

River Nith Catchment Fishery Management Plan 2014-2018



The Strategic Management Plan For All Species of Fish Within The River Nith Catchment

**Nith District Salmon Fishery Board
&
Nith Catchment Fishery Trust
2014**

About this Document

The first [River Nith Catchment Fishery Management Plan](#) was prepared by the Nith District Salmon Fishery Board in 2008 and published following public consultation. Within the plan, local management priorities were identified as part of a national programme supported by the Scottish Government and the Rivers and Fisheries Trusts of Scotland (RAFTS). These plans linked national, regional and local priorities for all-species fisheries management across Scotland and were implemented by Fishery Trusts and Salmon Fishery Boards.

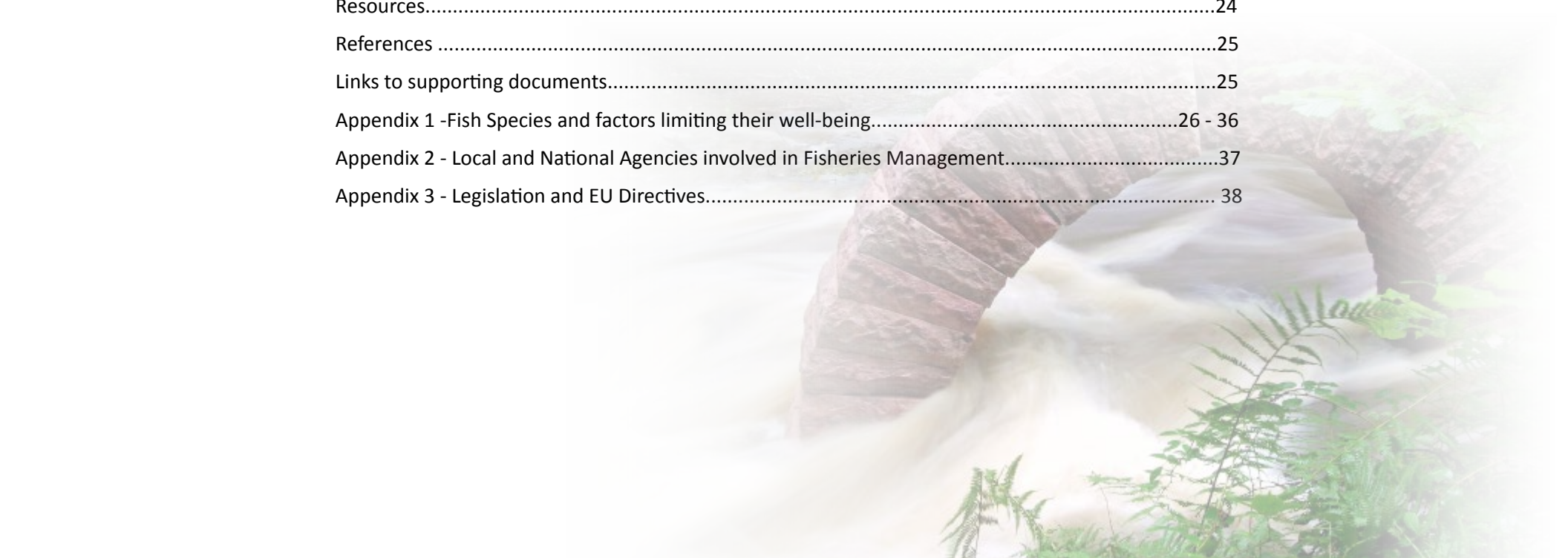
The original River Nith Catchment Fishery Management Plan extended over a five year term covering the period 2008 – 2012. This period permitted sufficient time to implement management initiatives to address issues in the fishery and was lengthy enough to enable actions to be put in place by either Board or Trust within a term of management. For further information on the implementation of this plan please see the [Review of Implementation 2008-2012](#).

This Fishery Management Plan covers the period from 2014 to 2018 inclusive and will take account of changes over the previous five year period and propose management actions thought necessary and foreseen currently. Predicting future requirements for fisheries management within the catchment is difficult at best due to the uncontrollable influences of weather, climate and the fact that migratory species spend a large proportion of their lifecycle in the marine environment, beyond our control. The success or failure of actions taken today can only be assessed, at the earliest, five years on. This reflects the time period of the lifecycle of migratory salmonids. Some management actions such as habitat improvements will take at least 10 to 15 years to mature and yield results within the fishery.



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Chairman’s Foreword

Since I became closely involved in the management of our river, through both the Nith District Salmon Fishery Board and the Nith Catchment Fishery Trust, I have become fully aware of the challenges faced by both organisations. Our primary task is to manage and improve the stocks of fish within all the watercourses of the River Nith catchment. This challenging task is complicated by the migratory life-cycle of some of our fish species. When our salmon and sea trout go to sea they are on their own.

Having said that there is a great deal that we can do to make the Nith more productive. The Board and the Trust meet quarterly (or more often if necessary). It might be useful if I list out, in no particular order of importance, the objectives we review at most, if not all, of our meetings:

- The mitigation of the effects of coal mining and other industrial activity.
- The prevention of poaching.
- The removal of barriers to migrating fish.
- The improvement of water quality and the riparian habitat.
- The maintenance of an appropriate hatchery programme.
- The encouragement of anglers to ‘catch and release’.
- The acquisition of licenses to permit the destruction of predators.
- The control and/or destruction of invasive non-native species.
- The support of science that studies British migratory fish.
- The exercise of influence on the Scottish Government with regard to fisheries and river management policy.

This is not an exhaustive list but it gives a good ‘snap shot’ of current issues. Both the Board and the Trust are focussed, as appropriate, on all of these objectives and this new Fishery Management Plan (2014-2018) seeks to articulate how we intend to make progress on them in the years ahead.

I would prefer to be writing this foreword at a time of record high catches but unfortunately this is not the case. Anglers on the Nith have had a lean time of it in the recent past. They are not, however, alone. All Scottish rivers have suffered a decline in catches in recent years and, while many theories exist as to the cause of this, no one is certain. We can, however, be encouraged by the fact that migratory fish activity is cyclical. There have been several occasions over the last 60 years when catches have been at levels similar to those we are experiencing today, and the ability of fish populations to bounce back is well established.

There is no quick fix to the situation in which our river finds itself. What we can and will do is continue to work towards improving the condition of the river in all its aspects over the long term. This Fishery Management Plan sets out how we will achieve this and I commend it to all who fish in our catchment.



E.P.K. Weatherall
NDSFB Chairman



Summary of Prescriptions

The following prescriptions have been agreed by fishery proprietors and managers as necessary to ensure the welfare of populations of fish within the River Nith catchment.

Poaching (High Priority)

- maintain a team of Water Bailiffs commensurate with the threat of illegal fishing.

Exploitation (High Priority)

- encourage the promotion of sustainable fishing throughout the catchment with all of its proprietors using the angling code and to develop an annual conservation code to be made available to all anglers.
- promote accurate recording of all catches.
- further endorse sustainable fishing via its education programme and by raising awareness of the benefits of catch and release.
- adopt and promote carcass tagging which is anticipated will be initiated within the term of this fishery management plan for the purpose of assisting with the sustainable management of fish stocks.
- discourage further exploitation of the resource.

Engineering procedures (High Priority)

- respond to applications to conduct engineering and offer advice on mitigation and environmental protection in order to prevent degradation of habitat or fishing potential.
- conduct monitoring in relation to engineering works.

Renewable energy (High Priority)

- respond and comment on applications to construct renewable energy projects.
- provide data and scientific input in relation to consideration of all renewable energy projects.
- conduct monitoring to establish fishery data.

- recommend mitigation to prevent damage to the resource.

Biosecurity (High/Medium Priority)

- take full cognisance of the River Nith Bio-security Plan when responding to consultations.
- combat invasive non-native species throughout the catchment and continue to raise awareness about this issue.
- participate in catchment, local, national and international initiatives to combat INNS.

Habitat degradation (High Priority)

- carry out habitat surveys within catchment to identify potential habitat improvements.
- carry out habitat works where identified and permitted.
- maintain existing habitat schemes.

Access for fish (High Priority)

- prioritise barriers within the Nith catchment using recognised barrier assessment tools.
- remove temporary impediments to migration.
- seek removal of any man-made obstruction to fish.

Water Quality (Medium Priority)

- liaise with SEPA and other agencies regarding potential or existing water quality issues.
- respond to any reported incident with the potential to impact on fish stocks and pursue through appropriate channels.
- expand the Riverfly Partnership Anglers Monitoring Initiative.

Marine survival (High Priority)

- participate in appropriate local, national and international research projects.
- work with other agencies to gain knowledge.
- use latest science to advise and make informed

management decisions on local and national levels.

Predation (Medium Priority)

- conduct predator counts to provide accurate data for license applications.
- apply for annual licences to predators.
- conduct annual licenced predator culls.
- conduct mink trapping within the Nith catchment.
- improve counting techniques and keep abreast of alternative means of control.

Fish stock data (High Priority)

- conducting electrofishing surveys throughout the catchment.
- conduct repeat annual electrofishing surveys at core sites throughout the catchment to assess annual fluctuations.
- carry out scale reading of adult and juvenile salmonids to gain data on the structure of fish populations.
- continue to participate in national research programmes to determine stock dynamics and populations trends within the Nith catchment.

Artificial enhancement programmes (High Priority)

- continue to operate a hatchery at levels agreed by the NDSFB Stocking Committee.
- endeavour to maximise natural stock production by improving habitat, access and conserving stocks of returning adults rather than stocking artificially.
- authorise and stock fry into areas identified.
- monitor any salmon and sea trout stocking.
- comment on applications made to Marine Scotland to stock brown trout.

Nith District Salmon Fishery Board



Nith District Salmon Fishery Board (NDSFB) is a statutory body that was established in 1862 and is responsible for the protection and welfare of migratory salmonids within the Nith catchment. The NDSFB is empowered under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 and other legislation to conduct such acts as it considers expedient for the protection, enhancement and conservation of stocks of migratory salmonids.

The NDSFB's objectives are to preserve, protect and enhance stocks of migratory salmonids in the Nith catchment and to preserve, protect and enhance the fishery.

Powers are

- to act, undertake works and incur expenses for the protection and improvement of the fisheries within their districts, for the increase of migratory salmonids and the stocking of the district with these fish.
- to impose financial assessments on each salmon fishery in the district, and to charge interest on arrears.
- to borrow funds, and to incur a wide range of expenditure in furtherance of their powers and duties.
- to appoint Water Bailiffs to enforce the salmon fisheries legislation.
- to exempt persons from certain provisions of the law for scientific or other purposes.
- to sue in the name of the clerk.

Duties are

- to appoint a clerk
- to maintain a list of proprietors within the DSFBs district
- to produce an annual report and audited accounts and to consider these at an AGM
- to call a triennial electoral meeting

NDSFB responsibilities

To protect the fishery by

- ensuring the protection of migratory salmonid fish within the Nith catchment
- enforcing current fisheries legislation
- regulating the stocking of salmon and sea trout within the Nith catchment
- responding to pollution incidents which impact negatively on fish populations
- monitoring and controlling predators that have a negative impact on salmonid fish, where appropriate and within the legislative framework

To enhance the fishery by

- operating a hatchery responsibly in accordance with best practice
- encouraging and assisting with habitat restoration projects

To preserve the fishery by

- advising industry and individuals on best practice
- responding to planning applications and scoping reports
- ensuring minimum ecological impact results from renewable energy projects
- conducting fisheries surveys and fish rescues
- providing written reports on fisheries data

To assist in the advancement of national and local policies by

- involvement in national and local research projects
- participating in national and local management committees and advisory groups for the advancement of fisheries management
- assisting in the provision of samples for research
- providing data for research projects
- inputting into national legislation and policies for the advancement of migratory salmonid species of fish
- ensuring management decisions are based on current science and best practice

Nith Catchment Fishery Trust



Company number: SC366067
Charity number: SC040908

Nith Catchment Fishery Trust (NCFT) is a Scottish registered charity which was formed in 2009 to conserve and enhance all native freshwater fish and their habitats located within the inland and coastal waters of the River Nith catchment and the jurisdictional area of the Nith District Salmon Fishery Board.

The aims of the NCFT are

- to advance environmental protection and improvement by conserving and enhancing all species of freshwater fish and their environs within the River Nith catchment, for public benefit.
- to advance the education of the general public through raising awareness of aquatic ecosystems including their fauna, flora and economic activity within the River Nith catchment.

The Trust responsibilities are

To improve fish populations by

- monitoring still water and riverine fish populations throughout the catchment
- analysing current and historic fisheries data
- monitoring invertebrate populations

To improve habitat by

- surveying and identifying riparian zones suitable for restoration
- restoring riparian habitat using recognised restoration techniques

- surveying for and identifying obstructions to fish passage
- making best efforts to remove obstructions where appropriate

To educate and raise awareness by

- promoting fishery conservation within the Nith catchment
- raising awareness of the importance of sustainable fishing
- educating the general public, anglers, nets men and proprietors about the aquatic environment

To protect the bio-security of the catchment by

- monitoring the catchment's biosecurity status
- identifying any invasive species reports with the potential to threaten the biosecurity of the Nith catchment
- pro-actively tackling invasive species that threaten the security of the Nith catchment where appropriate and possible

To assist in the advancement of science by

- involvement in national and local research projects
- assisting in the provision of samples for research
- providing data for research projects
- inputting into national and local policies for the advancement of all species of fish
- ensuring management is provided with current science and best practice in order to assist in decision making

The Nith Catchment

Salmon and Sea Trout Fishery

The salmon and sea trout fisheries are owned by 36 proprietors within the Nith catchment.

Average annual catch of:

- 2873 Atlantic salmon
 - 1032 Sea trout
- (5 year average from 2008-2012)

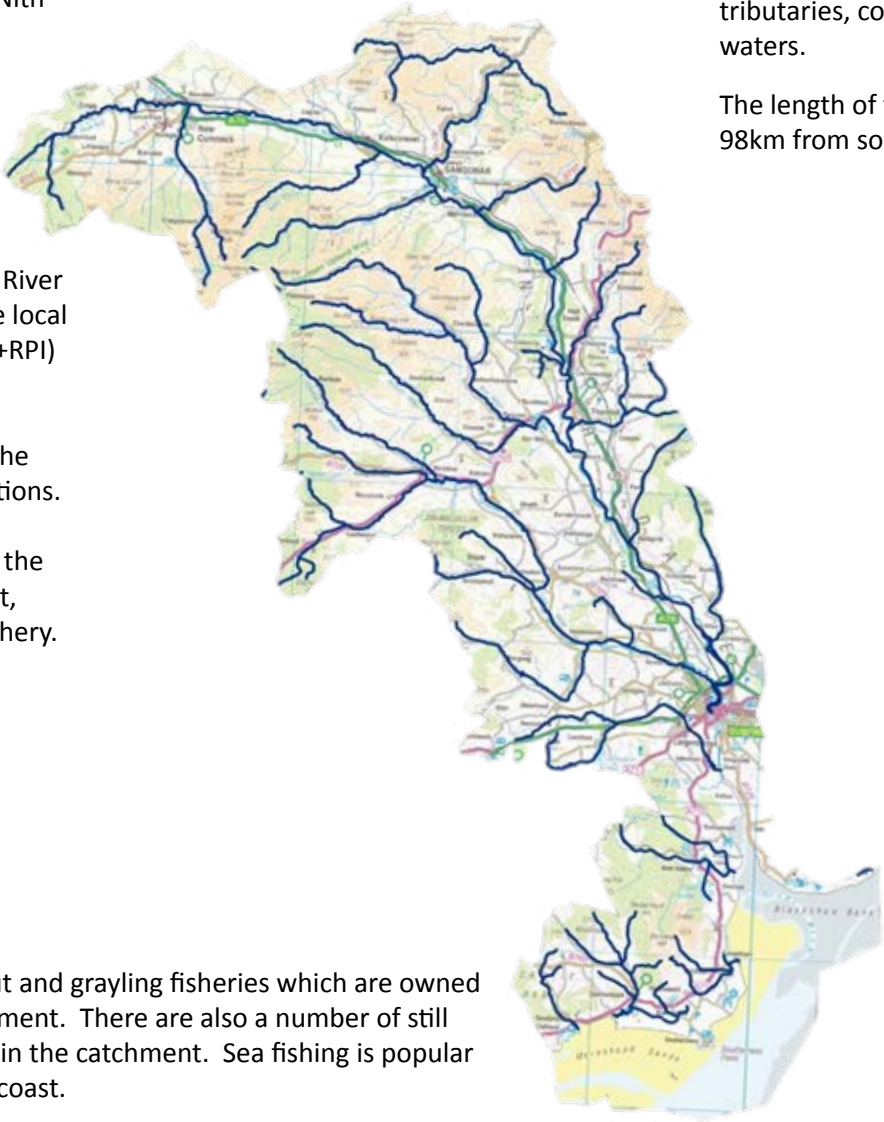
Salmon and sea trout angling on the River Nith contributes £2.9 million into the local rural economy (based on 2000 data +RPI) (Leslie 2000).

Over 60% of rod and line fishing on the Nith is controlled by Angling Associations.

Commercial fishing methods used in the Nith catchment include one stake net, haaf netting and a net and cobble fishery.

Other Fisheries

The Nith also has healthy brown trout and grayling fisheries which are owned by landowners throughout the catchment. There are also a number of still water trout and coarse fisheries within the catchment. Sea fishing is popular at the quay at Glencaple and off the coast.



Vital Statistics

The total catchment area is 1596km² which includes the main stem River Nith, its tributaries, coastal burns and connected still waters.

The length of the main stem of the River Nith is 98km from source to estuary.

Fish Species Present

- Atlantic salmon
- Sea trout
- Brown trout
- Grayling
- Pike
- Eel
- Lamprey
- Minnow
- Stone loach
- Stickleback
- Tench
- Perch
- Bream
- Roach

See Appendix 1

The River Nith is one of several rivers that flow into the north shoreline of the Solway Firth in South West Scotland. The Nith has a productive salmon and sea trout fishery and based on average annual catch returns for salmon and sea trout from Scottish rivers, as published by the Scottish Government agency Marine Scotland Science, it consistently produces returns of these species to rank it among the top ten rivers in Scotland (Marine Scotland Science Statistical Bulletin).

The catchment of the River Nith is long and narrow in shape and spans an area of approximately 1,596 km² (NDSFB, 2013). The catchment originates from the upland, industrialised landscape around New Cumnock, noted for its traditional local industry of coal mining. Historically this industry employed underground methods for the mining of coal but now the coal is worked using surface mining techniques. The catchment extends from the industrialised upper catchment in East Ayrshire southwards through Dumfries & Galloway to the estuary in the Solway Firth. The land use through the majority of the catchment is dedicated to agriculture and many of the watercourses are foliated by deciduous trees. The river then traverses an urbanised area through the town of Dumfries, the largest town in South West Scotland. The tidal limit of the River Nith is at Dumfries but the river actually enters the sea at Glencaple village located approximately 7 kms to the south of Dumfries. To the west, the catchment includes the area around the village of Moniaive and to the Lowther Hills to the east.

Geology

The geology of the River Nith catchment differs from many of the other south west catchments draining into the Solway Firth. Much of the bedrock to the west of the Nith catchment is predominantly granite. However, the granite gives way to a mixture of other geological features and combinations in the Nith catchment. Large reserves of coal exist in the upper River Nith catchment in Ayrshire and extend down the River Nith valley to south of the town of Sanquhar. Sandstone is present around the village of Thornhill in the mid river reaches and large reserves of sandstone exist in the Dumfries area. Indeed,

many grand buildings in the town of Dumfries and some in the city of Glasgow are constructed with locally quarried sandstone. Currently, coal is mined in the Nith catchment and sandstone is still quarried. Whinstone is quarried within the catchment on the western side of the River Nith.

Land use

Some areas of the upper River Nith catchment have been planted with coniferous trees. Some of these plantation areas have since been deemed to be an inappropriate use of land for economic reasons and by reason of conflict with modern biodiversity theory and practice. Planting undertaken 40-50 years ago has been detrimental to nursery areas for salmonids and has changed the flood flow/retention characteristics of the river and its main tributaries. However, the situation is improving.

Modern forestry plans within the River Nith catchment make provision for the removal of riparian coniferous trees and replanting with native broadleaf species. Conifer forests currently cover 15% and broadleaf forests cover 3% of the catchment area (SEPA, 2007). Large areas of the upper catchment are utilised by the industrial process of surface coal mining. Often these areas are reinstated to their former land use. However, long term conservation objectives are given a priority.

The land use in the River Nith catchment is predominantly agricultural. Sheep and beef farming comprise the mainstay land use although there are over 100 dairy units within the catchment. The more intensive dairy units are generally located in the lower valley bottoms while sheep are grazed on the hill tops. Arable land accounts for 13% of land use within the catchment (SEPA, 2007) with wheat and winter/spring barley as two standard examples of diverse crop farming. Large areas of the upper Nith catchment are categorised as rough grazing having Less Favoured Area (LFA) status (SEERAD, 2008).

Overview of the Period 2008 - 2013

There have been many changes on the River Nith over the past five years since the writing of the first Fishery Management Plan. These changes have dictated the direction that some management actions have had to take in order to comply or combat the challenges that have materialised. It is interesting to compare the management challenges and objectives in 2008 with those which we seek to address in the new Fishery Management Plan.

Since 2008 the number of salmon and grilse captured in the Nith has decreased from 4504, the best catch on the Nith since 1994, to 1635 in 2012. The River Nith was not the only river that experienced this decrease with other Scottish, Norwegian and Icelandic rivers also having a poor salmon run in 2012. The catches for the 2013 season are known to be depressed further but exact data is not available at the time of writing.

In 2008, 1178 sea trout were recorded as having been caught compared to 945 in 2012. Sea trout are in decline on a national scale and this has promoted greater research into this species. NDSFB has been involved in a national sea trout research project that has increased our knowledge about sea trout in the marine environment.

In 2008 the Fishery Management Plan had identified the issue and measured the extent of Invasive Non-Native Species (INNS) as a preliminary step to address the problem. Management staff are now four years into a control programme and have treated significantly more that was originally mapped. During 2008 there were no North American Signal Crayfish recorded within the Nith catchment. These species have subsequently been identified in Lochrutton and are being trapped.

At the inception of the first Fishery Management Plan, only NDSFB existed to conduct all management within the fishery throughout the catchment. In 2009, the Nith Catchment Fishery Trust was constituted. It now shares the management of the fishery to allow an all-inclusive management approach to freshwater species as well as migratory species of fish.

There has been new legislation in the form of the Aquaculture and Fisheries (Scotland) Act 2013.

There is a greater awareness and willingness on the part of anglers to adopt Catch and Release, the rates of which have increased from 35% in 2008 to 40% in 2012.

In this age of social media and the internet there is a greater importance of not just doing the job but being seen to do the job. The Board and the Trust have responded to this and have a shared website, facebook and twitter feeds.

There is a trend of fewer young local people taking up the sport of fishing. However the Board and Trust have had great success in introducing many young people to the sport of fishing and increasing their general understanding of the aquatic environment.

The use of coastal nets has increased along with the perceived issue of by-catch of migratory salmonids since 2008.

In economic terms, 2013 presents extremely challenging and different issues from those of 2008 and it is acknowledged that much of Europe is experiencing economic recession.

There has been an explosion of renewable energy proposals both in the wind farming and hydroelectric sectors. Both are potentially damaging to the fishery and require careful monitoring. To date, this industry has not proved detrimental to the fishery.



Climate change

The effects of climate change on the environment are apparent, especially in the marine environment. It is predicted that climate change will affect a number of factors in respect of fisheries, particularly Atlantic salmon stocks.

Key consequences of climate change are predicted to be:

- fewer but more severe storms
- increased river and marine flooding
- increasing sea temperatures
- rising sea levels
- slowing of the Atlantic Heat Conveyor
- increasing riverine and coastal erosion.

These changes could mean that:

- the seasonal timing of plankton blooms alters, so when salmon arrive at known feeding grounds the prey fish are not present
- water temperatures increase above upper tolerance levels for some of our native species, the most sensitive of these being trout
- the number of non-native species could increase, potentially out competing the indigenous species
- there could be changes in migration patterns and return times.

In order to mitigate these changes, the ecosystem needs to be treated in its entirety and local management should take into account national and international strategies to reduce the impact of climate change on our environment.

On a catchment level this should include monitoring water temperature fluctuations to develop long term trends, identify areas most vulnerable to increased water temperature, concentrate habitat restoration at these identified areas, monitor for non-native species and input into local, national and international research to improve our knowledge and increase our ability to climate proof our catchment.



Exploitation

Over exploitation of salmon and sea trout by anglers and netsmen is just one of the reasons that populations of salmon and sea trout have crashed throughout the Northern Atlantic Hemisphere. Over the last decade, there have been numerous conservation measures brought in to restrict the exploitation of salmon and sea trout.

Conservation limits

In Ireland, conservation limits have been set for each fishery. This limit is established by determining the carrying capacity of the system and how many salmon are required in order to ensure that the maximum carrying capacity for the river is achieved. Once a Conservation Limit has been set, fish stocks are monitored using catch data to determine if sufficient fish are entering the system and the level of exploitation is adjusted accordingly. Exploitation of the fishery is only allowed once there is a sustainable surplus above the conservation limit.

Accurately determining the carrying capacity of a river is difficult and Scotland is currently working on methods that would work for Scottish rivers. In Ireland, the River Bush has been monitored since the 1970’s using extensive trapping to monitor smolts and returning adults. This data has been used to set conservation limits for other catchments in Ireland. It is unlikely that a robust model for Scotland will have been developed and put in place within the lifetime of this Fishery Management Plan. However, baseline data on habitat and juvenile populations collected over the next five years could prove invaluable in ensuring that any future conservation limits set are accurate and appropriate to the Nith system. Gaining accurate catch data over the next five years is also of importance as it is likely that the five year average catch data would be used to determine if exploitation is above or below the conservation limit.

Catch and release

In the past, salmon fishing has been viewed as a sport, but one that at the end of the day might yield to the successful angler, one or more fish for the table. Those days are gone now, with stocks of salmon and sea trout declining in all countries around the Northern Atlantic. There are no longer enough salmon and sea trout present to be able to exploit the resource to this level. It is likely that whatever is happening to salmon to prevent them returning to rivers to spawn is occurring at sea and it is likely to be a combination of different factors such as illegal fishing of the high seas, predation, aquaculture and climate change. It is important that we conserve as many of the salmon as possible that are returning to spawn.

On average, 2875 salmon and grilse were caught in the Nith system per season over the last 5 years and it is generally assumed by the scientists and biologists that this is approximately 10% of the total number of salmon entering the river. On the basis of that assumption, 30,000 salmon and grilse should enter the River Nith and its tributaries every year to spawn. If it is assumed that 50% of these are females that means that 15,000 hen salmon should deposit eggs in the Nith every year and that if each of these females laid an average of 4500 eggs then 67.5 million eggs should be laid down naturally in the Nith catchment every year.

In 2012, 1635 salmon were caught of which only 515 were released. This means that over 2.5 million eggs failed to be laid down in the spawning grounds and it can be estimated that equates to approximately 2520 adults not returning in 2015-17 which would be the equivalent of 252 fewer being caught. Due to the various factors that dictate salmon survival, these figures are rough estimates designed to give an indicative idea of the potential loss to the fishery that killing salmon may be having.

Catch and release plays an important part in ensuring that salmon have as good a chance as possible to continue to populate rivers and that anglers continue to enjoy their hobby. The average catch and release rate for rivers across Scotland is approximately 70%, however the Nith in 2012 has been at 45% (rod only). The

net fisheries participate in the Board’s conservation policies by abstaining from fishing in the during the early part of the season thus avoiding capturing spring fish. In addition, the haaf net fishery returns a proportion of their catch. Whilst this is a small percentage, it is an important contribution.

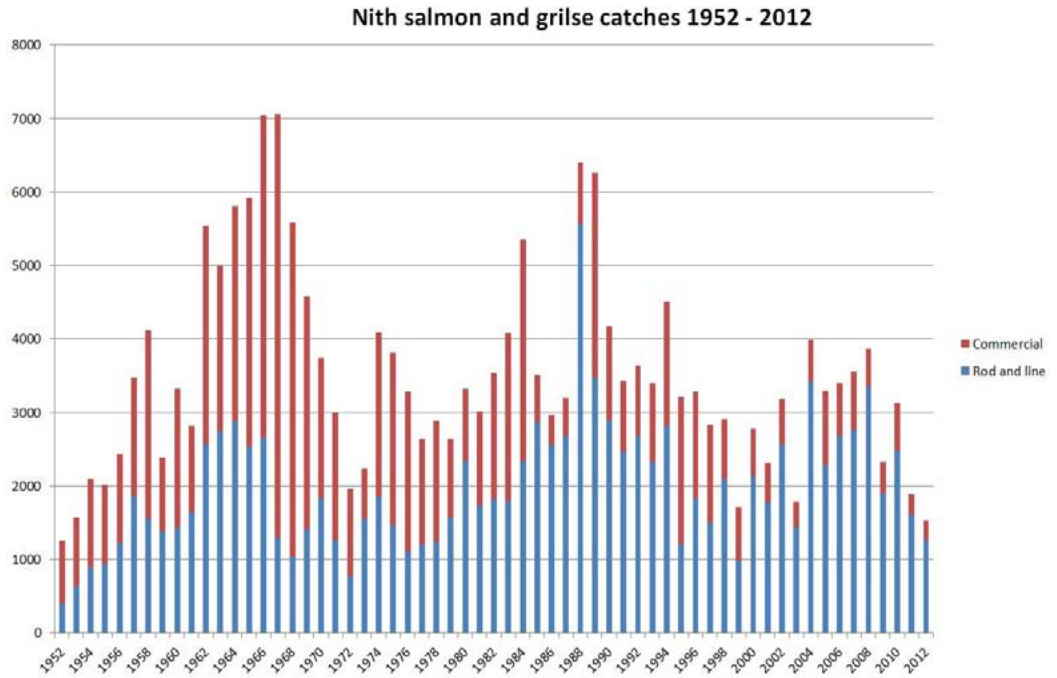
Catch and release rates have risen by 5% in the last 5 years but in order to sustain the salmon fishery it needs to improve. The possibility of adopting 100% catch and release policy for salmon and sea trout has been discussed by NDSFB and NCFT but at this time it is not believed to be the best option for the river as it could have a major economic impact on individual clubs and beats and the region in general. Instead the NDSFB and the NCFT wish to encourage vigorously improved catch and release rates across the whole river, seeking the cooperation of all fishery proprietors and anglers in adopting catch and release practice as the rule rather than the exception.

There are two ways in which to increase catch and release rates – one by using voluntary codes that are accepted by the clubs and proprietors and then enforced as any club rule would be enforced– or by NDSFB applying for an order to make it illegal for anyone to take a salmon. Unfortunately the way in which an order works does not allow for 70% catch and release to be put in place, only for 100% catch and release, which as mentioned previously, NDSFB does not wish to pursue at this time.

It is planned that over the next five years Conservation Codes will be agreed by NDSFB and NCFT annually and made available to anglers. The onus will then be on proprietors and clubs to make these codes part of the beat rules. When deciding on the annual Conservation Code, NDSFB and NCFT will look at a variety of different methods such as daily, weekly and seasonal bag limits, fishing methods and tackle and seasonal fishing times. To further encourage catch and release on the Nith system, NDSFB and NCFT will also develop Return and Reward initiatives and education programmes. However, if these approaches do not appear to be working and salmon and sea trout numbers continue to decline then Orders to prevent further exploitation will be considered.

Carcass Tagging

In 2013, the Aquaculture and Fisheries (Scotland) 2013 Act came into force and contains legislation that will enable fishery managers throughout Scotland to start using carcass tagging as a method of monitoring catch rates and assist in preventing illegally caught salmon and sea trout being sold. Carcass tagging is already taking place in Ireland, England and Wales and this will bring Scotland in line with the rest of the UK. This would help to prevent the sale of rod caught salmon that may be sold as commercially caught fish. Carcass tagging on the Nith has been considered previously but as a result of analysis of a voluntary tagging scheme undertaken on the Tweed system, it was determined that voluntary tagging schemes were ineffective and that a mandatory scheme would be required. For further information regarding carcass tagging see the [ASFB Carcass Tagging Policy](#).



Habitat

Good quality habitat is vital for salmon to be able to maximise their production and some of the best opportunities to make a real difference to their numbers are by increasing the amount of habitat available to them. This can be accomplished by conserving the habitat that they already use and by repairing any habitat that has become damaged through natural and man-made causes.

Juvenile salmonids generally inhabit the main stems of rivers and larger tributaries whereas sea trout can be found higher up tributaries and in small feeder burns. This is why it is important not forget about the smaller tributaries and coastal burns as they are an important component of sea trout populations. Interestingly, sea trout appear to prefer low nutrient catchments and it has become apparent from research carried out as part of the Celtic Sea Trout Project that enrichment of watercourses could be having a bigger negative impact on sea trout populations that originally thought.

All salmonids require the following habitat types in order to survive.

Diverse habitat

- Spawning substrate – gravel and cobble in cool, clean, well oxygenated water
- Fry habitat – areas of riffle with availability of food and cover from predators
- Parr habitat – larger boulders, roots and overhanging vegetation to provide cover. Parr are very territorial so the more cover available the less fighting takes place and more time is spent eating resulting in increased numbers and size of fish being produced.
- Parr, smolts and adults all require pools to rest in on their migrations up and down stream

Bankside vegetation

- Provides food, shade and shelter from predation for salmonids
- Leaf litter provides food for invertebrates, an important part of juvenile salmonid diets
- Helps prevent siltation and diffuse pollution from entering the watercourse
- Prevents erosion and subsequent widening of watercourses. As watercourses widen they become shallower and warm up more quickly, potentially exceeding maximum salmonid thresholds.

High water quality

- Poor water quality can be attributed to numerous sources such as industrial and agricultural pollution, acidification, eutrophication, droughts, and abstraction.

Free passage

- Adult salmonids need to be able to have free passage to spawning areas in the catchment in order to procreate. Barriers can obstruct their free passage either completely or partially, causing them to waste many days attempting to navigate past the obstruction before giving up and spawning elsewhere.

Over the last 20 years, over 77 kilometres of riverbank have been fenced throughout the Nith catchment. Habitat enhancement is carried out on an annual basis. In the work carried out by fishery managers many kilometres of riverbank have been fenced as a result of the Scottish Rural Development Programme (SRDP) 2007-2013 and NDSFB and NCFT have supported these schemes where possible. The next tranche of SRDP funding is due to run from 2014-2020 and NDSFB and NCFT will continue to support any scheme put through under this programme.

Artificial Stocking

The artificial stocking of salmon and sea trout into watercourses to improve stocks is one of the most controversial options for improving wild stocks of fish. The starting point in assessing any management plan that might include provision for artificial stocking is to determine the level of naturally occurring stocks of fish in the river. There is a finite or maximum number of fish that the river system can naturally support.

It was previously believed that stocking of salmon would help to improve numbers of returning adults, and in some cases it does. However it is now recognised that if stocking is carried out inappropriately then damage rather than improvement could be done to wild stocks of fish. Any stocking of fish into a system needs to be carefully considered. If stocked indiscriminately, negative impacts could be experienced such as:

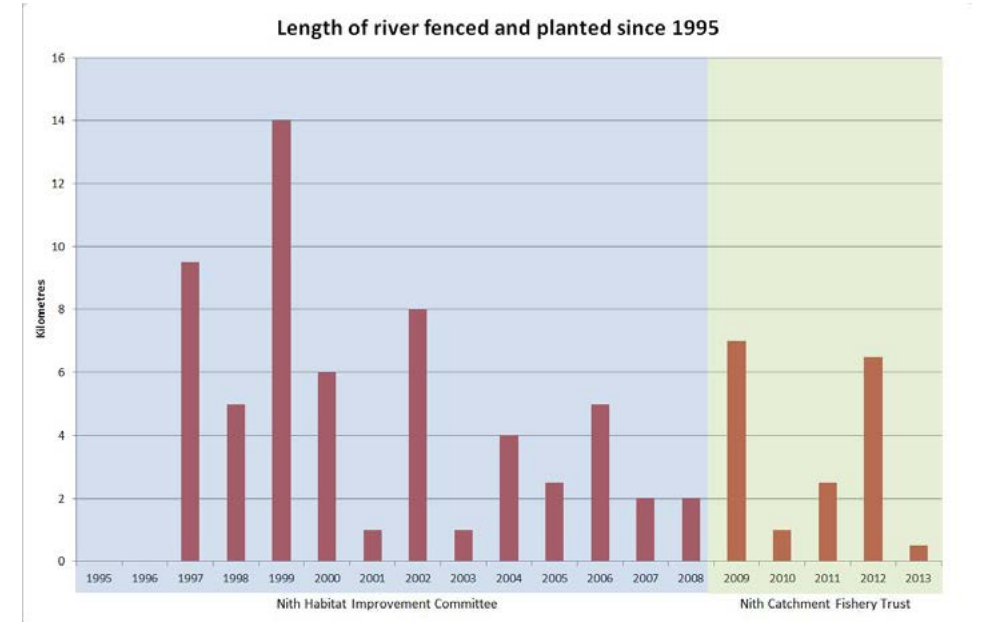
- a reduction of genetic integrity of wild salmon stocks resulting in weaker fish
- a reduction in genetic traits such as spring running salmon
- the displacing of wild stocks of salmon with inferior, less fit hatchery salmon
- the potential to introduce disease
- damaging indigenous wild populations of fish found above natural falls i.e. brown trout

Not all stocking is negative and the stocking of salmon and sea trout can be used effectively when fish populations have been virtually or completely wiped out or to mitigate against incidents such as pollution, disease and above man-made obstructions.

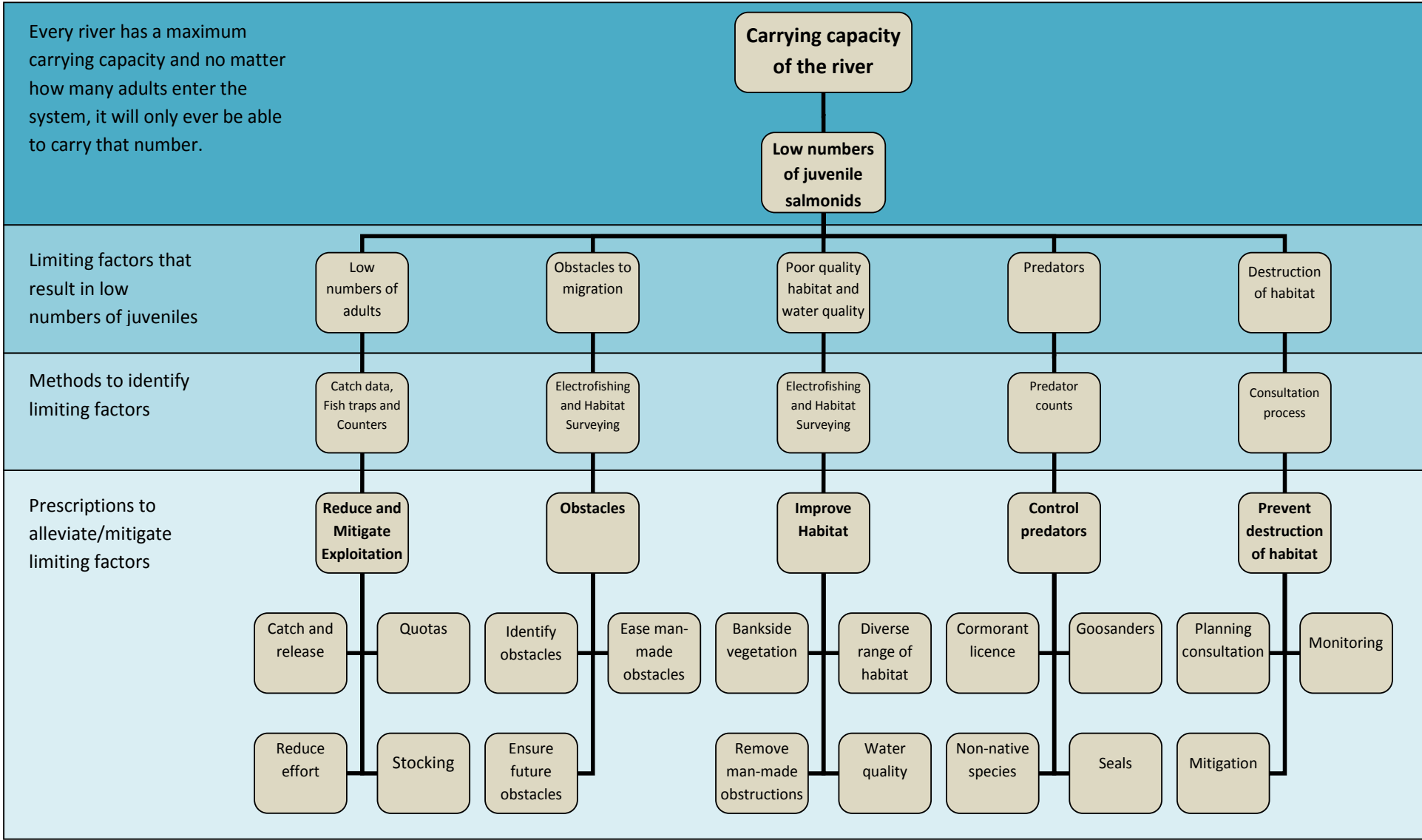
NDSFB and NCFT rely on current scientific research to base all management decisions. As a result it has been decided that the best course of action has been to reduce the output of hatchery reared fish to levels which will allow for any mitigation stocking to take place should there be any incidents within the catchment.

Further habitat surveying will assist in identifying any areas of the catchment that are requiring improvement. Recent surveys have identified that in certain areas of the catchment over-shading creates a problem. Consequently appropriate coppicing will be undertaken. This will allow more light into the watercourse, improving invertebrate and fish populations.

These habitat surveys will also identify any artificial barriers and choke points that have built up as a consequence of trees falling into watercourses causing gravel build up so that funding can be sourced and works scheduled. Over the last 20 years, many barriers have been removed or eased and there are now relatively few man-made barriers remaining that have the potential to prevent or restrict fish passage. NCFT is currently working with Rivers and Fishery Trusts of Scotland and has compiled a list of barriers on the Laggan Burn, Pennyland Burn, Marr Burn and Clauchrie Burn that are considered to be causing an impasse to fish migrations. Full surveys of the barriers will need to be carried out and licences acquired from Scottish Environment Protection Agency as part of the removal process. It is hoped that funding can be sought from SEPA’s Water Environment Fund.



Limiting Factors in a freshwater salmonid fishery



N.B. All management decisions must be based on sound science and a good understanding of salmonids is required to manage them properly

Prescriptions

Issue	Fish species affected	Existing Initiatives	Proposed Actions	Lead body Other agencies	Resources / Funding required	Priority
Poaching	Salmon Sea trout Trout Grayling	NDSFB operates a team of Water Bailiffs, in accordance with ASFB's policy on appointing Water Bailiffs , liaising with Police Scotland, Marine Scotland, Scottish Sea Fisheries Protection Agency and other fishery enforcement officers	Maintain a Water Bailiff force commensurate with the threat of illegal fishing in accordance with fisheries legislation . Continue to engage with Police Scotland, Marine Scotland, Scottish Sea Fisheries Protection Agency and other fishery enforcement officers.	NDSFB Police Scotland, Marine Scotland, Scottish Sea Fisheries Protection Agency and other fishery enforcement officers	NDSFB to continue funding of Water Bailiffs with adequate training and equipment to carry out their work.	High
Exploitation	Salmon Sea trout Trout	Promote conservation via The River Nith Catchment Angling Code (see links to supporting documents), Return and Reward Scheme and distribution of national guidance. Advise proprietors on suitable conservation measures. Discourage further exploitation	Encourage the promotion of sustainable fishing throughout the catchment with all of its proprietors using the angling code and to develop an annual conservation code to be made available to all anglers. To promote accurate recording of all catches. The NCFT to further endorse sustainable fishing via its education programme and by raising awareness of the benefits of catch and release. Adopt and promote carcass tagging which is anticipated will be initiated within the term of this fishery management plan for the purpose of assisting with the sustainable management of fish stocks. See ASFB Carcass Tagging Policy Paper for further information.	NDSFB & NCFT Association of Salmon Fishery Boards Rivers and Fisheries Trusts of Scotland Marine Scotland Science	All of these initiatives are jointly funded by NDSFB and NCFT. The NCFT has received funding for a 2 year education programme (2013-2015). Carcass tagging will require additional administrative resources.	High
	Grayling Pike Eel	Advise proprietors and river users on new legislation and suitable conservation measures.	Continue to provide advice and best practice associated with coarse fishing.	NCFT Rivers and Fisheries Trusts of Scotland Scottish Natural Heritage Marine Scotland Science	No further resources required	Low

Prescriptions

Issue	Fish species affected	Existing initiatives	Proposed actions	Lead body Other agencies	Resources / Funding required	Priority
Engineering procedures	All species	<p>Comment on all construction activity with the potential to impact on the aquatic environment.</p> <p>Conduct monitoring to establish fishery data.</p> <p>Respond to planning proposals.</p> <p>Advise on best practice and fishery mitigation and habitat establishment.</p>	<p>NDSFB will continue to respond to applications to conduct engineering and offer advice on mitigation and environmental protection in order to prevent degradation of habitat or fishing potential.</p> <p>Continue to conduct monitoring in relation to engineering works.</p> <p>Respond to all correspondence including planning proposals.</p> <p>Attend site meetings to assist with the protection of the aquatic environment.</p>	<ul style="list-style-type: none">• NDSFB (migratory salmonids)• NCFT (freshwater species of fish)• Scottish Environment Protection Agency• Scottish Natural Heritage• Marine Scotland Science• Association of Salmon Fishery Boards• Rivers and Fisheries Trusts of Scotland	Initial advice is funded by NDSFB, any associated work on the ground is funded via the client.	High
Renewable energy	Migratory species	<p>Comment on all proposals in accordance with ASFB/RAFTS guidance documents on Marine Renewables and Terrestrial Wind Farm Planning Processes and Wind Farm Policy Paper.</p> <p>Attend site meetings.</p> <p>Conduct monitoring to establish fishery data.</p> <p>Recommend mitigation to prevent damage to the resource.</p>	<p>NDSFB will continue to respond to applications to construct renewable energy projects.</p> <p>NDSFB and NCFT will provide data and scientific input in relation to consideration of all renewable energy projects.</p>	<ul style="list-style-type: none">• NDSFB (migratory salmonids)• NCFT (freshwater species of fish)• Scottish Environment Protection Agency• Scottish Natural Heritage• Marine Scotland Science• Association of Salmon Fishery Boards• Rivers and Fisheries Trusts of Scotland	Initial advice is funded by NDSFB, any associated work on the ground is funded via the client.	High

Prescriptions

Issue	Fish species affected	Existing initiatives	Proposed actions	Lead body Other agencies	Resources / Fund- ing required	Priority
Biosecurity	All species	<p>Production of the River Nith Catchment Biosecurity Plan.</p> <p>Erection of signage throughout the catchment.</p> <p>Participation in catchment, local, national and international initiatives to combat INNS.</p> <p>Delivery of Nith Riparian INNS project.</p> <p>Detection and monitoring of signal crayfish populations.</p> <p>Publicise and raise awareness of importance of Bio-security.</p>	<p>NDSFB will take full cognisance of the River Nith Bio-security Plan when responding to consultations.</p> <p>NCFT will continue to combat invasive non-native species throughout the catchment and continue to raise awareness about this issue.</p> <p>NDSFB and NCFT will continue to participate in catchment, local, national and international initiatives to combat INNS.</p> <p>Continue to develop new strategies for dealing with INNS.</p> <p>Assist in the development of action plans for potential new threats.</p>	<ul style="list-style-type: none">• NCFT• NDSFB• GB Non-Native Species Secretariat• Scottish Environment Protection Agency• Scottish Natural Heritage• Marine Scotland Science• Association of Salmon Fishery Boards• Rivers and Fisheries Trusts of Scotland• Proprietors• River users	NCFT – via project funding	High/Medium
Habitat degradation	All species	<p>Over 77km of riparian fencing of identified spawning/nursery areas carried out.</p> <p>Planting of riparian species of trees and shrubs where appropriate.</p> <p>Repair of river banks where appropriate.</p>	<p>Carry out habitat surveys within catchment to identify potential habitat improvements.</p> <p>Carry out habitat works where identified and permitted.</p> <p>Seek to maximise habitat potential for fish within any proposed works.</p> <p>Maintain existing habitat schemes.</p>	<ul style="list-style-type: none">• NCFT• NDSFB• Scottish Environment Protection Agency• Scottish Natural Heritage• Riparian proprietors	<p>Surveying funded via the NCFT.</p> <p>Further works will require funding</p>	Medium

Prescriptions

Issue	Fish species affected	Existing initiatives	Proposed actions	Lead body Other agencies	Resources / Funding required	Priority
Access for fish	Migratory species	Engaging with RAFTS and SEPA via the Barriers Project. Prioritised barriers within the Nith catchment using recognised barrier assessment tools . One member of staff qualified in barrier assessment.	Continue to remove temporary impediments to migration. Continue to seek removal of any man-made obstruction to fish.	<ul style="list-style-type: none">• NDSFB & NCFT• Scottish Environment Protection Agency• Scottish Natural Heritage• Rivers and Fisheries Trusts of Scotland• Riparian proprietors	Removal of temporary barriers within existing budgets. Funding required to remove major barriers.	High
Water quality	All species but primarily the most sensitive species i.e. Atlantic salmon, Brown/Sea trout, Sea lamprey and River lamprey	Liaise with SEPA on any aspect affecting water quality. Respond to any report of pollution within the Nith catchment, with the potential to impact on fish stocks. Riverfly Partnership Anglers Monitoring Initiative training to monitor invertebrate populations.	Continue to liaise with SEPA and other agencies regarding potential or existing water quality issues. Respond to any reported incident with the potential to impact on fish stocks and pursue through appropriate channels. Field staff to monitor for pollution incidents. Expand Riverfly Partnership AMI scheme. Identify areas subjected to diffuse pollution and tie in with habitat restoration work.	<ul style="list-style-type: none">• SEPA• NDSFB• NCFT• Scottish Natural Heritage• Marine Scotland Science• Association of Salmon Fishery Boards• Rivers and Fisheries Trusts of Scotland• Proprietors• River users	Liaising and responding to pollution incidents within existing budgets. Funding required to train more AMI volunteers and for habitat restoration. Trust staff to engage with volunteers.	Medium

Prescriptions

Issue	Fish species affected	Existing Initiatives	Proposed Actions	Lead body Other agencies	Resources / Funding re-quired	Priority
Marine survival	Salmon Sea trout Eel Sea lamprey	Providing genetic samples for the national and international research projects. Participation in the Celtic Sea Trout Project and Chairman of the management group. Participation in local, national and international forums relating to marine survival.	Continued participation in appropriate local, national and international research projects Work with other agencies to gain knowledge Use latest science to advise and make informed management decisions on local and national levels	<ul style="list-style-type: none">• NDSFB• NCFT• Scottish Natural Heritage• Marine Scotland Science• Association of Salmon Fishery Boards• Rivers and Fisheries Trusts of Scotland• Other national and international agencies	Funding will be required to carry out any research projects	High
Predation	All species	Conduct annual goosander and cormorant counts to support licence applications. Apply for annual licences to control goosanders, cormorants and seals. Conduct annual cormorant and goosander cull within licence conditions Conduct annual mink trapping programme throughout the Nith catchment. Participate in local and national predator surveys	Continue to conduct annual goosander and cormorant counts to provide accurate data for licence applications Apply for annual licences to control goosanders, cormorants and seals based on accurate count data and the predicted impact on the fishery Continue to conduct annual cormorant and goosander culls according to the conditions of the licence. Continue to conduct mink trapping within the Nith catchment. Participate in any coordinated mink trapping projects if appropriate. Improve counting techniques and keep abreast of alternative means of control.	<ul style="list-style-type: none">• NDSFB & NCFT• Scottish Natural Heritage• Scottish Anglers National Association	All of these initiatives are funded by NDSFB and NCFT. Coordinated predator control projects would require project funding	Medium

Prescriptions

Issue	Fish species affected	Existing initiatives	Proposed actions	Lead body Other agencies	Resources / Funding required	Priority
Fish Stock data	All species, primarily salmon, sea trout, brown trout, lamprey and eels	<p>Conduct electrofishing surveys according to SFCC protocol within catchment to assess juvenile salmonid recruitment.</p> <p>Record the presence of other species.</p> <p>Collect and analyse annual catch data in order to identify population trends and fluctuations.</p> <p>Participated in national genetics programme to identify family structures within the Nith catchment.</p>	<p>Continue conducting electrofishing surveys throughout the catchment.</p> <p>Conduct repeat annual electrofishing surveys at core sites throughout the catchment to assess annual fluctuations.</p> <p>Scale reading of adult and juvenile salmonids to gain data on the structure of fish populations.</p> <p>Continue to participate in national research programmes to determine stock dynamics and populations trends within the Nith catchment.</p> <p>Use all data to assist in making sound management decisions based on science and best practice.</p>	<ul style="list-style-type: none">• NDSFB & NCFT• Scottish Environment Protection Agency• Scottish Natural Heritage• Marine Scotland Science• Association of Salmon Fishery Boards• Rivers and Fisheries Trusts of Scotland• Other national and international agencies	<p>Core annual surveys and analysis of catch data is funded by the NDSFB and NCFT.</p> <p>Research projects will require funding</p>	High

Prescriptions

Issue	Fish species affected	Existing initiatives	Proposed actions	Lead body Other agencies	Resources / Funding required	Priority
Artificial enhancement programmes	Salmon Sea trout Brown trout	<p>Operate a hatchery to produce fed and un-fed salmon and sea trout fry in accordance with ASFB & RAFTS stocking protocols and best practice (see link to further information).</p> <p>Identify areas that require any stocking of salmon and sea trout in accordance with ASFB & RAFTS stocking protocols and best practice.</p> <p>Stock fed and unfed salmon and sea trout fry in identified areas or as part of mitigation package.</p> <p>Monitor stocking sites post stocking to assess survival of stocked fish.</p> <p>NDSFB authorise the stocking of salmon and sea trout fry within the Nith catchment.</p> <p>Comment on applications made to Marine Scotland to stock brown trout.</p>	<p>NDSFB will continue to operate a hatchery at levels agreed by the NDSFB Stocking Committee, taking into account best practice and latest scientific advice.</p> <p>Endeavour to maximise natural stock production by improving habitat, access and conserving stocks of returning adults rather than stocking artificially.</p> <p>Continue to authorise and stock unfed and fed fry into areas identified as requiring intervention taking into account the impact on local wild stocks of salmon and trout.</p> <p>Continue to monitor any salmon and sea trout stocking carried out within catchment and recommend that any stocking of brown trout is monitored post stocking to assess effectiveness as recommended by ASFB.</p>	<ul style="list-style-type: none">• NDSFB & NCFT• Marine Scotland Science	<p>Hatchery operations are funded by NDSFB</p> <p>Monitoring currently conducted in relation to salmon and sea trout is funded by NDSFB and NCFT. Any additional monitoring would require funding.</p>	High

Resources

Finance

It is important to recognise that the current fisheries management operations are funded by either NDSFB via its assessments raised from salmon fishing proprietors, or NCFT from their grant aid from the NDSFB or funds ingathered via the Trust’s charitable status. There is no financial slack in the system that allows for additional work to be undertaken without the requirement to raise additional funds. NCFT is in a position to apply for grants to conduct specific projects. These projects are time limited and span a specific period. More often than not these projects are paid in arrears and require financing to enable their commencement and then subsequent claim back. This presents cash flow issues for the Trust which is not in a position to front funds in advance. NDSFB has provided funds for this purpose previously and it is anticipated that it will continue to do so. Both organisations have the ability to earn additional funds via payment for services rendered in respect of consultancy work on the impact of engineering and similar projects that might impact on the catchment.

Staff

NDSFB employs permanent members of staff, seasonal members of staff and has the services of auxiliary Water Bailiffs that are unpaid but still do the same job as the permanent employed staff. NDSFB trains its entire staff to the highest level in order that they are equipped with the knowledge to do the tasks required. Staff are encouraged to participate in all appropriate courses and conferences to ensure that their continued professional development is on-going. When requested and where appropriate NDSFB staff will participate in a training role or facilitation function at catchment, regional, national or international events. NDSFB currently employs a Fishery Director, a Senior Water Bailiff, two seasonal Water Bailiffs, two auxiliary Water Bailiffs, a part time administrative assistant and a Clerk.

NCFT employs permanent members of staff, seasonal members of staff and has a number of volunteers that assist the Trust with specific tasks. NCFT trains its employed staff to the highest level in order that they are equipped with the knowledge to do the tasks required. Staff are encouraged to participate in all appropriate courses and conferences to ensure that their continued professional development is current. NCFT currently employs a Fishery Biologist, a seasonal Fishery Assistant and a number of volunteers.

Buildings and Equipment

NDSFB has long term leases on two hatcheries and a suite of offices. NDSFB owns two four wheel drive vehicles and has a range of modern equipment and aids to effect the tasks required for the management of the Nith catchment. The office is equipped with all modern information technology aids necessary for the communications associated with a fishery management organisation. NCFT leases office space from NDSFB and owns a vehicle. The Trust leases equipment such as electrofishing gear from the Board and uses the hatchery facilities for their education projects and public events. A spirit of cooperation and resource sharing exists between both organisations.

References

Leslie, T. 2000. The Economic Importance of Salmon Angling In Scotland: The River Nith to Dumfries and Galloway and The River Tweed to the Borders. University of Stirling

Nith District Salmon Fishery Board, 2013. The River Nith District Salmon Fishery Board, Management Report And Review 2012 Season. Nith District Salmon Fishery Board, Dumfries.

Scottish Environment Protection Agency, 2007. The River Nith Catchment Plan (incorporating the Lochar Water) Scottish Environment Protection Agency, SEPA Dumfries, Rivers House, Irongray Road, Dumfries

S.E.E.R.A.D., 2008. Fisheries Research Services. Statistical Bulletin. Scottish Salmon and Sea Trout Catches, 2007. Fisheries Series, No. Fis/2008/1. Scottish Executive Environment & Rural Affairs Department, FRS Freshwater Laboratory, Montrose.

Links to supporting documents

River Nith Catchment Fishery Management Plan 2008 - 2012 - [www.river-nith.com/uploads/PDFs/RNCFMP%20\(emailable\).pdf](http://www.river-nith.com/uploads/PDFs/RNCFMP%20(emailable).pdf)

Review of Implimentation of Nith Fishery Management Plan 2008 - 2012 - http://www.river-nith.com/uploads/PDFs/FMP_summary_2008-12_Final_email_vs.pdf

The River Nith Catchment Angling Code - www.river-nith.com/uploads/PDFs/Nith_Angling_Code.pdf

The River Nith Bio-security Plan - www.river-nith.com/uploads/PDFs/Nith%20Catchment%20Biosecurity%20Plan.pdf

Scottish Fisheries Co-ordination Centre Protocols - www.scotland.gov.uk/Topics/marine/science/sfcc/Protocols

Assocviation of Salmon Fishery Boards Policy and Guidance papers

Salmon Stocking Policy - <http://www.asfb.org.uk/wp-content/uploads/2011/04/ASFB-RAFTS-Salmon-stocking-policy-paper.pdf>

Guidance on Salmon and Freshwater Fisheries Legislation and offences - <http://www.asfb.org.uk/wp-content/uploads/2011/11/Salmon-and-Freshwater-Fisheries-legislation-and-offences.pdf>

Policy on Appointment of Water Bailiffs - <http://79.170.44.155/asfb.org.uk/wp-content/uploads/2011/04/ASFB-Policy-on-appointment-of-water-bailiffs1.pdf>

Policy on Carcass Tagging - www.asfb.org.uk/wp-content/uploads/2011/04/ASFB-Carcass-Tagging-Policy-Paper1.pdf

Guidance on Marine Renewables Planning Process - www.asfb.org.uk/wp-content/uploads/2011/04/ASFB-RAFTS-Advice-on-Marine-Renewables1.pdf

Guidance on Terrestrial Wind Farm Planning Process -www.asfb.org.uk/wp-content/uploads/2012/04/Advice-on-Terrestrial-Windfarm-Planning-Process.pdf

Wind farm Policy paper - <http://79.170.44.155/asfb.org.uk/wp-content/uploads/2011/06/Wind-Farm-Policy.pdf>

Appendix 1 - Atlantic Salmon (Salmo salar)



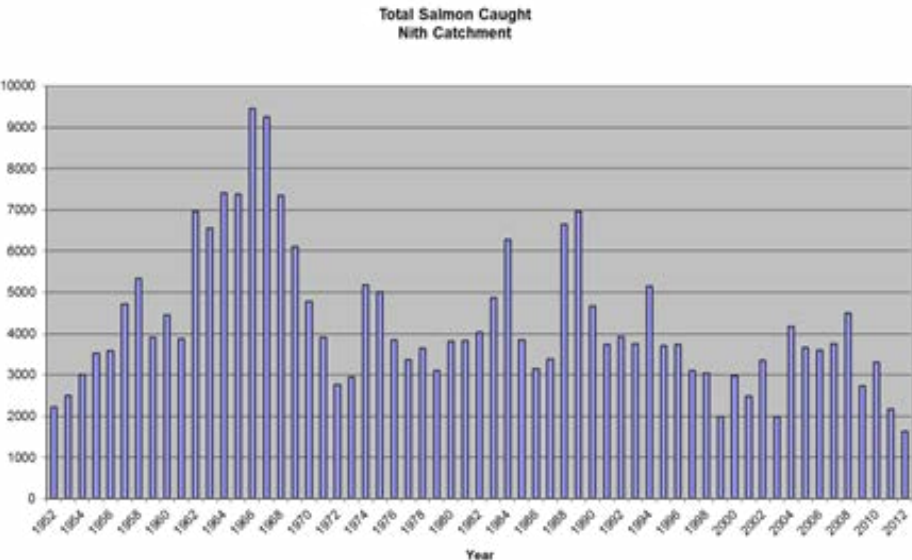
- **Native**
- **Migratory**
- **Anadromous**

Brief Description

Atlantic salmon are an anadromous migratory salmonid species of fish. This dictates that they return from the marine environment to freshwater in order to breed. The juveniles inhabit the river for 2-3 years before migrating out to sea to complete their lifecycle as adults. Salmon may spend up to 5 years at sea, depending on the abundance of food. Atlantic salmon are native to the Nith catchment. Salmon fishing in the Nith catchment is of significant socio-economic importance bringing in approximately £2.9 million (Leslie, 2000) to the local economy through the sale of visitor tickets, accommodation, restaurants and local tackle shops, etc.

Current status

Juvenile Atlantic salmon are widespread throughout the Nith catchment and annual surveying shows that there are strong populations present within the main stem of the Nith and in the majority of the tributaries. However, since 2008 the numbers of Atlantic salmon being captured by angling has decreased, raising concerns about marine mortality and future stocks. There are areas of the catchment that currently do not contain juvenile salmon or where populations are reduced and the aim of this plan will be to ensure that the catchment’s ability to sustain salmon at all stages of their lifecycle is maximised.



Breeding pair
Return to river to spawn from October-January



Eggs incubating
October - March



Alevins
March - June



Fry
1st year in freshwater

Limiting Factors

- **Poaching** - Whilst the scourge of wholesale in-river poaching has thankfully decreased it is impossible to eliminate this threat. Worryingly the proliferation of coastal interceptor nets intended to capture other species does pose a threat to migrating salmon.
- **Exploitation** – Inappropriate exploitation by legal fishers can exert pressure on the resource via over-harvesting or the taking of coloured fish.
- **Engineering procedures** – Inappropriate engineering procedures have the ability to adversely impact on populations of fish.
- **Renewables** – Renewable energy projects have the potential to adversely impact on populations of fish either during the construction phase, via the mechanism of the machinery or the use of the water resource.
- **Biosecurity** – Any breach of bio-security within the catchment threatens fish stocks. Of specific importance are some of the waterborne diseases, viruses and parasites such as Gyrodactylus salaris.
- **Habitat degradation** – Salmonids are by nature territorial and require specific habitats at various stages of their lifecycle. It is important to recognise that any deficiencies in habitat at any stage of salmonids lifecycles will pose a limiting factor in overall population densities.
- **Deficiencies in catch data** – Although all anglers/proprietors are legally obligated to provide accurate catch data there is no requirement to provide information on fishing effort making it difficult to establish accurate trends.
- **Access** – It is essential that all potential habitat is accessible to migrating salmon throughout the catchment. Any barrier to migration reduces the overall capacity of the river to produce smolts and consequently adult salmon.
- **Water Quality** – As a basic requirement salmon need clean, well oxygenated water in plentiful supply. The River Nith catchment has many threats to the quality of water including agriculture, forestry, road and rail infrastructure and the active surface coal mining industry located in the upper catchment.
- **Marine survival** – Approximately half of the salmon’s lifecycle is spent in the marine environment and not within the control of either the NDSFB or NCFT. Nith salmon have to face threats within the marine environment associated with aquaculture, international fisheries, predation and climate change.
- **Predation** – Salmon face predation threats from their embryonic stage in the gravel through to them swimming freely in the marine environment during their migrations. Some forms of predation can be combated however many predators that prey on salmon are afforded protected status.
- **Inappropriate artificial enhancement** - The inappropriate input of artificially reared salmon can pose a threat by out-competing wild populations.



Parr
2nd and 3rd year in freshwater



Smolt
April - June migrate to sea



Adult Atlantic salmon
1-4 sea winters

Appendix 1 - Sea Trout (Salmo trutta trutta)



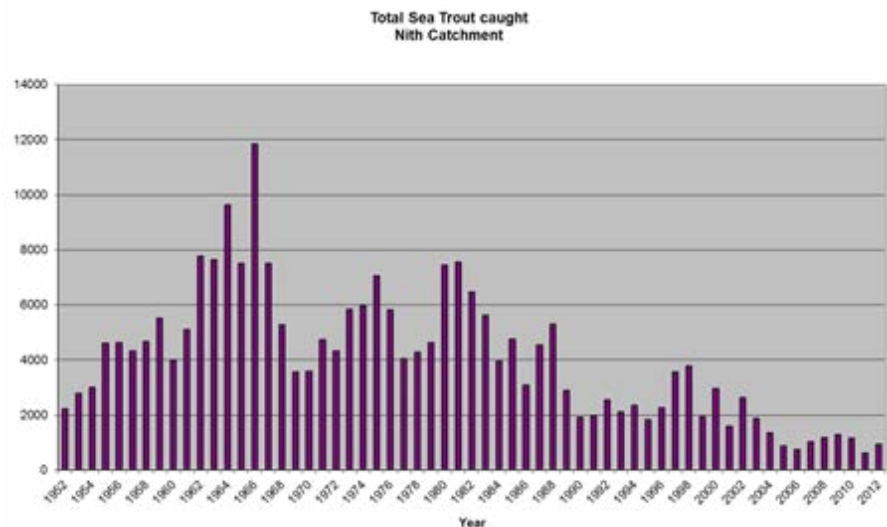
Brief Description

Sea trout are anadromous migratory salmonids and have a very similar lifecycle to Atlantic salmon. However if they make the life decision not go to sea, they are known as brown trout and are resident within a river system. Unlike Atlantic salmon, sea trout do not migrate as far from their natal rivers. They may however, travel several hundreds of miles whilst they are out at sea in search of food. Sea trout have long played “second fiddle” to salmon and in the past, very little research has carried out. This however is changing and since the national decline in sea trout since the 1980’s more research into their life history has occurred.

- **Native**
- **Migratory**
- **Anadromous**

Current status

Over recent years the data gained from electrofishing surveys has shown that juvenile trout have been in decline. The reduced density of juvenile trout has predictably been created by virtue of the fact that fewer adult sea trout have been present in the river. This fact has been corroborated by the catch returns from anglers and netsmen over recent fishing seasons. However, from a low point in 2011 with a recorded catch of 609 sea trout, 2012 saw an increase up to 945 sea trout. Catch returns for 2013 are not in yet at time of writing.



Breeding pair
Return to river to spawn from September - November



Eggs incubating
September - February



Alevins
February - May



Fry
1st year in freshwater

Limiting Factors

- **Poaching** - Whilst the scourge of wholesale in-river poaching has thankfully decreased it is impossible to eliminate this threat. Worryingly the proliferation of coastal interceptor nets intended to capture other species does pose a threat to migrating sea trout.
- **Exploitation** – Inappropriate exploitation by legal fishers can exert pressure on the resource via over-harvesting or the taking of coloured fish.
- **Engineering procedures** – Inappropriate engineering procedures have the ability to adversely impact on populations of sea trout.
- **Renewables** – Renewable energy projects have the potential to adversely impact on populations of sea trout. Renewable energy projects located in remote areas of the catchment can impact on resident trout populations. Due to habitat limitations, the progeny of these trout often smolt and migrate to eventually become sea trout.
- **Biosecurity** – Any breach of bio-security within the catchment threatens fish stocks. Of specific importance are some of the waterborne diseases, viruses and parasites such as Gyrodactylus salaris.
- **Access** – It is essential that all potential habitat is accessible to migrating sea trout throughout the catchment. Any barrier to migration reduces the overall capacity of the river to produce smolts and consequently adult sea trout.
- **Deficiencies in catch data** – Although all anglers/proprietors are legally obligated to provide accurate catch data there is no requirement to provide information on fishing effort making it difficult to establish accurate trends.
- **Habitat degradation** – Salmonids are by nature territorial and require specific habitats at various stages of their lifecycle. It is important to recognise that any deficiencies in habitat at any stage of salmonids lifecycles will pose a limiting factor in overall population densities.
- **Water Quality** – As a basic requirement sea trout need clean well oxygenated water in plentiful supply. The River Nith catchment has many threats to the quality of water including agriculture, forestry, road and rail infrastructure and the active surface coal mining industry located in the upper catchment.
- **Marine survival** – Approximately half of the sea trout’s lifecycle is spent in the marine environment and not within the control of either the NDSFB or NCFT. Nith sea trout face many different threats within the marine environment from coastal and marine netting, marine renewable energy schemes to predation and reduction or altered distribution of prey species.
- **Predation** – Sea trout face predation threats from their embryonic stage in the gravel through to them swimming freely in the marine environment during their migrations. Some forms of predation can be combated however many predators that prey on sea trout are afforded protected status.
- **Inappropriate artificial enhancement** - The input of artificially reared salmon, sea trout or brown trout can pose a threat to wild populations by out-competing or inter-breeding resulting in weakening of genetic strains.



Parr
2nd and 3rd year in freshwater



Smolt
March/June migrate to sea



Adult sea trout
4th – 7th year at sea

Appendix 1 - Brown Trout (Salmo trutta fario)



- Native
- Non-migratory
- Freshwater

Brief Description

Brown trout are non-migratory salmonids that complete their lifecycle in freshwater. Brown trout and sea trout are one and the same creature genetically but have chosen differing life strategies. Partially this is down to genetics but a lot of the decision whether or not to smolt is based on environmental factors. If a juvenile trout is present in a rich burn where good habitat exists and food is abundant then it is more likely to become resident and mature into a brown trout. Conversely, if there is limited habitat for adults and restricted food due to competition then it is more likely the trout will smolt and migrate out to sea.

Current status

It is difficult to quantify the number of brown trout present in the system due to the fact that anglers are not required to include brown trout in their catch returns at the end of a fishing season. Additionally, when assessing juvenile densities it is not known what proportion of those juveniles are going to mature as brown trout. However, the number of brown trout in the system does appear to have declined but it is impossible to state by how much.



Eggs incubating September - February Alevins February - May Fry 1st year in freshwater Parr 2nd and 3rd year in freshwater Adult trout Resident in freshwater

Limiting Factors

- **Renewable energy** – Genetically distinct populations of brown trout found above natural or artificial barriers are particularly at risk from micro-hydro schemes on small watercourses.
- **Over-exploitation** – Inappropriate exploitation by legal fishers can exert pressure on the resource via over-harvesting.
- **Inappropriate artificial enhancement** - The input of artificially reared salmon, sea trout or brown trout can pose a threat to wild brown trout populations by out-competing or inter-breeding resulting in weakening of genetic strains.
- **Predation** – Brown trout face predation threats from their embryonic stage in the gravel through to their adult stage. Some forms of predation can be combated however many predators that prey on brown trout are afforded protected status.
- **Habitat degradation/deficiencies** – Adult brown trout require a specific habitat in order to thrive and an important part of this is large wood debris. It is important to recognise that any deficiencies in habitat at any stage of salmonids lifecycles will pose a limiting factor in overall population densities.
- **Deficiencies in catch data** – There is currently no catch data recorded for brown trout making it extremely difficult to accurately access populations of brown trout in the catchment.
- **Biosecurity** – Any breach of bio-security within the catchment threatens fish stocks. Of specific importance are some of the waterborne diseases, viruses and parasites such as Gyrodactylus salaris.

Appendix 1 - Grayling (Thymallus thymallus)



- Native
- Non-migratory
- Freshwater

Brief Description

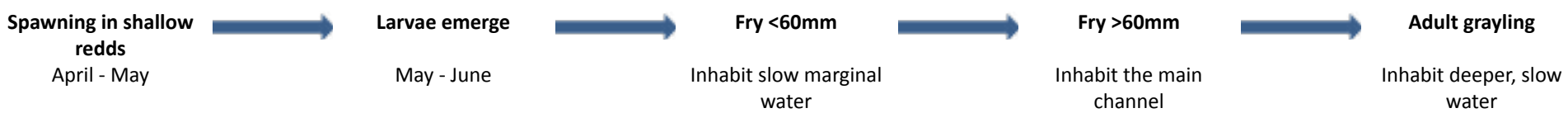
Grayling are members of the salmon family and are a popular game fish in the Nith catchment. Grayling can be identified by their large sail-like dorsal fin and larger scales. The largest grayling caught in Scotland weighed in at 3lb 13oz but it is believed that larger grayling have been caught in the Nith.

Current status

There are healthy stocks of grayling in the River Nith and the number of grayling being caught appears to have increased since 2008. As it is not a legal requirement to report the number of grayling caught it is hard to estimate the grayling population. Grayling fishing is a popular winter sport taking place when salmon are out of season. Juvenile grayling are often found when carrying out surveys on the main stem of the River Nith.

Limiting Factors

- **Poaching** – Grayling are often a by-catch of riverine netting and are discarded.
- **Over-exploitation** – Although grayling are related to salmon they have often been considered a pest in the past and killed whenever accidentally captured.
- **Predation** – Grayling face predation threats throughout their lifecycle and are particularly vulnerable when they inhabit the shallow backwaters as fry.
- **Habitat degradation/deficiencies** – It is important to recognise that any deficiencies in habitat at any stage of salmonids lifecycles will pose a limiting factor in overall population densities.
- **Lack of catch data** – There is currently no catch data recorded for grayling making it extremely difficult to accurately access populations of grayling in the catchment.
- **Biosecurity** – Any breach of bio-security within the catchment threatens fish stocks.
- **Engineering procedures** – Inappropriate engineering procedures have the ability to adversely impact on populations of grayling.



Apendix 1 - Eel (Anguilla anguilla)



- Native
- Migratory
- Catadromous

Brief Description

European eel are a migratory, catadromous fish, meaning that they spend their adult lives in fresh water and migrate out to sea to spawn. It is believed that they spawn in the Sargasso Sea, approximately a 4,000 mile migration.

Current status

Eels are classified as Critically Endangered by the IUCN Red List of Threatened Species. In the last 25-30 years eel recruitment is believed to have declined by 95%. As a result, new Scottish legislation has been put in place that prohibits fishing for eel. Eels are still caught accidentally but they must be returned to the river. During electrofishing surveys, eel numbers and lengths are recorded to monitor the status of this species.



Apendix 1 - Lamprey (Lampetra sp.)

Lamprey belong to a primitive group of animals called Aganatha (meaning “without jaws”). They are not true fish but are normally referred to as fish. They look similar to eels but have a sucker-like mouth and do not have scales or bones. Their gills are seven small holes on the side of their head. There are three types of lamprey in the Nith; Brook lamprey, River lamprey and Sea lamprey.

- Brook Lamprey**
Lampetra planeri
- Native
 - Non-migratory
 - Freshwater

Brief Description and current status

Brook lamprey are resident in freshwater and are the smallest lamprey reaching only 13-15cm long. They migrate short distances within the river to spawn, preferring soft silty substrate to inhabit. Brook lamprey are the most abundant species of lamprey in Britain but populations are in decline.

Limiting Factors

- **Access** – Lamprey are particularly vulnerable to barriers obstructing their passage as they are unable to jump or climb up the side of vertical structures.
- **Predation** – Lamprey are vulnerable to predation throughout their lifecycle, particularly by North American mink and otters.
- **Habitat degradation/deficiencies** –It is important to recognise that any deficiencies in habitat at any stage of the lamprey’s lifecycle will pose a limiting factor in overall population densities. Channelisation and dredging can be damaging to lamprey populations.
- **Lack of data** – There is a lack of knowledge about the current populations of lamprey in the Nith, making management difficult.
- **Marine survival** – River and Sea lamprey spend part of their lifecycle in the coastal or marine environment and very little is currently known about this part of their life history.
- **Biosecurity** – Any breach of bio-security within the catchment threatens lamprey stocks.
- **Water quality** – Lamprey are sensitive to pollution and increased sedimentation can smother spawning gravels and nursery silts.

Lifecycle of Brook lamprey

- Spawn in March to April
- Larvae (known as Ammocoetes) hatch and drift downstream – up to 3 years
- Larvae metamorphose in to adults
- Adult Brook lamprey do not feed but immediately migrate upstream to spawn

- River Lamprey**
Lampetra fluviatilis
- Native
 - Migratory
 - Anadomous

Brief Description and current status

River lamprey are larger than Brook lamprey reaching approximately 30cm long. River lamprey spend their adult lives in estuaries before returning to the river to spawn. River lamprey numbers have declined in the last century but are not yet at critical levels

Lifecycle of River lamprey

- Spawn in gravel during March and April
- Larvae (known as Ammocoetes) hatch and drift downstream – up to 3 years
- Larvae metamorphose in to adults
- Migrate downstream into estuaries
- Adults migrate upstream to spawn



- Sea Lamprey**
Petromyzon marinus
- Native
 - Migratory
 - Anadomous

Brief Description and current status

Sea lampreys are the largest of British lamprey reaching up to 1m in length. Large sea lamprey can often be seen spawning in the Nith, excavating large nests in the gravel.

Lifecycle of Sea lamprey

- Spawn in gravel during May and June
- Larvae (known as Ammocoetes) hatch and drift downstream – up to 5 years
- Larvae metamorphose in to adults
- Migrate downstream into estuaries
- Adults migrate into rivers to spawn

Appendix 1 - Other species of fish



Native Non-migratory Freshwater species

Brief Description and current status

Pike exist in some of the lochs that are located within the River Nith catchment area and in the upper stretches of the River Nith near New Cumnock. These fish are the subject of angling effort during the winter months and there is a perception that this species predates heavily on salmonids giving rise to persecution by well intentioned anglers.

Limiting Factors

- Exploitation
- Engineering procedures
- Biosecurity
- Habitat degradation/deficiencies
- Predation
- Water quality

Lifecycle

Spawns in February to May

Fry hatch 7-14 days later and remain in vegetation until their yolk sack has been absorbed

Fry feed on aquatic invertebrates

Pike mature at 2-4 years old



Native Non-migratory Freshwater species

Brief Description and current status

Perch are present in very small numbers in the River Nith, its tributaries and in many still waters throughout the catchment. Anglers very occasionally catch perch when fishing for other species.

Limiting Factors

- Predation
- Habitat degradation/deficiencies
- Biosecurity
- Water quality

Lifecycle

Spawns April and May on stones, branches and aquatic plants

Fry hatch after 14-17 days and feed on planktonic organisms and later on the fry of other fish.

Older fish move into deeper water



Native Non-migratory Freshwater species

Brief Description and current status

There are good numbers of flounder in the coastal areas but they are also present in the lower section in the Nith and in the coastal burns. Juveniles often migrate up into river systems and do not return to sea again till they are 3-4 years old. Flounder are a good indicator species that can be sensitive to the effects of riverine pollution.

Limiting Factors

- Predation
- Habitat degradation/deficiencies
- Biosecurity
- Water quality

Lifecycle

Spawning takes place in May to April in sea water

Fry hatch in 5-11 days

At 8-9mm flounder change shape to become flat fish

Young Flounder often migrate into rivers for 2-3 years

Flounder return to the sea when they mature

Appendix 1 - Other species of fish



Native Non-migratory Freshwater species

Brief Description and current status

Tench do not exist in the main stem of the River Nith. However they are found in a few still waters in the mid catchment (Buccleuch Estates). These are a sport, quarry, and coarse fish, anglers travel long distances to come to the area to fish for tench. Many still waters within the Nith catchment have the potential to be developed as Tench fisheries.

Limiting Factors

Exploitation

Predation

Habitat degradation/deficiencies

Biosecurity

Water quality

Lifecycle

Spawning takes place from May-July, laying eggs on aquatic vegetation

Fry hatch after 4 – 8 days but do not swim away from weed for another 14-17 days

Tench mature at about 2 years of age



Native Non-migratory Freshwater species

Brief Description and current status

Bream are a member of the Cyprinid family and are identifiable by their deep, flat body, growing up to 15lb in weight. Bream are not native to the Nith catchment and are not present in the Nith itself but can be found in a number of still waters such as Lochrutton.

Limiting Factors

Exploitation

Predation

Habitat degradation/deficiencies

Biosecurity

Water quality

Lifecycle

Spawn in May and June, laying eggs on aquatic plants in shallow water.

Fry hatch after 3 – 12 days

Young bream feed on zooplankton

Bream mature at 4 – 7 years old



Native Non-migratory Freshwater species

Brief Description and current status

Roach are one of the smaller members of the cyprinid family growing up to 20-40cm. They can be identified by their red paired fins and red eye but can be easily confused with Rudd, Dace and Ide. Roach are present within still waters and some small watercourses in the Nith

Limiting Factors

Predation

Habitat degradation/deficiencies

Biosecurity

Water quality

Lifecycle




Spawn April to May on aquatic plants

Fry hatch approximately 12 days later

Young roach feed on planktonic and benthic invertebrates.

Roach mature at 4 – 5 years old

Appendix 1 - Other species of fish

Stone loach <i>Barbatula barbatula</i>		Three-spined Stickleback <i>Gasterosteus aculeatus</i>		Common Minnow <i>Phoxinus phoxinus</i>	
Native Non-migratory Freshwater species		Native Non-migratory Freshwater species		Native Non-migratory Freshwater species	
Brief Description and current status		Brief Description and current status		Brief Description and current status	
The stone loach is found on the bottom of watercourses throughout the catchment of the River Nith and forms an important part of the aquatic eco system of the River Nith catchment. Stone loach form part of the diet of predatory fish species.		The three-spined stickleback exists in various parts of the catchment. This species has the tolerance to survive in aquatic environments when other species cannot. It is therefore deemed to be even more important than minnows or stone loach as an environmental quality indicator species.		Minnows exist throughout the catchment of the River Nith where suitable habitat exists, generally in shallow backwaters and eddies in the river. They are shoaling fish and are often seen in large numbers along the edges of the river. This is an important species for the Nith catchment and forms part of the diet of many fish predators.	
Limiting Factors		Limiting Factors		Limiting Factors	
<ul style="list-style-type: none">• Predation• Habitat degradation/deficiencies• Biosecurity• Water quality		<ul style="list-style-type: none">• Predation• Habitat degradation/deficiencies• Biosecurity• Water quality		<ul style="list-style-type: none">• Predation• Habitat degradation/deficiencies• Biosecurity• Water quality	
Lifecycle		Lifecycle		Lifecycle	
Spawn from March to May amongst sand and stones and guarded by the male		Spawning occurs in April and May with eggs being laid in a nest that the male builds out of leaves and sticks		Spawn in April to June on sandy substrate in shallow water	
Fry hatch in 14-16 days and grow quickly				Fry hatch after 5-10 days	
Stone loach feed on aquatic invertebrates and worms		The male the protects the nest and fry once they hatch after 7-8 days		Minnow mature in 2-4 years	
		Young stickleback feed on planktonic organisms		Stickleback matures in 2-3 years but only breed for 1 season	
				Stone loach mature at 1 year old	

Appendix 2 - Local/National Agencies involved in Fisheries Management

Local Bodies	National Bodies
Nith District Salmon Fishery Board (est. 1862) - www.river-nith.com <ul style="list-style-type: none">• Statutory body• Protection of salmon and sea trout fisheries• Inputs into national fisheries policy• Enforcement of fisheries legislation• Advises on conservation measures/guidance on the whole river• Employs permanent, seasonal and voluntary staff	Marine Scotland Science - www.scotland.gov.uk/Topics/marine/science <ul style="list-style-type: none">• Provide scientific, economic and technical advice and services in support of the policies and regulatory activities of the Scottish Government
Nith Catchment Fishery Trust (est. 2009) - www.river-nith.com <ul style="list-style-type: none">• A Scottish registered charity• Involved in the conservation of all fish species within the catchment• Provides best scientific advice to assist with management decisions• Employs permanent, seasonal and voluntary staff	Police Scotland - www.scotland.police.uk <ul style="list-style-type: none">• To enforce legislation
Salmon Fishing Proprietors <ul style="list-style-type: none">• Potential to stand as Members of the Board• Sell permits to anglers to fish their beats• Set rules and conditions for the management of individual beats	Scottish National Heritage - www.snh.gov.uk <ul style="list-style-type: none">• Promote, care for and improve Scotland's natural heritage• Help people enjoy it responsibly and promote its sustainable use
Riparian landowners <ul style="list-style-type: none">• Manage the riparian fringes of the river• Can sell permits for “white fishings” only	Scottish Environment Protection Agency - www.sepa.org.uk <ul style="list-style-type: none">• To protect and improve the environment by regulating and monitoring Scotland's air, land and water• Advise Scottish Government
Anglers and Netsmen <ul style="list-style-type: none">• Obligation to fish legally according to national legislation and local beat rules• Responsible for following the conservation measures laid down by the Board, Trust and fishery owners• Obligation to respect the land and wildlife and to follow the Country Code	Rivers and Fisheries Trusts of Scotland - www.rafts.org.uk <ul style="list-style-type: none">• Represents Scotland's national network of 25 Rivers and Fishery Trusts and Foundations• The conservation and enhancement of native freshwater fish and their environments in Scotland• Supports Trusts at a local level and represent their interests at a national level
	Association of Salmon Fishery Boards - www.asfb.org.uk <ul style="list-style-type: none">• Represents Scotland's 41 District Salmon Fishery Boards• Develops policies to conserve fish stocks and the habitats on which they depend• Promotes best practice for fishery management within Scotland• Coordinates and delivers training covering fishery management and enforcement

Appendix 3 - Legislation and EU Directives

Legislation and EU Directives

There are various Acts of legislation that govern Fisheries management in Scotland.

- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003
- Aquaculture and Fisheries (Scotland) Act 2013
- Wildlife and Natural Environment (Scotland) Act 2011
- The Freshwater Fish Conservation (Prohibition on Fishing for Eels) (Scotland) Regulations 2008
- Wildlife and Countryside Act 1981
- Marine (Scotland) Act 2012
- The Water Environment and Water Services (Scotland) Act 2003
- The Aquaculture and Fisheries (Scotland) Act 2007
- The Fish Health Regulations 1997
- The Disease of Fish (Control) Regulations 1994
- Disease of Fish Act 1937
- The Conservation of Salmon (Prohibition of Sale) (Scotland) Regulations 2002
- The Salmon (Fish passes and Screens) (Scotland) Regulations 1994
- The Sea Fish Conservation Act 1967
- The Inshore Fishing (Scotland) Act 1984
- Water Framework Directive
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011
- The Water Environment (Controlled Activities) (Scotland) Amendment



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