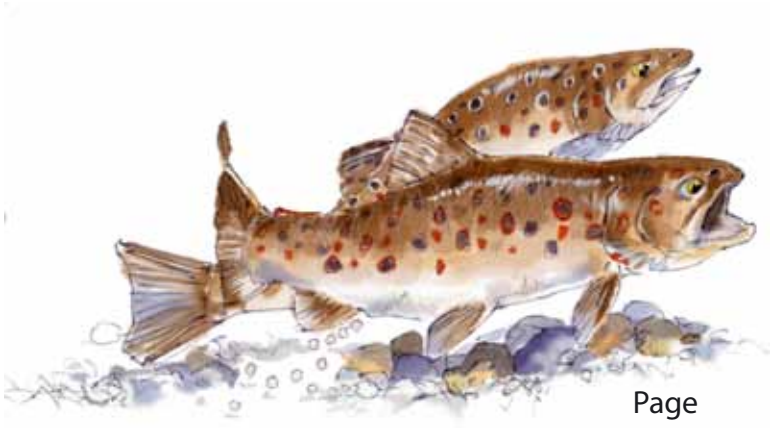
Loughs Agency **Trout Strategy**

Foras Thuaídh/Theas

a Cross Border body

Contents



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Wild Trout Trust and DAB Graphics

Introduction

1. The aim of the strategy

The aim of the strategy is to develop a template to conserve and improve wild stocks of Brown and Sea trout, while enhancing the environment for all fish species in the Foyle and Carlingford areas.

The strategy will also explore methods to enhance the social, economic and environmental benefits derived from sustainable management and development of the fisheries of Foyle and Carlingford.

Sea trout, trout that make a migration to sea during their life cycle, are an important economic and social asset as a recreational fishery. Long term evidence has highlighted a collapse of the sea trout fish stocks in the late 1980's and early 1990's and this collapse appears variable among river systems in Ireland, Northern Ireland and Scotland.

Since the fishery collapse, changes made to the management of the marine fishery, marine aquaculture and the promotion of "catch and release" in freshwaters has coincided with a recovery in the numbers of returning sea trout.

Despite this increase, sea trout populations have not yet attained the pre collapse numbers. Long-term information collected from angler's catch in Irish river systems highlighted a collapse of the fishery in the late 1980's. Since this time there has been some improvement in the numbers of fish caught but the sea trout fishery is still significantly depleted compared with pre collapse levels.

Precautionary Approach:

'Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.

Rio Declaration 1992

Threats from "development":

The Earth Summit (Rio de Janeiro, 1992) promoted the conservation of ecosystems as a public good, independent of their utility as a resource.

2. Executive Summary

The strategy is founded on the Agency's mission statement:-

> *"The Loughs Agency aims to provide sustainable social, economic and environmental benefits through the effective conservation, management, promotion and development of the fisheries and marine resources of the Foyle and Carlingford Areas."*

Consultation and collaboration with relevant local and national interests is crucial to both the development and successful implementation of the strategy.

Best practice within this strategy will be based on internationally agreed guidelines - in particular, those developed by the North Atlantic Salmon Conservation Organisation or NASCO, the principles of conservation of salmon being of similar application to trout.

Enhancing the social, environmental and economic benefits realised from wild trout fisheries will be achieved primarily by promoting angling as a sport (and an important element of the tourism sector) and strategically developing sustainable angling opportunities. Particular consideration will be given to the need for social inclusion and environmental awareness. Recreational angling has been shown to be, by far, the largest participation sport in these islands - a participative sport not simply a spectator sport.

Wild trout fishing has the added advantage of offering a much broader availability than is offered by other species - a variety of viable catching methods, steady availability over all months of the season, not as dependant on river levels as salmon angling etc. The sport is affordable and 'good' water is more widely available than that for other forms of fishing.

Where practical, conservation targets will be developed for wild stocks, against which their status can be assessed.

Policies are to be developed to help ensure the conservation of wild stocks of trout. These relate to six main areas:

- Habitat improvement;
- Exploitation;
- Stock management;
- Barriers to migration;
- Culverting;
- Water abstraction and impoundment.

The success of the strategy will be assessed by a range of measures relating to the desired social, economic and ecological outcomes.

The Loughs Agency trout strategy, put succinctly is:-

- Improve and enhance spawning habitat;
- Improve and enhance juvenile habitat;
- Improve and enhance holding habitat;
- Remove or mitigate barriers to fish movement - adults moving upstream and smolts moving down.

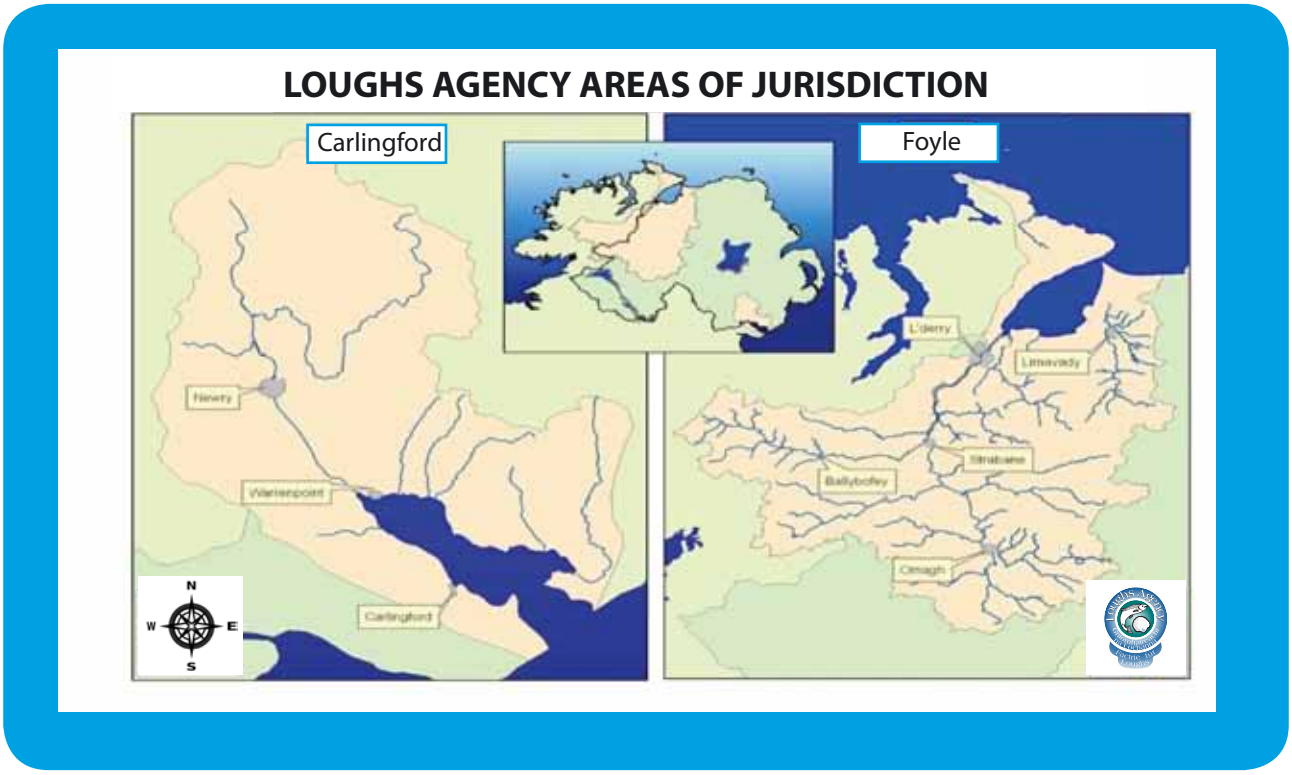
3. The need for a strategy

The Loughs Agency has a duty under the Foyle Fisheries Acts to 'maintain, improve and develop salmon, trout, freshwater fisheries', within the overall aim of contributing towards sustainable development.

Each year, about ten thousand anglers buy a Loughs Agency rod licence. Of these, a large percentage fish for trout. The value of trout fishing rights in both still and running waters is in the millions of pounds. Therefore, socio-economic aspects of angling are very important when considering wild trout fishery management.

In the past, licensed salmon net operators coincidentally landed small numbers of sea trout when fishing for salmon - mainly in the River Foyle draft net fishery. These were seen as a 'by catch', yet often these fish did not realise their commercial value (nor is their environmental value recognised) and catches were not recorded.

The Loughs Agency jurisdiction covers Lough Foyle and Carlingford Lough and their sub catchments, and - in the Foyle area - coastal waters out to twelve miles. Trout are widely distributed throughout (whether naturally or through stocking) in a wide range of rural and urban waters - including streams, rivers, lakes, reservoirs tidal and coastal waters.



Although Brown trout and sea trout are the same species *Salmo trutta*, they exhibit a wide diversity of life- cycle patterns, physical appearance and behavioural characteristics.

Some of this variation is known to have a genetic basis and may reflect adaptation to environment. Indeed, brown or sea trout, *Salmo trutta*, shows one of the greatest degrees of local genetic structuring. Loughs Agency will take steps to conserve this biodiversity for its aesthetic, scientific and potential economic value, and also to maintain the evolutionary potential of the species at a time when environmental change is increasingly evident.

The viability of trout populations and fisheries may be affected by a range of factors including habitat quality, exploitation, stocking and predation. This strategy has been developed to enable social and economic benefits to be realised, while protecting and enhancing the natural resource.

The graphs at annex C illustrate the population trends of trout in some of the Foyle Catchment Rivers. These graphs clearly illustrate that Trout populations are in serious decline, and highlights the need for action.

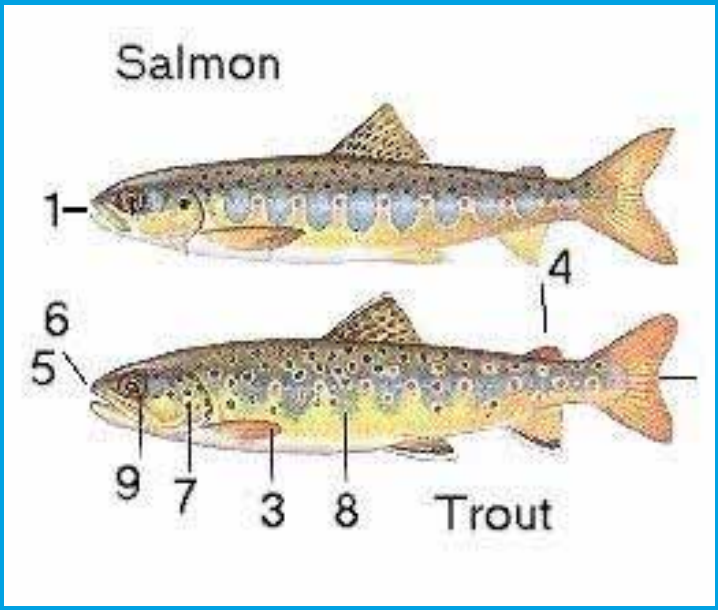
4. Strategy target species - an introduction (see annex B for more detail)

Sea trout are a salmonid, and have the characteristic adipose fin, similar to the Atlantic Salmon (*Salmo salar* L.).

The sea trout is a migratory form of the more common and widely distributed brown trout. However, it may be more accurate to view the brown trout as the 'resident' form of the migratory sea trout!

The sea trout life cycle is similar in many ways to the Atlantic Salmon . It migrates to the sea to feed and grow before returning to fresh water to spawn (known as Anadromous) but it is known to lightly feed in fresh water (unlike adult salmon).

Salmon and trout parr can be difficult to distinguish between. Fry of both species are even more difficult to correctly identify. When viewed in the water salmon fry and parr tend to be isolated. Salmon are much more territorial, so if you see a shoal of fry or parr they are much more likely to be trout. Salmon parr also tend to keep to the faster riffles. They have bigger pectoral fins, which they use to hold station in the fast water. Trout are less well adapted to these conditions and seek out slacker water.

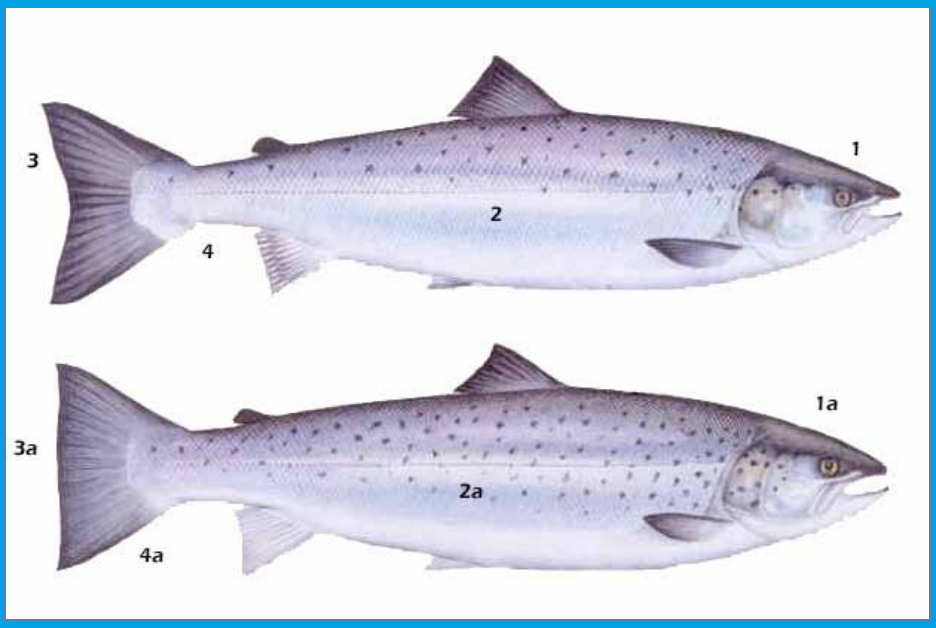


Salmon Parr can normally be distinguished from young Brown/ Sea Trout by:

1. more streamlined shape
2. deeply forked tail
3. longer pectoral fin
4. lack of orange on adipose fin
5. smaller mouth
6. sharper snout
7. only 1-4 spots on gill cover (often one large spot)
8. well defined parr marks.
9. shorter maxilla (does not extend beyond the eye)

(Published courtesy of the Atlantic Salmon Trust and Robin Ade.)

The difference between adult Salmon and Sea Trout



Atlantic Salmon - *Salmo salar* (Top)	Sea Trout - *Salmo trutta* (Below)
1. The Salmon's eye extends no further than the mouth.	1a. The Sea Trout's eye extends further than the mouth.
2. There are few markings below the fishes lateral line.	2a. Larger number of markings below the lateral line.
3. The tail of a Salmon is concave (Forked).	3a. The tail of the Sea Trout will be square, even convex.
4. The Salmon has a narrow tail base with a noticeable wrist.	4a. The tail base is wide, with no noticeable wrist.

Trout / Atlantic salmon Interactions

Trout and salmon co-habit and are in competition for food resources and space. Trout may have a competitive advantage in that they hatch earlier and move out of the gravel to establish territories before salmon. As a result of this they tend to be larger and able to displace salmon. Salmon have larger pectoral fins than trout and so are more suited to utilising the faster water in streams and rivers although in the absence of trout they will fill other niches which the trout would normally occupy.

5. Angling - economic and social development

Trout anglers need not be wealthy. On fisheries that are not operated to generate a profit, and which do not require heavy stocking, trout fishing can be inexpensive for local people. Such fisheries tend to be run by angling clubs or public bodies and can be important recreational facilities, especially for those with low incomes or with limited access to transport. On many fisheries, concessionary rates on permits are offered to junior, senior or disabled anglers and, on some, specific stretches are set aside near centres of population for such anglers.

The Loughs Agency, Department of Culture, Arts and Leisure (DCAL) and the Northern Ireland Tourist Board (NITB) commissioned a study to examine the social and economic impact of recreational fishing in Northern Ireland. This was completed by Price Waterhouse Cooper (PWC) and the report was entitled "The Social and Economic Impact of Recreational Angling in Northern Ireland".

This report concluded:-

- it is estimated that, in 2005, there were 24,890 resident and 4,463 tourist or visiting coarse and game anglers in Northern Ireland;
- Northern Ireland resident anglers typically spent £1,313 on angling annually;
- average overall spend per trip per visiting angler came to £508, while the average spend per trip per day/night was £103.80;
- aggregate gross expenditure contribution of NI resident anglers was £39.3 million in 2005;
- gross expenditure contribution from game anglers amounts to £25.7 million (or 64% of the total);
- gross expenditure contribution arising from visitor/tourist anglers to Northern Ireland totalled approximately £3.5 million during 2005;
- overall net economic impact of visitor/tourist game, coarse and sea/shore angling equalled £1.8 million during 2005.

The PWC report also stressed that "angling can provide a range of benefits beyond economic contributions... a significant contribution to environmental and social goals in Northern Ireland". The main findings in this regard were:

- By monitoring waterways, contributing funding through the sale of licences and investing in fish spawning and nursery areas, anglers have made a positive impact on the environment;
- Social benefits include participation in sport and interaction between a diverse range of individuals and groups;
- Diversion of young people away from anti-social behaviour;
- Angling can be used as tool to enable learning;
- Angling is a relaxing outdoor activity, a healthy living lifestyle that can contribute health benefits;
- Significant savings in other departments and agencies can be realised, such as savings from health improvement and crime reduction.

Leaving aside the PWC report, fishing rights for trout, constitutes a significant capital asset for the owners of these rights - whether clubs, businesses or individuals - and for the country as a whole.

By helping to promote angling, we will increase the general demand for angling opportunities, and thereby help maintain and enhance the overall economic value of fishing rights.

The economic value of an individual fishery will depend largely on the type of fishing offered and its location. While management of individual fisheries, especially stocked fisheries, is largely in the hands of the owners or lessees, the Agency may be able to make information available that can assist fisheries managers, and so enhance the value of fisheries.

Options for fisheries management are to an extent constrained by legislation. Such legislation needs to take account of changing circumstances. One example is the minimum statutory close season for brown trout in still water fisheries. Many such fisheries are entirely dependent on stocking, in some cases with sterile, triploid trout. The close season for brown trout could be dispensed with on such waters to give managers the opportunity of extending angling opportunities, and enhancing the value of their fisheries.

Anglers spend money on permission to fish, fishing tackle, travel, food, drink, accommodation and other items, contributing to employment and incomes.

Anglers' expenditure can contribute significantly to the local economy in rural areas, where the higher-quality fisheries are often found. There is potential for enhancing such expenditure by improving and marketing opportunities for angling. [PWC study estimated a mean spend of £103/day spent by visiting anglers]

Anglers' tastes vary and a range of angling opportunities is required to meet demand. Many find fisheries stocked with rainbow trout attractive, especially if the trout are large and numerous. However, others prefer to catch the native species, brown trout. Even those whose regular angling is on stocked fisheries may appreciate the opportunity to fish for wild fish on occasion. A recent survey for the Environment Agency of England and Wales indicates a preference among trout anglers for wild rather than stocked fish. Information on the types of fishery anglers prefer and choose will aid fisheries managers and the strategic development of fisheries

Policy 1

We will work with others to help provide high quality accessible opportunities for fishing near centres of population both within the Foyle and Carlingford areas particularly for use by such anglers, and generally to increase the availability of trout fishing.

Policy 2

We will work with others to identify, develop and market sustainable angling opportunities that will contribute to the local economy, especially through tourism in rural areas.

Policy 3

We will regularly assess anglers' preferences for different types of trout fishing in and throughout the Foyle and Carlingford areas.

6. Encouraging Angling

The benefits of angling as a healthy and environmentally educative form of recreation apply to all ages and sections of the population. Anglers are concerned with more than just catching fish, and the quality of the aquatic environment is important to their enjoyment of a day's fishing. Indeed, anglers are often the first to raise concerns about issues such as pollution, over-abstraction or physical damage to the aquatic environment. As part of environmental protection, society as a whole will therefore benefit from the promotion of angling for trout.

Policy 4

We will offer concessionary rates on Agency rod licences to junior anglers to encourage the growth of the next generation of anglers in the Foyle and Carlingford areas.

Policy 5

We will work with others to promote angling for trout within the context of environmental protection and integration with other forms of recreation.

7. Habitat

Trout fisheries, whether for wild or stocked fish, depend on the physical, chemical and biological quality of the habitat, including good water quality, flows, cover and invertebrate life. For wild trout, the need for good habitat may extend throughout much, if not all, of a catchment. Many spawn in small streams, with juveniles using these and larger tributaries as nursery areas before migrating to the main river, a lake or the sea, where they grow to maturity. Wild trout populations are, therefore, useful indicators of the quality and integrity of the aquatic environment.

As part of its work to protect the aquatic environment, the Agency regulates or monitors some, but not all, facets of fish habitat, including

- point discharges to rivers and lakes;
- chemical water quality in larger streams and rivers;
- macro invertebrate community structure in larger streams and rivers;
- abstractions from surface or ground waters;
- physical works on main rivers and their banks, and obstructions.

However, the quality of trout habitat also depends on the work of many others. If habitats are to be protected and improved, a joint effort will be needed by many, including Government, farmers, landowners, local authorities, water companies and, of course, national and local angling interests and conservation bodies, as well as the Agency. In many parts of the country, there are already local schemes for improving habitat involving river trusts and associations, wildlife trusts, and the Wild Trout Trust.

Current concerns include

- Pollution;
- pesticides including sheep dip;
- increasing sediment loads;
- degradation of spawning and nursery areas;
- over abstraction;
- channelisation;
- nutrient enrichment;
- acidification;
- impacts of climate change;
- predation, especially by birds;
- gravel extraction;
- invasive alien weeds and species;
- obstructions to migration;
- over exploitation.

Policy 6

We will work with others to monitor, protect and improve the physical, chemical and biological quality of trout habitat, including work with partners to ensure that impacts on fisheries are fully considered in the development of new policies and grant schemes relating to land use.

8. Predation

Predation on fish, particularly by birds and especially by cormorants, is an issue that concerns many fishery owners and anglers. Fish-eating birds can cause serious damage to certain fisheries, though this can be difficult to demonstrate, particularly on rivers.

A range of measures can be employed to reduce the impact of predation by cormorants, though their effect will vary from one site to another. One measure, shooting to kill, is permitted only as part of a pre-determined programme of scaring and must be licensed by Northern Ireland Environment Agency or National Parks and Wildlife Service.

Policy 7

We will support further research into more effective ways of preventing serious damage to fisheries. Where there is clear evidence of serious damage to fisheries, we support the control of fish predating birds and other predators on a case by case basis.

9. Obstructions

In some rivers, access to spawning and nursery areas is obstructed, limiting recruitment to the fisheries downstream. Where natural obstructions are impassable, the trout populations upstream will be genetically isolated, and may have developed unusual characteristics

For any new structures, where the Agency's consent is required, these must be designed to enable fish passage.

Policy 8

We will work with others to improve natural recruitment to trout fisheries by removing, or making passable, obstructions to migration, taking into account the costs and benefits. Such obstructions might be man-made or, if natural, not wholly restricting passage.

Policy 9

Where natural obstructions are considered impassable, we will take a precautionary approach to the protection of stocks which may be genetically distinct and not remove the obstructions or ease fish passage past them.

10. Fly life and weed growth

While environmental quality will directly affect the fish, whether wild or stocked, it may also affect the quality of trout angling less directly. For example, dry fly fishing is considered by many anglers to be synonymous with river trout fishing. Yet the quality of dry fly fishing depends not only on the abundance of trout, but also on abundant hatches of a wide range of insect species throughout the angling season. Lose the insects and the quality of fishing declines.

Policy 10

We will work with fisheries interests to identify key insect and plant species and habitat associated with fishing throughout the season, and where practical, adapt existing monitoring programmes to assess their abundance.

11. Commercial Fisheries

Some sea trout are exploited with salmon by net fisheries in tidal waters as well as by angling in rivers. Although there are comparatively few nets men, net fisheries can be significant locally, contributing to employment and cultural interest.

Policy 11

Our aim is to optimise the economic and social value of sustainable exploitation of fish stocks. Where rod fishing interests are willing to compensate nets men to stop netting, we will assist both parties to reach a mutually acceptable agreement.

12. Conservation of the wild stocks

The conservation of wild stocks is vital to the success of those fisheries that exploit them now and in the future. This is true for all sea trout fisheries, for many brown trout fisheries. However, most managed trout fisheries rely partly or, in many cases, entirely on stocking to maintain catches.

Even in stocked waters, any significant wild trout population, and the habitat required to support it, still need protection for the following reasons:

- the wild stock can contribute to anglers' catches, enhancing the value of fisheries;
- wild trout are part of the native fauna with intrinsic conservation value and are an important component of the ecosystem which the Water Framework Directive aims to bring all waters up to good ecological status by 2015;
- the contribution that management for angling can make to the quality of natural habitats and the wide variety of species that depend upon them.

The quality of fishing for stocked fish also depends, though to a lesser extent, on habitat quality.

To ensure the conservation of wild trout stocks, measures are needed to protect their:

- genetic diversity
- habitats;
- abundance;
- population structure.

As well as our fisheries duties, we also have specific conservation duties, including one to promote the conservation of flora and fauna dependent on an aquatic environment. We must also further the 'conservation of fauna and flora of special interest', which includes specific local populations of Arctic charr (*Salvelinus alpinus* L.) and other fish. Some social and economic benefits will be generated just from conserving fish and the aquatic environment, in addition to the benefits generated from fisheries. Stocks that are genetically distinct or evolutionarily important will generally have the greatest conservation value, particularly if they are not derived from introductions.

13. Setting conservation targets for wild fish

Fish abundance depends on the carrying capacity of the habitat, the size of the spawning stock and subsequent survival. The carrying capacity of the habitat depends upon habitat quality and there is often scope to improve this, making room for more fish. Salmon stocks are managed using conservation limits for the number of spawners but, for a variety of reasons, it is not currently practical to calculate such limits for trout in the same way. A key reason is that there are rarely measures of the abundance of adult fish, other than for sea trout that could be used to estimate the size of the spawning stock. Furthermore, where trout are stocked it may be difficult to differentiate wild from stocked fish.

Nonetheless, it may be possible to develop targets using other measures, notably:

- juvenile abundance of trout from electric fishing surveys in nursery areas;
- adult abundance and population structure for sea trout from anglers' catch returns, catch returns from nets men, traps and fish counters;
- adult abundance and population structure for wild trout from angler log-book schemes from appropriate fisheries;

Policy 12

We will work in the long term to develop conservation targets for the abundance and structure of wild trout stocks against which the status of these stocks can be assessed. Once set, failure to comply with conservation targets will trigger management action, including investigation of the likely causes.

Developing targets for the genetic diversity of wild trout stocks is currently impractical. Protection will therefore be achieved by taking a precautionary approach, especially with regard to stocking.

14. Protecting and improving wild stocks

The quality of a wild fish stock will depend on a range of factors. Three key factors that we regulate in part are:

- habitat quality;
- exploitation;
- stocking.

15. Exploitation management

Many anglers recognise that they can help to improve the quality of their fishing by reducing the number of fish they kill. Catch-and-release is widely, and increasingly, practised voluntarily by anglers.

Sea trout stocks must be protected from over-exploitation, whether by rods or nets. Sea trout are migrating to the sea at a younger age, and many are returning to freshwater as Finnock after less than a year at sea. This may be due to climate change, but it may also indicate a reduction in the abundance of young trout. Therefore further restrictions on the exploitation of sea trout may be needed to increase spawning escapement.

Policy 13

We will regularly review the upper and lower size limits, set by Agency statutory instruments for non-migratory trout, so that these limits will exceed the length at which fish mature and support survival of larger spawners. Only where it is apparent that wild stocks are depleted and that over-exploitation may be contributing, will we consider imposing additional mandatory restrictions. For wild non-migratory trout that currently have no general assessment of angler catch or adult abundance, a precautionary approach can be taken to reduce the risk of over-exploitation.

Policy 14

Having due regard to the spirit of the precautionary principle, measures will be introduced to restrict catches so that stocks can recover where commercial netting or angling is likely to contribute to preventing stocks of sea trout achieving conservation targets.

We will review the size limits, set by Agency regulation, to safeguard the migration of smolts and survival of Finnock (small sea trout).

- *We will review "bag limits" for rod caught fish.*
- *We will enforce the ban on the sale of rod-caught sea trout.*
- *We will work with others to control illegal exploitation as effectively as possible, giving priority to the protection of wild stocks.*

16. Stocking and introductions

Most trout fisheries with wild stocks still rely to some extent on stocking with farmed strains. Farmed trout differ, both genetically and behaviourally, from their wild counterparts. Many experts believe that it is best if farmed trout do not interbreed with a wild stock. There may, therefore, be no need for farmed, stock fish to be released if caught. Indeed, if it were possible to recognise them, it might well be desirable to take stocked fish while releasing wild fish. In this way, recognisable stocked trout could buffer adult wild trout from over-exploitation, while simultaneously allowing an economically viable fishery to continue.

Policy 15

We will seek better ways of identifying the source of escapees.

Where we have relevant evidence we will assist in legal action taken against those responsible for escapes.

We will work with others to monitor the scale of the problem.

17. Non-native species and bio-security

Policy 16

We will not grant consent to introduce any non-native species, into rivers, streams and other unenclosed waters (however, see below for the situation regarding canals).

We will consider granting consent to stock into enclosed still waters outside the floodplain provided that all appropriate legal, environmental and disease conditions have been met.

Subject to other constraints, we will consider permitting introductions where there is a recent history of stocking and where there is a strong, valid and justifiable case to demonstrate that this management system sustains a fishery.

Subject to other constraints, we will consider permitting introductions where there is a valid and justifiable case to demonstrate that the introduction of non-breeding rainbow trout is a preferred environmental option.

Policy 16 (continued)

Notwithstanding the foregoing, we will consider the case for stocking of canals on an individual basis.

In all other cases, we will not consent the introduction of rainbow trout into rivers, streams or other unenclosed waters.

We will seek stronger legislation, and - if needed - additional resources, to reduce the incidence of escapes from fish farms and fisheries.

Policy 17

The Loughs Agency will endeavour to educate anglers, boat users, fishery managers and other water users on the importance of bio-security, preventing the spread of virus, invasive molluscs, invasive plants, non-native fish and other harmful organisms, as well as introduction of stocked fish from other catchments.

18. Classification of trout fisheries

To help conserve wild stocks and also to enhance the economic benefit derived from them, trout waters will initially be divided into:

Native trout: waters that have significant natural production of trout (Salmo trutta), whether migratory or non-migratory, or from which there is ready access to other waters with such production;

other: waters that do not have such production or access.

The designations of 'native trout' waters will initially be by our Area staff, but will be subject to subsequent local consultation. Consent to stock these waters will be subject to certain constraints to limit the risk of damaging the viability of the wild population.

19. Wild Fisheries Protection Zones

In some fisheries, wild stocks will be given greater protection as Wild Fisheries Protection Zones. These will only be designated after local consultation with fisheries and conservation interests. There will be a simple and cheap appeals mechanism for the classification.

The only exceptions to this Policy will be fisheries within 'Wild Fisheries Protection Zones' where stocking will not be consented for one or more of the following reasons;

The zone contains important nursery or spawning areas for trout and/or salmon, at unacceptable risk from predation/competition by stock fish.

Local fisheries interests wish to avoid their 'wild' fisheries being contaminated with stock fish;

The wild trout are considered to be genetically 'distinct or evolutionarily important';

The classification and associated constraints on stocking will help to achieve a number of desirable outcomes:

- Fisheries' managers wishing to attract anglers to wild fishing could ask for their fisheries to be designated as Wild Fisheries Protection Zones;
- Preventing an increased risk of genetic damage to wild stocks;
- Increased protection of key nursery areas for wild stocks of trout and salmon;
- Anglers will be able to identify whether they are fishing in waters containing wild trout or whether they may be stocked.

20. Local consultation and the role of Status Reports

Local consultation through Status Reports is fundamental to delivering the strategy. These plans will be area and, in some cases, catchment-based. They will cover all types of fishery including salmon, trout, other freshwater fish and eels in rivers, canals and still waters.

Plans will assess the potential for collaboration between the Agency and others, particularly fishery owners and lessees, to improve angling opportunities and enhance the conservation of wild stocks through

- define Wild Fisheries Protection Zones;
- assess local angling opportunities to identify where improvements in trout and fisheries will generate the greatest socio-economic benefits;
- review which waters should be defined as 'native trout' waters;
- identify appropriate sources of finance.

21. Advice to fishery owners

The Agency is often asked for, and provides, advice to fishery owners and angling clubs on matters related to fishery management, including;

- local demand for different types of fishing;
- avoiding serious damage due to predation;
- stocking;
- improving physical habitat;
- disease;
- controlling illegal fishing;
- water-quality problems;
- conservation issues.

Policy 18

Such advice will be both improved and made more widely available, resulting in a consequent benefit for trout populations, the quality of angling opportunities, the social and economic value of fisheries and the wider environment.

22. Research and development

The Agency and its predecessors have commissioned work to support the improved management of trout fisheries. Examples include:

- restoring riverine trout habitats;
- genetics ;
- a survey of rod licence holders;
- an economic evaluation of trout fisheries;
- developing management advice for trout fisheries;
- an inventory of trout fisheries;
- assessing the problem of fish-eating birds;
- Sea trout stock descriptions.

Policy 19

To ensure that sound science underpins the implementation of the strategy, we will identify and prioritise the research and development needed. We will commission work to meet these needs, in line with available resources, and where appropriate in collaboration with others.

23. Putting it into practice - principles

A full implementation plan will be developed to cover a five-year period from endorsement of the strategy. The plan will generally rest on four principles:

- development and dissemination of best practice and protocols;
- communication and application of best practice and protocols through local consultation and collaboration;
- local and national reporting;
- review and revision of practice and protocols.

POLICIES

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We will support further research into more effective ways of preventing serious damage to fisheries. Where there is clear evidence of serious damage to fisheries, we support the control of fish predating birds and other predators on a case by case basis.

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Where natural obstructions are considered impassable, we will take a precautionary approach to the protection of stocks which may be genetically distinct and not remove the obstructions or ease fish passage past them.

Policy 10

We will work with fisheries interests to identify key insect and plant species associated with fishing throughout the season, and where practical, adapt existing monitoring programmes to assess their abundance.

Policy 11

Our aim is to optimise the economic and social value of sustainable exploitation of fish stocks. Where rod fishing interests are willing to compensate nets men to stop netting, we will assist both parties to reach a mutually acceptable agreement.

Policy 12

We will work in the long term to develop conservation targets for the abundance and structure of wild trout stocks against which the status of these stocks can be assessed. Once set, failure to comply with conservation targets will trigger management action, including investigation of the likely causes.

Policy 13

We will regularly review the upper and lower size limits, set by Agency statutory instruments for non-migratory trout, so that these limits will exceed the length at which fish mature and support survival of larger spawners. Only where it is apparent that wild stocks are depleted and that over-exploitation may be contributing, will we consider imposing additional mandatory restrictions. For wild non-migratory trout that currently have no general assessment of angler catch or adult abundance, a precautionary approach can be taken to reduce the risk of over-exploitation.

Policy 14

Having due regard to the spirit of the precautionary principle, measures will be introduced to restrict catches so that stocks can recover where commercial netting or angling is likely to contribute to preventing stocks of sea trout achieving conservation targets.

- We will review the size limits, set by Agency regulation, to safeguard the migration of smolts and survival of Finnock (small sea trout).
- We will review "bag limits" for rod caught fish.
- We will enforce the ban on the sale of rod-caught sea trout.
- We will work with others to control illegal exploitation as effectively as possible, giving priority to the protection of wild stocks.

Policy 15

We will seek better ways of identifying the source of escapees.
Where we have relevant evidence we will assist in legal action taken against those responsible for escapes.

We will work with others to monitor the scale of the problem.

Policy 16

We will not grant consent to introduce any non-native species, into rivers, streams and other unenclosed waters (however, see below for the situation regarding canals).

We will consider granting consent to stock into enclosed still waters outside the floodplain provided that all appropriate legal, environmental and disease conditions have been met.

Subject to other constraints, we will consider permitting introductions where there is a recent history of stocking and where there is a strong, valid and justifiable case to demonstrate that this management system sustains a fishery.

Subject to other constraints, we will consider permitting introductions where there is a valid and justifiable case to demonstrate that the introduction of non-breeding rainbow trout is a preferred environmental option.

Notwithstanding the foregoing, we will consider the case for stocking of canals on an individual basis.

In all other cases, we will not consent the introduction of rainbow trout into rivers, streams or other unenclosed waters.

We will seek stronger legislation, and - if needed - additional resources, to reduce the incidence of escapes from fish farms and fisheries.

Policy 17

The Loughs Agency will educate anglers, boat users, fishery managers and other water users on the importance of bio-security, preventing the spread of virus, invasive molluscs, invasive plants, non-native fish and other harmful organisms, as well as introduction of stocked fish from other catchments.

Policy 18

Such advice will be both improved and made more widely available, resulting in a consequent benefit for trout populations, the quality of angling opportunities, the social and economic value of fisheries and the wider environment.

Policy 19

To ensure that sound science underpins the implementation of the strategy, we will identify and prioritise the research and development needed. We will commission work to meet these needs, in line with available resources, and where appropriate in collaboration with others.

TROUT CHARACTERISTICS AND LIFE CYCLE

Sea Trout

Sea trout are a salmonid, and have the characteristic adipose fin, similar to the Atlantic Salmon (*Salmo salar* L.).

The sea trout is widely regarded as a migratory form of the more common and widely distributed brown trout. However, it may be more accurate to view the brown trout as the 'resident' form of the migratory sea trout! As illustration, consider the end of the last ice age. As ice melted and rivers flowed into the sea, trout left the marine environment and probed these flowing waters to reach spawning beds. In time, some trout populations remained behind, over the millennia establishing distinct gene pools of brown trout. The 'colonising' behavior of sea trout offers promise and hope of recolonisation in a contemporary situation of systems losing their resident trout populations through disease or pollution.

The sea trout life cycle is similar in many ways to the Atlantic Salmon . It migrates to the sea to feed and grow before returning to fresh water to spawn, (known as Anadromous), but it is known to lightly feed in fresh water. Populations of trout may consist of almost exclusively sea trout or resident (freshwater) brown trout. However, many freshwater systems are characterized by the common occurrence of both types. The reasons for this are not fully known. However, it is believed that the tendency of different systems to produce migratory trout rather than residents reflects a number of biological, genetic and environmental factors that are currently not fully understood. Nevertheless, sea trout can be produced from eggs and milt stripped from adult fish migrating up rivers from the sea.

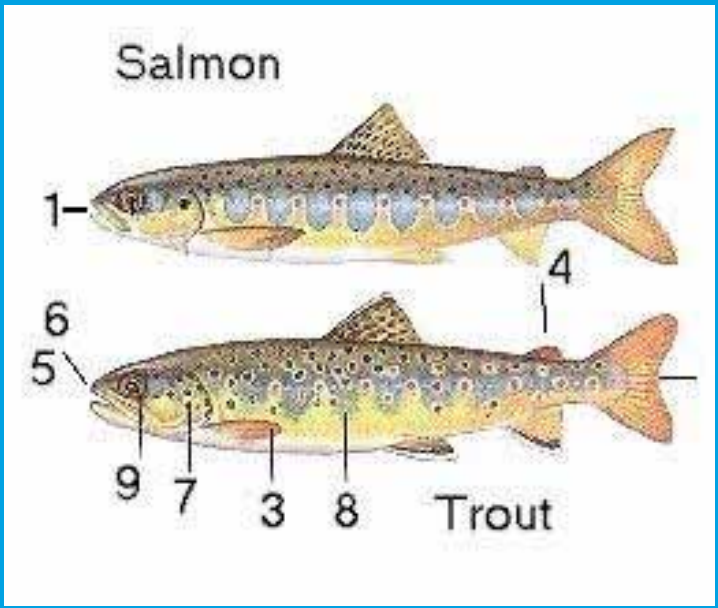
Anatomy

Juvenile trout have 9-10 Parr marks, 8-10 Dorsal fin rays. A red tipped adipose fin, orange-red ventral fins, a shallow forked tail, upper lip - long, to behind eye and 11 scales between lateral line and adipose fin. They may also be identified by their round body shape with a short blunt head, rounded fins, and red and brown spots. Adult fish have 11 scales between the lateral line and adipose fin, a short and stout wrist (tail peducle) and its tail, flat ended.

Fish which will migrate to sea are currently indistinguishable from their resident cousins during the juvenile freshwater phase.

During the early spring, many of the older and larger parr begin to turn into smolts. Sea trout smolts tend to be larger than salmon smolts. Typically, they are 5-9 inches long (13-23 cm) and distinguished by their spotted silvery flanks and yellow pectoral fins. When they first enter the river, adult sea trout are bright silver with hardly any spots but the longer they are in freshwater, the darker they become and towards the end of the season many are almost black.

Salmon and trout parr can be difficult to distinguish between. Fry of both species are even more difficult to correctly identify. When viewed in the water salmon fry and parr tend to be isolated. Salmon are much more territorial, so if you see a shoal of fry or parr they are much more likely to be trout. Salmon parr also tend to keep to the faster riffles. They have bigger pectoral fins, which they use to hold station in the fast water. Trout are less well adapted to these conditions and seek out slacker water.

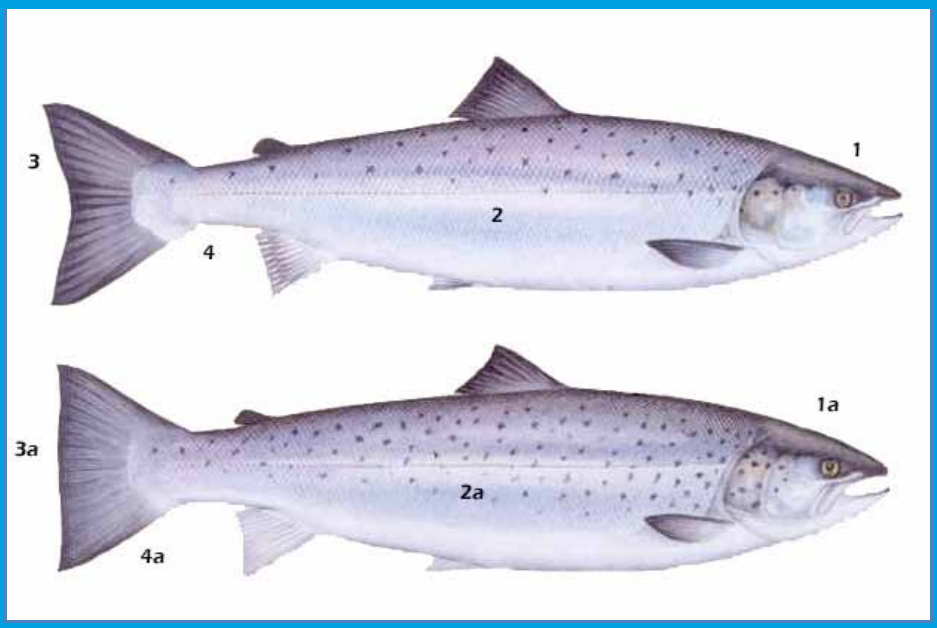


Salmon Parr can normally be distinguished from young Brown/ Sea Trout by:

1. the more streamlined shape .
2. deeply forked tail.
3. longer pectoral fin.
4. lack of orange on the adipose fin.
5. smaller mouth.
6. sharper snout.
7. only 1-4 spots on gill cover (often one large spot).
8. well defined parr marks.
9. shorter maxilla (does not extend beyond the eye)

(Published courtesy of the Atlantic Salmon Trust and Robin Ade.)

The difference between adult Salmon and Sea Trout



Atlantic Salmon - *Salmo salar* (Top)	Sea Trout - *Salmo trutta* (Below)
1. The Salmon's eye extends no further than the mouth.	1a. The Sea Trout's eye extends further than the mouth.
2. There are few markings below the fishes lateral line.	2a. Larger number of markings below the lateral line.
3. The tail of a Salmon is concave (Forked).	3a. The tail of the Sea Trout will be square, even convex.
4. The Salmon has a narrow tail base with a noticeable wrist.	4a. The tail base is wide, with no noticeable wrist.

Distribution

Sea trout are native to Ireland and the UK, and are found widely in Scandinavia, Iceland, the Baltic and many parts of the European Atlantic seaboard as far south as Portugal. Non-native populations are also found in some rivers in Chile, Argentina, Australia and New Zealand and the eastern seaboard of North America.

Habitat

Juvenile trout tend to inhabit the slower areas of rivers including pools and backwaters. They may also live in the margins of lakes. Trout parr that are destined to become sea trout remain in fresh water for a period of 1 and 5 years but most migrate to sea after 2 or 3 years in an Irish situation. The rate at which the young fish grow, and the age at which they enter the sea varies over their geographical range. Female parr are more likely to become smolts and migrate to sea than males. Migration downstream takes place in April, May and early June. The main stimuli for the onset of movement downstream are thought to be increases in river flow ('spates'), changes in water temperature, lunar phase and time of day.

Life cycle

Breeding (spawning)

By late summer and early autumn the adult fish have lost their sleek and silvery appearance and begun to take on their spawning colours. The females are drab brown and grey and are swollen with eggs. In contrast, the males become brown and red in colour and develop a characteristic hook ('kype') on their lower jaw. Spawning normally begins in mid-October and continues through to early January. The timing and duration of spawning is a river and stock-specific characteristic. The eggs are buried in 'redds' that are constructed in the gravely shallows of streams and lough margins. The female uses her tail to construct a shallow pit in the gravel. The male fertilises the eggs as they are discharged into the excavation. The female then covers the fertilised eggs with gravel. Egg number and size increase with female size, as does the depth at which they are buried. The eggs hatch after 100-150 days incubation. Nourished by their yolk sacs, the resulting alevins remain in the gravel for a further 35-50 days until they emerge as free-swimming fry. Fry emergence usually takes place during the early spring. Following spawning, the spent adults are called 'kelts'. Many sea trout kelts are taken by predators (e.g. otters and mink) or die due to other natural causes. Those that survive the rigours of spawning quickly regain their silvery coloration and return to the sea to resume feeding. These fish may then go on to make several further spawning migrations. Once spawning has taken place it continues annually for as long as the fish lives. Sea trout from upland rivers tend to have a longer life span than their lowland cousins and may make several spawning visits. Sea trout have been known to spawn up to thirteen times.

On the spawning grounds the progeny of the sea trout share their environment with those of the brown trout and the Atlantic salmon. Trout destined to become sea trout at smoltification develop salt secreting glands in their gills. Its colour changes too, becoming silvery. The smolts then migrate to the sea, some returning to the river of their birth during their first summer on a spawning run - finnock. Others spend more than a year at sea before making the trip back to spawn. Thereafter, an annual spawning run is common for.

Life in the Sea

Comparatively little is known about the habits of sea trout in the sea. The length of time spent at sea varies considerably among fish originating from different rivers. It is believed that most sea trout do not migrate far from the coast. Certain stocks may display preferences for certain feeding grounds. However, in most instances, patterns of movement along the coast are thought to be highly variable.

Return to Fresh Water

Like salmon, most sea trout tend to return to their native river to spawn. Some fish begin to return to the river for the first time after just a few weeks or months at sea, between July and September, However, most adults return as larger maiden fish after 12 to 14 months of marine feeding. The return of these larger and older fish usually begins in May and in some areas continues into October.

Migratory behaviour in rivers is highly variable. However, while sea trout do respond to increases in flow, they will move upstream without such a stimulus and are thought to require smaller discharges than do salmon.

Food and feeding

Sea trout feed on prey items such as small crustaceans, marine worms, sand eels (Ammodytes spp.), sand smelts (Atherina sp), Sprats (Clupea sprattus), juvenile members of the cod family, sticklebacks, sand goby (Pomatoschistus spp.) and terrestrial insects. Larger fish tend to consume larger prey items.

Growth and longevity

Growth is rapid in the sea. Many fish attain body weights of 0.5-1.5 kg within their first year. Older fish that have spent longer periods at sea may attain weights in excess of 5-10kg.Survival rates in the sea vary considerably. Among maiden fish (i.e. unspawned), survival rates can vary from less than 5% to over 40% per year. Similarly, among older fish that have spawned previously, rates commonly range between 20 and 40%.

Commercial and angling interests

Unlike resident brown trout, sea trout become of interest to anglers and commercial nets men when they are either still feeding and growing in the sea, or have completed their marine growth and returning to fresh water to spawn. The sea trout is an important natural resource that can provide significant social and economic benefits to communities principally via angling - particularly in rural areas. However, unfortunately, in many rivers it is still regarded as being of secondary importance to the salmon. Despite this, sea trout are a prized catch and their pursuit has become somewhat of an art form in Ireland. Many of the rivers that they run on this island are referred to as "spate" fed rivers. That is to say, the river level can rise and fall rapidly with many of the best rivers susceptible to localised rainfall. In many areas of western Ireland sea trout and salmon congregate in the estuaries awaiting the flood in the river that will allow passage into the systems of waterways that drain this remoter region of the country.

Finnock

Finnock are young sea trout that have recently reached adulthood. Other names are pealing and herling. They are often fish that have spent up to a year in coastal/ marine waters and generally weigh between 8oz and 1lb, although size is not the best criteria by which to classify whether a fish is a 'Finnock'. These fish are thought to be still sexually immature.

They often prove good sport when things have been slow for the salmon angler. However, worryingly, Finnock have become thinner on the ground in recent years - anglers are encouraged to return Finnock carefully.

Within the tidal sections of the Foyle catchment, anecdotal evidence suggests that anglers in the past would often catch up to twelve Finnock in a day during daylight hours.

Brown Trout

The brown trout (*Salmo trutta* morpha *fario* and S. *trutta* morpha *lacustris*) and the sea trout (S. *trutta* morpha *trutta*) are fish of the same species.

They are distinguished chiefly by the fact that the brown trout is largely a freshwater fish, while the sea trout shows anadromous reproduction, migrating to the oceans for much of its life and returning to freshwater only to spawn.

The lacustrine morph of brown trout is most usually potamodromous, migrating from lakes into rivers or streams to spawn, although there is some evidence of stocks that spawn on wind-swept shorelines of lakes. S. *trutta* morpha *fario* form stream-resident populations, typically in alpine streams but sometimes in larger rivers. There is evidence that anadromous and non-anadromous morphs coexisting in the same river can be genetically identical. In common usage, the name "brown trout" is often applied indiscriminately to the various morphs.

Range

The brown trout is normally considered to be native to Europe and Asia but the natural distribution of the migratory forms may be, in fact, circumpolar. There are also landlocked populations far from the oceans, for example in Greece and Estonia. The fish is not considered to be endangered although, in some cases, individual stocks are under various degrees of stress mainly through habitat degradation, overharvest and artificial propagation leading to introgression. In small streams brown trout is an important predator of macro-invertebrates and declining brown trout populations in these specific areas would affect the entire aquatic food web. S. trutta morpha fario prefers cold (though in comparison with other trout, this species has a somewhat higher temperature preference of about 60-65 °F, or 15.5-18.3 °C), well-oxygenated upland waters, especially large streams in mountainous areas. Cover is important to trout, and they are more likely to be found where there are submerged rocks, undercut banks, and overhanging vegetation.

Characteristics

The brown trout is a medium sized fish, growing to 20 kg or more in some localities although in many smaller rivers a mature weight of 1 kg (2 lb) or less is common.

Brown trout may live for several years. Most Irish fish tend to live for 4-5 years although ferox are longer lived 8-12 years commonly. But, as with the Atlantic salmon, there is a high proportion of death of males after spawning and probably fewer than 20% of female kelts recover from spawning. Some migratory forms grow to significantly larger sizes and may live longer. Brown trout are active both by day and by night and are opportunistic feeders. While in fresh water, the diet will frequently include invertebrates from the streambed, other fish, frogs, mice, birds, and insects flying near the water's surface. The high dietary reliance upon insect larvae, pupae, nymphs and adults is what allows trout to be a favoured target for fly fishing. Sea trout are especially fished for at night using wet flies or surface lures.

Freshwater brown trout feature a brassy brown cast fading to creamy white on the fish's belly, with medium-sized spots surrounded by lighter haloes.

The spawning behaviour of brown trout is similar to that of the closely related Atlantic salmon. A typical female produces about 2,000 eggs per kilogram (900 eggs per pound) of body weight at spawning. Brown trout rarely form hybrids, almost invariably infertile, with other species.

Diet

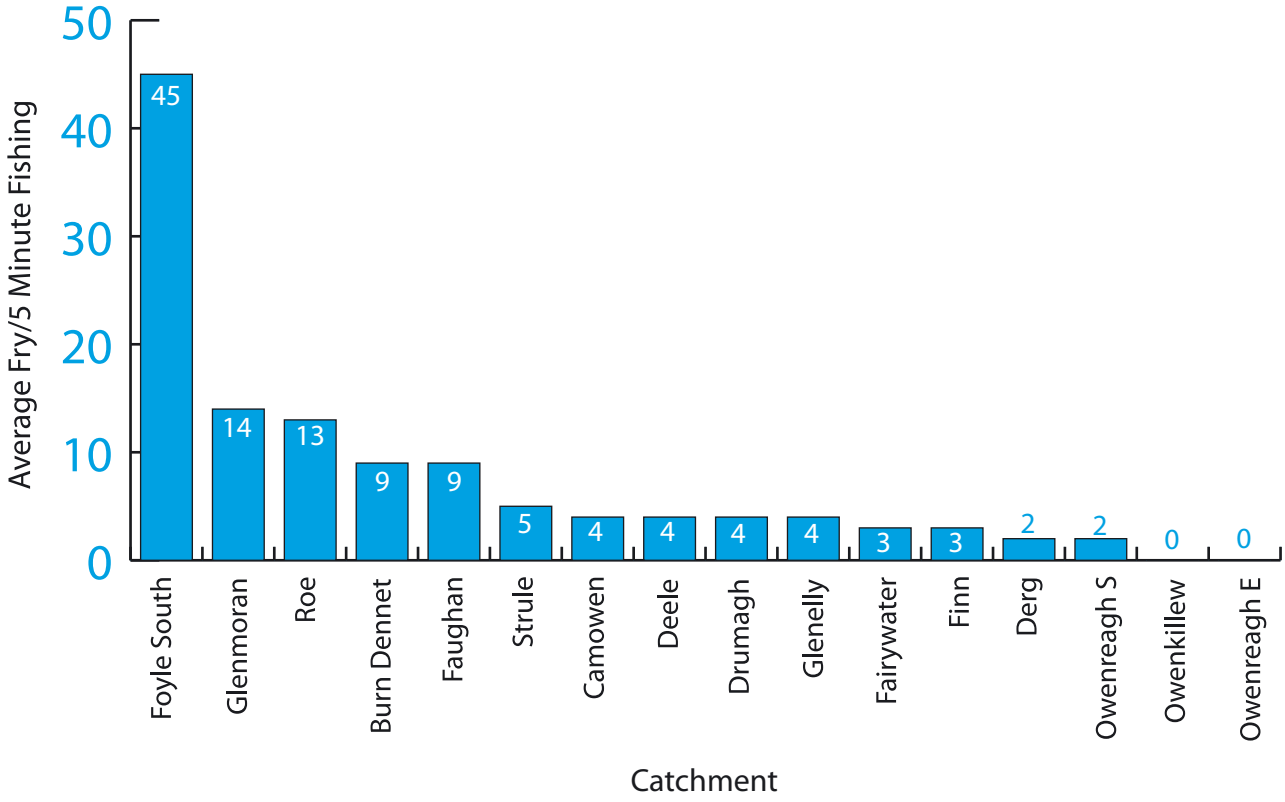
Young brown trout feed on insects and other invertebrates but the larger fish are active predators of fish including young brown trout, roach and perch larger brown trout will also feed on small terrestrial animals that fall into the water. Brown trout sometimes do not actively feed until the late afternoon or early evening but when the weather is cool they will feed during the day as well. The largest browns feed under cover of darkness. Brown trout can be caught with artificial flies, spoons, spinners, jigs, plastic worm imitations and lures.

Stocking, farming and non-native brown trout

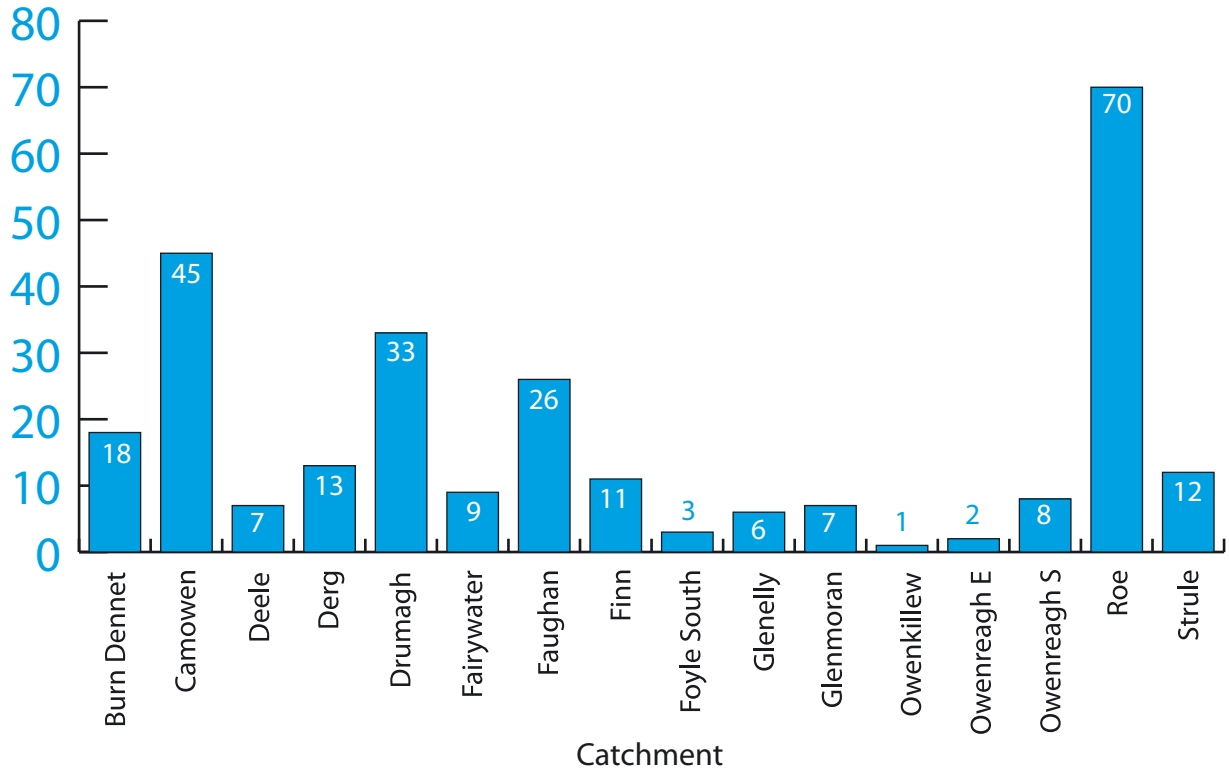
Farming of brown trout has included the production of infertile triploid fish by increasing the water temperature just after fertilisation of eggs, or more reliably by a process known as pressure shocking. Triploids are favoured by anglers because they grow faster and larger than diploid trout. Proponents of the stocking of triploids argue that, because they are infertile, they can be introduced into an environment that contains wild brown trout without the negative effects of cross-breeding. However, it is possible that stocking triploids may damage wild stocks in other ways. Triploids certainly compete with diploid fish for food, space and other resources. They could also be more aggressive than diploid fish and they may disturb spawning behaviour.

GRAPHS RELATING TO TROUT POPULATION DYNAMICS

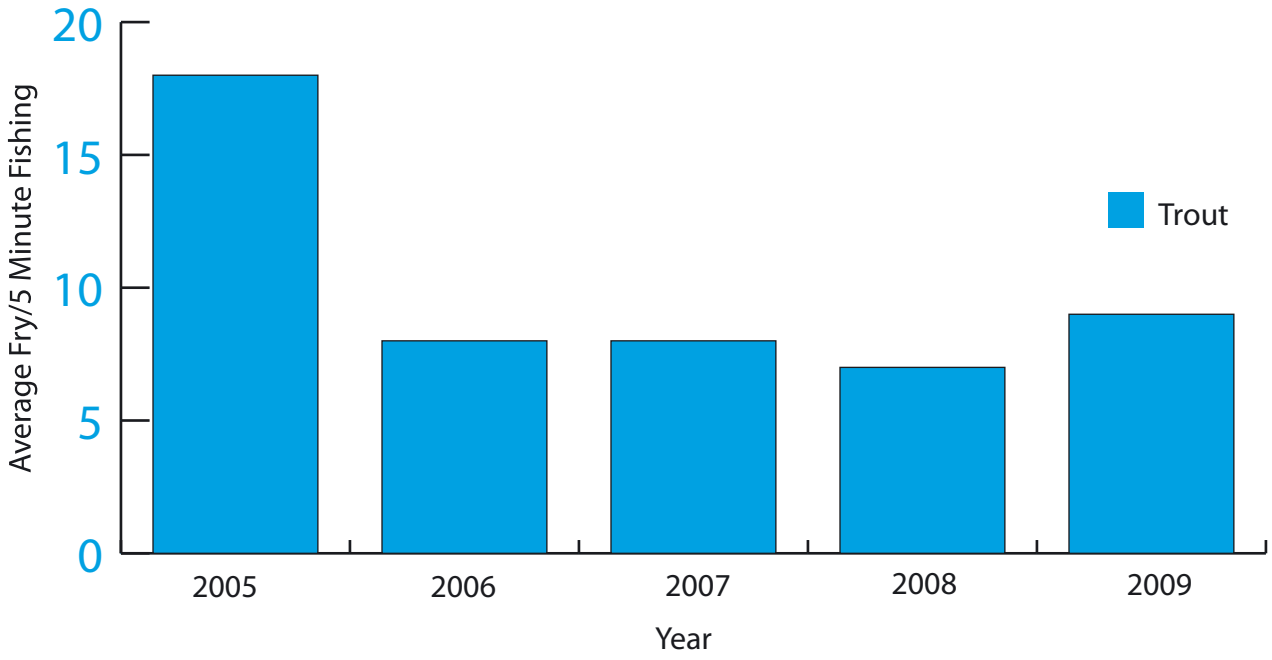
Trout Fry Semi Quantitative Electrofishing Index 2009



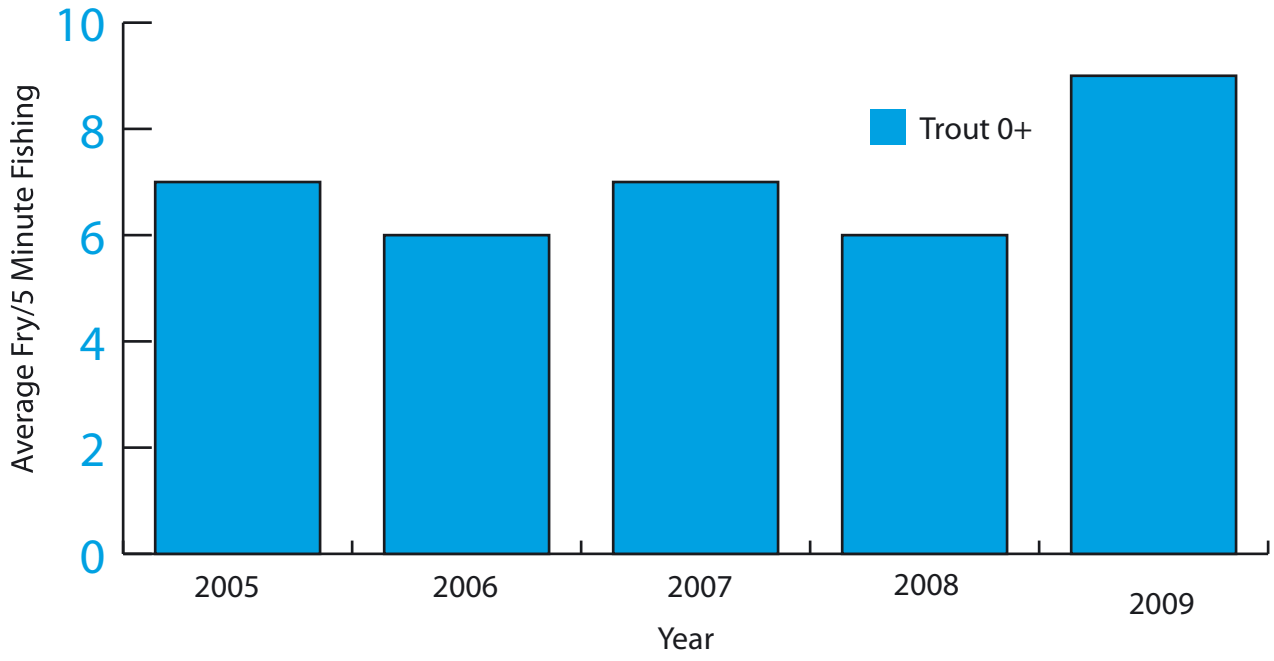
Number of Index Sites Consistently Surveyed 2005 - 2009 (5 Year Index)



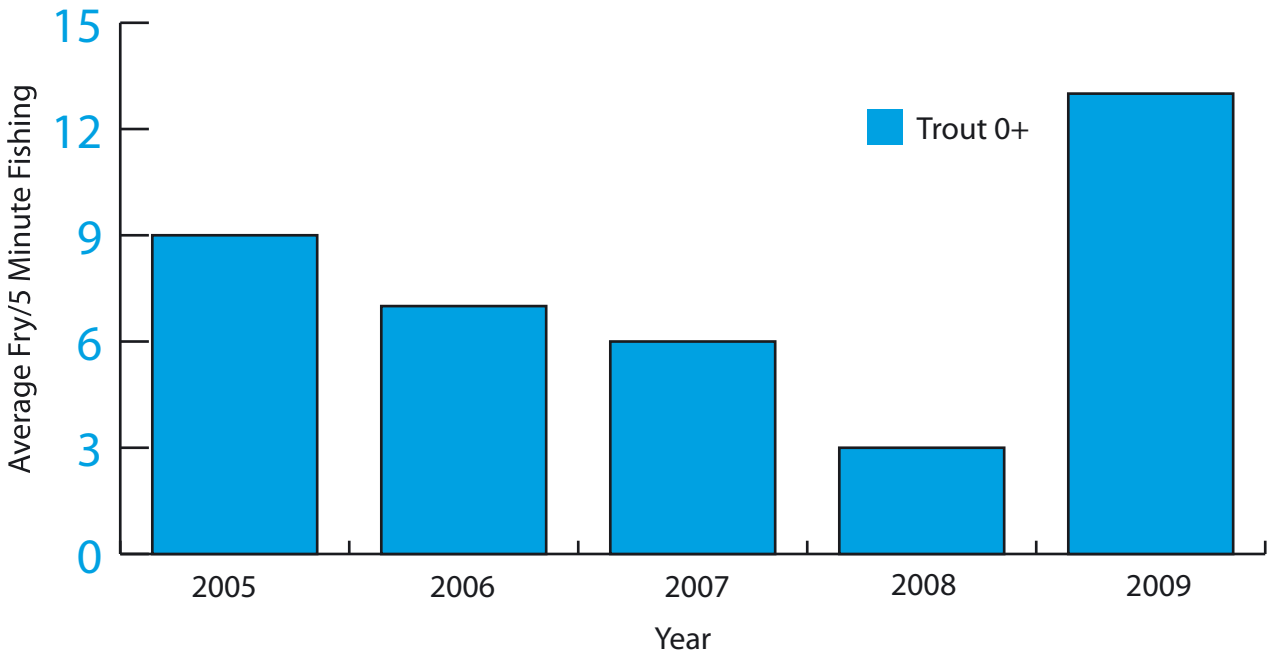
Burn Dennet Average Trout Fry (2005 - 2009)



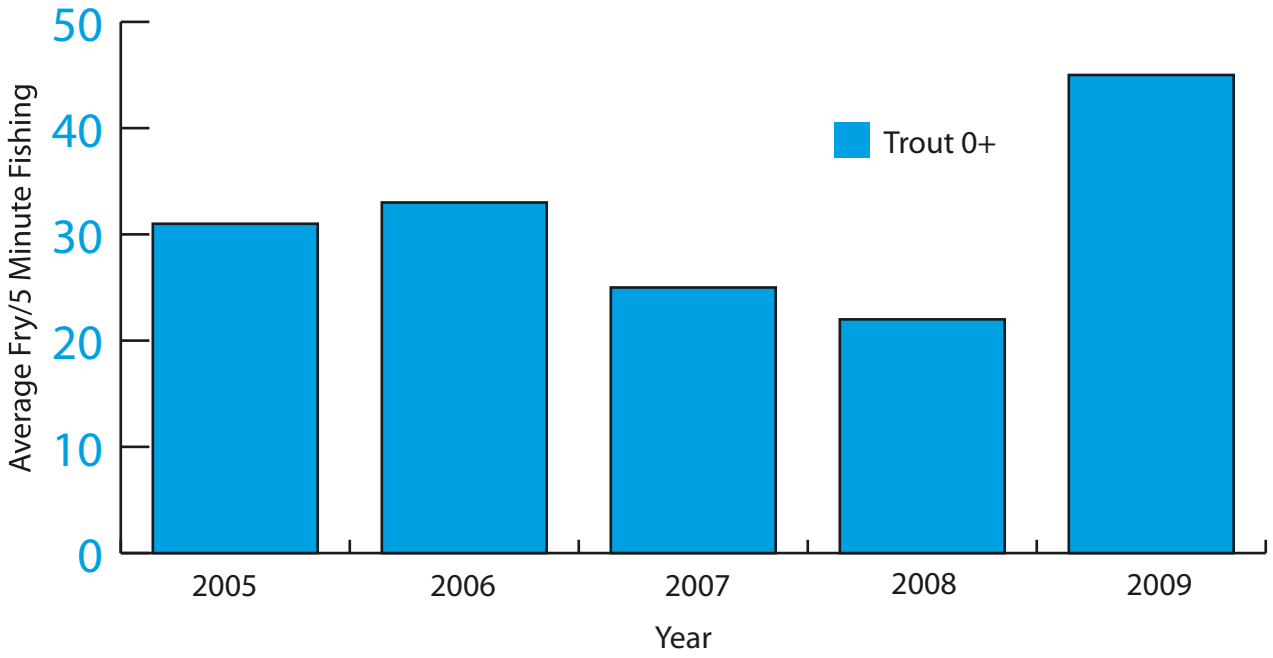
Faughan Average Trout Fry (2005 - 2009)



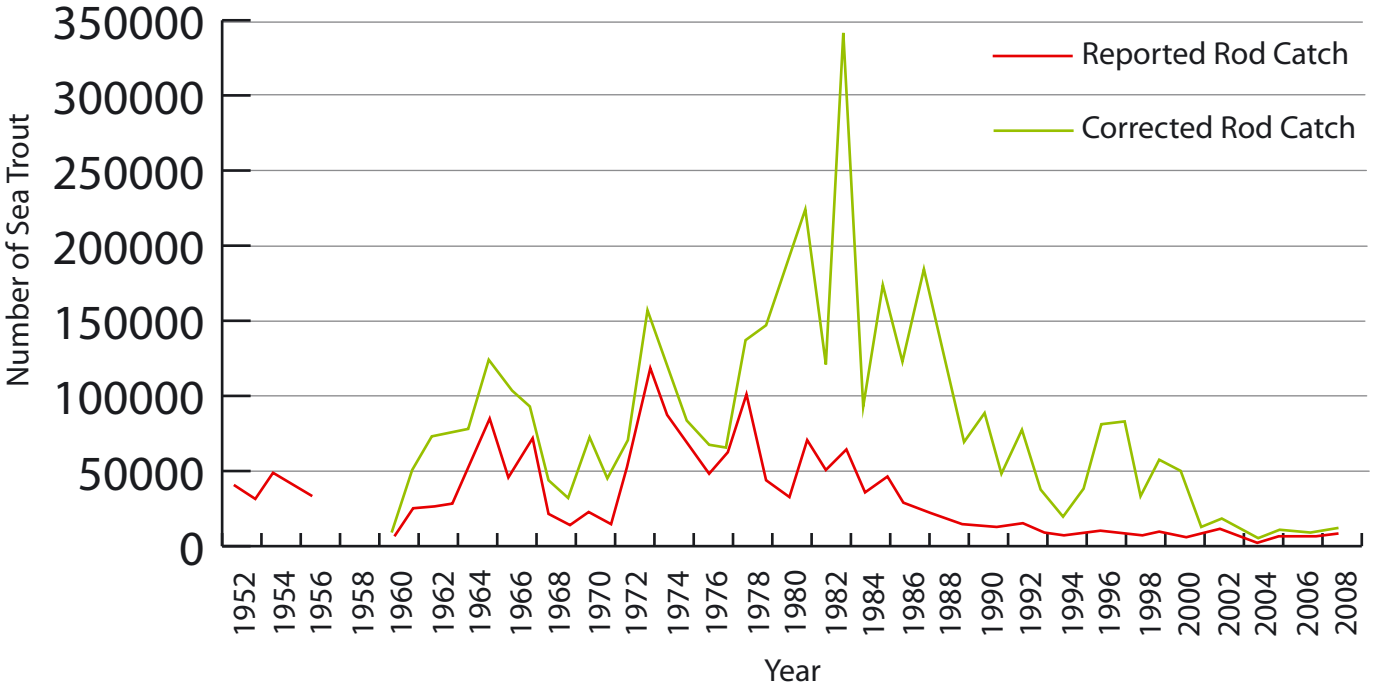
Roe Average Trout Fry (2005 - 2009)



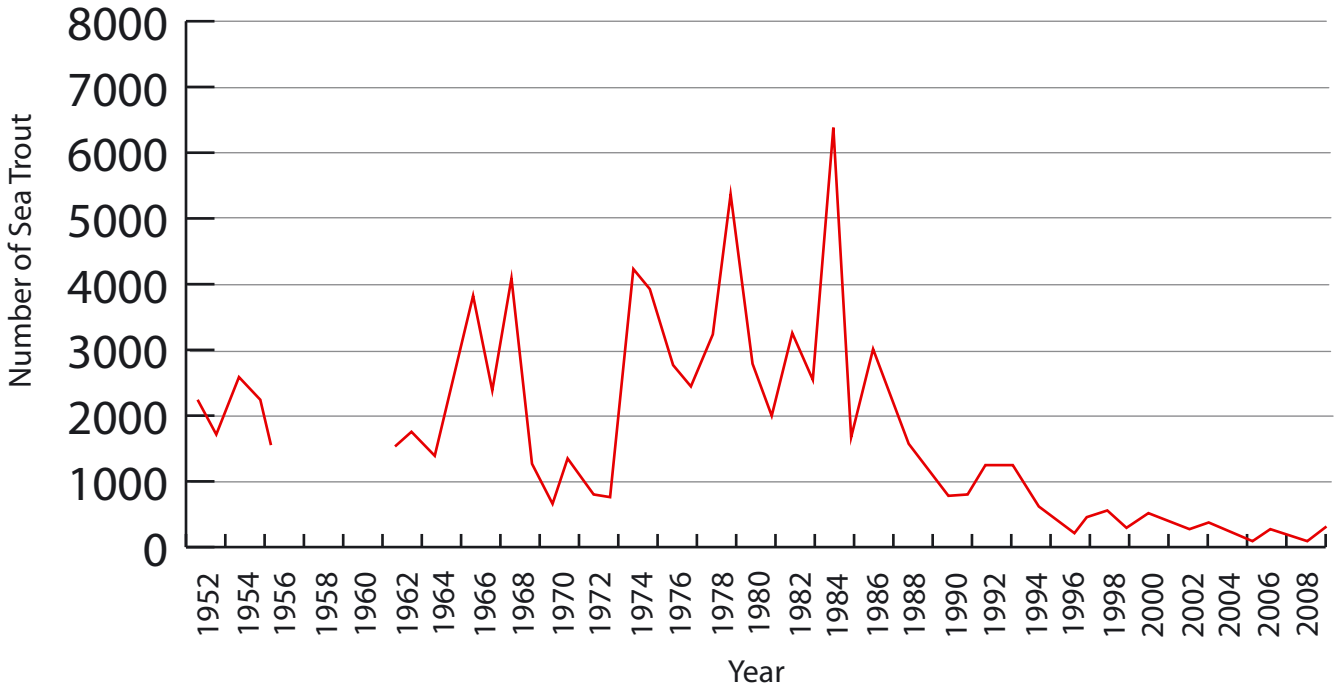
Foyle South Average Trout Fry (2005 - 2009)



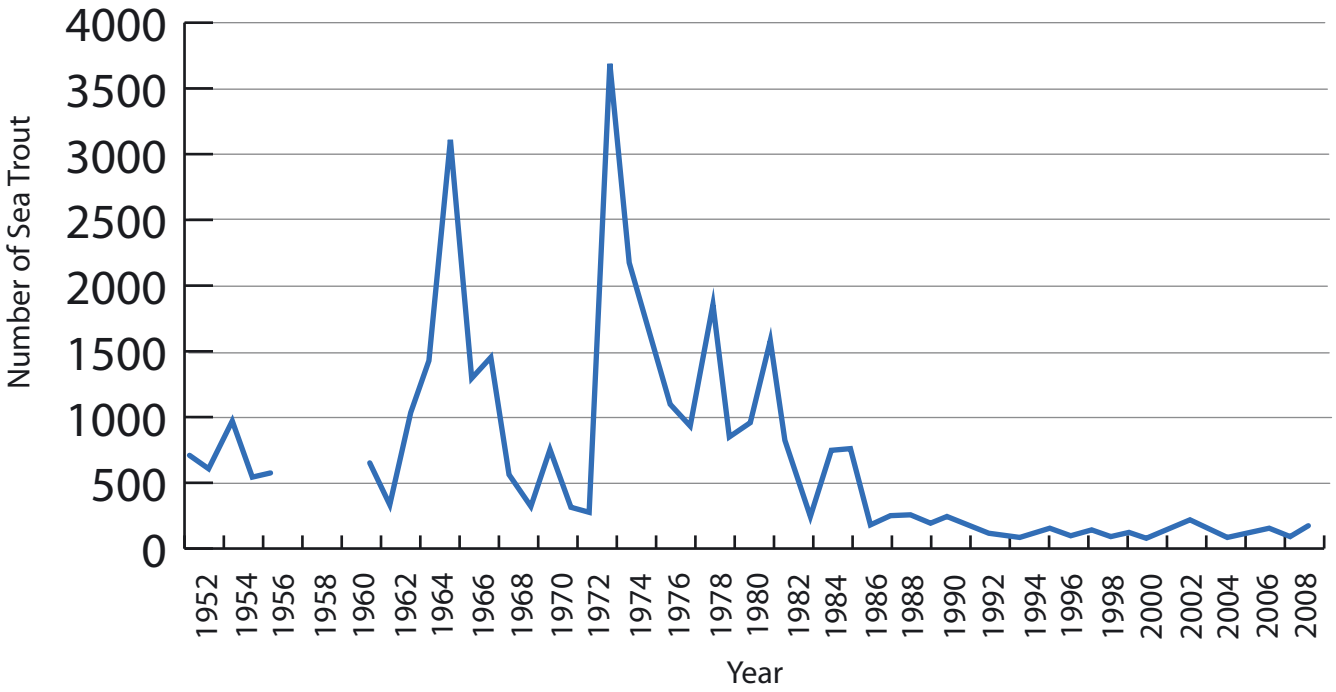
Reported and Corrected Sea Trout Road Catch
1952 - 2008 Data Not Available for Some Years



Reported Sea Trout Road Catch Faughan
1952 - 2008



Reported Sea Trout Road Catch Roe Catchment
1952 - 2008



Reported Sea Trout Road Catch Faughan
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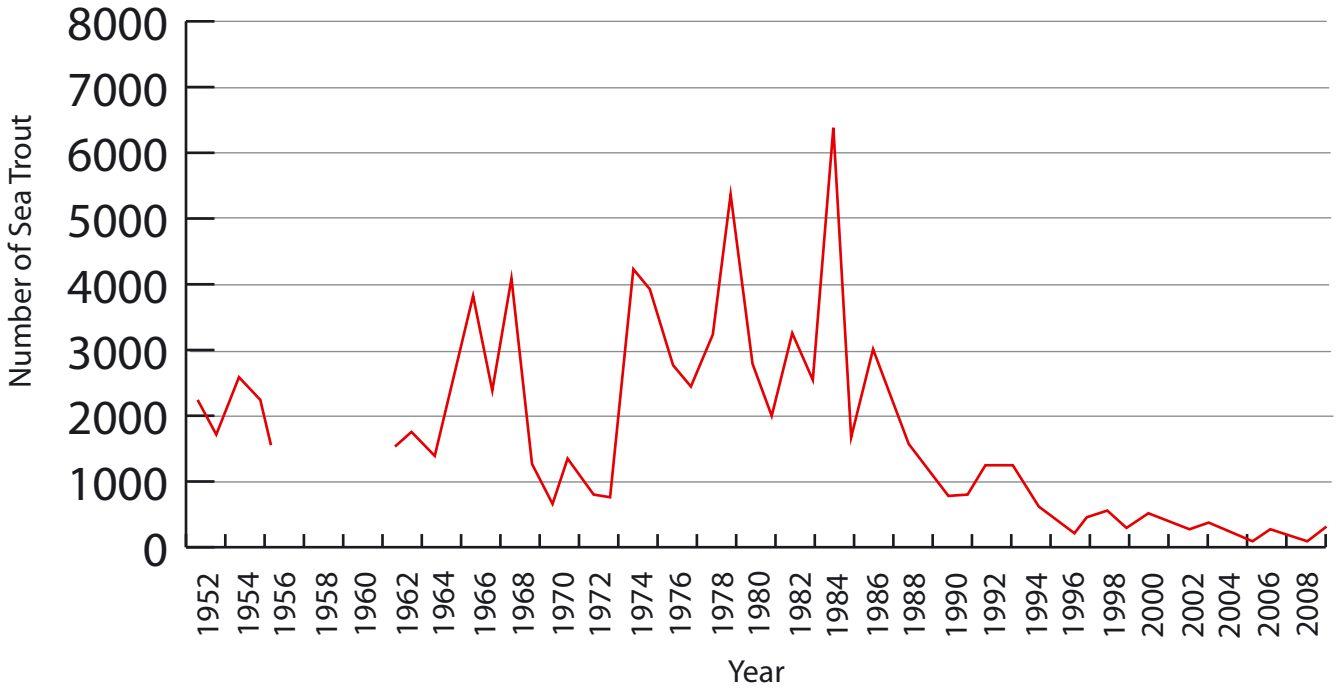

Reported Sea Trout Road Catch Burn Dennett
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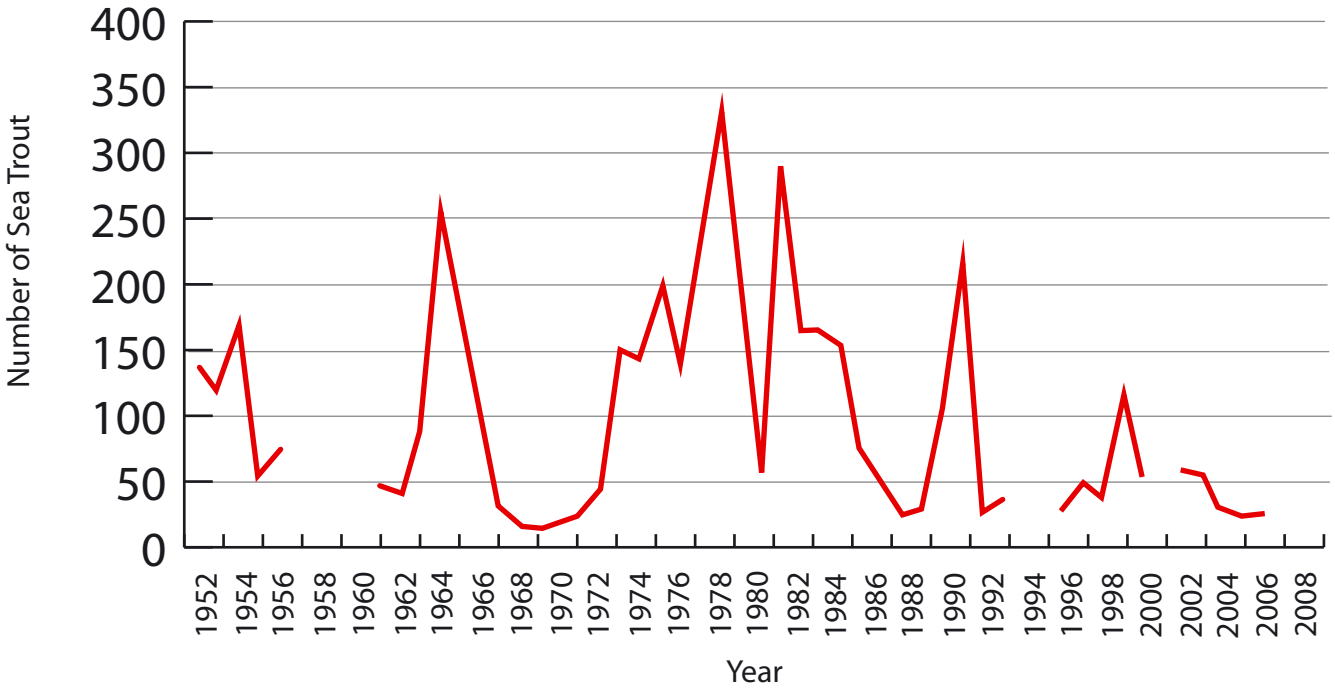

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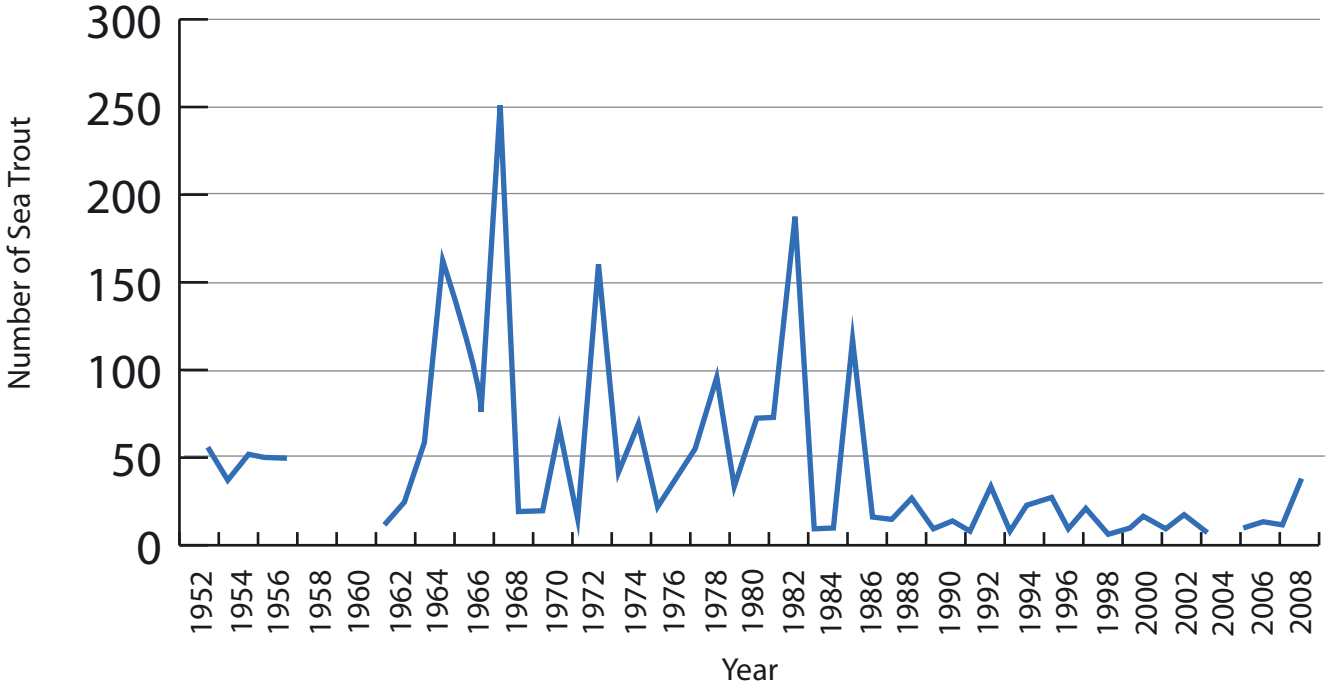
1952 - 2008



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