

Part 4 Salmon Fisheries

4.1 Introduction to Parts 4 and 5

This part of the report provides a summary of what is known about the salmon and trout fisheries of the system. The following questions are addressed:

- When do adult salmon return to the Little Gruinard?
- How big and how old are they?
- What can catch records tell us about the productivity and potential productivity of the system?
- What can catch records tell us about the health of respective fish populations?
- Are the fisheries as productive as they should be?

Through much of the 20th century, the Little Gruinard was relatively lightly fished except for a brief period in the 1960s when proprietors, confronted with proposals to develop a massive hydro-electric scheme, had to demonstrate that it was a significant salmon river (Graham-Stewart, 2005). Until the early 1990s, there was no vehicle track to the top of the river, so anyone fishing further upstream had to walk to get there. In 1990, Little Gruinard River became the first river in Scotland to adopt a mandatory 'catch and release policy'. This far-sighted conservation measure was introduced by the late Paul van Vlissingen, and remains in place. Studies elsewhere have shown that in some situations salmon may be caught two or more times in a season (Kindness, 2007).

Much new information about the salmon and trout of the Little Gruinard was obtained from studies carried out by Dr Andy Walker and colleagues from the Freshwater Fisheries Laboratory at Faskally in the period 1990 – 1994, at the request of proprietor Paul van Vlissingen. Walker's work included a radio-tracking study of rod-caught salmon, a radio tracking study of *ferox* trout, and scale reading of salmon, trout and sea trout. Subsequent catch records kept by the estate provide further information about the age and run timing of salmon in the system. Catch records were kindly provided by Graeme Wilson and Barbara Macdonald of Letterewe Estate.

Female grilse, taken in the Fionn Loch at the mouth of the Beannach River on 27th August 2009.

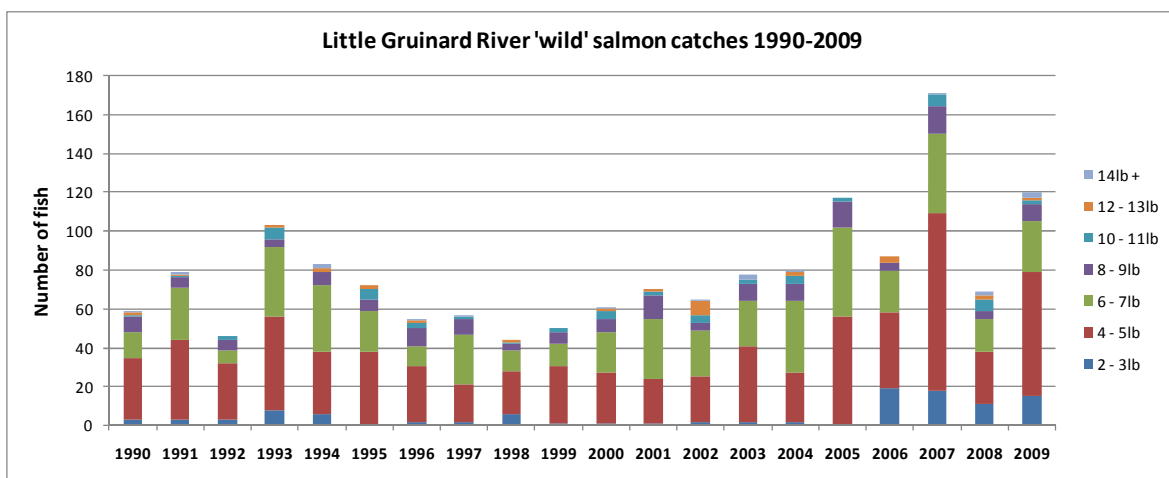


4.2 Rod catches of salmon

4.2.1 Annual catches of salmon

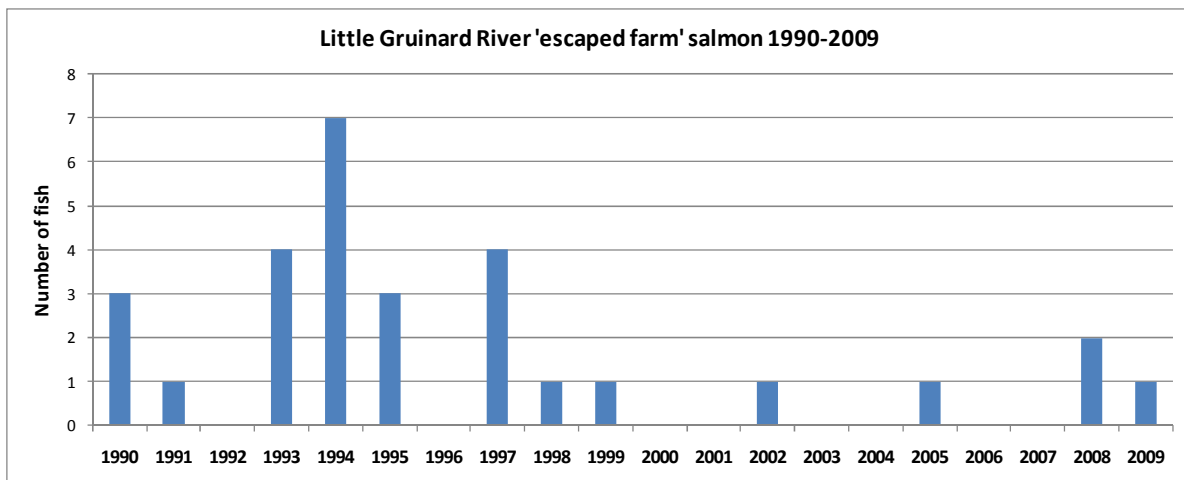
Figure 4.1 shows rod catches of salmon from the Little Gruinard for the period 1990 to 2009. Catches fell during the latter part of the 1990s to their lowest levels then recovered during the 2000s. Note that throughout this period the 'Catch and Release' policy has operated. A few fish were caught twice. Of the salmon that were tagged in 1991, 1992 and 1993; there were 4 recaptures. Kindness (2007) has shown that 10% or more of salmon which have been caught once may be caught a second time; the recapture rate will vary according to fishing effort and the number of fish in a river.

Figure 4.1 Rod catches of 'wild' salmon from the Little Gruinard, 1990-2009.



The graph below shows numbers of suspected 'farmed' salmon recorded in the Letterewe catch records book. During the period 1990-1996, the 'farmed' origin of many of these fish was confirmed by scale reading by Dr Andy Walker.

Figure 4.2 Rod catches of 'escaped farm' salmon from the Little Gruinard, 1990-2009.



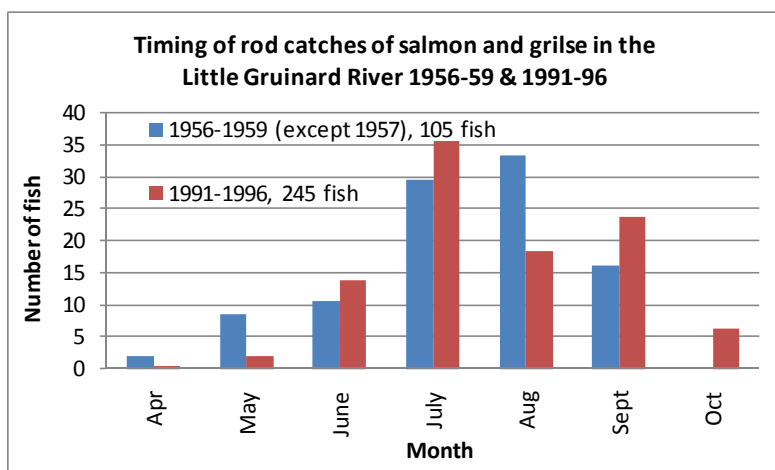
LITTLE GRUINARD FISHERIES MANAGEMENT PLAN 2011+

In comparison to some other rivers in Wester Ross, the Little Gruinard has been relatively unaffected by escaped farm salmon. Only in 1994 and 1997 did the recorded catch of escaped farm salmon in the Little Gruinard exceed 5% of the catch of 'wild salmon'. In other nearby rivers 30% or more of the rod catch comprised escaped farm fish in some years during the 1990s²⁴.

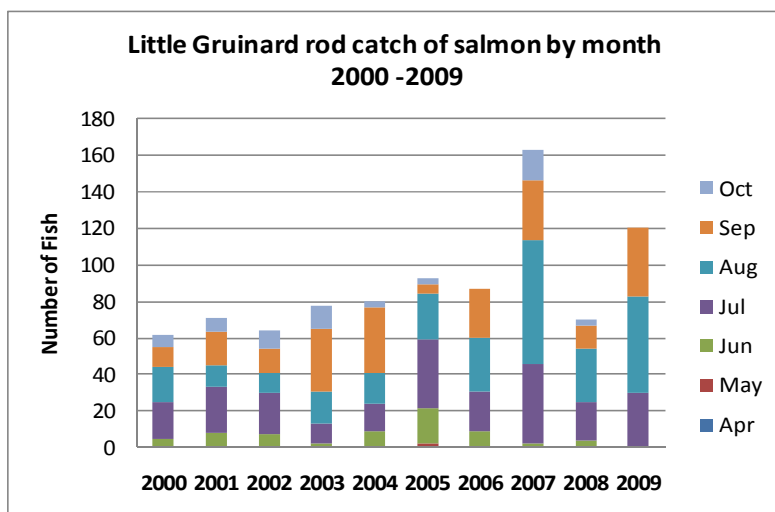
4.2.2 Timing of rod catches of salmon

Rod catch records provide an indication of the run timing of salmon in the Little Gruinard River. Figure 4.3 shows the timing of salmon catches during two periods in the latter part of the 20th Century. Most salmon were caught in the Little Gruinard River between June and September. In some years a few fish were taken in April and May; the earliest fish were sometimes larger 2 sea winter fish of 10lb or more. By July, catches were almost entirely of grilse; towards the end of the season (August and September), small numbers of MSW salmon were again taken in addition to grilse.

Figure 4.3 Timing, by month, of rod catches of Atlantic salmon in the Little Gruinard (a) 1956-59 and 1991-96



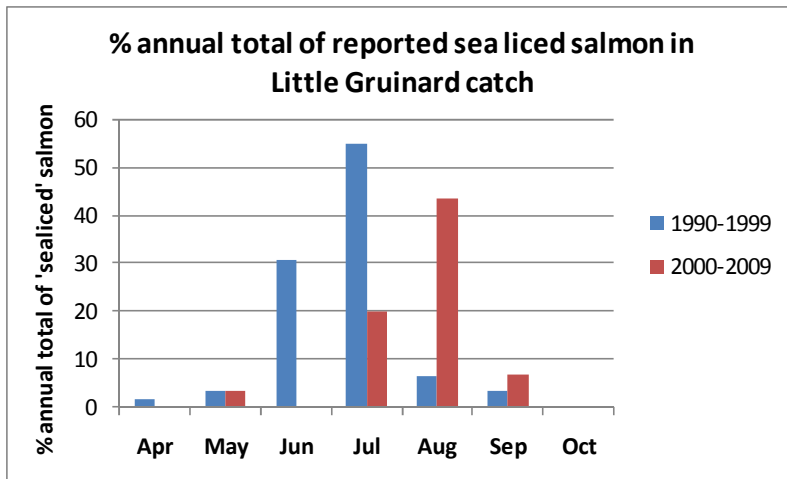
(b) 2000 -2009.



²⁴ see WRFT Fishery Management Plans for the Kanaird, Dundonnell, Ewe and Balgy rivers.

Many of the fish recorded in reported catches were described as ‘coloured’ [not silvery] and may have been in the river for several weeks or months prior to capture. The catch records sometimes note fish as being ‘sea liced’ [with sea lice still attached]. As parasitic sea lice (*Lepeophtheirus salmonis*) are lost from salmon within a few days of entering freshwater, their occurrence provides evidence that the fish have only been in the river for a few days. Fish noted as being ‘sea liced’ were caught in every month except October (Figure 4.4).

Figure 4.4 The occurrence of ‘sea liced’ fish in catch records.



The proportion of fish noted as sea liced taken in August is much higher during the years 2000 – 2009 than during the years 1990-1999, also suggesting a slight shift in the peak timing of river entry of Little Gruinard salmon from July to August during this period.



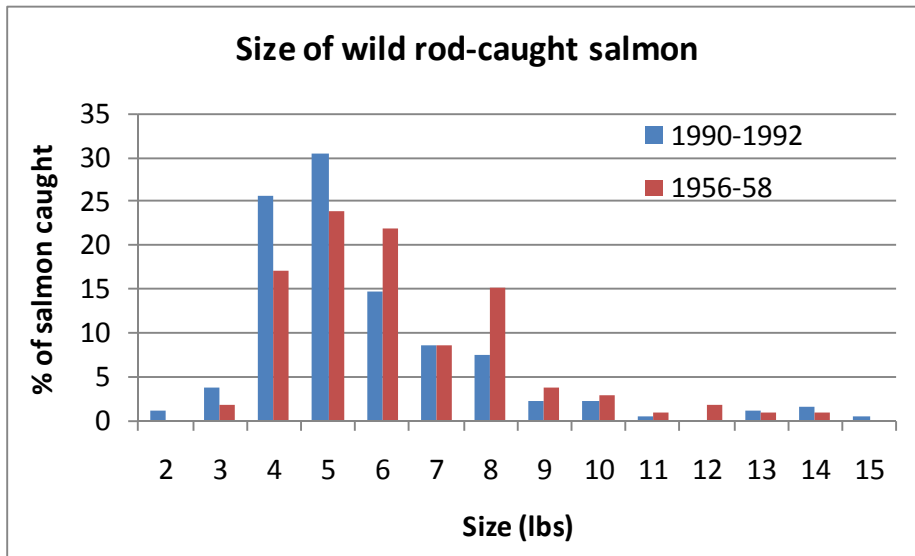
One of the largest salmon taken from the Little Gruinard in recent years; keeper Graeme Wilson with a cock salmon of estimated weight 19.5lb+ caught by Gavin Smart (left) on 4th September 2009. The fish was released after the photo had been taken.

LITTLE GRUINARD FISHERIES MANAGEMENT PLAN 2011+

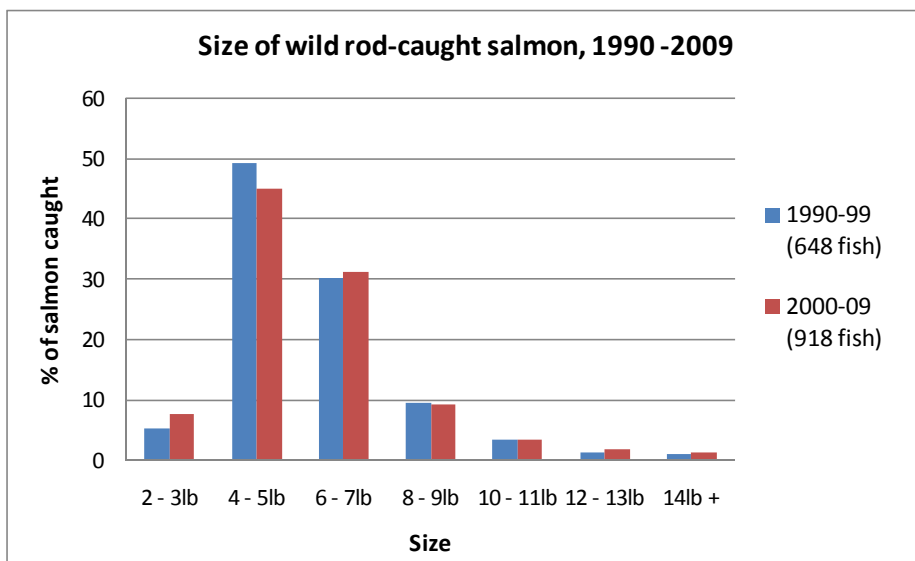
4.2.3 Size of salmon

Figure 4.5 shows the sizes of rod caught salmon in the Little Gruinard River in 1956-8 and 1990-92. The average size of salmon taken by rods from the Little Gruinard River was 2.98kg (6.55lb) in 1956-58 and 2.74 kg (6.02lb) in 1990-1992. The majority of Little Gruinard salmon were grilse of between 2kg (4.4lb) and 3.5kg (7.7lb) in weight (Figure 4.5). Fish of over 15lb were rarely recorded in Little Gruinard salmon catches.

Figure 4.5 Size of rod caught salmon in the Little Gruinard
(a) 1956 - 1958 & 1990 - 1992



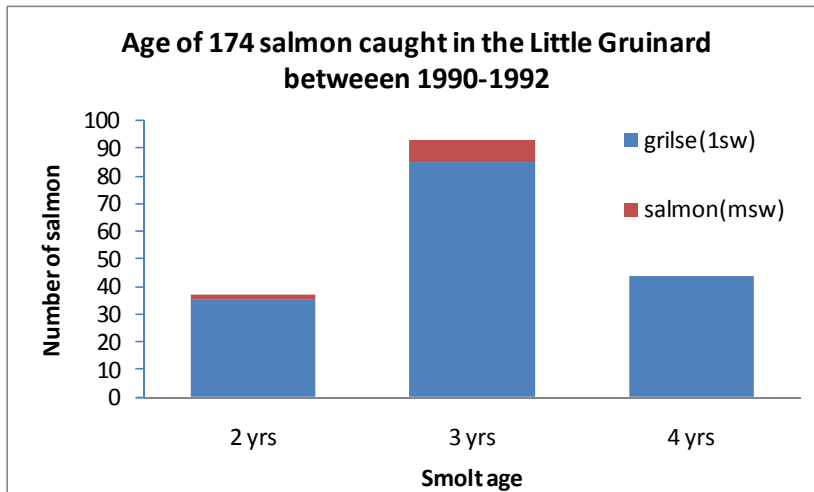
(b) 1990 - 1999 & 2000 - 2000



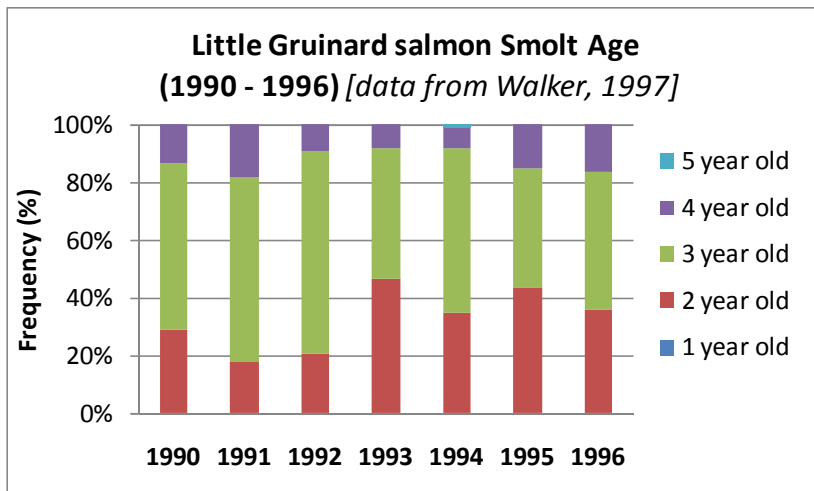
4.2.4 Age of salmon

By examining salmon scales under magnification, the age of the fish can often be ascertained. Several hundred adult salmon scales were read by Dr Andy Walker in the 1990s. The majority of fish had migrated to sea as smolts having spent three winters in freshwater, with a minority of two and four year old fish (Figure 4.6).

Figure 4.6 Freshwater age of salmon in the Little Gruinard (scales read by Dr Andy Walker)
(a) 1990 -1992



(b) 1990 -1996



LITTLE GRUINARD FISHERIES MANAGEMENT PLAN 2011+

Typically, 80% or more of Little Gruinard salmon are grilse having spent only one winter at sea (Figure 4.7). Larger 2 sea-winter (2SW) fish typically represent around 11% of the catch (maximum 20% in 1996) and most of these fish are between 8 and 13lbs in weight (Figure 4.8). Scale reading also identified small numbers of previous spawners in the catch, typically representing about 3% of the annual catch.

Figure 4.7 Sea age of salmon in the Little Gruinard

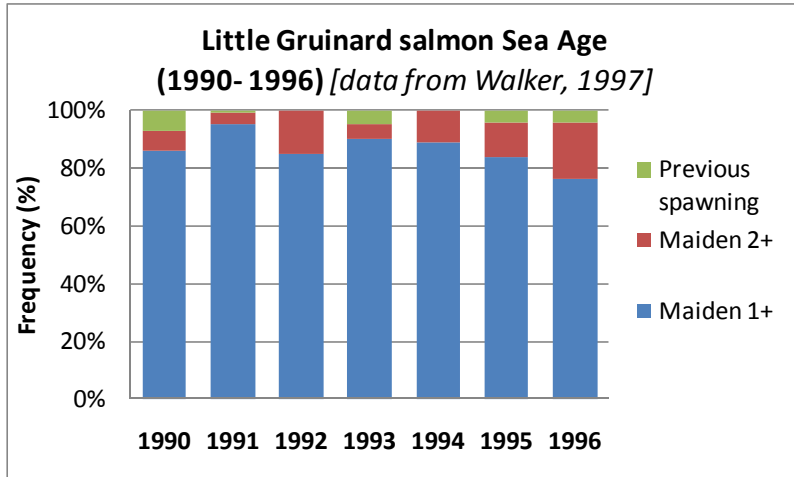


Figure 4.8 Size of 2SW salmon (from Walker, 1996)

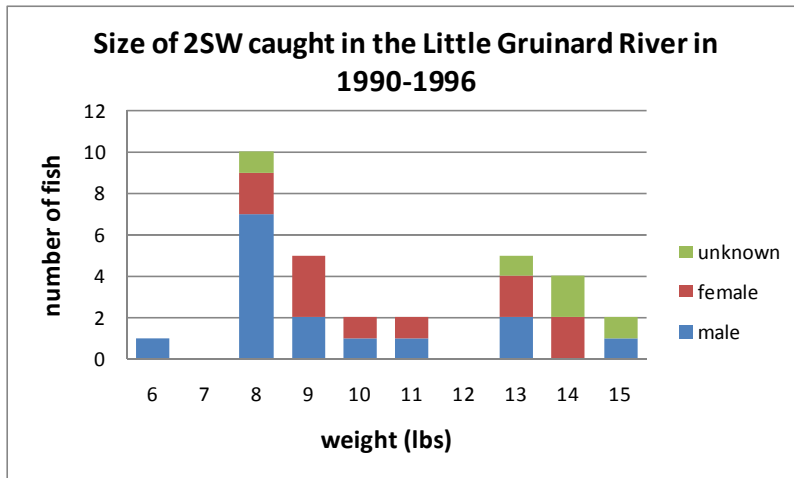
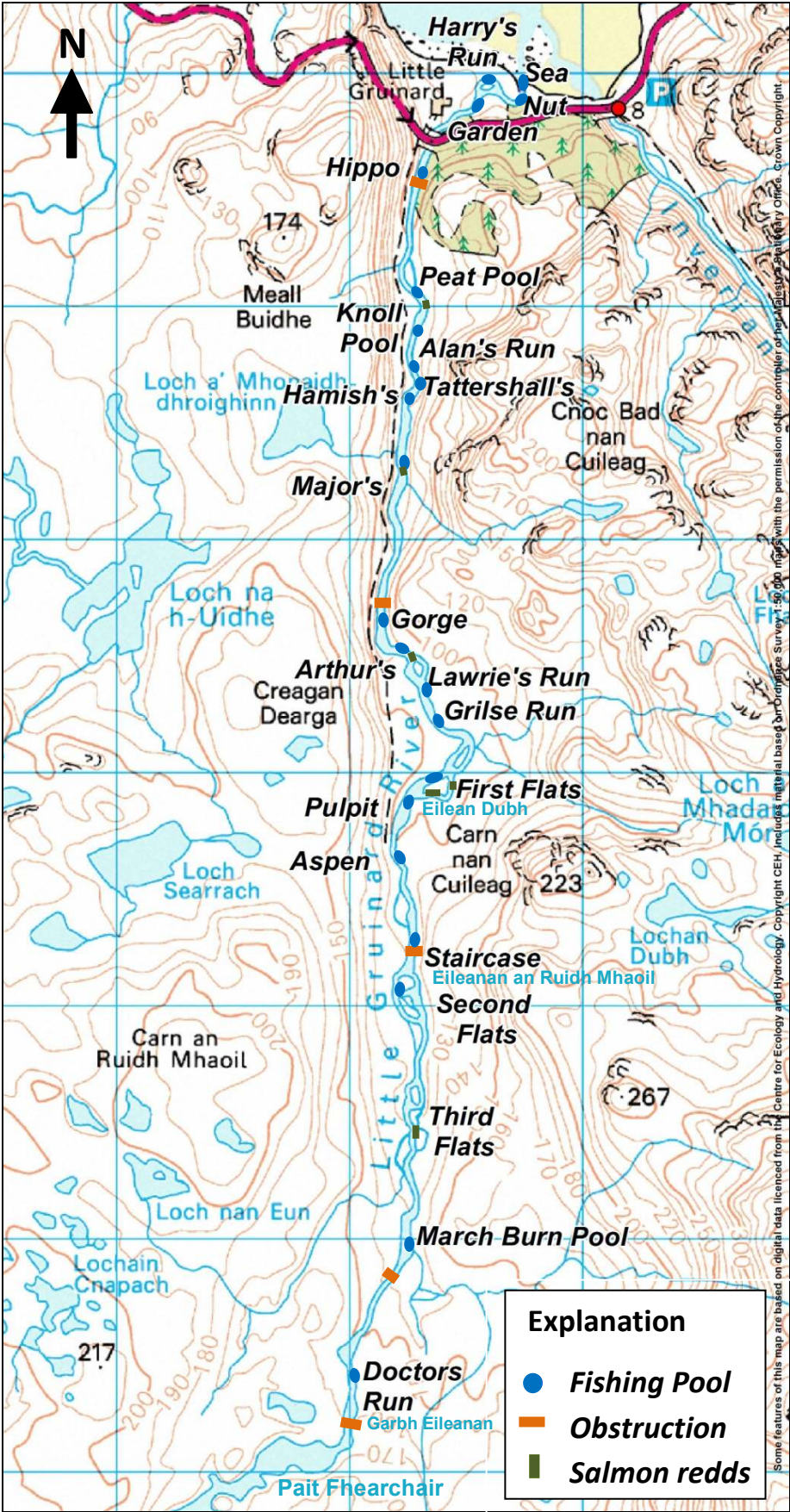


Figure 4.9 Some fishing pools (and other features) of the Little Gruinard River



4.3 Movements of adult salmon in the Little Gruinard

In 1990, The Little Gruinard became the first river in NW Scotland to adopt a catch and release policy for salmon. The policy was introduced by the proprietor to protect salmon; in addition to a fly fishing only policy, barbless hooks and knot-less landing nets were used to minimise damage to the fish.

In response to a request from proprietor Paul van Vlissingen for scientific investigation of the survival of rod caught and released fish, Dr Andy Walker from the FRS Freshwater Fisheries Laboratory carried out a number of studies of salmon and trout in the Little Gruinard River system. One of the studies investigated the survival of salmon to spawning time which were caught by angling, then radio-tagged and released. This radio-tracking project provided information about the survival of rod caught salmon which had been released back into the river, and also about movement patterns of salmon in relation to water flow and temperature.

Twenty five salmon were caught between late June and late August 1991 in the main river, comprising 23 grilse (one-sea winter fish), and two older fish, including a salmon which was on its second spawning return to the river. Radio tags were inserted into anaesthetised salmon, which after recovery and release were tracked using both hand-held receiver and automatic listening stations located at strategic places along the river system. The method and equipment used was similar to that subsequently used for the WRFT River Ewe Salmon Radio tracking study.

Table 4.1 Summary of radio – tracking results (from Walker and Walker, 1991)

Fate of the tacking fish	No. of fish
Tracked until spawning time – reached the Fionn Loch	8
Tracked until spawning time – remained in the river	5
Killed (angler, otter)	2
Signal lost in river	6
Returned to sea alive	1
Tags detected occasionally at low tide (fate of fish unknown)	6

The 13 fish which retained tags and survived moved up river in stages. The fish caught earlier tended to move upstream only when the river level rose. There was no relationship between fish movement and water temperature which varied between 13°C and 17°C between 10th and 22nd August, the first of the main periods when fish moved; and 12°C and 7°C during the period 19 September to 1st October, the second main period of movement.

Five of the 8 fish which entered the Fionn Loch were amongst the earliest fish tagged (between 29th June and 25th July); the other three fish were described as coloured when caught and may have also been early summer grilse. These fish were presumed to have spawned in the small streams flowing into the loch (see Part 6).

With over 50% of the salmon surviving to spawning time (possibly as high as 75%; some of the tags may have been disgorged by the salmon), the project demonstrated the value of the C&R policy.

4.4 Summary

1. Recorded rod catches for the Little Gruinard River have varied from less than 50 to over 150 salmon per year since 1990.
2. Only in 1994 and 1997 have the numbers of recorded escaped farm salmon exceeded 5% of the catch of wild salmon.
3. Most salmon were caught between July and September, with small numbers from as early as April in some years.
4. The average size of Little Gruinard salmon was 2.98kg during the years 1956-1958 and 2.74 kg in 1990-1992. Less than 10% of salmon were 4.5kg (10lb) or more in weight. Fish of 7 kg (15lb) or more were recorded less than once per year.
5. During the years 1990-96, most (80% or more) Little Gruinard salmon smolts migrated to sea after 2 or 3 years in freshwater, with the remainder 4 or rarely 5 year old smolts.
6. Typically 80% or more of Little Gruinard salmon were grilse with less than 20% maiden 2 Sea Winter fish and around 3% second time spawners.
7. The 1990 Little Gruinard Radio tracking study suggested that the salmon which migrate upstream to the Fionn Loch and beyond enter the river from the sea earlier in the summer than the salmon which spawn in the main river.

Part 5 Trout fisheries

5.1 Introduction

The Fionn Loch supports one of the most productive trout fisheries in Wester Ross and is famous for its large brown trout. Many trout of between 25-35cm in length are caught in the Fionn Loch by fly-fishermen each year. The loch is also noted as a 'ferox' water. There is also a run of sea trout into the river and each year some of these fish are caught. This section summarises what else is known about the wild trout of the Little Gruinard system.

5.2 Sea trout

In contrast to the neighbouring 'big' Gruinard River, the Little Gruinard has never been noted as a sea trout river. However, some notable sea trout have been recorded. The largest on record was in the 1960s: a fish of 17lb 8oz which was found dead by the Privy Pool having been hooked and lost by James Lawrie the day before in the Gorge. The fish was initially assumed to have been a salmon, and only identified as a sea trout from scale reading.

Numbers of sea trout caught and recorded were much less than salmon. In some years the recorded sea trout catch was 'nil'. In 1969, 25 sea trout ranging in size from 3/4lb to 4lb were recorded; the figures for the following year include 5 fish ranging in size from 4lb to 6.25lb taken in three days from 24th – 27th July. Most of these fish were taken in the pools of the lower river; up to the 1st Flats. Andy Walker snorkeled the lower river in 1991, observing 10-20 finnock in many of the pools.

Records for catches of finnock are patchy. Figure 5.1 shows the reported catches of larger sea trout of 1lb and over for the past 20 years. The main message appears to be that there were very few larger sea trout in the 1990s, but from 2004 onwards, numbers recovered with large fish of over 3lbs being recorded in most years, until 2006; then again in 2009. However, the consistency of fishing effort for sea trout during this period is uncertain.

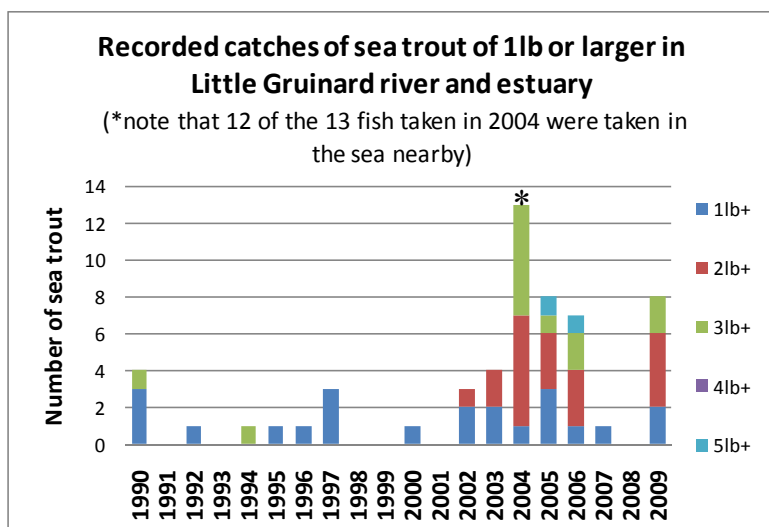


Figure 5.1 Recoded catches of sea trout in and near the mouth of the Little Gruinard, from estate records and Walker (1990-96)

Walker (1990) provided ages from scale reading of 36 sea trout caught in the lower pools of the river in summer 1990. Most of the fish were maiden finnock of between 190 and 290mm length. The sample also included 5 older trout, the largest of which weighted 2,185g and had three spawning marks. From scale reading, the majority of these fish had migrated to sea as 3 year old smolts (55%); four year old smolts were the next most common group (28%) as shown on Figure 5.2.

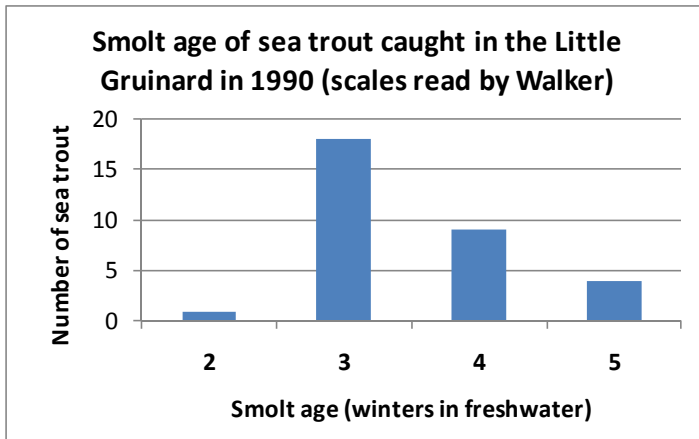
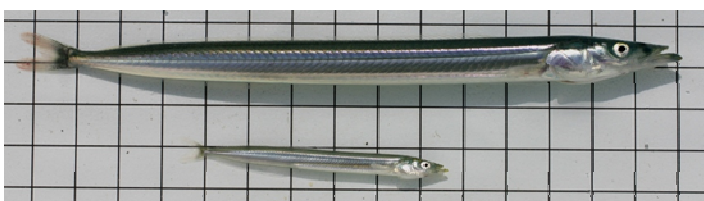


Figure 5.2 Smolt ages of sea trout taken in the Little Gruinard river, mostly in 1990. Data from Walker (1990)

MacKenzie (1921) states that both sea trout and salmon reach the Fionn Loch. Although there is plenty of evidence from electro-fishing surveys of salmon in the upper catchment; less is known about the occurrence of sea trout so far up the system. Sea trout progeny cannot be distinguished from brown trout progeny through electro-fishing surveys. None of the 154 mature trout taken in the Fionn Loch in October – December 1991 were sea trout (Walker, 1992). However, Gunn (*pers comm*) reports a sea trout of 6.5lbs taken around the end of the 1980s from the loch. Over 50% of sea trout recorded during the period 2000 – 2009 were taken in the Sea Pool and Estuary, and quite possibly were fish originating from another river system. However catch records report 2 sea trout of 1.5 and 2.5lb from the Major’s Pool in autumn 2007 and a 2lb sea trout from the 1st Flats in late August 2008, suggesting a spawning run of Little Gruinard sea trout in the autumn. Some of these fish are believed to spawn near the Lower Flats (Wilson, *pers comm*).



Sea trout grew quickly in coastal waters around Wester Ross in early summer 2009. These fish (sea trout above; Greater and lesser sandeel, left) were taken in Loch Gairloch.

5.3 Brown trout of the Fionn Loch

5.3.1 Introduction

Over the past ten years, the Fionn Loch has been fished both by guests of Letterewe Estate and by members of Gairloch Angling Club some of whom have fished the loch on and off since the 1960s. However, the reputation of the loch as a trout fishery extends back much further.

MacKenzie (1921) devoted a chapter to the Fionn Loch, providing a far more detailed and colourful description of its waters, its islands and its history than can be included here. Regarding the fishery: 'from time immemorial the Fionn Loch has always been famous for its enormous trout . . . the old crofter population who lived around its shores in their shieling bothies used to catch fish by tying a cod-hook to the end of a long string, baiting it with a good sized trout, and throwing it as far as possible into the loch from certain points and promontories best know to themselves. They used to spear the trout by bog-fir torchlight in the burns and the rivers in October and November'.

The WRFT biologist can claim no first-hand experience of the sampling methods described above. He is nonetheless intrigued by MacKenzie's account. 'The Old people declared that there were three different species (or at least varieties) of these trout, and gave them three different Gaelic names- vis., *Claigionnaich* (skully, big headed), *Carraigeanaich* (Stumpy, short and thick) and *Cnaimhaich* (bony, big boned). Certainly the trout do vary a lot in shape and colouring.'



A Fionn Loch 'Carraigeanaich' (?) of 43 cm (8.5 years old) taken by Ala Mackenzie on 14 August 2004, one of the most golden trout seen by the WRFT biologist in 10 years (Peter Cunningham)

Eighty-nine years later and interest in the genetic variation of Brown trout is as great as ever²⁵. Genetic studies elsewhere have demonstrated two or more different populations of trout in some Scottish lochs (Duguid *et al*, 2006). Traditional Ecologic Knowledge ('TEK') in more recent years has provided many clues from which follow up studies have made scientific breakthroughs. In Lough Melvin in Ireland, four different trout populations have been confirmed by genetic analyses

²⁵ Follow link to lecture on wild brown trout by Prof Andy Fergusson at:
http://www.wildtrout.org/index.php?option=com_content&task=view&id=389&Itemid=208

confirming the traditional understanding of trout types within the lough. The diversity of wild trout in the Fionn Loch has not yet been studied in detail. In the 1930s, Sawyer (see below) recognised two distinct types of trout within the Fionn Loch, one of which grew to large size. With several spawning burns and sub-catchments within the system, the Fionn Loch may have more than one trout population.

There are no records of attempts having been made to ‘improve’ the trout in the loch through stocking, in contrast to Loch Maree. As a stronghold for native Scottish Brown trout, the loch is possibly as good as it gets. Is the Fionn Loch now one of the most important native wild trout waters in Scotland to the north of the Great Glen?

5.3.2 Size of Fionn Loch Trout

MacKenzie provides an account of some of the larger trout taken in the Fionn Loch. In 1851, Sir Alexander Gordon Cumming of Altyre fished the loch in early March. By trolling, he caught 12 fish weighing 87 lbs 12 oz; the largest of which were 14lbs 8oz, 12lb 8oz, 12lb 4oz, 12lb 10 oz, 6lb 12oz. In about 1863, Mackenzie himself witnessed a trout of 18lbs from the loch; and hooked and lost a trout of larger size than this. In the early 20th Century a 12lbs trout was caught and preserved in a glass case.

Captain Sawyer of Inverewe also took a great interest in the wild trout of the Fionn Loch and other nearby lochs within the Little Gruinard catchment area. Sawyer carried out a series of studies of water quality, food availability and growth rates, corresponding with fisheries scientists in leading research institutions in the UK. Between August and September 1938, 6 larger fish were caught ranging in size from 2lb to 9.25lbs; with an average size of 5.5lbs. However, he noted that the size of large trout had decreased, suggesting that this was due to the replacement of cattle by sheep and then deer on the surrounding land? Sawyer reported that most of the fish caught averaged 3 to the lb of which 1,500 to 2,000 were caught per season.

In 1991 Walker carried out a study of the trout of the Fionn Loch. 176 trout were caught by angling, netting and electro-fishing. Most of these fish were between 20 and 30cm in length (Figure 5.3).

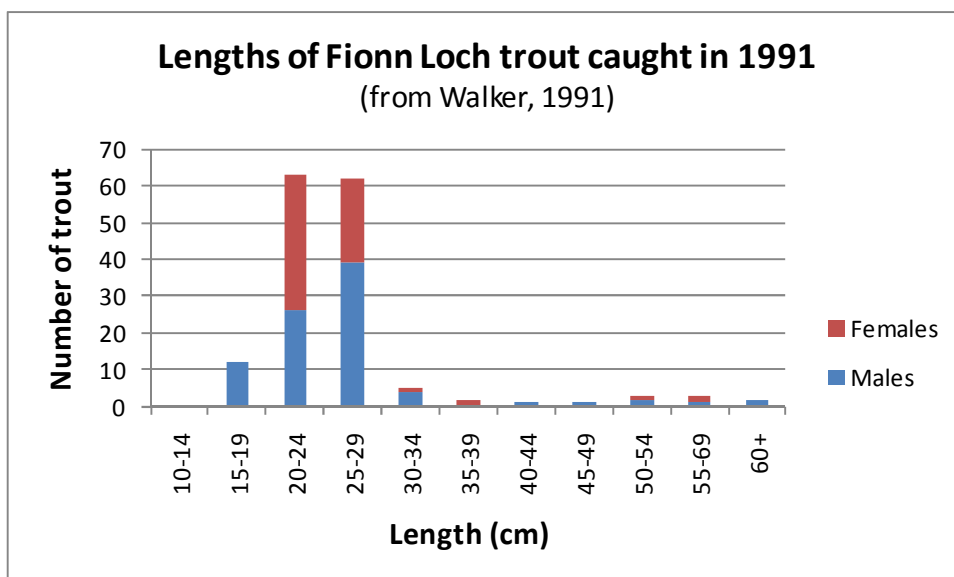


Figure 5.3 Lengths of Fionn Loch trout caught by Walker et al in 1991.

LITTLE GRUINARD FISHERIES MANAGEMENT PLAN 2011+

Of these, 154 were maturing, and 22 were non-maturing (i.e. had resting gonads having spawned the year before). The sample included 10 trout of over 40cm; the largest of which was a fish of 670mm, weighing 3584g (almost 8lb). The three largest trout, two of which were caught by trolling, were radio-tagged; one of them swam a minimum distance of 7.5km over 16 days from where she was released near the Carnmore burn to the mouth of the Beannach burn.

In 2004, Ala MacKenzie and other members of Gairloch Angling Club measured 382 trout caught on fly, many of which were returned (Figure 5.4). Only one of these fish was larger than 40cm (shown on page 47), with a majority of between 20 and 30cm in length.

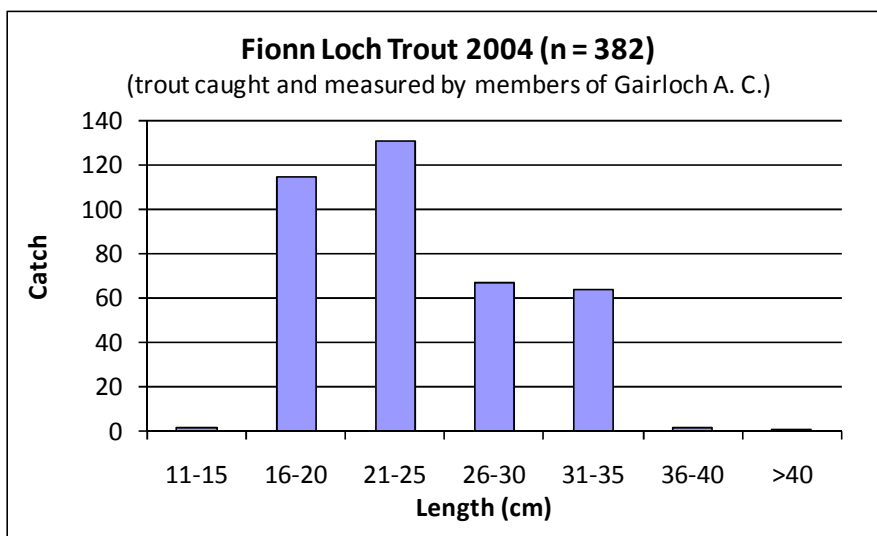


Figure 5.4 Lengths of brown trout caught in the Fionn Loch in 2004 by members of Gairloch Angling Club.

Larger trout in the Fionn Loch feed on small fish and the 'fly only' policy means that they have seldom been taken by anglers fishing the loch in recent years. Anecdotes suggest that by trolling a larger lure, larger fish would be taken more often.

Brown trout caught at top of Little Gruinard River (mouth of Fionn Loch) in August 2006.



5.3.3 Age of Trout

In the 1930s, Captain Sawyer sent samples of trout scales from his lochs to the Freshwater Biological Association where they were read by E. B. Worthington (Figure 5.5). The fastest growing fish were those in Loch Chrioneach; two types of Fionn loch trout were recognised; the faster growing of which became large *ferox* of over 500mm in length.

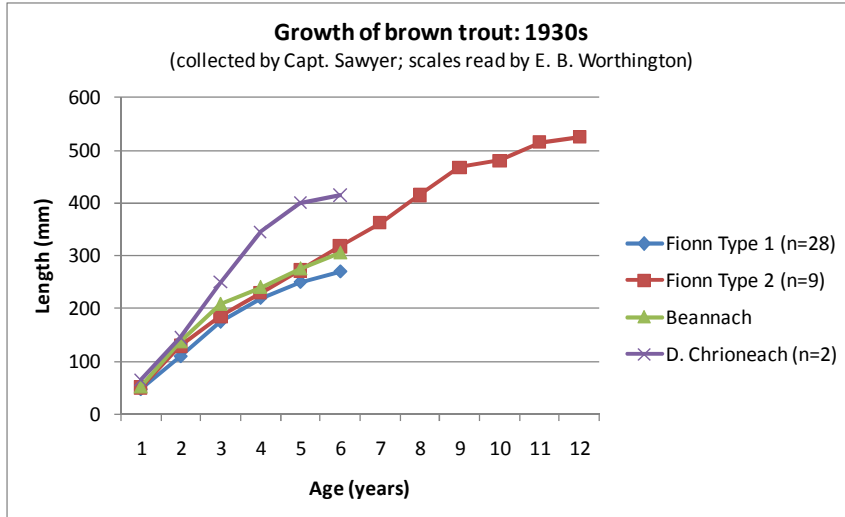


Figure 5.5 Growth of trout in lochs in the Little Gruinard catchment in the 1930s (data from Sawyer).

In 1991, trout aged by Walker showed a similar pattern of growth, taking 6 years to reach a length of 270mm – 300mm. Thereafter, some fish grew more quickly exceeding 500mm by the age of 10 before growth rates began to level off (Figure 5.6).

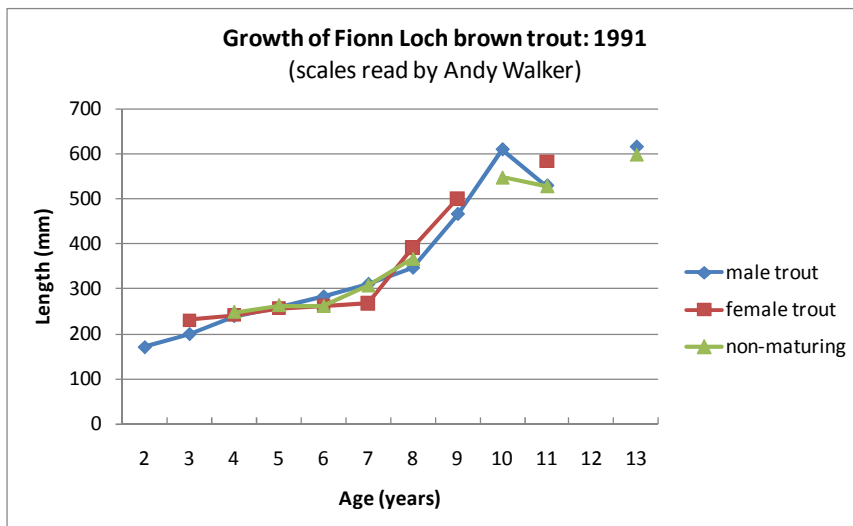


Figure 5.6 Growth of trout from the Fionn Loch, caught in 1991 (data from Walker 1991).

LITTLE GRUINARD FISHERIES MANAGEMENT PLAN 2011+

In 2004, scales were taken from a sample of trout from the Fionn Loch and aged (Figure 5.7). Trout reach a size of 25 cm in their 4th or 5th year. Results from this study indicated that trout had grown at a very similar rate as in the 1930s.

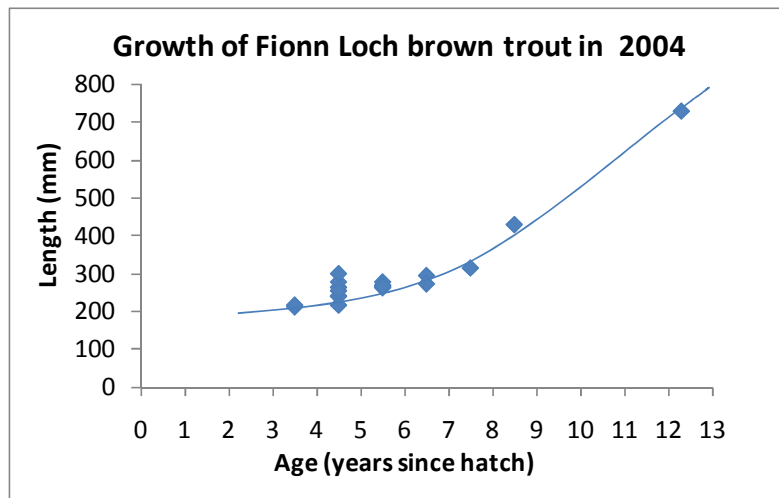


Figure 5.7: growth of Fionn loch Brown trout caught in 2004.

What is not known is whether the yield of trout changed; records of trout from the Fionn loch are incomplete for recent years; many anglers return a majority of the fish they catch.

5.4 Interaction between trout and salmon populations

Competition: Trout share their habitat with juvenile salmon. During the summer, juvenile salmon tend to be found at highest densities in faster water over cobble substrate where there is good cover. In the Little Gruinard River, few trout were recorded: fish populations are dominated by salmon.

Predation: We still know very little about the ecology of the Fionn Loch. The extent to which the trout population in the Fionn Loch influences the productivity of the salmon fishery (e.g. taking salmon smolts as they migrate through the loch) is not known.

Interaction between trout and juvenile salmon, both within the river and loch would be worth further investigation (see Part 6 for further discussion). Now that the Eurasian minnow is also now present in the system, changes can be anticipated.



One year old Brown trout (top) and one year old salmon parr (bottom) from a more fertile stream in southern Wester Ross.

5.5 Summary

1. In contrast to the big Gruinard River, few sea trout have been taken from the Little Gruinard system in recent years. Less than 10 sea trout of over 1lb were recorded per year during the period 1990-2009. Most were taken in the lower pools of the river.
2. Scales from 36 sea trout taken in 1990 were read by Walker, 1990. Half of these had spent 3 years in freshwater before migrating to sea; others were mostly 4 or 5 year old smolts.
3. Recent catch records suggest a small run of sea trout up the Little Gruinard River in the autumn. These fish are believed to spawn near the 1st Flats.
4. The Fionn Loch is one of the most productive brown trout fisheries in Wester Ross. MacKenzie describes three forms of trout known to the former residents around the loch with different gaelic names. Sea trout were also taken in the loch at least until the latter part of the 20th century.
5. In the 19th and 20th Century, the loch was noted for its large 'ferox' of over 10lb (4.5kg) in weight. In recent years few fish of this size have been recorded.
6. Most trout taken by Walker in 1991 and members of Gairloch Angling Club (fly fishing) in 2004 were between 20cm and 35cm in length, and 4 to 6 years old. These fish were very similar in size and growth to trout taken by Sawyer in the 1920s and 30s.
7. From scale reading, it is known that some larger trout grew faster when they reached a length of 30cm -35cm (age 7 or 8), exceeding 50cm by age 10.
8. Little is known about possible changes in the overall productivity and yield of trout of the Fionn Loch. Many anglers have returned a majority of rod caught fish in recent years.