WESTER ROSS FISHERIES TRUST

REVIEW JULY 2013

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REVIEW

by

Peter Cunningham, with contributions from Jonah Tosney, Pete Minting, Ruby Neervoort, Gunnar Scholtz and Dr Lorna Brown

July 2013

Cover photos (all photos © WRFT unless stated otherwise):

From top, clockwise:

(top) *The largest sea trout recorded in the WRFT area in 2012, a male trout of 530mm, 1826g, condition factor 1.23, taken in a fyke net at the mouth of the Dundonnell River in August 2012 with only two lice. Note the raw, louse damaged dorsal fin indicative of heavy louse infection earlier in the summer (photo A. MacDonald/Sally Clements).*

(top inset) *A sprat that was trapped in the fyke net at Dundonnell on 25th July 2012 (A. MacDonald/S.Clements).*

(right) *part of a Carron sea trout 395mm, 5th June 2012 (J. Tosney). The field data sheet recorded 200+ chalimus lice and 40+ adult and pre-adult lice; examination of photos suggested there were 700+ lice on the fish.*

(bottom right) *Juvenile fish survey sample of salmon, trout and eels following release after processing back into the River Lael on 5th October 2012. The picture is a still from a video recorded using GoPro Hero2.*

(bottom left) *This hawker dragonfly larvae [left] and Great diving beetle larvae [right] were found by children in a path-side pool in Laide Community Woodland at the 'aquatic beasties day' on 26th July 2012. The 2013 Laide Wood aquatic beasties discovery day will be on the 25th July.*

(left) *Tidying up after a sweep netting session at Flowerdale estuary, Loch Gairloch, 22 June 2012. Several sea trout were caught on more than one occasion in the Flowerdale estuary in 2012.*

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Alasdair MacDonald counting sea lice on a sea trout at Dundonnell, summer 2012 (photo by Sally Clements).

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Preface

The preface to the Review as long ago as 2010 predicted harder financial times and spoke of an increasingly constrained financial environment. How true that was. The election of a new Wester Ross Fishery Board late in 2012 led to a change in policy as regards the Trust, resulting in a halving of funding from fishery proprietors through their elected representatives. Last year also saw a major, although not unexpected, reduction in the Government funding distributed and administered by RAFTS. Thanks to the stalwart efforts of previous Chairmen and Trustees, a substantial reserve was built up over the years but it is only thanks to that buffer that we have been able to continue with the great variety of work which is done. The Trust is now in its eighteenth year of existence and in that time our biologists' monitoring work has built up some very valuable long term data sets. Sadly, it is becoming increasingly difficult to fund the monitoring work needed to maintain and update those data sets. We are constantly seeking to identify new sources of funds but in the prevailing financial climate it is difficult to be optimistic. By the same token, we are looking very hard at all our costs, including such things as printing. It was with great regret that we had, for example, to ask people to accept this Review in electronic form rather than on nice shiny paper but such economies save many hundreds of pounds and are essential.

That sounds - and is – depressing but it is not by any means all bad news, as will be seen from the very next page onwards. Peter Cunningham's unflagging energy and enthusiasm continue undiminished, not only in terms of the "routine " work of monitoring and surveying but in thinking up projects to further our knowledge and understanding. Jonah Tosney sadly – and regretfully – left us late last year but the survey work he was doing in conjunction with the Skye Trust is now being carried on by Peter. Peter Jarosz is equally innovative in finding new potential funders for our activities, despite the increasing difficulty of the task. The many faithful folk who give so freely of their time and expertise – some of whose faces appear in this Review - continue to provide critical support and encouragement, come rain or midge, and we are most grateful to them.

There have been a couple of changes amongst the Trustees since the last Review and we were particularly sorry to lose the support, both moral and tangible, of Angus Morrison when he left the Ewe. He had been a tireless supporter of the Trust and his wise counsel and encouragement are sadly missed. On the bright side, we were delighted when Angus Davidson joined us. Not only do we benefit from his wide knowledge and experience but he provides a specific geographic link and contact with the very North of our area which has been sadly under-represented for too long.

John Mackenzie, July 2013

Part 1 **Introduction**

It was mid May when I started to write this, and cool for the time of year with frequent showers. The rivers were high and the first rod caught salmon of the year had just been taken in Wester Ross. River Ewe had just produced its first fish, a magnificent and remarkably fat silvery spring salmon of 17lb, fresh from the sea. Imagine the size of the smiles of successful angler and ghillie?

Over the past year many people have expressed concern about the continued threats to the wild salmon and sea trout fisheries of the area, for example from the salmon farming industry. 'What are we doing about it?' Sometimes one has to remind oneself and others about the Trust's remit and why we do what we do.

Following its safe return, the 17lb salmon would very likely home back towards the upper part of the Ewe catchment. Until the late 1980s, the first salmon in the River Ewe system were usually taken in March, sometimes earlier. Some of these fish ascended the complex falls in the Bruachaig River to spawn in headwater streams above the Heights of Kinlochewe where wild salmon were last recorded in the 1990s. Our programme of restocking the headwaters of the Bruachaig using progeny of rod caught salmon taken in the Kinlochewe River the previous autumn, via hatchery facilities at Coulin Estate, has been underway since 2007. Electro-fishing surveys have demonstrated that in the absence of wild salmon, stocked fry have grown well. Given the numbers of large 1+ salmon parr recorded during e-fishing surveys of stocked areas, 10% or more of the salmon smolts entering Loch Maree are likely to have comprised of Bruachaig fish of stocked origin. Our aim and hope is that some of these fish on their return to freshwater will make the considerable effort to ascend the Bruachaig falls before spawning; that a wild self-sustaining salmon population will be restored in the headwaters.

This review summarises much of our other work. For rod catches of salmon, 2012 was generally a good year after a slow start. At Tournaig, Ben Rushbrooke recorded a record number of grilse entering the system; later in 2013 we'll find out whether salmon spawned successfully in the system. However, for juvenile salmon and trout, 2012 was a challenging year. After high water in May 2012, a period of drought extended through June into July. One nursery stream had dried out completely by the time we arrived to do an electro-fishing survey.

With little freshwater entering sea lochs, many sea trout were, once again, recorded carrying high numbers of sea lice in June 2012. The lousiest sea trout ever recorded by the WRFT to date was taken at the mouth of the River Carron. There were also many lice on sea trout in Little Loch Broom in June 2013. Given the salmon farming industry's expansion plans, there is still much concern for the future of wild sea trout and for wild salmon should the situation deteriorate further. The Scottish Government has been unable to hold the salmon farming industry accountable for damage caused to some of Scotland's iconic wild fisheries. Science can achieve little if there is not willingness and regulatory support to facilitate science-based management.

However, despite the sea louse onslaught, in some places sea trout survived and grew to respectable sizes; it's not just about sea lice. Where sprats were driven by mackerel into river estuaries, as in Little Loch Broom in July 2012, some sea trout fed well. Behind the mackerel were Common Dolphins and perhaps even the Killer Whales which were seen over several weeks around the Summer Isles. The importance of a healthy marine environment for wild sea trout is something that we stress at every opportunity. To what extent is a lack of larger spring running sea trout a consequence of fewer herring overwintering in local sea lochs? To what extent can a Wester Ross Marine Protected Area support the habitats that support the fish populations which provide vital food for many of our sea trout and salmon as they enter the sea? There are many challenges for the year ahead.

As always, we'll be delighted to hear from anyone else interested in restoring and improving the wild salmon and sea trout fisheries of the area who would like to meet up and join us for a few hours or a day in the field.

Peter Cunningham, May & July 2013

Part 2 **Salmon and sea trout stocks**

2.1 Juvenile fish surveys in Wester Ross

In 2012, electro-fishing surveys were carried out mainly on rivers in the northern part of the WRFT area between July and October (rivers in the south of the WRFT area will be surveyed later this year). Surveys were also carried out on the Isle of Skye by Jonah Tosney. The primary aim of our juvenile fish surveys was to maintain an understanding of the distribution and status of juvenile Atlantic salmon within the WRFT area. In addition to juvenile salmon, juvenile trout, eels, and other fishes were recorded.

Our most basic measure for juvenile salmon is the occurrence or absence of year classes. From a fisheries management perspective this information is often all that is needed to identify a problem and where something can be done about it, to make management decisions, (e.g. the need to stock or otherwise). The most useful field days are usually those where the river proprietor or manager is able to join the field team to find out first-hand what is in his / her river and discuss findings and implications for conservation and fishery management. Our least useful days are those where local fisheries interests have no interest in what we find.

Sites were normally fished using a 'timed' methodology, where the numbers of fish taken during fishing is divided by the time spent fishing to obtain 'Catch Per Unit Effort' data. Catch Per Unit Effort data provides an indication in the relative abundance of different year classes and numbers of fish at different sites, particularly on the day of survey. Table 2.1 defines the Catch per Unit Effort grades given in the subsequent text.

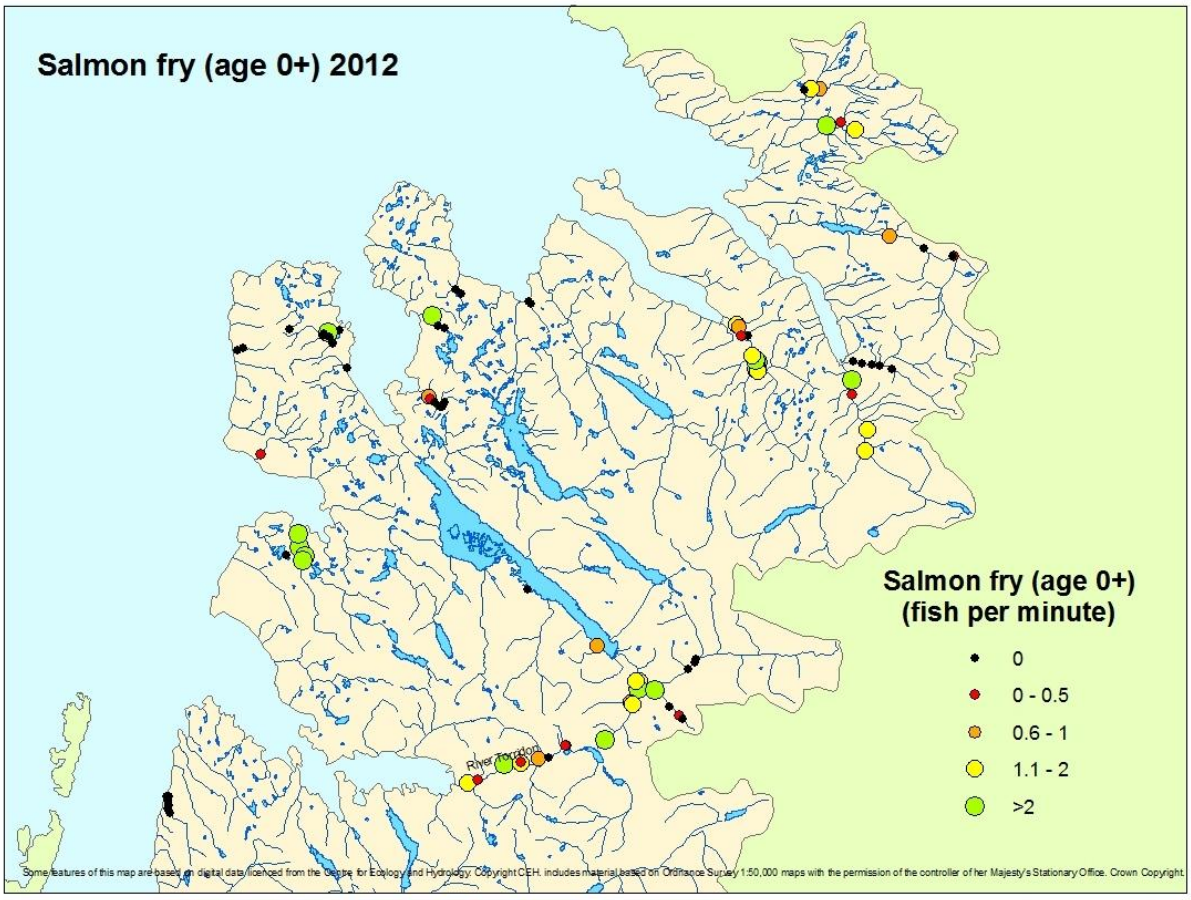
Table 2.1 Definition of Catch-per Unit Effort [CPUE] grades as used in the following text.

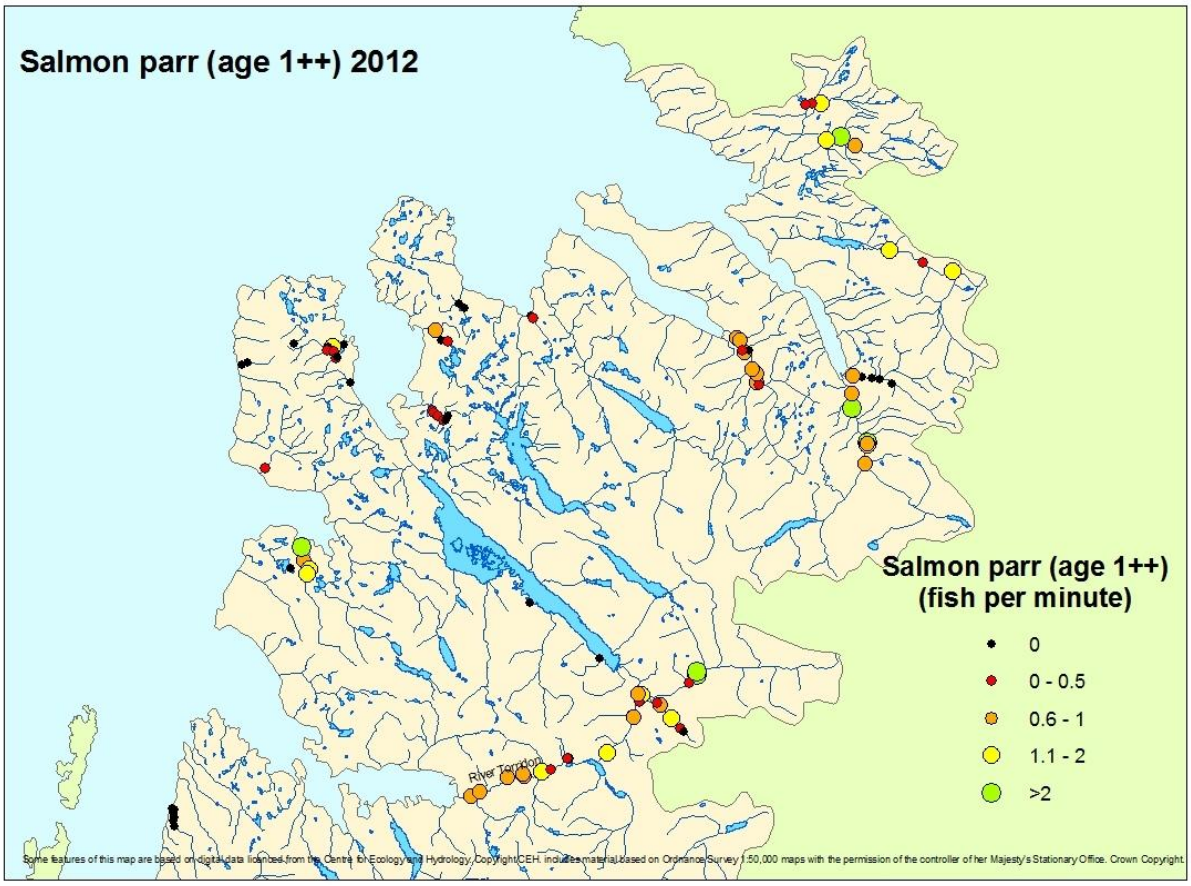
CPUE	**Grade**
0	Absent
0.1 – 0.5 fish per minute	Very low
0.6 – 1.0 fish per minute	Low
1.1 – 2.0 fish per minute	Moderate
> 2 fish per minute	High

CPUE can vary according to conditions on the day of survey. Therefore interpretations of the 'health' of juvenile fish populations are not based on the CPUE 'grade' alone. Water levels on the day of survey need to be considered: fish are often more easily caught when the river is low and fish are more crowded together. At high water temperatures, parr can sometimes be seen moving away from the electro-fishing team before they become 'trapped' within the electric field; so if used as the only measure, CPUE may underestimate parr abundance.

So other information, for example fish size, is also considered to indicate whether a juvenile salmon population is close to carrying capacity and in good health, or whether the river should (or could) support and produce more healthy wee fish. The relative sizes of juvenile salmon for their age reflect competition for available food. Unusually large fry and parr are more often found where there is less completion for available food; very small fry occur where competition between fish is highest. So fish size can provide additional clues as to whether or not there are as many fish in any particular stretch of river as there could be.

Figure 2.1 Distribution of salmon fry and (below) salmon parr at sites surveyed within the WRFT area in 2012.





Results and interpretation: Wester Ross

The following section provides a river by river summary of the results of juvenile fish surveys in 2012. Salmon and trout are considered together here.

Figure 2.1 shows CPUE values of salmon fry and parr at sites surveyed by WRFT in 2012.

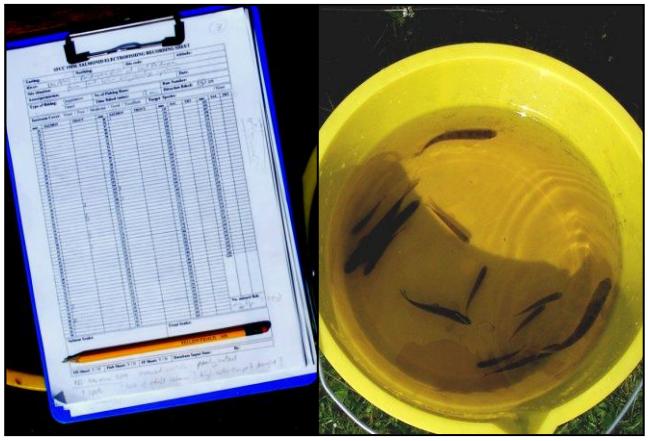
Kanaird (27th Sept 2012). The upper parts of the accessible area for salmon of both the mainstem Kanaird and the Runie were surveyed. Conditions were good for the survey with the river at a medium low level. Those involved with looking after the river from both estates helped with the survey and we were able to discuss our findings as the survey progressed. Salmon fry were recorded at moderate CPUE by Glen Cottage demonstrating successful spawning in 2011. Parr were also present here at low CPUE. However, the fry were relatively large here at between 55mm and 74mm in length reflecting densities which were below carrying capacity. In contrast, below Langwell salmon fry were recorded at high CPUE reflecting higher densities; however they were much smaller at between 37mm and 50mm in length. In the Runie below Drumrunie falls, salmon parr outnumbered salmon fry; primarily a reflection of habitat here. In the Allt Liathdoire below the road, smallish salmon fry were present at moderate CPUE. Trout fry were also present here; we discussed whether these could be progeny of sea trout or whether they were more likely to be progeny of brown trout. In the burn which flows out of Lochanan Dubha, trout, minnows, 2 salmon parr but no salmon fry were found. Overall, a useful day for all concerned with plenty of time to consider opportunities for improving the river for juvenile salmon and trout, including whether or not supplementary stocking or the development of riparian woodland enclosures could help fish production.

Survey team in the Kanaird headwaters, 27 Sept 2012. (l-r) Angus Davidson, Ben Rushbrooke, Henry Bulmer, Ben Bulmer, Arran Matheson, Ian McFadyen and (behind Ian) Marcus Munro. [Around the time the photo was taken this tapeworm had just been dissected out of the minnow (inset) taken in the stream nearby!]

Ullapool (3rd August 2012). Sites above Loch Achall were surveyed. Juvenile salmon were very scarce in the Rhidorroch River, particularly at the site by East Rhidorroch where no salmon fry were found. In contrast, there were much higher densities of juvenile salmon, including fry, and trout in the Allt Coire Cronaidh than in the main Rhidorroch River. The occurrence of higher numbers of salmon fry and parr in the Allt Coire Cronaidh argues against a lack of spawning salmon in this part of the Ullapool river system above Loch Achall in either 2010 or 2011. The Allt Coire Cronaidh is much more stable than the Rhidorroch River nearby. Therefore, possible reasons for the lack of salmon fry in the Rhidorroch River in 2012 are (1) that salmon eggs or fry were

scoured out of the river earlier in 2012; and / or (2) that water levels during the drought in June and early July were too low and many fish perished.

(right) The catch from the first run of the Allt Coire Cronaidh quantitative e-fishing site on 3rd August 2012 lots of wee fish. In contrast, (left) our bucket of fish from the Rhidorroch river at East Rhidorroch had very little in it – mostly wee trout. [Note the contrast of photos has been adjusted so that both the fish in the bucket (mostly wee trout) and data sheet can be seen: zoom to 400% to see data.]

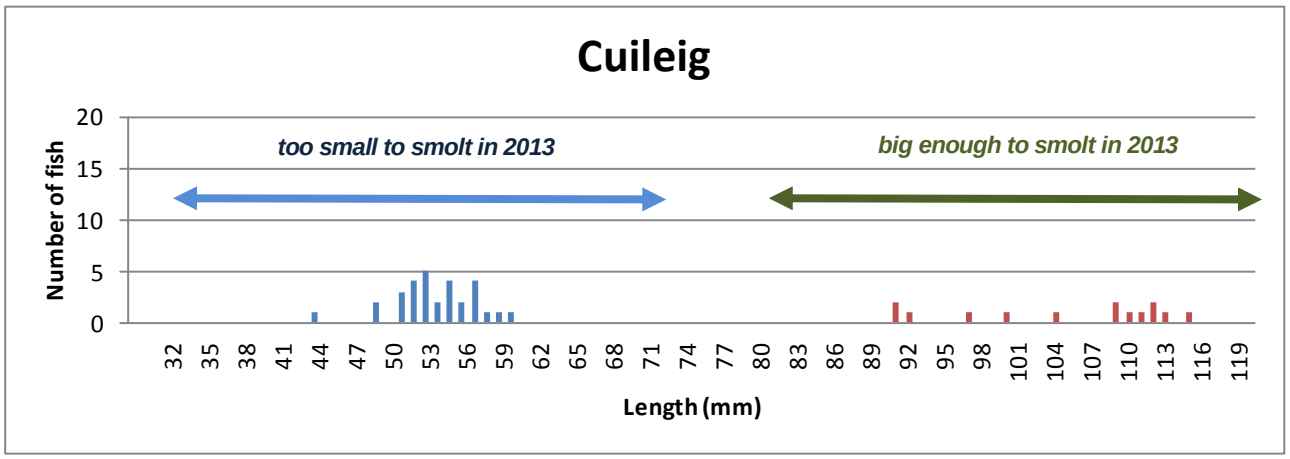


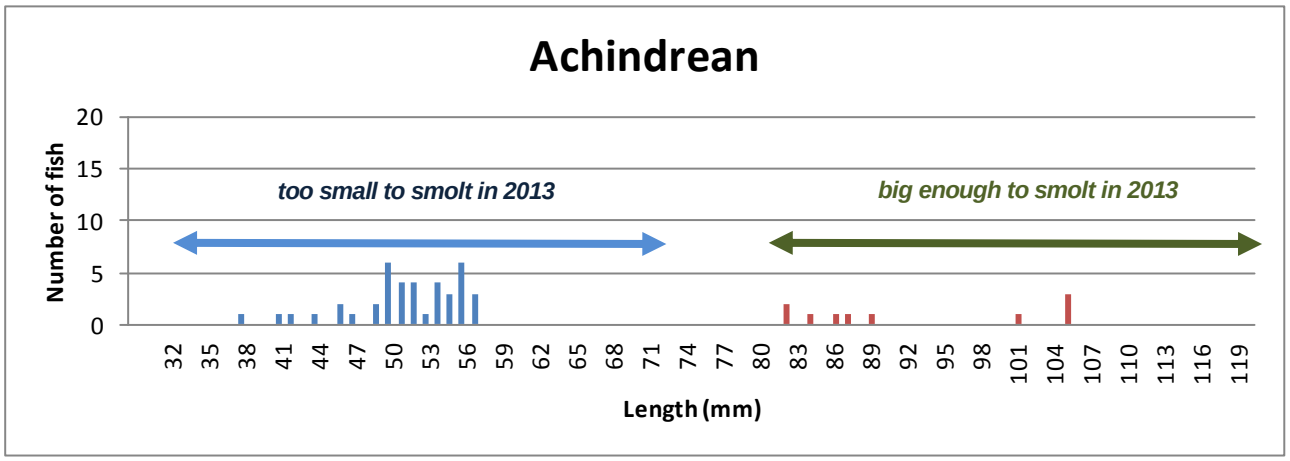
The Ullapool River Fisheries Management Plan 2006-2010 (which can be found on the WRFT website) considers problems in the Rhidorroch River associated with excessive rates of sediment movement and scouring. Spate flows associated with increasingly intensive rainfall (?climate change) are part of the problem. A very high spate in April 2012 may have caused redd washout. Much of the mobile sediment originates from eroding banks high up in Glen Douchary. Recommendations in the Ullapool FMP to safeguard juvenile salmon production in the Rhidorroch River, the principle salmon spawning stream in the system, via better protection of the riparian habitat in Glen Douchary to minimise rates of erosion and input of stream scouring sediment remain as valid in 2013 as they were in 2006. A solution to this problem requires a collaborative approach between the estates which share ownership of Glen Douchary. Similar problems have been seen in other catchments.

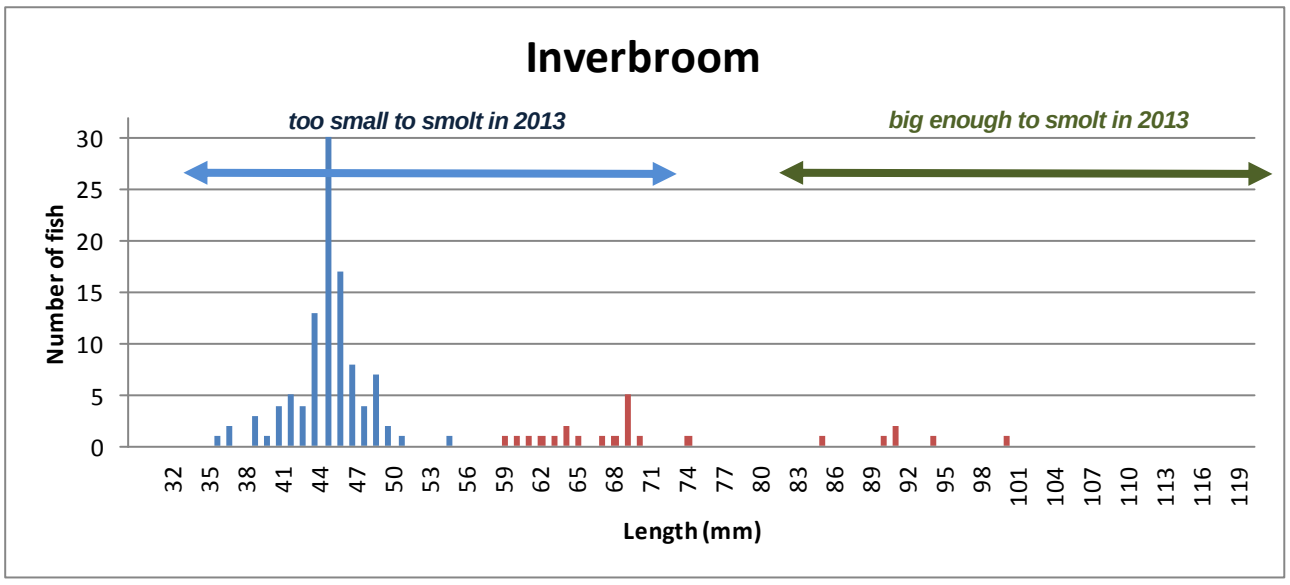
Broom (10th Aug), WRFT provided support to the SEPA electro-fishing team for a survey of three fully-quantitative electro-fishing sites. Salmon fry and parr, juvenile trout, and eels were found at all sites. Salmon fry were most abundant but smallest at the Inverbroom site. Overall numbers of salmon (both fry and parr) were lowest at the top Cuileig site; however, the parr were larger here that at the other sites; and depending upon the size at which a parr needs to grow to by late summer if it is to become a smolt the following year (possibly around 70mm – 80mm), it's possible that the Cuileig produces as many salmon smolts per unit area of streambed than the other sites (see Figure 2.2). At Inverbroom, two small flounders were also recorded.

Salmon smolt and two salmon parr from the River Broom at Achindrean bridge on 10th May 2012. Water levels were low through much of the spring in 2012: at Tournaig, in most years the peak period for migration of salmon smolts to the sea is at the end of April & first week of May. So I was a bit surprised to find this one still in the river.

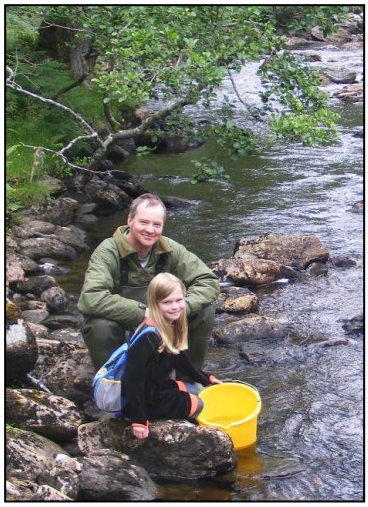
Figure 2.2 Juvenile salmon sizes – frequency graphs for the River Broom, from electro-fishing survey on 10th August 2012. The wetted area of each site was between 130m² and 150m². Fish from runs 1 & 2 (of 3 run fishing) have been included in these graphs. Note that (1) there were many more fry (blue columns) and parr (red columns) at the lowest site below Inverbroom Bridge; however (2) that both fry and parr were much smaller at Inverbroom than at the top site in the Cuileig. Big question: does more juvenile salmon always mean that more healthy smolts are produced? Please contact the WRFT Biologist to discuss further . . .







Dundonnell (11th and 24th July)



Alasdair and Sophie MacDonald at the highest e-fishing site in the Dundonnell River on 11th July 2012. Both salmon fry and parr were recorded here.

In 2012, for the first time in several years, salmon fry had not been stocked into the system in preceding months, and therefore all the fry recorded were assumed to be the progeny from natural spawning in 2011. Salmon fry were recorded at moderate or high CPUE at all the sites in the upper part of the accessible area on 11th July 2012. On 24th July, fry were relatively scarce at the sites below the road bridge to the sea, except at the tail of the long run below the Geta Ban pool, where they were recorded at over 5 fish per minute. Parr were recorded at low or very low CPUE at all main river sites.

Trout fry were recorded at highest CPUE in both 2010 and 2012 in the tributary burns flowing into the mainstem Dundonnell River. In 2012, both the 'March Burn' and the back channel of the main river by the mouth of the 'Cemetery Burn' had high trout fry CPUE. The juvenile trout sampled here may have included progeny of sea trout.

Brown trout from the Dundonnell River above the road bridge taken during the electro-fishing survey on 11th July 2012.

Water levels were particularly low at the time of the survey on 24th July and very little water was flowing down the backchannel. Trout fry were concentrated within shallow pools. So the e-fishing team downed tools for a wee while to divert a little bit more water from the main river into this channel (see Figure 2.3).

Figure 2.3. Rewatering the back channel of Dundonnell River above the mouth of the 'Cemetery Burn' on 24th July 2012. Following an unusually prolonged dry spell the flow in the back channel was reduced to a trickle and many trout fry were crowded into very shallow pools where they appeared rather vulnerable. (David Mullaney is holding the bucket.)

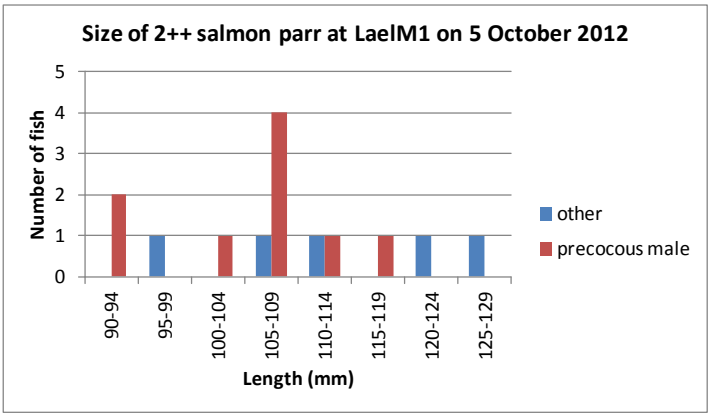
(below left) Drought. The top of the channel (at the tail of the 'Long Run') was almost completely cut off from the main river, with only a small flow of water percolating between the stones. (below right) After a few minutes of moving stones by hand, a flow down the back channel had been restored to increase the flow, depth and wetted area in the back channel available to trout fry and enabling passage by small fish between the pools.

Lael (24th August & 5th October)

Sites were fished in the River Lael as part of a contract to assess fish populations following the development of the Inverlael Hydropower scheme. Trout were found at all sites except in the Allt Gleann a' Mhadaidh; no fish were found in this tributary burn during previous surveys, and there may be too many waterfalls for trout to survive here.

Salmon were only found at the lowest site between the fields below the waterfalls and power house. Only one year class was recorded: 2+ year old salmon, at a density of 7.7 parr per 100m^2. These fish were from 93mm and 125mm in length, and the majority were male precocious parr (Figure 2.4); this may reflect a tendency of male salmon parr to mature early where densities are low relative to the carrying capacity of the available habitat (reviewed by Fleming & Einum 2011[1]).

Figure 2.4 (left) Lengths of 2++ salmon parr recorded at (right) site LaelM1 on 5th October 2012.



In 2010, both salmon fry and 1+ salmon parr were recorded at this site. The habitat section between the powerhouse and the estuary is only 1km in length, and it is considered to be unlikely, though not impossible, that fry or 1+ parr are present elsewhere in the system. Therefore our findings suggest that salmon have not spawned within the River Lael since 2009. The majority of salmon parr recorded in 2012 were precocious male parr. The majority of female fish in the 2009 fry year class may have migrated to sea as smolts earlier in 2012 as S2 smolts. See also Tournaig trap report . . . .

Further investigations may be required to interpret whether or not the lack of salmon fry or 1+ parr at this site in 2012 is in any way related to the HP scheme.

Inverianvie (5th October)

Sites were fished just above the roadbridge and 350m further upstream. Of salmon, no fry or 1+ parr were found, just one 2+ parr suggesting no salmon spawning since 2009. Of trout, fry and larger trout were caught at very low CPUE, including a mature male finnock of 243mm *(right: shown together with a mature male brown trout).* A larger sea trout was seen. Eels were also recorded at medium CPUE the lower site.

[1] Fleming, I.A. & Einum, S. 2011. Reproductive ecology: a tale of two sexes. In: Atlantic Salmon Ecology, pp. 33-65 (eds. Ø. Aas, S. Einum, A. Klemetsen & J. Skurdal). Wiley-Blackwell

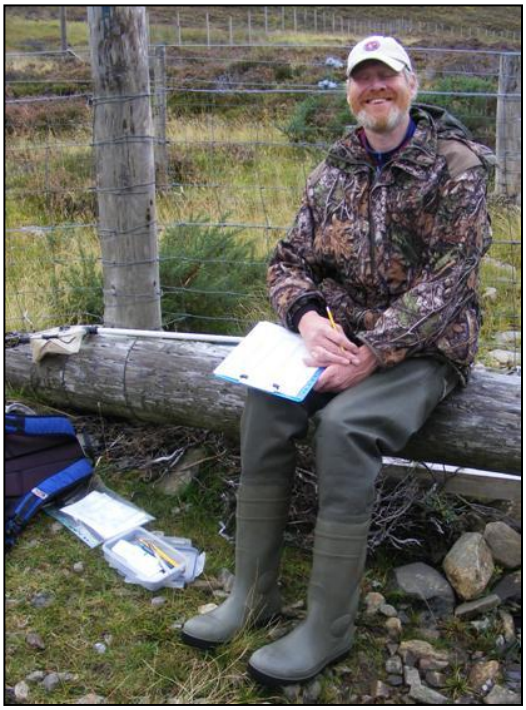
Laide (Sand) Burn (26th July 2012 & 15th April 2013). At the 'Laide Aquatic Beasties' family day we found small trout, and eels of up to 340mm in the woods. One question that remained unanswered was whether sea trout are able to pass through the road culvert beneath the A832 by the campsite. To investigate further, a search for sea trout smolts in the lower part of the river was undertaken in April 2013. No smolts were found; however a sea trout that had returned from the sea as a finnock in 2012 was found above the culvert demonstrating that some sea trout are able to pass through the culvert. Improvements to this culvert to ease passage for sea trout and salmon are still considered to be required.

Allt Beithe (26th Sept.). Salmon fry were found at high CPUE at the site below the old fish ladder, together with parr at low CPUE. Above the fish ladder trout fry and parr were found but no salmon fry; 3 large salmon parr were found at the top site below the 'Goose Loch' outflow. Further repairs are required to the fish ladder *(right)* to make it easier for salmon and sea trout to ascend.

Tournaig (11th Aug). For the second year in succession, salmon fry were found at only the lowest 2 sites below the first falls above Loch nan Dailthean in the Allt na Coille. The absence of salmon fry above the falls may be a reflection of inadequate flows to allow grilse to ascend the falls prior to the spawning season. See Part 3 for a more detailed Tournaig project report.

River Ewe system

In 2012, sites were fished in headwater streams above Loch Maree. Salmon fry were present at three of five sites in the Docherty burn and in both the burns which flow from Beinn Eighe above Loch Bharranch. Further downstream CPUE values for salmon fry at sites in the A' Ghairbhe and Kinlochewe River and lowest site in Docherty burn were moderate or high, indicative of generally healthy populations in core habitat areas. Salmon fry were also found in one of two burns flowing into the south shore of Loch Maree. On 14th June, salmon fry were not found in the Bruachaig River above the complex falls; salmon parr (of stocked origin) were found at moderate to high CPUE.



For salmon parr in 2012, the relatively low CPUE values at some higher sites may be an indication of poor recruitment of salmon fry in 2011, combined with the period of exceptional drought in June 2012 prior to electro-fishing surveys; some of the smaller nursery streams almost dried out.

A comfortable seat for Roger by an electro-fishing site in the Docherty Burn!

Sguod (14th August). CPUE values for trout fry in the burns flowing into Loch Sguod were higher than for other sites in river systems elsewhere surveyed in 2013. This may be partly a consequence of stocking with fry from sea trout parents. Salmon fry of wild origin were found at the lowest site in the northern burn but not in other burns. In the nearby **Inverasdale Burn** above the road bridge large trout fry were recorded, together with several eels including one of 70cm+ which grabbed a stunned trout, and two small flounders (largest 46mm).

Melvaig Burn (26th May) One-year old trout were found at moderate CPUE, together with several larger trout of up to 170mm. The juvenile trout may include progeny of sea trout. Eels were also recorded.

Sand River (30th June) Salmon fry, salmon parr, trout fry, older trout and eels were recorded at the site below the campsite on the day of the Gairloch Gathering.

Badachro (27th July) The river was at a very low level and fish were crowded together. Salmon fry were found at over 4 fish per minute at the site above the loch and also at high CPUE at sites in the braided section below the falls and in the Allt a 'Ghuibhais. However, salmon parr were recorded at moderate to low CPUE. At a site in the burn below Loch Clair where a salmon parr was recorded in 2010, water had stopped flowing and dead trout fry were seen in stagnant pools *(below).* We cut a channel through a sand bar at the outflow of this loch to restore a flow and perhaps sustain juvenile fish in some of the pools further downstream.

No water! (27th July 2012). The burn below the outflow of Loch Clair (Badachro system) had stopped flowing, and dead trout were seen in pools. To restore a flow, we cut a temporary channel through the sand bar at the outflow of the loch.



Torridon (25th Sept.). Salmon fry were found at sites in the Thrail and in the middle of the Torridon River at moderate or high CPUE. Elsewhere, salmon fry were scarce; salmon parr were more evenly distributed typically at low CPUE. Juvenile trout outnumbered juvenile salmon at sites in tributary burns, and trout fry were recorded at moderate CPUE at sites in the Allt Garaidh Dhu and low CPUE in the main river at the mouth of the Allt Luib Molaich.

Trout fry outnumbered salmon fry in the mainstem Torridon river by the mouth of the Allt Luib Molaich (left) where the finnock (inset) was taken; and in the Allt Gharaidh Dhuibh (right) by the road.



Box 2.1 Habitat notes: streambed stability and juvenile salmon production

One factor of importance for the production of juvenile salmon within the Wester Ross area is the stability of streambed habitat. During the summer of 2012, a GoPro Hero2 camera was used to record underwater video of areas where juvenile salmon were sampled within the A' Ghairbhe, River Ewe system, above Kinlochewe. This stream is considered to be one of the principle juvenile salmon producing streams within the Ewe catchment. However, as illustrated by the following pictures and site notes, streambed habitat varied from site to site. Pictures for examples 1 -3 were taken on 23rd August 2012.

Example 1. Site EWET73, Abhainn Ghairbhe (Ewe river system) ~400m downstream from the Cruive Pool at NGR 200621 858225. Streambed habitat is nearly as good as it gets in Wester Ross.

(left) The site, with David Mullaney looking upstream on 23rd August 2012. The river is very stable here. Nearby is the principle spawning area for salmon in the A' Ghairbhe. Salmon fry were found here at high CPUE.

Note the growth of periphyton and macrophytes on the streambed here; there is both good cover for juvenile salmon and food for macro-invertebrates. The stability of the stream and proximity to Loch Clair and Cruive Pool where mobile sediment is able to settle out, contribute to the high quality of this part of the river for production of juvenile salmon.

Salmon fry were recorded here at over 4 fish per minute, and salmon parr at 1.75 fish per minute; reflecting high carrying capacity and production capacity for this part of the river. Spawning gravels nearby are kept in good condition partly by the actions of female salmon as they excavate redds during the autumn.

Example 2. Site EWET150, Abhainn Ghairbhe, by side of the cobbly run near Cromasaig at NGR 202613 860805. The river is less stable here than at site EWET73.

(left) Looking upstream over the cobbly-bouldery river bed. The river bed is still fairly stable here, though the substrate is of a larger size, and more suitable for salmon parr than fry. Compare with example 1.

The streambed is less stable here, and the stones are subject to movement during spates. Stones also tend to be polished, indicative of abrasion by finer material. Salmon fry were recorded here at 1.18 per minute; salmon parr at 0.59 fish per minute; minnows were also recorded here for the first time.

Example 3. Site EWET118, Allt a' Chuirn above the road bridge at NGR 202437 860923. This tributary stream flows into the A' Ghairbhe 200m below site EWET150. The streambed is very mobile and; fewer fish were recorded.

(left) this burn drains the slopes of Beinn Eighe. Approximately 400m upstream from this site, the stream undercuts a bank and there has been much recent bank collapse and transportation of mixed sediment into and down the stream through this section and into the A' Ghairbhe (just below the bridge).

The stream bed is unstable here and stones were 'polished'. The stream is peat-stained like weak tea (check out the colour of water on the electronic version of this report). Densities of salmon were lower here than in the A' Ghairbhe nearby. Trout were present. In terms of food for small fish, terrestrial insects from riparian trees may partly compensate for lower instream productivity.

Example 4. Rhidorroch River (Ullapool river) below East Rhidorroch. This is one of the most unstable salmon spawning streams within the WRFT area. Much of the sediment that is deposited here has been transported downstream from high up in Glen Douchary. To stabilise important nursery habitat for salmon and to better protect farmland, attention needs to be directed towards solving problems of erosion and bank collapse in Glen Douchary. This may require reducing grazing pressure from red deer along parts of the riparian corridor.

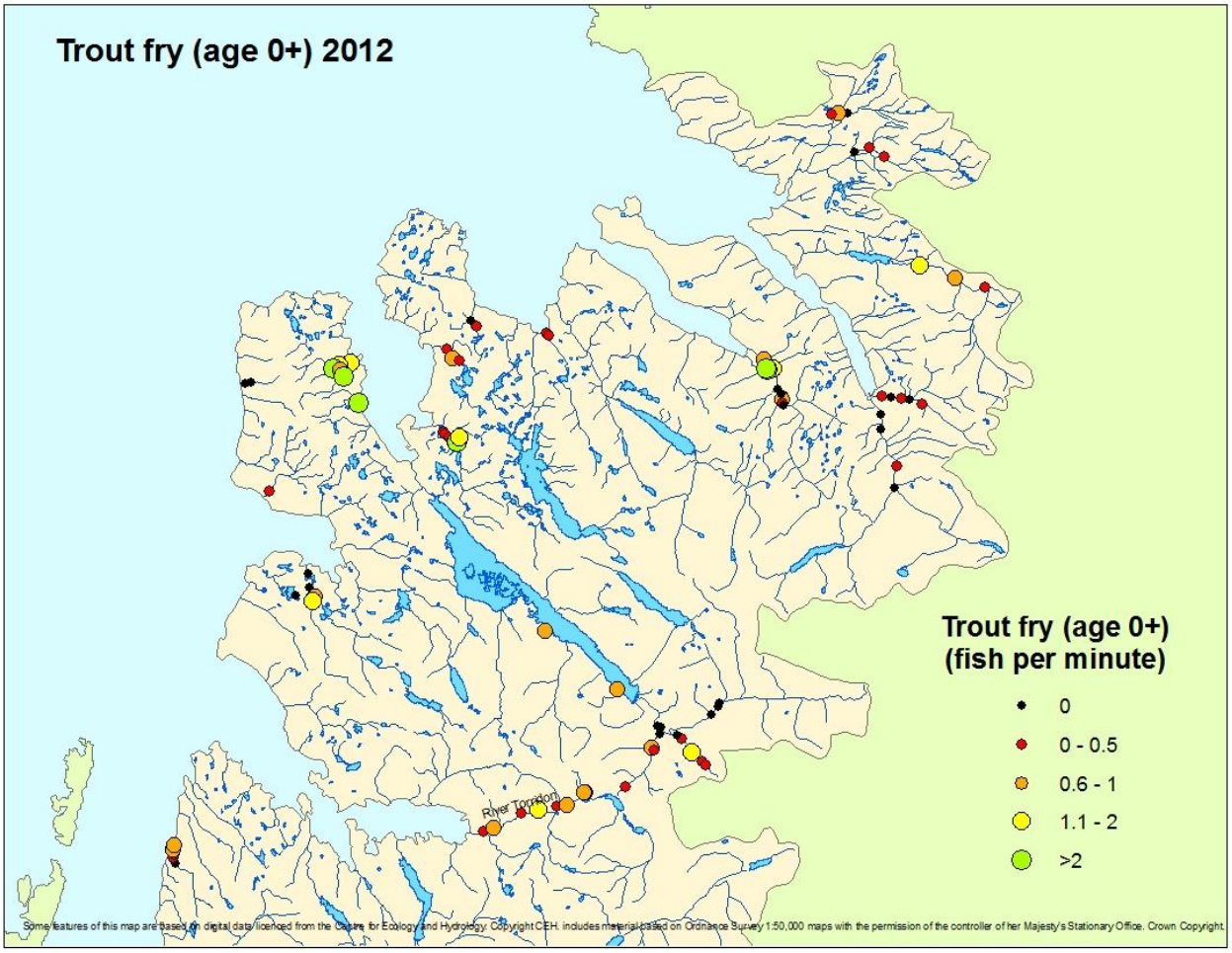
20th August 2002. *The main channel is in the right of the picture.*

24th August 2007. *The main channel is now on the left side of the picture. Not that the alder tree and some of the grassland in the right of the above (2002) picture has been washed away, and also quite a large area of gorse bushes and grass on the left of the 2002 picture.*

3rd August 2012. *The main channel has pushed further to the left of the picture and indeed (shown below), is undercutting the embankment below the road. The roots of the alder tree have held the bank together a little better than where there are no roots. However, the tree is dead, roots are rotting and the bank is collapsing into the river, exacerbating problems.*

Contrary to normal guidance, as a short-term measure one option could be the extraction of gravels from the floodplain here to provide a place for sediment to settle and to reduce rates of bed-load sediment transportation to infill the river channel further downstream from here on a regular basis. The gravel could be used for nearby road maintenance. Please contact WRFT biologist to discuss further . . .

Figure 2.5 Distribution of trout fry at sites surveyed in the WRFT area in 2012.



Summary and conclusions of juvenile fish survey in Wester Ross

In 2012, the WRFT electro-fishing survey focused on the rivers in the northern part of the WRFT area. The results are regarded as being partly a reflection of weather conditions during the preceding year. In core sections of the main rivers, CPUE levels for salmon fry and parr were considered to reflect juvenile salmon populations at levels close to the production capacity of respective areas, giving no cause for concern.

However, the scarcity or absence of salmon fry and/or parr in upstream sections or headwaters of the Ullapool River, Allt Beith, Tournaig, Sguod and Docherty Burn was considered due to either a lack of water to enable adult salmon to spawn in some areas, to exceptional drought earlier in 2012 (e.g. Loch Clair burn, Badachro system), or in the case of the Rhidorroch River to redd washout.

Where salmon fail to spawn in headwater streams in some years, supplementary stocking using progeny of fish taken in respective river systems may help to maintain optimum smolt output (e.g. Bruachaig). Where redd washout may be a problem (e.g. headwaters of Ullapool and Gruinard River systems), attention needs to be focused on long-term protection and restoration of strongly rooted riparian vegetation to minimise the rates at which sediment enters respective streams.

Juvenile fish surveys remain a key objective of the Wester Ross Fisheries Trust as a means of recording and understanding changes in fish populations, identifying problems, and finding opportunities for timely action to improve fish production. As elsewhere in the world, the productivity of salmon fisheries in Wester Ross is dependent upon the health and productivity of the nursery streams where wild salmon smolts are produced.

2.2 Skye electro-fishing in 2012

by Dr Jonah Tosney

2012 was a very interesting year on Skye, as Skye Fisheries Trust contracted WRFT to survey a number of rivers which had never been electro-fished before. Previous work on the island had focused on twelve of the islands larger rivers with relatively well known trout and salmon populations. The rivers selected in 2012 were slightly smaller and rarely fished. Some, such as the Eynort and Kilmarie were known to have had sea trout or salmon runs in the past, but none had been surveyed.

Fourteen rivers were surveyed in 2012, adding to the twelve surveyed in 2005 and 2011, allowing Skye Fisheries Trust to add to the island's "salmon map". Of these fourteen rivers, six had salmon populations and all had trout populations, and all but one contained eels. Of the salmon rivers, two (The Brogaig and Rha) contained parr but no fry, mirroring a pattern seen on two of the smaller rivers in 2011, suggesting that populations in some of the smaller rivers may be ephemeral, with salmon only spawning in years when conditions are good.

It was noticeable that the body shapes of the salmon from the slower limestone burns in the north of the island where different to those in the spatier rivers running off the Cuilin in the south. Water running through limestone is rich in minerals, allowing good invertebrate growth (and growth of species such as freshwater shrimps, a salmonid favourite). The fish appeared to be correspondingly plumper with faster growth than their southern cousins.

An unusually "Plump" Brogaig salmon parr

With the exception of the Talisker where salmon numbers were remarkably high for a small river, trout outnumbered salmon in the 2012 surveys, as would be expected in the smaller rivers. It is not possible to say how this translates into sea trout productivity, however a couple of finnock were caught in the Choishleader during electro-fishing. Perhaps worryingly, locals reported that both the Bay and Horneval had once held salmon but had not for many years. The Bay certainly appears to have plenty of suitable salmon habitat, as does the lower Eynort, but none were found in either river. Both of these rivers have relatively new forestry plantations, and one crofter reported water levels dropping since the trees were planted.

Choishleader sea trout

Perhaps the most exciting results were from the Strathmore and Talisker rivers, each of which contained high densities of salmon for their size and a full range of age classes. The Talisker in particular is a rather small river, so to see a strong salmon population was encouraging.

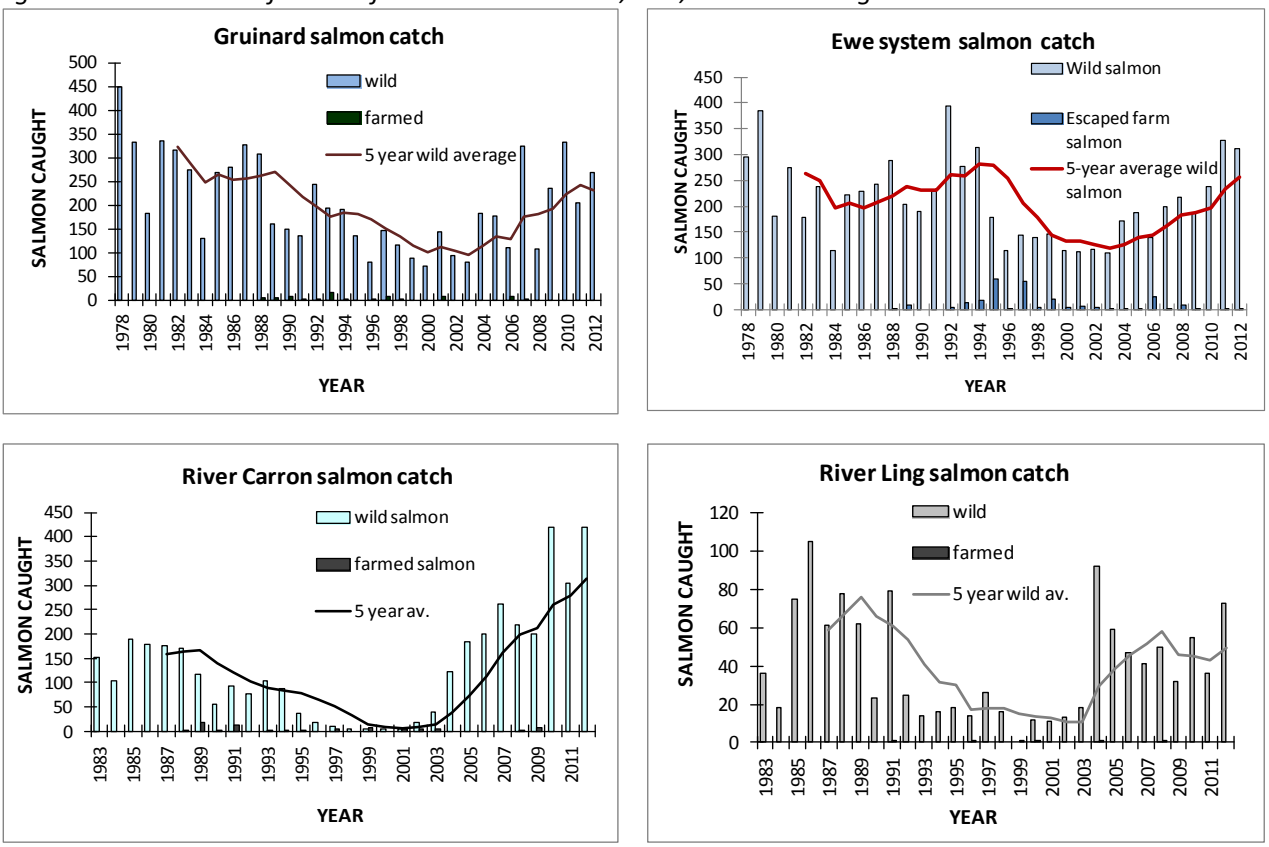
The eager biologist also took the opportunity to sample likely habitat for further lamprey populations, although none were found. In 2005 brook lamprey were found in the Broadford River and in 2011 more were found in the Sligachan. All lamprey species require both clean gravels and stable silt beds, and although promising mud was found in a couple of the 2012 rivers no further lamprey were found. Given that scientists now suspect that brook lamprey and river lamprey may be the same species (comparable to sea trout / brown trout) it may yet be that river lamprey will eventually be found on Skye. As 'monster' sea lampreys are occasionally found in the nearby Carron these too may one day be discovered on the island.

2.3 Rod catches

Salmon

Given the length of the drought through June and much of July 2012, the end of season totals for rod catches of salmon were quite impressive. Graphs for the rod catches for the rivers Gruinard, Ewe, Carron and Ling are shown in Figure 2.5.

Figure 2.5 Rod catches of salmon for the rivers Gruinard, Ewe, Carron and Ling.



The River Carron recorded its best ever season with 420 rod caught salmon and grilse reported to Marine Science Scotland. Many other rivers also had a good season with good catches of grilse towards the end of the season. One of the largest salmon was caught and released by Greg Purdie from the Dundonnell River on 12th September; the fish was about 40 inches long, with estimated weight of 20lb.

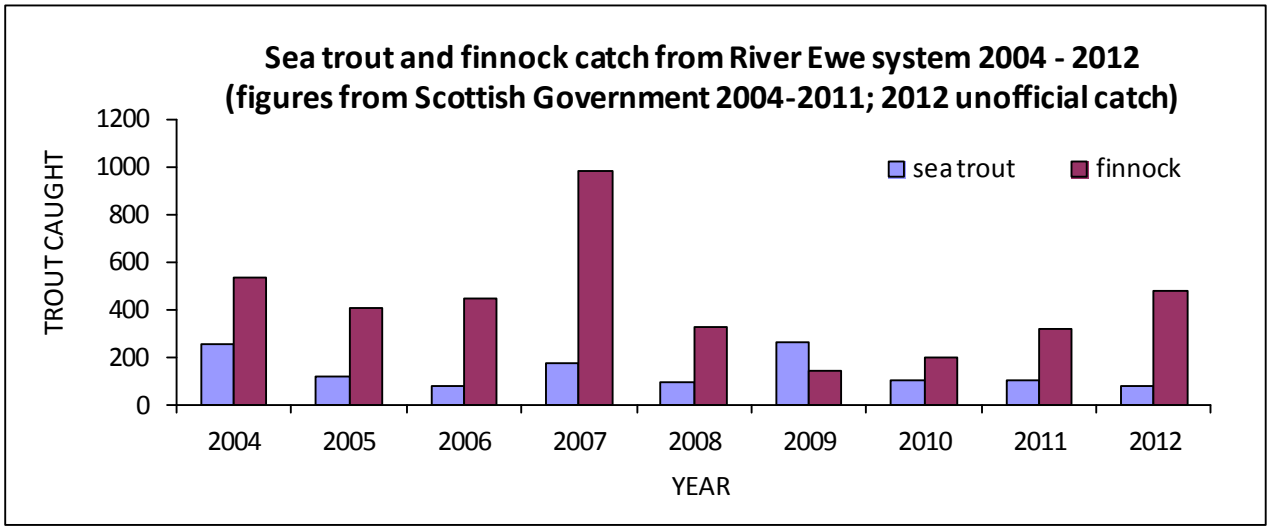
(*left) Greg Purdie with a salmon from the Dundonnell River of length 40 inches, 12th September 2012*

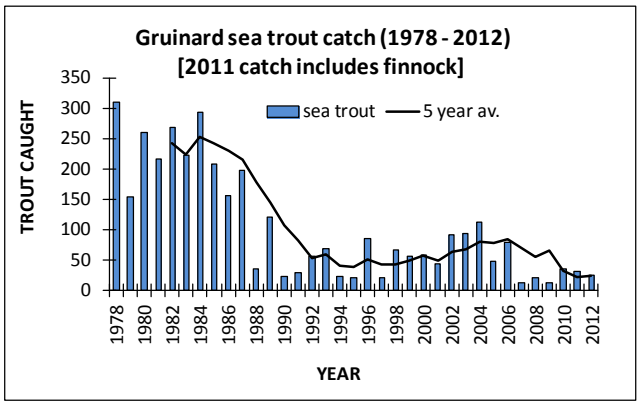
(above), Sea trout of 1lb+ taken by Donald McLeod at the mouth of the River Broom on 28th July 2012.

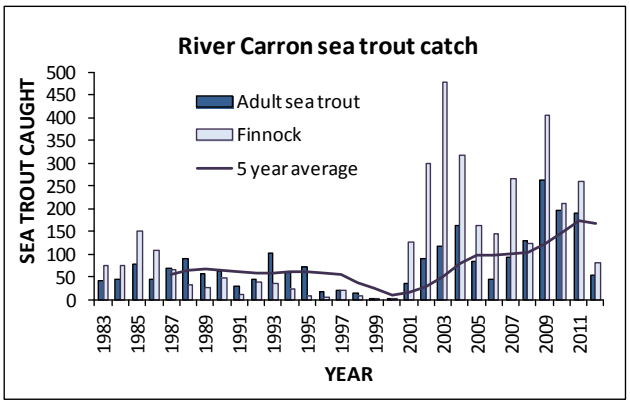
Sea trout

Recorded rod catches of sea trout for the 2012 season were amongst the lowest on record for rivers in Wester Ross. Rod catches of sea trout for the rivers Gruinard, Ewe system and Carron are shown in Figure 2.6.

Figure 2.6 Rod catches of sea trout for the rivers Gruinard, Ewe system and Carron.







For the Ewe system, fishing effort from the Loch Maree Hotel was minimal as the hotel remained closed for the season as renovation work was underway (the hotel *has since re-opened).* The largest sea trout reported from Loch Maree during the 2012 season weighed 3.5lb.

(right) Terry Jack dapping on Loch Maree, with ghillie Ala MacKenzie, 20th Sept. 2012.

2.3 Net catches

The only netting station that operated within the WRFT area in 2012 was in Loch Long and recorded a catch of 25 wild salmon and grilse and 16 farmed salmon and grilse. Fish were taken in May and July. See: http://www.scotland.gov.uk/Topics/marine/science/Publications/stats/SalmonSeaTroutCatches/2012.

Part 3 **Tournaig Trap Project**

Supported in 2011-2012 by Marine Harvest Ltd.

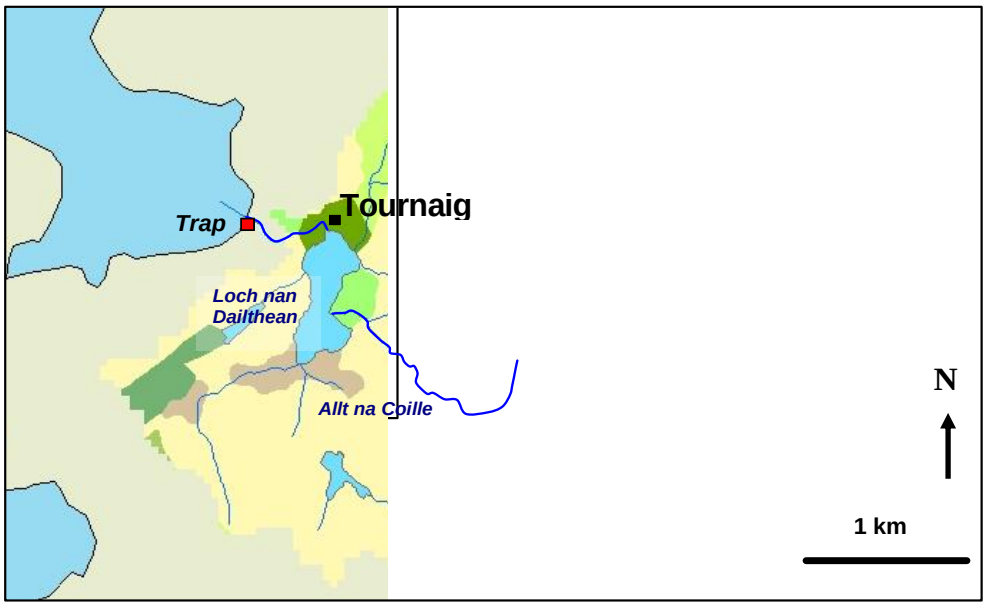
3.1 Introduction

The Tournaig River flows into Loch Ewe, 3km to the north-east of Poolewe (Figure 3.1). With a catchment area of only 9.6 km^2, the Tournaig River is one of the smallest river systems in the Wester Ross area known to have supported wild salmon. Adult salmon and sea trout are able to enter from the sea via a fish ladder reputedly built by Osgood Mackenzie in 1875. In March 1999, an upstream-downstream fish trap was established in the fish ladder. The primary long-term aim of the project is to monitor the status of the wild salmon and trout populations, particularly in relation to marine survival, by recording the numbers of smolts leaving each year and the numbers of returning adult fish. The system has not been stocked in recent years.

The traps have been checked and maintained on a daily basis. From 2001, Ben Rushbrooke (Garden Cottage Nursery) has operated the traps. Traps were checked between 7am and 9am each day, seven days per week during the trapping season which usually extended from late March (to record smolts migrating to sea) to the end of October (to record adult salmon and sea trout entering from the sea). In addition to the operation of the fish traps, an annual electro-fishing survey was carried out to record the occurrence of juvenile salmon in the principle spawning stream, the Allt na Coille.

The project is of relevance to the much larger River Ewe system's fisheries because of its proximity. Salmon and sea trout smolts emigrating from the Tournaig system face similar challenges affecting marine performance to those from the River Ewe. With regard to freshwater production of juvenile fish, the little Tournaig system can also be compared to some of the smaller tributary stream systems within the River Ewe system. Floods and droughts which affect juvenile salmon production at Tournaig are also likely to affect juvenile salmon production in the River Ewe system's spawning streams and other nearby rivers.

Figure 3.1 Tournaig river catchment area, showing the location of the traps and the salmon nursery stream (the stream sections accessible to adult salmon during spate flows are shown in darker blue).

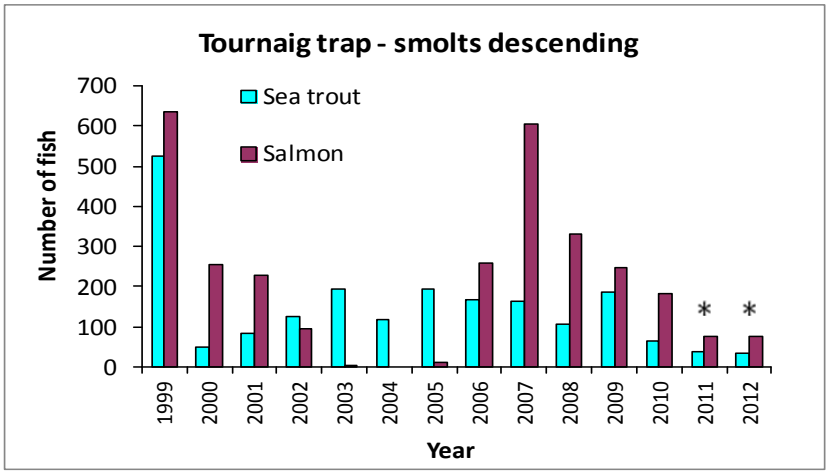


3.2 Results and interpretation

3.2.1 Trap catches

Figure 3.2 shows the numbers of smolts recorded descending towards the sea at Tournaig for the years 1999 to 2012.

Figure 3.2. The numbers of smolts recorded descending towards the sea at Tournaig for the years 1999 to 2012.

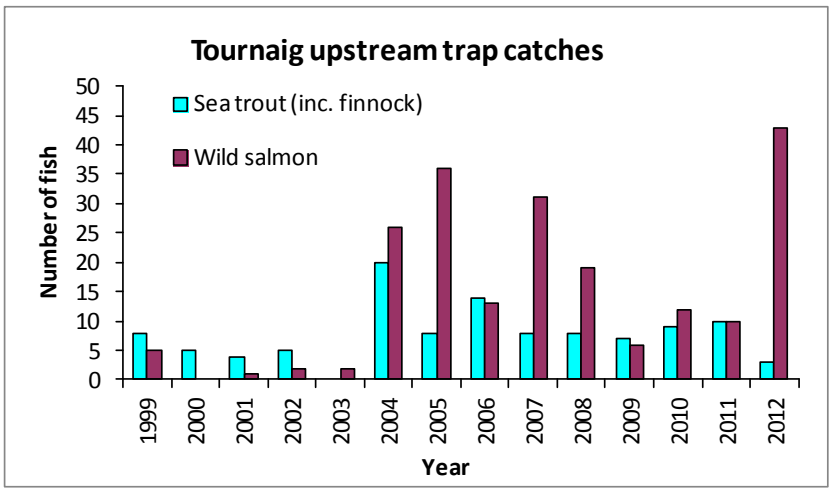


Note*: In 2011 and 2012 water levels were higher than the top of the screen to divert smolts into the fish ladder; in these years some smolts may have been swept to sea over the waterfall. So the number of smolts recorded in these years is considered to represent only part of the smolt run.

In 2003 and 2004 no salmon smolts survived to reach the sea. In 2003 an attempt was made to retain the smolt run of 4 fish as a captive broodstock; all died.

Figure 3.3 shows the numbers of adult salmon and sea trout recorded entering the Tournaig system for the years 1999 to 2012.

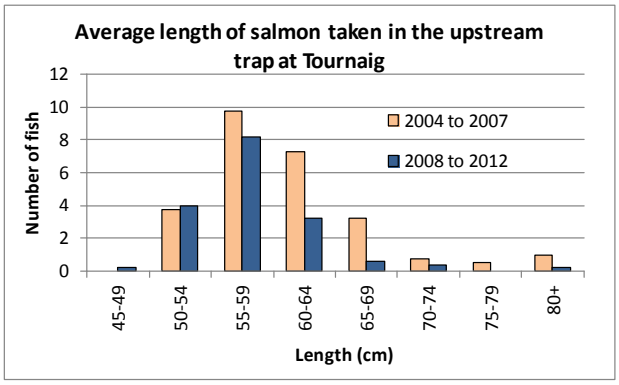
Figure 3.3. The numbers of adult salmon and sea trout recorded in the upstream trap (to catch fish entering from the sea) at Tournaig, 1999-2012.

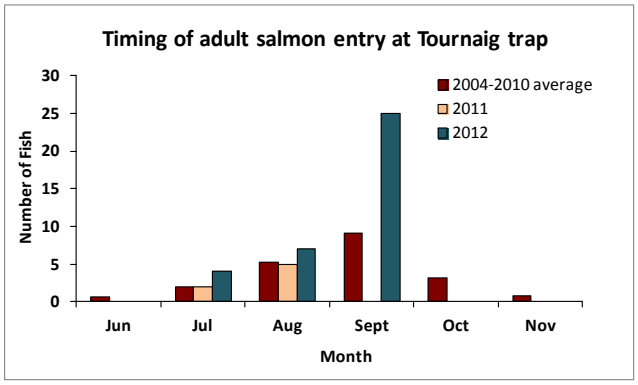


In 2004, 26 stray wild salmon (all grilse) entered the system via the upstream trap. We know these were stray fish, as there had been no smolt run in 2003. In the following years numbers of adult salmon recorded entering the system were: 36 in 2005 (all strays); 13 in 2006 (all strays); and 32 in 2007 (may have included returning Tournaig fish; DNA analyses to follow). Adult salmon entered the system in each of the years 2008-2011 in lower numbers than in 2007 and spawned. In 2012, following a long period of drought from June until late July, a record 41 salmon were recorded entering the system. All except one of these fish were thought to be wild grilse; the largest fish of 83cm was a wild two sea-winter salmon.

Figure 3.4 shows the lengths of salmon taken in the Tournaig trap; and Figure 3.5 shows the timing of entry of salmon taken in the upstream trap at Tournaig in 2011 and 2012 in comparison to the monthly average for 2004 to 2010.

Figure 3.4 (left) The lengths of salmon taken in the Tournaig trap; Figure 3.5 (right) The timing of entry of salmon taken in the upstream trap at Tournaig in 2011 and 2012 in comparison to the monthly average for 2004 to 2010.



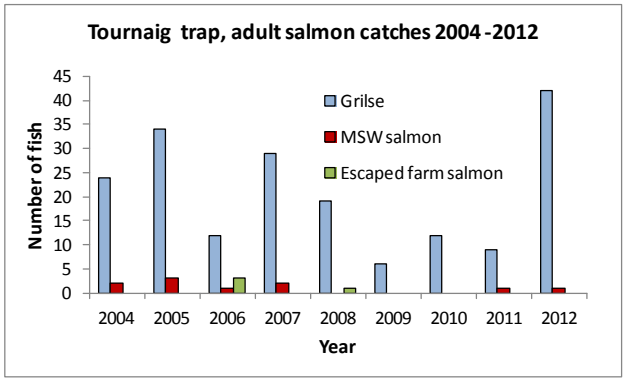


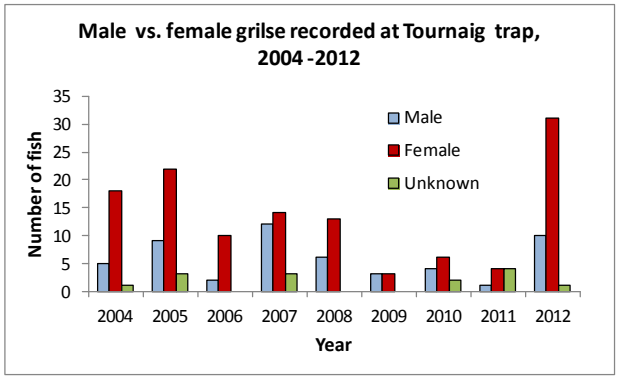
Most of the salmon taken at Tournaig were grilse of between 54cm to 65cm in length (Figure 3.6). Most of these fish entered the river in September; though in most years a few salmon entered in July and August, and some in October. Note that in 2011 and 2012 the trap was decommissioned in mid October; so any fish entering the system in November would not have been recorded.

Multi sea-winter salmon, Tournaig, 81cm, 20th September 2012

In addition to wild salmon, escaped farm salmon were recorded at Tournaig in two years since 2004. Three escaped farm salmon were recorded in 2006 and one in 2008 (Figure 3.6). Nearly all the wild salmon were female fish (Figure 3.7), reasons for which may include the tendency of some male salmon parr to mature and remain for one or more years longer than female parr, especially when juvenile salmon densities are low. This is considered further in a report posted on the WRFT website.

Figure 3.6 (left) Catches of wild grilse, wild multi sea-winter salmon, and escaped farm salmon taken in the Tournaig trap 2004 -2012. Figure 3.7 (right) The numbers of male vs. female salmon taken in the upstream trap at Tournaig, 2004 to 2012.





Two grilse from the Tournaig trap on 3rd August 2012. (Top) female fish of 52cm; bottom male fish of 58.5cm. Note: the difference in condition: the lower fish is considerably fatter than the top fish. Photos by Ben Rushbrooke.

3.3 Juvenile salmon production at Tournaig

The main areas of spawning and nursery habitat within the Tournaig system are in the Allt na Coille above Loch nan Dailthean. The Allt na Coille, like some of the smaller streams in the River Ewe catchment (e.g. Docherty Burn, Slattadale burn, Allt Doire Bheithe) represents marginal habitat for wild salmon. Adult salmon are only able to access the main areas of spawning habitat in the Allt na Coille above two complex waterfalls during high spate flows. Some years, flows may be inadequate to enable salmon to access the upper spawning areas. Additionally, very low flows in the early summer can cause a substantial reduction in the wetted area available to juvenile salmon, causing crowding.

Table 3.1 shows the numbers of adult salmon and juvenile salmon recorded in traps together with average catch per unit effort for salmon fry and parr in the principle spawning burn within the Tournaig system, the Allt na Coille, for the years 2003-2012. These figures are set alongside figures for monthly rainfall at the nearby Inverewe Gardens for key periods in the year. Colour coding has been used to highlight the progress of the dominant year class for each year.

Table 3.1 Numbers of adult salmon and juvenile salmon recorded in traps; fry and parr average catch per unit effort for juvenile salmon for 6 electro-fishing sites in the principle spawning burn within the Tournaig system, 2003-2012. Figures for monthly rainfall at nearby NTS Inverewe Gardens are included for key periods in the year. Colour coding has been used to highlight the progress of the dominant year class for respective years. Rainfall data belongs to the National Trust for Scotland.

Year	Adult salmon recorded in upstream trap	Number of sites where salmon fry recorded	Salmon fry average number per minute	Number of sites where salmon parr recorded	Salmon parr average number per minute	Salmon smolts recorded in down-stream trap	Inverewe rainfall - April (mm)	Inverewe rainfall - May (mm)	Inverewe rainfall - lowest summer month (mm)	Inverewe rainfall - December (mm)	Inverewe rainfall - November (mm)
2003	2	0	0.00	0	0.00	0	37	116	75	169	199
2004	26	4	1.81	0	0.00	0	136	88	111	207	315
2005	36	6	1.09	6	0.55	11	197	117	50	273	101
2006	13	5	1.99	6	0.87	257	133	107	62	182	260
2007	31	6	1.07	6	1.17	607	72	165	44	232	143
2008	19	4	0.67	6	0.74	332	85	21	78	245	108
2009	6	5	1.05	5	0.41	246	74	123	74	204	87
2010	12	5	0.88	6	0.55	183	83	64	25	110	106
2011	10	2	0.06	5	0.24	77*	122	229	84	180	287
2012	43	2	0.14	4	0.08	78*	71	66	49		
	*some smolts missed when water level higher than screen										

The occurrence of juvenile salmon within the system, and production of salmon smolts from the Tournaig system has varied between years. In August 2004, salmon fry were recorded in the Tournaig system for the first time since 2000, demonstrating spawning the previous autumn. Subsequently salmon fry (young of the year) were found throughout the system in 2005, 2006 & 2007. By summer 2006, the juvenile salmon population was considered to be close to carrying capacity for the river system, and in 2007 the average salmon parr CPUE peaked at 1.17 fish per minute for the six sites in the principle spawning burn. However, thereafter juvenile salmon populations declined; in 2011 and 2012, salmon fry were not recorded at four of the six electro-fishing sites in the spawning burn. What will we find in 2013?

3.4 Discussion and conclusions

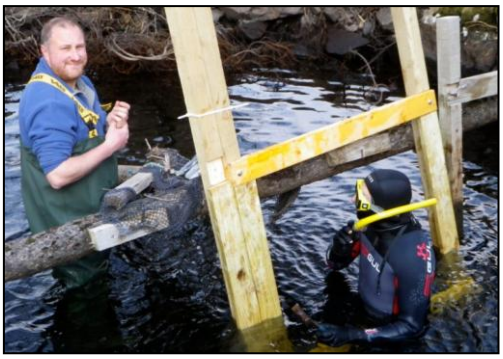
The success of salmon in the Tournaig system has been highly variable. Salmon failed to breed within the river system in 2000, 2001 and 2002. Salmon smolt runs fell from an estimated 634 in 1999, to 96 in 2002; then in 2003, only 5 salmon smolts migrated downstream: all were retained in a belated attempt to establish a captive broodstock of 'native' Tournaig salmon; all died. No salmon smolts were recorded in 2004, the second successive year without an emigrant salmon smolt run from the system.

The need to intervene by stocking to restore a salmon population was discussed. A stocking programme was considered then rejected. Instead, it was decided to see what would happen without intervention. In 2003, only two wild adult salmon were recorded entering the system. However, in March 2004 two kelts were recorded on their way downstream indicating that other salmon had ascended the waterfalls and bypassed the fish trap in autumn 2003, presumably during a period of exceptionally high discharge. Subsequently, the electro-fishing survey in 2004 demonstrated that salmon had spawned successfully in the Tournaig system in autumn 2003 for the first time since 1999. The Tournaig River system had been recolonised by wild salmon.

The location of the Tournaig river mouth in proximity to the mouth of the River Ewe may have been a factor contributing to high numbers of straying fish: Tournaig may have always included a proportion of stray fish from the River Ewe system or other rivers. Almost all the adult salmon that have entered the upstream trap at Tournaig have been photographed by Ben Rushbrooke since 2004. Approximately 10% of these fish had marks interpreted as predator damage by seals; and seals were frequently seen around the mouth of the river and may have 'chased' some of the fish into the system.

At Tournaig, the number of salmon smolts which leave the system does not simply relate to the number of adult fish that entered the upstream trap in earlier years. Variable weather conditions and water levels also affected smolt output. Juvenile salmon production at Tournaig is particularly vulnerable to drought conditions.

From the point of view of fisheries management many questions remain unanswered. Are the progeny of the stray wild salmon that have recolonised the system any more likely to have the 'right stuff' in terms of suitable genes than progeny of similar fish that could have been stocked into the system in 2004 (for example progeny of River Ewe salmon)? Will they contribute to the formation of a new 'Tournaig' salmon population, or are little systems like Tournaig always dependent upon salmon randomly straying (or being chased . . .) into them from other rivers if they are to support a juvenile salmon population (part of a meta-population)? Some of these questions may be answered in future years as genetic samples have been taken from nearly all adult salmon that have entered the system and approximately one in 5 salmon smolts that have left the system.



Higher levels of smolt production in the years 2000 – 2006 could have been achieved through supplementary stocking of salmon fry at Tournaig. A fishery manager might still argue that 6 years of smolt production at Tournaig was lost for little long-term gain . . .

Ben Rushbrooke and Peter Cunningham fitting screens at Tournaig in preparation for the smolt run in April 2013 (photo by Pete Minting).

Part 4 **Sea trout monitoring**

4.1 Introduction

Supported by the Scottish Government via the RAFTS Aquaculture Project

This section presents a brief summary of the results of sea trout sampling in 2012 by WRFT. It also considers differences in the size structure of sea trout populations within the WRFT area, past and present. The comprehensive WRFT Sea Trout Monitoring Report for 2012 from which much of this section has been taken, and includes consideration of larger sea trout in Wester Ross, can be found on the WRFT website at: http://www.wrft.org.uk/files/wrft%20sea%20trout%20monitoing%20report%20April%202013%20v5.pdf

The samples of sea trout were caught using a sweep net in the River Kanaird estuary, Gruinard Bay, Loch Ewe, Loch Gairloch and the River Carron estuary; using a fyke net in the Dundonnell River estuary, and with rod and line in the sea pool of the River Ewe. To learn about rates of survival/mortality of sea trout in different parts of the area, subsamples of larger sea trout (fish of 310mm and larger) were treated separately. This size category was chosen in order to minimise sampling bias on the assumption that fish in this size class would be more evenly represented in sweep net catches relative to their actual abundance within respective sea trout populations than in samples including smaller fish; and also to allow comparison with samples taken in 1980 (Walker, 1980) and the 1920s (Nall, 1926 & 1938), and those from samples taken elsewhere.

4.2 Results from Wester Ross in 2012

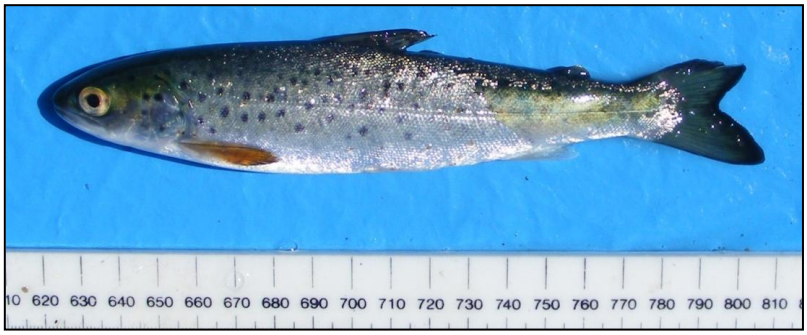
In 2012, WRFT collected data from 383 trout. Table 4.1 presents a summary of results. Samples taken at all sites in May and June were dominated by post-smolt sea trout of less than 250mm. The RAFTS post-smolt report . presents the results of post-smolt monitoring in the West of Scotland in 2012.

Table 4.1 Summary information for sea trout sampled in coastal or estuarine waters around Wester Ross in 2012, in geographic (north to south) order.

Date [2012]	Location	Method	Sample size (no. of fish)	Number of infected fish	Abundance (= average number of lice per fish)	Average number of copepodid & chalimus	Average number of preadults & adults	Prevalence (% of sample infected with sea lice)	Intensity (= average no. of lice per infected fish)	Note
5-Jun	Kanaird	sweep	54	50	70.59	69.06	1.53	92.59	76.24	164 other trout caught
17-Jul	Kanaird	sweep	49	39	11.47	9.27	2.20	79.59	14.41	
Jun - Jul	Dundonnell	fyke	76	71	41.92	37.20	4.75	93.42	44.87	lice total nos only for some fish
Aug	Dundonnell	fyke	22	16	5.77	4.30	1.46	72.73	7.93	
23-May	Mungasdale	sweep	1	1	27.00	10.00	17.00	100.00	27.00	
4-Jul	Boor	sweep	5	5	16.00	12.00	4.00	100.00	16.00	
5-Jul	Boor	sweep	4	4	9.25	8.00	1.25	100.00	9.25	
19-Jun	Inverasdale	sweep	2	2	11.50	4.00	7.50	100.00	11.50	
11-Jul	Ewe	r&l	15	14	25.00	11.50	13.50	93.33	26.79	Caligus av. 4.8/fish
20-Jul	Ewe	r&l	15	12	7.30	3.60	3.70	80.00	9.13	Caligus av. 0.5/fish
11-Apr	Flowerdale	sweep	45	38	6.56	5.49	1.07	84.44	7.77	
22-May	Flowerdale	sweep	40	7	1.35	0.35	1.00	17.50	7.71	
22-Jun	Flowerdale	sweep	2	2	12.00	8.50	3.50	100.00	12.00	
20-Jul	Flowerdale	sweep	10	10	41.90	26.20	15.70	100.00	41.90	
21-Aug	Flowerdale	sweep	1	1	4.00	0.00	4.00	100.00	4.00	
17-Sep	Flowerdale	sweep	8	7	4.38	0.00	4.38	87.50	5.00	
15-Oct	Flowerdale	sweep	14	4	0.57	0.00	0.57	28.57	2.00	
9-May	Carron	sweep	5	4	78.00	43.60	34.40	80.00	97.50	
5-Jun	Carron	sweep	2	2	149.50	107.00	42.50	100.00	149.50	minimum estimate of lice

Within the WRFT area, sea trout sampled in the River Carron estuary in May and June 2012 carried the highest number of lice with an average of over 100 lice / fish for the six infected fish sampled. Sea trout carrying over 100 lice were caught in the Kanaird estuary, Dundonnell river estuary, River Ewe, Flowerdale (Loch Gairloch) and the River Carron estuary. All samples with high average numbers of lice were taken during periods when there was little freshwater entering sea lochs; the months of June and early July were particularly dry. The majority of larval lice are assumed to have originated on nearby salmon farms.

The lousiest fish of the year was a sea trout of 395mm taken in the estuary of the River Carron on 5th June 2012, with an estimated 700+ *Lepeophtheirus salmonis* lice. In terms of number of lice per unit body weight, 18 of the top 20 fish with the highest number of lice per gram of sea trout were taken in the Kanaird sweep on 5th June 2012; the other two were taken in the Dundonnell sweep net in June.



This post smolt taken at River Kanaird estuary on 5th June had 170 small attached lice on it. At only 49g, it had the highest number of lice per unit weight of any sea trout sampled by WRFT in 2012. Note the loss of scales and tail damage associated with a bird attack

Update: on 13th March 2013, the sweep netting team visited Little Loch Broom *(below).* The net was set in water about 1.2m deep from a boat which was walked out at low tide at the mouth of the Dundonnell River. Two seals were seen only about 50m further out from where the net was set. 21 sea trout were caught of which 16 were 400mm in length or more. The largest fish was 570mm and weighed 1652g *(below)*. Three trout carried between 50 and 80 lice; the other fish had fewer lice. Many fish had healed dorsal fins, indicative of louse damage in 2012. This sample demonstrated the ability of some sea trout in Little Loch Broom to survive and grow to relatively large sizes despite recorded high levels of infection by sea lice of many post-smolt sea trout in the fyke-net during the summer of 2012.

The WRFT Sea Trout Monitoring Report for 2012 presents the full results of sweep netting in 2013, and an analyses of the occurrence of larger sea trout in Wester Ross, contrasting differences in the sizes of sea trout taken in recent years with those from the past, and those caught by WRFT in Loch Gairloch with those taken in the Marine Scotland trap at Shieldaig Loch Torridon.

Part 5 **Wild Fisheries and Salmon Farming**

5.1 Introduction

The forgoing parts of this review highlight a range of factors affecting wild salmon and sea trout in Wester Ross in both the freshwater environment (habitat degradation, drought and redd washout) and in the sea (sea lice infection, food availability and predation). Of these, the problems of sea lice infection have generated greatest concern by wild fisheries interests in the area over the past year. Data collected by Wester Ross Fisheries Trust and other fisheries trusts in the West of Scotland has demonstrated that there is a relationship between lice levels recorded on sea trout and the proximity of salmon farms (Middlemas *et al*, 2012). Lice numbers were higher on sea trout taken closer to salmon farms in the second year of the two year production cycle.

Our findings, reported in the WRFT Sea Trout Monitoring Report for 2012 support the contention that rates of survival of sea trout in areas with salmon farms during the period 2000 up to 2012 were inadequate to support traditional sea trout fisheries. Although there were many small post-smolts in some areas (e.g. Loch Ewe), there were few records of larger fish of 1kg (2.2lb) or more; in some areas (e.g. Shieldaig river system, Loch Torridon) evidently there were none of these larger fish at all. This could be interpreted as a population level impact. Records of the occurrence of larger sea trout, including rod caught fish, should be analysed further.

Over the past year WRFT has participated in the Managing Interactions with Aquaculture Project (MIAP) which was set up to support the better coordination and management of wild fisheries and stocks with the aquaculture industry; and also prepared responses to a series of salmon farm planning applications within the coast waters of the WRFT area.

5.2 Managing Interactions with Aquaculture Project (MIAP)

5.2.1 Background

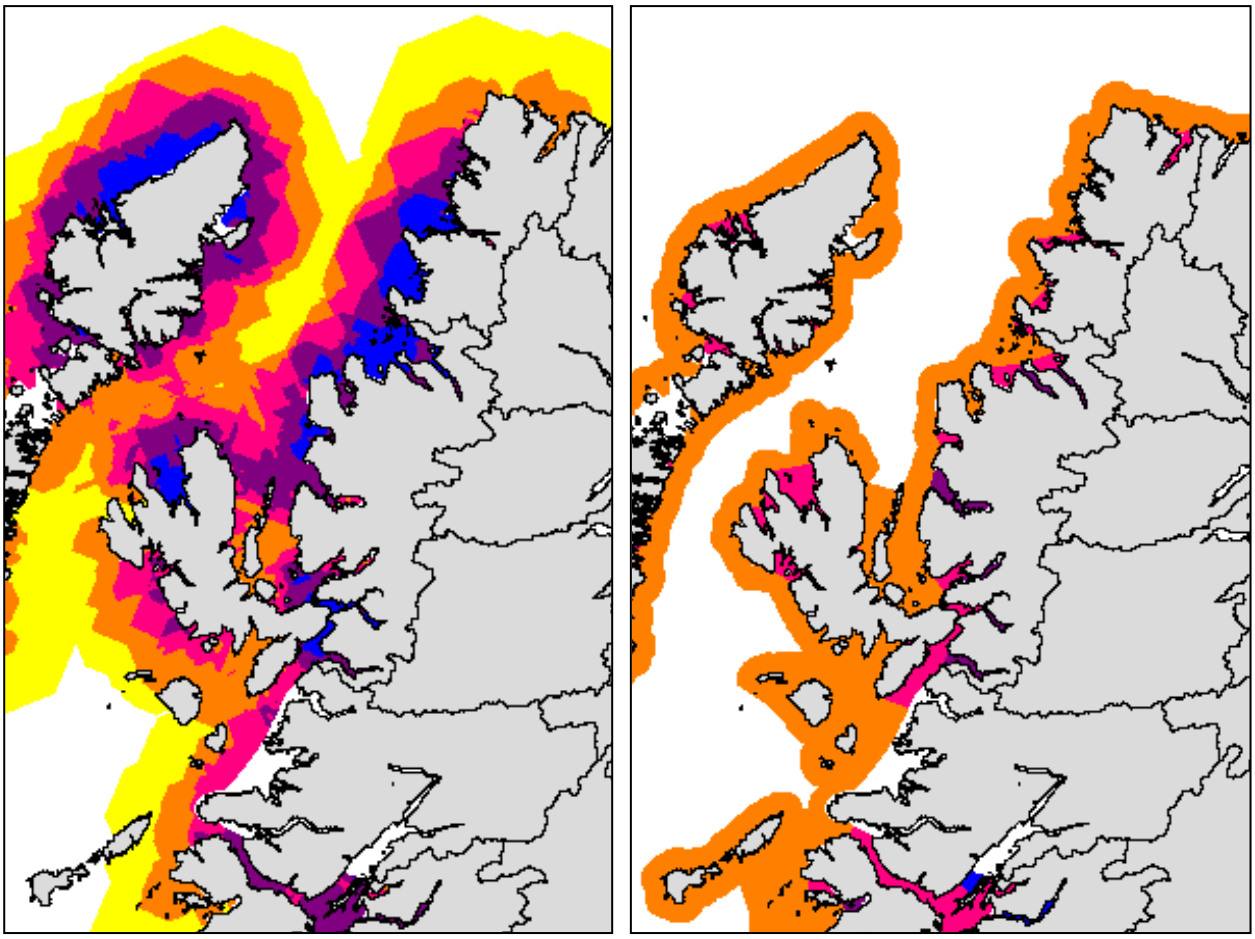
Much of the sea lice monitoring work described in Part 4 of this report was funded by the Scottish Government as part of the Managing Interactions with Aquaculture Project (MIAP). Additional objectives of the MIAP project included providing clearer guidance to the salmon farming industry and planning authorities on the sensitivity of different parts of the west of Scotland for wild salmon and trout populations, and clarification of the extent to which genetic material of aquaculture origin is present in wild salmon populations.

5.2.2 MIAP Locational Guidance Tool v1

To provide clearer guidance, 'Version 1' of this tool, developed as a Geographic Information Systems (GIS) package led by Dr Donna-Claire Hunter of RAFTS, was presented early in 2013. Two GIS models were produced: a 'River and Fisheries' model and a 'Coastal and Transitional Waters' model.

Within each model, a series of criteria were selected and weighted for inclusion in the model according to the consensus view of the MIAP Steering Group of participating fisheries trust representatives, a RAFTS team and observers from the Scottish Government. The output of each model is a GIS map showing zones of sensitivity within the West of Scotland. Figure 5.1 shows parts of respective maps covering the WRFT area.

Figure 5.1 Output from the MIAP Locational Guidance Tool version 1: (left) zones of sensitivity from the 'Rivers and Lochs' model v1; (right) zones of sensitivity from the 'Coastal and Transitional Waters' model v1. For both maps, the most sensitive zones are show in blue (darkest shading) and the least sensitive in yellow or white (lightest shading).



For the 'Rivers and Fisheries' model which incorporated seven criteria ranging from 'designated river systems' to 'status of juvenile salmonid populations', 19% of coastal waters in the West of Scotland had the highest sensitivity scores of '4' or '5', including most of the sea lochs within the WRFT area. For the 'Coastal and Transitional Waters' model which incorporated 4 criteria describing the type of loch, flushing rate and sea lice monitoring data, 25% of coastal waters in the West of Scotland had the highest sensitivity scores of '4' or '5', including all the sea lochs in Wester Ross except Loch Ewe.

All the active marine salmon farms within the WRFT area are located in areas which were scored in the two highest sensitivity bands in one or both of the models. The locational guidance tool v1 therefore indicates that all salmon farms in the WRFT area are in areas that are sensitive to wild fisheries for one or more reasons.

So how will the locational guidance tool help planners? Inevitably, the choice of criteria and their relative weighting depended upon the availability of data and the subjective assessment of participants. The models have yet to incorporate data describing sea trout and salmon migration routes. In Wester Ross, sea trout fisheries were formerly of particular importance. The River Ewe, River Balgy and River Carron have sizable freshwater lochs and were historically of particular importance for sea trout. Freshwater lochs which are accessible to sea trout need to be given greater weighting.

5.2.3 MIAP Genetic Tool Development for Distinguishing Farmed vs. Wild Fish in Scotland

To support the identification of wild and aquaculture origin salmon from west coast catchments in Scotland, one of the aims of the MIAP project was the development and application of new genetic tools. This work was led by Mark Coulson of RAFTS who is based at Marine Scotland Science's Freshwater Laboratory.

The initial investigation demonstrated the potential to identify aquaculture strains of Norwegian origin salmon from Scottish salmon using tissue sample analyses. Using genetic markers developed in Norway and genetic samples of wild salmon taken from rivers in Scotland, this study provided strong resolution between Scottish fish and Norwegian farmed strains. However, the genetic marker set was unable to reliably distinguish between wild Norwegian and farmed Norwegian origin. Furthermore, the maker set was unable to identify Scottish aquaculture fish of Scottish origin from wild Scottish fish.

Subsequently, DNA samples from sites in the West of Scotland were screened to assess whether there was evidence of any Norwegian origin genetic 'signature' in the wild salmon population. DNA samples from juvenile salmon were collected from sites including the rivers Gruinard, Torridon, Balgy, Kishhorn, Tullich Burn [Loch Carron] and River Carron in Wester Ross for analyses.

Results to date have demonstrated varying levels of the presence of Norwegian genetic signatures from most of the sites screened. All the samples taken by WRFT biologists in Wester Ross in 2011 and earlier years included some fish with some Norwegian genetic signature. These ranged from the Gruinard samples where just over 10% of samples were 'admixed' (fish which had some Norwegian genetic signature as a result of interbreeding) to 33% - 50% 'admixed fish' (e.g. Kerry, Torridon, and Lair [Carron] samples), to several cases of putative direct escapees sampled in the wild where all of the sample had a Norwegian genetic signature (e.g. Tullich Burn).

The full report can be found at:
http://www.rafts.org.uk/wp-content/uploads/2013/02/MIAP_Genetic_report_final.pdf

The findings of the RAFTS MIAP study are consistent with concerns raised over many years that genetic introgression of wild salmon populations by non-native escaped farm salmon has taken place in Wester Ross. During the early 1990s evidence of escaped farm salmon breeding in Wester Ross rivers was published by John Webb of the Atlantic Salmon Trust, and Alan Youngson and colleagues working for the Government's Freshwater Laboratory (for review, see: http://www.wrft.org.uk/news/newsitem.cfm?id=161).

All efforts should be made to minimize the number of farmed salmon that escape and breed in the wild. Anglers and ghillies please note that for approximately £25, you can have a genetic sample of any salmon (for example an unusually large fish) analyzed to find out if there are indeed 'Norwegian' genes in its ancestry or not . . .

5.3 Responses to salmon farm planning applications

Over the past year, WRFT has provided comments in response to salmon farm planning applications reflecting not just the sensitivity to wild fisheries of where the proposed salmon farms were to be located (as per MIAP Locational Guidance Tool, see Part 5.1), but rather more significantly, restating the strongly held contention, that for wild sea trout and salmon populations within the WRFT area, and based on the findings of sea trout and sea lice monitoring work and the past record of salmon farm companies to control sea lice (so far as this has been disclosed through Freedom of Information requests), there is already too much farm salmon production within the WRFT area to safeguard the wild sea trout fisheries of the area.

Rod fisheries for salmon have recovered from their lowest levels in most rivers during the past 10 years following decline (e.g. rivers Gruinards, Ewe) or collapse (e.g. River Carron) in the 1990s. However, without regulation to control emissions of larval sea lice into coastal waters, the risk of future damage to sea trout and salmon fisheries associated with existing salmon farms within the WRFT area remains high.

Over the past two years, WRFT provided information in response to the following planning applications:

- 11/04228/FUL -The Scottish Salmon Company – New fish farm, Sgeir Dughall, Loch Torridon.

This proposal was for a large new fish farm for the northern/eastern shore of outer Loch Torridon, north-west of Diabaig comprising 14 x 100 m circle cages and a feed barge. The cages would be in a single group within a 65m x 65m grid matrix. The area of the development would be nearly 37 ha, with a proposed maximum proposed standing biomass of 2091 tonnes. The WRASFB objected. Planning permission was granted, subject to conditions.

- 12/00762/FUL Scottish Salmon Farms, New Fish farm Kishorn Outer, 700 metres south of Airigh-Drishaig, Applecross

An application was lodged for a new fish farm consisting of 16 x 80 m circumference circular cages and automated feed barge in 2012. Prior to this farm, the Loch Carron - Loch Kishorn area already had in excess of 5873 tonnes of farmed salmon biomass, with large existing salmon farms operated by the Scottish Salmon Company at Mid Strome and by Scottish Sea Farms in Loch Kishorn. The proposed biomass for the new farm was 2000 tonnes. The WRFT submitted an objection. Planning permission was granted following an appeal to the Scottish Government.

- 13/01494/FUL Marine Fish Farm - Atlantic Salmon - Alterations to existing site to create single group of 46 square steel pens each 15m x 15m and allow for the installation of an automated feed barge. Loch Kanaird Eastern Side of Isle Martin.

The WRASFB submitted an objection. At the time of writing, the outcome of this planning application is awaited.

Further information and submissions from other government agencies and individuals relating to each of the above planning applications can be found via links on the Highland Council's e-planning website at:
http://www.highland.gov.uk/yourenvironment/planning/eplanning/

Part 6 **Herring and Marine Protected Areas**

6.1 Herring Rediscovery Project

in collaboration with Two Lochs Radio and the Scottish Association for Marine Science.

My name is Ruby Neervoort and I am a Masters student Environment and Research Management at the Vrije University in Amsterdam, Holland. For my master thesis I have been doing research on the history of the herring fisheries in the Wester Ross Area.

(left to right) Sue Pomeroy, former herring fisherman (& WRFT Trustee), Cllr Richard Greene, and Ruby Neervoort in the WRFT office.

The Wester Ross Fisheries Trust (WRFT) together with the Scottish Association for Marine Science (SAMS) are interested in evaluating the history of the local herring fishery and the possibility of rejuvenating the local fishery in the Wester Ross area, Scotland. Within the time limits of the project, my research focussed on the early stages of the overall Wester Ross Herring Rediscovery project. Fourteen interviews that were conducted by Sue Pomeroy with local fishers were transcribed. I also used field trips, literature and archival research to help to answer the research question: *What factors lay behind the historical changes in the herring fishery in Wester Ross, Scotland over the last 50 years?* The research question was answered for two different aspects: ***Political*** and ***Social*** with the help of four sub-questions. A third aspect: ***Ecological*** was created to investigate the habits of the Herring (*Clupea harengus*) however this aspect was not a big part of the research as no time and funding was available.

A timeline was used to compare how events for each aspect were related to each other. The study showed that after WWII (when my research starts) local communities initially depended on herring for their living. The herring fishery was an important food and job source for local people up until the late 1960s. However, during the late 1960s bigger boats were introduced, then in 1972 after the United Kingdom joined the Common Market, international fleets came into coastal water and local herring stocks collapsed as they had in other waters around Scotland in the 1960s. The herring ban of 1977 was established to let the herring stocks recover. Unfortunately the herring never returned to the same stock levels in the West of Scotland after the ban. With a high certainty, it can be said that overfishing of the bigger boats and international fleets led to the disappearance of the local herring fishery. However, this does not explain why the herring have not recovered to former levels after the ban was lifted. Had the local herring stocks in coastal waters recovered during or after the Ban, then the local fishery could have been restored. More research should be done about possible environmental changes and damage to seabed habitats in and around the lochs before a complete answer can be given to the research question of this study.

This research would not have been not possible without the help of the Wester Ross Fisheries Trust, especially Sue Pomeroy and Peter Cunningham, and to Dr Clive Fox of Scottish Association for Marine Science and Dr Alison Gilbert of Vrije University.

6.2 Proposed Marine Protected Areas in Wester Ross

In 2012, WRFT biologist Peter Cunningham co-ordinated a third party bid to the Scottish Government to establish part of Loch Ewe and Loch Gairloch as Marine Protected Area (MPA) on behalf of the local community. One of the aims of the bid was raise awareness of the need for a holistic approach to protecting the marine habitats that are of importance for fish populations, including fish species such as herring which are of importance as food for sea trout and salmon.

On 14th December 2012, SNH and JNCC published their advice to the Scottish Government on the selection of Nature Conservation Marine Protected Areas (MPAs) for the development of the Scottish MPA network. The report had proposals for 33 MPAs. The proposals were based primarily on scientific assessment of the occurrence of priority marine features (habitats and species) by the SNH team. The sites chosen were those that were judged to make the biggest contribution to the protection of respective priority MPA features in Scottish waters.

For those who supported the Gairloch and Wester Loch Ewe third party bid submitted on behalf of the local community earlier in the year, the news was mixed. However, the whole of Loch Ewe has been included within a proposed Northwest Sea Lochs MPA encompassing much of the Wester Ross coastline from Rubha Reidh to Rubha Mor, also including the sea around Greenstone Point, Gruinard Bay, Little Loch Broom, Loch Broom and the Summer Isles.

Loch Gairloch was not included within a proposed MPA, for two reasons:

- Although several priority MPA search features, including maerl beds, eelgrass beds and burrowed mud were found in Loch Gairloch, these features were also found in the proposed Northwest Sea lochs MPA area.
- Loch Gairloch already has greater protection than most areas through an existing ban on mobile fishing gear (benthic trawling and dredging).

Further south a proposal has been developed for a MPA for lochs Duich, Long and Alsh following sea bed surveys earlier in 2012.

Marine Scotland now intends to run a public consultation on the MPA proposals later in the summer. The challenge now is to seek support for the designation of MPAs in respective areas with management objectives and that can help to restore and improve wild fish populations for the benefit of the local area as well as achieving national objectives a means to deliver them.

The local Gairloch & Wester Loch Ewe community Third Party Bid for a MPA and further background information can be found on the WRFT website at http://www.wrft.org.uk/news/newsitem.cfm?id=160

The SNH advice and Scottish Government report can be found at:
http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=1959 & http://www.scotland.gov.uk/Resource/0041/00410442.pdf .

Part 7 **Other projects**

7.1 River Carron Research Project Update

from the River Carron Research Project Newsletter drafted by Dr Pete Minting

The River Carron restoration research project was set up to sustainably manage the salmon and sea trout stocks of the River Carron and to research the efficacy and impacts of the salmon and sea trout stocking programme.

In 1995 Bob Kindness of Inverness College began a stocking programme on the River Carron following a decline in rod catches. This work was initiated by the River Carron Improvement Association. Since 2000 rod catches have increased dramatically, to the point where 2010 and 2012 were the best years on record. The River Carron Research Project aims to investigate the efficacy of the stocking programme through genetic and ecological studies whilst maintaining salmon stocks on the River Carron. In January 2012 funding was secured for three years to continue the stocking programme and undertake the research project

The River Carron Research Project has now been fully integrated into the Rivers and Lochs Institute led by Prof Eric Verspoor. From 1st February 2013, Eric took over management of the RCRP and will report on progress and development to the RCRP Steering Group. The RLI is integral to the wider development of research activity at Inverness College led by Dr Melanie Smith.

Stocking with hatchery-reared salmon and sea trout began in earnest on the River Carron in 2001. All of the salmon stocking has been carried out using broodstock captured in the River Carron. Sea trout stocking was initially carried out using broodstock from the neighbouring River Ewe because it was too difficult to capture sea trout in the Carron when the stocking programme began. A combination of fry and smolts has been used for stocking. The majority of hatchery-reared fish have been released into the main stem of the river, with the remainder stocked into tributaries with suitable habitat.

Work is currently underway to try and assess the effectiveness of the salmon stocking programme. One study has shown that some stocked salmon (fin-clipped and marked with coded-wire tags) do return as adults to the River Carron, though return rates appear low. Other methods (including genetics and modelling) are also being used to complete this assessment. Genetic samples have been taken from sub-sets of salmon stocked out in 2012. Along with fin clips from adult broodstock, it is intended to use these samples to work out how many juvenile salmon captured in the river (by electrofishing or using a rotary screw-trap) are derived from stocking. When stocking began, low rod catches implied a low number of returning adult salmon and sea trout. It is not known if juvenile abundance was also low at the time but, if so, stocking may have provided a useful boost to wild stocks. In recent years electrofishing surveys have shown that wild spawning is now widespread and at high levels in the River Carron. The contribution made by stocked salmonids to this breeding activity is at present uncertain.

Further information, including the initial results of the tagging programme, can be found on the River Carron Restoration Project website at: http://www.rivercarron.org.uk/ .

7.1 Mink activity in Wester Ross

Scottish Mink Initiative
Working with Communities to Protect Native Wildlife

by Gunnar Scholtz

Mink, filmed near Applecross, September 2012 (Ben Rushbrooke).

In 2012 almost 30 invasive American mink were caught in Wester Ross. The bulk of these were caught in the Gruinard Bay area and around Loch Carron. Other locations included Loch Maree, Isle Ewe and Little Loch Broom.

To date in 2013 only 4 mink have been caught; one each at Kyle (road kill), Lochcarron (trapped on a fish farm cage), Isle Ewe (trapped) and Dundonnell (shot on sight). Most animals were trapped by dedicated volunteers, a few were road kills and there was one dead individual being washed up on a beach. A camera trap picked up an animal in Lael, Loch Broom, but despite intense trapping it has not been caught. No mink have been caught from the Gruinard area so far in 2013 where a dozen were caught in 2012, which shows the impact trapping can have on a localised population. However there have been more sightings from the Greenstone Point peninsula, Loch Broom and repeatedly Applecross; in June 2013 five were seen at Mellon Charles near a tern breeding colony.

In the summer of 2012 time we had some assistance from two dog handlers from the Hebridean Mink Project (HMP) who are working on the Western Isles. The dogs are being used to assist the trappers to identify mink presence in areas that are being trapped or monitored. During the breeding season in the spring dogs are a very good tool to sniff out active dens which can then be targeted by the trapper and remove the whole litter before they disperse. The dogs did one week each in different areas across Wester Ross and West Sutherland. Areas covered included Greenstone Peninsula, River Broom and the Loch, Coigach and the Canaird. There were indications on the Greenstone Peninsula, Coigach and Ardmair, of which the latter two were subsequently trapped but nothing was caught. The dogs did however not indicate anything at all in Assynt and further north, which is considered to be good news.

The majority of the carcasses were frozen and shipped to the University of Aberdeen, where students are working on various projects including DNA analysis and lead concentration in tissues. Elaine Fraser who has been working on mink in Wester Ross and Skye and Lochalsh before, has published some results earlier this year on the DNA relationships of west coast mink compared to mink being caught in central and eastern Scotland. It seems that the animals being caught in Wester Ross have not bred with relatives from the east coast. Loch Broom still seems to be on the northern most edge for the mink population that is establishing itself in Wester Ross. Every individual that is caught south of Loch Broom therefore reduces the advance of mink into the far north. And while the population size across WR is not as high as in parts in the east of Scotland, it is important to control them now before it gets out of hand. Every little trap and sighting report helps! See page 2 of the latest SMI Newsletter on www.scottishmink.org.uk

Wester Ross FT and SNH have again called up a few volunteers to get traps out and checked for a fortnight around Loch Maree and Gairloch during the mating season. There are spare traps and rafts in the WRFT office for anyone interested in monitoring or trapping their local area. Just get in touch with Peter at WRFT or Gunnar gunnar@rafts.org.uk 07825 184 080.

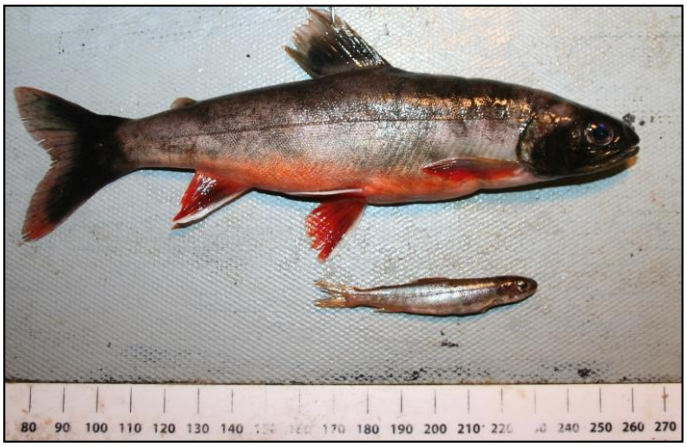
7.2 Arctic Charr (and Wild Trout) Discovery week 2012

The 4th Arctic Charr Discovery week took place in early November 2012 thanks to a team of scientists led by Alex Lyle and Dr Jennifer Dodd from Glasgow University. Under special license from the Scottish Government and with permission from Tournaig Estate, nets were set in several lochs to find out about the occurrence of Arctic charr.

The highlight of the week was the rediscovery of a population of a charr population in Loch a' Bhaid-luachraich, locally known as the 'Goose Loch', near Aultbea. The only previously documented records of charr in this loch were pre 1940. Following an unsuccessful netting attempt in 2006, there was some doubt as to whether a charr population remained within the loch. The sample taken in 2012 included both adult charr and a single charr fry (young of the year). The mature fish were all of less than 20cm in length. Mature males are colourful; very dark (almost black) on top and orange below, with red-orange fins.

Charr are seldom seen or caught by anglers as they live in deep water for much of the year, occupying a different niche from Brown Trout. The charr populations in many lochs are thought to be descended from ancestors which colonised freshwater systems from the sea at the end of the last ice age when water temperatures were much cooler. All charr populations in Scotland are now landlocked and do not migrate to the sea in the same way as sea trout and salmon. Wester Ross retains many healthy charr populations and is one of the most important areas for charr conservation within the United Kingdom.

(left) Alex Lyle, Dr Peter Minting, Martin Hughes and Dr Jennifer Dodd of Glasgow University sorting fish from a net in the WRFT Office (right) Adult male charr and charr fry from Loch a' Bhaid-luachraich, November 2012.



Part 8 **Education Projects**

By Dr Lorna Brown

Last year was a relatively quiet one for my environmental education activities for the Trust - with Jonah in charge of finishing "Salmon in the Classroom" with the southern schools, only three schools starting with hatcheries in the classroom this spring and a delay in the Plockton High School "Living Lochs" project until after the summer holidays. Despite that, it was still very eventful and once again the pupils involved were great fun and full of surprises!

The first excitement came when we were approached to participate in a BBC programme about our "Salmon in the Classroom" project. The plan was to take Plockton Primary School pupils out to see an electrofishing demonstration in the stream where they had released their fish. The day of the filming dawned and the sun was shining. The pupils were fantastic during the pre-electrofishing discussion. They remembered that they had kept their salmon eggs cold and oxygenated and that once the alevins used up their yolk-sacs they had to let them go. Jonah stepped into the water to begin fishing and fish were zooming out from all corners of the stream. The pupils very quickly worked out how to tell young trout and salmon apart and all was going to plan.

But then our interviews came…no spare microphone for Jonah so I was solo (gulp…), facing into the sun so that I couldn't see properly without squinting (wince…), and having to answer all the questions that I'd specifically asked the researcher not to use …and very few questions about the project (groan…). I suggested we start again and was told not to worry it was fine (sigh…). So I have a very strong suspicion that in few weeks time when the programme hits your screen the pupils of Plockton Primary are going to appear as little academic geniuses while the Fisheries Trust biologist will appear somewhat "glaickit"!

Early in 2013 we approached Gairloch, Poolewe and Bualnaluib Primary Schools to ask if they would like to take part in the "Salmon in the Classroom" project again. The sales pitch I use is that the hatchery system is so simple that the pupils (usually Primary 6 to 7) can manage it by themselves, with no help from the teachers. So it was with some apprehension I headed to Gairloch to set up the tank in the *infant's class - primary 1 to 3* ! I needn't have worried though – they were extremely enthusiastic and took their job of looking after the eggs very seriously. Our only near disaster and near emotional breakdown was when one pupil accidently bumped another during the release trip and a small fish landed on the ground. Both boys dried their tears when they realised the fish was fine and could be released as planned. I have also had some very amusing feedback from the parents of the little ones. In one house in Gairloch they have to eat 'fish' now, as salmon is no longer acceptable on the menu. My favourite story is of a very small boy spending quite some time trying to explain the project to a somewhat bemused lady at the fish counter in Tesco in Dingwall!

As ever I am indebted to all those who support the project. Thanks to Neil Morrison at Coulin and Alasdair MacDonald at Dundonnell for the provision of eggs – we could not carry on the project without you. Thanks also to Dundonnell, Letterewe Estates and SNH Beinn Eighe Reserve for allowing us to release the fish, and many thanks to the participating teachers and all those who have funded our work.

*Look out for Lorna in the forthcoming BBC series 'Britain's Big Wildlife Revival' to be screened later this summer.

Part 9 **Financial Statement**

For the year ended 31 March 2013

		Unrestricted Funds	Restricted Funds	2012 to 2013	Unrestricted Funds	Restricted Funds	2011 to 2012
Incoming resources from generated funds							
	Voluntary income						
	WRASFB	23000		23000	23000		23000
	WRASFB b/fwd from 2011/2012	7000		7000			
	Membership	350		350	540		540
	Sub Total	**30350**		**30350**	**23540**		**23540**
	Activities for generated funds						
	Investment Income	**761**		**761**	**560**		**560**
	Gift Aid	**0**		**0**	**1038**		**1038**
	Sub Total	**761**		**761**	**1598**		**1598**
	Incoming resources from charitable activities						
	Fish Farms	5317		5317	5162		5162
	Southern River Proprietors	5275		5275	5121		5121
	RAFTS Whitley Animal Protection Trust	0		0	372		372
	Individual donations	3255		3255	485		485
	Sales	115		115	436		436
	Contracts	6814		6814	7027		7027
	Sub Total	**20776**		**20776**	**18603**		**18603**
	Total Voluntary incoming resources	**51887**		**51887**	**43741**		**43741**
	Incoming resources from charitable						
	Activities Restricted.						
	Skye E Fishing		7416			9135	
	E-Fishing equipment grant Leader					4896	
	Salmon in the classroom Highland Council					3750	
	Salmon in the Classroom RAFTS					1150	
	RAFTS Sweep netting/sea lice		10500			12000	
	Tournaig trap Marine Harvest		2735			2655	
	Living Lochs Nineveh Trust		2830			2747	
	Bruchaig Restocking S&SE					1500	
	RAFTS / SNH Little Gruinard SAC Equipment					6352	
	SG via RAFTS FMP update / poster		2300			7000	
	SG via RAFTS Aquaculture data provision					2161	
	SG via RAFTS SAC Genetics 2011					2000	
	Little Gruniard SAC E Fishing		1000				
	Sub Total	**0**	**26781**		**0**	**55346**	
	Total Donations	**51887**	**26781**	**78668**	**43741**	**55346**	**99087**
	Figures shown in Book keeping						99087

Financial statement for the year ended 31 March 2013 (continued):

Resources expended	Direct	Support	2012	Direct	Support	2011
Costs of generating funds	Costs	Costs	to 2013	Costs	Costs	to 2012
Fundraising trading cost of goods sold				9744		
Charitable activities						
Total resources expended						
Costs of activities in furtherance of charity's objectives						
Support Costs						
Wages & Contract labour	19728			21116		
Insurance	1653			1935		
Telephone	730			739		
Heat & Light	983			710		
Subscriptions	2287			1326		
Training expenses	475					
Printing/Post / Stationery	249			611		
Sundry expenses	1027			2796		
Computer equipment						
Professional fees	1020					
Sub Total	**28152**	**0**	**28152**	**29233**	**0**	**29233**
Charitable activities direct costs						
Publishing		633			1670	
Motor vehicle travel & subsistance expenses		8173			7881	
Wages, Social Security, Pension		55028			59150	
Equipment / hire / repairs		1679			960	
Equipment new		549			10426	
Governance costs		1796			1794	
Depreciation						
RAFTS / FRS Commission		1000			1000	
Sundry					1331	
Sub Total	**0**	**68858**	**68858**	**0**	**84212**	**84212**
Note						
Increase in the Costs is due to having						
two biologists.						
Charitable activities total costs			**97010**			**113445**
Figures as shown in book keeping			**97010**			**113445**
IMPORTANT NOTICE						
The 2013 figures are for information only and have not been checked or audited						
The figures have been checked to book keeping; however there will adjustments made by the accountants.						

Acknowledgements

Wester Ross Fisheries Trust has received a great deal of help and advice over the past year. Thank you to:

Ala MacKenzie
Alan, Greg & Frank Choonara
Alan McGillivray
Alan Wells (RAFTS)
Alasdair Macdonald (Dundonnell Estate)
Alexander MacLeod
Alison Rowe
Alastair Pearson (The Old Inn)
Andrew Graham-Stewart
Andrew and Roxanne Ramsay
Andrew Slaughter
Dr Andrew Walker
Andrew Wallace (RAFTS)
Angus Davidson
Angus Morrison
Anne and Alex Gray
Antony Watkins (SEPA)
Arran Matheson
Barbara MacDonald (Letterewe)
Prof Barry Blake
Ben Hadfield (Marine Harvest)
Ben, Ron and Lesley Rushbrooke
Bill Anderson
Bill Whyte (Gruinard Estate)
Bob Kindness (River Carron Restoration
Brian Fraser
Callum Sinclair (RAFTS)
Calum MacKenzie
Catherine Vine
Dr Chris Horrill (RAFTS Invasive species)
Clint Barker
Colin Milne (WRF)
Prof Andrew (Dave) Barclay
David, Dougie and Flora Foreman
David Holland
David and Veronica Mullaney
Derek Roxborough
Donald Macleod
Donald Rice
Donna-Clare Hunter (RAFTS)
Duncan Donald & family
Duncan MacKenzie (Gairloch)
Dundonnell Estate
Elaine Fraser
Eilean Darach Estate
Eoghain Maclean
Dr Eric Verspoor (UNI)
Fergus Mackenzie
Frank Buckley
Frank Kalinowski
Gary Bulmer
Gavin Skipper
Gilpin Bradley (WRF)
Graeme Wilson
Greg Jeffries
Gunnar Scholtz (Mink Project Officer)
Hugh Richards (WRF)
Hugh Whittle
Hugo van Vredenburch
Jackie Anderson (MS Science)
Jake Buckthorpe and family
Jamie Bain
Jane MacLay
Jane Murphy
Janet & Derek Ullman
Jenny Scobie
Jim Buchanan
Jim Raffell
Dr John Armstrong (MS Science)
John Ian Grant MacDonald
John Ogle & family and friends
John Mackenzie
John Murdo Mackenzie
John Webb
Johnie Parry
Julia Haig
Karen Starr
Kenny Nelson (SNH)
Kenneth Maclean
Kevin Ginty
Letterewe Estate
Les Bates
Dr Lorna Brown
Marcus Munro
Marcus Simpson
Mark Coulson (RAFTS Genetics)
Mark Williams and family
Mary Gibson (SNH)
Dr Melanie Smith
Neil Campbell
Neil Morrison
Nick Benge (Watergems)
Nick Thomson and family (Loch Maree Hotel)
Nicola Tallach (SNH)
Norman Thomas
School teachers and pupils too many to name!
Patrick Ullman Campbell
Peter Bridgeman
Prof Peter Maguire
Philip Smith
Ray Dingwall
Richard Wilson, family and friends
Roderick MacIvor
Roger and Tracy McLachlan
Ross Gardiner (MS Science)
Roxanne Ramsay
Ruth Watts (SEPA)
Sally Clemments
Col Sandy Lindsay
Sandy Patience
Simon MacKelvey (Cromarty Firth Fisheries Trust)
Simon Stewart (Coulin Estate)
Dr Shona Marshall (West Sutherland FT)
Spey DSFB
Steve, Connor & Isle Ewe Fish farm team
Stuart Allison
Dr Steve Kett (Middlesex University)
Terry Jack
Tim Fison
Tom Forrest (WREN)
Tom Reid
Tournaig Estate (& their ATV)
Willie Matheson
Will Parry

…and all the other anglers, keepers and ghillies, fish farmers, school teachers, schoolchildren and parents, and everybody else who has helped us with our work.

Supporting wild fisheries and the Trust's Work

The current work programme for 2012 – 2013 includes excursions to sample trout lochs and streams, electro-fishing surveys of many of the rivers between Ullapool and Knoydart, sweep netting for sea trout, river surveys, a herring 'rediscovery project' and much else which may be of interest. There are many opportunities for becoming actively involved with the work of the Trust or for simply coming along for a day in the field to find out what we do. Please contact biologist Peter Cunningham (*left, on holiday, with one which didn't get away; South Uist, June 2013 [photo by Pete Hill]*).

Wester Ross Fisheries Trust
Harbour Centre, Gairloch, Ross-shire, IV21 2BQ
Tel: 01445 712 899
Email: admin@wrft.org.uk

WRFT Registered Charity No: SCO24787

1. Member details

Please complete details

Title: Ms Miss Mrs Mr

First name: _____

Surname: _____

Postal address: _____

_____

_____

_____ Post code: _____

Tel:_____

E-mail: _____

2. Renew my membership

		Please Tick
One year	**£20**	
Single Life (1 card)	**£150**	
Joint Life (2 cards)	**£200**	

Rates are valid until 31/12/2012

3. Payment details

Membership Fees (from section 2)	**£**
Donation	**£**
TOTAL DUE	**£**

4. Method of payment

a. ☐ I enclose a cheque payable to Wester Ross Fisheries Trust for **£**

b. ☐ I would like to pay by Standing Order (please fill in the Standing Order form below – UK bank account holders only)

5. Gift Aid

Use gift aid and you can make your donation worth more. For every pound you give to us, we get an extra 28 pence from the Inland Revenue and it costs you nothing.

I want all donations I've made since 6 April 2007, and all donations I make in the future, to be Gift Aid until I notify you otherwise.

To qualify for Gift Aid, what you pay in income tax or capital gains tax must equal the amount we will claim in the tax year.

Just tick the box and sign below: ☐

Signature Date / /

Please return this completed form to: **Wester Ross Fisheries Trust, Harbour Centre, Gairloch, IV21 2BQ**

Data Protection: The information you provide will be held for processing your membership and for mailing with information about Wester Ross Fisheries Trust. Your details will only be used by Wester Ross Fisheries Trust and will not be made available to any other organisation.

Instruction to your Bank or Building Society to pay Standing Order to:

Bank Name & Address: Bank of Scotland – Gairloch Office

Account Name: Wester Ross Fisheries Trust **Sort Code:** 80-06-87 **Account No:** 06000911

PLEASE PAY THE FOLLOWING

Amount £ In Words

Commencing:

Thereafter: Due Date: Annually On / /

TO BE DEBITED FROM MY ACCOUNT

Bank Name: _____

Bank Address _____

_____Postcode _____

Name(s) of account holder(s)

Branch sort code ☐☐-☐☐-☐☐ Bank/ Building Society Account Number ☐☐☐☐☐☐☐☐

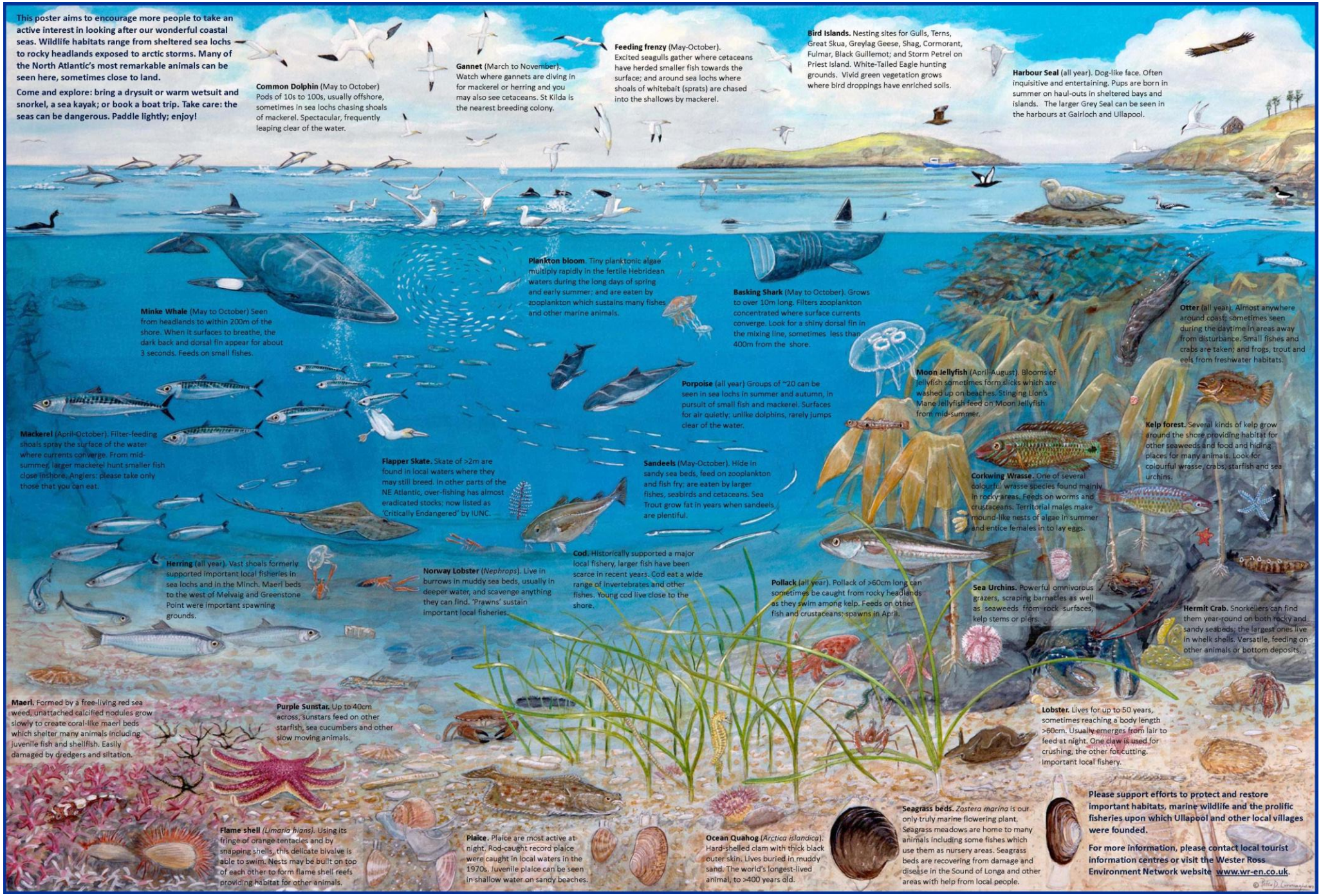
WRFT Ref. No: (office use only)

Instruction to your Bank or Building Society: Please pay Wester Ross Fisheries Trust Standing Order Mandate from the account detailed in this instruction. I understand that this Instruction may remain with the WRFT and, if so, details will be passed electronically to my Bank/Building Society. A photo copy may also be kept on file with the SGA.

Please cancel all previous standing order and/or direct debit mandates under Wester Ross Fisheries Trust.

Signature(s) Date / /

Forty salmon taken in the Tournaig Trap in 2012. The fish are shown in the order that they entered the trap, between the middle of July and middle of September (top left to top right . . . bottom left to bottom right). Visit the WRFT website www.wrft.org.uk for high definition image of this mosaic. Photos by Ben Rushbrooke.


This poster aims to encourage more people to take an active interest in looking after our wonderful coastal seas. Wildlife habitats range from sheltered sea lochs to rocky headlands exposed to arctic storms. Many of the North Atlantic's most remarkable animals can be seen here, sometimes close to land.
Come and explore: bring a drysuit or warm wetsuit and snorkel, a sea kayak; or book a boat trip. Take care: the seas can be dangerous. Paddle lightly; enjoy!
Common Dolphin (May to October) Pods of 10s to 100s, usually offshore, sometimes in sea lochs chasing shoals of mackerel. Spectacular, frequently leaping clear of the water.
Gannet (March to November). Watch where gannets are diving in for mackerel or herring and you may also see cetaceans. St Kilda is the nearest breeding colony.
Feeding frenzy (May-October). Excited seagulls gather where cetaceans have herded smaller fish towards the surface; and around sea lochs where shoals of whitebait (sprats) are chased into the shallows by mackerel.
Bird Islands. Nesting sites for Gulls, Terns, Great Skua, Greylag Geese, Shag, Cormorant, Fulmar, Black Guillemot; and Storm Petrel on Priest Island. White-Tailed Eagle hunting grounds. Vivid green vegetation grows where bird droppings have enriched soils.
Harbour Seal (all year). Dog-like face. Often inquisitive and entertaining. Pups are born in summer on haul-outs in sheltered bays and islands. The larger Grey Seal can be seen in the harbours at Gairloch and Ullapool.
Plankton bloom. Tiny planktonic algae multiply rapidly in the fertile Hebridean waters during the long days of spring and early summer; and are eaten by zooplankton which sustains many fishes and other marine animals.
Basking Shark (May to October). Grows to over 10m long. Filters zooplankton concentrated where surface currents converge. Look for a shiny dorsal fin in the mixing line, sometimes less than 400m from the shore.
Minke Whale (May to October) Seen from headlands to within 200m of the shore. When it surfaces to breathe, the dark back and dorsal fin appear for about 3 seconds. Feeds on small fishes.
Porpoise (all year) Groups of ~20 can be seen in sea lochs in summer and autumn, in pursuit of small fish and mackerel. Surfaces for air quietly; unlike dolphins, rarely jumps clear of the water.
Otter (all year). Almost anywhere around coast; sometimes seen during the daytime in areas away from disturbance. Small fishes and crabs are taken; and frogs, trout and eels from freshwater habitats.
Moon Jellyfish (April-August). Blooms of jellyfish sometimes form slicks which are washed up on beaches. Stinging Lion's Mane Jellyfish feed on Moon Jellyfish from mid-summer.
Mackerel (April-October). Filter-feeding shoals spray the surface of the water where currents converge. From mid-summer, larger mackerel hunt smaller fish close inshore. Anglers: please take only those that you can eat.
Flapper Skate. Skate of >2m are found in local waters where they may still breed. In other parts of the NE Atlantic, over-fishing has almost eradicated stocks; now listed as 'Critically Endangered' by IUNC.
Sandeels (May-October). Hide in sandy sea beds, feed on zooplankton and fish fry; are eaten by larger fishes, seabirds and cetaceans. Sea Trout grow fat in years when sandeels are plentiful.
Kelp forest. Several kinds of kelp grow around the shore providing habitat for other seaweeds and food and hiding places for many animals. Look for colourful wrasse, crabs, starfish and sea urchins.
Corkwing Wrasse. One of several colourful wrasse species found mainly in rocky areas. Feeds on worms and crustaceans. Territorial males make mound-like nests of algae in summer and entice females in to lay eggs.
Herring (all year). Vast shoals formerly supported important local fisheries in sea lochs and in the Minch. Maerl beds to the west of Melvaig and Greenstone Point were important spawning grounds.
Norway Lobster (Nephrops). Live in burrows in muddy sea beds, usually in deeper water, and scavenge anything they can find. 'Prawns' sustain important local fisheries.
Cod. Historically supported a major local fishery, larger fish have been scarce in recent years. Cod eat a wide range of invertebrates and other fishes. Young cod live close to the shore.
Pollack (all year). Pollack of >60cm long can sometimes be caught from rocky headlands as they swim among kelp. Feeds on other fish and crustaceans; spawns in April.
Sea Urchins. Powerful omnivorous grazers, scraping barnacles as well as seaweeds from rock surfaces, kelp stems or piers.
Hermit Crab. Snorkellers can find them year-round on both rocky and sandy seabeds; the largest ones live in whelk shells. Versatile, feeding on other animals or bottom deposits.
Maerl. Formed by a free-living red sea weed, unattached calcified nodules grow slowly to create coral-like maerl beds which shelter many animals including juvenile fish and shellfish. Easily damaged by dredgers and siltation.
Purple Sunstar. Up to 40cm across, sunstars feed on other starfish, sea cucumbers and other slow moving animals.
Lobster. Lives for up to 50 years, sometimes reaching a body length >60cm. Usually emerges from lair to feed at night. One claw is used for crushing, the other for cutting. Important local fishery.
Flame shell (Limaria hians). Using its fringe of orange tentacles and by snapping shells, this delicate bivalve is able to swim. Nests may be built on top of each other to form flame shell reefs providing habitat for other animals.
Plaice. Plaice are most active at night. Rod-caught record plaice were caught in local waters in the 1970s. Juvenile plaice can be seen in shallow water on sandy beaches.
Ocean Quahog (Arctica islandica). Hard-shelled clam with thick black outer skin. Lives buried in muddy sand. The world's longest-lived animal, to >400 years old.
Seagrass beds. Zostera marina is our only truly marine flowering plant. Seagrass meadows are home to many animals including some fishes which use them as nursery areas. Seagrass beds are recovering from damage and disease in the Sound of Longa and other areas with help from local people.
Please support efforts to protect and restore important habitats, marine wildlife and the prolific fisheries upon which Ullapool and other local villages were founded.
For more information, please contact local tourist information centres or visit the Wester Ross Environment Network website www.wr-en.co.uk.