

Atlantic Coast (Wester Ross) Project

Topic Paper:

Sport Fishing: Salmonids

1. Introduction

This paper is one of a series prepared to help inform the future use and development of the coastal zone of Loch Broom, Little Loch Broom, the Summer Isles and Gruinard Bay. The paper represents the results of basic survey and evaluation work and should not be regarded as a policy document. It is however intended to help in the formulation of policy and to promote discussion. The Atlantic Coast project aims to develop and test an integrated coastal zone plan for this area which can help in the evaluation of development proposals, guide investment, and minimise conflicts of interest. It aims to promote a balanced approach: one that can safeguard the area's core natural assets and sustain or enhance its productivity over the longer term.

The issues set out in this topic paper have been identified in response to concerns raised in the project area. Some have scientific backing. Others are based on mainly anecdotal evidence from those directly involved in activities such as fisheries, fish farming, natural history and angling.

Salmon and sea trout are found in all the major river systems around the project area, and sport angling for both species is popular with both locals and visitors. However, populations of both salmon and sea trout have declined considerably in recent years, in the project area and further afield.

Several different explanations have been suggested for the observed declines but the situation is complex. It is becoming clear that the decline is due to a combination of factors. These include climate change, by-catch of juvenile fish by mackerel fishing boats, impacts of sea lice associated with finfish farming, and habitat degradation.

The decline in salmon and sea trout populations is significant economically as well as environmentally. Visiting anglers have traditionally brought much-needed revenue to the area, and river management for angling provides valuable employment.

2. Background

The Atlantic Salmon *Salmo salar* is an anadromous species, meaning that it begins its life in fresh water, spends part of its life at sea, and then returns to fresh water to spawn. Salmon in the west of Scotland typically spend 2-3 years in the river in which they were spawned. They then undergo a physiological change known as *smolting* which prepares them for life in salt water, and migrate down the rivers and out to sea. The higher productivity of the marine environment allows salmon to grow fast during their time at sea, which may last from one to three or more years. Following this period they return to the river in which they were born, as fully mature adults ready to spawn. Most salmon only spawn once, and die soon after spawning.

The ability of salmon to home accurately to their natal river has led to the evolution of many small, genetically distinct populations, each associated with one river or river system.

The Sea Trout *Salmo trutta* is an anadromous form of the Brown Trout. While brown trout spend their entire lives in freshwater rivers and lochs, some individuals from the same population can undergo the process of smolting, and leave the rivers to spend a summer or longer feeding at sea before returning to fresh water. These individuals are known as sea trout, and although they belong to the same species as brown trout, they have a very different life history. The good feeding to be found at sea and in estuarine areas allows sea trout to reach much larger sizes than brown trout. Unlike salmon, sea trout may spawn on several consecutive years, returning to the sea again after each spawning period.

Salmon and sea trout have played a significant part throughout the history of the Scottish Highlands. Historically, they were important as food fish for coastal settlements and were caught mainly in stone-built fish traps in estuaries and at the heads of sea lochs, alongside marine species such as herring. Remnants of these traps can still be seen around the project area, for example at the head of Loch Broom.

In the 19th and 20th centuries netting stations were established along the coast, and bag-nets and sweep-nets were used to intercept the returning salmon before they reached the rivers. These fisheries continued in many areas until the 1990s, but were gradually closed down as salmon populations declined.

Sport angling took off during the Victorian era, with anglers seeking out both good 'sport' and a 'wilderness experience'. Estates employed keepers and bailiffs to protect against poaching and to guide visiting anglers, providing much-needed jobs. This has continued to the present day, providing an important source of revenue for local estates, as well as local employment in remote rural communities.

However, serious declines in the populations of both salmon and sea trout in recent years have raised concerns both for those who make a living from the fishery, and for the future of the species themselves.

3. Current situation

3.1. Status of wild fisheries in the project area

The main river systems in the project area are the Gruinard and Little Gruinard, the Inverianvie, Dundonnell, Ullapool, Broom, and Kanaird.

All the rivers in the project area have supported salmonids in the past and continue to do so today, albeit in much reduced numbers. However, three rivers stand out as particularly important to salmonid conservation.

The Little Gruinard River, with its complex system of lochs and burns providing excellent habitat for all stages of the salmon life cycle, retains a healthy salmon population by comparison with neighbouring rivers. The river has been designated as a Special Area of Conservation (SAC) for salmon. Similarly the Gruinard River, although currently having no conservation designation, provides excellent habitat and supports good salmon populations.

The third river of particular importance in the project area is the Ullapool River. It does not support populations on the scale of those in the Gruinards but is known for its spring-running salmon. This is something of a rarity on the west coast, and the

Ullapool River, with records of 'springers' going back for 150 years, merits efforts to protect the genetic integrity of its stock.

Salmon and sea trout populations have declined considerably in the project area over recent years. This decline cannot be attributed directly to any single cause, but has been linked to a number of different factors, including:

- increased levels of parasitic sea lice in coastal waters associated with salmon farming;
- by-catch of juvenile salmon by commercial pelagic mackerel fisheries;
- genetic 'dilution' of stocks in individual rivers by interbreeding with fish farm escapes;
- habitat degradation in the catchments of spawning rivers and burns;
- acidification of spawning rivers and burns.

Of these, habitat degradation and acidification are not thought to be serious problems in the project area, and are unlikely to have contributed significantly to the observed decline. Other factors, such as by-catch of post-smolts, may be very significant but they emanate from well beyond the geographical boundaries of this project.

A further concern which has been raised on the west coast of Scotland is that the decline in salmonid populations might be partly linked to a decrease in marine prey species - the 'baitfish' or juvenile fish which salmonids feed on in coastal waters. This decrease may be linked to the impacts of trawling in inshore waters or even to global climate change. A number of research proposals are being developed at present to investigate the situation.

3.2. Stocking

Restocking of rivers with salmon has been carried out in the Kanaird, Ullapool, Dundonnell and Gruinard Rivers. The introduced fry have been raised from broodstock from the relevant rivers, to preserve the genetic integrity of the stocks. Salmon broodstock are held in Aultbea (for the River Kanaird), Eilean Darach Estate (for the Dundonnell and Gruinard Rivers), Dundonnell Estate (for the Dundonnell River) and Gruinard Estate for the Gruinard River.

3.3. Conservation measures

Due to continuing declines, Atlantic Salmon has been classified as a threatened species in Annex II of the EU Habitats and Species Directive. Both salmon and sea trout are listed as locally important species in the recently published Wester Ross Biodiversity Action Plan, and the Gruinard River has been designated a candidate SAC for salmon.

There is a catch-and-release policy on most rivers in the project area. More than 70% of the catch on the Gruinard River is returned, and fishing effort has been cut by 40% as a conservation measure in association with its candidate SAC status.

3.4. Sea lice

Concern has increased in recent years over the impacts of sea lice on wild salmon and sea trout populations. The salmon louse *Lepeophtheirus salmonis* is a naturally occurring parasite of wild salmon and sea trout. However, its abundance has increased dramatically in recent years due to an artificial source of hosts in the form of caged salmon.

Sea lice begin life as free-living larvae in the sea, moving with currents and tides, until they encounter a suitable host on which to settle and feed. Lice tend to stay on the same fish until maturity, feeding on the skin and mucus of the host. On reaching

maturity the lice mate, and the females produce long strands of fertile eggs which are then released into the sea to hatch and become new larvae, beginning the cycle once more.

The large numbers of fish concentrated in salmon farms mean that even when the number of lice per fish is low, there can still be unnaturally high concentrations of egg-bearing female lice within the farm area. This leads to relatively high densities of louse larvae in surrounding waters. These larvae settle on wild salmon and sea trout, as well as back on the farmed fish.

Juvenile (post-smolt) sea trout are particularly vulnerable to louse infection as they feed in inshore waters where most fish farms are located, and where lice larvae are most abundant.

Heavy infection with lice causes stress, lesions and failure of the fishes' ability to regulate its water balance. The fish will die unless the lice are removed or lost.

Sea lice populations can be regulated in a number of ways. The most effective is the use of synchronised fallowing periods for all the fish farms in an area, which deprives the lice of hosts and breaks the life cycle. A number of effective medicines have also been developed.

In the project area, a period of record low sea trout catches in the late 1990's on the Dundonnell River coincided with very high levels of sea lice on captured sea trout. In 2003, following a three year fallow on the farms in Little Loch Broom, sea trout catches were higher than they had been for many years.

3.5. The 'Two Brooms' Area Management Agreement

The Tripartite Working Group (TWG), comprising representatives of wild fishery interests, the aquaculture industry, and the Scottish Executive, was convened in 1999 to tackle the damage caused to wild salmon and sea trout populations by the high densities of sea-lice associated with caged farmed fish. The TWG seeks to ensure the maintenance of healthy wild salmon and sea trout stocks alongside a sustainable aquaculture industry. It aims to achieve this through the development of Area Management Agreements (AMA's) for defined management areas.

The TWG advises fish farm operators to adopt integrated sea lice management strategies, including synchronous year-class stocking within management areas, regular and accurate sea lice counts, effective treatments to achieve as close a possible to zero levels of egg-bearing lice, and the adoption of novel methods to reduce reliance on chemical medicines.

Considerable efforts have been made to establish an Area Management Agreement for the project area (the 'Two Brooms' AMA) which would be acceptable to all parties. However it has not yet been possible to reach agreement. Local wild fishery interests believe the salmon farmers must commit to the synchronisation of production cycles within the area. However, one of the smaller fish farm companies in the area feels it is unable to make such a commitment without jeopardising its business. The Area Management Group is continuing to search for a compromise which can satisfy all parties.

4. Value of this sector

Wild fisheries management in the project area provides an estimated total of six full-time jobs. In addition, the local revenue from visiting anglers (and the friends and families which accompany them) is significant because they stay in local

accommodation, spend money in the local shops, and eat in local restaurants. One estimate suggests that for every rod-caught salmon, an average of £1600 is spent in the area.

Sensitive management of rivers to support healthy salmon and sea trout populations has knock-on benefits for other riverine species. These include species of conservation importance such as freshwater pearl mussels and otters.

5. Key issues and priorities

This section seeks to identify the core assets, main issues, and current priorities for the wild fisheries sector in the project area.

5.1. Assets

- Good quality riverine habitats;
- Relatively strong salmon populations in the Gruinard and Little Gruinard rivers;
- Fish farming interests may be prepared to consider options such as relocation.
- Catch-and-return schemes are established on many rivers.

5.2. Issues

- The impacts of high levels of parasitic sea lice (associated with salmon farming) on wild salmon and sea trout populations.
- Loss of genetic integrity of some stocks due to interbreeding with escaped farmed fish. There is a need to establish more effective measures for escape prevention and recovery.
- The current lack of progress in the AMA process.
- Vulnerability of rivers and coastal areas to poaching.
- Possible decline in baitfish abundance leading to a reduced food supply for salmonids in coastal waters.

5.3. Priorities

- Establish an Area Management Agreement acceptable to all parties, which makes adequate provision for the control of sea-lice populations within the project area.
- Restoration of native fish stocks in rivers which have seen falling catches.
- Strengthening of catch-and-return schemes.

5.4. Interaction with other sectors

- **Aquaculture:** The issues of sea lice and fish farm escapes are the main areas of interaction between wild fisheries interests and the aquaculture industry. However, it is important to note that it is in the interests of both sides that escapes should be avoided and sea lice levels kept to a minimum.
- **Nature Conservation:** in general, the interests of the wild fisheries sector coincide with nature conservation interests in terms of the protection of stocks. Nevertheless, conflicts sometimes arise over the extent to which predator-control measures should be permitted (eg for seals and saw-billed ducks).

6. Development opportunities

- Investigate the possibility of relocating certain fish farm sites away from the mouths of rivers;
- Conduct research into the distribution and abundance of baitfish in the project area;
- Improve hatchery facilities for restocking local rivers with native stock;

- Encourage catch-and-release policies on all rivers until populations of spawning stock are recovered

7. Conclusions and recommendations

Salmon and sea trout are an integral part of the natural and cultural heritage of the project area. Furthermore, the salmon population of the Little Gruinard River is considered to be of international importance. There is much still to be understood about the species, the threats they face and the causes of their decline. However, there are still a number of actions which can be taken within the project area to improve people's understanding of the issues and to maximise the chances of recovery and survival of local salmon and sea trout populations. These include supporting the AMA process, taking a cautious approach to the establishment of new fish farms, and encouraging the relocation of certain farms away from river mouths. They also include maximising our understanding of local conditions through supporting current research efforts into baitfish populations and sea lice distribution.

8. Acknowledgements

Much of the information in this paper came from reports published by the Wester Ross Fisheries Trust.

9. Comments and additional information

Information in the paper was gathered from published documents, agency records, and local individuals and organisations. If any of the information in the paper is inaccurate, or if there are significant elements missing, please contact the Atlantic Coast Project Officer at the address below.

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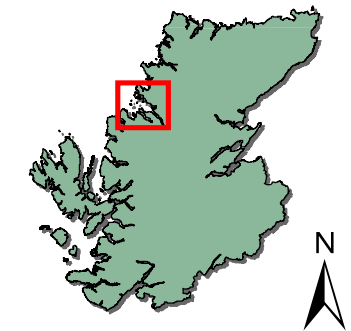
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Sport Fishing









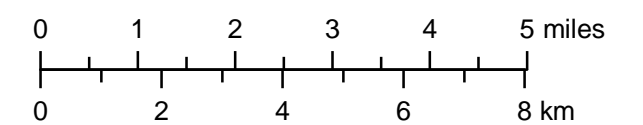
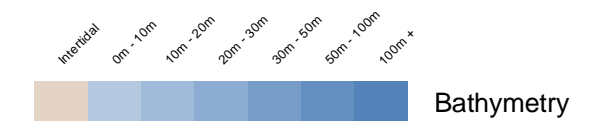
Legend

Topic: Sport Fishing

-  Former Netting Station
-  Wild Fishery

Topic: Map Base

-  Settlement
-  Main Peak
-  Trunk Road
-  A Road
-  B Road
-  Other



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