC	SC
		Oka	-	8	-	8	-	6	-	6	SC	SC	SC	SC
		Lea	-	13	2	15	-	9	3	12	SC	SC	SC	SC
		Artibai	-	5	-	5	-	2	-	2	SC	SC	SC	SC
		Deba	1	111	21	133	4	119	16	139	SC	SC	SC	SC
		Urola	20	9	5	34	16	12	1	29	SC	SC	SC	SC
		Oria	28	77	15	120	27	70	10	107	SC	SC	SC	SC
		Bidasoa	-	2	-	2	-	-	2	2	SC	SC	SC	SC
		Total	54	363	57	474	50	347	48	445				
Asturias	North II	Nalón	50	67	-	117	47	70	-	117	45	49	-	94
		Others	0	204	-	204	0	164	-	164	0	156	-	56
		Total	50	271	-	321	47	234	-	281	45	205	-	250
Valencia	Jucar	L' Albufera	-	-	-	-	-	-	-	-	-	-	-	N.D.
		Total	-	-	-	-	-	-	-	-	-	-	-	168
Catalonia	Ebro	Delta	-	-	-	-	-	-	-	-	-	-	-	N.D.
	C. Inner	Muga, Fluvia, Ter	-	-	-	-	-	-	-	-	-	-	-	N.D.

SC: Still collecting data from fishers for the season 2007–2008.

N.D.: No data available

Ns: Non specified

In the Autonomous region of Valencia, there are approximately 140 fishers fishing glass eel in the Albufera. The number of licenses is higher than the number of fishers. This is because some fishers associations are collaborating partners.

In **Catalonia**, the total catches of glass eel in the inner river basins were collected by 15 fishers.

ES.D Fishing effort

In the Basque Country, the number of fishing hours per fishing season has decreased

slightly from 2005–2006 to the 2006–2007 season (Table ES. d). There is not data available yet for 2007–2008 season for a comparative analysis between the last three seasons.

Table ES.d. Number of hours (Basque Country) and days (Asturias and Valencia) dedicated to glass eels fishing during the last three fishing season.

			2005–2006				2006–2007				2007–2008			
	RBD	RB	BOAT	LAND	Ns	TOTAL	BOAT	LAND	Ns	TOTAL	BOAT	LAND	Ns	TOTAL
Basque C. *	B. Inner	Barbadun	-	78	6	84	-	334	22	356	SC	SC	SC	SC
		Nervion Ibaizabal	-	1808	190	1998	16	1318	168	1501	SC	SC	SC	SC
		Butron	290	987	24	1302	67	946	212	1225	SC	SC	SC	SC
		Oka	-	157	-	157	-	97		97	SC	SC	SC	SC
		Lea	-	278	31	308	-	143	40	183	SC	SC	SC	SC
		Artibai	-	117	-	117	-	39		39	SC	SC	SC	SC
		Deba	4	2720	176	2900	22	2919	126	3068	SC	SC	SC	SC
		Urola	1208	186	75	1468	996	325	62	1382	SC	SC	SC	SC
		Oria	1727	1778	225	3730	1576	1400	98	3073	SC	SC	SC	SC
		Bidasoa		24	-	24	-	-	18	18	SC	SC	SC	SC
		Total	3229	8132	727	12 088	2677	7551	745	10 973				
Asturias**	North II	Nalón	1317	1968	-	3285	952	458	-	1410	891	376	-	1267
Valencia**	Jucar	L' Albufera	-	-	-	-	-	-	-	-	-	206	-	-

***: Fishing hours**

****: Fishing days**

SC: Still collecting data from fishers for the season 2007-2008.

Ns: Non specified

In **Asturias**, both the total days dedicated to fish and the days each fisher dedicates to fish have decreased since the preceding two seasons. In the latter season, the time each boat fishers dedicated to fishing have maintained. However, the time each land fisher dedicated to fish increased slightly from the previous season 2006–2007.

In the Autonomous region of **Valencia**, the mean value of the number of days dedicated to fish has been 161.1 days/year in the last 10 years However, the value obtained for the 2007–2008 season is slightly above this mean value.

Table ES.e. Number of fishing hours (Basque County) and fishing days (Asturias and Valencia) per fishers.

			2005–2006			2006–2007			2007–2008		
	RBD	RB	BOAT	LAND	Ns	BOAT	LAND	Ns	BOAT	LAND	Ns
Basque C. *	B. Inner	Barbadun	-	13.0	5.8	-	23.8	11.1	SC	SC	SC
		Nervion Ibaizabal	-	23.5	27.2	16.0	20.9	41.9	SC	SC	SC
		Butron	58.1	17.9	4.0	33.6	18.2	21.2	SC	SC	SC
		Oka	-	19.6	-	-	16.1	-	SC	SC	SC
		Lea	-	21.4	15.3	-	15.9	13.3	SC	SC	SC
		Artibai	-	23.5	-	-	19.3	-	SC	SC	SC
		Deba	4.2	24.5	8.4	5.5	24.5	7.9	SC	SC	SC
		Urola	60.4	20.6	15.0	62.2	27.1	61.7	SC	SC	SC
		Oria	61.7	23.1	15.0	58.4	20.0	9.8	SC	SC	SC
		Bidasoa	-	12.0	-	-	-	9.0	SC	SC	SC
		Average	46.1	19.9	12.9	35.1	20.6	22.0			
Asturias**	North II	Nalón	26	7	-	20	5	-	19.8	7.7	-
Valencia**	Jucar	L' Albufera	-	-	-	-	-	-	-	1.5	-

***: Fishing hours/fisher**

****: Fishing days/fisher**

SC: Still collecting data from fishers

Ns: Non specified

In the Autonomous region of **Valencia,** data of glass eel fishing days from the Albufera between 1981 and 2007 is available although some years are missing. The number of days that the fishers have dedicated to glass eel fishing has ranged from less than 100 days to 200 days. The fishers reached the largest number of fishing days during the 2007–2008 season.

Figure ES.3. Glass eel fishing days in The Albufera.

In **Catalonia**, data regarding the time dedicated to glass eel fishery is not available for

the 2007–2008 season.

ES.E Catches and landings

During the short time-series in the **Basque Country,** glass eel catches have been the lowest during the 2006–2007 season. This is because the number of licenses, the hours per license, and the cpues have all decreased (Tables ES.c., ES.d. and ES.h.).

In **Asturias**, there is an important historical dataseries of glass eel catches in the Nalón (see annex) from 50 years ago. The Nalón is the region with more important catches and hence, it could be an adequate indicator of the fishery tendency. However, for the rest of Asturias the data ranges from 1990s to nowadays.

The glass eel catches were stable the first years, then they increased significantly from the 1970s to 1980. From then on the catches were in general regressive. Regarding the last three seasons, the glass eel catches were similar but slightly increasing, from 2005–2006 to 2007–2008.

Table ES.f. Glass eel catches during the last three fishing seasons.

			2005 2006				2006 2007				2007 2008			
	RBD	**RB**	**Boat**	**Land**	**Ns**	**Total**	**Boat**	**Land**	**Ns**	**Total**	**Boat**	**Land**	**Ns**	**Total**
Basque C.	B. Inner	Barbadun	-	1.6	0.1	1.8	-	5.0	0.4	5.5	SC	SC	SC	SC
		Nervion Ibaizabal	-	127.9	12.6	140.5	0.0	90.9	6.0	96.9	SC	SC	SC	SC
		Butron	15.6	48.9	1.8	66.2	4.9	57.6	8.1	70.6	SC	SC	SC	SC
		Oka	-	11.9	-	11.9	-	7.4	-	7.4	SC	SC	SC	SC
		Lea	-	23.8	3.7	27.5	-	6.4	0.8	7.2	SC	SC	SC	SC
		Artibai	-	2.9	-	2.9	-	0.0	-	0.0	SC	SC	SC	SC
		Deba	0.1	312.3	20.3	332.7	1.0	207.2	7.9	216.0	SC	SC	SC	SC
		Urola	137.6	5.6	6.6	149.9	75.6	7.8	0.6	83.9	SC	SC	SC	SC
		Oria	401.9	129.6	16.3	547.7	239.8	67.7	1.9	309.4	SC	SC	SC	SC
		Bidasoa	-	1.0	-	1.0	-	-	0.1	0.1	SC	SC	SC	SC
		Total	555.2	665.5	61.3	12 82.1	321.2	452.2	25.9	799.3				
Asturias	North II	Nalón	-	-	-	1354. 5	-	-	-	1004. 6	1053.6	330.6	-	1384.2
		Others	-	-	-	820	-	-	-	1261	-	-	-	994.8
		Total	-	-	-	2175	-	-	-	2266	-	-		2379
Valencia	Jucar	L' Albufera	209	-	-	209	-	-	-	N.D.	-	-	-	164.6
Cataluña	Ebro	Ebro	-	-	-	-	-	-	-	-	-	-	-	1170.4
	C. inner	Muga, Fluviá, Ter	-	-	-	-	-	-	-	-	-	-	-	79.1

SC: Still collecting data from fishers.

N.D.: No data available.

Ns: Non specified.

Regarding the yellow and silver eel, the catches of Verduxo (Galicia**)** increased significantly in 2006 in relation to 2005. However, they decreased again in 2007 to a similar level of 2005. In the other Galician rivers, catches of yellow and silver eel decreased in general from the previous seasons to the last 2007–2008 season. Although there is not catches data available for 2006 in the Albufera, the catches in the last season exceed those obtained in 2005 for the same river basin.

Table ES.g. Yellow and silver eel catches (tons) during the last three fishing seasons

			YELLOW			SILVER			TOTAL			
Area	RBD	River Basin	2005	2006	2007	2005	2006	2007	2005	2006	2007	Data source
Galicia	G. Coast	Landro							5. 8	8. 0	2.7	Auctions
	G. Coast	Eo							2. 5	2. 3	2.9	Auctions
	G. Coast	Verduxo							14. 5	43. 0	18.5	Auctions
	G. Coast	Lérez								0. 1	0.01	Auctions
	G. Coast	Arousa							8. 9	9. 7	3.8	Auctions
		Total							30. 1	63 1	28.3	Auctions
A.R. Valencia	Jucar	Albufera	6. 0			1. 5			7. 5		10.67	xxx

The yellow and silver eel historical catches dataseries from the Albufera demonstrates a clear decline that started in the late 1960s. The decline is observed both in yellow and silver eel catches (Figure ES.5). The decline in total eel catches was particularly influenced by the decline in yellow catches.

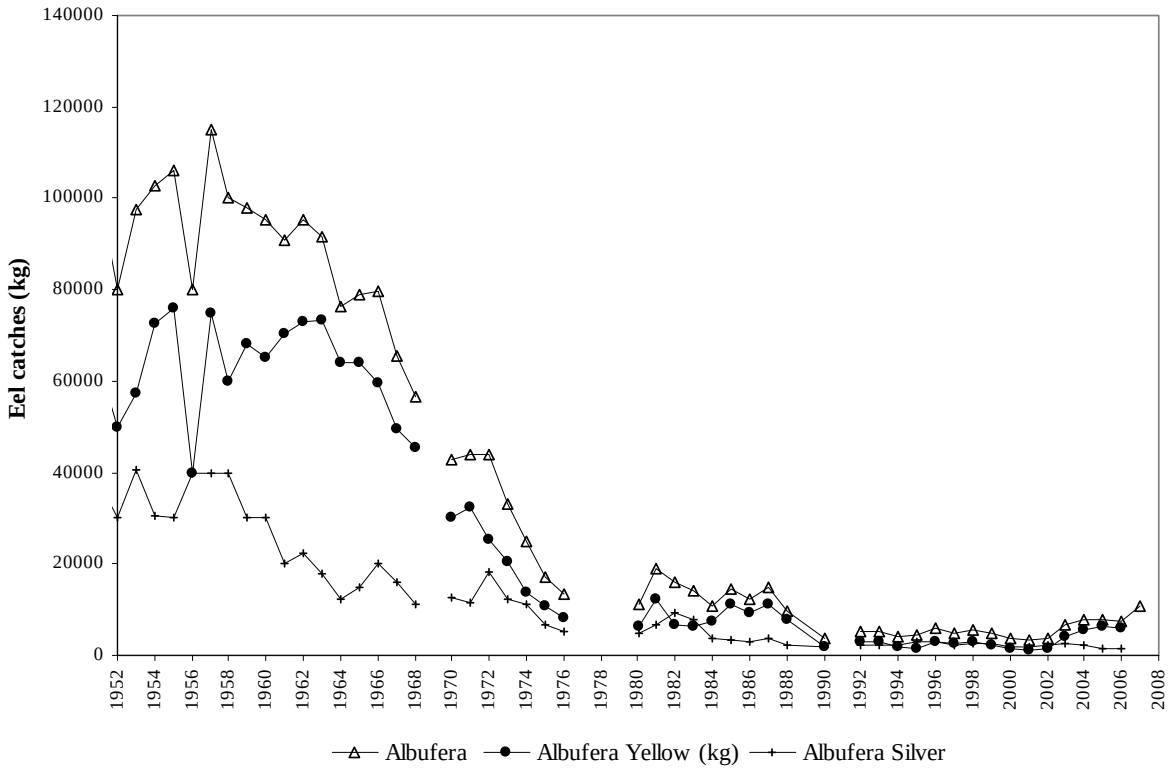

Figure ES.5. Time trends in yellow and silver eel catches in Albufera.

Albufera has been historically an important fishing point for eel in Spain, but nowadays, the catches in Verduxo (Galicia) are higher than in the Albufera. They reached almost half the maximum historical catches of 115 000 kg obtained in the 1950s. However, the catches obtained in Verduxo the last season. 2007–2008 decreased from the previous season but maintain at the same level of the 2005–2006 season (Figure ES.6).

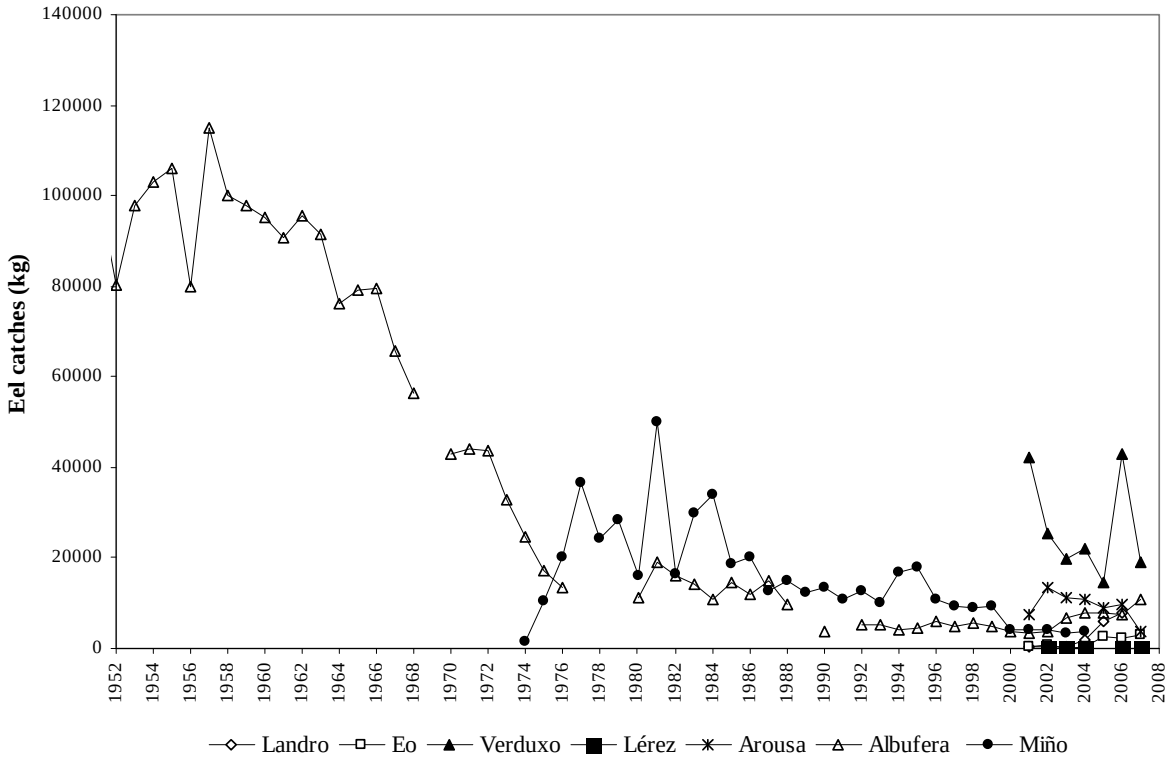

Figure ES.6. Time trends in eel (yellow and silver eels together) catches in some rivers belonging to Galicia river basin, Jucar river basin (Albufera) and Miño Basin.

The catches from Miño experienced an increase in early 1980s. However, they have regressed steadily since late 1980s to 2004. There is no data available for the last four years.

ES.F Catch per unit of effort

The available dataseries of cpues in the **Basque Country** and **Asturias** are not wide enough to detect any trend. However, in **Asturias** glass eel total cpues have slightly increased from the last three seasons (Table ES.h).

In the Albufera the value of the last season cpues of glass eel is 1.25 (Table ES.h). This value is 0.103 of the mean value of the last fishing seasons.

Table ES.h. Glass eel cpues during the last three fishing seasons.

			2005 2006				2006 2007				2007 2008			
	RBD	RB	BOAT	LAND	Ns	TOTAL	BOAT	LAND	Ns	TOTAL	BOAT	LAND	Ns	TOTAL
Basque C. *	B. Inner	Barbadun	-	0.021	0.019	0.040	-	0.015	0.019	0.034	SC	SC	SC	SC
		Nervion Ibaizabal	-	0.071	0.066	0.137	0.000	0.069	0.036	0.105	SC	SC	SC	SC
		Butron	0.054	0.050	0.073	0.176	0.072	0.061	0.038	0.172	SC	SC	SC	SC
		Oka	-	0.076	-	0.076	-	0.000	-	0.000	SC	SC	SC	SC
		Lea	-	0.086	0.121	0.207	-	0.076	-	0.076	SC	SC	SC	SC
		Artibai	-	0.025	-	0.025	-	0.044	0.020	0.064	SC	SC	SC	SC
		Deba	0.029	0.115	0.116	0.259	-	0.001	-	0.001	SC	SC	SC	SC
		Urola	0.114	0.030	0.088	0.232	0.044	0.071	0.062	0.178	SC	SC	SC	SC
		Oria	0.233	0.073	0.072	0.378	0.076	0.024	0.010	0.110	SC	SC	SC	SC
		Bidasoa	-	0.043	-	0.043	0.152	0.048	0.020	0.220	SC	SC	SC	SC
		Total	0.429	0.588	0.555	1.572	-	-	0.006	0.006	-	-	-	-
Asturias**	North II	Nalón	0.75	0.72	-	1.47	0.74	0.73	-	1.47	1.18	0.88	-	1.98
Valencia**	Jucar	L' Albufera	-	-	-	N.D.	-	-	-	N.D.	-	-	-	1.25

***: Glass eel (Kg)/ Fishing hour**

****: Glass eel (Kg)/ Fishing days**

SC: Still collecting data from fishers

N.D.: No data available

Ns: Non specified

The historical records of the glass eel cpues in the Albufera, measured as glass eel catches per fishing day, demonstrate that the number of glass eel arriving to the Albufera has decreased since 1981 (Figure ES. 7).

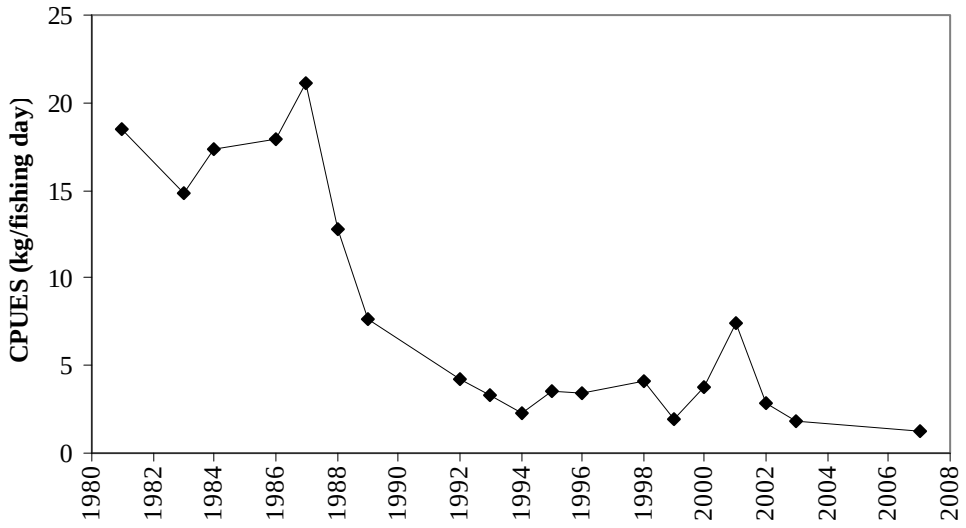

Figure ES.7. Time trends in cpues of glass eels in the Albufera.

ES.G Scientific surveys of the stock

In Spain there is not any national eel specific survey programme. However, there are some researches that have made some work in the subject. Besides, some Autonomies had promoted different studies regarding the eel.

ES. G.1 Recruitment surveys

In the **Basque Country**, during the fishing seasons of 2005–2006, 2006–2007 and 2007–2008 a series of experimental fishing have been made in order to determine the daily recruitment of glass eel in the Oria river basin (Castellanos *et al*., 2008). Transects to obtain glass eel abundance have been carried out with two different sieves, one of them in the deepest layer and another one in water surface. Transects were performed in the left and right bank of the river as long as the high tide lasted. During these experimental fishing, data regarding filtered water volume and current speed were measured. To determine the recruitment corresponding to the experimental fishing days, the Adour model has been used (Bru *et al*., 2004). This model is based in the extrapolation of the glass eel biomass obtained in the experimental fishing to the entire river using software designed in S+.

Using fishing notebooks the average daily catches and cpues per fishers are obtained. These two parameters are then related to the values of recruitment, estimated with the Adour model, using a polynomial function. Finally, this polynomial function is used to obtain recruitment data in those days in which only fishery data were available.

The data from 2007–2008 is still colleting and the recruitment is in consequence not yet available. Nonetheless, the recruitment in 2006–2007 was slightly higher than in 2005–2006 (Figure ES. 8).

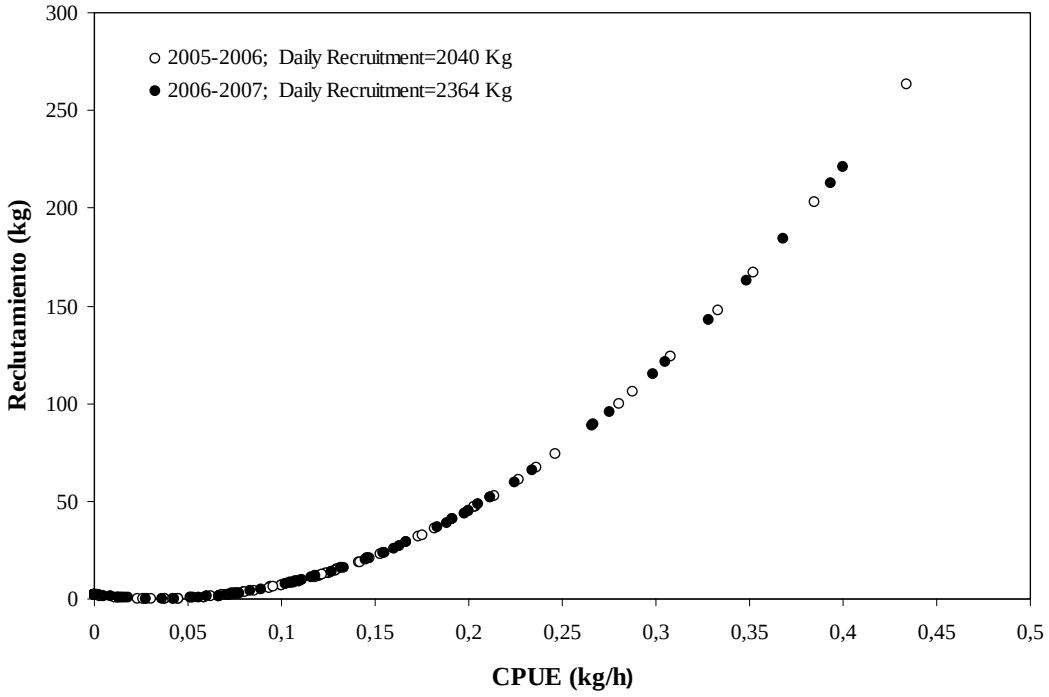

Figure ES. 8. The estimation of daily recruitment using polinomial function of Adour Model. This model correlates real recruitment with the cpues (y = 1656 x2 – 115.1 x + 2.0; r2 = 0.97; n = 10).

In this way, in order to analyse recruitment historical trends in Spain, it is necessary to use the glass eel catches. The oldest dataseries, the one form San Juan de la Arena (Atlantic Sea) and the other from the Albufera (Mediterranean Sea) confirms the decline in glass eel recruitment observed in the rest of Europe (Figure ES. 9). The glass eel data from the Miño go back to early 1980s. These catches were highest around middle 1990s. After then, they began to decline. The values of the latest years are nearly half of the values obtained in the 1990s.

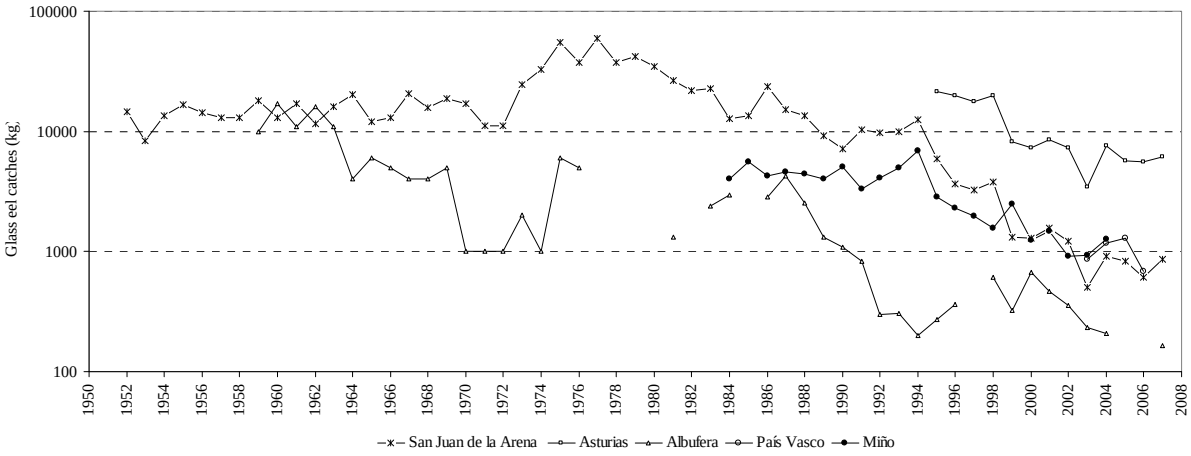

Figure ES.9. Time trends in glass eel sales or catches in different Spanish basins. Note that the scale is logarithmic.

There are no official statistics on commercial glass eel catches in the Guadalquivir river basins as the fishery in this river has not been regulated yet. In this sense, Sobrino *et al.*, 2005 made some samplings along the Guadalquivir River in order to analyse glass eel fishing activity during 1997–1998 and 1998–199 seasons. They then determined glass eel catches and cpues during this period.

Table ES.i. Glass eel catches and cpues (Catches per fishing day) in the Guadalquivir estuary.

	1997–1998					1998–1999				
	No. of boats	Fishing days	Fishing hours	Catch	cpue	No. of boats	Fishing days	Fishing hours	Catch	cpue
Zone I *	1.2	218		-	-	29.3	5333	42 661	1900	0.5
Zone II*	7.8	1420	1747	-	-	29.3	5333	42 661	1800	0.3
Zone III*	15.5	2821	11 357	-	-	15.7	2857	22 859	900	0.3
Total	24.5	4459	22 568	5000	1.1	74.3	13 532	108 181	4600	0.3

Source: Sobrino *et al.*, 2005.

*** : Zone I: upper zone of the river. Zone II: middle part of the river; Zone III: river mouth.**

There is not **restocking** in the **Basque Country** and **Asturias**. In **Catalonia**, a percentage of the glass eels catches should be conserved for restocking. In the A R. of **Valencia**, the old national service for the continental fishing in the early 1940s followed up the study of the eel catches realized in the channels of the Albufera. Regarding the regulation for the glass eel fishing, the glass eel fishers had to release the 10% of their catches over the sluice gates (named "golas" which regulate the level of the Albufera

lagoon). This is not this way anymore. From 1989 on, the administration began a re-stocking programme for the eel in the continental waters of the Valencian Autonomy. The centre for the production and experimentation of warm-water fish was established then (Polinyà del Xúquer), where the fishers should give a percentage of the glass eels catches in Albufera and Bullent and Molinell rivers, to be farmed until they reach a weight of 8–10 g.

Then the eels are released up in the river waters and wetlands of the Valencia Autonomy and even in other Autonomies. The eel farms must give back to the city council 3000 eels of 8 gr for each Kg of glass eel they have received. There is not data available on the monitoring of the restocking that allows evaluating the success of it.

ES.G. 2 Yellow and silver eel surveys

In the **Basque Country,** an ascendant young eel sampling station was installed in September 2004 in the Oria River which will give abundance and fluvial recruitment indices independent of fisheries. The trap was installed in a monitoring station for salmonids, located 11 km from the Oria River mouth in the tidal limit. Although the time-series is not wide enough to extract any conclusion (2005, 2006 and 2007), some general trends can be observed. The young eels start upstream migration in May and finish it in November. During this period, migration is constant but irregular. There are daily peaks of 10 462 g and 1989 individuals (29/08/2007; Figure ES. X).

The number of eels captured has increase since 2005, from 2656 to 3868 and 8960 approximately. But the biomass decreased in 2006 (from 32 106 g in 2005 to 20 939 g in 2006) to increase significantly later in 2007 (60 642 g; Figure ES. 9). This was probably as a result of the accumulation of bigger eels below the trap, caused by the impediment of migration by the dam until the trap was installed.

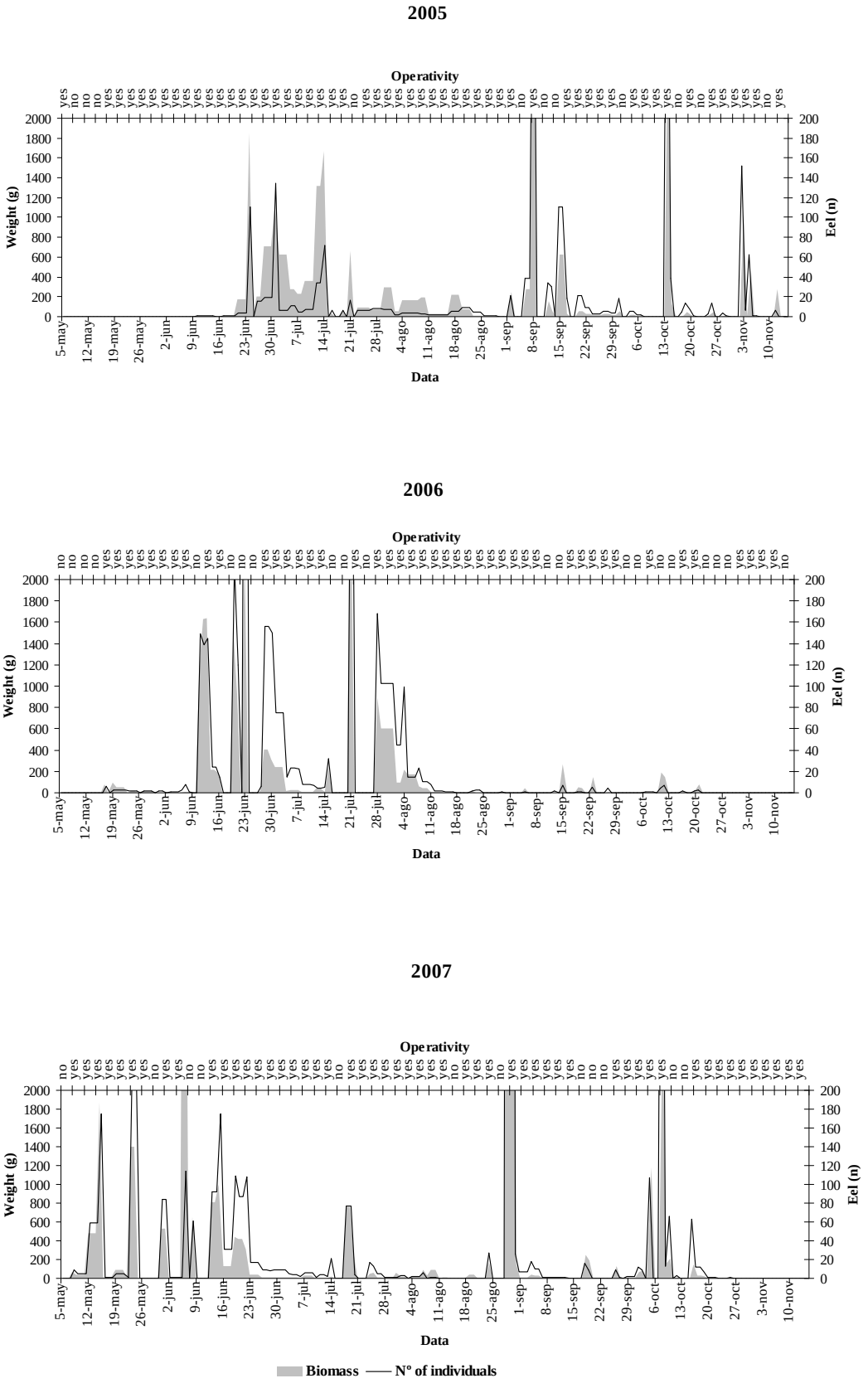

Figure ES. 10. Eel catches evolution in biomass and number of individuals during the migrations seasons of 2005, 2006 and 2007. The operativity indicates the state of the trap when sampling. Yes: active; No: inactive.

In general, there is a decrease in eel migrant size from May on. Eel length classes' frequencies demonstrated that a great proportion of captured individuals in every year belonged to length class of 10–15 cm (Figure ES. 11), which corresponds to individuals that stayed less than one year in the river before reaching the trap. Hence, the application of any restriction adopted to the glass eel fishery should be reflected in the data obtained in the trap the next year. On the other hand, the presence of the individuals belonging to the major length class was higher during 2005 than 2006 and 2007; probably as a consequence of the accumulation of individual below the dam before the pass was installed, as explained above.

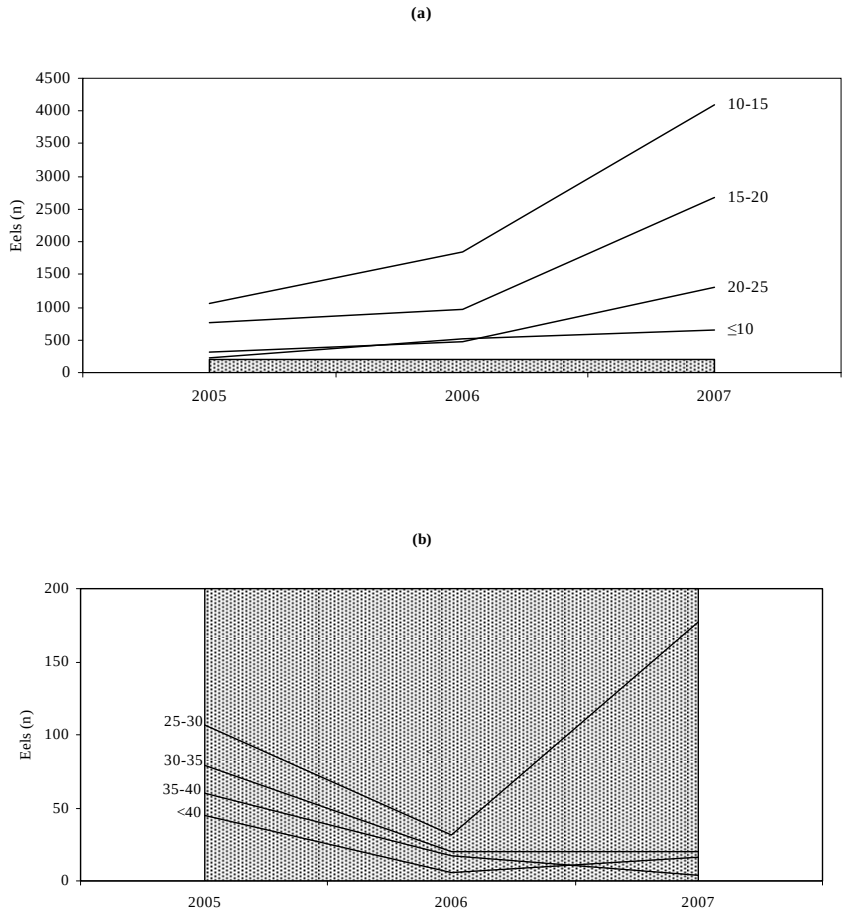

Figure ES.11. Temporal evolution of eel length classes captured in the tramp of the Oria River basin during 2005. 2006 and 2007. (a) ≤10; 10–15; 15–20; 20–25 and (b) 25–30; 35–40; ≥40. Note that the shadow area in (a) correspond to graphic area in (b).

In **Galicia**, the descendant eel length and weight data has been collected since 1993 from the trap located in Ximode preserve centre in the Ulla River, which flows into of the Arousa estuary. In general, the highest frequencies were obtained those yellow eels measuring 20–25cm and silver eels of 35–40 cm for almost every year, with a maximum number of individuals in 2001for both eel stages (Figure ES 12 a, b).

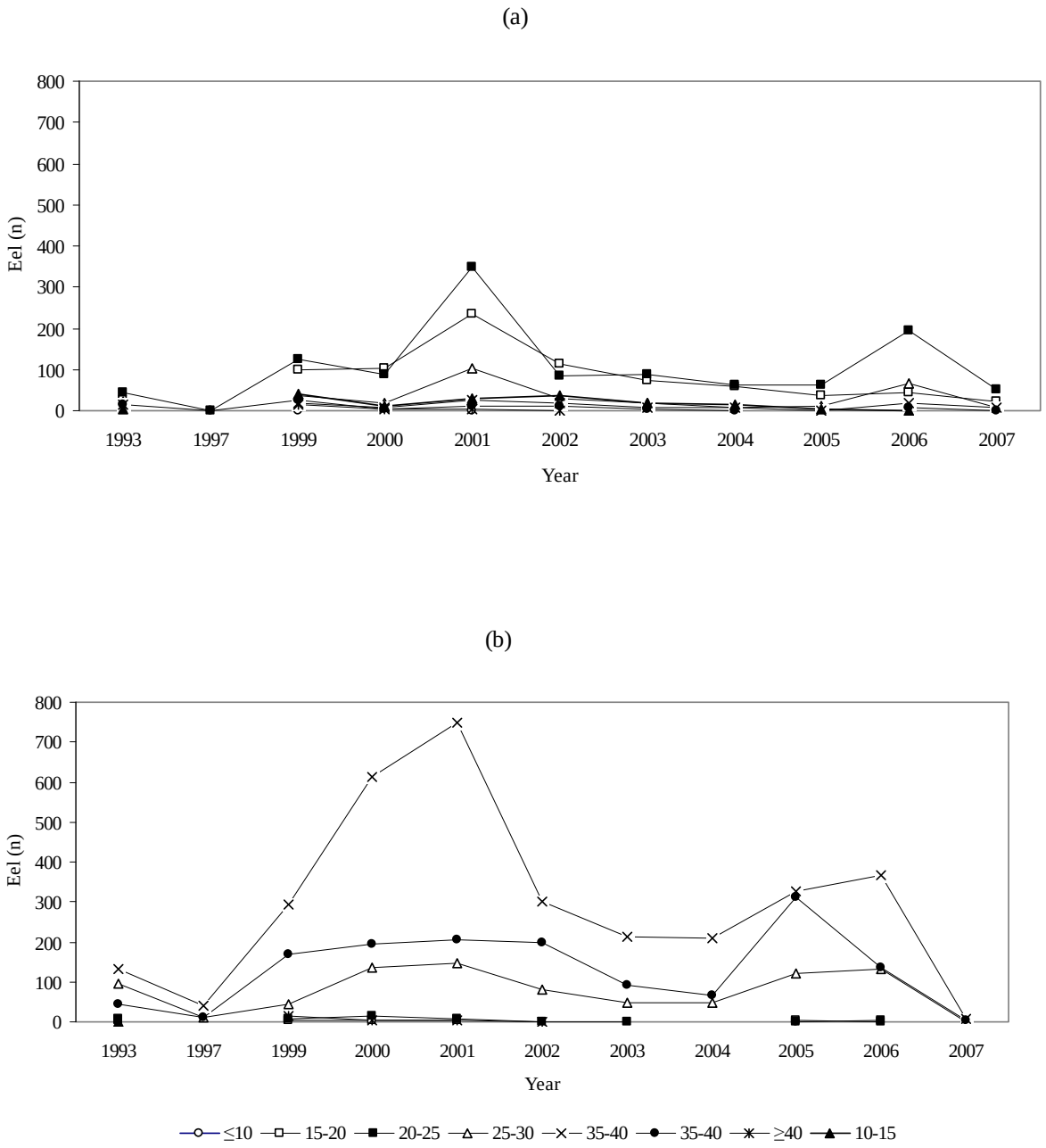

Figure ES.12. Temporal evolution of yellow (a) and silver eel (b) length classes (cm) captured in the trap of Ximode in the Ulla River.

The largest number of descending eels was reached in 2001 for almost all the size classes. On the contrary, the smallest number was obtained in 2007.

In **Asturias,** Javier Lobón has been monitoring the yellow and silver eel in the Esva basin since 1986 (Lobon-Cervia, *et al*., 1990; Lobon-Cervia and Carrascal, 1992; Lobon-Cervia *et al*., 1995; Lobon-Cervia, 1999).

In **Castilla la Mancha**, the Historical Evolution of the eel has been studied by Marin *et al.*, 1994**.**

ES.H Catch composition by age and length

No information available.

ES.I Other biological sampling

ES.I.1 Length and weight and growth (DCR)

As mentioned above, in Spain there is not any national eel specific surveys programme. In the Spanish National Programme proposal for 2007 (http://datacollection. jrc. cec. eu. int/nationalprog. php?y=2007) Spain has asked for an exemption to sample eel based on the low discards. However, the bulk of the eel catches are monitored by the autonomous governments of the different Spanish regions as mentioned above, but these data are not centralized, and therefore, in Spain total eel catches are unknown.

ES.I.2 Parasites

Some studies have been carried out regarding the presence of *Anguillicola crassus* in rivers form Spain (Table. ES.j). These studies have demonstrated that the parasite is widespread in Spain. However, there are still some rivers **in Asturias** and **Galicia** that have not been colonized yet; therefore special measures should be taken to avoid the infection of these basins. It is difficult to follow the sequence of A. crassus introduction in Spain since the first data we have is from 2000 and probably the nematode arrived before that data. However, it looks like in the Mediterranean the presence of the parasite is lower than in the Atlantic (lower prevalence, intensity and abundance). In the **Basque Country**, comparing the results of Gallastegi *et al.*, 2002 in the Butron in year 2000, with those of Díaz *et al*., 2007 in the Basque rivers in 2006, we can see that there is an increase in the prevalence of the parasite, but that the infection intensity has decreased.

ES.I.3 Contaminants

Although there is not any specific survey to analyse the presence of contaminants on eel, eel is sometimes among the species included in the biomonitoring of water masses made by the public administrations. Additionally, in some studies that evaluate the contamination in the biota, the eel is among the studied species. In this way, information regarding PCBs, pesticides and heavy metals bioaccumulation in eels from rivers of the Basque Country (Sanchez *et al*., 1997), from the river Ebro (Santillo *et al*., 2006), river Miño (Santillo *et al*., 2006), river Jucar (Bordajandi *et al*., 2003) and river Guadalquivir (Usero *et al*., 2003) is available. Few studies represent a specific survey to analyse the presence of contaminants in eel, as heavy metals determination in eels from the Albufera lacuna (Alcaide and Esteve, 2007). These authors concluded that among the tested HM. bioaccumulation of Cd, Hg, Zn, and Cu in liver tissue is related to the age/length of individuals [W and B values; $p \leq 0.01$] and so recommendations are remarked on standardization on length and/on age of the eels used in such studies (Alcaide and Esteve, 2007). On the other hand, Ureña *et al*., 2007 concluded for the same location of the latter study that the eels with similar length demonstrate different pattern of metal distribution among tissue depending on there are from the wild or farmed.

ES.I.4 Predators

In 1996 there were 35 000 great cormorants (*Phalacrocorax carbo sinensis*) ovewintering in Spain, by 2003 the population increased by 96% (DelMoral and DeSouza, 2004).

Regarding the impact of this species in eels, the Cantabrian Goverment carried out a

study in which they analysed the gut content of cormorants (Serdio, 2005). In that study, it was concluded that salmonids were the most consumed prey by cormorants, and that they had a high impact in trout population. However, the presence of eel in the cormorant diet was not very important (Table ES.k.). The same happened in the Mediterranean Santa Pola Lagoon, where eel constituted the 1% of the diet of the cormorants about numbers and the 0.4% about biomass. In fact, the diet of cormorants was mainly composes of mugilids (Olmos *et al.*, 2000).

Table ES.j. Prevalence, infection intensity and abundance of *Anguillicola crassus* in different basins from Spain.

	River/Lake	Lat	Long	Year	N eels	Mean Size(cm)	N sites	N sites infected	Prevalence	Infection intensity	Abundance	Reference
Jucar	Albufera	39º20' N	0º20' O	2003/04/05	45	29. 6	-	-	6	0.33	0. 18	Esteve and Alcaide, 2007
Jucar	Albufera	39º20' N	0º20' O	2003/04/05	46	39. 7	-	-	15	2. 4	0. 58	Esteve and Alcaide, 2007
Jucar	Albufera	39º20' N	0º20' O	2003/04/05	31	56. 7	-	-	13	1	0. 32	Esteve and Alcaide, 2007
B. inner	Urumea	43º19'N	1º58' O	2006	10	28. 9	1	1	70	4.3	3. 0	Díaz *et al.*, 2006
B. inner	Oria	43º16' N	2º06' O	2006	24	34. 7	4	3	25	3.8	1. 0	Díaz *et al.*, 2006
B. inner	Urola	43º17'N	2º14' O	2006	1	59. 5	1	0	0	0	0. 0	Díaz *et al.*, 2006
B. inner	Artibai	43º19' N	2º26' O	2006	34	25. 0	1	1	64. 7	2.8	1. 8	Díaz *et al.*, 2006
B. inner	Lea	43º21' N	2º29' O	2006	13	19. 9	1	1	15. 4	2	0. 3	Díaz *et al.*, 2006
B. inner	Ea	43º22' N	2º35' O	2006	28	23. 6	1	1	42. 9	2.7	1. 1	Díaz *et al.*, 2006
B. inner	Oka	43º21' N	2º40' O	2006	54	28. 3	3	3	44. 4	2.3	1. 0	Díaz *et al.*, 2006
B. inner	Estepona	43º25' N	2º48' O	2006	29	32. 4	1	1	48. 3	3.3	1. 6	Díaz *et al.*, 2006
B. inner	Butrón	43º23' N	2º56' O	2006	5	31. 7	1	1	60	1.7	1. 0	Díaz *et al.*, 2006
B. inner	Butrón	43º23' N	2º56' O	2000	90	32. 1	1	1	7. 8	9	0. 7	Gallastegi, *et al.*, 2002
B. inner	Nervión	43º19' N	3º00' O	2006	63	32. 6	4	4	44. 4	2.6	1. 2	Díaz *et al.*, 2006
B. inner	Barbadun	43º17' N	3º07' O	2006	28	27. 3	1	1	28. 6	1.9	0. 5	Díaz *et al.*, 2006
North II	Cares	43º19' N	4º36' O	2006	46	29. 6	-	-	0	0	0	Aguilar *et al.* 2005

	River/Lake	Lat	Long	Year	N eels	Mean Size(cm)	N sites	N sites infected	Prevalence	Infection intensity	Abundance	Reference
North II	Bedón	43º26' N	4º52' O	2006	25	28. 0	-	-	0	0	0	García pers. Comm., 2006
North II	Sella	43º27' N	5º 03' O	2006	204	27. 6	-	-	51. 2	3.8	1. 9	García pers. Comm., 2006
North II	Sella	43º27' N	5º 03' O	2006	23	32. 8	-	-	34. 8	4.6	1. 6	García pers. Comm., 2006
North II	Villaviciosa	43º31'N	5º23' O	2006	20	17. 4	-	-	60	1.7	1	García pers. Comm., 2006
North II	Nalón	43º33' N	6º04' O	2006	75	28. 8	-	-	50. 7	1.9	1	García pers. Comm., 2006
North II	Esva	43º32' N	6º27' O	2006	20	25. 5	-	-	0	0	0	García pers. Comm., 2006
North II	Porcía	43º33' N	6º52' O	2006	15	20. 1	-	-	0	0	0	García pers. Comm., 2006
North II	Eo	43º31' N	7º02' O	2006	45	38. 3	-	-	0	0	0	García pers. Comm., 2006
G. coast	R. Tea	42º05' N	8º21' O	1999/2000	200	-	-	-	55. 5	5. 5	3. 05	Aguilar *et al.*, 2005
G. coast	R. Ulla	42º39' N	8º44' O	1999/2000	323	-	-	-	0	0	0	Aguilar *et al.*, 2005

Table ES.k. Presence of eel in the diet of eel in Cormorants from Cantabria.

			N	Full gut	Ingested preys/ day	Ingested biomass/ day	Trophic diversity	F (%)	P (%)	BM (%)
Ason	**43º20' N**	**3º25' O**	**14**	**13**	**5.1**	**327.2**	**1.3**	**7.7**	**3**	**6.9**
Pas-Pisueña	**43º23' N**	**3º58' O**	**6**	**3**	**7**	**176.5**	**0.9**			
Besaya	**43º20' N**	**4º04 O**	**14**	**14**	**15.1**	**262.8**	**1**	**7.1**	**0.5**	**6.6**
Saja	**43º21' N**	**4º07 O**	**12**	**8**	**3.7**	**670.9**	**0.8**			
Deva	**43º06' N**	**3º12' O**	**5**	**5**	**4.2**	**398.3**	**1.1**	**20**	**4.8**	**1.5**
Ebro	**42º55' N**	**4º01' O**	**37**	**31**	**15.5**	**205**	**0.9**			

Trophic diversity according to Shannon-Weaver

F: Frequency of presence of eel in the diet (%)

P: Percentage of eel in relation to the total consumed fish

BM: Percentage of the species in the total consumed biomass

ES.J Other samplings

Researchers of the University of Valencia have studied the incidence of infectious diseases in the Albufera´s eel population (Jucar basin, Valencia), through a 3-years period (from October 2003 to July 2005. They analysed 122 individuals of different growth stage (Durif *et al.*, 2005) and health condition and observed that eels suffer from acute diseases such as those produced by highly virulent bacteria belonging to *Edwardsiella tarda* and *Vibrio vulnificus* species (Alcaide *et al.*, 2006; Esteve *et al.*, 2007; Esteve and Alcaide, 2007). *Edwardsiella tarda* disease was present along the study period with a prevalence ranging from 5.6 to 27.8% in the nine surveys performed (Esteve and Alcaide, 2007). *Vibrio vulnificus* disease had a sporadic incidence during the study; it was detected in November 2003 with a very high prevalence of 77.2% (Esteve *et al.*, 2007). In addition, chronic and mixed infections caused by weakly virulent bacteria (*Aeromonas* sp. and *Pseudomonas* sp.) and fungi (*Saprolegnia* sp.) were observed along the study period with a prevalence ranging from 10.5 to 22.2% in the nine surveys performed (Esteve and Alcaide, 2007). In fact, authors remarked that pathogenic bacteria may play a leading role in the decline of Albufera´s eel population as the prevalence of each bacterial disease was at the same level than that observed for the swimbladder parasitic disease (Esteve and Alcaide, 2007).

Interestingly, the correlation between the sanitary status of an eel [Healthy; Acute bacterial disease; and Chronic disease] and its growth stage [Young Yellow; Sexually differentiated Yellow; and Mature Silver] was statistically significant: observed number of both "young yellow eels which present acute bacterial disease" and "silver eels which present chronic illness" notably exceed those expected [Pearson X^2= 10.812; P(4 d.f.)= 0.029] (Esteve and Alcaide, 2007). Thus, authors suggested that youngest eels could suffer high mortality rates in the natural habitat (Albufera lacuna), and that low quality of mature adults could reduce their survival along the downstream migration to the sea.

ES.K Stock assessment

There is no general advice on eel management in Spain. Each Autonomy has his own regulation regarding eel fisheries, and some Autonomies don't have any regulation. For the Basque Country, a group coordinated by AZTI-Tecnalia has been created including the Deputations of the three provinces (Gipuzkoa, Araba and Bizkaia), and The Basque Government, that has already started to work in the design of an eel management plan. Besides, some meetings have been held with technicians from the Northern Coastal Autonomies of Spain (Basque Country, Cantabria, Asturias, and Galicia) regarding eel management plans.

ES.L Sampling intensity and precision

No works has been done in this subject until now.

ES.M Standardisation and harmonization of methodology

No work has been done in this subject until now.

ES.N Overview, conclusions and recommendations

As mentioned above, in Spain, each autonomous government is in charge of the control, regulation and management of the eel fishery and population. Apart from the present report, there is not any global study or sampling programme for compiling information (fishery data, biological information etc.) from each the Spanish region, in order to give a Spanish national overview of the eel situation.

For that reason, and considering the new EC regulation proposal for eel, it is proposed the inclusion of eel in the Spanish National Data Collection Programme. Besides, it is considered that a special effort should be carried out in order to compile information regarding eel population in the whole of Spain; then, develop a national management plan for eel in base of it.

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Table ES.l. Glass eel catches (kg) in Spain from 1952 on.

Year	B. Country*	San Juan de la Arena**	Nalón**●	Rest of Asturias**	Asturias**	Miño***	Guadalquivir†	Albufera**	Delta Ebro*	Rest of Catalonia*
1952		**14 529**								
1953		**8318**								
1954		**13 576**								
1955		**16 649**								
1956		**14 351**								
1957		**12 911**								
1958		**13 071**								
1959		**17 975**						**10 000**		
1960		**13 060**						**17 000**		
1961		**17 177**						**11 000**		
1962		**11 507**						**16 000**		
1963		**16 139**						**11 000**		
1964		**20 364**						**4000**		
1965		**11 974**						**6000**		
1966		**12 977**						**5000**		
1967		**20 556**						**4000**		

Year	B. Country*	San Juan de la Arena**	Nalón**●	Rest of Asturias**	Asturias**	Miño***	Guadalquivir†	Albufera**	Delta Ebro*	Rest of Catalonia*
1968		**15 628**						**4000**		
1969		**18 753**						**5000**		
1970		**17 032**						**1000**		
1971		**11 219**						**1000**		
1972		**11 056**						**1000**		
1973		**24 481**						**2000**		
1974		**32 611**						**1000**		
1975		**55 514**						**6000**		
1976		**37 661**						**5000**		
1977		**59 918**								
1978		**37 468**								
1979		**42 110**								
1980		**34 645**								
1981		**26 295**						**1309**		
1982		**21 837**								
1983		**22 541**			**30 804**			**2387**		
1984		**12 839**			**15 911**	**4027**		**2980**		
1985		**13 544**			**14 229**	**5534**				
1986		**23 536**			**22 219**	**4282**		**2845**		
1987		**15 211**			**27 417**	**4627**		**4255**		
1988		**13 574**			**13 500**	**4468**		**2513**		
1989		**9216**			**14 309**	**4037**		**1322**		
1990		**7117**			**7515**	**5075**		**1079**		
1991		**10 259**			**7660**	**3313**		**831**		
1992		**9673**			**12 990**	**4126**		**300**		
1993		**9900**			**10 109**	**4960**		**303**		
1994		**12 500**			**14 307**	**6866**		**199**		
1995		**5900**	**6117**	**1850,8**	**7751**	**2843**		**271**		
1996		**3656**	**5302**	**3673,4**	**7329**	**2296**	**5000**	**366**		

Year	B. Country *	San Juan de la Arena**	Nalón**●	Rest of Asturias**	Asturias**	Miño***	Guadalquivir†	Albufera**	Delta Ebro*	Rest of Catalonia*
1997		3273	4723	3241,3	6514	1980	4600		3125	
1998		3815	5572	3297,9	7113	1580		616	2905	
1999		1330	2039	1728,5	3058	2503		323	1518	401
2000		1285	1839	1446,3	2732	1254		678	4644	368
2001		1569	2305	1535,7	3105	1474		466	6964	
2002		1231	1793	1538,6	2770	918		357	3850	357
2003	858	506	764	845,6	1351	935		233	3577	283
2004	1181	914	1835	1961,0	2875	1277		209	1238	
2005	1282	836	1355	1339,3	2175				2065	147
2006	799	615	1005	1650,2	2266				1313	148
2007	SC	871	1423	1508,0	2379			165	1170	86

***Data from catches report; ** Data from auctions; † Sobrino *et al.*, 2005; ***Data from river command corresponding to Spain and Portugal.**

● In the Nalón River, data from San Juan de la Arena and Cudillero guilds is included.

SC: Still collecting data from fishers.

Table ES.1 Yellow and silver eel catches in Spain from 1950 on

Table ES.l. Yellow and silver eel catches (kg) in Spain from 1950 on.

	Landro*	Eo*	Verduxo*	Lérez*	Arousa*	Miño**	Albufera*		
Year	Yellow + silver						Yellow	Silver	Yellow + silver
1950							60 000	30 000	90 000
1951							64 200	38 000	102 200
1952							50 000	30 200	80 200
1953							57 300	40 400	97 700
1954							72 500	30 400	102 900
1955							75 860	30 260	106 120
1956							40 000	40 000	80 000
1957							75 000	40 000	115 000
1958							60 000	40 000	100 000
1959							68 000	30 000	98 000
1960							65 300	30 040	95 340
1961							70 500	20 200	90 700
1962							73 000	22 400	95 400
1963							73 500	18 000	91 500
1964							64 000	12 300	76 300
1965							64 000	15 000	79 000
1966							59 500	20 000	79 500
1967							49 600	16 000	65 600
1968							45 300	11 200	56 500
1969									
1970							30 250	12 600	42 850
1971							32 400	11 612	44 012
1972							25 500	18 300	43 800
1973							20 600	12 428	33 028
1974						1650	13 612	11 210	24 822
1975						10 600	10 620	6570	17 190
1976						20 000	8260	5300	13 560

	Landro*	Eo*	Verduxo*	Lérez*	Arousa*	Miño**	Albufera*		
1977						36 600			
1978						24 300			
1979						28 400			
1980						16 000	6352	4668	11 020
1981						50 000	12 269	6848	19 117
1982						16 400	6845	9126	15 971
1983						30 000	6397	7697	14 094
1984						34 127	7395	3577	10 972
1985						18 534	11 013	3464	14 477
1986						20 321	9243	2871	12 114
1987						12 827	11 228	3611	14 839
1988						14 827	7698	2098	9796
1990						12 499	2000	1843	3843
1991						13 318			
1992						10 648	3000	2330	5330
1993						12 619	3000	2349	5349
1994						9928	2000	2155	4155
1995						16 867	1600	2897	4497
1996						18 066	2960	3105	6065
1997						10 979	2784	2123	4907
1998						9358	3100	2563	5663
1999						8992	2400	2503	4903
2000						9315	1537	2047	3584
2001	479	467	42 159	0	7439	3973	1284	1995	3279
2002	213	643	25 252	30	13 563	4001	1432	2126	3558
2003	266	180	19 708	16	11 171	4073	4042	2598	6640
2004	1887	460	22 014	14	10 997	3297	5591	2138	7729
2005	5849	2480	14 512	0	8861		6493	1472	7965
2006	7993	2344	42 994	73	9707		5974	1479	7453
2007	2721	2900	18 860	10	3788				10 675

*** Data from auctions; ** Data from river command corresponding to Spain and Portugal.**

Report on the eel stock and fisheries in Italy

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IT.B. Introduction

Eel (*Anguilla anguilla* L.) exploitation in Italy has a long standing tradition, and still concerns all continental stages, i.e. glass eel, yellow and migratory silver eel.

A most distinctive exploitation pattern for eel in Italy has been in the past coastal lagoon fishery, that yielded most of yellow and silver eel extensive culture and fishery production (Ciccotti, 1997; Ciccotti *et al*., 2000; Ciccotti, 2005). Quite important was also eel intensive aquaculture, that played a major role within the national and European context up to a few years ago, but has strongly reduced today (Ciccotti *et al*., 2000; Ciccotti and Fontenelle, 2001).

Lagoons cover around 1500 km^2, 610 of which are exploited at the present moment. Of the exploited area, about 300 km^2 are located in the upper Adriatic and 120 in the Po delta, the rest being scattered in Apulia, Campania, Latium, Tuscany, Sicily and Sardinia (Ardizzone *et al*., 1988).

In the upper Adriatic lagoons the typical form of management was the *vallicoltura* that slightly differed from other lagoon management and fisheries because relying on artificial fry stocking and active hydraulic management.

Inland eel fisheries are found in main rivers and lakes. Most of the eel catches are from the great Alpine lakes in the northern regions, but the eel is also an important target species for professional fisheries in some volcanic lakes of Central Italy. Professional eel fisheries in rivers are confined today to residual activities, although professional glass eel fisheries still take place in some estuaries, and in many channel mouths as well. At the moment, most of the glass eel yield comes from the Central and Southern Thyrrenhian area. The main sites of glass eel catches are the estuaries of rivers such as the Arno and Ombrone in Tuscany, the Tiber and the Garigliano in Latium, and the Volturno and Sele in the Campania region. Those sites are frequented not only by local fishers but occasionally also by fry fishers from other regions, who reach those sites with trucks equipped with oxygenated tanks to collect mullet, sea bass, sea bream and eel fry. Local fishers are usually single or Co-operative fishers that are equipped with boats and structures to store the product alive. Fishing instruments vary depending on the characteristics of the site.

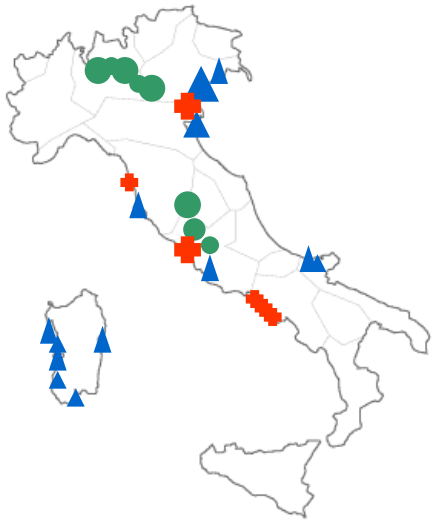

Figure IT.1 Distribution of main eel fisheries in Italy (O Lakes, Δ Coastal lagoons, ⌖ Rivers).

Governmental management framework for eel results disjointed, because in Italy the Ministry of Agriculture and Forestry Politics controls salt and brackish waters, although inland waters are under the control of local Administrations, i.e. Regions or Provinces. Therefore the only eel fisheries under a central Administration are the glass eel fisheries practised in estuaries, as no marine adult eel fishery exists in Italy. In most cases, anyway, central and regional regulations are in agreement, glass eel fishery regulation being joined always to the regulation of fishery of finfish and bivalve fry for aquaculture. In both departments, a license is necessary, which has to be renewed annually, in which quantities to be fished have to be declared. Fishermen must notify their catches and sales. Destination of glass eels ought to be restricted to aquaculture and restocking purposes. However, poaching and black market in some regions remain a problem. In absence of counterchecks, collection of data can prove to be partial, and their reliability doubtful.

With regards to inland fisheries, each Region has its own regulations, none specific for eel. At the present moment, an agreement between National Administration and Regions is being discussed regarding fisheries, but not yet in force. Up to now, as a rule individual professional fishing licenses are issued, which are valid for six years, by each Region, and are enlisted in registers kept by the Provinces. The permitted gears vary from region to region, also in relation to local traditions, and are specified by each Administration, together with authorized times and places. For the nets, mesh sizes and minimum and maximum dimensions of gears are listed.

In the present report an overview on the eel stock and fisheries in Italy is presented, based on information gathered for previous meetings (Workshop on National Data Collection for the European eel held in Sweden in 2005, Eel WG 2006 and 2007), and updated to 2008. At the present moment, Italy has not established yet its Data Collection Framework for eel, nor has developed a final proposal for a National Management Plan as foreseen by the Regulation 1100. Nevertheless some actions are being undertaken, in particular in November 2007 a programme has started targeted to the setting up of the knowledge base for the preparation of a National Management Plan [title: "Investigation to gather the knoledge base for the drafting of a National Management Plan for the

sustainable management of the eel, *Anguilla anguilla*"-Ministero per le Risorse Agricole Alimentari e Forestali, Consorzio Unimar e Università di Roma "Tor Vergata"].

Aim of the project is the development of a data collection framework specific for eel, and the identification of the key elements for eel management and restoration at the national level. This programme is in course at the present moment, and its preliminary results shall constitute the basis for the drafting of the Eel National Management Plan to be presented at the end of the year to the European Commission.

IT.C, D, E and F Fishing capacity, fishing effort, catches and landings, catch per unit of effort

Notwithstanding the above mentioned Programme, that is providing for a mapping and census of all eel fishing activities at the national level, at the present moment no estimates of fishing capacity can be given. A central registration is not available of fishing companies per fishing typology nor per region, apart the Province Registers, and the census of fishing licenses is at the moment still far from complete. For adult eel, there is no possibility of evaluating the number of companies dedicated to eel fishing at the present moment. For glass eel fisheries in marine waters, the number of licenses issued annually by the Ministry for coastal waters demonstrates a sharp drop in the course of the 1990s, also as a consequence of the fact that from 1998 a pecuniary charge is due by the fry fishing companies, but it must be borne in mind that the license is not restricted to glass eel. A rough estimate of fishing companies dedicated to glass eel amounts to less than ten.

Fishing equipment for eel catching in lagoons, lakes and rivers includes a variety of instruments ranging from single fykenets to groups of fykenets, traps, baskets and fish hooks. Systems consisting of arrangements of nets and fykenets, constituting barriers that close the lagoon from one shore to the other, are used in some lagoons, such as the "paranze" from the lagoon of Lesina in the Southern Adriatic, Italy. Most of silver eel captures take place at fish barriers (*lavoriero*), devices based on the principle of V-shaped traps that intercept the fish when moving to reach the sea: for silver eel, most captures take place in winter in coincidence with seaward migration. Fishing efficiency by these devices can be considered to attain 100%.

For glass eel fishing, dipnets are used often in Tuscany, but usually glass eel fishing is carried out with fykenets of varying dimensions, which are often provided with wings.

There are no logbook systems to record type and number of nets, neither obligatory nor voluntary, at any level, neither central nor local. Considering the large heterogeneity of the fishing devices, no other measure of fishing effort, fuel consumption or other, seems applicable at the present moment.

No obligatory registration of landings exists, at any level, at the present moment, for eel, apart the catch declarations required by the Ministry or by the local Administrations for issuing annual glass eel fishing licenses that seem purely indicative. Within the actions foreseen by the programme, a thorough investigation of actual productions is being performed, by direct interviews with the fishers' cooperatives, but no data are available up to now.

Official statistics to which it is possible to make reference for eel are, at the present moment, still those gathered by the Istituto Nazionale di Statistica, Servizio Statistiche sull'Agricoltura. Statistics are grouped on an annual basis, by region and by species or

species group. Data are given separately for marine and brackish waters (lagoon and sea fisheries) and for inland (lakes and artificial basin fisheries). Riverine catches are not considered, being probably worthless. It must be borne in mind that statistics referring to eel consider only adult eel, yellow and silver cumulated, deriving only by professional fisheries. However, catches from anglers are possibly quite significant.

Eel total landings from lagoon fisheries in Italy from 1969 to 2004 are reported in Figure IT.2. Data refer to coastal lagoons only, no marine fisheries existing, although extensive culture productions such as the *vallicoltura* yields ought not to be considered, falling within the aquaculture productions. It is possible, however, that a certain overlap has occurred in the past. Data from 2005 are not available for eel singled out from other species.

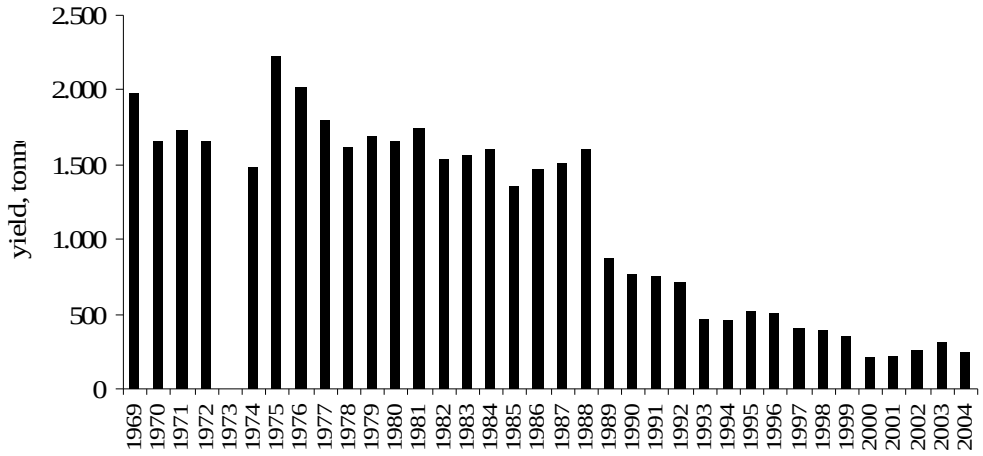

Figure IT.2 Eel landings (yellow and silver eel) in Italy, period 1969–2004, from lagoon fisheries (Istituto Nazionale di Statistica). From 2005 data are cumulated to other minor species, and therefore not available.

Inland waters eel landings from 1969 to 2006 are reported in figure IT.3; statistics refer only to lakes and artificial basins.

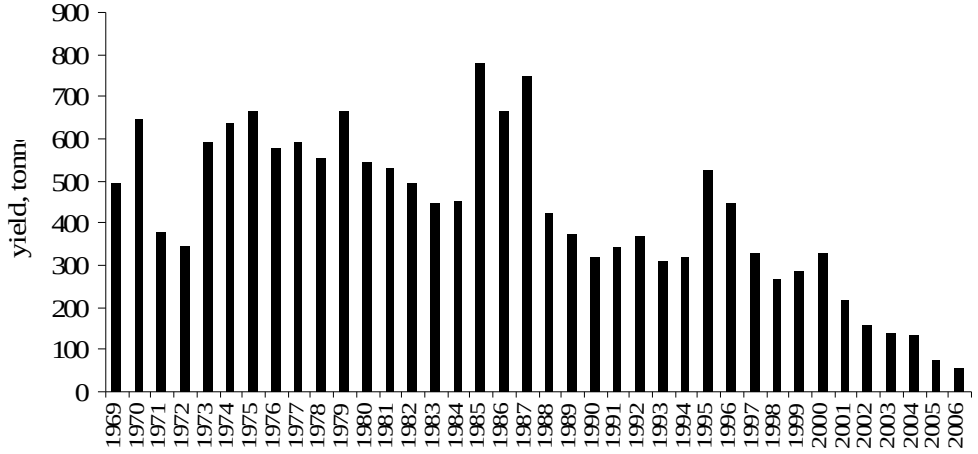

Figure IT.3 Eel landings (yellow and silver eel) in Italy, period 1969–2006, from lakes and artificial basins (Istituto Nazionale di Statistica).

The above statistics refer to yields cumulated for all Italy, but landing data split at the Regional level are also available, not given in the present report.

With regards to catch per unit of effort, considering that no estimate of fishing effort can be given, it is not possible to estimate cpue for eel, for any of the fishing tipologies.

IT.G. Scientific surveys of the stock

IT.G.1 Recruitment surveys, glass eel

The monitoring of glass eel recruitment in Italy has been carried out since the mid 1980s within research programmes supported by the Ministry of Agriculture and Forestry Politics, aimed at the assessment of euryhaline finfish fry used for aquaculture and re-stocking (Ciccotti, 2002; Ciccotti, 2004; Ciccotti 2006). Methodology has been extensively described in Ciccotti, 2002.

The monitoring method set up in the Tiber has allowed to describe glass eel recruitment trend at the river Tiber estuary during 16 years monitoring, as well has having allowed to draw a picture of the trend of glass eel fishery dating back as far as the mid 1970s, and appeared completely reliable in recording catches of the local fishery. Catch data from the Tiber, and the fishing indicators obtained within the monitoring, also allowed to figure out an overview of recruitment at a national scale, because of a general coherence of recruitment trends among sites, and evidenced a declining trend up to the season 2005–2006. Nevertheless, an assessment of total glass eel yield at the national level has never been possible because of gaps regarding regions where the glass eel fishery seems to continue with good results (such as in Campania and Toscana), and because of a general lack of information in relation to poaching and black markets.

The monitoring at the Tiber mouth has allowed to witness the ending of the glass eel professional fishery, as a consequence of the unquestionable drop in recruitment, but also of a local environmental situation (unpredictable floods, water quality), although the yellow eel fishery, practised by the same fishers, is still going on, even if it has progressively

reduced.

The monitoring in this site, owing to the situation described above and to the ending of the specific monitoring programmes in 2006, has therefore ended. Similarly, also the monitoring at a second monitoring site, located on the river Marta estuary, also in Latium, on the Thyrrenian coast, has been discontinued in 2007. The fishery in this site is still going on, but no information is available at present.

At the present moment, a breakdown of the monitoring work, that involves also a weakening of the monitoring framework set up in the course of the years, appears a major problem in relation to the necessity of follow up of recruitment, and to the fact that the existing time-series have been discontinued. It is to be hoped that some recruitment monitoring can be resumed within the programme mentioned above.

IT.G.2 Stock surveys, yellow and silver eels

Scientific surveys of eel stock in Italy have been carried out on a continuative basis only for recruitment, and up to 2006. For yellow and silver eels, a number of researches on population dynamics were carried out between 1973 and 1985, for some northern Adriatic *valli* populations as well as for some other coastal lakes in the southern Adriatic (Lesina, Varano, Acquatina) and Thyrrhenian (Monaci, Orbetello, Sardinian ponds) as well as for the Tiber river. Most of those were published in scientific journals, although some remained as grey literature (see Ciccotti, 1997 for a review). Subsequently, as interest, also in research, shifted towards intensive aquaculture, investigations on wild stock were abandoned, apart from some modelling applications investigated more recently that focus on eel population structure and body growth, and its applications for the resource management (De Leo and Gatto, 1995; De Leo and Gatto, 1996; De Leo and Gatto, 2001).

Anyway, all these investigations rely on scattered, in space and time, samplings, and therefore cannot be defined scientific surveys. Nothing is actually being executed on a continuative basis. Recently (2007) a national research project regarding eel has started, financed by the Ministry of Research that involves five Universities, aimed at the widening of the knowledge base for the management of the European eel.

IT.H Catch composition by age and length

In Italy there is no sampling programme foreseen in any national or regional framework for adult eel, and therefore no samplings are taken from commercial catches, within any fishery tipology. It must be borne in mind that landing data are collected for statistical purposes, linked therefore to the characterization of social, economic and environmental conditions of the country, and only secondarily related to fishery management. A number of researches were carried out in the past (see above section), but no information is available at present for recent years.

IT.I. Other biological sampling (age and growth, weight, sex, maturity, fecundity)

As specified above, only incidental samplings within specific researches have been performed, and not recently, and this represents a major gap, because for many local stocks it may be that strong changes have occurred, regarding productivity, age structure, length composition, sex ratio. Unfortunately, no routine programme for any population

parameter is executed.

Among the samplings and examinations performed within specific research projects, other features have been occasionally examined, such as parasitic infestations, in particular regarding *Anguillicola* sp. infection rates, contaminants loads and eel condition, fat levels, etc. Some recent data based on available information (published, grey) have been gathered, presented in the relative section of the present Report. Probably, occasionally some analyses for these features related to human health or to veterinary aspects have been monitored by official sanitary or veterinary services, but no information is ever made available and most probably also in this case only scattered sporadic samplings have been actuated.

IT.J Other sampling

For inland waters, most Regional laws in Italy contemplate the accomplishment of Fish Maps by the Provinces, instruments aimed at the planning and management of fish populations and of fishing activities. The reference unit for the Fish Maps is the catchment basin, investigation levels are actuated at different levels (environmental characteristics of water habitats, anthropogenic effects, structure and dynamics of fish populations, fisheries). Methodologies should follow in most cases standardized guidelines, and differ depending on the habitat. Therefore, Fish Maps could contribute with a useful amount of information. Up to now, only a certain number of Provinces, mostly in the northern regions, have compiled Fish Maps, and in most cases have been published by the Provinces and available. The main constraint at the present moment for the utilization of this source if information is the fact that no centralized work of coordination and synthesis is done for any fish species. Eel presence has been ascertained in most of the catchments where investigations have been carried out, but no data on density or biomass are available.

Other samplings in Italy concern environmental monitoring, that involves a network of Agencies at different levels. The APAT (Agenzia per la Protezione dell'Ambiente e per i Servizi Tecnici) is the technical organ of the Ministry of the Environment, whose function is to coordinate actions as well as to maintain the connection with the European network EIOnet, although the ARPA are Regional Agencies involved in environmental protection. An important section of the work of these Agencies involves water environments. Data from environmental monitoring are collected, elaborated and divulgated on a framework basis through the SINAnet, the National Environmental Informative System. In this way a great amount of information regarding different environmental aspects is made available.

IT.K Stock assessment

In Italy no routine assessment of eel stock is under any scheme neither at the central nor regional level. There is no formal advice on eel fishery management.

IT.L Sampling intensity and precision

Having stated beforehand that no samplings or investigations on catch composition and/or age and growth are carried out within official recordings, it is not possible to analyse variation in samplings, within and among sites, seasons, gears. Anyway, a discussion on this topic seems important for eel in Italian waters (and probably in other Mediterranean countries) in relation to the heterogeneity in eel habitats and fisheries or-

ganization, to the seasonal variation of eel catch and catch composition most pronounced in lagoons, etc.

IT.M Standardisation and harmonization of methodology

Having stated beforehand that only incidental samplings within specific researches have been performed, it is impossible to give an overview of methods with regards to the different items. In most research studies, sampling collection and sampling treatment (size measurements, age reading, sex determination, stage identification) as well as any other biological observation (parasites) or determination (contaminants) has been done by following the latest protocols as inferred from literature available at the moment the research was carried out.

The setting up of a standardized sampling methodology and of protocols for biological investigations on eel is therefore a priority.

IT.N. Overview, conclusions and recommendations

In the present report an overview of the European eel stock and fisheries is presented for Italy. From the presented information, it is possible to summarize the following points:

- Eel landings in Italy, in coastal waters as well as in inland water bodies, demonstrate a continued decrease. Glass eel monitoring, carried out up to 2006, confirms the current low trend in recruitment.
- Scientific surveys on a continuative basis have been carried out only for recruitment, along 16 years (1999–2006) within the Three-year Plan of Ministry of Agriculture and Forestry Politics, law 41/82, and contributed up to now to the understanding of the eel stock situation in Italy with respect to the rest of Europe. At the present moment, anyway, the monitoring has been discontinued.
- At the present moment, Italy has not established yet its Data Collection Framework for eel, nor has developed a proposal for a National Management Plan. Nevertheless, in the course of 2007 the Ministry of Agriculture and Forestry Politics has financed a Project, that followed a specific call, for a programme started in autumn 2007, targeted to the setting up of the knowledge base for the preparation of a National Management Plan, by developing a data collection framework specific for eel, and by identifying the key elements for eel management and restoration at the national level.
- Debate on the course of actions to be undertaken to comply with the European Commission dispositions is currently being held at different levels, administrative as well as scientific, in relation to the awareness of the necessity of urgent actions for the eel stock recovery. A group has been established to work at the drafting of an Eel Management Plan for Italy. Therefore the next months shall prove to be extremely important for the development of these actions.

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