

**RIVER DON  
FISHERY MANAGEMENT PLAN  
2009 – 2011**



**CONSULTATION DRAFT  
November 2008**

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# 1. INTRODUCTION

This fishery management plan sets out a systematic programme to gather current data on the River Don catchment and its fish stocks, with the purpose of providing scientifically robust information leading to a better understanding of the fish and fishery and on which management and the prioritisation of resources can be based.

It has been produced by the River Don Trust (RDT) with the support of the Don District Salmon Fishery Board (Don DSFB). The RDT is a charity newly established to provide scientific research and advice for the management of the fishery and who will carry out the bulk of the surveying requirements of this plan. The Don DSFB is the statutory authority established under the Salmon Acts of the 1860s and tasked with the protection and management of the salmon (and sea trout) fisheries.

## *Rationale behind the plan*

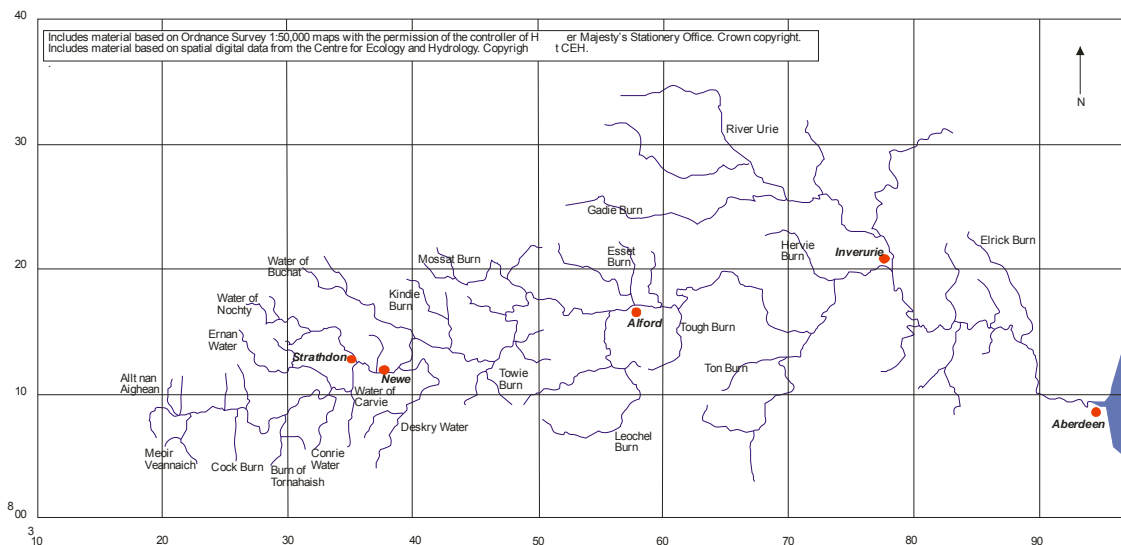
To this stage information on the condition of the Don fishery has been gathered piecemeal to address specific management problems, but contemporary data for the whole of the catchment is lacking. Consequently, this management plan sets out to address this through a comprehensive survey programme, in order that future management decisions are fully informed.

## 1.1 AIMS AND OBJECTIVES

### *Scope of the Don FMP*

The Don FMP covers the whole of the River Don catchment from its headwaters in the Cairngorms National Park between Glen Avon and Cock Bridge, to its mouth at the Bridge of Don, and including its tributaries (Figure 1.1).

Figure 1.1 The River Don and Principal Tributaries.



Salmon, sea trout and brown trout create commercial fisheries on the catchment. Primarily these are in freshwater but there remains a small coastal netting fishery for salmon and sea trout. In addition non-commercial coarse fish species and species of conservation importance such as eel and lamprey are also present. An inventory of current knowledge has previously been prepared for the Don fishery and provides more detailed background to the catchment than is presented here (DDCT, 2008). It identified a lack of comprehensive information for all fish species on the Don: this Don FMP seeks to address this with the aim of ensuring the native fish populations and their habitats are conserved and, where possible, improved.

#### *Objectives of the Don FMP*

This FMP sets out a survey programme to systematically collect data on all fish species to establish the current status of fish populations and their habitats, determining:

- Biodiversity: which fish species are currently present on the catchment
- Their distributions across the catchment
- The numbers in which they are present
- The population structure:  
are there bottlenecks during production reducing the number of adult fish available?, are there sub-species using different parts of the catchment?
- The factors which are impacting upon the fish and fisheries
- Measures which can be taken to redress these impacts.

As a consequence of the survey programme management decisions will be taken based upon current information and restoration measures prioritised according to urgency and benefit.

#### *Duration*

This initial FMP will have a duration of three years, from January 2009, during which the majority of new work on the catchment will focus on data collection and any urgent improvement works which come to light.

The FMP will then be revised on the basis of these findings. This will include prioritising the management actions identified in balance with their potential benefit to the fish or fishery, the financial cost of the works and their feasibility. The precautionary approach will be applied before investigating any potential to further develop the fishery. The revised Don Fishery Management Plan will incorporate the proposed improvements and establish future monitoring programmes to assess their success covering the period from 2012 to the end of 2014.

#### *Other plans*

The Scottish Environment Protection Agency (SEPA) is in the process of producing the River Basin Management Plan for carrying out the requirements of the Water Framework Directive for Scotland (with the exception of the Solway and Tweed areas). Within this the North-East Area Management Plan will be of relevance to the Don catchment and will be considered when carrying out this Fisheries Management Plan.

## **2 THE DON CATCHMENT**

### **2.1 Fisheries Management Infrastructure**

The Don District Salmon Fishery Board is the statutory authority established under the Salmon Acts of the 1860s and tasked with the protection and management of salmon (and sea trout) fisheries within its district. Members of the Don Board are elected and co-opted in line with the relevant legislation ([www.riverdon.org.uk](http://www.riverdon.org.uk)). Three members of staff are employed: a river superintendent, a deputy superintendent and a senior bailiff.

The River Don Trust is newly constituted with aims to provide research and information to conserve and enhance all species of freshwater fish in the River Don. There are six elected trustees of anglers, proprietors and angling association members, and employed staff are to be appointed to carry out the research laid out in this plan.

The River Don Brown Trout Improvement Association (RDBTIA) was formed following the establishment in 1990 of the freshwater fish Protection Order covering most of the Don mainstem and the lower part of the River Urie. The RDBTIA reports to the Scottish Government on behalf of the river owners the level of permit sales and access to the river.

### **2.2 Geology and Hydrology**

The bedrock of the Don catchment is dominated by granite and quartz-based acidic rock types which are weathering-resistant. Consequently they introduce low levels of nutrients into the river and offer little buffering capacity against acidic rainfall.

Some localised areas of the catchment are naturally more nutrient-rich. Basic rock types such as the gabbro and allied types underlying the Urie and around Strathdon are important for introducing nutrients to the water, as are areas of Old Red Sandstone around Kildrummy and the limestone and hornblende-schists upstream of Strathdon.

River flows in the mountainous upper Don are rapid to rise and fall in response to rainfall, although snow melt in the spring has become less influential recently. The lower gradient lands around Alford slow the flow and result in a meandering course around Kintore and Hatton of Fintray. Two main points of abstraction are present on the river; the two paper mills at Inverurie (NJ 78150 19400) and at Stonewood (NJ 89800 10950) both of which are recognised pressures identified under the Water Framework Directive (SEPA, 2005).

River flows across the catchment reach their lowest levels in the summer months of July and August. Overall, the mean monthly flow at Parkhill, the SEPA gauging station furthest downstream and approximately 10.5 km from the tidal limit, is 20.54 m<sup>3</sup>/s and the 95% exceedance flow is 5.3 m<sup>3</sup>/s (Data from D. Fraser, SEPA, and National River Flow Archive [www.nwl.ac.uk/ih/nrfa](http://www.nwl.ac.uk/ih/nrfa)).

### **2.3 Topography**

The mainstem of the River Don extends for approximately 135 km, making it the sixth longest river in Scotland. The catchment has two distinct topographical areas: the mountainous west end and the relatively flat floodplains and farmland between Kildrummy and the coast.

The western tributaries arise in the mountains of the Cairngorms National Park and the Ladder Hills. The highest headwater, the Meoir Veannaich on Brown Cow Hill, has an elevation of 810m, whilst other tributaries begin above 600m. In general, steep gradients are found in the reaches above 400m elevation.

Downstream of Strathdon the topography changes and more of the surrounding land is low gradient agricultural land: 67.1% of the catchment lies between 0 and 300m above sea level. To the east of Kildrummy the land is predominantly below 150m elevation.

The gradient increases for the final 8 km or so which historically resulted in the Don's use as a power source for numerous fabric and paper mills. The coastal area of the River Don consists of sandy beaches and dunes.

### **2.4 Climate**

The climate of the Don catchment is greatly influenced by the presence of the Cairngorm Mountains and Ladder Hills so that the west of the catchment received 1100-1200 mm of rainfall per year whilst that to the east of Alford received around 800 mm per year ([www.nwl.ac.uk/ih/nrfa/spatialinfo/Index/indexNorthScotland.html](http://www.nwl.ac.uk/ih/nrfa/spatialinfo/Index/indexNorthScotland.html)).

Rainfall was measurable ( $\geq 1$ mm) for 137 days per year at Craibstone College (grid reference NJ 875 107) on the lower Don but colder air temperatures resulted in snowfall in the Cairngorms on average 100 days per year. Thus snowmelt can contribute to river flow when temperatures at altitude become milder. ([www.metoffice.co.uk](http://www.metoffice.co.uk)).

### **2.5 Water Quality**

The water quality of the Don catchment is subject to a range of diffuse and point source pollution pressures. The catchment downstream of Kildrummy (NJ 470 165) lies within the North East Nitrate Vulnerable Zone designated under the Nitrates Directive (91/676/EEC) and the Lower Don is designated a Nutrient Sensitive Area (Eutrophication) under the Urban Wastewater Treatment Directive (91/271/EEC). Whilst the water quality of the vast majority of the catchment has been classified as A2 (Good) or A1 (Excellent) under the water quality classification previously employed by SEPA (SEPA National Water Quality Classification Report 2006), parts of the catchment are failing to meet the standards now required through the Water Framework Directive (WFD).

Parts of the Don catchment are classified as being "at risk" of failing to achieve good ecological status under the WFD. Diffuse inputs of agricultural nutrients are of concern

with the Leochel and Esset Burns around Alford, the Burn Hervie, the Urie and Lochter Burn, the Don downstream of Inverurie and the Tuach and the Blackburn (SEPA, 2005). The cumulative effects of this diffuse pollution have resulted in ammonium and nitrite levels failing the guideline standards for salmonid waters (SEPA, 2007a-f). In addition point source pollution inputs, primarily from sewage treatment works and paper manufacturing operations, have contributed to a phosphorus level in the river currently exceeding the WFD's good status environmental standard. This is manifest in the Lower Don but is the cumulative effect of treatment plants from Alford and downstream on the Don and from Inch and downstream on the Urie.

## 2.6 Land Use

In the mountainous west land use on the Don catchment is dominated by moorland grazing for deer and sheep and includes the Ladder Hills SAC, a Special Area of Conservation for blanket bog habitat around the headwaters of the Ernan Water and Water of Nochtly ([www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030179](http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030179)). Grazing quality improves to grassland in the lower levels of the tributaries and along the valley around the mainstem of the Don. Settlements in this area are small and sparse. Coniferous plantations generally follow the lower slopes of the upper Don but are larger around Strathdon and on areas of higher ground further downstream. Woodlands in the lower catchment are mainly small, mixed woodlands: Paradise and Tilliefoure Woods are designated Sites of Special Scientific Interest as upland oak woods.

Agriculture dominates the land use downstream of Strathdon and Kildrummy. The largest settlements are present in the east and the lower Don is under increased pressure from urban development which includes Aberdeen Airport and seven sewage treatment works.

Table 2.1 Land use within the Don and Urie catchment.

Land Use	Coverage (%)
Arable and Horticultural	29.4
Grassland	28.9
Mountain, Heath and Bog	23.4
Woodland	15.8
Built-up areas	1.2
Inland Waters	0.1

(CEH Monks Wood's Land Cover Map 2000 survey:  
[www.nwl.ac.uk/ih/nrfa/spatialinfo/Index/indexNorthScotland.html](http://www.nwl.ac.uk/ih/nrfa/spatialinfo/Index/indexNorthScotland.html)).

Adjacent to the Don catchment, but not flowing into it, are a series of three lochs, Corby, Lily and Bishop's Lochs, which are designated as SSSIs for their non-breeding colonies of greylag geese and for the mesotrophic status of the lochs.

Historical land use pressures on the catchment have included a variety of industries at the start of the twentieth century whose pollution, abstraction and obstruction greatly affected

the salmon fishing on the river (Calderwood, 1909; DDCT, 2008 and references therein). In the last thirty years cumulative pollution from a number of sources caused the condition “Pigmented salmon syndrome”, resulting in the death of large numbers of salmon over the winter of 1981/1982. Once the cause was established appropriate control measures were applied and no further cases have been reported since 1988 (DDCT, 2008 and references therein).

### **3. DESCRIPTION OF FISH SPECIES AND FISHERIES**

#### **3.1 THE DON'S FISH STOCKS**

Data for the distribution and population status for all of the fish species recorded on the River Don is limited, being either incomplete or out of date; hence it is necessary for this fisheries management plan to set up a systematic programme of surveys to gather data for all species. What is known is summarised below and is presented in more detail in the previous inventory of the catchment (DDCT, 2008).

Much of the information on the distribution of salmonid species is drawn from the work of the Don District Salmon Fishery Board, which is mainly restricted to areas where stocking occurs, and from the PhD study carried out by Shields (1996). Most information about the distributions of other fish species is derived from the National Biodiversity Network ([www.searchnbn.net](http://www.searchnbn.net)) and the Database and Atlas of Freshwater Fishes (DAFF), the most recent information being from 2002. This data is external to the RDT and the DDSFB and the purposes for which it was collected, the methods by which it was collected and any other information other than the presence of the fish species is unknown.

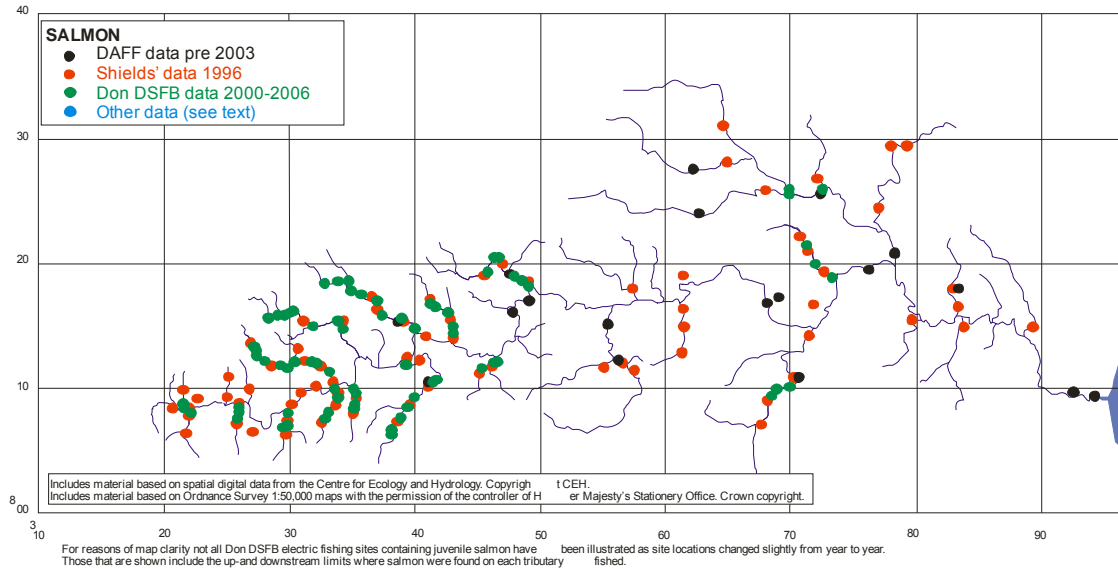
##### **3.1.1 Atlantic Salmon *Salmo salar***

The distribution of Atlantic salmon is believed to extend to all parts of the catchment accessible to adult salmon; inaccessible parts include the high gradient upper reaches of the western tributaries and areas upstream of dams on the Allt Veannaich (NJ 21846 08195) and the Elrick burn (NJ 89465 15430). Man-made obstacles to salmon migration are also present on the Esset burn (weir at NJ 54763 17950) and Leochel Burn (weir at NJ 55218 15890).

The salmon run is structured into multi-sea winter (MSW) and one-sea winter (grilse) components. Spring-running and autumn-running MSW are present within the rod catch. Similar to other Scottish rivers the current run is dominated by late-running salmon and grilse (Summers, 1990; 1995). Early-running salmon are believed to spawn in the upper catchment. There are no fish counters present on the Don and so no information, other than catch numbers, is available on the numbers of adult fish entering the river.

The detailed juvenile surveys of Shields in the early 1990s found salmon fry and 1+ parr densities to be greatest in the upper catchment, with both the mainstem and tributaries being used as nursery grounds (Shields, 1996).

Figure 3.1.1 Distribution of Atlantic Salmon

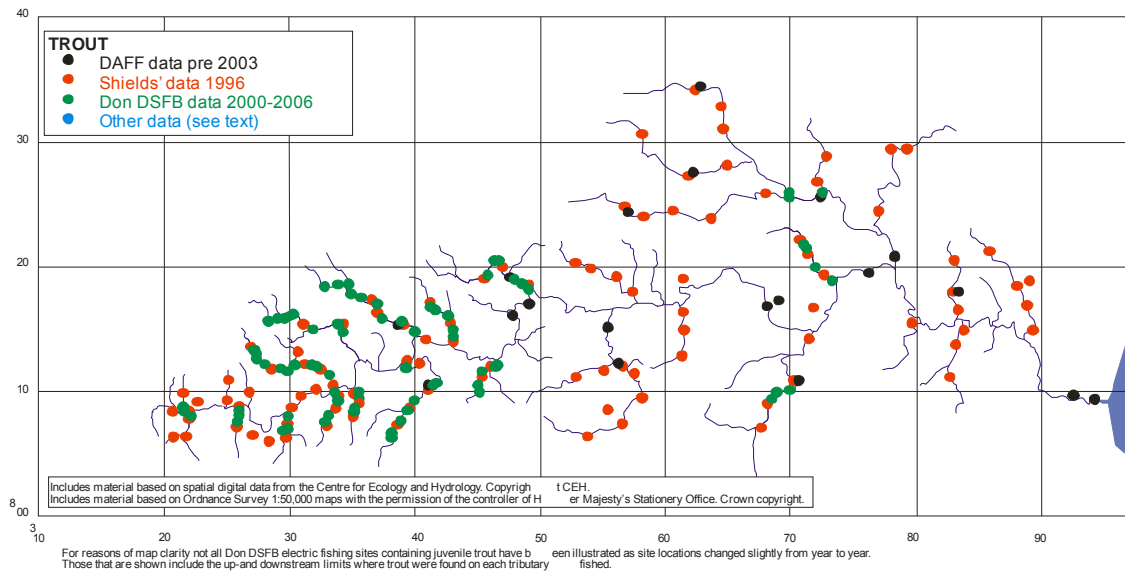


### 3.1.2 Brown and Sea Trout *Salmo trutta trutta* and *Salmo trutta fario*

Migratory sea trout and non-migratory brown trout are members of the same species which have adopted different life styles; brown trout remain resident in freshwater throughout their life whilst sea trout migrate to sea after two or more years in the river, returning to freshwater to spawn. Both are present in the Don.

The distribution of trout extends to all parts of the catchment accessible to adult fish; resident trout populations have been found upstream of the obstacles mentioned above although access for sea trout, like salmon, is obstructed. The detailed juvenile surveys of Shields found trout fry and/or 1+ parr at all 103 study sites spread throughout the catchment, with the greatest densities in the tributary sites (Shields, 1996).

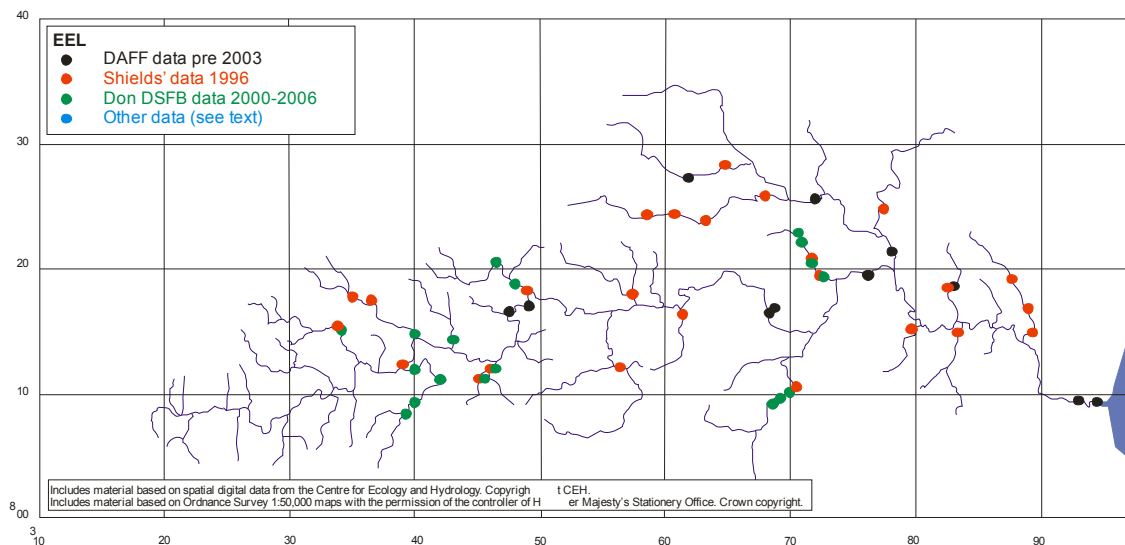
Figure 3.1.2 Distribution of Trout



### 3.1.3 European eel *Anguilla Anguilla*

The distribution of eels is believed to extend to all suitable areas of the catchment. The surveys of the Don DSFB have not always recorded their presence but eels have been observed widely throughout the catchment (J. Kerr, pers. comm.). Shields (1996) recorded their presence on all of the principal burns downstream of the Water of Nocty, except for the Kindie Burn. No additional information is known about their biological characteristics or numbers.

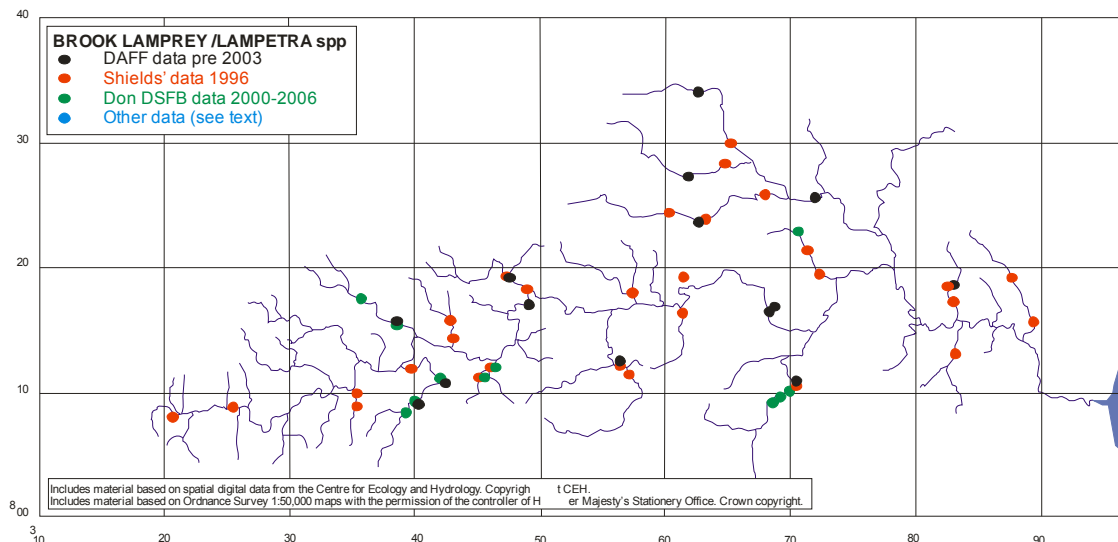
Figure 3.1.3 Distribution of Eel



### 3.1.4 Lamprey species

The adult sea lamprey *Petromyzon marinus* is occasionally noted in the lowest reaches of the Don, within 10km of the sea, possibly restricted from further movement upstream by the remains of weirs in the river. *Lampetra* species recordings have been more widespread but the species has only been positively noted as river lamprey (*Lampetra fluviatilis*) once in the late 1960s or early 1970s in the River Urie around Inverurie (DAFF record). In all other cases the species were either identified as brook lamprey (*Lampetra planeri*) or not identified beyond being *Lampetra*. Their presence, but no further information, has been recorded on the Fèith Bhàit at the head of the catchment and many of the tributaries as far as the Elrick Burn (Shields, 1996). The National Survey of Lampreys did not carry out any field work on the River Don and it was noted that new and reliable information is required as the Don contains much suitable habitat (ERA, 2004).

Figure 3.1.4 Distribution of Brook Lamprey



### 3.1.5 Other Fish Species

The presence of the following fish species has been recorded in the Don catchment. The limited information is presented in the previous catchment inventory (DDCT, 2008).

<i>Gasterosteus aculeatus</i>	Three-spined stickleback
<i>Platichthys flesus</i>	Flounder
<i>Esox lucius</i>	Pike
<i>Gobio gobio</i>	Gudgeon
<i>Perca fluviatilis</i>	Perch
<i>Phoxinus phoxinus</i>	Minnnow
<i>Alosa</i>	Shad species
<i>Barbatula barbatula</i>	Stoneloach
<i>Onchorhynchus mykiss</i>	Rainbow trout
<i>Rutilus rutilus</i>	Roach

## 3.2 THE DON'S FISHERIES

### 3.2.1 Salmon Fishery

The salmon fishery on the Don consists of both a coastal net fishery and an inland rod and line fishery. In common with other Scottish rivers, total catches of MSW salmon from both fisheries have declined sharply since 1952 when the reporting of catches became compulsory (Fig. 3.2.1). Spring salmon numbers fell sharply at the beginning of this period, whilst later-running MSW catches have declined more slowly. Total grilse catches peaked in the early 1970s but have since declined. In part the decline is a reflection of the decreased netting effort: the in-river net and coble fishery at the Cruives of Don closed in the 1960s and now only four fixed engine stations remain, operating along the coast to the north of the estuary at Berryhill, Tarbet Hill, Blackdog and Mennie. In the 1950s the nets accounted for 90% of the total salmon catch, by 1990 this had fallen to around 30% and is currently less than 10%. In addition the Autumn run of fish appears to be becoming later and may therefore be less likely to be intercepted during the fishing season.

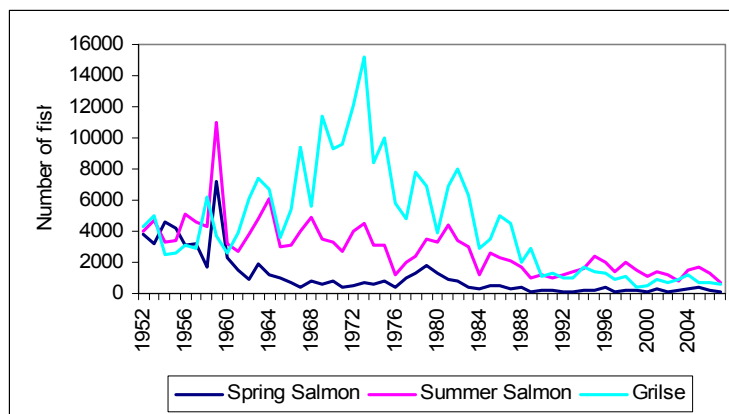


Figure 3.2.1 Numbers of salmon caught by all methods in the River Don District. Data from FRS Montrose: Fisheries statistics collated for the Statistical Bulletin.

Angling catches have shown more varied trends amongst components of the salmon run. Spring salmon catches have declined over the period whereas summer salmon and grilse rod catches have shown an increasing trend over the last thirty years (Fig. 3.2.2). Since 1994 records have included those fish returned to the water: in 2007 these represented 79%, 70% and 58% respectively of the spring salmon, summer salmon and grilse catches reported. The five-year average catches (retained and released) for 2003-2007 are 221 spring salmon, 1280 summer salmon and 654 grilse.

There are no fish counters present on the river and so the total run of salmon is unknown. Consequently the proportion of the run being caught, or the exploitation rate, is unknown. A voluntary Conservation Code has been promoted on the Don since 2002 encouraging catch and release and setting a seasonal limit on the number of salmon and sea trout which can be retained per angler ([www.riverdon.org.uk](http://www.riverdon.org.uk)).

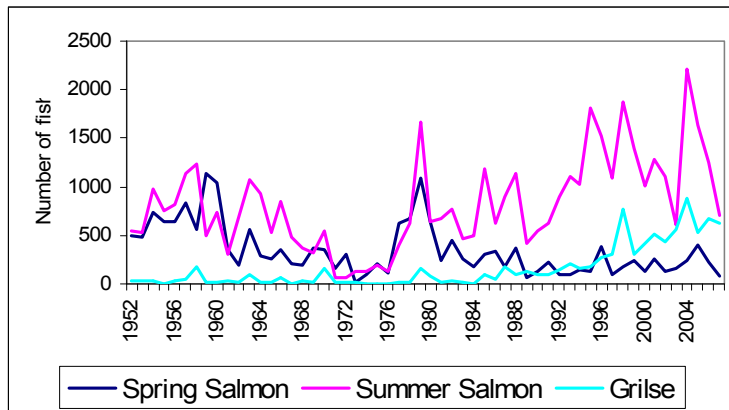


Figure 3.2.2 Numbers of salmon caught by rod and line (retained and released) in the River Don District.

Data from FRS Montrose: Fisheries statistics collated for the Statistical Bulletin.

### 3.2.2 Sea Trout Fishery

The numbers of sea trout caught fluctuate greatly from year to year. The overall trend in all method catches has been downward, in part due to the reduction in netting (Figure 3.2.3). Sea trout (and finnock) catches by rod and line accounted for 98.5% of the total catch in 2007. Of these 70% of the sea trout (207 fish) and 91% of the finnock (32 fish) were returned (Data from FRS Montrose: Fisheries statistics collated for the Statistical Bulletin). As mentioned above sea trout form part of the Don's Conservation Code. The five-year average catches (retained and released) are 587 sea trout and 312 finnock\* (\*data only collected since 2004).

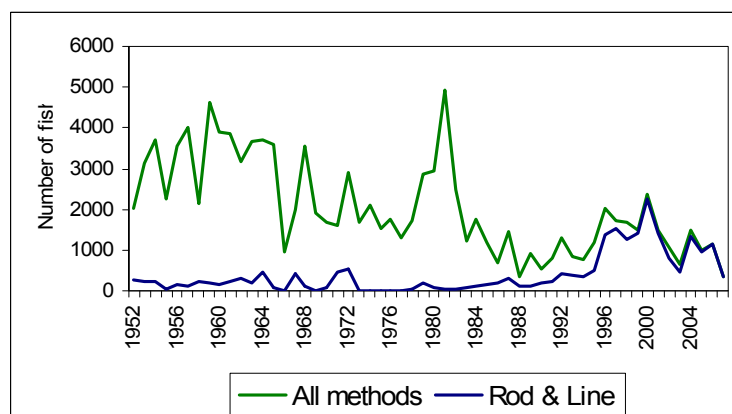


Figure 3.2.3 Numbers of sea trout caught in the River Don District.

Data from FRS Montrose: Fisheries statistics collated for the Statistical Bulletin.

### 3.2.3 Brown Trout Fishery

The River Don is well-known for the quality of its brown trout. There is no legal requirement to report brown trout catch returns and so they are not collated centrally and remain with individual proprietors. The numbers of brown trout caught on the Aberdeen and District Angling Association's waters in the lower river are available from 1985 (Figure 3.2.4). This limited amount of information shows that the numbers caught fluctuate from year to year, but overall catches show a slight upward trend. Since 1996 the figures have included the proportion of fish which are returned to the water; between 1997 and 2006 this averaged 71%.

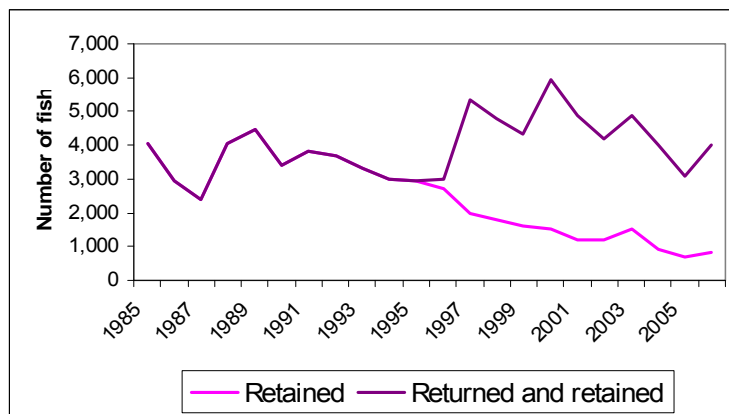


Figure 3.2.4 Numbers of brown trout caught by rod and line in the ADAA's waters.

The Protection Order has made it easier for anglers to access brown trout fishing but information from Aberdeenshire Council, which has fishings at Inverurie, Kintore and Alford, suggests that at best only around 60% of anglers purchasing day permits, including those fishing for salmon and sea trout, submit catch returns. This may in part be a failure to report blank days but illustrates that for some fishings information is incomplete. Brown trout catches have only been recorded by the Council since 2006 (J. Stevenson, pers. comm.). Consequently, whilst the general impression amongst anglers is that brown trout fishing on the Don appears to be doing well, detailed data collection and analysis is required to assess if this is true.

### 3.2.4 Stocked Trout Fisheries

Commercial loch fisheries, principally specialising in rainbow trout have been developed in the Don Board's area since the early 1990s. These include Corby Loch, to the north of Bridge of Don, which drains via the Burn of Mundurno to the sea and where rainbow trout are believed to have successfully spawned (Walker, 2003). For further details see the previous inventory (DDCT, 2008).

### **3.2.5 Coarse Species Fisheries**

Recognised fisheries for coarse fish species have not been established on the River Don and any records remain the property of the individual anglers. Private ponds where coarse fish are present may be more regulated, but again the information is not widely available. A concerted effort to collect data on the fish species and their abundance would be required before it could be established if there is potential for any sustainable coarse species fishery on the Don, which would be regulated under the Protection Order, or whether it remains on a casual, *ad hoc*, low level.

## **3.3 STOCK ENHANCEMENT**

Stocking of salmonids has been carried out by the Don DSFB since the late 1950s, initially to help overcome the depletion of stocks caused by pollution problems in the lower river. From 2006 the stocking activity has been reduced from 750,000 to 300,000 salmon eggs, and approximately 100,000 trout eggs. All were derived from broodstock migrating to the upper catchment in late October or November and collected at the Newe Weir (NJ 370 120). In the past the resulting progeny have been stocked out mainly as fry but also some as parr. Since 2006 all salmon progeny have been transplanted into artificial redds as eyed ova and trout were transferred as unfed fry in early spring. This is in order to reduce the extent of hatchery imprinting and use conditions that are as natural as possible. The locations for stocking out the eggs and fry are determined by the redd counts and electric fishing from the previous year. Areas which have been naturally underused, both on the mainstem and the upper river tributaries, are stocked. Due to the early stages stocked out it has not been possible to tag or mark the fish to determine their survival to adulthood or their contribution to the rod catch.

The hatchery at Newe follows closely the regulations of the Fish Health Inspectorate and is subject to regular checks by SEPA and Fisheries Research Services. Stringent records on fish movements and mortality rates are maintained and the use of chemical treatments is avoided through good practice.

Since the 1980s a small number of fish have been introduced yearly into the Don originating from outside of the catchment. The Aberdeen and District Angling Association stocks its waters in the lower river annually with around a thousand brown trout of approximately 1 lb, currently sourced from Howietown Fishery at Stirling. Since 1993 these have made up between 30 and 46% of the brown trout catches reported to the Association, as identified from pan jet marks, and averaging 36% (J. Pirie, pers. comm.).

### 3.4 PREDATORS AND COMPETING SPECIES

Fish-predating species on the Don include mammals, birds and fish. Common seals, *Phoca vitulina*, are known to use the Don estuary as a haul-out, also taking some large salmonids, but fewer than the rods (Carter *et al.*, 2001). Individual seals have been culled by the coastal netmen when they have been a problem. Cormorants, *Phalacrocorax carbo*, are present on the lower river from the autumn through to the late spring.

Predation by coarse fish species, such as pike and perch, may have a localised impact as they are not spread throughout the catchment, but more information is required on their numbers and diet to quantify this.

The presence of the American mink (*Mustela vison*), the Goosander (*Mergus merganser* a saw-billed duck), and the Grey Heron (*Ardea cinerea*) is more widespread through the catchment and so all areas are likely to be predated. Although their impact on the juvenile population has not been quantified, all typically predate on parr-sized fish and salmonid species are likely to be most affected as they are the most numerous. Predator control is not carried out by the Don DSFB although individual proprietors may carry out some mink trapping.

## **4. MANAGEMENT PRIORITIES**

In order to achieve the aim of understanding and managing the different components of the Don and its fisheries the management priorities of this plan are aligned to a number of milestones. These can be summarised as follows:

### **Milestone I**

Employ a suitably qualified Biologist to conduct the surveys described later in this document. This should occur early in 2009.

### **Milestone II**

For the first three years undertake a thorough knowledge-gathering exercise so that the fish populations and the factors which influence them can be understood.

### **Milestone III**

At the end of 2011 review the survey data gathered to understand the factors affecting the fish populations and prioritise remedies against the detrimental impacts.

### **Milestone IV**

Commence restoration of the catchment from 2012 onwards and continue to refine knowledge of the catchment through continued research.

### **Milestone V**

Review success of initial restoration schemes in 2014 and prioritise works for the next six year period.

#### **4.1 Milestone I**

The employment of a Biologist will bring the necessary skills to obtain high quality survey information on the Don and the factors affecting the fish. Although this person will be a RDT employee they will need to work closely with DDSFB personnel so that the combined resources of the two organisations can be deployed efficiently. This will require good man-management and co-operation between the two organisations.

For the purposes of this Plan it is scheduled that the Biologist will be employed in early 2009: a delay will require that the timetables given later in this document are pushed back accordingly.

## 4.2 Milestone II

The second milestone is to start to gain an understanding of the fish within the Don by establishing a comprehensive, structured survey plan.

The principles guiding the survey plan are:

- To establish what species are currently present
- To establish where they are found and in what numbers
- To find out what factors are impacting on the fish populations
- To establish what practical measures can be taken to improve them.

Whilst only a limited amount of information can be gained in a three-year period it should be sufficient to start to prioritise restoration work programmes in an objective and costed manner, and to guide future research. The first three years of the survey programme are detailed in the following sections.

### 4.2.1 Habitat Survey

#### *Survey purpose*

A comprehensive habitat survey is an important first step to understanding the Don catchment and its problems. Mapping the location, quality and suitability of the habitat for juvenile fish production and then comparing it with the actual usage, from redd counts and electric fishing surveys, will highlight good areas being under-utilised as well as areas where poor quality habitat is restricting fish production. Data collected in the habitat survey will feed into many of the other avenues of investigation on the catchment and so its completion should be the priority of the first year's survey work.

It can be expected from the analysis of diffuse pollution already carried out for the Water Framework Directive (SEPA, 2005) that there are likely to be watercourses which would benefit from measures to reduce the impact of agricultural pressures. By carrying out a catchment-wide habitat survey the options for habitat improvements, for example improving adult access or reducing instream siltation, can be prioritised to where they will be of most benefit.

#### *Survey method*

Initial efforts will be directed at habitat suitability for salmonids, as they form the main Don fisheries. Habitat features significant to other species can be noted at the same time, for example suitable nursery areas for lamprey or gravel areas where freshwater pearl mussels are present, and targeted for specific study projects at a later date.

From the 1:50,000 scale Ordnance Survey map there are over 1010 km of mainstem and tributary waters of the Don catchment which may potentially hold salmonid fish. To cover these efficiently the walkover survey method of Hendry and Cragg-Hine (1997) described in the SFCC's Habitat Surveys Training Manual (2007) should be used. This is targeted towards salmonids and provides a means of recording on a map the location of

instream habitat types suitable for different ages of fish and features of significance about the surrounding riparian zone, for example the condition of the banks, presence of pollution sources and obstructions to migration.

At a survey rate of 8km per day it is estimated that one surveyor will require 7 months to complete the survey, with additional time to write up the data and in the event of weather delays. However, if the Board's staff could also be used to carry out the survey the catchment could be covered more efficiently and, with two teams of two surveyors able to cover around 16 km a day each, the time for completion of the field work would be reduced to 2 months, suggested to be May and June. Within the team of two the surveyors cover the river in a leapfrog manner surveying alternate stretches and moving the vehicle forward to a prearranged site each time a stretch is completed, thereby, whenever road access allows, avoiding the need to double back at the end of the day to return to the vehicle.

In addition to covering the ground most efficiently, this team coverage can also be used to record suitable locations for the later electric fishing survey and record information pertinent to the Health and Safety risk assessment such as mobile phone reception. Completing the survey within one season allows the current situation across the catchment to be assessed and ensures areas are prioritised correctly. It has the advantage that plant species can be considered, including invasive species such as *Ranunculus*, Giant Hogweed and Japanese Knotweed which the Don DSFB is developing a control programme for, and assessed in the same growing season. Although Board staff will be required they will remain a visible presence on the river and can concentrate on surveying the mainstem in June when plant species should be growing.

If all of the Board staff are not available then use can be made of the seasonal staff that it will be necessary to employ to help with electric fishing surveys plus one bailiff on a rotational basis, leaving two bailiffs for protection duties. Whilst efficient and feasible this will result in skills and knowledge leaving the area when the two seasonal staff depart at the end of their contract. The employment would be likely to cover June and July for the habitat survey and August and September for electric fishing.

In the event that the habitat survey can not be completed in a single year the catchment electric fishing survey should be postponed until it is and electric fishing carried out in the first year should be restricted to the collection of some of the genetic samples and if possible the obstruction impact assessments.

The data produced will be analysed by the Biologist and can be incorporated into a Geographical Information System (GIS) to aid interpretation with other data sources across the catchment.

Data gathered as part of the Don Board's earlier habitat survey to locate areas for improvement in the upper catchment can be compared with current data to determine if areas have deteriorated.

*Outcomes of Habitat Survey*

<b>Habitat data collected</b>	<b>Data uses</b>
Location, extent and quality of salmonid spawning grounds	<ul style="list-style-type: none"> <li>• Estimate potential production</li> <li>• GIS mapping</li> <li>• Interpretation of redd count data</li> <li>• Interpretation of juvenile electric fishing data</li> <li>• Determine likely location of distinct breeding populations and location of sampling sites for genetic analysis</li> <li>• Determine scope for gravel cleaning e.g. as a result of instream vegetation and siltation</li> <li>• Determine scope for stocking</li> </ul>
Location, extent and quality of salmonid nursery grounds	<ul style="list-style-type: none"> <li>• Estimate potential juvenile production</li> <li>• GIS mapping</li> <li>• Interpretation of juvenile electric fishing data</li> <li>• Determine scope for stocking</li> </ul>
Locate areas of habitat suitable for species with distinct requirements	<ul style="list-style-type: none"> <li>• Locate potential Lamprey habitat</li> <li>• Identify areas sensitive to development e.g. pearl mussel beds</li> </ul>
Presence of obstructions	<ul style="list-style-type: none"> <li>• Potential migratory access problems</li> <li>• Effect on fish numbers upstream?</li> <li>• Potential for opening up new nursery grounds</li> </ul>
Presence of pollution sources	<ul style="list-style-type: none"> <li>• Effect on fish numbers</li> <li>• Potential for improvement works</li> </ul>
Presence of degraded instream habitat e.g. dredged burns for agricultural drainage	<ul style="list-style-type: none"> <li>• Effect on fish numbers</li> <li>• Potential for improvement works</li> </ul>
Presence of degraded riparian habitat e.g. livestock-poached banks	<ul style="list-style-type: none"> <li>• Effect on fish numbers</li> <li>• Potential for improvement works</li> </ul>
Presence of invasive plant species	<ul style="list-style-type: none"> <li>• Effect on fish numbers</li> <li>• Effect on angler access to fishery</li> <li>• Mapping extent of Giant Hogweed, Japanese Knotweed, <i>Ranunculus</i> on catchment</li> <li>• Potential for control measures</li> </ul>

### *Lead Bodies*

Scientific research is a core role for the River Don Trust and so the RDT will be leading the habitat surveys. As discussed there is merit in also training Don DSFB staff in the method so that efficient use of resources can be made.

### *Future Work*

Areas of the catchment identified for improvement works, whether instream works, such as rubble mat addition, or riparian works, such as fencing and buffer strip creation or tree planting, can be prioritised when the habitat survey has been considered in conjunction with electric fishing and other data. This should be based on factors such as those considered in the River Dee Trust's 2008 report "Prioritisation of Habitat Restoration based upon the 1999 River Dee Habitat Survey and Subsequent Updates":

- Feasibility of the restoration work
- Severity of the impact
- Potential increase in fish production following restoration
- Impact on vulnerable components of the fish stock e.g. spring salmon
- Cost of implementing restoration work.

Once work has been prioritised detailed surveys of the tributaries in question can be carried out to produce project plans fully costed to the type of improvements required. Application can then be made to the Scottish Rural Development Programme for assistance and consultation with the local landowners to ensure their needs are met. Future revisions of the Fishery Management Plan for the river will encompass these plans and the subsequent monitoring to quantify their success.

## **4.2.2 Electric Fishing Surveys**

### *Survey Purpose*

Widespread electric fishing is required to establish baseline data as to which species are currently present, their abundance and extent across the Don catchment. Due to the importance of the salmonid fisheries on the Don, electric fishing will primarily be aimed at these species. Other fish species encountered shall be recorded in full detail in order that future investigations can be targeted, perhaps using additional methods. Targeted data collection on species of conservation importance, such as eels or lampreys may be possible through collaborations with SNH.

### *Survey Method*

Electric fishing on the Don catchment will be carried out in accordance with the training and methods of the Scottish Fisheries Co-ordination Centre (SFCC).

The Time Delineated Method will be used in order that:

- The whole of the catchment can be surveyed, including wadeable areas of wide mainstem waters
- Overall trends in relative fish abundance, rather than exact fish numbers, can be determined

This will allow the greatest amount of information to be gathered from across the entire catchment in the limited survey season.

The habitat survey will provide more detail on how many minor burns are of a size worth electric fishing, areas of the mainstem Don and Urie which are unwadeable and should be excluded, and the frequency of sites on the mainstem. Based on the 1:50,000 Ordnance Survey map the following number of sites are estimated:

	<b>Site frequency</b>			
	1 per 2 km on mainstem Don & Urie	1 per 2 km on tributaries	1 per 5 km on mainstem Don & Urie	1 per 2 km on tributaries
	79	193	34	193
<b>Total number of sites</b>	272		227	
<b>Approximate number of survey days</b>	<b>30</b>		<b>25</b>	

N.B. Additional sites are required on four tributaries with obstructions to migration (see section 4.2.5).

To establish robust baseline data the sites should all be revisited in each of the three years of this plan or at least in the second and third years if completion of the habitat survey takes up the first year.

*Outcomes of Electric Fishing Survey*

<b>Electric Fishing Data Collected</b>	<b>Data Uses</b>
Fish species present	<ul style="list-style-type: none"> <li>• Which species are present</li> <li>• Distribution across the catchment</li> <li>• Absence may relate to obstructions or other features in the habitat survey</li> </ul>
Numbers and sizes of fish	<ul style="list-style-type: none"> <li>• Relate to abundance at similar sites</li> <li>• Relate to quality of habitat</li> <li>• Poor numbers may indicate pollution or habitat for improvement</li> <li>• Poor growth may indicate water quality / food resource problems</li> </ul>
Scale sampling	<ul style="list-style-type: none"> <li>• Missing age classes may indicate pollution events, poor spawning years</li> </ul>
Samples for DNA analysis	<ul style="list-style-type: none"> <li>• Fin clip samples from live juvenile salmon to identify distinct sub-populations and management units</li> </ul>
Habitat usage	<ul style="list-style-type: none"> <li>• Highlight areas below carrying capacity – evaluate for improvements / stocking</li> <li>• Identify habitats used by non-salmonid species for more detailed surveys</li> </ul>

### *Lead Bodies*

Electric fishing surveys will form a large part of the field work duties for the RDT staff and will require additional trained survey assistants to be employed for the summer survey season.

### *Future Work*

After a three-year period of gathering baseline data on the fish populations the information gleaned can be used to establish an annual monitoring programme using a smaller, but statistically robust, number of quantitative electric fishing sites which will be able to detect any statistically significant changes in the salmonid fish populations. The SFCC will be able to provide advice on the number of sites required.

## **4.2.3 Redd Counts**

### *Survey Purpose*

The Don DSFB carries out annual redd counts on the upper mainstem Don between Cock Bridge and Ardhuncart and between Alford and Kemnay Bridges (approximately 40km from the sea), and on the major tributaries the Nocht, Deskry, Kindie, Buchat and Leochel burns and the River Urie. The surveys are used to highlight areas where spawning grounds are not being fully used and where there is scope for enhancement stocking.

### *Survey method*

Redd counts are carried out from late November until late January, beginning at the top of the catchment and working downstream, by individual surveyors on the tributaries and by pairs of surveyors each covering half the river width on the mainstem. The number of large characteristic gravel disturbances believed to have been made by salmon in each subsection of the survey stretch is recorded on a single occasion to provide an indication of spawning usage. It should be borne in mind that individual redds may a) not contain any eggs, b) be the result of several females (and males) and that c) individual females (and males) may produce more than one redd: consequently the number of redds is a relative indicator of spawning abundance and not a direct reflection of the number of spawning fish (Youngson *et al.*, 2007).

*Outcomes of Redd Counts*

<b>Redd Count Data Collected</b>	<b>Data Uses</b>
Number of potential salmon spawning redds	<ul style="list-style-type: none"> <li>• GIS mapping</li> <li>• Relate to habitat survey – location of nursery habitat for fry and parr stages</li> <li>• Relate to habitat survey – presence of impacting features e.g. affecting adult access</li> <li>• Relate to electric fishing data on actual juvenile production / survival</li> </ul>
Location of poorly used spawning gravels	<ul style="list-style-type: none"> <li>• GIS mapping</li> <li>• Relate to gravel quality e.g. substrate compaction, over-vegetation, nearby land use</li> <li>• Relate to electric fishing data on actual juvenile production / survival</li> <li>• Evaluate if preferentially used by trout</li> <li>• Evaluate value of stocking or other improvement measures</li> <li>• Combine information with hatchery evaluation and with genetic mapping to determine if different sub-populations of Don salmon are being best managed</li> </ul>

*Lead Bodies*

Counts are carried out by the Don DSFB bailiffs who have training and experience in identifying gravel redds. Collaboration with the RDT will allow the count data, habitat and electric fishing data to be effectively combined.

**4.2.4 Genetic Sampling**

*Survey Purpose*

Genetic research shows that in all but the smallest rivers the run of salmon consists of a number of discrete breeding populations which are reproductively and genetically distinct. Understanding the population structure is essential for effective stock management and will allow the conservation of vulnerable components. Samples taken from live fish can be used to identify different breeding populations of salmon living within the Don catchment and establish, for instance, whether salmon in the mainstem are distinct from those in a particular tributary and should be managed separately.

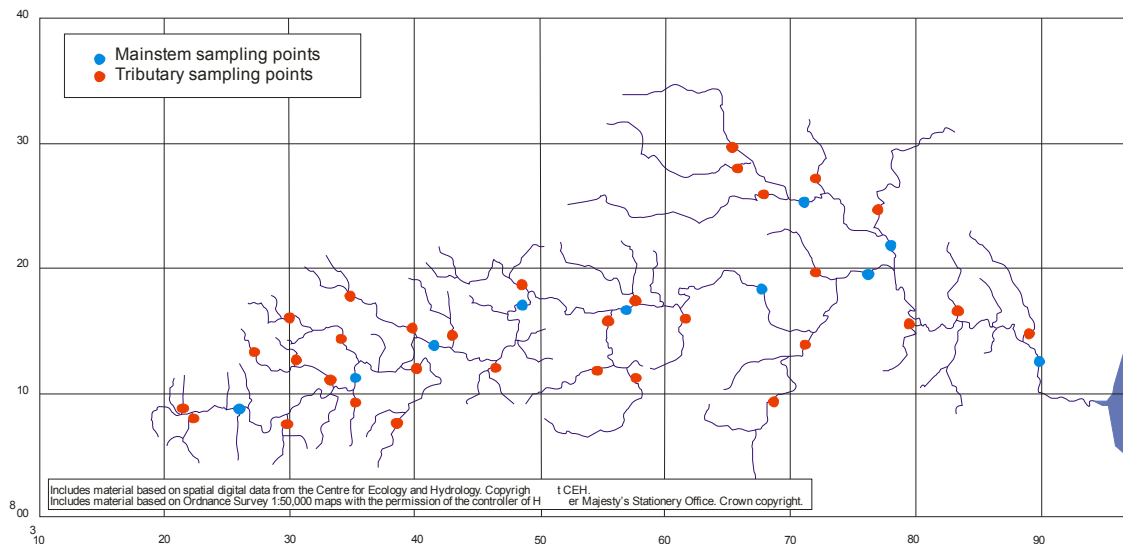
### Survey Method

Fin clips can be removed from live juvenile salmon during the course of routine electric fishing surveys or from adult salmon captured as broodstock, following the guidelines produced co-operatively between RAFTS and FRS.

Data from the habitat survey will help to determine where the spawning grounds are present as discrete stretches on the mainstem and therefore likely to be used by distinct populations of salmon. Distinct populations may also occur on tributaries where there is access to more than a few kilometres of available habitat; branching in a river system often leads to distinct salmon populations. Assuming that this is the case, there may be in the region of twenty five or more separate spawning populations on the Don. Figure 4.2.1 shows a preliminary map of the electric fishing locations for sampling the genetics of juvenile Don salmon. This is likely to need refining following the habitat survey and further developed each year as information from the genetic analysis becomes available.

Sample analysis is to be provided centrally to RAFTS members, including the RDT and is supported with funding from the Scottish Government. However analysis is costly therefore the earliest sites for analysis should include a broad coverage of the catchment and target areas thought to contribute greatest to the overall stock of salmon, i.e. where salmon are abundant. The sampling programme will be ongoing over a number of years and samples can be stored for analysis when funds allow.

Figure 4.2.1 Preliminary Genetic Sampling Locations



### *Outcomes of Genetic Sampling*

<b>Data collected</b>	<b>Data Uses</b>
Genetic characteristics of Don salmon	<ul style="list-style-type: none"><li>• Combine with habitat data to aid identification of distinct breeding populations</li><li>• GIS mapping of distinct breeding populations &amp; management units</li><li>• Combine with habitat data to determine scale at which habitat improvements will be effective</li><li>• Combine with hatchery evaluation to determine best policy for stocking programme e.g. source of broodstock and locations for stocking progeny to prevent mixing different genetic populations</li><li>• Allow restoration targeted towards vulnerable components</li></ul>

#### *Lead Bodies*

The RDT will be the main body carrying out the sampling work associated with juvenile salmon populations through the routine electric fishing surveys. Samples have been taken from two locations on the mainstem, Cock Bridge and Ardhuncart, in 2007 with assistance from the Don DSFB. Genetic samples can also be taken from adult salmon captured at Newe for broodstock. The sampling may provide insight as to whether the broodstock are from disparate populations destined for a number of the tributaries upstream of Newe, or whether, due to their capture late in the season, they are from a tighter group heading for a smaller area of catchment.

#### *Future Work*

The sampling network can be revised in conjunction with the guidance from RAFTS and FRS following completion of the habitat survey. Combining information from the habitat survey and the genetic sampling will help to identify which parts of the river should be considered separately for the management of salmon. Future work may involve identifying separate breeding populations of trout for management purposes.

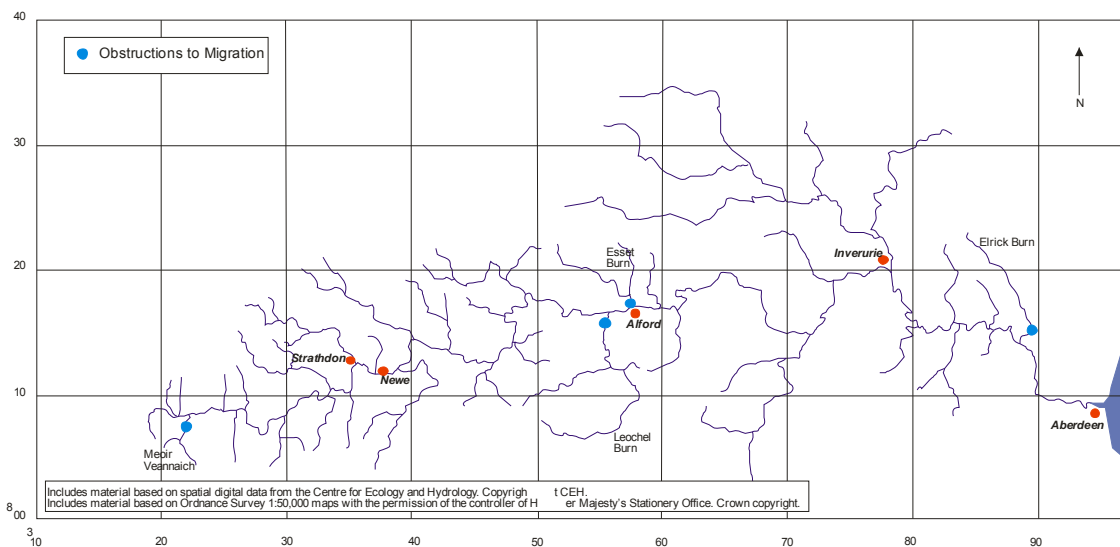
## 4.2.5 Impact of Known Obstructions

### *Survey Purpose*

The remains of a number of weirs and abstraction points from now defunct manufacturing industries are still present on the lower Don, but have been breached and are not thought to greatly delay fish migration. Four man-made obstructions on the catchment have been highlighted which shall be evaluated for the impact they have on fish migration and the potential for improving access. They are:

- Loch dam on the Allt Veannaich (NJ 21851 08190)
- Weir on the Leochel Burn (NJ 55218 15890)
- Mill weir on the Esset Burn (NJ 57463 17950) and
- Weir on the Elrick Burn (NJ 89456 15440).

Figure 4.2.2 Location of Known Obstructions to Fish Migration



### *Survey Method*

The habitat survey of the Don catchment will quantify the amount and quality of potential fish habitat upstream of these obstructions and will identify any other potential obstacles to fish migration on the river.

Timed electric fishing of a large number of sites both up- and downstream of the obstacles will determine whether they are impassable to migratory fish or whether there are certain flow conditions under which access is possible. Thirty timed sites above and below the obstructions would be preferable, but the length of the tributaries involved indicates that this is unlikely to be achieved below the obstructions, in which case as many sites as is practical should be fished below and at least the same number upstream of the obstruction.

### *Outcomes of Obstruction Impact Assessment*

<b>Data Collected</b>	<b>Data Uses</b>
Location, type and severity of obstructions – data from habitat survey	<ul style="list-style-type: none"><li>• Correlate with fish numbers / species upstream</li><li>• Assess potential for removal or improving access</li><li>• Estimate potential increase in fish production with increase in available habitat</li></ul>
Impact on species / populations found upstream – electric fishing data	<ul style="list-style-type: none"><li>• Quantify severity of obstacle</li><li>• Consider effect on any previously isolated populations upstream of obstruction if access is improved</li></ul>

#### *Lead Bodies*

Assessment of the obstacles will be carried out in the course of the habitat and electric fishing surveys by the RDT.

#### *Future Work*

Once the impact of the obstacles has been assessed the potential benefit, in terms of the additional fish production, that would arise from improving fish access can be estimated and weighed against the cost, feasibility and any disadvantages of the works. Application can then be made to funds such as SEPA's River Restoration Fund for financial assistance with the works.

A monitoring programme repeating the detailed electric fishing survey above and below the obstacles will be required following any alterations to assess if they have been successful.

## **4.2.6 Catch Returns and Scale Sampling**

### *Survey Purpose*

Catch returns for salmon and sea trout submitted annually to the Scottish Government are made publicly available in a summarised form covering the whole of the river and divided into catches January to April and May to December (presented in section 3.2.1). More information could be gleaned about the adult fish being caught if the individual fisheries on the River Don were prepared to make the detailed catches in game books available to the RDT for examination or if they provided monthly catch figures and fish weights. This would allow changing trends to be assessed such as in the time of year when fish are being caught and in the average weights, both for the river as a whole and for different sub-catchments of the river.

There is no legal requirement to submit catches of brown trout and other freshwater fish to the Scottish Government. Under the Protection Order the River Don Brown Trout

Improvement Association collates information on the number of fishing permits sold, but assessing the quantity of fish and their sizes would provide useful information for the management of the brown trout fishery and monitoring its performance.

A scale sampling programme will allow information to be gathered on growth rates in freshwater, smolt ages and sizes, confirm whether salmon are grilse or multi-sea winter fish, i.e. how long they have spent at sea, the age at maturity for brown and sea trout and the incidence of repeat spawning.

#### *Survey Method*

As a minimum, the Don DSFB can ask to receive a monthly breakdown of all the catches which have been submitted to the Scottish Government since 1952, which would provide some indication of how the timing of salmon and sea trout runs for the river as a whole has changed over that period.

To allow different parts of the river to be compared permission will need to be sought from proprietors and angling clubs from a number of representative fisheries on the river to access their fishing records. From these sources the numbers of fish of each species caught and their weights can be examined by month for each year and changing trends noted for the whole river and for sub-catchments. It is unlikely that changes in the fishing effort can be fully quantified.

If possible the records of the coastal netting stations should be examined for changes in the time of year salmon and sea trout are entering the river.

Brown trout catch records are likely to be less detailed, particularly as many permits are sold as day tickets and casual anglers may be less inclined to report back at the end of a day's fishing. Following on from the work of Shields (1996), examining the catch records will determine if the numbers of brown trout being caught are continuing to decline, whilst the weight of individual fish is increasing through reduced competition for resources. Reporting through the River Don Brown Trout Improvement Association as a central body should be encouraged to improve the understanding of the brown trout fishery and improve its management.

Scale sample packets and instructions should be distributed through the fisheries so that salmon, sea trout and brown trout samples can be collected. RDT staff should be trained in reading the scales to determine ages and growth rates as mentioned above. Fisheries Research Services can provide such training.

*Outcomes of Catch Return and Scale Analyses*

<b>Data Collected</b>	<b>Data Uses</b>
Species, numbers and weights caught by month	<ul style="list-style-type: none"> <li>• Changes in fish availability to rods / nets (run timing)</li> <li>• Changes in abundance of MSW / grilse</li> <li>• Changes in abundance of sea trout</li> <li>• Changes in abundance of brown trout</li> <li>• Trends in weights</li> <li>• Comparisons between different parts of catchment</li> <li>• Indication of vulnerable populations</li> </ul>
Ages and sizes at different stages of maturity	<ul style="list-style-type: none"> <li>• Smolt ages – changes may indicate changes in the level of competition between juvenile fish</li> <li>• Confirmation of grilse / MSW identification</li> <li>• Age at maturity and occurrence of repeat spawning in sea trout</li> <li>• Age at maturity and occurrence of repeat spawning in brown trout</li> <li>• Ensure conservation measures are protecting vulnerable parts of fish stock</li> </ul>

*Lead Bodies*

The involvement of a number of organisations is required for this data collection: co-operation is required from the fishery owners, the Don DSFB and the RDBTIA for accessing and collating the information, although the bulk of data evaluation will be carried out by the RDT.

*Future Work*

Other fish species are present on the Don catchment and little is known about how their numbers are changing or whether they can be fished for sustainably. Coarse fish species are currently of a lower priority than the salmonids prominent on the river but the RDT should develop contacts with coarse fish anglers on the Don to begin sourcing current information about the species present.

#### **4.2.7 Evaluation of Hatchery Programme**

##### *Survey Purpose*

The Don DSFB has been operating a hatchery at Newe on the Upper Don since the late 1960s, initially to help overcome the depletion of stocks caused by pollution problems in the lower river. Broodstock heading for the upper catchment are intercepted at a single point, the weir at Newe (NJ 370 120), stripped when ready and the fertilised eggs held at the hatchery. The progeny are stocked out as eyed ova into artificial redds (salmon) or transplanted as unfed fry (trout) early the following year into areas throughout the upper catchment which appeared to be underused from the previous year's redd counts and electric fishing surveys.

The numbers raised in the hatchery have been reduced in recent years from 700,000 to 350,000 salmon eggs and 100,000 trout eggs. The hatchery requires regular manpower through maintenance and daily husbandry visits whilst the tanks are in use. A formal appraisal of the stocking programme should lay out the objectives of the stocking programme and determine if they are being met. It should take into account the costs incurred in providing the facility and any detrimental impact on the naturally breeding population, and weigh these against any quantifiable benefit arising from the stocking procedure, e.g. increase in juvenile density compared to non-stocked areas. Further considerations are reviewed by Youngson (2007).

##### *Survey Method*

The hatchery evaluation will involve information gathered from a number of the other surveys on the catchment, in particular the habitat, electric fishing and genetic sampling surveys. Three approaches can be taken:

##### 1) Habitat units and carrying capacities.

From the habitat survey the catchment can be divided into units, for instance individual tributaries, and from the areas of fry habitat and juvenile habitat recorded estimates of the salmon carrying capacity can be made. Comparing the estimates with the actual numbers recorded by electric fishing will establish if any tributaries are supporting significantly less than their carrying capacity and these areas can be considered for continued stocking or for other appropriate improvement measures.

##### 2) Electric fishing and juvenile densities.

Following on from the first step, the electric fishing data can be examined to determine if there is a particular stage at which fish production is failing. For instance, if adequate fry numbers are being produced for the available habitat but parr numbers are poor, stocking will not increase fish production but other measures such as increasing the number of refuges for parr through boulder addition may be more appropriate. Where fry numbers are poor, for example through poor quality spawning grounds, fully costed comparisons can be made between the hatchery operations and instream improvements to determine the most appropriate method.

### 3) Genetic analysis.

Particular groups of fish are genetically suited to particular locations within catchments and so natural genetic population structuring should therefore be conserved (Youngson, 2007). The migrating adults intercepted at Newe weir may have been destined to spawn in one of a number of tributaries or the mainstem of the Don upstream. The resulting progeny may therefore be more naturally suited to specific parts of the catchment and if they are instead stocked somewhere less appropriate survival may be reduced. Comparing the genetic make-up of juvenile populations within different tributaries in the upper catchment will help to establish if the populations are distinct and should be conserved as such.

The extensive recording of individual brood fish information required by law during the running of the hatchery is adhered to by the Board and overseen by the Marine Directorate. The hatchery facility and procedures can also be reviewed as part of the evaluation to determine whether future investment is required.

#### *Outcomes of Hatchery Programme Evaluation*

<b>Data Collected</b>	<b>Data Uses</b>
Available habitat and juvenile densities	<ul style="list-style-type: none"><li>• Establish where stocking would be beneficial</li><li>• Establish if stocking is the most cost effective approach</li></ul>
Genetic analysis	<ul style="list-style-type: none"><li>• Determine if population mixing is occurring</li><li>• Confirm if brood stock source location and stocking locations are appropriate</li></ul>

#### *Lead Bodies*

The hatchery operations are managed by the Don DSFB. Collaboration with the RDT will allow the data derived from the habitat, electric fishing and genetic surveys to be effectively integrated into the evaluation process.

#### *Future Work*

A revision of the stocking procedure in light of best practice, (FRS, 2003; Youngson, 2007) and the evaluation may be necessary. Any stocking which is carried out should be monitored to ensure it is beneficial, e.g. results in increased numbers of juvenile salmon.

#### 4.2.8 Timescale for Survey Programme

	2009	2010	2011	Lead Body
HABITAT SURVEY # Fieldwork * catchment survey ** priority improvements Database & reporting	Apr – Oct * (RDT only) Apr – Jul * (RDT + 3 others)  Oct -	May, Jun **  Mar  Oct -	May, Jun **  Mar  Oct -	RDT RDT (+DDSFb /assistants)  RDT
ELECTRIC FISHING Fieldwork Database & reporting	Aug - Sep †  Oct -	Jul - Sep  Oct -	Jul - Sep  Oct -	RDT (DDSFb) RDT
REDD COUNTS	Nov -	Jan  Nov -	Jan  Nov -	DDSFb
GENETIC SAMPLING juvenile sampling (e. fishing) – broodstock -	Aug / Sep  Nov	Jul - Sep  Nov		RDT DDSFb
OBSTACLE ASSESSMENT Fieldwork Reporting	Aug / Sep	Aug / Sep Jan, Feb	Jan, Feb	RDT
CATCH RETURNS SCALE SAMPLING	Set up returns collation Set up scale sampling Analysis	Feb, Mar	Feb, Mar	DDSFb, RDBTIA RDT RDT
HATCHERY EVALUATION Reporting			Jan, Feb	RDT (DDSFb)
<b>REVIEW AND PUBLISH FIRST THREE YEARS' FINDINGS, ESTABLISH NEXT THREE YEARS' WORK PROGRAMME</b>			Oct – Dec	RDT

# Two timescales for the catchment's habitat survey have been included based on a single surveyor or four surveyors.

† The widespread electric fishing of the catchment in 2009 is dependent upon the habitat survey having been completed.

### **4.3 Milestone III**

At the end of 2011 a review of the work carried out so far will be necessary. This will review the survey work carried out in the first three-year phase, evaluate the findings and any shortcomings, and prioritise improvement works and research programmes for the next three years.

The management targets to have been achieved in the first three-year period are therefore:

- Complete a habitat survey of the entire catchment
- Conduct a minimum of two years of initial electric fishing surveys
- Relate these surveys to redd counts, the stocking programme and ongoing genetic results
- Establish a robust programme of scale and catch data collation
- Identify impacting problems on the catchment and prioritise solutions

### **4.4 Milestone IV**

Small-scale habitat improvements, such as the removal of fallen trees creating temporary access barriers which have already been identified during the course of the Board's work, can be carried out as and when the current work programme allows.

Major habitat restoration works, prioritised at the end of 2011, will be planned in detail and fully costed early in 2012 with a view to beginning improvement works that year. This will include detailed surveys to calculate the full extent of work required, such as the length and location of fencing, and site specific requirements, for example cattle watering points, in conjunction with the landowner. Funding sources such as the Scottish Rural Development Programme will be approached for financial support. Pre- and post-improvement monitoring of the sites and their surroundings will be built into the survey programme. Baseline information on the fish species at the improvement sites before work commences will be compared with data collected from the same sites for the three years following the works.

Distinct from the monitoring surveys, the research programme will be refined to include a statistically robust series of electric fishing sites to measure changes in the juvenile salmonid population, whilst specific locations and perhaps other methods can be targeted to provide further detail on the coarse fish species so far encountered.

### **4.5 Milestone V**

By the end of 2014 the data from the monitoring programme will be reviewed to determine the success, or otherwise, of the restoration works carried out to date. Knowledge and experience gathered will be incorporated into future rounds of improvements. At this stage the next Fisheries Management Plan, prioritising work on the Don catchment for the next six years from 2015 to the end of 2020, will be prepared and consulted upon.

## **4.6 Ongoing Management**

There are existing management practices being carried out on the Don which are independent of establishing a structured survey programme and which will continue alongside it. These include aspects of the Don DSFB's work and control measures being taken on a wider scale throughout Aberdeenshire to address problems of agricultural and urban pollution.

### **4.6.1 Bailiffing**

The Don DSFB is responsible for carrying out the statutory duties regarding policing the river. The patrols carried out are a varying combination of night and day shifts to avoid predictability, extending up through the catchment from the tidal limit depending upon the time of year and the distribution of migratory fish. All areas of the catchment are deemed vulnerable if water levels are low.

In addition coastal patrols are carried out to check for gill nets between June and September, and to liaise with the four netting stations to ensure compliance with the weekly closed period.

The Board bailiffs also carry out protection duties with regard to brown trout fishing, although there is additional scope for the appointment of fishery wardens under the auspices of the Protection Order.

### **4.6.2 Education**

Education plays an important role in the work of The Don DSFB with operations at the hatchery providing a central focus. Visitors to the facility have ranged from angling association members, to primary and secondary school pupils, graduate students from Aberdeen University and the Strathdon Round Table, promoting awareness and interest in environmental issues on the Don.

The staff have been carrying out school visits for twenty years, providing primary school children with a valuable knowledge and interest in the river. The classes visit the Board hatchery in January, are given the opportunity to rear eggs to hatching in the classroom and at a later date observe electric fishing of young fish in the wild. In 2008 five schools were involved in the project. Some Fishery Boards and Trusts have received assistance from Scottish Natural Heritage for their classroom projects ([www.snh.org.uk/salmonintheclassroom](http://www.snh.org.uk/salmonintheclassroom)) and this may be an approach for further development on the Don. Links with Aberdeen University can be strengthened and may provide student assistants for the summer survey season.

The on-going training of staff, from the RDT, the Board and all estates involved in fisheries management on the Don, is paramount in ensuring that survey data is collected on the catchment to the highest standard and that management practices employed are used appropriately and professionally. Close involvement with the Scottish Fisheries Co-ordination Centre, the Rivers and Fisheries Trusts of Scotland and Fisheries Research Services will ensure fisheries management on the Don is in

line with the best practices employed throughout Scotland. This includes providing information and facilities for anglers for dealing with matters of national importance such as biosecurity measures against *Gyrodactylus salaris* (see also 4.6.4. below).

The information produced by the RDT should be effectively disseminated to all those with an interest in the fish and fishery through the production of reports and the website currently under development ([www.riverdon.org.uk](http://www.riverdon.org.uk)) to be of greatest value to managing the fishery.

#### **4.6.3 Pollution Reduction Measures**

Although habitat improvement measures can be targeted to intercept pollutants before they enter the river and so increase fish productivity, much of the diffuse pollution entering the watercourse is outwith the control of fishery management bodies. Measures such as the Controlled Activities Regulations, the River Urie Environmental Improvement Action Plan and the Nitrate Vulnerable Zone Action Programme being carried forward by SEPA and Scottish Water's improvement measures to reduce phosphorus release at a number of sewage treatment works should be fully supported.

#### **4.6.4 Establish Biosecurity Measures for Non-Native Invasive Species**

The Don DSFB is already investigating measures to control the growth of invasive species such as Giant Hogweed and Japanese Knotweed on the catchment. In line with District Boards and Fisheries Trusts throughout Scotland the Don DSFB has adopted a disease prevention policy to reduce the risk of the parasite *Gyrodactylus salaris* being introduced to Scotland on fishing tackle and equipment that has been used abroad. The need for further biosecurity measures is being examined centrally for fisheries organisations through the Rivers and Fisheries Trusts of Scotland, of which the RDT is a member.

#### **4.7 Potential Future Data Collection**

The need for additional lines of information may arise during the course of the initial data gathering. Data sources for future consideration may include:

- Installation of a counter – for instance to quantify the number of migratory adults returning to a sub-catchment of the Don to determine if the Conservation Code and current bag limits employed are appropriate to the fish stock
- Radio tagging – for instance to follow adult salmon from the Newe weir to their spawning beds
- Invertebrate sampling – to evaluate the invertebrate community present in a variety of locations in the catchment as an indication of the water quality and the food resource available to juvenile fish and to provide a baseline before habitat improvements are carried out.

## 5. STAFF STRUCTURE AND DEVELOPMENT

As mentioned above the RDT needs to appoint a suitably qualified biologist to carry out this Fisheries Management Plan. In addition two survey assistants or the use of one of the Board's bailiffs and one assistant will be required during the summer season in order that health and safety requirements are met for carrying out electric fishing surveys. Adequate lone working procedures need to be adopted to ensure staff safety when covering remote areas during the course of habitat surveys.

Continued staff development is essential in ensuring information on the fisheries is gathered and utilised to the highest standard and is seen as paramount to the successful management of the River Don. Both the RDT and the Don DSFB are members of a wider network of fisheries trusts and boards covering the majority of Scotland and co-operating together through the umbrella groups of RAFTS, the Rivers and Fisheries Trusts of Scotland, and the ASFB, the Association of Salmon Fishery Boards. Scientific support to these groups exists through the SFCC, the Scottish Fisheries Co-ordination Centre and River Don personnel are or will be trained in SFCC field survey methods, with refresher training as appropriate. Training for other disciplines, such as Geographical Information Systems and first aid, or for any other requirement will be sourced from appropriately qualified providers, as and when the need arises.

## 6. BUDGET

### Projected Income

A projection of the main sources of income and tentative amounts are shown for the RDT for financial years ending 31<sup>st</sup> March. For the financial years covering the period of 2009-2011 the income is a conservative estimate. For the sake of compiling this projection the funds pledged for the first three full years of operation of the RDT have been assumed to continue through into 2012 and 2013. No allowance has been made for contract research associated with investigating developments on the catchment, which may total £5,000 to £10,000 per annum.

<b>Income (£1,000s)</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Don DSFB	4.3	17.7	18.4	19.2	20.0	20.8
Charitable Donations	6.9	6.9	6.9	7.1	7.2	7.3
Grants and Research	17.3	17.3	17.3	17.3	17.3	17.3
Investments	2	2	2	2	2	2
<b>Total</b>	<b>30.5</b>	<b>43.9</b>	<b>44.6</b>	<b>45.6</b>	<b>46.5</b>	<b>47.4</b>

### Projected Expenditure

A projection of the main cost elements, apart from the start-up costs and writing of this plan, have been apportioned to two categories. For the period 2009 to 2011 inclusive 90% of the income is allocated to research and monitoring programmes and 10 % to restoration and education. For the year ending 2013 onwards this split is equally divided between the two categories.

<b>Expenditure (£1,000s)</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Start-up Costs	6.0	0	0	0	0	0
FMP Contract	7.3	0	0	0	0	0
Research & Monitoring	14.3	45.3	46.4	47.7	32.2	32.9
Restoration & Education	1.6	5.0	5.2	5.3	32.2	32.9
<b>Total</b>	<b>29.2</b>	<b>50.3</b>	<b>51.6</b>	<b>53.0</b>	<b>64.4</b>	<b>65.8</b>

It can be seen that additional funds will need to be raised to implement improvements on the catchment.

## **7. REVIEW OF THE FISHERY MANAGEMENT PLAN**

This Fishery Management Plan has a duration of three years covering the initial data gathering phase of work on the River Don. The process of reviewing the work shall be continuous, and not just localised to the period of producing the next three year improvements programme or the next six year plan at the end of 2014, and shall allow practices to be adopted where they are shown to be of benefit to the fish and fishery.

The main review points are described below.

### **7.1 Annual Review**

An annual appraisal of the progress made in implementing the plan will be made in December of each year. This will include achievements and the rationale for any deviation from the plan. The results of this review will be published and made available on the [www.riverdon.org.uk](http://www.riverdon.org.uk) website.

### **7.2 Three-Year Review**

A major review of the plan will be conducted in December 2011 to mark the halfway stage of implementation and examine the progress of the plan in relation to the targets laid out in section 4.3. This will provide an opportunity to examine the findings to date, to produce the prioritised and budgeted remediation programme, and to lay out research priorities for the next three years. The outcome of this review will also be made public.

### **7.3 Six-Year Review**

The accomplishments and areas of weakness in implementing the plan will be reviewed in early 2014. This will help to shape future iterations of the plan.

### **7.4 River Don Fishery Management Plan 2015 to 2021.**

Following on from the six-year review of the initial plan the second plan will be written and put out to consultation in the late autumn of 2014 before commencing on January 1<sup>st</sup> 2015. The document will then continue to be reviewed and updated.

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