

Ness System Habitat Survey



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Introduction.

The terrestrial and aquatic habitat within the Ness catchment has been extensively impacted by anthropogenic influences over many hundreds of years. In particular, changes in agricultural and forestry practices, the installation and operation of hydro-electric schemes, the construction of the Caledonian Canal, the urbanisation of Inverness and extensive road construction programmes have all influenced fish distribution and the quality of habitat that is available.

Data relating to the quality of salmon and trout habitat has been collected within the Ness catchment for a number of years. Initially, the data was collected in support of specific projects such as the proposal to construct a new fish pass in the weir at Ceannacroc on the River Moriston and the proposal to remove the screens at Poulary on the River Garry system. The surveys undertaken in support of these two proposals were produced by ERA consultancy and the data produced is now held by the Ness & Beaully Fisheries Trust (N&BFT). Shortly after its formation, N&BFT commenced a programme of habitat survey targeted primarily in those areas believed to be accessible to salmon and sea trout. Surveys were undertaken in accordance with protocols established by the Scottish Fisheries Co-ordination Centre¹. This method utilises a habitat surveyor walking in an upstream direction recording estimations of variables such as water depth, flow pattern, substrate type, vegetation, trampling by animals, erosion, potential barriers to migration etc. Such variables are recorded for a stretch of the river, known as transects, which are typically around 250m in length. It should be noted that lochs are excluded from surveys. Some very small tributaries within the Ness catchment were excluded from the survey – typically these were less than 1m wide. This report attempts to integrate the data collected by ERA consultancy and Ness & Beaully Fisheries Trust. The prime focus of this report concerns the areas accessible to salmon and sea trout, surveys that have been undertaken in areas upstream of natural barriers have not routinely been incorporated into this report although for some areas of the Ness such information is available. Exceptions to this include areas where land use issues, for example, upstream of such barriers may impinge on the quality of the downstream habitat. There are slight difference in the survey methodology utilised between ERA and N&BFT, however the basic data collected by each is broadly similar.

Results of the habitat survey are briefly summarised in the following chapters and key findings indicated. A summary table is also provided at the end of each chapter including an estimate of smolt production based on a highly generic figure of 3 smolts per 100m². This figure is an estimate based on data derived from the nearby Conon catchment of 1-7 smolts per 100m² of suitable habitat (Simon McKelvey, Cromarty Firth Fisheries Trust, personal communication) It should be noted, however, that the results of this approach to assessment of productivity should be treated with extreme caution. In particular, such figures may represent an over-estimation of production in deep and slow moving areas of main stem river but a considerable under-estimation of production in smaller tributaries or shallow, narrow rivers. Life history traits are also not taken into account. Where relevant, reference is made to electro-fishing data and other data held by N&BFT and is integrated into the report although specific figures for densities obtained in surveys etc are not given. The raw data collected during the habitat survey is held in spreadsheets by N&BFT.

¹ www.marinescotland.gov.uk/sfcc/protocols

For the purposes of this report, the Ness catchment has been split into a number of sub catchments, namely the Ness, Enrick and Coiltie, Moriston, Garry and Oich, Tarff, Foyers and Farigaig. In some cases the choice of such catchments is somewhat arbitrary in nature particularly in respect of the inclusion of the Oich in the Garry section. However, the division of the Ness system into smaller areas forms a useful basis for analyses of habitat issues.

5. Habitat Requirements of Salmon and Trout in Running Water

Some habitat requirements of salmon and trout, such as water quality, remain largely unaltered during their life history. Other requirements may change, however, depending upon the stage of the life cycle that has been reached. Puhr² has identified a number of important habitat requirements of stream-dwelling salmonids:

- **Water Quality.** Clean, well-oxygenated water is required at all stages of their life history. Natural factors such as underlying geology and anthropogenic factors such as both diffuse and point-source pollution are both likely to influence the water quality of a river.
- **Shelter and Feeding Territory.** Juvenile salmon require shelter from predators and severe events such as floods. Such shelter may be provided by the substrate (stream bed), instream vegetation or bankside features such as undercut banks or terrestrial vegetation rooted in the banks. Salmon parr in particular are highly territorial and areas with good shelter, such as those with a large proportion of boulders and cobble-sized stones in the substrate matrix, often have the highest densities of juveniles. Anthropogenic interference may impinge on the amounts of shelter available. Collapsed banks due to the presence of farm livestock, for example, may remove bankside shelter.
- **Availability of Food.** Juvenile salmonids feed predominately on invertebrates from both aquatic and terrestrial sources. In turn the abundance of aquatic insects is influenced by factors such as water quality, water depth, flow type, the nature of the substrate and instream vegetation. The availability of terrestrial insects to juvenile salmon is closely associated with the abundance of riparian vegetation such as trees and grass.
- **Availability of Spawning Habitat.** Both salmon and trout require well-oxygenated water and substrate of a suitable size in order to spawn successfully. Optimal size of substrate for salmon is pebble (similar size to a golf ball) or cobble (similar size to a tennis ball). Trout tend to utilise areas dominated by pebble. Table 1 illustrates the habitat preferences of salmon and trout at different stages of their life history as described by Puhr.

² Puhr, C.B. (1998). *Habitat surveys according to the SFCC protocol v2.1.*

Table 1 Salmon and trout habitat preferences.

	Salmon	Trout
Eggs/ alevins.	Golf ball to tennis ball sized substrate.	Dependent on fish size. Golf ball to tennis ball sized substrate for large brown trout and sea trout. Pea to golf ball sized material for smaller trout.
Fry (less than one year old).	Golf ball to tennis ball sized substrate, fast flowing, shallow broken water.	Golf ball to tennis ball sized substrate, slow to medium flowing shallow water, often concentrated in stream margins.
Parr (one year or older).	Tennis ball to football sized substrate, fast flowing broken water, often slightly deeper than fry.	Variety of substrate, undercut banks, tree roots, big rocks, deeper slower water.
Smolts.	Unknown.	Unknown.
Adults.	Deep Pools.	Deeper areas, sustained flow but not too fast, undercut banks, tree roots, good instream vegetation and large rocks.

6. Methodology

The current survey utilised SFCC protocols during data collection. In order to assess the suitability of habitat for salmonids and other fish species a number of features are recorded which may be broadly categorised as follows:

1. Water depth.
2. Water flow type.
3. Instream characteristics.
4. Bankside characteristics.
5. Riparian vegetation.
6. Surrounding landuse.
7. Bankside fencing and grazing.
8. Erosion and bankside collapse.
9. Pollution sources.
10. Bankside and channel modifications.

In order to conduct the survey, the river is usually split up into transects of between 100-500m in length depending on the width of the river and the presence of natural or manmade 'break-points' such as where two rivers merge or fence lines are marked on Ordnance Survey maps. The surveyor marks transect lines on the Ordnance Survey map and then records the habitat details on printed sheets. Typically, these are recorded in terms of percentages of the survey stretch as a whole. Photographs are also taken of interesting features.

Chapter 1 River Ness, Holm Burn & Ault na Skiach

General Description

The main stem of the River Ness is circa 10km in length including tidal reaches. The River Ness has been extensively modified both in terms of bank alteration and reinforcement (some of it presumably as a result of the Caledonian Canal construction) and instream structures particularly weirs. The latter were predominately, though not exclusively, constructed to produce power for mills. In addition to the large weirs, various croys have been constructed in the belief that they will improve fishing opportunities. Water from the River Ness has been historically diverted for the production of power and as such numerous lades exist running parallel to the main stem of the river. In particular, a lade at Ness Castle was historically used to drive a mill wheel and a lade at Whin Park diverted water to a hydro-electric turbine.

Despite the highly modified nature of the River Ness, the present survey has highlighted the fact that it remains inherently highly productive habitat for the production of salmon and trout as well as other fish such as various lamprey species and eels. Much of the length of the River Ness offers habitat highly suitable for spawning by salmon, trout and lamprey with areas suitable as juvenile habitat also available. The electro-fishing data held by N&BFT suggests that the productive potential of the River Ness is in some measure matched by the actual production of salmon fry and parr. It should be noted that an assessment of the current productivity of the River Ness is severely hampered by the lack of a long term data set of electro-fishing results as, indeed, is also the case for the rest of the Ness system. As such it is impossible to place the results of current electro-fishing surveys within an historical context. It should further be noted that wide rivers such as the Ness are logistically difficult to electro-fish and ideal sites for such activities are numerically limited. The ostensibly positive results of River Ness electro-fishing surveys undertaken by N&BFT in recent years may in part be an artefact of the limited number of sites available and the results may not be fully representative of the river as a whole.

There are two major tributaries of the River Ness, namely the Holm Burn and the Ault na Skiach, although there are several smaller burns which enter the main river. Information given to N&BFT suggests that the smaller burns periodically dry out and as such have been excluded from inclusion in this report. Access by migratory fish to the Holm Burn and Ault na Skiach has been historically denied or limited due to manmade barriers in the lower reaches of the burns. In the case of Ault na Skiach, this presently remains the case whereas in contrast access to the Holm Burn has been facilitated by a fish pass constructed in 2010. The habitat available in both burns has been degraded largely as a result of flood defence initiatives, road construction and property construction. The survey highlights the fact that both burns are currently in a poor condition.

1.1 River Ness

The River Ness supports important salmon and sea trout fisheries throughout its length. Habitat surveys in wide rivers are typically problematical in nature given the inherent difficulty in observing the substrate in many areas. However, much of the Ness is relatively shallow and the water is typically very clear thus giving the surveyors more opportunity to observe the substrate than might

normally be expected. It is clear from the survey that the River Ness has been intensively modified with numerous bridges, croys, weirs and heavily altered banks. Much of this appears to be a legacy of the harnessing of the flows within the Ness for the production of power (e.g. to drive mills and turbines). It is also likely that the construction of the Caledonian Canal has radically altered the true left bank of the River Ness. Despite the modified nature of the River Ness it would appear to be inherently very productive with the surveyor noting extensive areas of potential spawning medium throughout the length of the river. In addition, shallow riffle areas suitable for salmon parr production were also located at a number of locations within the river corridor.

Wide rivers such as the Ness present particular difficulties in respect of successful electro-fishing. Whilst the River Ness is largely shallow in nature and is thus accessible to electro-fishing the width of the river means that larger juveniles such as salmon and trout parr move away from the area being surveyed by the electro-fishing team. Timed surveys have been undertaken by N&BFT and some attempts have also been made to produce quantitative data in the relatively few locations where this is possible. Typically, salmon and trout fry are largely restricted to a relatively narrow strip a few metres wide close to each bank whereas parr are captured across the river width. Electro-fishing results are routinely amongst the highest within the whole Ness catchment and, indeed, bear comparison with results from the better areas of the Beaully system. Caution, however, should be attached to the electro-fishing results as surveys have tended to be undertaken at sites which are ostensibly highly suited for juvenile salmon production. Thus any extrapolation from the figures obtained from these surveys should be treated as indicative figures only. In addition to salmon and trout, the main stem of the River Ness supports eels (including small juveniles), flounder, stickleback and three species of lamprey.

With the exception of a few relatively confined areas of erosion, there would appear to be few issues that require remedial action on the River Ness. The surveyors did note, however, the presence of non-native plant species at a number of locations. If left unchecked, such plants can exacerbate natural erosion. Whilst some non-native removal has been undertaken historically it is suggested that the River Ness and associated tributaries would benefit from a thorough survey being undertaken for the presence of non-native plants.

Some opportunities exist to utilise existing lades in order to provide semi-natural rearing conditions for salmon. In particular, the lade in Whin Park offers potential for this type of development. To this end, a feasibility study was commissioned in 2010 to assess the potential for improving the habitat available within the lade itself³. Several other lades offer potential for utilisation as nursery areas. Given the numerical paucity of tributaries that flow into the River Ness and the degraded state of those that do exist, it is suggested that exploring such opportunities could be beneficial.

³ Aquamaintain (2010) *A proposal for the restoration and enhancement of the Bught Mill Lade Inverness*.

Plate 1. Lower reaches of River Ness showing good juvenile habitat.



Plate 2 Good salmon parr habitat at the head of the Black Stream, Ness Castle.



Plate 3 In the background, good parr habitat at Dochfour.



1.2 Allt na Skiach

Anecdotal information provided to N&BFT suggests that the Ault na Skiach has historically supported populations of salmon and sea trout. Currently, however, the burn is in a highly degraded state. Major issues on the burn include the blocking of fish ingress due to a poorly designed culvert at the junction of the Allt na Skiach with the River Ness (Plate 4). The burn has been heavily impacted and altered by human influences with major impacts including bankside modifications. Of particular concern is the input of silt, other fine particles which is particularly evident on this burn. Such inputs may be particularly pernicious in respect of mortality of incubating eggs and the ability of salmonid fish to construct redds (nests in the substrate).

Plate 4 Poor culvert design forming a barrier to fish migration in Ault na Skiach.



Plate 5 Gabion baskets used as bank reinforcements, Ault na Skiach.



Despite the many problems associated with Ault na Skiach, there are a number of areas where habitat quality remains inherently good including areas suitable for both spawning and juvenile development. Limited electro-fishing surveys have been undertaken on the Ault na Skiach, however such surveys that have been undertaken illustrate that it supports trout, eels and stickleback. The former, though, have largely been captured in the upper reaches of the burn which may be indicative of water quality issues further downstream. The surveyor noted that when in conversation with a householder, whose land abuts the burn, he was informed that fish kills in the burn had occurred in recent years possibly due to silt inputs or other forms of pollution.

Plate 6 Good Habitat in Ault na Skiach.



Plate 7 Highly turbid water in Ault na Skiach



1.3 Holm Burn

In excess of 1.5km of the Holm Burn is currently accessible to migratory fish with access to the upper reaches of the burn being barred by a large natural barrier. Until 2010 access to migratory fish was largely restricted to the first 60m of the burn due to the presence of a weir in the grounds of Ness-Side. Electro-fishing surveys undertaken by N&BFT suggest that salmon rarely successfully negotiated the weir with, presumably access was only possible during high flow episodes. At the request of the Ness District Salmon Fishery Board, N&BFT and the owners of the Ness-Side, Highland Council installed a fish pass to replace the weir during the construction of a flood defence scheme. Indications from electro-fishing surveys undertaken in 2011 and 2012 indicate that re-colonisation of the Holm Burn by salmon has to date been successful over the length of habitat available.

Plate 8 Weir at Ness-side which has now been replaced by a fish pass.



Despite the successful re-colonisation of the Holm Burn there are a number of ongoing issues that require remedial action or are a cause for concern. Firstly, the long-term effects of the flood alleviation construction scheme remains unknown. In particular, during periods of high flow in neighbouring burns a proportion of the flow will be diverted into the Holm Burn thus increasing peak levels. It is likely that the flood alleviation scheme will increase the risk of gravel movement in addition to egg and juvenile fish displacement. Secondly, the channel is deeply incised immediately downstream of the falls with the banks being of a clay-like material. Ostensibly the substrate in this area appears to be reasonably good but closer examination reveals that the pebbles, cobbles etc are firmly embedded in the clay thus offering limited spawning opportunities. The length of the burn where this is a particular feature is approximately half a kilometre. Thirdly, the source of the burn is Loch Ashie which itself is a key source of the water supply for Inverness and the surrounding district. Currently, there is no compensation flow agreement in place for the Holm Burn which results in periodic drying out of the lower reaches of the burn and subsequent fish kills.

Plate 9 Deeply incised channel of the Holm Burn. Note the clay-like soils on the banks.



Plate 10 Waterfall marking upstream extent of habitat accessible to salmon on Holm Burn.



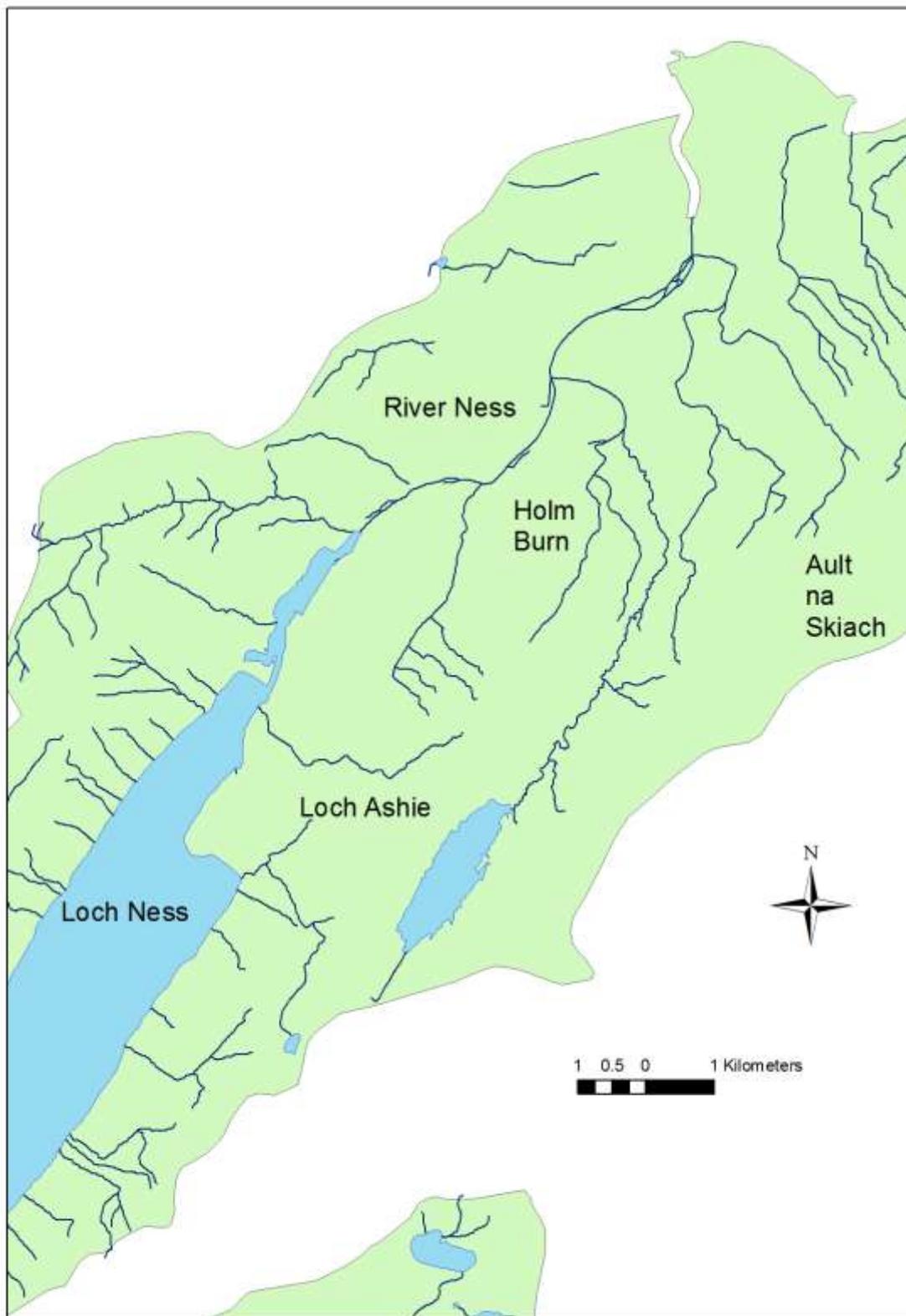
Recommendations

1. The survey undertaken suggests that the River Ness remains inherently productive. In particular, there is an abundance of areas highly suitable as a spawning material for salmon and sea trout as well as considerable areas of high quality nursery habitat. It is vital that such habitat is protected from inappropriate development and the negative impacts of the introduction non-native species. Appropriate flows are also required to ensure that such habitat remains productive. Given the proposed levels of hydro-electric development within the catchment this may prove challenging.
2. The Holm Burn is the largest tributary entering the River Ness and access to the burn has been recently been secured via the construction of a fish pass. Monitoring is required to ensure that re-colonisation is successful and that the fish pass remains in a working condition. An agreement with Scottish Water and SEPA regarding the provision of a compensation flow from Loch Ashie is vital if major fish kills are to be avoided in the future. Should electro-fishing suggest that numbers of salmon fry are low in the areas where the bed of the river does not appear to be conducive to salmon spawning then it is suggested that techniques such as the use of streamside incubators be trialled.
3. The Ault na Skiach Burn is badly degraded but consideration should be given to removing the barrier in the lower reaches. An alternative short term strategy would be to undertake a trial stocking of salmon and/or egg box experiments in the lower reaches to ascertain if salmon can survive in this area. Pollution remains an issue in this burn and will require to be increasingly monitored going forward.
4. Available habitat in lades etc should be brought into production as far as possible although it is suggested that semi natural rearing should be utilised in order to minimise any possible adverse genetic implications of hatchery use.
5. The Ness system would benefit from a comprehensive non-native plant species survey that covers the entire main stem and tributaries.

Table 2 Summary of estimates of wetted area, River Ness and major tributaries.

River Section	Naturally Accessible Wetted Area	Estimated Smolt Output
River Ness	786,990	23,609
Holm Burn	5,680	170
Ault na Skiach*	6,613	-
Total	799,283	23,779

*Access to Ault na Skiach is currently likely to be not available to a road culvert.



Chapter 2 River Enrick and River Coiltie

The main stem of the River Enrick that is fully accessible to salmon and sea trout is approximately 17km with further upstream access being prevented by the very large waterfalls at Corrimony. This length does not include Loch Meikle which is situated near the village of Balnain. The Enrick does not currently support an official salmon fishery although it has historically done so when under the ownership of Seafield Estate. Loch Meiklie was historically an important brown trout fishery and is still fished by Glen Urquhart Angling Association. There is the perception that trout angling on Loch Meiklie has declined in recent years.

The main stem of the River Enrick was surveyed in 2006 by N&BFT as part of the European funded SAFER project. The aim of the survey was to ascertain if the habitat provided by the Enrick was still inherently productive due to the general perception in the area that salmon and trout populations were at low levels and continuing to decline. The report⁴ published subsequent to the survey concluded that the Enrick did indeed remain inherently productive in terms of juvenile habitat as well as containing large areas suitable for salmon and trout spawning. An important consideration in the overall productivity of the Enrick is the connectivity of the salmon spawning areas with habitat ideally suited to the production of salmon fry and parr. It is notable that the major spawning areas in Corrimony and Urquhart Bay Woods are in close proximity to extensive areas of larger substrate and flows which provide the habitat generally favoured by salmon parr.

Electro-fishing data held by N&BFT suggests that salmon fry and parr densities are routinely amongst the highest in the Ness catchment and as such the Enrick catchment is likely to contribute a significant proportion of the overall system salmon smolt output. In addition to salmon and trout the Enrick catchment supports populations of lamprey and eels as well as non-native pike and minnow. There is one anecdotal report of Arctic charr being captured in Loch Meiklie. As a cautionary note there is a general paucity of historical electro-fishing data for the Enrick catchment – as is indeed the case for the entire Ness system – with which to compare present levels of salmon and trout juveniles.

There are a number of important tributaries of the River Enrick. The Coiltie enters the Enrick a short distance upstream of the confluence with Loch Ness and provides a considerable amount of habitat for salmon and trout. As with the Enrick, the Coiltie does not support an official salmon fishery but electro-fishing surveys suggest that it supports healthy populations of salmon, trout, lamprey and eels. Additionally, there are a number of smaller tributaries that flow into the Enrick and into Loch Meiklie. Typically, access for migratory fish is limited by a natural barrier a relatively short distance upstream from the River Enrick or Loch Meiklie respectively. Despite this, most play host to salmon populations as well as lampreys and eels. An exception to limited extent of available habitat in tributaries is the Allt Drimneach branch of the upper reaches of the Enrick which provides a considerable amount of habitat including extensive spawning areas.

Along with the Farigaig, the Enrick is the only major catchment within the Ness system that has not been harnessed for the production of electricity therefore flow profiles are more natural than those seen on the Moriston, Garry and Oich. However, there are a number of issues associated with land use that are likely to have influenced the flow pattern negatively. In particular, the upper parts of

⁴ Ness & Beaulieu Fisheries Trust, (2006). *Fish Habitat Survey of the River Enrick*.

the Enrick and Coiltie catchments have been the subject of large-scale commercial forestry plantations. Anecdotal evidence suggests that the forestry developments have increased the speed of run-off of rainfall which in turn has exacerbated historical issues of flooding and erosion of the banks of the Enrick. It is also likely that forestry has increased the inputs of coarse woody debris into the system. In normal circumstances, the input of such debris fulfils important ecological functions in the aquatic environment which benefits fish production and is therefore to be welcomed. However, the volume and nature of this woody debris within the Enrick can cause blockages which have occurred periodically and are of particular concern in the lowermost reaches of the Enrick.

Ownership of the Enrick is particularly fragmented which on occasions hampers efforts aimed at remedial action but an organisation of riparian interests does exist in the form of Glen Urquhart Land Partnership. The Partnership is active in reducing flooding risk and aims to achieve its aims in a sustainable manner.

River Enrick

A detailed discussion regarding the aquatic habitat of main stem of the River Enrick from its confluence with Loch Ness to Corrimony Falls is available in *Fish Habitat Survey of the River Enrick*, a report produced by N&BFT and commissioned by the Strategies and Actions for Flood Emergency Risk Management. The commissioning of the survey was partly a response to previous commissioned reports compiled by organisations which suggested the aquatic ecology of the Enrick was in decline, but provided little evidence to support that view. The survey was undertaken in September 2006 by Christopher Daphne (then of Cromarty Firth Fisheries Trust) and Keith Williams of N&BFT. The survey did not include any tributaries of the River Enrick although a poorly designed bridge apron was noted at the junction of the Polmailly Burn with the River Enrick. The report highlighted that the Enrick offers ostensibly very productive habitat for juvenile salmonids with an abundance of spawning and nursery areas. A number of issues were identified by the survey in particular accumulations of woody debris potentially forming barriers to fish migration in the lower reaches of the burn, serious erosion and point sources of pollution particularly an inadequate septic tank system near Balnain.

The main recommendations listed within the report were:

- Annual walk-up surveys should be conducted to ensure that fallen trees and associated trash dams do not form a barrier to fish migration.
- Instream works that include gravel removal or perturbation should be minimised - and completely avoided in the period October to June.
- Point pollution sources should be rectified.
- Stock fencing was generally adequate but the provision of fencing in those areas where it is absent and stock is present will remove the effects of bankside trampling.
- Riparian tree cover was generally very good but judicious planting of native species such as alder in areas where it is not present may help to stabilise the bank and also improve the

habitat for fish species. Some areas should also be considered for coppicing as there was a degree of over-shading.

- The habitat survey should be extended to include the tributaries of the Enrick.

Subsequent to the habitat survey of the main stem of the Enrick being completed, the majority of the above recommendations have been enacted by N&BFT. In particular, representations made to SEPA regarding the inadequate septic tank system assisted in the riparian owner's success in getting a replacement system constructed. Several incidents of unauthorised gravel removal within the Enrick have also been reported to SEPA and anecdotal evidence suggests that this type of activity has declined over time.

Plate 11 Severe erosion on Enrick.



Plate 12 Gabion basket bank reinforcement on Enrick.



Plate 13 Gabion baskets being constructed to block entire branch of Enrick at an island.



To follow up the 2006 habitat survey N&BFT undertook electro-fishing surveys over a period of several years. The surveys have highlighted that the Enrick is routinely amongst the most productive areas of the Ness catchment and is also diverse in terms of the numbers of species present. In particular, salmon spawning appears to take place at a number of locations and habitat suitable for juveniles, particularly older age classes of fish is abundant.

Despite the inherent productivity of the Enrick, it is suggested that remedial action is required to reduce adverse impacts. Firstly, woody debris accumulation in the lowermost reaches of the Enrick (and Coiltie) can periodically become an issue. Due to the fact that Urquhart Bay Woods is an SAC for riparian woodland, the breaching or removal of potential barriers is problematical. A draft protocol has been formulated by N&BFT and SNH to attempt to remedy potential conflict although this remains to be formally agreed between the relevant stakeholders. Secondly, the Enrick is particularly susceptible to flooding events and erosion. It is likely that this has been exacerbated by the establishment of commercial forestry plantations in the upper reaches of the catchment and it is suggested that careful consideration needs to be given to lessening the long term impact of this land use, particularly given the increased likelihood of severe weather events resulting from climate change. These events may seriously impinge on egg and juvenile survival.

Plate 14 Septic tank pollution point.



Plate 15 Area of Enrick recently altered by owner. The bed of the river was too unstable to stand on safely.



Plate 16 Excellent spawning areas near Corrimony.



River Coiltie

The River Coiltie is the largest tributary of the Enrick with the junction of the two rivers being close to Loch Ness. In general the Coiltie appears to contain less spawning habitat than the Enrick with the exception of its lowermost reaches. However, electro-fishing results suggest that salmon and trout spawning does occur throughout much of its length. The Coiltie has been heavily modified historically with, in particular, bank protection works being extensively deployed. As with the Enrick, flooding issues are an ongoing concern as is erosion.

Plate 17 Excellent parr habitat on the Coiltie.



Scottish water historically abstracted water from the Coiltie as part of the Lewiston water supply system. The structure to facilitate this abstraction is still in situ but it is the understanding of N&BFT that it is no longer in use. Currently, it would appear that this weir constitutes a complete barrier to upstream fish migration. However, this will need to be confirmed by electro-fishing in order to ascertain the desirability or otherwise of the removal of this obstruction.

Plate 18 Scottish Water intake structure likely to be a complete barrier to upstream fish migration.



Prior to the formation of N&BFT there was a perception by many that the Coiltie was unimportant as a nursery area for salmon due to its highly degraded nature. Electro-fishing surveys have demonstrated that the Coiltie is highly productive and that efforts need to be made to maintain and, if possible, enhance that productivity. In addition to the major artificial barrier on the Coiltie, other issues are broadly similar to those on the Enrick and should be considered in conjunction with efforts to initiate remedial action.

Plate 19 Large boulders used as bank protection on Coiltie.



Polmaily, Shenval, Allt Drimneach and small tributaries.

There are a number of relatively small tributaries that enter the River Enrick and Loch Meiklie. These tributaries typically comprise a section of low gradient, good quality habitat including areas suitable for spawning before the gradient increases and an impassable waterfall prevents access for migratory salmonids. Three of the burns in question (Polmaily, Allt Tarbh and Camalt) have a bridge apron/culvert which is likely to hinder salmon and trout migration although in the case of the latter two barriers very limited habitat is available upstream. On the Millness Burn a manmade log barrier potentially prevents access to good quality habitat although the extent of such habitat is not large. In the case of the Polmaily Burn electro-fishing results strongly suggest that salmon do successfully negotiate the barrier in some years but the regular absence of year classes suggest that this is not always the case. It is likely that the permeability of the barrier is a function of water height and temperature during the spawning period. An exception to the relatively small amounts of habitat available is Allt Drimneach. Extensive spawning areas are available in the lower reaches of Allt Drimneach close to its junction with the Enrick. Further upstream, habitat is more suited to parr production. There are a large number of small waterfalls on Allt Drimneach but it is not currently known how far salmon can penetrate the burn. It is suggested that the degree of utilisation of Allt Drimneach should be established by electro-fishing.

Plate 20 Good habitat on Allt Drimneach.



Recommendations

1. Continued patrols by fisheries personal for blockages caused by woody debris accumulations are essential. Equally, protocols for the judicious removal of debris at key periods of the year (i.e. smolt migration and immediately prior to the spawning period) need to be formally agreed with SNH.
2. Measures to slow the speed of rainfall run-off in the upper parts of the catchment should be investigated in conjunction with Glen Urquhart Land Partnership, SNH and Forestry Commission Scotland.
3. Electro-fishing should be undertaken on the Coiltie to obtain a better understanding of juvenile salmon distribution, in particular relative to the geographical location of the Scottish Water abstraction barrier. Similarly, electro-fishing would be useful to better establish the salmon distribution on Allt Drimneach.
4. Representations should continue to be made to SEPA in respect of easing the bridge apron on the Polmaily Burn.
5. Fencing programmes in areas where it is required should be initiated.

Plate 21 Poorly designed culvert, Polmaily Burn.



Plate 22 Culvert on Allt Tarbh.

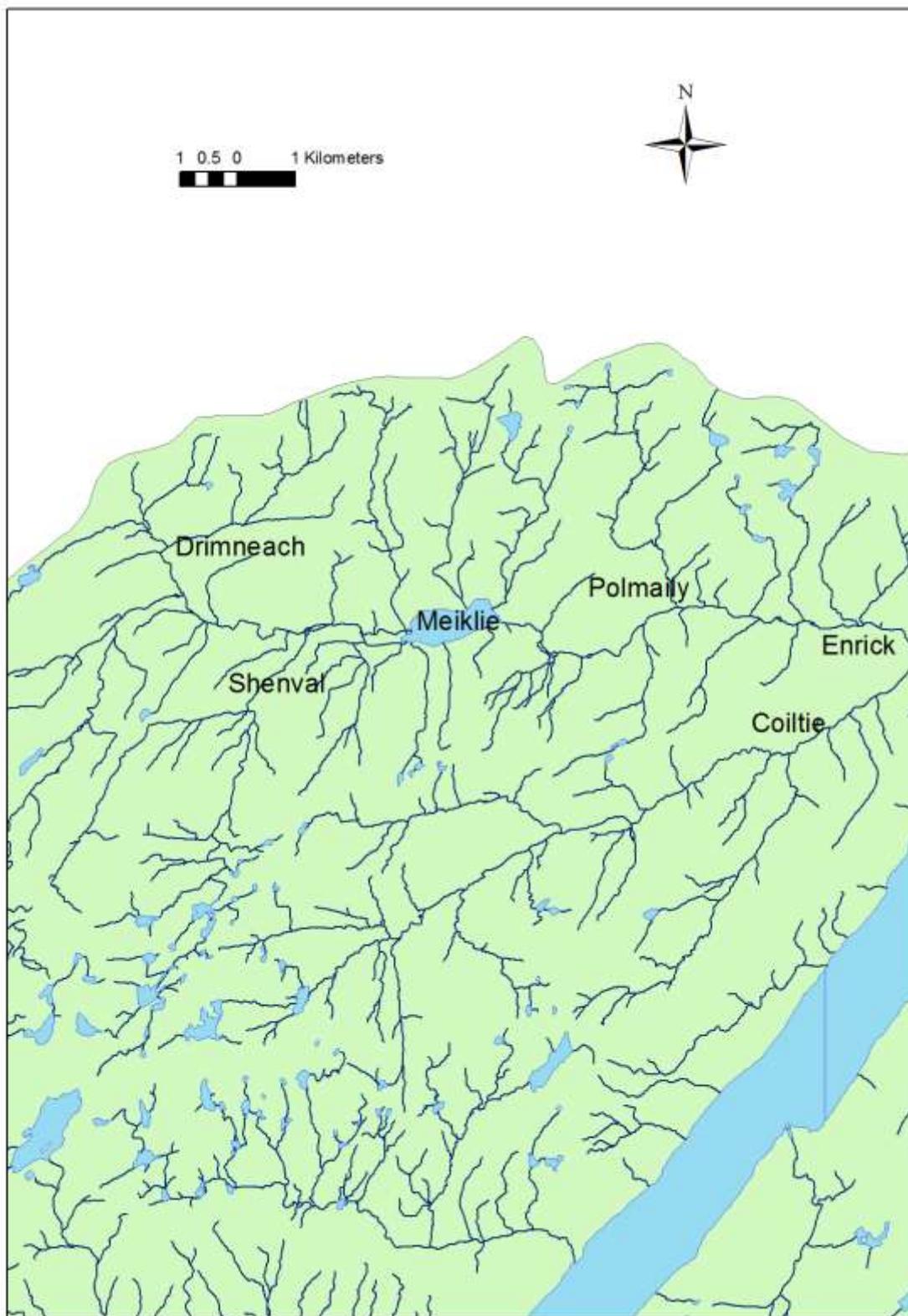


Plate 23 Bridge apron on Camault.



Table 3 Summary of Enrick and Coiltie.

River Section	Naturally Accessible Wetted Area	Estimated Smolt Output
River Enrick (Loch Ness to Loch Meiklie)	111,975	3,359
River Enrick (Loch Meiklie to Corrimony)	79,600	2,388
River Coiltie	39,950	1,198
Shenval	4,100	123
Polmaily	2,200	66
Culnakirk	1,163	35
Gartally	1,250	38
Camault	2,025	61
Allt a' Bhaile Uachdaraich	1,500	45
Allt a' Chaichinn	1,275	38
Millness	1,950	59
Allt na Dalaich Moire	1,438	43
Allt a' Chlacharain	3,450	104
Allt Tarbh	700	21
Allt Drimneach	7,275	218
Total	259,851	7,796



Chapter 3 River Moriston

General Description

Prior to 1880 salmon access to the Moriston system was limited by an impassable waterfall a short distance downstream of the village of Invermoriston. A fish pass was constructed to facilitate access to the upper reaches of the Moriston followed by an improved fish pass in 1902. It is the understanding of N&BFT that a hatchery was operated for a relatively short period of time in order to facilitate the colonisation of salmon throughout the Moriston catchment. N&BFT is unable to source information regarding the origin of the broodstock for the hatchery operation and the success or otherwise of the hatchery programme. It is possible that some or all of the colonisation took place from a salmon population that already existed downstream of the falls.

The headwaters of the Moriston have been extensively harnessed for the production of electricity and as such the Moriston has been the subject of extensive engineering activities. The scheme became fully operational in 1962. The headwaters upstream of the present Clunie and Loyne dams was effectively lost to salmon production as no fish passage facilities were incorporated in the dams. In mitigation for the loss of spawning and nursery areas a heck (fish trap) was constructed at Ceannacroc in order to capture returning adult salmon. The progeny were then to be stocked elsewhere in the system. Numbers of salmon returning to the heck dwindled, however, and this approach to maintaining a viable salmon population was abandoned in 2006 with the construction of a fish pass. Prior to the construction of the fish pass a thorough habitat survey of the sections of the Loyne and the Moriston between Ceannacroc and Loyne Dam and Ceannacroc and Clunie Dam respectively was undertaken by ERA consultancy with a number of potential management actions assessed and recommendations made. Salmon have utilised this fish pass and are apparently re-colonising the stretch of the Moriston downstream of Clunie Dam. Initially, only a very small number of salmon fry were captured and N&BFT undertook an egg box experiment in 2009 to ensure that egg survival was not being compromised by water quality, temperature or other factors. The high survival rate of the eggs in the experiment suggest that the aforementioned factors are unlikely to be the cause of ongoing issues and the occurrence of very low numbers of fry in 2008 remains unexplained. Subsequent to this period salmon fry have been captured in 2011 and 2012 which could not have emanated from the egg box experiment and are the result of natural colonisation.

The Moriston supports an extremely important salmon fishery in its lower reaches, known as the Moriston Estuary. The fishery is in the ownership of Glenmoriston Lodge Estate and is particularly notable in that early-running (January-May), large salmon constitute the bulk of the catch. Upstream of this lower section angling pressure in respect of salmon is typically very light and indeed the area under the ownership of SSE is preserved as a 'sanctuary' area. Trout fishing along much of the length of the Moriston is undertaken, however.

Management of the Moriston system benefits from the presence of a fish counter within Dundreggan fish pass. Data from the counters suggests that the numbers of salmon entering the section of the River Moriston upstream of the Dam are small but appear to be relatively stable. What is not currently known is whether there has been any change in the composition of the overall stock over time (i.e. the ratio of early-running to later running salmon).

In addition to being an important salmon river the Moriston supports an internationally important population of freshwater pearl mussels. As a result the main stem of the Moriston is designated as an Special Area of Conservation (SAC) for freshwater pearl mussels. Due to the dependence of pearl mussels on salmon and trout to complete their life cycle, salmon are also listed as a qualifying feature of the SAC. Due to this fact management actions may need to undergo an appropriate assessment prior to being enacted, with SNH being the arbiter as to whether such actions have the potential to damage the populations of freshwater pearl mussels or salmon.

Lower Moriston

Habitat in the Lower Moriston is of mixed quality. Some spawning is available in addition to some juvenile habitat in the area known as the estuary. Electro-fishing surveys have illustrated that spawning does indeed take place in this area. Habitat quality declines rapidly in the gorge-like section between the estuary and the road crossing in Invermoriston due to the amounts of bedrock in the substrate matrix. Some spawning and good salmon parr habitat is available immediately upstream of the old road bridge with electro-fishing surveys showing good numbers of parr in most years plus salmon fry in some years. Some deep pools are in evidence towards the western edge of the village of Invermoriston and these are likely to constitute important holding pools for adult salmon. Upstream of Invermoriston the substrate becomes much larger in nature and areas offering potential spawning opportunities are at a premium. It is possible that this lack of finer substrate material is linked to the presence of Dundreggan Dam. Impoundments potentially act as a sediment trap cutting off the supply of material to the areas downstream. If this is indeed the case in this example then it is highly likely that this situation will become worse over time. Several tributaries enter the Lower Moriston from the west although most are very small in nature. The largest of the tributaries is Bhlaraidh which is itself the subject of impoundment by SSE. Substrate in this tributary is typically large in nature with few spawning areas available. Electro-fishing suggests that salmon parr do utilise this burn as well as trout. No salmon fry have been found in this burn. Access to the burn is limited by a large waterfall.

Plate 24 Good parr habitat, Lower Moriston.



Poorly designed bridge culverts are an issue in the Lower Moriston on two burns. Although limited habitat is available upstream of the barriers it may be beneficial if they were removed. The Lower Moriston has been the subject of commercial forestry plantations and it is suggested that an audit of the forestry is required to ensure that drainage etc adheres to best practice.

Plate 25 Bridge apron on Caochain na Muic.



Plate 26 Poor culvert design, Levishe Burn.



Upper Moriston

Upstream of Loch Dundreggan the habitat is extremely variable in nature. The distribution of areas suitable for spawning is particularly patchy in nature. The choice of sites for electro-fishing is likely to skew results in respect of salmon fry in particular. However, electro-fishing surveys have identified several key spawning areas. Parr distribution is much wider than fry distribution and as such care needs to be taken when extrapolating from electro-fishing data to assess the health of the Moriston salmon population. The bulk of the Upper Moriston is difficult to habitat survey due to the depth of the water. Several tributaries enter the Upper Moriston. With the exception of Allt an Eoin electro-fishing results are relatively modest. In each burn waterfalls limit the extent of habitat available to migratory fish. A particular issue on some of the burns is accumulations of woody debris in the lower reaches which have the potential to impede access for migratory fish. Abstraction of the burns by SSE is also an issue in some instances. General land use, particularly in respect of the use of riparian areas by livestock is an issue on many of the tributaries as well as the main stem of the river. As with the Lower Moriston forestry practices require closer attention. Some areas of the Upper Moriston would benefit from fencing to keep deer and livestock from the riparian zone.

Plate 27 Severe debris blockage on Eas an Tarbh.



In the section of the Moriston between Cluanie Dam and Ceannacroc it is highly likely that flow regimes will be altered as part of ongoing trials. It is vital that the salmon and trout populations are monitored during any trial period to ensure that the re-colonisation of this section of the Moriston continues to be successful. Full details of the habitat in the section between Cluanie Dam and

Ceannacroc as well as Loyne Dam to the junction with the Moriston are available in a separate report authored by ERA consultancy⁵. While the Moriston in this area has good sections of habitat, the Loyne is very poor and is unlikely to support anything other than a very small population of salmon and trout. It is not presently known whether some natural barriers on the Loyne are passable by salmon.

Plate 28 Good quality spawning material in the lower reaches of Allt an Eoin.



Recommendations

1. In conjunction with SEPA, SNH and other organisations, SSE are currently undertaking work on other river systems in respect of the impacts of dams on sediment. The outcome of this work may in turn help inform any future assessment of the perceived sediment issues downstream of Dundreggan Dam and identify any possible remedial action that can be taken. N&BFT and Ness DSFB should keep up to date with any progress made in this field and work with SSE going forward should any new information become available.
2. The amount of habitat upstream of poorly designed bridge culverts is limited. However, representations should be made to Transerv and Highland Council to ensure that when replaced more appropriate designs are utilised.
3. As part of the SNH led LIFE funding application for the 'Pearls in Peril Project' Forestry Commission Scotland sought funding for an audit of forestry practices in the catchment. This

⁵ ERA (2006). *Salmon Habitat and Population Survey: Rivers Loyne & Moriston*. ERA Report 54

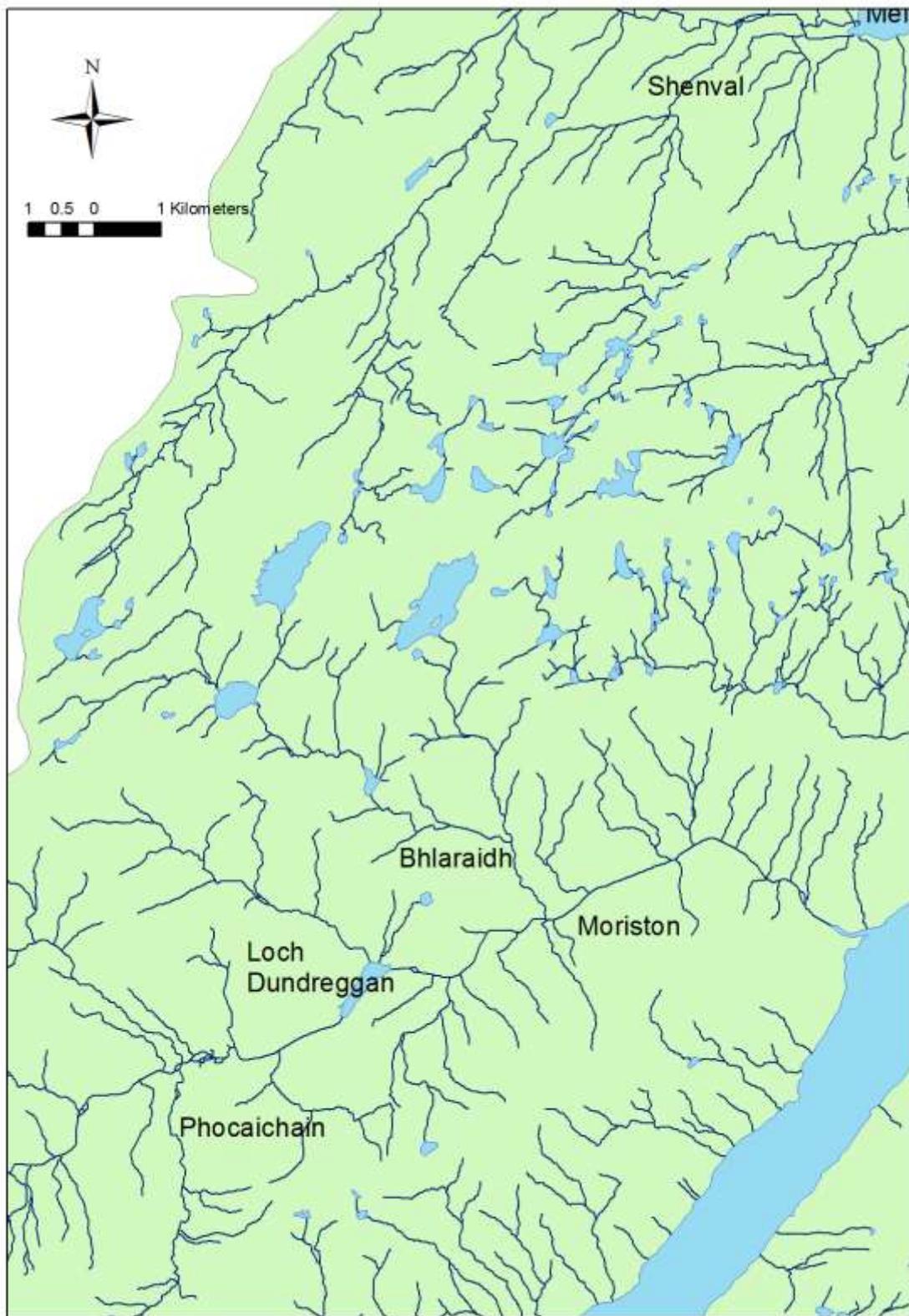
part of the bid was unsuccessful but it is suggested that representations are made to Forestry Commission Scotland to undertake such an exercise despite the lack of funding.

4. In 2011 an initial meeting was orchestrated by SNH aimed at creating a forum for discussion on catchment management within the Moriston system. It is suggested that a catchment-wide management vehicle is established incorporating a wide range of stakeholder interests. The primary aim of the group should be to improve land use for the benefit of the river system.
5. Re-colonisation of the areas upstream of the fish pass at Ceannacroc is very important for the future of the salmon population in the Upper Moriston. Annual monitoring is currently required to ensure that salmon continue to spawn in such areas. Should this prove not to be the case, adaptive remedial action will be required.
6. The tributaries of the Upper Moriston would benefit from regular assessments in respect of the build up of flood debris. However, there should be a general presumption against the removal of such material unless it is felt likely that access for migratory fish is being severely hindered.

Table 4 Moriston Summary Statistics.

River Section	Naturally Accessible Wetted Area	Estimated Smolt Output
Lower Morsiton	315,156	9,454
Upper Morsiton (below Ceannacroc)	724,922	21,748
Upper Moriston (above Ceannacroc)*	115,459	3,463
Loyne	??	??
Levishie	650	20
Bhlaraidh	2,825	85
Red Burn	1,738	52
Allt na Mhuic	7,050	211
Caochain na Muic	1,100	33
Allt cenn-an-Acaidh	725	22
Eas an Tarbh	2,925	88
Allt Phocaichain	2,550	77
Allt an Eoin	7,150	215
Allt Baile nan Carn	4,575	137
Allt Larairidh	500	15
Total	1,187,325	35,620

***From ERA report.**





Chapter 4 Garry and Oich

General Description

The River Garry system and the River Oich are separated by Loch Oich. The Oich runs parallel to the Caledonian Canal and it is the understanding of N&BFT that extensive modifications to the river were made when the canal was constructed. While the Oich is not directly influenced by the impoundments in the Garry catchment, flow patterns are likely to be indirectly influenced by hydro-electric activities further upstream e.g. by freshet release from Invergarry Dam. The Oich supports a salmon fishery on three separate beats although currently catches are relatively low in comparison to historical levels. It is likely that catches on the Oich have been heavily influenced by fish ultimately bound for the Garry catchment. As such the present depressed state of the fishery on the Oich is likely to be related to the diminution of numbers of adult salmon returning to the Garry catchment and, in particular the Upper Garry. In addition to the main stem of the River Oich there are several small tributaries plus a reasonably large one, namely the Invervigar Burn.

Loch Oich supports a salmon fishery as well as a fishery for trout and pike. There is one major tributary of Loch Oich that is known to support a salmon population, namely the Calder Burn. However, the amount of available habitat in this burn is limited in extent.

Prior to the harnessing of the Garry catchment in the 1950s, the Lower Garry was an internationally famous salmon fishery with the primary target being large early-running salmon that were delayed at a major falls (close to what is now Invergarry Dam) which acted as a temperature barrier to migration. It is likely that there were two major areas of salmon spawning upstream of Loch Garry, namely the upper reaches of the River Kingie and the River Quoich. A large dam was constructed on the Quoich branch of the catchment which did not include the provision of a fish pass thus effectively this section of the catchment was lost to salmon production. The construction of the dam also effectively drowned the lower reaches of the Quoich and other burns in this part of the catchment. In mitigation for the loss of spawning areas a large hatchery was constructed in the village of Invergarry and a heck (fish trap) installed at Poulary. The success of this mitigation exercise was, in the opinion of this author, wholly dependent on the continued stocking of the upper reaches of the Upper Kingie with the progeny of the fish captured at Poulary. Human access to the upper reaches of the Kingie is logistically difficult and it is clear from examination of stocking records that stocking of the Kingie annually was not continued as it should have been. Following a highly detailed habitat survey of the whole Garry catchment by ERA consultancy⁶, the screens at Poulary Heck were removed in 2005.

River Oich and Invervigar Burn

The habitat survey of the main stem of the Oich suggests that it is inherently productive in nature with good spawning areas in places and some good parr habitat also available. Initial electro-fishing results from surveys undertaken by N&BFT compared favourably with the meagre historical data available. However, subsequent surveys have been less positive with the exception of the area around Invervigar Burn although timber blockages in the lower reaches are an issue on occasion. The

⁶ ERA (2004). *Garry Catchment Project Phase 1. Data review, habitat survey and assessment of freshwater invertebrate communities. ERA report 33.*

Invervigar Burn supports a salmon population and contains good spawning in its lower reaches with a considerable distance of high quality parr habitat further upstream. Several other small tributaries enter the Oich from the north side of the main river. A number of these currently support salmon populations but historical evidence suggests that the burns entering the lower reaches of the Oich are prone to drying up under dry summer conditions. Since the inception of N&BFT, however, this has not occurred.

Plate 29 Good spawning material on the River Oich.



Calder Burn

Loch Oich has one tributary that is known to support a salmon population, namely the Calder Burn. Spawning areas are restricted to the lower reaches of the burn and there is a reasonable quantity of salmon parr habitat prior to an impassable waterfall being reached.

Upper and Lower Garry

The habitat of the Upper and Lower Garry was extensively surveyed and described by ERA consultancy in a series of reports. Management options are currently being assessed by a sub-group of the Ness District Salmon Fishery Board. In addition to any short-term measures it is suggested that improved dialogue in respect of forestry interests within the catchment should be established as soon as is practicable. Consideration should also be given to the feasibility of judicious tree planting in the upper reaches of the Kingie in order to begin the process of 'climate change proofing'

the Ness catchment. The removal of Rhododendron from both the lower and upper catchments would also be beneficial.

Plate 30 Fallen timber and flood debris with potential to block access for fish, Invervigar Burn.



Plate 31 Good parr habitat on the Calder Burn.



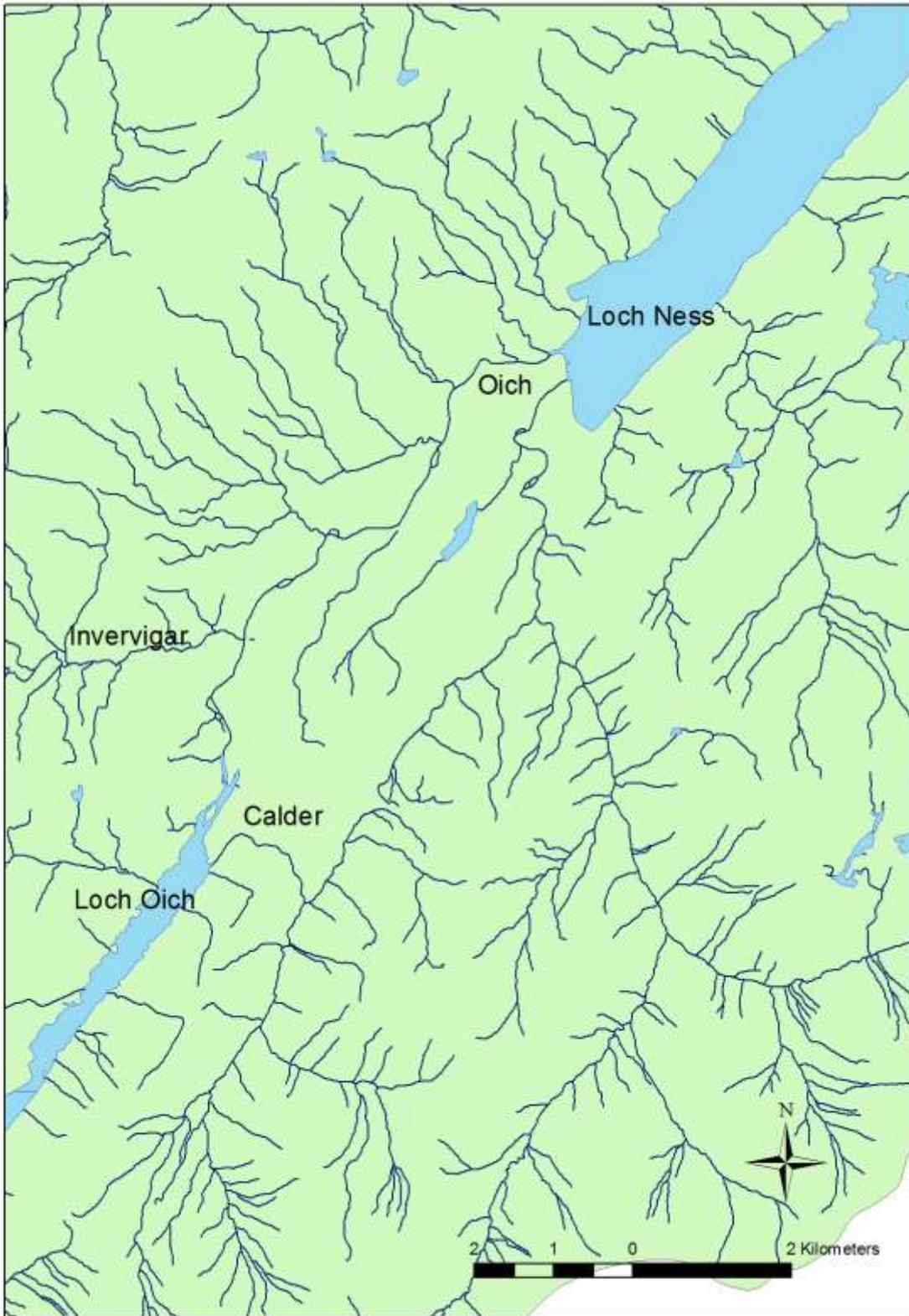
Recommendations

1. The lower reaches of the Invervigar Burn should be checked annually for flood and other debris and such blockages breached or removed if they are deemed to constitute a barrier to fish movements.
2. An assessment should be made as to the feasibility of native tree planting in the upper reaches of the Kingie. This would potentially improve the physical and chemical environment by increasing leaf and woody debris inputs, fixing nutrients in the soil and providing cover for fish.
3. Non-native tree and plant species should be removed.
4. An improved relationship with Forestry Commission Scotland would likely lead to a better understanding of, and input into, the forestry design plans of the catchment.

Table 5 Oich summary statistics.

River Section	Naturally Accessible Wetted Area	Estimated Smolt Output
River Oich	423,890	12,717
Invervigar	5,000	150
Calder Burn	7,600	228
Allt na Fearna	3,900	117
River Garry (lower)*	183,269	5,498
River Garry (upper)*	341,910	10,257
Greenfield Burn*	6,688	201
Allt Garry Gulach*	6,468	194
Allt Coire a' Bhalachain*	9,675	290
Small Garry tributaries*	11,282	338
River Kingie*	354,608	10,638
Garr Garry*	68,129	2,043
Total	1,422,419	42,671

***From ERA Report.**



Chapter 5 River Tarff

General Description

The River Tarff enters Loch Ness close to the village of Fort Augustus. The River does not support a salmon fishery but has a diverse fish population including salmon, trout, eels and lamprey. The upper reaches of the Tarff have in recent years been harnessed as part of the Glendoe hydro-electric scheme. There has been a history of unauthorised mechanical perturbation within the Tarff but this has apparently declined in recent years. As with the rest of the Ness system, there is a paucity of historical electro-fishing information for the Tarff although the AURIS electro-fishing results from surveys undertaken in the early 1990s resulted in the belief that the Tarff supported only a very small population of salmon. However, the electro-fishing monitoring undertaken as part of the Glendoe scheme suggests that reasonable numbers of salmon juveniles are produced from the Tarff.

River Tarff

Approximately four kilometres of habitat are available to migratory salmonids in the River Tarff. Spawning material is mostly available in the lower reaches of the burn although there are pockets of such material throughout much of the River Tarff downstream of the major waterfall. Upstream of the impassable waterfall habitat is suited to trout production and, indeed, electro-fishing results indicate that the upper reaches of the Tarff support a reasonable trout population. Salmon parr habitat is widely available in the Tarff and electro-fishing surveys indicate that parr are widely distributed amongst the habitat that is available. Salmon fry distribution is typically more patchy and appears to be the subject of great interannual variation. It is suggested that the degree of ingress by salmon may be a function of river levels during the key spawning periods.

Plate 32 Looking downstream from the main road bridge over the River Tarff.



Plate 33 Gorge section of the Tarff.

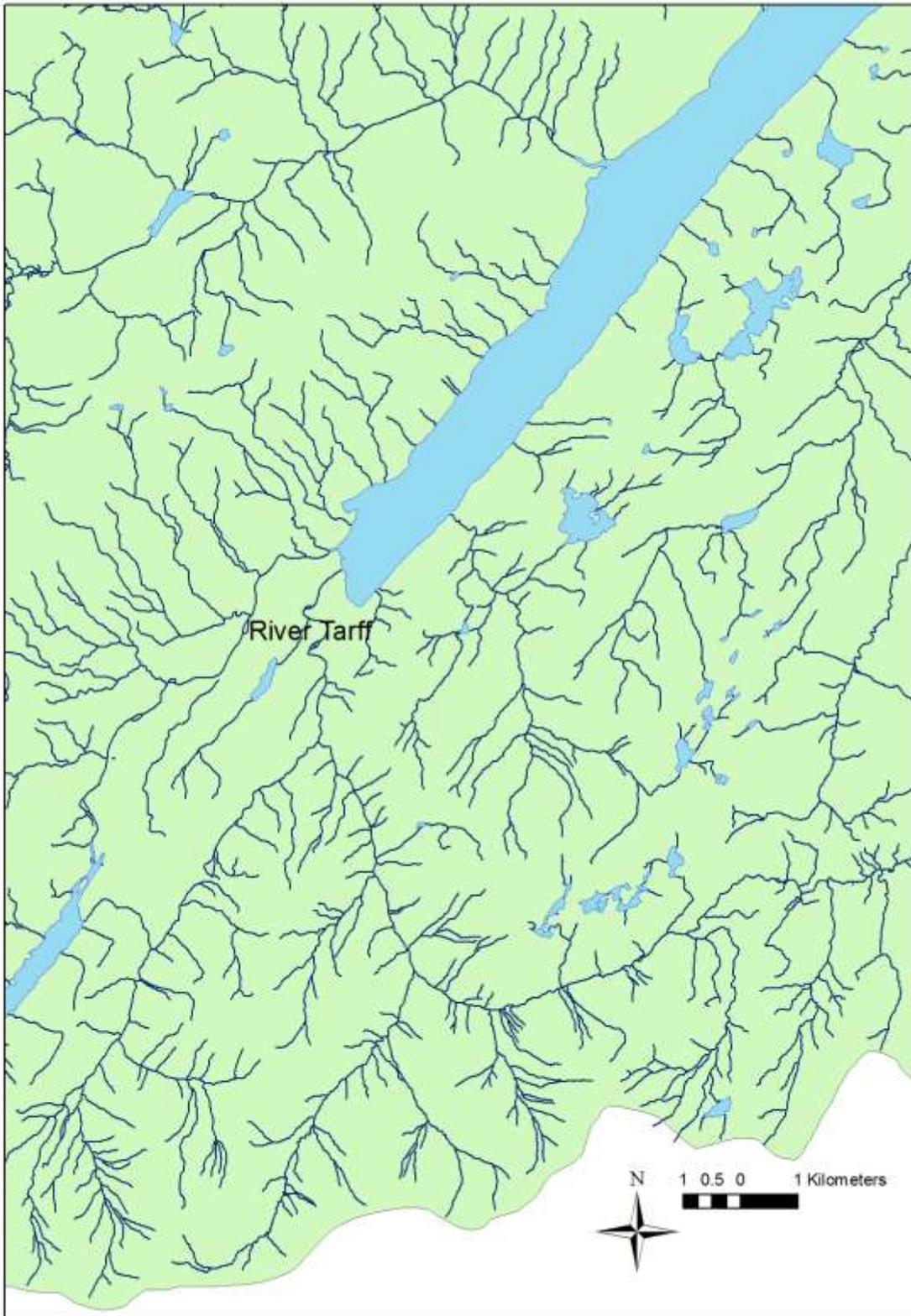


Recommendations

1. In the light of the Glendoe development, the long term monitoring of fish populations within the Tarff should be continued.

Table 6 Summary of Tarff Habitat.

River Section	Naturally Accessible Wetted Area	Estimated Smolt Output
River Tarff	43,700	1,311
Total	43,700	1,311



River Foyers

General Description

A short stretch of the Foyers is available to migrating salmon due to the presence of a large waterfall on the river. The Foyers has been extensively harnessed for the production of electricity with the result that flows are much reduced. N&BFT have accessed the lowermost reaches of the Foyers which appears to be still in nature and could be considered to be merely an extension of Loch Ness under present conditions. Electro-fishing has been undertaken but this was unsuccessful due to the nature of the water conditions. It is the understanding of N&BFT that the lower river was historically netted for the supply of broodstock to hatchery operations therefore it is possible that a remnant salmon population exists within this tributary. N&BFT have had difficulties in safely accessing the Foyers in order to undertake a habitat survey and electro-fishing.

Recommendations

1. Safe access to the Foyers needs to be identified in order to undertake a habitat survey and facilitate the identification of suitable electro-fishing sites.

Chapter 6 River Farigaig and Liath Burn

General Description

The Farigaig is one of the largest of the river systems that enter Loch Ness from a southerly direction. Additionally it is perhaps the only remaining river that enters on the south shore that support a population of salmon, although the status of the Foyers is currently unknown. Presently it is one of the few sub-catchments that is not the subject of major abstraction for either domestic water supply or hydroelectric production. The Farigaig does not support a formal fishery although it is the understanding of N&BFT that some brown trout are captured on rod and line in the main river and its tributaries.

The Farigaig catchment has been the subject of commercial forestry development which is likely to have impinged on its productive potential. In particular, several areas appear to suffer from over-shading by conifers. One of the key constraints to maximising salmon production is the presence of a perched bridge apron in the lower reaches of the river.

6.1 River Farigaig

N&BFT surveyed approximately 16km of the Farigaig although it should be noted that some sections run through gorges and as such are difficult to access safely. In such locations a broad estimate was made by the surveyor. A large waterfall approximately 1.5km upstream of the outfall of the Farigaig into Loch Ness prevents access for salmon and sea trout to the upper reaches of the Farigaig. Additionally, a bridge apron at the Invefarigaig road crossing appears to present difficulties in respect of the passage of salmon. An engineering assessment of the bridge apron has been undertaken and a plan for remedial action drafted⁷. Habitat downstream of the bridge apron is dominated by large substrate sizes and there is a paucity of material of a suitable size for salmon and trout spawning. Better quality habitat is available upstream of the bridge particularly in the vicinity of the junction of the Farigaig with the Liath Burn. Indeed, the Liath Burn offers material suitable for spawning throughout much of its length.

The limited electro-fishing data held by N&BFT indicates that year classes of salmon appear to be missing on occasion and further suggest that the salmon population of the Farigaig is likely to be numerically small. Given the highly volatile nature of flows in the Farigaig and the large average substrate size in the areas of the Farigaig accessible to salmon, it is unlikely that the river will support a numerically large salmon population. However, it is likely that the Farigaig salmon population remains genetically discrete and as such it is suggested that it is important to safeguard and enhance this population as much as is practicable.

The lower reaches of the Farigaig are in the ownership of Forestry Commission Scotland and this area contains commercial forestry plantations of non-native tree species. It is likely that the utilisation of the catchment for commercial forestry will have negatively impacted on the hydrology of the catchment.

The upper reaches of the Farigaig contain inherently productive habitat for trout including areas highly suitable for spawning. The survey suggests, though, that erosion with its associated input of

⁷ Beech, M (2010). *SEPA Fish Passage Restoration Project. Inverfaigaig Bridge Apron (09) River Farigaig.*

fine sediment is a potential problem in some areas of the burn and is being exacerbated by allowing livestock to access the river banks.

Plate 34 Good trout spawning areas in the upper reaches of the Farigaig not accessible to salmon due to waterfalls downstream.



Plate 35 Perching bridge apron in lower Farigaig.



Plate 36 Impassible waterfalls on River Farigaig.



Plate 37 Erosion in upper reaches of River Farigaig.



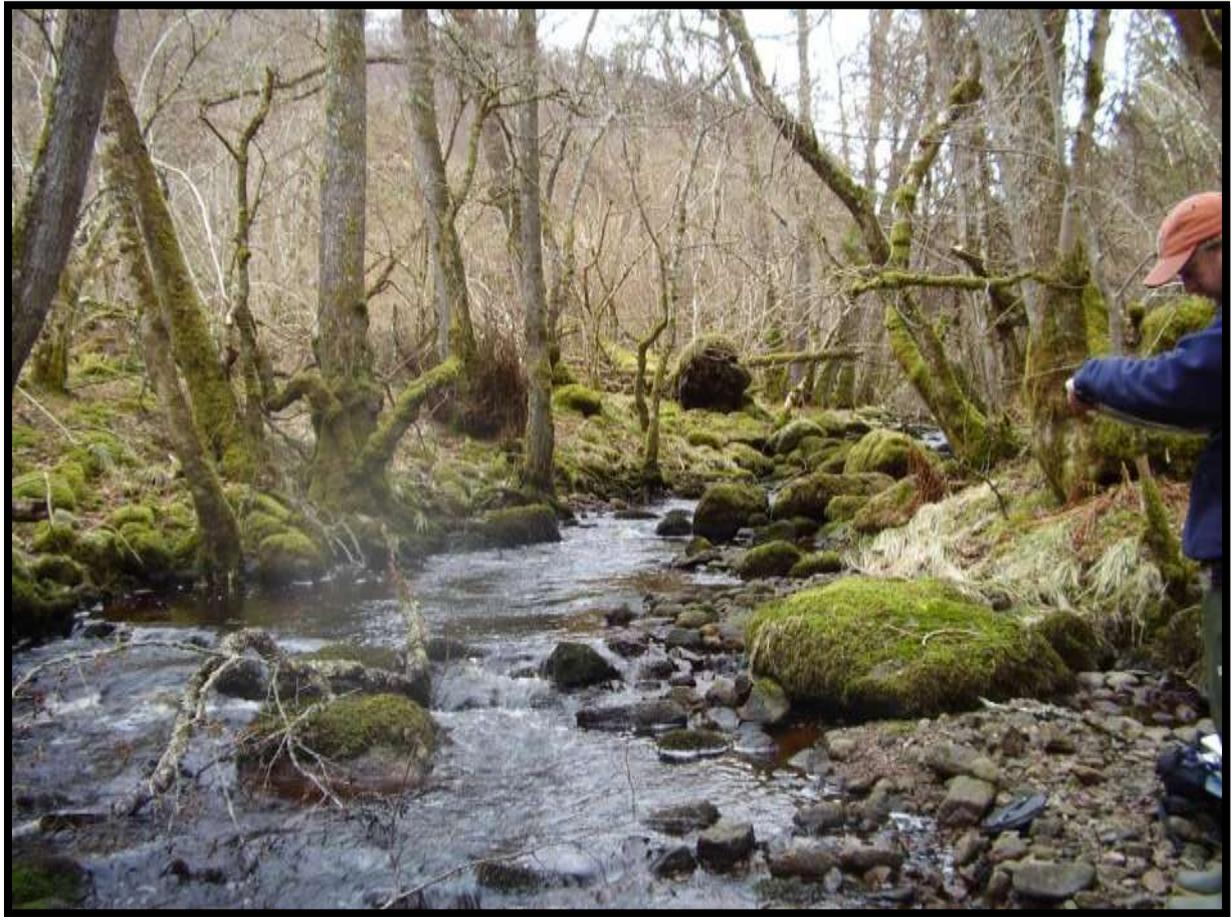
6.2 Liath Burn and Allt Chearc

The Liath Burn provides in excess of 2km of reasonable quality habitat, particularly for trout. Electro-fishing surveys suggest that salmon are typically found in the lower reaches of the Liath Burn with good populations of trout being found throughout its length. Native broadleaved trees are much in evidence through the length of the burn which is likely to be highly beneficial due to its shading properties, input of leaf litter to the stream and the provision of terrestrial insects for the fish which inhabit the stream. However, the small tributaries of the Liath Burn have been subjected to commercial forestry plantations. While it is small, Allt Chearc has some good quality habitat. Forestry guidelines have not been adhered to in this region with the result that forestry plantations are over-shading the burn preventing light entering etc.

Plate 38 Non-native trees encroaching on river bank, Allt Chearc.



Plate 39 Lower reaches of Liath Burn.



Recommendations

1. The bridge apron on the River Farigaig requires urgent remedial action.
2. N&BFT have discussed the issues of forestry practices with Forestry Commission Scotland and it is our understanding that the concerns raised have been incorporated into the area forestry design plans. However, this should be checked and the forestry issues on the Farigaig should be viewed within the context of the wider use of the Ness catchment by the forestry industry.

Plate 40 Summary statistics for Farigaig Catchment.

River Section	Naturally Accessible Wetted Area	Estimated Smolt Output
River Farigaig	16,875	506
Allt Mor (Liath Burn)	6,375	191
Allt Chearc	2,281	68
Total	25,531	765

