River Nairn Fisheries
Management Plan 2010 – 2015.

R. Laughton

Spey Foundation Report 02/10

Spey Foundation, 1 Nether Borlum Cottage, Knockando,
Morayshire, AB38 7SD.
Tel 01340 810841.
Email: research@speyfisheryboard.com

For
Findhorn, Nairn and Lossie Fisheries Trust
Logie Steading, Dunphail, Morayshire, IV36 2QN.

June 2010

Contents

River Nairn Fisheries Management Plan 2010 - 2015

R. Laughton.

Spey Foundation,

1 Nether Borlum Cottage, Knockando, Morayshire, AB38 7SD.

Tel 01340 810841, email research@speyfisheryboard.com

1. Scope of the Plan

This Fishery Research and Management Plan has been prepared by the Spey Foundation on behalf of the Findhorn, Nairn and Lossie Fisheries Trust (FNLFT) to facilitate the proper management of all fish species in the Nairn Fishery District. It provides a framework for within which the Nairn District Salmon Fishery Board (NDSFB) and the FNLFT Trust can identify target areas for research and apply specific funding.

Inherent in the drive towards a scientific approach to the management of the Nairn's fish species on a catchment wide basis is the integrated nature of the research and management. Where possible the research proposed in this plan builds on existing data however, given that this is the first Fisheries management plan for the Nairn the majority of the proposals here are designed to initiate data collection to allow improved management decisions in the future.

1.1 Wider Perspective: Water Framework Directive and A Strategic Framework for Scottish Freshwater Fisheries

Fish and their habitats are affected by many factors and so an integrated catchment management approach is desirable for their effective management. The implementation of the Water Framework Directive (WFD) has led to the development of River Basin Management Plans (RBMP). This is led by the Scottish Environment Protection Agency (SEPA) and these river basin

management plans (RBMPs) ensure that public sector bodies, businesses and individuals work together to protect the water environment and address significant impacts by co-ordinating all aspects of water management for the next 6 years. The first River Basin Management Plan (RBMP) was published on 22nd December 2009 http://www.sepa.org.uk/water/river_basin_planning.aspx and provides the most up to date picture of the current status of the catchment in terms of the WFD. The actions proposed in this Fishery Management plan can also make a contribution to improving water bodies to good status or preventing deterioration. In particular good datasets are required to underpin the classification process, for example, data from juvenile surveys may prove to be very useful for this process in the future. The Nairn lies within the North Highland Area Advisory Group (AAG) and the RBMP for this area should be consulted regularly. More details can be found at: http://www.sepa.org.uk/water/river_basin_planning/area_advisory_groups/north_highland.aspx

In addition the following key document is also important in the development of this Plan - A Strategic Framework for Scottish Freshwater Fisheries (Scottish Government 2008)
http://www.scotland.gov.uk/Publications/2008/06/26110733/15.

2. Nairn Catchment

The River Nairn originates near Carn Ghriogair in the Monadhliath at approx 800m above sea level. It flows largely for approx 54km (36miles) north east to meet the Moray Firth at Nairn, the largest settlement along the river. The main tributaries are the River Brin, River Farnack, Craggie Burn and Cawdor Burn although there are several other smaller burns. Loch Duntelchaig is the only major loch draining into the Nairn although some smaller still waters are present. Loch Duntelchaig is also used for public water supply.

The geology of the Nairn catchment is dominated by schists and gneisses in the upper river while some Old Red Sandstone is present in the lower reaches along with glacial and alluvial deposits. Moorland and substantial commercial conifer plantations are present in the headwaters while arable farming is more prevalent in the lower reaches.

The river flow is monitored by SEPA at their Firhill gauging station in Nairn and the mean daily flow is $5.53 m^3 s^{-1}$. Water quality is also monitored by SEPA and in general water quality is good throughout the catchment. The River Nairn has a catchment size of $313 km^2$ and an average annual rainfall of 940mm.

The catchment is entirely within the Local Authority administration of Highland Council. The area can be classed as a low population density area with Nairn (pop 8,600) being the only sizeable town within the catchment.

3. Fisheries Management on the Nairn

3.1 Fish species occurring in the Nairn catchment

i. Native species

Atlantic salmon (*Salmo salar*); Brown/sea trout (*Salmo trutta*); Eel (*Anguilla Anguilla;* Brook lamprey (*Lampetra planeri*). Flounder *(Platichthys flesus)*.

ii. Non-native species (Historical Introductions)

Northern pike (*Esox lucius*); Perch (Perca fluviatilis)

iii. Non-native species (Recent Introductions)

Rainbow trout (*Oncorhynchus mykiss*), Brook Trout (*Salvelinus fontinalis*)

An adult Sea lamprey (*Petromyzon marinus*) has been observed in the river in recent years and River Lamprey (*Lampetra fluviatilis*) may also be present although recent surveys did not confirm this (Era 2004).

Pike and perch are present in Loch Dumtelchaig and are probably introduced some time ago.

Thus the Nairn is similar to many Highland rivers supporting only a limited range of fish species and the preservation of this limited fish fauna should be a key management target rather than attempting to broaden the species list through introductions of non-natives.

3.2 Fisheries Management on the Nairn

Management of salmon and sea trout within the River Nairn catchment is the responsibility of the Nairn District Salmon Fishery Board (NDSFB). The Board

works in close coordination with the newly established (2009) Findhorn, Nairn and Lossie Fisheries Trust (FNLFT).

The Nairn District Salmon Fishery Board was established under the 1860's Salmon Fisheries legislation as subsequently amended and stated in the Salmon Act 1986 and the Salmon Conservation (Scotland) Act 2001. This legislation has recently been streamlined into the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. It is empowered under the legislation to take such acts as considered expedient for the protection, enhancement and conservation of Atlantic salmon and sea trout stocks and fisheries.

Statutory responsibilities of the NDFSB are to:

1. provide fisheries protection (salmon and sea-trout)
2. set the salmon rod fishery season
3. set the sea trout rod fishery season
4. set weekly rod fishery close times (midnight Saturday – midnight Sunday)
5. police the purchase and sale of illegally-caught or unseasonable fish
6. ensure fish passage over obstructions to migration
7. protect juvenile fish and spawning redds
8. regulate the movement and introduction of adults, juveniles and ova.

The official season for salmon and sea trout runs from the 11th February until 7th October. However, many of the fishing estates and Angling Associations vary the season length within this. The official season for brown trout is 15th March until 7th October and again there are variations within this along the river.

The Findhorn, Nairn and Lossie Fisheries Trust (FNLFT) is an independent charity whose objectives are:

- To conserve and restore all species of native freshwater fish and improve their habitats,

- To advance the education and understanding of the river environment and river catchment management.

The Trust has a broad remit and works in close coordination with the District Salmon Fisheries Boards for the Rivers Findhorn, Nairn and Lossie. The Trust also works closely with the angling associations, local councils, SEPA, SNH and other organisations. Both Board and the Elgin Angling Association are also represented on the board of the Findhorn, Nairn and Lossie Fisheries Trust (FNLFT), which is also a member or the Rivers and Fisheries Trusts, Scotland (RAFTS)

The NDSFB is a member of the Association of Salmon Fishery Boards, both Board and the Nairn Angling Association are also represented on the board of the Findhorn, Nairn and Lossie Fisheries Trust (FNLFT), which is also a member of the Rivers and Fisheries Trusts, Scotland (RAFTS).

3.3 Salmon and sea trout fisheries

A salmon and sea trout fixed engine net fishery existed within the Nairn District until 1985 when it was closed. Today the Nairn is fished by rod and line along part of the mainstem. The majority of fishing effort occurs in the Nairn Angling Association stretch from Cantray Bridge down to the tidal limit while further upstream fishing is available from a number of estates.

3.4 Other fisheries

Loch based fisheries within the Nairn catchment are limited to Loch Duntelchaig. There is a put and take fisheries operated at Geddes offering stocked rainbow trout and/or brown trout. Lochan a' Chaorainn which feeds the Craggie Burn was operated as a small private fishery and reputedly stocked with Brook trout in the late 1990s (Mackay 2000). Whether this practice is still continued is unknown and further investigation is required.

4. Fisheries Research on the Nairn

4.1 Catch Data

Adult salmon and sea trout catch data is available from 1952 onwards from Marine Scotland Science. Data is available from the rod and line fishery and coastal fixed engine fishery. The fixed net fishery operated between 1952 and 1985 when it was closed. Yearly catch data for the two fisheries is provided in Appendix 1. Catch data prior to 1952 may also exist in Estate and Angling Club records as well as historical netting records and further investigation may turn up valuable datasets.

Figure 1 and Table 1 illustrates the rod and line catch for the River Nairn from 1952 to 2008. It is clear from Figure 1 that until recently salmon catches and sea trout catches are often very similar. Figure 1 indicates that salmon catches in the Nairn have always been fairly low but in the last few years good returns have been reported. Indeed from 2004 to 2008 the salmon and grilse catch was considerably more than the sea trout one. The reasons for this increase are not clear although better salmon catches were also reported in neighbouring rivers as well. It is also evident that sea trout catches have declined sharply in the last decade. There has been little research carried out on sea trout populations in the area so the reasons for this decline are poorly understood. This is also true for other rivers in the Moray Firth area and to address the issues the Moray Firth Sea Trout project was initiated in 2007. For further details see www.mfstp.co.uk.

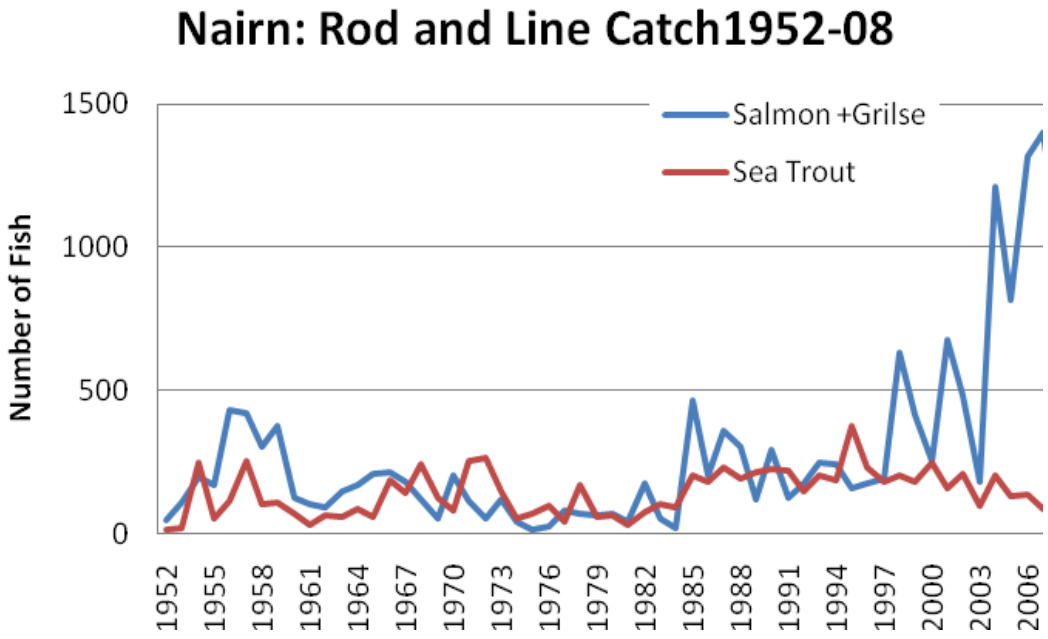


Figure 1: Rod and line catch for the River Nairn 1952 to 2008. (The data used in this figure are Crown copyright, used with the permission of Marine Scotland Science).

Table 1: Long term mean and maximum catches from the River Nairn 1952 - 08.

	Salmon	Grilse	Salmon and Grilse	Sea Trout
Long-term Mean	105	178	278	143
Maximum Catch (Year)	395 (2007)	1064 (2006)	1402 (2007)	377 (1995)

Catch data provides an indication of trends in the fish populations, but data on fishing effort is poor or missing, data on finnock catch is also poor and work is also required to examine the effects of environmental conditions such as water flow. Data on Brown trout catches are also desireable and may be available through Estate record books.

4.2 Juvenile Salmonid Data

A very limited amount of electro-fishing data is available for the Nairn. A site near the bridge at Faillie (NH 71199 38002) was surveyed by SEPA staff in September 2008 (Table 2). Their results indicated that salmon and trout were present along with eels and lamprey. Three age classes of salmon 0+, 1+ and 2+ were found. The densities of salmon 0+and trout indicated a healthy population.

Table 2: Juvenile salmon and trout densities from River Nairn electro-fishing site, September 2008 (data supplied by A. Duguid, SEPA).

	Salmon 0+	Salmon Parr	Trout 0+	Trout Parr
Density ($100m^{-2}$)	123.85	13.95	2.79	1.26
Standard Error	3.41	0.27	0.12	0.18

Scottish Fisheries Co-ordination Centre electro-fishing training sessions were held on a burn near Farr in Strathdearn. Although fish population density data was not determined salmon, trout and eels were all recorded as present.

Currently no further data on juvenile salmon and trout within the Nairn is available. It is recommended that an electro-fishing survey is carried out to establish better distribution and density data.

4.3 Other Fish Species

Trout and salmon are likely to dominate in the fish fauna of the Nairn but eels, lamprey have also been reported (*pers comm.* A. Duguid SEPA). More detailed data on the lamprey population is provided by Era (2004) from a national survey of lamprey populations. Their findings indicated that lampreys were present and

that these were mostly Brook Lamprey. However, some were not identified to species level so River and/or Sea lamprey could also be present. Further information is desirable.

4.4 Future Data Collection

Good data on for the fish populations in a river is essential to inform management and one of the key aims should be to determine spawning targets for salmon and sea trout.

Each river has a certain carrying capacity based on the accessible area available for spawning adults. By determining this area and calculating the minimum number of eggs required to saturate the area to produce the maximum output of smolts, it is possible to assess from adult fish returns whether the river is reaching its spawning potential. This approach is now recommended by bodies such as NASCO as a method of managing salmonid stocks on a river by river basis (Butler 2002). However, to achieve the good data sets required will take time and they are costly to collect. Despite a limited budget there is already a range of data sets available for the Lossie, particularly on adult catch data and juvenile distribution. Effort needs to be applied to maintaining these datasets and linking them to geographical information system (GIS) to allow better linkage and analysis to other dataset in the future Currently no data on smolt production, spawning distribution, age structure and exploitation rates are available, adult counter data would also be desirable.

Recent genetic analysis of salmon populations in other rivers has indicated that river stocks may be structured on fine scale into multiple distinct breeding populations. For example, salmon breeding above and below waterfalls or other natural features may often be heritably different in ways that affect their behaviour, survival and reproductive success. This can be true of neighbouring tributary populations and key to allowing each to cope with particular

environmental conditions than the other. Therefore intermixing of the populations may not be desirable. In large rivers many different populations can potentially exist and an understanding of this population structure is essential for the development of effective stock conservation and management programmes.

This partnership project established in 2009, Focusing Atlantic Salmon Management on Populations (FASMOP) between RAFTS, Marine Scotland (MS) and individual District Salmon Fishery Boards (DSFB) and Fisheries Trusts seeks to combine the financial, management and staff resources of Fisheries Trusts and DSFBs with the scientific and technical genetic analysis expertise and facilities of MS. This project will collect and analyse a databank of tissue samples from river catchments across the length and breadth of Scotland.

The work will inform local management but will also contribute to the work on the genetic character of Scottish salmon stocks as part of the pan European NASCO sponsored and EU funded SALSEA-MERGE project. Funding from this project will cover some of the costs of genetically screening local stocks. The main funding support for genetic screening will come from Scottish Government funding provided to support local fisheries management activities and from monies raised locally by trusts and boards. This programme of sampling and analysis is currently funded until April 2011. Further information on the FASMOP project see: http://www.rafts.org.uk/projects/geneticsproject.asp and the SALSEA-MERGE see: http://www.nasco.int/sas/salsea.htm. Tissue samples from the Nairn salmon stocks will be collected in the near future for analysis within this initiative.

Opportunities to combine with other monitoring initiatives such as Moray Firth Sea Trout Project (MFSTP) http://mfstp.co.uk/, Moray Firth Seal Control Plan etc, should also be grasped when possible; the development of the Trust will also assist the process. The FNLFT will also play a key role in the development of data collection for the future management of the fish stocks within the Nairn.

5. Key Issues and Pressures

Many pressures impinge on a river system and affect the performance of the fish stocks. Arguably the greatest factor affecting sea-run salmonid stocks at the moment is sea survival. Although recent years have seen a good catch of salmon and grilse within the Nairn, evidence from the North Esk still suggests that the survival rates for salmon smolts to returning adults are currently very low 5% or less (see Appendix 2). Survival rates for sea trout also seem to be low. Work is underway to improve our understanding of the salmon and sea trout's life at sea but this is highly expensive and beyond the scope of most Fishery Boards. However, with poor survival rates evident at sea it is essential that the natal rivers are kept in good order to maximise the output of natural wild salmon sea trout stocks. Thus this Plan seeks to maintain and where possible improve the habitat and conditions for fish within the Nairn. Selections of key issues are listed below.

5.1 Hatcheries and Stocking

Currently the Nairn does not operate a hatchery for enhancing salmonid stocks. There is considerable debate on the value of hatcheries and how best to source broodstock and plant-out the resultant juveniles. Before embarking on a hatchery program better data on the distribution and abundance of salmonids within the catchment is required and a survey programme is recommended to establish this. Further information on the sub population structure is also required through genetic analysis. This allows better management of the stocks to be carried out. Should a clear weakness in the Nairn stocks be established and ther alternative methods of improving the stock be discounted then consideration may be given to establish then a hatchery programme.

5.2 Fish Access

Allowing fish to reach their spawning grounds is fundamental to securing future populations. There a few waterfalls present within the catchment on the upper Nairn at Aberarder, the Craggie Burn and the Cawdor Burn. These restrict access for salmon and sea trout and upstream of the falls and upstream a resident brown trout population is likely to be present. These are natural features and any attempts to allow fish access above them may have consequences for these brown trout populations. Similarly stocking above the falls with salmonids should be avoided.

In an extensive habitat survey of the Nairn by Mackay (2000) a number of obstacles to fish passage were identified. Many of these were temporary (ie watergates clogged with debris, log jams etc) so are unlikely to still be present. However, walk surveys of the burns prior to spawning migrations would be use ful to identify potential blockages and deal with them if necessary. A weir on the Cawdor Burn for the water supply to Brackla distillery was also identified and this was thought to be awkward for fish passage. Further review of this structure, if it is still in place, would be useful.

Creation of new obstacles to fish passage is should also be addressed. This can arise if an old bridge is being replaced or new estate/forestry access roads are being built. Bridge and culvert design should allow fish passage for all species in up and downstream directions. It is recommend plans for new or replacement river crossings be reviewed by the NDSFB and/or the FNL Fisheries Trust to ensure they allow fish passage.

5.3 Land Management

The Nairn is affected by a variety of land use activities within the catchment. Forestry, agriculture and upland land management activities can impinge upon the water quality and quantity of the catchment. For the most part these activities are controlled through a wealth of guidelines and regulations. Furthermore recently the Scottish Government has implemented a new approach to development planning. Rather than a “case by case” approach, they are aiming to have the development plan guide to where development should, or should not, happen. As part of this new approach SNH is less likely to comment on planning casework which is outwith designated sites (which would apply to most of the Nairn), or which is not subject to Environmental Impact Assessment (EIA). Thus it is crucially important that the Board maintain close liaison with Local Authorities regarding “Development Plans” and bodies such as SNH, SEPA, the Forestry Commission, National Farmers Union, and also local proprietors to raise awareness of the requirements for maintaining healthy fish populations and prevent damaging practices.

5.3.1 Riparian Habitat

An extensive habitat survey of the river has been conducted (Mackay 2000). The purpose of this survey was to evaluate the quality of habitat available for juvenile salmonids, identify spawning areas, identify obstructions, and sections which would benefit from improvement. Point source pollutions were also identified. Much of the Nairn still retains reasonable riparian vegetation and instream habitat. However, several areas for improvement were identified. The report was completed in 2000 so some areas may have changed however, a revisit to some of the areas identified as having degraded habitat would be useful to develop remedial strategies.

A good salmon and sea trout fishery relies on good pools allowing fish to congregate and provide a good angling opportunity. In recent years a number of pools in the lower Nairn have become infilled with gravel and reduced fishing opportunities. The Nairn, similar to all highland rivers, is a constantly changing entity and so as some pools are formed others may fill in this process is known as geohydromorphology. River change is a very complex process and will be affected by land form, spates, and land management practices among many other things. Thus very careful consideration of a range of aspects must be undertaken if changes are made to pools or bank repairs are proposed. Consideration for the potential effects of in riverworks on the rivers structure further downstream must also be made. In addition a Controlled Activities Licence would be required to conduct the work. It is recommended that expert advice should be sought while planning any works of this kind.

5.3.2 Agriculture

Agriculture is fairly intensive in the lower reaches of the river and there have been effects through the straightening of channels and grazing. Mackay (2000) identifies a number of areas where over grazing and trampling is contributing to bank erosion and increasing siltation. A revisit to these areas to examine the extent of this problem and possible remedial activities would be worthwhile. In addition water is also used for irrigating crops during the summer and this may affect burns which are already running at low levels. Little information exists on this aspect.

5.3.3 Quarrying

There is a substantial quarry within the Nairn catchment which may have an effect on the riparian habitat and water quality within the river. It would be useful to determine if there is any adverse effect on fish population as a result of the industry.

5.3.4 Forestry

Extensive conifer plantations are present in the catchment and there is evidence that these have affected watercourses particularly on some upper burns. Some of this forestry is approaching harvestable age and it is important to develop close links with foresters to ensure new planting methods are adopted to protect watercourses and adhere to the latest Forests and Waterguides. A survey identifying areas of poor planting practices within the existing conifer forests would also be useful to target areas for riparian restoration.

5.4 Invasive Non Native Species

A major challenge is to maintain the distribution and status of the current fish fauna, and protect the genetic integrity of native fish populations. The protection of fish biodiversity at the inter- and intraspecfic level is a key deliverable of this Fisheries Management Plan. Development of a "Biosecurity Plan" to identify and control fish fauna is also desirable and further details of how to achieve this through a RAFTS project is available from http://www.rafts.org.uk/projects/biosecurityplanningproject.asp.

5.4.1 North American Signal Crayfish

The North American signal crayfish (*Pacifastacus leniusculus*), is already established in the Geddes Burn and River Nairn. Trapping and removal of the animal is underway and it is important that every effort is made to restrict its distribution both within the Nairn and to other neighbouring rivers. Control methods such as disinfecting fishing kit when moving from one catchment to the other must be implemented. In addition methods for the control and/or eradication of the species from the Nairn should be discussed with other relevant organisations and if possible implemented.

5.4.2 Gyrodactylus salaris

Gyrodactylus salaris (GS) is a highly contagious monogenean ectoparasite of salmon. It originates from the Baltic where it co-exists with salmon populations. However, when it has been transferred to rivers out with the Baltic it has had devastating effects on the salmon populations leading to the complete loss of salmon in many Norwegian rivers. GS is still absent from UK rivers and every effort must be made to ensure the parasite does not establish here. Raising awareness of the threats posed by this parasite and implementing preventative measures are critical to safeguarding the Nairn in the future. Further details on GS and control measures can be found at,
http://www.scotland.gov.uk/Topics/marine/Fisheries/Fish-Shellfish/workinggroups/gswg and the Home and Dry campaign http://www.infoscotland.com/gsbug/

5.4.3 Mink

American mink *(Mustela vison)* is present in the Nairn catchment. Mink spread by migration and kill water fowl, small mammals and juvenile salmon and trout. Mink are closely linked to the decline of water voles. A mink eradication project is now underway in the Cairngorms area and this is already showing good signs of success. The Board have mink traps in operation and continuing their use plus linking into other nearby mink eradication projects such as the one in the Cairngorms is recommended.

5.4.4 Non Native Plant Species

An additional challenge for riparian management is the increasing abundance of non-native plants such as Giant Hogweed, Japanese Knotweed and Himalayan Balsam. While the plants do not directly affect fish populations they do choke out

the native riparian vegetation. This may in turn reduce the range of leaf matter and invertebrates entering the river and so affect the food supplies for juvenile fish. All three are now well established in the lower reaches of the Nairn and although there is some limited control in place an accurate map of their distribution leading to an organised and concerted effort to eradicate the plants is required. There are potential sources of funding to achieve this through SEPA restoration scheme. However, given the density of hogweed infestation, eradication will be costly. An initial step to deal with non native plants and fish introductions is to develop a "Biosecurity Plan". This concentrates on reviewing the current level of non native species within the catchment and developing practical strategies for their control and removal. It also develops methodology for preventing new unwanted species entering the catchment. Given that many of the problems are also present on neighbouring rivers a Moray Firth based approach may be worth considering. Further information on how to achieve this through a RAFTS project can be found at http://www.rafts.org.uk/projects/biosecurityplanningproject.asp and further information on non native species is available from http://www.nonnativespecies.org.

5.4.5 Non Native Fish

The Nairn is similar to many Highland rivers supporting only a limited range of fish species and the preservation of this limited fish fauna should be a key management target rather than attempting to broaden the species list through introductions of non-natives.

No data available on whether minnows are present in the Nairn, these fish have appeared in most other rivers in the Moray Firth as a result of surplus bait used during "drop minnow" fishing. The release of surplus bait which has been transported live to fish dead as in drop minnow fishing would now require a licence – and if carried out without one would be an illegal act.

There is a put and take fisheries operated at Geddes offering stocked rainbow trout and/or brown trout. Lochan a' Chaorainn which feeds the Craggie Burn was operated as a small private fishery and reputedly stocked with Brook trout in the late 1990s (Mackay 2000). Whether this practice is still continued is unknown and further investigation is required. Perch and pike are present in Loch Dumtelchaig, however, until further information is gained the Nairn appears to have escaped many new fish species being established.

Section 35 of the Aquaculture and Fisheries (Scotland) act 2007, which inserts a new section 33A into the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003, makes it an offence for any person to intentionally introduce any live fish or spawn of any fish into inland waters, or possess such with intention of introduction without previous written agreement of the appropriate authority. For salmon and sea trout the appropriate authority is the District Salmon Fishery Board but for other fish species it is Scottish Ministers. There is the potential that fish could be introduced to the catchment without consultation with the Fishery Board. To improve this, the Board should request Marine Scotland Science to consult with them on any fish stocking activities in the catchment.

5.4.6 Non Native Plants

The increasing influx of hogweed, Japanese Knotweed and Himalayan Balsam is acutely evident in the lower reaches of the Nairn. While not directly affecting fish populations these plants are dangerous to human health (hogweed) and choke out native riparian vegetation. Control is difficult but with sustained effort it can be achieved. However, to achieve this, a clear map of the species is required and then control form the upper limit downstream can be initiated. A co-ordinated approach amount Estates, Councils and other agencies is also necessary to be

effective. The Trust could be well placed in the future to co-ordinate such an effort provided sufficient funds can be sourced.

5.5 Predation

Fish provide a valuable food source for many other animals in the catchment including avian predators such as heron, sawbill ducks, cormorants and osprey, mammals such as otters, seals, dolphins and porpoises. Many of these animals are now afforded protection having been over persecuted in the past. However, there are concerns that species such as goosander, merganser, cormorant and seals may be affecting salmon and trout populations and that control measures may be required to reduce predation levels.

5.5.1 Avian Predators

Predation on fish by sawbill ducks (goosander and merganser) and cormorants is an issue that concerns many fishery owners and anglers. The smolts provide an important food source for sawbills and cormorants. These birds are afforded protection under wildlife legislation and indiscriminate culling is not permissible. A license to shoot some birds as an aid to scaring may be issued by Scottish Government Landscapes and Habitats Division if a sufficiently strong case can be made. Any application must be supported by good quality data and the applicant must provide evidence that the birds are causing “serious damage” to the fishery.

The impact of predatory birds on fish stocks has not been quantified within the Nairn catchment so more information is needed to develop a sensible management approach to the problem. In essence better bird count data is required along with better data on their dietary habits. There is a developing Moray Firth approach to managing sawbill ducks and cormorants and participation in this process is recommended.

5.5.2 Seals

Both common and grey seals predate on salmon and trout within the Nairn coastal area. The Moray Firth Seal Management Plan was implemented in 2005 with the aim of protecting salmon and sea trout stocks while also maintaining the conservation status of the Dornoch Firth SAC for common seals. The scheme introduced the approach of managing seals and salmon over a large geographical area, the training of nominated marksmen to an agreed standard, and the accurate reporting of all seals shot. The Plan allowed for specific quotas of seals to be culled within river reaches. The Moray Firth Seal Management Plan continued throughout 2008 and it seems likely that this type of approach will be favoured in the future. However, similar to sawbills there is a need for improving data on the presence of seals within and around the Nairn through initiation of a structured counting scheme.

5.6 Fisheries Protection

Poaching remains a problem to all fishery boards and although the problem is less than a few decades ago it still requires attention. Operating a paid and fully trained bailiff team to control poaching is expensive and often beyond smaller Boards such as the Nairn. In this situation river watchers are often utilised who are generally local volunteers who know the river and local anglers well and can often help deter poaching activities. However, river watchers do not usually hold a warrant card so have more limited powers of arrest than a bailiff. They seldom have back up in terms of additional personnel and can only spend a limited amount of time on the river.

Poaching is still a serious issue on the Nairn and neighbouring rivers and it is recommended that a more unified approach to the problem is explored with other neighbouring Moray Firth fishery boards and with the Police.

5.8 Distillery Influence

There is only one active distillery, Royal Brackla, within the Nairn catchment. Distilleries require considerable amounts of water for production of whisky and in particular water is needed to cool the distillate. This warm water is then usually discharged back to the river where it can raise the ambient river temperatures by several degrees. This in turn can affect the wildlife and ecology of the receiving stream for example fish growth rates can be more rapid.

A considerable amount of monitoring of the Brackla discharge has been completed and this indicates that the temperatures have seldom exceeded EU guidelines. These EU guidelines indicate that the temperature in the river receiving the cooling water should not be raised by more than $1.5^{O}C$ above ambient. However, these guidelines are under review and are likely to adopt a more realistic uplift level of $3.0^{O}C$ in the future.

To ensure that the distillers do not breach these uplift regulations is the responsibility of SEPA. However, it is also important that the Board and the Trust maintain good communications with the distillery.

5.9 Wind farm Development

The Nairn catchment has one existing wind farm development within in its boundary, Farr Wind Farm. Further developments may also impinge on the catchment in the future. Wind farms and the associated network of access roads create considerable disturbance to the surrounding land and this may lead to changes in run off. This in turn could affect the water quality of the rivers and stream draining the area and the fish populations within them. Indeed there were reports of run-off problems with the Farr development during construction. It is

recommended that if any further developments are proposed then a monitoring plan to ensure water quality and fish populations are protected is implemented.

5.10 Fish Disease

No major outbreak of fish disease resulting in significant losses of fish has occurred in recent years but it has happened in the past. Little direct action can be taken to treat the disease outbreaks however, removal of infected fish where possible could prevent further spread. In general outbreaks of fish diseases pose little or no threat to human health. However, red vent syndrome (RVS) which is caused by accumulations of the Anasikis parasite near the salmons vent is transferable to humans through eating raw fish such as sushi. Further information is available from: http://www.marlab.ac.uk/FRS.Web/Uploads/Documents/Red%20vent%20Scotweb.pdf and http://www.food.gov.uk/multimedia/pdfs/guidsalmonanisakis.pdf.

5.11 Sea Survival

In recent years the generally low abundance of salmon and grilse appears to be related to poor survival at sea (Appendix 2). For some monitored stocks such as the North Esk, the survival of salmon smolts to adulthood is currently less than half what it was in the 1970s. Many factors may affect marine survival of salmon including environmental changes, diseases and parasites, predation, competition, availability of food, exploitation (including by-catch in pelagic fisheries targeting other species) and factors operating in freshwater which subsequently influence survival in the sea. However, there is a lack of information of the marine phase of the salmon's life-cycle due, in part, to the expense of conducting research at sea. This is largely outwith local control although the NDSFB and FNLFT should where possible support larger national and international initiatives aimed at improving knowledge of the marine phase of the salmon and sea trout.

5.12 Education and Publicity

To date the NDSFB has not pursued an active education role. Many other Boards and Trusts in Scotland see this as an essential element of the management and promotion of the river. It is important that all those who might have an effect upon the river or may have access to the river, understand about fish and fisheries management. Furthermore, initiatives such as “Salmon Go To School” have taken a very positive role in promoting awareness of the importance of the salmon resource to the local primary schools and coupled with options such as river visits, fly-tying and fishing days provide local children with a chance to experience the ecology of the river and try the delights of angling. However, to fully promote these tasks requires staff and funding. The establishment of the FNLFT will enable closer working with local anglers and Angling Associations in order to develop these initiatives.

5.13 Establishing Priorities

The Fisheries Management Plan 2010-2015 is intended to provide a framework within which the Nairn District Salmon Fishery Board (LDSFB) and the Findhorn, Nairn and Lossie Fisheries Trust (FNLFT) can identify target areas for research projects and apply specific funding. In any plan it is useful to priorities target areas and this has been attempted here using the following criteria (Table 3). However, this is only a guide and a flexible approach should to dealing with issues as they arise and developing projects should be maintained.

The Plan also identifies whether the whether the Board or the Trust should lead on a particular aspect in column 6. Although many items will require a flexible and/or combined approach the led organisation is the upper one in column 6.

Table 3: Nairn fishery management plan priority list.

Priority	Key Issues
1	Fish Access, Migration, Distribution and Population Structure Predation Control, Disease Prevention , Poaching Control, Water Quality and pollution
2	Information Gathering, Habitat Management, Fish Stocking Invasive Non-Natives, Education and Publicity
3	Assisting External/National Projects

6. The Fisheries Management Plan 2010-2015.

1. The Environment

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
1.1 Marine Environment	Currently marine survival for both salmon and sea trout is low leading to poor adult return rates.		Maintain liaison with AST, MS, NASCO, MFSTP regarding the results of marine and wider research programmes.	3	Board Trust
1.2 Freshwater Environment .	Water quality is generally good within the Nairn catchment. Discharges from sewage treatment works may be having an adverse effect on the river habitat and fish populations. Demand for potable water may be increasing as populations increase within the catchment. Thermal discharges from distilleries may affect salmonid populations	Seek to minimise any reduction in water quality or quantity within the Nairn catchment To ensure that future developments have a minimal negative impact on the river flow and water quality.	Provide expert advice on the requirements of fish with respect to water quantity and quality. Review any water abstraction operations within the Nairn. Ensure that all existing abstraction schemes have effective means of adult access and smolt screening on intakes. Ensure that there is there is little or no loss of fish habitat or access through any proposed new or existing water abstraction schemes. Develop close liaison with distillers and SEPA to review cooling water discharges.	1 1 1 1 2	Trust Board Trust Board Trust Board Trust Board Trust Board

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
1.3 Land Use	Physical riverworks such as bank repairs, bridge and culvert construction or repair, drainage channels can all affect fish populations. Forestry, quarry and agriculture practices can potentially affect the quality and quantity of water entering the Nairn. Further housing and industrial developments may occur within the Nairn catchment.	To ensure that future developments have a minimal negative impact on the riverine and riparian habitat. To strengthen links with SNH, SEPA and Highland Council and ensure that future developments have a minimal negative impact on the river flow, water quality and fish populations. To improve understanding of how riverworks impact on fish and fish habitats.	Provide expert advice to SNH, SEPA and Highland Council during the planning of developments which may affect riverine habitat and fish populations. Develop close liaison with SEPA and SNH and other statutory bodies regarding developments which may affect the river and fish populations. Provide best practice advice to organisations involved in engineering works. Consider adopting or developing a “Code of Good Practice” for riverworks. Encourage the development of water and fish monitoring programmes alongside significant land use developments. Collaborate and contribute to the North Highland Area Advisory Group (AAG) and River Basin Management Plan (RBMP) process. .	1 1 1 1 1	Trust Board Trust Board Trust Board Trust Board Board Trust

2. Adult Salmon and Trout Stocks

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
2.1 Adult Salmon and Trout Escapement, Exploitation And Conservation.	Encourage and promote sustainable angling for salmon and trout in the Nairn catchment. Maintaining sufficient numbers of adults escape to maximise egg deposition. No data on exploitation rates for salmon and trout. Identify man-made obstructions are affecting salmon and trout access. Raise awareness on fish disease.	Continue to raise awareness of the importance of salmon and sea trout fisheries and highlight the need for conservation practices. Regularly review and if necessary implement conservation policies for salmon and sea trout. Maximise the numbers of adult salmon and trout reaching spawning areas and increase egg deposition. Improve data on exploitation rates for adult salmon and trout Improve data on adult salmonid spawning distribution in the Nairn catchment	Regularly re-assess conservation policies in light of catch and return figures. Collate all existing data on salmon and trout populations. Map all obstacles to salmonid migration. Assess options for the removal of man-made obstacles. Continue monitoring adult salmonids, using catch data and collect fishing effort data. Identify any opportunities for installing a fish counter. Establish project to identify the sub-population structure of the salmon and trout using genetic markers. Determine spawning distribution of adult salmonids. Consider tagging project to determine on exploitation rates of salmon and sea trout. Develop stock recruitment models. Raise awareness on fish disease, particularly Red Vent Syndrome	1 2 1 2 1 2 2 2 2	Board Trust Board Trust Board Trust Board Trust Board Trust Board Trust Board Trust Board Trust

3. Juvenile Salmon and Trout Stocks

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
3.1 Juvenile Salmon and Trout distribution and abundance.	Data on juvenile salmon and trout distribution and abundance is required.	Determine distribution and abundance of juvenile salmon and trout. Identify problem areas and target for remedial action.	Conduct electro-fishing survey to provide better distribution and abundance data for salmon and trout.	1	Trust/Board
	Data on the genetic structure of the Nairn salmon and trout populations is required	Identify genetic structure of Nairn salmon and trout populations	Contribute to tissue samples to SALSEA-MERGE and if possible FASMOP project to identify the population structure of the salmon and trout within the Nairn using genetic marker techniques.	1	Trust/Board
3.2 Salmon and Trout Smolt Production	No data smolt production is available for Nairn catchment.	To provide better measure of the salmon and trout output from the River Nairn.	Explore funding possibilities for establishing a smolts trap(s) within the catchment.	2	Trust Board
			Identify suitable locations for establishing smolt traps throughout the Nairn.	2	Trust Board

4. Protection of Salmon and Trout Stocks

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust
4.1 Predation of salmon and trout by sawbill ducks, cormorants, seals, mink and other animals is often perceived as a problem by anglers and fishery owners.	The effects of bird and seal predation on salmon and sea trout stocks are not clear and development of acceptable control methods is necessary. Mink predation on juvenile salmonids is reducing smolt output.	Work within the Moray Firth predator management framework, to develop sustainable strategies for managing the impact of predators upon salmonids.	Consider ways of improving sawbill duck, cormorant and seal counts. Contribute to the development of a Moray Firth Sawbill Duck and Cormorant Management Program. Continue participation in the Moray Firth Seal Management Programme. Consider linking to or establishing a mink eradication programme. Investigate other predator control methods.	1 1 1 1 1	Board Trust Board Trust Board Trust Board Trust Board Trust

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
4.2 Non Native species .	American Signal Crayfish, are detrimental to existing native species and their habitats Both instream and riparian non native plant species are becoming more abundant and leading loss of native vegetation. Introductions of non native fish are damaging to native populations.	Develop bio-security plan/strategy Develop a control and if possible eradication programme for American Signal Crayfish Prevention of further non-native plant species from entering the catchment. Prevention of non-native fish species from entering the catchment .	Develop education strategy and bio-security plan to prevent the further introduction of non-native plants and/or animals to the Nairn catchment. Support the introduction of better controls on the transfer of fish within Scotland to curb the spread of unwanted species and reduce risks to valuable native populations. Review options for controlling the spread of and if possible eradication programme for American Signal Crayfish Map alien plant species distributions and liaise with relevant partner organisations to develop plans for alien plant species eradication. Develop an eradication strategy for the removal of the non-native invasive plants such as Giant hogweed, Japanese knotweed, Himalayan Balsam, from the catchment.	2 2 1 2 2	Trust Board Trust Board Trust Board Trust Board Trust Board

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
4.2 Gyrodactylus salaris introduction.	The threat of GS introduction is ever present and strategies need to be put in place to prevent its accidental introduction into the system.	To prevent the arrival of GS within the Nairn catchment.	Raise awareness of the GS threat and inform anglers and fisheries of the methods for preventing GS infection within Scottish waters Encourage stronger controls on anglers including the disinfection of tackle, clothing, etc when the visit Nairn fishing locations.	1 1	Board Trust Board Trust

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
4.4 Illegal Fishing (Poaching)	Illegal fishing is still practised in the Nairn district. Anglers do occasionally fish the Nairn without appropriate fishing permit. Maintaining trained personnel to patrol river is desirable but costly.	To reduce and if possible eliminate illegal fishing for salmon and sea trout. Maintain/Develop network of river watchers.	Review river watchers roles and duties and provide additional training when required. Develop and improve links with neighbouring Fishery Boards bailiff staff. Maintain close liaison with the Police, particularly Wildlife Crime officers. Where sufficient evidence is collected, pursue convictions of captured poachers.	1 1 1 1	Board Board Board Board

5. Enhancement of Salmon and Trout Stocks

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
5.1 Habitat Management and Enhancement	Some salmonid habitat has been lost and degraded over time due to poor land management practices. A good habitat survey has been completed for the Nairn but updating the data is required.	To maintain the good quality habitat that is present in most areas of the Nairn catchment Identify river reaches where fish habitat is degraded and consider improvements. Improve the numbers of juvenile salmonids across the age classes and smolt output through improved habitat management.	Digitise data from 2000 habitat survey and prepare a detailed map of key fish habitat features and degraded areas potentially requiring remedial action for the catchment. Re assess habitat survey from 2000 and re-visited areas identified with degraded habitat and draw up plans for habitat improvement projects. Encourage best practice, e.g. exclusion zones to prevent access to instream and riparian areas by grazing animals. Initiate new habitat improvement projects in partnership with proprietors, farmers and external organisations. Review river bed movements, loss of pools and erosion in lower Nairn and seek expert advice.	2 2 2 2 2	Trust Board Trust Board Trust Board Trust Board Board Trust

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
5.2 Hatchery Stocking	No hatchery is present within the Nairn	Currently no plans to implement artificial stocking program	Review hatchery stocking information from elsewhere regularly.	2	Board Trust

6. Management of Other Fish Species

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
6.1 Other Native Fish Species	Better data on the distribution of the other fish species is required.	To improve data on other native fish species and develop more robust management.	Promote projects to examine the ecology and importance of native fish species.	2	Trust

7. Education and Publicity

Factor	Summary of Issue(s)	Management Aims and Strategy	Action Proposed	Priority	Lead (Board/Trust)
7.1 To educate and publicise fisheries management on the Nairn.	Declining interest in fishing and countryside management.	To promote sustainable angling in the Nairn	Promote the fisheries research and management amongst all those who have access to the river.	2	Trust
		To publicise fisheries research and management on the River Nairn.	Promote the fisheries research and management on the Nairn through regular publications.	2	Trust
			Consider developing fisheries education projects with local schools.	2	Trust
7.2 To contribute to wider National Fisheries Management	Need to improve fisheries management within Scotland.	Seek to improve fisheries management across Scotland through contributing to National management organisations.	Maintain membership and continue to contribute to National Fishery organizations such as ASFB, RAFTS and others.	3	Board Trust
			Continue to maintain strong links with Marine Scotland, SNH and SEPA. In particular continue to contribute to Area Advisory Groups and development of Basin Management Plans.	3	Board Trust
			Continue to develop links with Local Authorities and other relevant Agencies.	3	Board Trust

7. Duration and Review

The lifespan of this plan is six years, commencing 1st January 2010 and ending 31st December 2015. During this time the plan will be regularly reviewed by the Nairn Fishery Board and the Findhorn Nairn and Lossie Fisheries Trust. Regular updates will be presented through the Annual Reports, and on http://www.riverfindhorn.org.uk/findhorn_master.html.

8. Consultation

Draft versions of the Nairn Fisheries Management Plan were circulated to the following organisations and the author is grateful for their useful comments,

Scottish Environment Protection Agency
Scottish Natural Heritage
Marine Scotland
Local Biodiversity Officers
Highland Council

9. Acknowledgements

The production this fishery plan was enabled by funding from Scottish Government.

I am also grateful to Callum Sinclair (RAFTS) for his support, encouragement and patience during the production of the plan. Thanks also to members of the Findhorn, Nairn and Lossie Fisheries Trust and the Nairn Fishery Board who provided comments on earlier drafts.

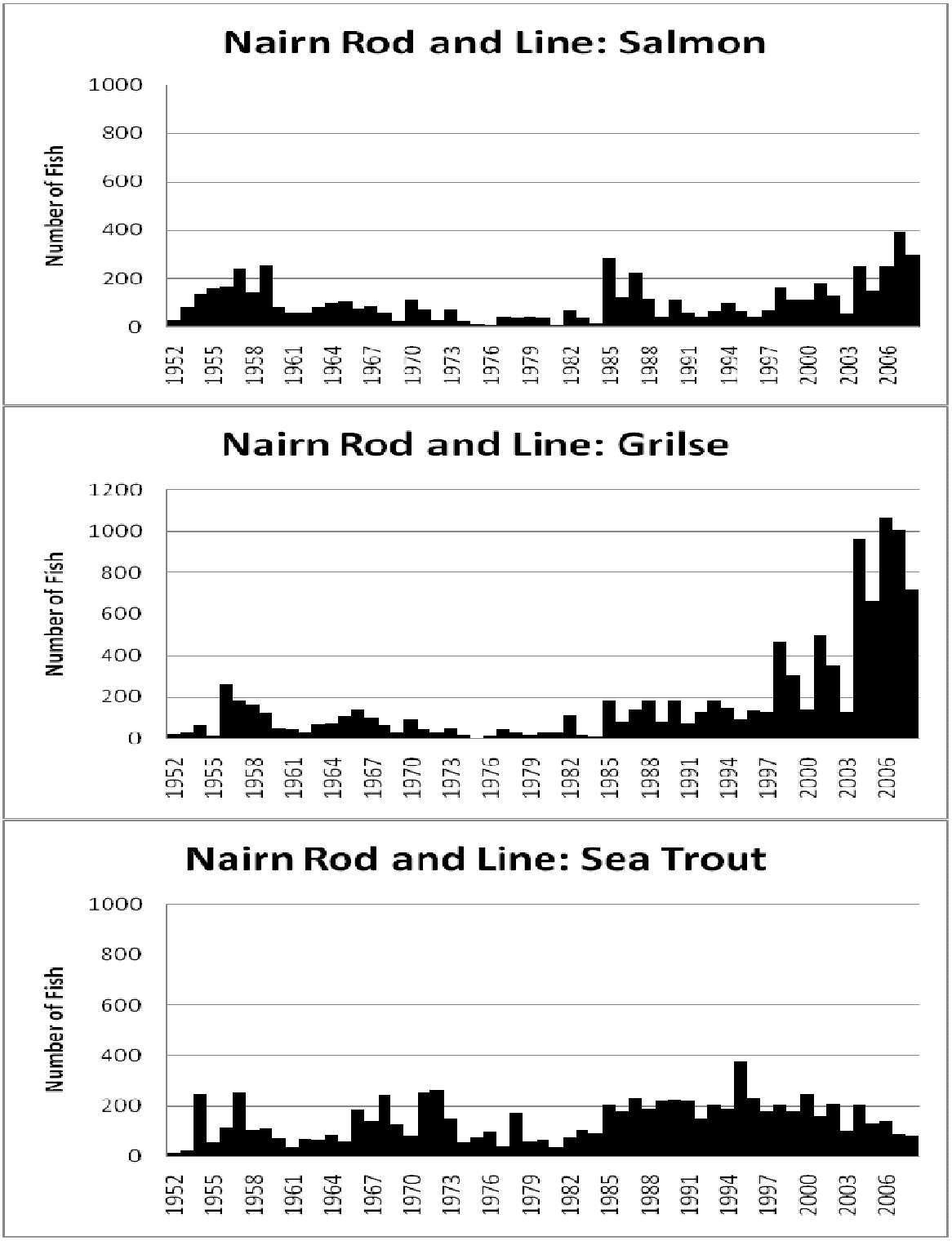
10. References

Butler, J. 2002. River Ewe Fishery Management Plan 2002-2006. Wester Ross Fisheries Trust. 123pp.

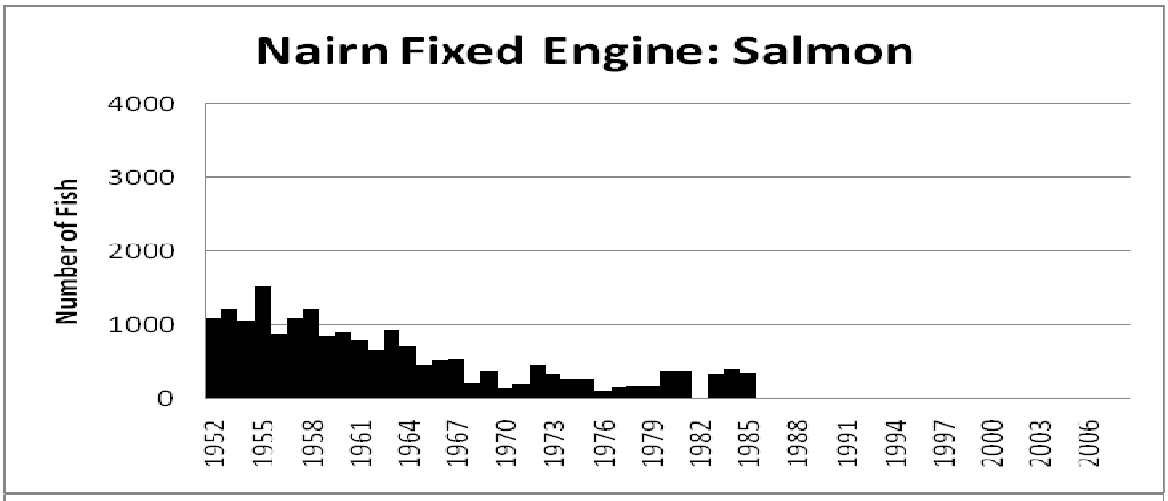
Era. 2004. National Survey of Lamprey Phase I Report: Distribution in Scotland and survey of waters with records of lamprey. Report to Scottish Natural Heritage.

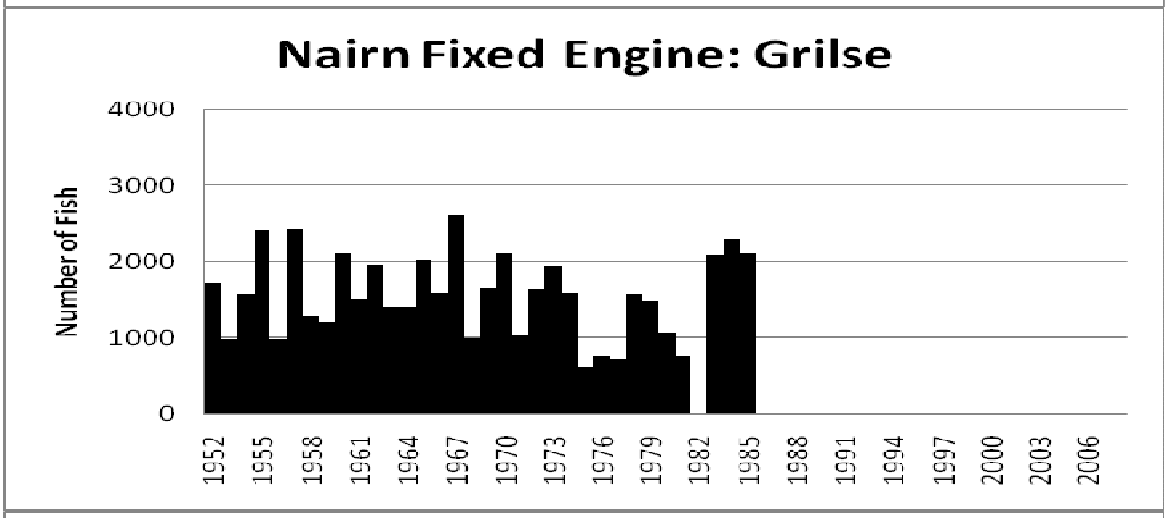
Mackay, S. 2000. Salmonid Habitat Survey of the River Nairn and its Tributaries. Report to the Nairn District Salmon Fishery Board.42pp.

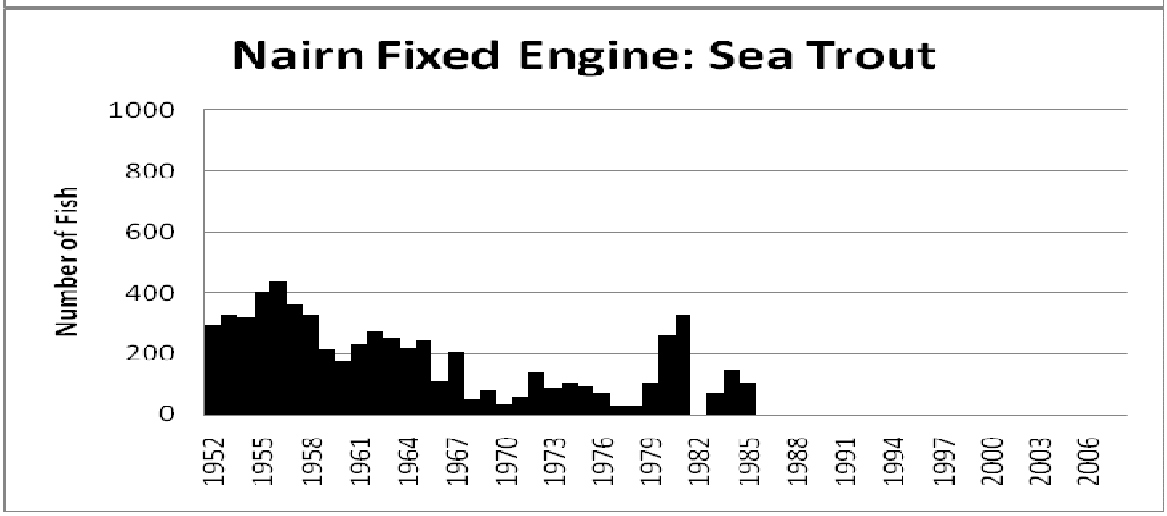
Appendix 1: Catch Data for the River Nairn 1952 to 2008.



 Data from 2004 onwards include retained and released fish.







Appendix 2: North Esk Marine Survival Rates for Salmon Smolts to Adults.