River Derg and Tributaries Catchment Status Report 2008

Loughs Agency of the Foyle Carlingford and Irish Lights Commission
River Derg and Tributaries Catchment Status Report 2008

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River Derg and Tributaries Catchment Status Report 2008

1.0 INTRODUCTION

The annual River Derg and Tributaries Catchment Status Report has been updated to include results collated on the fishery resources within the catchment in 2008 and reports and discusses additional environmental information which when combined can facilitate in the sustainable management of aquatic resources within the catchment.

This is one of an annual series of catchment status reports produced by the Loughs Agency. The primary objective of the catchment status reports is to disseminate catchment specific information to all interested stakeholders. Over recent years the catchment status reports have been consulted widely by a variety of stakeholders including local angling associations, fishery owners, statutory bodies, environmental consultants and private individuals. The catchment status reports provide summary data which demonstrates the work that the Loughs Agency conducts within specific catchments and outlines catchment specific objectives.

The theme for the 2008 catchment status reports is aquatic and riparian habitats. Both habitats are essential for a balanced ecosystem ensuring that the biodiversity of wild salmonids and other native flora and fauna is preserved.

Significant focus has been placed on aquatic resource management by a combination of national, European and international legislation and conventions. In 2009 the first River Basin Management plans produced under the European Union Water Framework Directive will outline a structure for classifying all water bodies as having good ecological status. This will be an iterative process over many reporting cycles with significant improvements in water quality expected over coming years. Partnership development and collaborative working has been highlighted as an essential mechanism to achieve this and the Loughs Agency is playing an active role as a significant stakeholder and manager of aquatic resources within the Foyle and Carlingford areas.

In addition the European Union Habitats Directive and Birds Directive have resulted in the designation of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Together these designations have formed the NATURA 2000 network of protected sites. Throughout the Foyle and Carlingford areas there are significant areas designated as SAC or SPA. Under the SAC designation Atlantic salmon is one of the main species that led to the significant number of Foyle area tributaries being
designated. Designation provides an additional mechanism for the protection and conservation of these important aquatic ecosystems.

Northern Ireland and the Republic of Ireland are also a signatory through their membership of the European Union to the North Atlantic Salmon Conservation Organisation (NASCO) convention for the conservation of salmon in the North Atlantic Ocean. Contracting parties are required to contribute towards the compilation and implementation of focus area reports the most recent of which was on the Protection Restoration and Enhancement of Salmon Habitat. The Loughs Agency provided input for areas within its jurisdiction.

![Figure 1.0 Main salmon producing rivers and tributaries in the Loughs Agency, Foyle and Carlingford areas. Foyle 1 Burn Dennet, 2 Camowen, 3 Culdaff, 4 Deele, 5 Derg, 6 Drumragh, 7 Fairywater, 8 Faughan, 9 Finn, 10 Muff, 11 Glenelly, 12 Glenmornan, 13 Mourne, 14 Owenkillie, 15 Owenreagh East, 16 Owenreagh South, 17 Roe, 18 Strule, 19 River Foyle (tidal). Carlingford Only the Whitewater (10) has a consistent population of Atlantic salmon present. 1 Bessbrook, 2 Cassy Water, 3 Clanrye, 4 Ghann, 5 Greenore, 6 Killbroney, 7 Moygannon, 8 Newry, 9 Ryland, 10 Whitewater](image)

Under the Foyle Fisheries Acts 1952 and the recent amendment by the Foyle and Carlingford Fisheries Act/Order 2007 there are various legislative requirements and offences including under the 2007 legislation a new offence of removal of any bed material from the freshwater portion of any river in the Foyle or Carlingford areas without consent of the Loughs Agency. This has provided an important control on activities likely to impact directly on aquatic habitats and indirectly on fish populations.
1.1 The Derg Catchment

The River Derg and tributaries have a channel length of approximately 60km and a catchment area of 438km². The rivers generally flow in an easterly direction from the Killeter uplands through the town of Castlederg to its confluence with the River Mourne.

The main River Derg drains Lough Derg and the surrounding catchment. The primary tributaries of the Derg catchment include the Mournebeg River, Leaghany River and Glendergan River. The Derg valley is broad in nature and is enclosed by an undulating landscape of rounded hills. The Derg catchment has many shallow tributary valleys with gently undulating landform. In places low embankments enclose the main River Derg to protect agriculturally productive land from flooding, this is predominantly restricted to the lower end of the catchment where the land is more suited to intensive agricultural use.

Extensive patches of peaty marsh, scrubby fen woodland and open moorland dominate the upland areas of the catchment. Stone walls and hedgerows enclose field boundaries and drainage ditches. There is little forestry in the lower Derg valley which is in stark contrast to the upper Derg valley and Killeter uplands where extensive commercial coniferous forestry plantations are maintained.

The coniferous forestry plantations within the Derg catchment create hard angular lines across the landscape and overshadow many of the burns and tributaries of the upper Derg catchment. There are large areas of cut over blanket bog and large expanses of intact bog of national and international importance within the catchment. The Derg catchment has a number of important mesotrophic lakes (middle level of nutrients) and oligotrophic lakes (low level of nutrients).

The Derg catchment is a cross border river catchment with the headwaters and Lough Derg in the Republic of Ireland and the main river and tributaries predominantly in Northern Ireland.

Fig 1.1 Upper section of the River Derg. Note large scale coniferous forestry plantations.
Fig 1.11 Foyle and Carlingford catchments illustrating the main rivers of the systems and highlighting the River Derg and Tributaries
1.2 Atlantic Salmon and Sea Trout

Salmon and Sea Trout are referred to as being anadromous meaning that they migrate between the freshwater and marine environments returning to freshwater to reproduce. This complex life history exposes them to varied environmental pressures and recreational and commercial fisheries.

Adult Atlantic salmon return to their natal rivers where spawning takes place. Sea trout also demonstrate an ability to return to their natal river but their homing instinct may not be as strong as those of the Atlantic salmon. After the eggs hatch the juveniles (initially referred to as fry and then parr) remain in freshwater for up to three years.

Smoltification is the physiological adaptation which occurs when the juvenile salmon change from the parr stage (freshwater phase) to the smolt stage (marine phase). In the Foyle system this can occur after one, two or three years. Most Foyle salmon (referred to as post smolts) will remain after smoltification in the North Atlantic for one year and are referred to on their return to the coast and rivers as grilse. Salmon which stay at sea for longer than one year are referred to as multi sea winter (MSW) salmon.

1.3 Non Salmonid Fish Species

As highlighted earlier populations of other non salmonid fish species occur within the Derg catchment. In the past monitoring was targeted at salmonid species however with obligations under the Water Framework Directive other non salmonid fish species are being monitored more closely.

Fish species presence and abundance can act as a good environmental/ecological indicator demonstrating the ability of the aquatic habitat to support a diverse array of native species. Populations of the European Eel, Three spined stickleback, River/Brook and Sea Lamprey form an important part of the native fisheries biodiversity of the Derg catchment. Maintaining high standards of water quality and appropriate habitat for these species is essential for the overall health of the aquatic ecosystem.

Fig 1.3 Sample of fish from the Foyle estuary
2.0 ATLANTIC SALMON STOCKS

In order to describe the status of salmon stocks each of the following points need to be considered:

- Redd Counts
- Juvenile abundance
- Marine survival
- Adult abundance
- Exploitation

2.1 Redd Counts

Redds are spawning nests created by salmon or trout. Differentiation between salmon and trout redds can be made as salmon redds tend to be larger in size and trout tend to spawn earlier than salmon within the Foyle system. Research within the Foyle system using extensive annual redd count data has highlighted a good relationship between the number of redds and the total annual catch of salmon. Table 2.1 shows redd count data for the Derg catchment and the Foyle system. Water flow is of significance when monitoring redds as in high water conditions the ability to see and count redds in rivers is impaired. Figure 2.1 outlines redd counts within the Foyle area and the Derg catchment.

<table>
<thead>
<tr>
<th></th>
<th>2004/05</th>
<th>2005/06</th>
<th>2006/07</th>
<th>2007/08</th>
<th>2008/09</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foyle System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foyle System</td>
<td>2478</td>
<td>5354</td>
<td>*1338</td>
<td>3039</td>
<td>5507</td>
</tr>
<tr>
<td><strong>Derg Catchment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derg Catchment</td>
<td>58</td>
<td>498</td>
<td>*N/A</td>
<td>567</td>
<td>618</td>
</tr>
<tr>
<td><strong>Derg as a % of Foyle</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derg as a % of Foyle</td>
<td>2</td>
<td>9</td>
<td>*N/A</td>
<td>19</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 2.1 Redd counts for Foyle system and Derg catchment 2004/05 – 2008/09. *Note 2006/07 had extremely poor water conditions for redd counting
Fig 2.1 Redd counts for Foyle system and Derg catchment 2004/05 – 2008/09. *Note 2006/07 had extremely poor water conditions for redd counting

Fig 2.11 Redd counts for Foyle system 1952/53 – 2008/09
2.2 Juvenile Abundance

Within the Loughs Agency jurisdiction trends in abundance of juvenile salmonids are monitored by annual semi-quantitative electrofishing surveys. The numbers, age and species of fish captured during five minute timed electrofishing surveys are compared with previous year’s data allowing for change to be monitored, facilitating suitable fishery management practices to be implemented.

In 2008 a total of 403 sites were semi-quantitatively electrofished within the Foyle system. The results for each site for salmon and trout are classified as excellent (>25 fish), good (15-24 fish), fair (5-15 fish), poor (1-4 fish) and absent (0 fish), Table 2.2. Figures 2.2 - 2.22 outline the salmon 0+ electrofishing results and site classifications for the Derg catchment in 2008. Please consult previous status reports for site classifications in other years.

Semi-quantitative electrofishing was developed to monitor 0+ salmonids (fry/young of the year). In order to quantify the abundance of 1+ salmonids (parr and older) fully quantitative electrofishing surveys are required which can be used to calculate fish densities within a defined area. Rivers and tributaries with good environmental quality are more likely to support good populations of each year class.

Fish populations can vary considerably over time and location, it is therefore necessary to monitor the populations over a period of years to highlight meaningful trends before considering remedial activities such as habitat improvement works. These trends are being continually monitored by the Loughs Agency and the most appropriate management options considered.

There are a variety of reasons why electrofishing sites may be perceived to be under producing, these can include, lack of suitable juvenile habitat, the presence of impassable obstacles to migratory fish species on lower sections of a tributary, pollution, inconsiderate channel maintenance, tunnelling by bank side vegetation, stream gradient and poor forestry practices etc. The critical point is to recognise the major factors at play and to investigate all possible reasons for underproduction accepting that there may be inherent reasons as to why production may not be improved upon in certain areas. When the same areas are surveyed for other non salmonid species it may be discovered that they provide habitat more suited to these species. Habitat improvement works and the rationale behind them are discussed in greater detail later.

Obligations under the Water Framework Directive are driving quantitative surveys of both salmonid and non salmonid species under proposed Surveillance, Operational, Investigative and Protected Area monitoring programmes.
### Table 2.2 Loughs Agency semi-quantitative electrofishing classification system for 0+ salmon and trout

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Grade</th>
<th>Number of 0+ Salmonids</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>Excellent</td>
<td>&gt;25</td>
</tr>
<tr>
<td>○</td>
<td>Good</td>
<td>15-24</td>
</tr>
<tr>
<td>○</td>
<td>Fair</td>
<td>5-14</td>
</tr>
<tr>
<td>●</td>
<td>Poor</td>
<td>1-4</td>
</tr>
<tr>
<td>○</td>
<td>Absent</td>
<td>0</td>
</tr>
</tbody>
</table>

Fig 2.2 River Derg catchment salmon fry index 2001-2008. Note number of sites surveyed has fluctuated annually from 6 in 1998 to 40 in 2008, the number of sites surveyed has stabilised since 2002.
Fig 2.21. The mean abundance of salmon fry in 17 catchments in 2008 from semi quantitative electrofishing.
Fig 2.22 Salmon 0+ electrofishing site classification 2008
3.0 TROUT STOCKS

Annual trends in the populations of juvenile trout are also monitored within the Loughs Agency jurisdiction using the same methodology and classification system as those employed for salmon. The semi quantitative electrofishing results for trout fry in the Derg catchment and site classifications are displayed in Figs 3.0, 3.01, 3.02 & 3.03.

Fig 3.0 Electrofishing survey and trout parr

![Chart showing Derg Trout Fry Index from 2001 to 2008]

Fig 3.01 River Derg catchment trout fry index 2001-2008. Note number of sites surveyed has fluctuated annually from 6 in 1998 to 40 in 2008, the number of sites surveyed has stabilised since 2002.
Fig 3.02. The mean abundance of trout fry in 17 catchments in 2008 from semi quantitative electrofishing. Note Sites selected were biased towards salmon habitat.
Fig 3.03 Trout 0+ electrofishing site classification 2008
4.0 MARINE SURVIVAL

The numbers of salmon that survive to return to the freshwater environment are greatly influenced by conditions in the marine environment. Climate change leading to changes in sea surface temperatures, prey abundance, high seas fishing, marine pollution, sub lethal levels of pollution and predation all have an effect on the Atlantic salmon and indeed other migratory fish species chances of survival.

Marine survival trends are monitored on a number of index rivers in the North East Atlantic where total trapping facilities are available for both migrating juvenile and adult populations. Total trapping allows for an accurate count of all migrant smolts (total freshwater production) and returning adults to be made and therefore an accurate estimate of marine survival. These projects are facilitated by the use of Coded Wire Tags (CWT). Coded wire tags are small (2-3mm long) micro tags that are injected automatically by a CWT device into the snout cartilage of anaesthetised fish remaining there for the duration of the life of the fish. CWT fish also have their adipose fin (small fin between the dorsal fin and caudal fin (tail fin)) removed so that they can be identified in the various fisheries that may intercept them. In Ireland a comprehensive screening programme is conducted at all major landing ports and markets. This programme is important in monitoring the effect of the remaining salmon fisheries on salmon stocks from rivers both within and outside of the island of Ireland.

Trends in marine survival for the River Bush (nearest index river to the Foyle system) confirm patterns observed elsewhere on the southern stocks of North Eastern Atlantic salmon, which indicate that marine survival can be variable between stocks and years. In the River Bush marine survival has decreased considerably over recent years as outlined in Table 4.0.

<table>
<thead>
<tr>
<th>Year of Smolt Cohort</th>
<th>Year of Returning 1SW Grilse</th>
<th>Marine Survival %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre 1996</td>
<td>Pre 1998</td>
<td>Circa 30%</td>
</tr>
<tr>
<td>2002</td>
<td>2003</td>
<td>5.9</td>
</tr>
<tr>
<td>2003</td>
<td>2004</td>
<td>4.3</td>
</tr>
<tr>
<td>2004</td>
<td>2005</td>
<td>4.6</td>
</tr>
<tr>
<td>2005</td>
<td>2006</td>
<td>4.2</td>
</tr>
<tr>
<td>2006</td>
<td>2007</td>
<td>13.0</td>
</tr>
<tr>
<td>2007</td>
<td>2008</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Table 4.0 Marine survival rates for the River Bush of 1SW grilse (after exploitation at sea) pre 1996 and 2002-2007 smolt cohort. Data supplied by Agri Food and Bioscience Institute, River Bush Salmon Research Station
The figures outlined in table 4.0 are mirrored by those for other index rivers monitoring the southern stocks of North Eastern Atlantic salmon populations. These figures suggest that salmon are facing increased pressure for survival at sea. A major new international research project called SALSEA - Merge has been developed by scientists from the North Atlantic Salmon Conservation Organisation (NASCO) parties and its research wing the International Atlantic Salmon Research Board (IASRB). There are twenty consortium members in total including the Loughs Agency. SALSEA aims to monitor how Atlantic salmon use the ocean; where they go; how they use ocean currents, and the ocean’s food resources, and what factors influence migration and distribution at sea. Research cruises commenced in 2008 and will continue in 2009 to collect the necessary data to answer the questions listed above. Over 426 post smolts were caught by the two Irish cruises and 363 post smolts caught by the Faroese in the areas highlighted below. Further information and project details can be found at: [http://www.nasco.int/sas/salsea.htm](http://www.nasco.int/sas/salsea.htm)
Fig 4a RV Celtic Explorer SALSEA research cruise 2008

Figure 4b Picture from the Irish Research Vessel Celtic Explorer taken during the second SALSEA research cruise 16-24\textsuperscript{th} May 2008
Since 2003 partial smolt trapping including CWT tagging has been conducted in the Faughan catchment using a rotary screw trap, Fig 4c.

Figure 4c Rotary screw trap in position on the River Faughan directly below the fish pass at Campsie barrage.

Smolt trapping can have a number of objectives including the monitoring of both salmonid and non salmonid species. Sampling of the age composition, obtaining information on run timing and recording length/weight data is conducted in tandem with the tagging programme. As mentioned above total counts of migrating smolts can be made on rivers. Where this is unfeasible due to the absence of total trapping facilities, total smolt migration can be estimated by means of a mark-recapture experiment.

In 2004 an estimate of total smolt production for the Faughan catchment was made by a mark-recapture study resulting in a minimum run size estimate of 33,854 migrating salmon smolts. The estimate was a minimum due to a number of high water events that prevented the smolt trap from fishing for a period of time during the peak smolt migration period. Tables 4.01 and 4.02 outline numbers of salmon smolts tagged from 2003-2008 and recapture data for 2003 and 2004.

<table>
<thead>
<tr>
<th>Year</th>
<th>No of Salmon Smolts Tagged</th>
<th>Average Length (mm)</th>
<th>Average Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>2113</td>
<td>149</td>
<td>33.45</td>
</tr>
<tr>
<td>2004</td>
<td>2500</td>
<td>134</td>
<td>24.6</td>
</tr>
<tr>
<td>2005</td>
<td>2210</td>
<td>133</td>
<td>23.6</td>
</tr>
<tr>
<td>2006</td>
<td>1025</td>
<td>133</td>
<td>25.36</td>
</tr>
<tr>
<td>2007</td>
<td>2062</td>
<td>135</td>
<td>27.1</td>
</tr>
<tr>
<td>2008</td>
<td>1865</td>
<td>130</td>
<td>22.1</td>
</tr>
</tbody>
</table>

Table 4.01 Numbers and average weight and length of salmon smolts tagged on the River Faughan 2003-2008. Coded Wire Tagging equipment was purchased by the Loughs Agency in 2005 with funding secured from the European Regional Development Fund through the INTERREG IIIA Programme, administered by the Environment and Heritage Service, on behalf of the Department of Environment.
### Table 4.02 Recapture data from River Faughan CWT programme. Data for fish tagged in 2007 and recovered in 2008 will not be available until 2009.

<table>
<thead>
<tr>
<th>Year Tagged</th>
<th>Year Recaptured</th>
<th>Numbers Recaptured</th>
<th>Recapture Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>2004</td>
<td>12</td>
<td>Greencastle, Burtonport, Malin Head, Belmullet and Torr Head</td>
</tr>
<tr>
<td>2004</td>
<td>2005</td>
<td>16</td>
<td>Greencastle, Malin Head, Donegal and Galway Bay</td>
</tr>
<tr>
<td>2005</td>
<td>2006</td>
<td>3</td>
<td>Greencastle</td>
</tr>
<tr>
<td>2006</td>
<td>2007</td>
<td>2</td>
<td>Greencastle and Ballycastle</td>
</tr>
</tbody>
</table>

**Figure 4d** Salmon smolt run timing and abundance from rotary screw trap sub sample, River Faughan 2004-2008. Breaks in data are due to closure of trap during high water conditions.
In 2004 a detailed examination was carried out on the age class of migrating salmon smolts in the Faughan catchment, Table 4.03.

<table>
<thead>
<tr>
<th>Age at Smolting</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>83</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 4.03 Age class of salmon smolts migrating from the Faughan catchment in 2004

Fig 4.01. From top to bottom, Atlantic salmon smolts from the Faughan Catchment, brook lamprey, river lamprey and sea lamprey also caught in the River Faughan smolt trap
5.0 ADULT ABUNDANCE

Adult Atlantic salmon abundance is assessed in three ways: directly by using commercial netting/recreational rod catches and fish counters and indirectly by reference to conservation limits/spawning targets.

Using catch data as a measure of population status is a well established and extensively used technique. In the Foyle system annual commercial and recreational catch data has been recorded since the establishment of the Foyle Fisheries Commission in 1952, with some data available before this period. The relationship between catch and stock is complex and care should be applied in interpretation. A more precise measure of catch incorporates fishing effort (number of licences issued or the amount of time fished) and is referred to as catch per unit effort (CPUE).

5.1 Recreational Fisheries

One problem encountered when analysing catch data is unreported catch. All recreational fishers are required by law to make catch returns. This information facilitates management decision making and therefore it is vitally important that all catch returns are accurate and made promptly at the seasons end.

<table>
<thead>
<tr>
<th>Year</th>
<th>Declared Rod Catch Salmon</th>
<th>Declared Rod Catch Sea Trout</th>
<th>Returns as a % of Licences Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>1022</td>
<td>679</td>
<td>3.74</td>
</tr>
<tr>
<td>2000</td>
<td>723</td>
<td>417</td>
<td>2.55</td>
</tr>
<tr>
<td>2001</td>
<td>3188</td>
<td>450</td>
<td>17.68</td>
</tr>
<tr>
<td>2002</td>
<td>5117</td>
<td>1010</td>
<td>27.93</td>
</tr>
<tr>
<td>2003</td>
<td>1844</td>
<td>361</td>
<td>15.5</td>
</tr>
<tr>
<td>2004</td>
<td>2285</td>
<td>75</td>
<td>13.99</td>
</tr>
<tr>
<td>2005</td>
<td>4084</td>
<td>413</td>
<td>25.77</td>
</tr>
<tr>
<td>2006</td>
<td>3476</td>
<td>469</td>
<td>37</td>
</tr>
<tr>
<td>2007</td>
<td>4929</td>
<td>379</td>
<td>22.11</td>
</tr>
<tr>
<td>2008</td>
<td>4060</td>
<td>815</td>
<td>54.94</td>
</tr>
</tbody>
</table>

Table 5.1 Declared rod catch returns for salmon and trout in the Foyle and Carlingford areas. Note figures include the Clanrye and Whitewater in the Carlingford area from 2001 onwards. Carcass tagging was introduced in 2001.
Table 5.11 Declared catch from the Derg catchment for salmon and sea trout 2001-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Declared Catch Derg Catchment Salmon</th>
<th>Declared Catch Derg Catchment Sea Trout</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>614</td>
<td>14</td>
</tr>
<tr>
<td>2003</td>
<td>156</td>
<td>3</td>
</tr>
<tr>
<td>2004</td>
<td>84</td>
<td>0</td>
</tr>
<tr>
<td>2005</td>
<td>324</td>
<td>6</td>
</tr>
<tr>
<td>2006</td>
<td>157</td>
<td>10</td>
</tr>
<tr>
<td>2007</td>
<td>310</td>
<td>7</td>
</tr>
<tr>
<td>2008</td>
<td>260</td>
<td>35</td>
</tr>
</tbody>
</table>

5.2 Commercial Fisheries

Commercial fisheries have traditionally operated within the Foyle sea area, Lough Foyle and tidal River Foyle. The drift net and draft net fisheries as well as the rod fisheries have been closely regulated with a real time management regime in place to monitor the numbers of fish migrating up key rivers. If predetermined numbers of fish have not been counted by the strategically placed electronic fish counters at Sion Mills weir (River Mourne), Campsie Barrage (River Faughan) and the Plumb Hole (River Roe) then specified closures of the commercial and/or recreational fisheries are enforced.

In 2007 new regulations were introduced to reduce the number of commercial nets operating within the Foyle area and all mixed stock interceptory drift nets seaward of Lough Foyle were curtailed. This decision was made to comply with the EU Habitats Directive, similar curtailment of mixed stock fisheries were introduced in the Republic of Ireland. Within the Foyle area this was achieved through a voluntary hardship scheme. 18 out of 112 drift nets remain in Lough Foyle, those remaining have been reduced in size from 900m to 500m and 10 out of 50 draft nets remain. This represents a significant reduction of netting effort. Regulations were also introduced to limit the numbers of fish which could be retained by the recreational rod fishery throughout the Foyle and Carlingford areas.
## Year Drift Catch Draft Catch Total Drift and Draft

<table>
<thead>
<tr>
<th>Year</th>
<th>Drift Catch</th>
<th>Draft Catch</th>
<th>Total Drift and Draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>31296</td>
<td>11141</td>
<td>42437</td>
</tr>
<tr>
<td>1999</td>
<td>15397</td>
<td>7893</td>
<td>23290</td>
</tr>
<tr>
<td>2000</td>
<td>22333</td>
<td>10339</td>
<td>32672</td>
</tr>
<tr>
<td>2001</td>
<td>13500</td>
<td>9476</td>
<td>22976</td>
</tr>
<tr>
<td>2002</td>
<td>28851</td>
<td>11917</td>
<td>40768</td>
</tr>
<tr>
<td>2003</td>
<td>15741</td>
<td>16991</td>
<td>32732</td>
</tr>
<tr>
<td>2004</td>
<td>12800</td>
<td>9490</td>
<td>22290</td>
</tr>
<tr>
<td>2005</td>
<td>13391</td>
<td>12143</td>
<td>25534</td>
</tr>
<tr>
<td>2006</td>
<td>6160</td>
<td>6031</td>
<td>12191</td>
</tr>
<tr>
<td>*2007</td>
<td>2598</td>
<td>2774</td>
<td>5372</td>
</tr>
<tr>
<td>2008</td>
<td>1248</td>
<td>2924</td>
<td>4172</td>
</tr>
</tbody>
</table>

Table 5.2 Declared catch from the commercial salmon fisheries 1998-2008. Note 100% rate of catch returns. * Reduced numbers of commercial nets operating in the Foyle area from 2007.

### 5.3 Counters

Within the Foyle system a number of river catchments have electronic fish counting facilities that provide estimates on the run timing and abundance of fish >45cm. The Derg catchment does not have a fish counter at present. In the absence of a counter the fisheries within the Derg catchment are controlled by monitoring the run timing and abundance of fish passing over the Sion Mills fish counting facilities on the River Mourne. A time series of counts for the Sion Mills fish counting station on the River Mourne is outlined in table 5.3. The Sion Mills fish counting station counts fish destined for all rivers located upstream of this point and is used to control both commercial and recreational fishing within the entire Foyle system.
Fig 5.3 Fish counting facilities at Sion Mills, River Mourne

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of fish &gt;45cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>12991</td>
</tr>
<tr>
<td>2003</td>
<td>12129</td>
</tr>
<tr>
<td>2004</td>
<td>10270</td>
</tr>
<tr>
<td>2005</td>
<td>9397</td>
</tr>
<tr>
<td>2006</td>
<td>9926</td>
</tr>
<tr>
<td>*2007</td>
<td>*3714</td>
</tr>
<tr>
<td>*2008</td>
<td>*3452</td>
</tr>
</tbody>
</table>

Table 5.3 Sion Mills fish counter figures 2002-2008. *Note low counts in 2007 and 2008 were influenced by high water levels during peak run timing during June and July. Sion Mills is a partial counter and does not cover the entire length of the weir. In high water levels as experienced in 2007 and 2008 significant numbers of fish can bypass the counting channels. Methods to reduce this are being investigated as part of the Fish Counter Programme Review, commissioned in 2008.

Fig 5.31 Monthly fish counts on the River Mourne 2004-2008 as recorded at Sion Mills
5.4 Conservation Limits/Spawning targets

Another way to assess adult salmon stock status is to monitor run sizes on rivers and to compare them with predefined reference points called conservation limits. In the Foyle system the conservation limits define a level of spawning that optimises the sustainable catch by commercial and recreational fisheries. If exploitation rates increase above the sustainable catch levels the catch may increase in the short-term but the stock will eventually reduce. Conservation limits demarcate the spawning stock level at which recruitment would begin to decline significantly (NASCO). The real time management regime incorporating the setting of management targets and spawning targets implemented in the Foyle aims to manage the fisheries and spawning populations in a sustainable manner. The management and spawning targets are set for the various river catchments based on the amount and quality of nursery habitat present. River habitat surveys are carried out along each stretch of river and graded according to the type and quality. Egg deposition levels are set according to the quality grading of each section of nursery habitat.

There are four grades of nursery habitat, however for the purpose of setting egg deposition levels only grades 1-3 are utilised. Grade 1 denotes the best quality habitat. The egg deposition rate/carrying capacity is set as follows. Grade 1 = 10 eggs per m², grade 2 = 5 eggs per m² and grade 3 = 2.5 eggs per m². The total number of eggs is calculated by multiplying the area of each grade of nursery habitat
by the appropriate density of eggs per m². 25% is deducted from the management target allowing for loss of salmon by angling (15%) and poaching and predation (10%). The remaining figure is referred to as the conservation limit/spawning target.

Once the number of eggs required for each river has been established this can be converted to a total number of fish required to achieve the management targets and conservation limit/spawning targets. The average fecundity (number of eggs produced per female) of Foyle salmon has been estimated at 2500 and the ratio of female to male salmon estimated at 60:40. When combined with the amount of nursery habitat of the various grades this equates to the conservation limit/spawning target. A management target of 8000 adult Atlantic salmon has been set for above Sion Mills, this equates to a conservation limit/spawning target of over 6000 salmon.

<table>
<thead>
<tr>
<th>Year</th>
<th>No of Fish Across Counter</th>
<th>Estimated Egg Deposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>12991</td>
<td>14,614,875</td>
</tr>
<tr>
<td>2003</td>
<td>12129</td>
<td>13,645,125</td>
</tr>
<tr>
<td>2004</td>
<td>10270</td>
<td>11,553,750</td>
</tr>
<tr>
<td>2005</td>
<td>9397</td>
<td>10,571,625</td>
</tr>
<tr>
<td>2006</td>
<td>9926</td>
<td>11,166,750</td>
</tr>
<tr>
<td>*2007</td>
<td>*3714</td>
<td>*4,178,250</td>
</tr>
<tr>
<td>*2008</td>
<td>*3452</td>
<td>*3,883,500</td>
</tr>
</tbody>
</table>

Table 5.4 Upstream of Sion Mills estimated egg deposition 2002-2007. *Note 2007 and 2008 figures are minimum estimates of escapement due to high water levels resulting in the bypassing of the Sion Mills counting channels.

6.0 HABITAT MONITORING

The Loughs Agency has carried out extensive habitat surveys on all the major rivers and tributaries within the Foyle and Carlingford catchments. Habitat surveys are carried out on foot. Although time consuming this is at present the best method for classifying the various grades of habitat. Habitat is classified into one of three life cycle units Fig 6.0, the presence and order of which is essential to the productive capacity of a salmonid river. Other non salmonid species also benefit from diverse in-channel habitat. The life cycle unit categories include spawning, nursery and holding habitat. Each category is then graded on a scale of 1-4, 1 representing the best quality attainable and 4 the worst. Other data collected during these surveys include channel width and impassable barriers to migratory fish species.
Fig 6.0 Life cycle unit depicting the type of habitat found in spawning, nursery and holding zones

Fig 6.01 Examples of spawning, nursery and holding habitat
Fig 6.02 Habitat overview key for Derg Catchment
Fig 6.03 Derg catchment habitat survey map 1
Fig 6.04 Derg catchment habitat survey map 2
Fig 6.05 Derg catchment habitat survey map 3
Fig 6.06 Derg catchment habitat survey map 4

Derg Habitat Survey 4

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EMOU 205.1
Fig 6.07 Derg catchment habitat survey map 5
7.0 LAND USE

Land use classification is an important tool when assessing the potential impacts within a particular river catchment or indeed when looking at specific land use and land management practices. Land use impacts could have either a positive or negative impact on rivers and tributaries. A good understanding of the land use within a catchment is therefore imperative in managing at a catchment scale.

Land use in Northern Ireland has been captured using satellite imaging technology and classified to type. The following figures outline the broad land use classification within the Derg Catchment.

![Land Use in the Derg Catchment](image)

Fig 7.0 Derg catchment land use classification
Fig 7.01. Derg catchment land use classification map
8.0 WATER QUALITY

Routine water quality monitoring within the Foyle and Carlingford areas is conducted by the Northern Ireland Environment Agency (NIEA) of the Department of the Environment for Northern Ireland and the County Councils in the Republic of Ireland (Donegal County Council and Louth County Council). Routine sampling is conducted regularly for both chemical and biological General Quality Assessments (GQA).

In addition to the routine river monitoring carried out by the NIEA and the County Councils the Loughs Agency conducts proactive and reactive pollution investigations to investigate or highlight problems or potential problems which may have an effect on the aquatic environment and ultimately on the fish species and aquatic habitats.

In 2007 the Loughs Agency instigated a programme of monitoring at the tributary level for assessments of chemical and biological water quality. Four stations on tributaries of the River Derg were monitored for chemical water quality parameters including Biological Oxygen Demand (BOD), Suspended Solids, Ammonia and Phosphorous. Biological water quality was assessed using the Biological Monitoring Working Party (BMWP) a biotic scoring index.

Fig 8.0 Loughs Agency chemical water quality testing in the laboratory
The Loughs Agency also maintains a mobile pollution response unit containing aerating equipment and absorbent and non absorbent booms for oil and chemical spills. The unit can be rapidly deployed to the site of a pollution incident.

**Water Quality Parameters**

The following water quality parameters are monitored through the Loughs Agency monitoring programme and determined from water samples in the laboratory:

- Biochemical Oxygen Demand (BOD)
- Ammonia
- Phosphorus
- Suspended Solids

**BOD**

Any organic matter discharged into a river provides an immediate source of food for bacteria. These bacteria will break down the organic matter eventually into simple compounds such as carbon dioxide and water. Biochemical Oxygen Demand or Biological Oxygen Demand (BOD) is a chemical procedure for determining how fast biological organisms use up oxygen in a body of water. It is considered as an indication of the quality of a watercourse.

**Ammonia (NH₃)**

Ammonia is generally found in small amounts in rivers and streams. This is due to microbiological activity and the resultant reduction of compounds containing nitrogen. High levels of ammonia can occur as a result from sewage pollution and have detrimental impacts on fish species.

**Phosphorus (PO₄)**

The over-loading of nutrients such as phosphorus in watercourses often leads to a process known as eutrophication. Eutrophication is a major environmental issue in Irish rivers and lakes. Sources of phosphorus include agricultural fertilizers and household detergents.

**Suspended Solids**

Particulate matter may be organic or inorganic in nature. Organic solids may consist of algal growths, indicative of eutrophic conditions. Inorganic solids generally are the result of discharge washings from sand and gravel extraction activities or quarries. Suspended solids can affect plant growth and fish habitats.

The following parameters are also recorded at each sample station by means of an electronic measuring probe:
• pH
• Temperature
• Dissolved Oxygen
• Conductivity

pH
This is a measure of the hydrogen ion concentration of a solution and therefore an indication of whether a liquid is acid or alkaline. The pH scale ranges from 0 (very acid) to 14 (very alkaline), with results generally influenced by geological conditions. Fish can be susceptible to changes in pH. Low pH levels are generally found in catchments with high forestry operation impacts.

Temperature
The effect of changes in temperature on living organisms, such as fish, can be critical. Thermal discharges from urban and industrial sources can lead to temperature increases in watercourses and increased stress on aquatic habitats and associated species.

Dissolved Oxygen
Sufficient levels of oxygen saturation in fresh waters are generally an indication of good ecological status and ideal for fish life. The main point to remember about oxygen solubility is that it has an inverse relationship with temperature. This helps explain why DO levels are generally lowest during summer low flow conditions, increasing the risk of pollution from discharges at this time.

Conductivity
The conductivity or electrical conductivity of a watercourse is a measure of its ability to conduct an electric current. Electrical conductivity estimates the amount of total dissolved salts, or the total amount of dissolved ions in the water. Electrical Conductivity is controlled by geology and any variations may be sourced to increased ions from wastewater from sewage treatment plants or urban run-off from roads.
Fig 8.01 Derg catchment average suspended solids results 2008. Values are in mg/l
Fig 8.02 Derg catchment Ammonia results 2008. Values are in mg/l
Fig 8.03 Derg catchment phosphorous results 2008. Values are in mg/l
Fig 8.04 Derg catchment Biological Oxygen Demand (BOD) results 2008. Values are in mg/l
Fig 8.05 Derg catchment Biological Monitoring Working Party results 2008
NIEA routinely monitor both the chemical and biological water quality within the rivers of Northern Ireland. In relation to chemical monitoring an extensive network of sampling stations are monitored for a variety of chemicals. The General Quality Assessment (GQA) is defined by limits for the concentrations of Biological Oxygen Demand (BOD), ammonia and dissolved oxygen (DO). The measures listed are indicators of the affect on water quality by waste water discharges and agricultural run-off containing organic material. Water quality can be affected by a variety of sources and the GQA determinands provide a recognised assessment of water quality.

The overall GQA class assigned to a section of river is based on the worst performing of the three measures (BOD, ammonia and DO). Table 8.0 outlines the standards for the chemical GQA.

<table>
<thead>
<tr>
<th>GQA Class</th>
<th>Dissolved Oxygen (% Sat) 10-percentile</th>
<th>BOD (mg/l) 90-percentile</th>
<th>Ammonia (mg/l) 90-percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Very Good)</td>
<td>80</td>
<td>2.5</td>
<td>0.25</td>
</tr>
<tr>
<td>B (Good)</td>
<td>70</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td>C (Fairly Good)</td>
<td>60</td>
<td>6</td>
<td>1.3</td>
</tr>
<tr>
<td>D (Fair)</td>
<td>50</td>
<td>8</td>
<td>2.5</td>
</tr>
<tr>
<td>E (Poor)</td>
<td>20</td>
<td>15</td>
<td>9.0</td>
</tr>
<tr>
<td>F (Bad)</td>
<td>&lt;20</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 8.0 chemical GQA class limiting criteria

The above table can be summarised as follows: for BOD and ammonia the section of river should contain less than the stated levels for at least 90% of the time. DO levels must not fall below the stated levels for more than 10 percent of the time.

In relation to biological monitoring an extensive network of sampling stations is also routinely monitored. The biological GQA is defined by observed measures of the abundance and diversity of macro invertebrates (for example freshwater shrimps, insect larvae and molluscs) compared to expected values as derived from a UK computer model adapted for Northern Ireland called River Invertebrate Prediction and Classification System (RIVPACS).

Different species of macro invertebrates are more sensitive to specific forms of pollution and therefore environmental quality indices (EQIs) based on biological results may be used to assess water quality. Macro invertebrates are also the dominant prey of both salmonid and some non salmonid fish species. The measure of diversity of a macro invertebrate community can be a more reliable indicator of the pollution pressures within a catchment than relying solely on an assessment of chemical water quality. The impacts of pollution on a macro invertebrate community are longer lasting and can highlight intermittent pollution impacts that may be missed through chemical water quality monitoring.
Biotic scoring systems have been developed to assign a score based on a standardised system to each sample site. One such system is the Biological Monitoring Working Party (BMWP). Generally the higher the BMWP score the better quality of the macro invertebrate community which reflects better water quality.

Based on a combination of biotic scoring systems biological GQA classes are assigned to sections of river. The two EQIs used are as follows:

\[ \text{EQItaxa} = \frac{\text{BMWP Observed Number of Taxa}}{\text{BMWP Predicted Number of Taxa (as derived from UK model)}} \]

\[ \text{EQIASPT} = \frac{\text{BMWP Observed ASPT (Average Score Per Taxon)}}{\text{BMWP Predicted ASPT (as derived from UK model)}} \]

<table>
<thead>
<tr>
<th>Biological Class</th>
<th>EQI for ASPT</th>
<th>EQI for Taxon</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Very Good)</td>
<td>1.00 or above</td>
<td>0.85 or above</td>
</tr>
<tr>
<td>B (Good)</td>
<td>0.90-0.99</td>
<td>0.70-0.84</td>
</tr>
<tr>
<td>C (Fairly Good)</td>
<td>0.77-0.89</td>
<td>0.55-0.69</td>
</tr>
<tr>
<td>DC (Fair)</td>
<td>0.65-0.76</td>
<td>0.45-0.54</td>
</tr>
<tr>
<td>E (Poor)</td>
<td>0.50-0.64</td>
<td>0.30-0.44</td>
</tr>
<tr>
<td>F (Bad)</td>
<td>&lt;0.50</td>
<td>&lt;0.30</td>
</tr>
</tbody>
</table>

Table 8.01 Biological GQA class limiting criteria

This indicates that those areas designated as areas of nature conservation designated for salmon should strive to achieve the water quality targets that are necessary for the designated species, which has additions to the GQA standards.

While it is current government policy for all rivers to meet the General Quality Assessment Standards, the Agency feels that favourable conditions standards as detailed below should be the water quality targets for all salmonid rivers within its jurisdiction.

8.1 Favourable Condition Tables, Target Levels

Natural Heritage of Northern Ireland Environment Agency have suggested guidelines for the determination of water quality, the first being the proposed UK Guidance on Conservation Objectives from monitoring designated sites and includes the following, which are considered as the favourable conditions tables.

They recommend Biological GQA Class A or B with no drop in class from the existing station, and Chemical GQA Class A or B depending on which type. This is in addition to no drop in class from the existing station. In addition to these favourable conditions tables, based on publications from Conserving Natura 2000 Rivers, the European Life Series, Ecology Series; No 7 Ecology of the Atlantic Salmon, *Salmo Salar* L. these publications have indicated that there are specific favourable conditions for this species.

An annual mean of less than 10 milligrams per litre suspended solids for nursery grounds, and annual mean of less than 25 milligrams per litre for migratory passage and the setting of soluble reactive phosphorous targets in relation to river reach types which should be as near background levels.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Level</th>
<th>Percentile</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD mg/l</td>
<td>2.5</td>
<td>90</td>
<td>GQA class A</td>
</tr>
<tr>
<td>Ammonia mg/l</td>
<td>0.25</td>
<td>90</td>
<td>GQA class A</td>
</tr>
<tr>
<td>Dissolved Oxygen % Saturation</td>
<td>80</td>
<td>10</td>
<td>GQA class A</td>
</tr>
<tr>
<td>Unionised Ammonia mg/l</td>
<td>0.025</td>
<td>95</td>
<td>Favourable Conditions Habitat Forming Specific for Atlantic Salmon</td>
</tr>
<tr>
<td>Suspended solids mg/l</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursery grounds</td>
<td>10</td>
<td></td>
<td>Specific for Atlantic Salmon</td>
</tr>
<tr>
<td>Migratory passage</td>
<td>25</td>
<td></td>
<td>Specific for Atlantic Salmon</td>
</tr>
<tr>
<td>Soluble Reactive Phosphorous mg/l</td>
<td>Background</td>
<td>-</td>
<td>Specific for Atlantic Salmon</td>
</tr>
</tbody>
</table>

Table 8.02 Favourable condition targets for Atlantic salmon
The Water Quality data in the reports has come from the Northern Ireland Environment Agency, Water Management Units Water Quality Archive. It is accepted by the Agency that monitoring is designed to ensure that water quality is monitored to ensure compliance with European Union directives. The monitoring however does not tie in well with the habitat and electrofishing survey monitoring carried out by the Loughs Agency, and as such the Loughs Agency instigated its own monitoring programmes in 2007 to link fish life, macro invertebrates and water quality into one holistic site evaluation. Additionally Northern Ireland Environment Agency, Water Management Unit data is not released in real-time and the data displayed below is for 2007, where the Loughs Agency status report is for 2008. By collecting and analysing water quality data the Loughs Agency can react to local water quality issues more effectively.

From 2008 water quality information from NIEA will be reported in a different manner. The European Union Water Framework Directive requires that numerous water quality parameters in addition to those traditionally monitored should be combined to provide an overall classification for water bodies. Additional parameters will include fish, diatoms and morphology amongst others. The Loughs Agency will monitor fish for WFD purposes and provide this information to NIEA.

The Loughs Agency will report on WFD classifications in the 2009 catchment status reports.
Fig 8.1 Chemical General Quality Assessment (GQA) Derg catchment 2007. Data supplied by NIEA
Fig 8.01 Biological General Quality Assessment (GQA) Derg catchment 2007. Data supplied by NIEA
9.0 CONSERVATION AND PROTECTION

The Loughs Agency continues to carry out an active fishery protection role throughout the catchments of the Foyle and Carlingford areas including the sea area, River Foyle and on all tributaries. Tables 9.0, 9.01 and 9.02 outline the number of patrols and some duties carried out by the Loughs Agency staff in the Derg catchment and seizures for the Foyle area.

A team of Fishery Officers are responsible for the Derg catchment dividing their time between the Owenkillew catchment, Glenelly catchment, Mourne catchment and the standing waters within the Loughs Agency Central zone. This is in addition to regular fishery protection patrols on the River Foyle.

<table>
<thead>
<tr>
<th>Year</th>
<th>Patrol Hours</th>
<th>No of Licence Checks</th>
<th>Joint Patrols</th>
<th>On-site Inspections</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>554</td>
<td>172</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>2007</td>
<td>780</td>
<td>214</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>2008</td>
<td>842</td>
<td>188</td>
<td>0</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 9.0 Breakdown of conservation and protection duties in the Derg catchment 2006-2008

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nets</td>
<td>114</td>
<td>100</td>
<td>97</td>
<td>114</td>
<td>181</td>
<td>198</td>
<td>207</td>
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<tr>
<td>Salmon</td>
<td>92</td>
<td>56</td>
<td>91</td>
<td>118</td>
<td>130</td>
<td>155</td>
<td>94</td>
</tr>
<tr>
<td>Rod &amp; Reel</td>
<td>136</td>
<td>85</td>
<td>26</td>
<td>10</td>
<td>16</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Vehicles</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 9.01 Seized nets, salmon, rod/reels and vehicles in the Foyle system 2002-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Nets</th>
<th>Salmon/Trout</th>
<th>Rod/Reel</th>
<th>Vehicles</th>
<th>Boats</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2007</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 9.02 Seizures in the Derg catchment 2006-2008
9.1 Habitat Improvement Works

In addition to the traditional protection duties carried out by the Loughs Agency staff conservation and improvement of habitat has been increasing over recent years.

Over time man has imposed significant changes on the natural courses of many rivers and flood plains. The driving forces behind these changes have included amongst others; arterial drainage schemes to provide more suitable land for agricultural purposes, urban sprawl, infrastructure expansion (roads etc.), flood defences, water abstraction and hydro power generation. All have had a significant impact on the natural meanderings and discharges of rivers and tributaries resulting in faster runoff of floodwaters ultimately leading to a change in the morphology and flow regime of rivers and resultant impacts on fisheries.

While all these processes have had some impact within the Foyle system, it is still considered to be a relatively natural system with natural river structure present in the catchments headwaters. In areas that have been altered methods for reinstating lost habitat are investigated and where appropriate action taken.

In 2003 the Loughs Agency became aware of a problem at the outflow of Lough Derg. The outflow had been impounded to maintain water levels within the Lough, Figure 9.1 and 9.11.

Any activities with the potential to cause an impact on the fishery resources of the Foyle and Carlingford area need to be officially sanctioned by the Loughs Agency and other relevant statutory bodies in Northern Ireland or the Republic of Ireland.

In this instance the Loughs Agency had not been consulted and the source of the River Derg had been artificially blocked. The impoundment prevented upstream and downstream migrating fish from accessing the river and lough as well as dewatering a considerable section of the river, significantly impacting upon the salmonid nursery habitat and associated aquatic and riparian flora and fauna immediately downstream of the lough outflow, figures 9.12 and 9.13.

Figure 9.1 Artificial impoundment at the outflow of Lough Derg into the River Derg. Photograph taken looking downstream
Figure 9.11 Secondary impoundment on the River Derg looking upstream towards first impoundment

Figure 9.12 Dewatered stretch of River Derg below impoundments

Figure 9.13 Good quality salmonid nursery habitat downstream of impoundments highlighting dewatering
The severe dewatering of the River Derg in 2003 was due to conflicting stakeholder objectives. From a fishery perspective river water flow needs to be maintained to facilitate the passage of upstream and downstream migratory fish species of various life history stages in order to provide access to and from Lough Derg.

The Loughs Agency endeavoured to apply a solution that would be acceptable to all stakeholders. This involved removing any barriers to fish migration and guaranteed river flow in the upper section of the River Derg. An offset boulder weir was also constructed, figure 9.14, which acted as an impoundment yet allowed water and migrating fish over in all flow conditions.

The river directly downstream of the location of the second impoundment was narrowed to facilitate migratory fish passage in all flow conditions. This was achieved by constructing a deflector groyne on the left hand bank increasing flow and water depth, figure 9.15.

![Offset Boulder Weir](image-url)
In-channel works were completed in 2005 after a number of temporary measures had been used to accommodate fish passage. Figures 9.16-9.18 show the site one year after the works were completed. The river substrate has stabilised providing suitable nursery habitat and possibly some spawning habitat. Water levels of the lough were maintained and access for upstream and downstream migrating fish was possible in all flow conditions.
In late 2006 early 2007 the Loughs Agency were dismayed to discover that the in-channel improvement works, constructed at significant expense in 2005 had been removed without permission or consultation and the passage of migratory fish impeded once again. The Loughs Agency has investigated this incident and has implemented measures to facilitate fish passage.
In 2006 a number of in-channel habitat improvement schemes were completed on feeder tributaries of Lough Derg. The schemes were designed to improve juvenile salmonid production and included the installation of habitat units, bankside protection and fencing.

It is anticipated that further works will be conducted within the Derg catchment including developing native riparian buffer strips adjacent to watercourses and gravel loosening in areas where spawning gravels have been compacted. Working partnerships are being developed with the relevant forestry bodies to ensure best practice is implemented with reference to coniferous forestry plantations and their management in relation to aquatic resources.

9.2 Finfish Aquaculture

Fish rearing facilities are located on both the main River Derg and on the Mournebeg River. Salmon smolts are produced for the marine aquaculture sector on the River Derg and Rainbow trout are produced on the Mournebeg River for human consumption. Water is abstracted from the Derg catchment to facilitate propagation and will be monitored by the Loughs Agency in conjunction with other statutory bodies in both Northern Ireland and the Republic of Ireland.

Figure 9.2 Smolt rearing facility on the Upper River Derg near Lough Derg.
10.0 ENVIRONMENTAL ISSUES

Some environmental issues affecting water quality have already been outlined previously. The following list presents some of the main habitat pressures to salmonids within the Foyle system:

- Agricultural activities – enrichment from natural and artificial fertilisers often make their way into watercourses, enhancing problems with eutrophication.
- Forestry activities – planting and felling operations can lead to increased loading of suspended solids in watercourses. Established forestry as a major upland land use has been attributed to increased acidification.
- Barriers to migration – a range of natural and anthropogenic features on rivers can lead to barriers for migrating salmonids and other fish species. These can include weirs and hydro-electric schemes.
- Gravel removal – gravel is extremely important for the creation of redds for spawning fish. Removal of gravel from the river bed in sensitive areas can destroy potential spawning and nursery habitat.
- Quarrying activities – the extraction of aggregates such as rock, sand and gravel has the potential to cause increased levels of suspended solids in nearby watercourses. Sufficient mitigation measures should be in place at such sites to trap increased sediment loads entering rivers and streams.
- Abstraction – water abstraction from watercourses for a range of uses is increasing throughout the Foyle and Carlingford catchments. Unless appropriately assessed and licenced, these activities have the potential to reduce residual flow levels and alter the ecological status of our rivers. This is even more concerning in the light of climate change.
- Peat harvesting – Peat harvesting still occurs in small upland pockets throughout the Foyle system. It has the potential to increase sediment loading in receiving waters.
- Sewage treatment – sewage and waste water treatment works are under considerable pressure with the increase in urban development in our towns and villages. Several inadequate systems throughout the Foyle system continue to pollute rivers.
- Hydropower – small-scale hydropower schemes are beginning to appear on rivers throughout the Foyle and Carlingford catchments. Baseline fishery data must be provided to allow for sufficient assessment of any proposed scheme, unless located above an impassable fish barrier.
- Urban development – the expansion of large-scale housing developments and the associated pressures on waste water and sewage treatment works are a potential source of water pollution in the event of overflows.
• Drainage and canalisation – these have direct impacts on the quality of available fishery habitat within the catchments. Canalisation in particular can lead to the removal of important spawning, nursery or holding areas of rivers.

• Industrial discharges – larger urban areas with industrial discharges have the potential to cause pollution through toxic discharges and can alter the temperature of the watercourse.

• Septic tanks – a proliferation of single dwellings and their septic tanks is an ongoing area of concern. Initial research from parts of the Foyle system indicate that this is major contributor to decreased water quality and local increases in suspended solids.

### 11.0 DESIGNATED AREAS

The European Commission Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (EU Habitats Directive 92/43/EEC) requires that all member states designate Special Areas of Conservation (SACs) in order to protect threatened habitats and species. The European Commission Directive on the Conservation of Wild Birds (Birds Directive 79/409/EEC) also requires the designation of Special Protected Areas (SPA’s). Together the designated SAC’s and SPA’s create the NATURA 2000 network of protected sites. A number of rivers have been designated as SAC’s both in Northern Ireland and in the Republic of Ireland.

One of most recent additions to the list of SACs is the River Foyle and Tributaries SAC which includes the River Derg, Mournebeg River and Glendergan River.

Atlantic salmon is listed as an Annex II and Annex V species within the directive meaning that they are of community interest requiring the designation of an SAC (only in fresh water).

"The River Foyle and its tributaries have the largest population of Atlantic salmon in Northern Ireland. The majority of the salmon returning are grilse (single wintering salmon), with a smaller but important number of spring salmon (multi-wintering salmon) also occurring. Research has indicated that individual sub-catchments within the system support genetically distinct salmon populations" (Environment and Heritage Service).

Within the Derg catchment there is a diverse range of landscapes, habitats and species. National and as mentioned above European Legislation requires that important and threatened landscapes, species and habitats are protected by various designations.
At the national level the primary designations within the Derg catchment include the designation of Areas of Special Scientific Interest (ASSI) including Moneygal Bog which is one of the finest raised bog pool systems in Northern Ireland with associated species of importance and Moneygal Bog Part II an area of cutover lowland raised bog important for its vegetative ecology providing habitat for a diverse range of birds including Snipe, Woodcock and Meadow Pipit. Essan Burn and Mullyfamore, a large area of blanket bog with intact hydrology and vegetation including the carnivorous plant Sundew, is also an ASSI. Killeter Nature Reserve part of the National Nature Reserve network (NNR) and has been designated to protect its blanket bog and associated species.

At the European level Special Areas of Conservation (SAC’s) have been designated to protect landscapes, species and habitats of international importance. Within the Derg catchment these include, Moneygal Bog as above, the River Foyle and its tributaries incorporating the River Derg, the Mourne Beg River and the Glendergan River designated for important Atlantic Salmon populations and river habitat which is viewed as being fast flowing spate rivers characterised by sequences of rapid, riffle and run. The channels are natural and composed of large cobblesubstrate with scattered boulders and sandy deposits. At the top end of the River Derg there is good representative riparian and in-stream vegetation including Water Crowfoot (Ranunculus species). Otters are also present within the catchment.

Dunragh Lough/Pettigo Plateau has also been designated as an SAC. The area includes part of the Derg catchment on the western shore of Lough Derg. It comprises an extensive complex of blanket bog, wet heath, lakes and pools and associated flora and fauna covering an area of low hills and broad basins.

Lough Derg has been designated a Special Protected Area (SPA). The Lough Derg SPA was designated for its populations of Lesser Black-backed Gull (the largest colony in the Republic of Ireland), Herring Gull and Greenland White-fronted Geese (current status unknown). Populations of Common Gull, Tufted Duck, Mallard, Goldeneye and Greylag Geese can also be seen on Lough Derg.

From a fisheries perspective it is not only important to conserve and protect the natural fisheries biodiversity but as part of an ecosystem management approach it is essential to be aware of the wider interconnections between different species and their habitats.

12.0 GENETIC STUDY

A baseline genetic survey was carried out in the Foyle system in 2003 and a resurvey conducted between 2006 and 2008 to analyse the populations of Atlantic salmon present within the Foyle catchment. Results confirmed the existence of genetically distinct populations between and within the rivers and tributaries of the
Foyle area. An understanding of these genetically differentiated populations is required to facilitate appropriate management of conservation measures and the commercial/recreational fisheries.

The report concluded that genetic diversity is high between and within the various salmon populations present in the Foyle system. Each population has evolved over time creating distinct populations (with some gene flow from straying fish) that are best suited to the conditions present in a particular river or tributary. The non-uniform nature of the populations adds to the diversity of life history strategies exercised by Foyle salmon. Distinct differences such as run-timing and age at smolting can act as natures insurance policy to any catastrophic events which would threaten a homogenous population.

The report stated that the current genetic structure and diversity of Foyle salmon is representative of what might be regarded as the native structure of wild salmon populations. The maintenance of genetic diversity is a core requirement for the long-term sustainability of wild populations, preserving the biodiversity of the wild salmonids of the Foyle system is therefore a primary objective of the Loughs Agency.

### 13.0 POLLUTION MONITORING

The Loughs Agency has a statutory obligation to monitor the pollution of watercourses. In conjunction with the Northern Ireland Environment Agency all reported pollution incidents are investigated.

### 14.0 FISHERIES OFFICERS DERG AREA REPORT 2008

In 2008 Fishery Officers continued their work within the Derg catchment. No report was submitted for 2008

### 15.0 ACTIONS FOR 2009

In order to fully utilise the extensive data resources collected and held by the Loughs Agency on the fish populations and habitats of the Derg catchment it is necessary to focus attention on specific management objectives.

The Loughs Agency has stated in its corporate plan 2008-2010 that it will conserve, protect, manage and improve the fisheries of the Foyle and Carlingford areas. By way of fulfilling these objectives a targeted series of actions utilising data collected over recent years will be implemented. Fishery owners and local angling clubs will
continue to be consulted regarding any proposed works and stakeholder input sought.

15.1 Foyle and Carlingford Areas Ongoing Actions for 2009

**Good water quality** is essential for the conservation of productive aquatic ecosystems. Fish populations rely on unpolluted water for survival and feeding. The Loughs Agency is committed to ensuring deleterious matter does not enter any watercourse. Routine monitoring is conducted throughout the Foyle and Carlingford areas. Proactive pollution visits and water quality monitoring will continue in 2009.

**Water quantity** is becoming an increasingly important issue from a fisheries management perspective with continuing demand from a variety of sources including industry, hydro power generation and abstraction for meeting the ever growing needs of industry and the wider population. The Loughs Agency are aware of the conflicting needs of aquatic environments and water resource users and comment on development issues which may have an impact on the important aquatic resources of the Foyle and Carlingford areas with reference to national and international obligations.

**In-channel and riparian habitat improvement** projects provide an important mechanism by which to improve and protect valuable fishery resources. Over recent years the Loughs Agency has developed a number of projects designed to improve the survival and production of robust populations of juvenile salmonid and other native fish species. These programmes will continue where funding is available, The Loughs Agency also encourages local stakeholder groups to source appropriate funding to develop collaborative habitat improvement projects. The Loughs Agency can provide advice and recommendations for in-channel and riparian improvements and are eager to facilitate the development of such programmes.

Work is continuing to assess and record all **Barriers to Migration** within the catchments of the Foyle and Carlingford areas and these will be incorporated into the Loughs Agency Geographical Information System (GIS). Where finances are available the removal of artificial barriers will be investigated.

**Predation by cormorants and seals** of economically important fish species continues to be a contentious issue. The Loughs Agency will continue to promote the development of a management strategy incorporating economic, social and environmental factors.

The Loughs Agency will continue to monitor the salmon and inland fishery resources of the Foyle and Carlingford areas, utilising best practice methods including fish counters, juvenile population surveys and catch returns. The importance of the Atlantic salmon resource has been further highlighted by recent genetic studies which have identified the presence of genetically distinct populations...
of salmon between and within main river catchments. This information will be utilised when developing habitat improvement programmes to ensure the presence of a diverse resource capable of withstanding change.

**Invasive species** in both aquatic and riparian habitats have become an important issue in fisheries management and in wider environmental management. Invasive species have the potential to significantly alter ecosystems and their function. The Loughs Agency is contributing towards the development and implementation of invasive species codes of practice.

15.2 Derg Catchment Potential Habitat Improvement Schemes for 2009

- Investigate and develop habitat improvement schemes aimed at conserving active spawning habitats

15.3 Derg Catchment Specific Actions for 2009

- Implement habitat improvement schemes as dictated by business plan/corporate plan
- Conduct annual fish population surveys and spawning surveys
- Conduct ongoing water quality monitoring and investigate areas highlighted as being of concern
- Develop potential habitat improvement projects including riparian buffer zone creation, fencing, native species planting and in-channel habitat improvements including spawning bed and nursery habitat improvement
- Monitor forestry operations adjacent to watercourses or areas likely to impact on watercourses
- Assist with Water Framework Directive fish monitoring programme
- Monitor all sand and gravel extraction sites and onsite water management practices
- Ensure all fish passes, dams and mill races meet required standards