

3.5 Brown trout *Salmo trutta*

3.5.1 Distribution

Wild trout are wonderful fish; wild trout fishing in Wester Ross is (or in the case of sea trout, was) about as good as it gets for many anglers [including the WRFT Biologist!]. In terms of numbers of discrete biological populations there is little doubt that trout are number one on the freshwater fish list for the WRFT area. Trout are *probably* also the most widely distributed fish species within the area. 'Probably' because it's just possible that from time to time, eels find their way into a larger number of out-of-the-way lochans than trout. Eels were found in a stream above a waterfall which is insurmountable to trout or salmon in the Talladale valley.

All rivers in which salmon are found also support trout populations. Trout are particularly numerous in lochs, of which Loch Maree is the largest. Trout occur in hill lochs up to an altitude of at least 560m. How much higher can they be found?

The 'natural' distribution of wild trout in Wester Ross is difficult to establish. In some waters, especially small lochans without gravelly areas or inflowing streams, trout are not naturally present. The practice of moving a bucket of small trout from one water where trout may be numerous though feeding limited to another where there may be good feeding though no self-sustaining trout population has been part of local trout loch management culture for 100++ years. Note that from 1st August 2008 this practice now requires permission from the Scottish Government. Please refer to Cunningham, 2007 (Wild Trout Project report) for further discussion.

History of brown trout fishing

Although, the WRFT is unaware of any artifacts or trout catching contraptions of the archaeological sort (fishing spears or hooks) that have been found within the area, it seems likely that wild brown trout have been used to supplement the diet of local people for millennia. In an area around Loch Bad a' Chreamh near Gairloch there are hut circles and old field enclosures which run down to the loch side, of Mesolithic or Neolithic origin. The 'crannogs' marked on the OS map at Loch Kernsary and Loch Tollie which may date from around the same time are in fact old stone dwellings on rock islands (the Kernsary 'crannog' was snorkel surveyed by Cunningham in 2007). The people who lived in them would have had a readily available food source; the WRFT Biologist guddled a fine trout of ¾ lb from a nearby spawning stream in 2007; an otter had taken at least two a little earlier.

More recently, until about 200 years ago there was transhumance migration of people to the higher ground to spend summers with their cattle in shielings in the hills (Clarke, 1995). Many were near trout lochs. Wild trout production would have benefited from the cattle grazing around the loch margins and dunging in the loch. Senior residents of Gairloch have reported to the WRFT biologist how some families were allocated exclusive 'rights' by the crofting township grazings committee to fish from a particular location on particular lochs (e.g. Loch Bad a Chreamh).

This trout was taken from a small loch near Ullapool (Duncan Mackenzie)



Anglers have fished lochs in the WRFT area for sport for well over 150 years. WRFT has catch records from Loch Achall (Ullapool system) which show sustained yields of over 1000 trout averaging 'three to

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the pound' for several years in succession at different periods in the 20th Century. The most famous trout water in the WRFT area is the Fionn Loch where the average size of rod caught trout has remained at a consistent 2 or 3 to the lb since at least 1912; this loch also has a reputation for producing much larger trout (see Mackenzie, 1995 [1921] for the catch record of a Mr F.C McGrady for June – July 1912; in total he recorded 3,625 trout for 1,410lb in just over 1 months fishing). Another notable brown trout loch is Loch a' Bhraoin (Broom system) where a fishing lodge formerly provided accommodation for two ghillies during the summer months in the early 20th century until it burnt down.

The majority of trout fishing in Wester Ross is on smaller waters. Efforts were made by many proprietors to improve the quality of trout fishing. WRFT has in its possession a dossier of correspondence by Captain Sawyer of Inverewe describing efforts to improve the quality of wild trout fishing in nearby lochs in the 1920s and 1930s. Many lochs were stocked with brown trout, some with rainbow trout and at least one with brook trout over the years. There are also accounts of *Gammarid* shrimps being introduced to some waters to improve the feeding of trout. Most of the details have been lost, but the game books of some estates provide a record of some of the stocking levels that went on. Brown trout from Loch Leven were believed to have superior growth and quality to native brown trout and were introduced to several waters. In recent years, local angling clubs and some estates have continued to buy brown trout from fisheries elsewhere in Scotland to enhance their fisheries.

The **Loch Maree Wild Trout Project** is assessing the genetic diversity of trout in the River Ewe catchment area and may help to clarify whether or not any of the trout which have been stocked have established local populations. Some 'trout' populations are clearly of non-native origin. **The Brook trout** (*Salvelinus fontinalis*) population (of American origin) in Lochan Uaine, high in the hills above Loch Coulin, has been there for almost 140 years following introduction in the 1870s. Given the remoteness of this loch, it is more than likely that some brown trout populations also owe their origin to stocking in the past.

The Wester Ross Wild Trout Project Report (Cunningham, 2007) provides further information about the history of wild brown trout fishing in Wester Ross.

3.5.2 Population structuring

Within the species 'Brown trout' there is considerable variation between populations in life habitat and morphology. Sea trout are present in all river systems where salmon are found. Until the late 1980s, Loch Maree was the most productive sea trout fishery and was regarded as one of the best loch sea trout fisheries in the world attracting anglers from USA and continental Europe. Loch Maree sea trout populations, and their collapse, have been described in detail elsewhere (see Butler, 2002 and Butler and Walker, 2006). In one study, 57% of Loch Maree sea trout were found to be females; a larger proportion of male trout were non-sea going trout remaining in freshwater.

Sea trout are the anadromous members of Brown trout populations. They are not a separate species. The proportion of small trout that turn silvery and head for the sea when they reach about 15cm (6 inches) in length varies between populations. Where trout populations have access to the sea, the proportion may be quite high. Where trout are landlocked above an insurmountable waterfall, it is usually zero; though not always. Even after several generations following the stocking of trout with some sea trout 'genes', some small trout in lochs above waterfalls may still turn silvery and migrate downstream, never to return.

Trout populations within the River Ewe – Loch Maree watershed are currently subject to a genetic study, the **Loch Maree Wild Trout Project**, to determine the number of distinct populations; the biodiversity within the species. Like lochs further south (e.g. Loch Laggan, Duguid, 2006), there may be genetically discrete 'sympatric' populations occupying different niches within the fish community of Loch Maree, in addition to numerous 'hill loch' brown trout populations in waters above insurmountable waterfalls. Initial results suggest that there are a number of distinct genetically discrete populations; 6 different 'haplotypes' (maternal lineages) have already been recognised.

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3.5.3 Sea trout

Wester Ross was formerly one of the most prolific areas in the country for wild sea trout fishing. Many of the river systems supported runs of sea trout in addition to salmon. Table 3.5.1 provides an indication of the highest recorded catches of sea trout from some of the major river systems within the WRFT area. Sea trout stocks declined during the 1970s, recovered a little during the 1980s, then collapsed at the end of the 1980s.

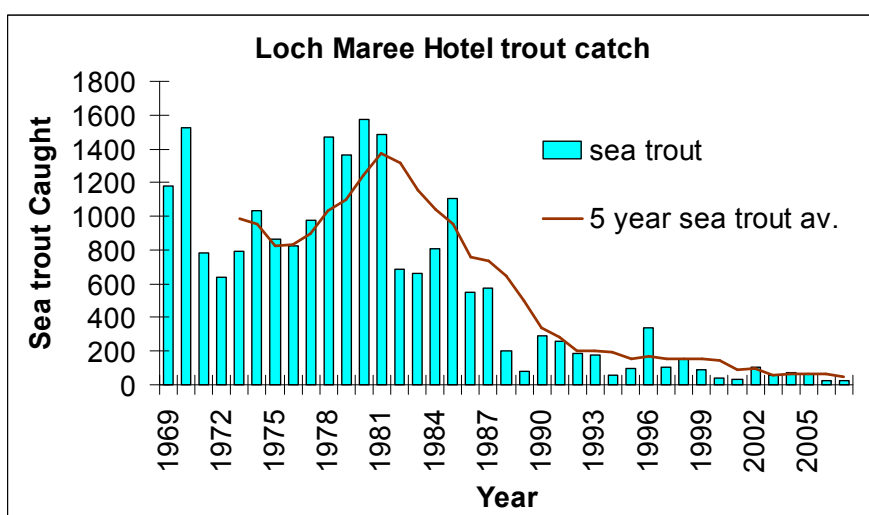
Table 3.5.1 High recorded rod catch of sea trout taken from rivers in WRFT area (from north to south) in recent decades to provide indication of productive potential.

River system	High rod catch of sea trout	Year
Kanaird	139	1986
Ullapool	81	1982
Broom	143	1982
Dundonnell	125	1988
Gruinard	292	1984
Ewe	2,994	1980
Balgy	300	1980
Carron	150	2005
Ling	109	1990

River Ewe and Loch Maree

The Loch Maree sea trout fishery was the largest rod fishery of any sort within the WRFT area. For the Ewe system as a whole, the 5-year average catch of sea trout fell from 2,500 in 1982 to 800 in 2000. Recorded catches at the Loch Maree hotel in 2006 and 2007 were around the lowest on record (Figure 3.5.1).

Figure 3.5.1 Recorded catches of sea trout at the Loch Maree Hotel (1969 – 2007)



The catches of sea trout do not correlate directly with the status of the sea trout population. Fishing effort collapsed at the Loch Maree hotel during the 1990s; recorded catches fell from over 1000 sea trout per year in the late 1970s to only 22 in 2007. Quite simply, few serious sea trout anglers have bothered to fish the loch in recent years, though some do, returning year after year in the hope that things will one day improve. There has always been some difficulty in deciding what a sea trout is and what a finnock is; this became more complex during the 1990s with many 'early-returned', malnourished fish. Fish 'size'

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does not easily correlate with fish 'age'. Some of the fish taken in 2007 in the River Ewe were 'sea trout' which had spent only a few weeks at sea, returning prematurely with sea lice infestation.

A further indication of the collapse in the sea trout stock is the lack of larger sea trout taken in rod catches over recent years. Formerly sea trout of over 5lb in weight were regularly taken. Only a handful of fish of over 2lb were recorded in either the River Ewe or in Loch Maree in 2007. Further details of this fishery and its collapse can be found in Butler (2002) and Butler and Walker (2006).

Much has been written about sea trout fishing in Loch Maree; once 'famous among anglers everywhere' (McLaren and Currie, 1972). The art of dapping was developed on the loch in the 1920s, and is still used today for fishing for trout and sea trout. During the 1970s and 1980s, the Loch Maree Hotel employed 9 ghillies through the fishing season (April to October). Hotels in Kinlochewe also employed several ghillies. For the economy of the area, sea trout were as important as salmon so far as supporting local jobs. With the collapse of the sea trout fishery, the majority of fisheries related jobs in the River Ewe system were lost. Two up-market hotel establishments have subsequently become holiday lodges, with associated loss of employment.

Numbers of brown trout relative to sea trout recorded in Loch Maree hotel catches increased during the 1990s, possibly reflecting an underlying change in the trout population. Fortunately, some sea trout genes are retained within the wild brown trout population(s): the potential for full recovery of the sea trout fishery and for a full revival of the ecosystem and economy supported by healthy sea trout stocks, remains.

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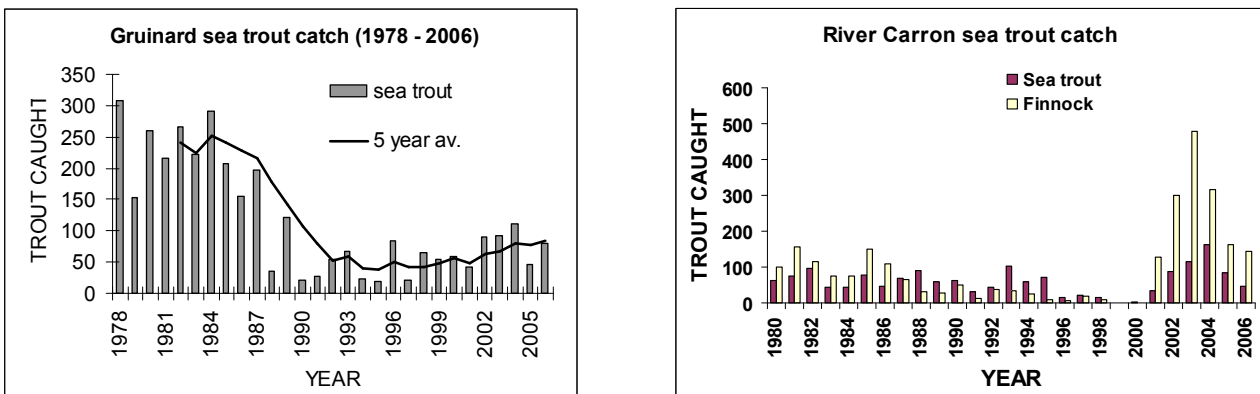
Other rivers

Stocks of sea trout in other rivers have also fallen. Other river systems which had notable sea trout fisheries in Wester Ross were the Broom (over 200 sea trout per year before 1975), Gruinard (over 250 sea trout per year in early 1980s) and the Balgy including Loch Damh (400 sea trout in 1975 – these may have included finnock).

In 1938, Herbert Nall described the sea trout of the River Carron and Loch Dhughaille in a remarkable study which demonstrated the abundance of fish at that time, and their size. This study also compares the growth rates of Carron sea trout with those of the Ewe (Loch Maree), Laxford and Ailort, and those of East Coast Rivers. The River Carron sea trout populations also collapsed in the 1990s. A stock restoration programme was initiated by fishery proprietors, and led by Bob Kindness of Seafield College. Catches of sea trout recovered until 2004 when a 'record' rod catch of 150 sea trout was recorded. Subsequently catches have fallen again.

The FRS Shildaig Project was set up to investigate problems affecting sea trout in a small river system by Loch Torridon. Ten years on, problems associated with sea lice emanating from fish farms have yet to be resolved (Raffell *et al* 2007). Most small river systems, especially those with lochs, provided sea trout fishing for holidaymakers, and there is great potential to restore many of the smaller systems if solutions to sea lice problems can be found.

Figure 3.5.2 Sea trout catches in the River Gruinard and the River Carron.



Finnock (juvenile sea trout) and sea lice from mouth of River Ewe, June 2005



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3.5.4 Stocking

Trout have been stocked into some of the rivers and lochs of the area in Wester Ross for at least 100 years. Traditionally, local anglers have moved trout from loch to loch by bucket. Trout from Ardgay hatchery were stocked into the Ullapool River in the 1950s. Angling clubs stocked trout including 'Loch Leven trout' into many lochs. In recent years both angling clubs and loch proprietors have stocked trout from out with respective catchments into hill lochs.

Following the collapse of Loch Maree sea trout stocks in the 1990s, non-native sea trout of Tyne – Osgaig origin were stocked into the system. Subsequently FRS supported efforts to use native stock and established a captive broodstock in 1994. Some of the fish reared from progeny of sea trout caught in 1994, were still producing eggs in 2007 which are fertilised with milt from wild male trout taken in Coulin spawning streams in the autumn.

Trout of Coulin (Ewe headwaters) origin have been stocked into a number of other systems, notably the Shieldaig system (Loch Torridon) by FRS; and by Seafield College into other systems, including the River Carron where over 100,000 fry have been stocked annually since 2001.

Elsewhere brown trout from out with the local area have been regularly stocked by angling clubs into local lochs. The practice of stocking is discussed further in Cunningham, 2007 (Wester Ross Wild Trout Project Report).

Stephen Buttle has worked at the FRS Shieldaig Sea trout project since 2004. The fish he is holding was taken in a sweep net at the mouth of the River Carron in July 2008 and was the largest sea trout he had seen to date. The fish was carrying over 50 sea lice and had a tatty dorsal fin.



3.6 Arctic charr *Salvelinus alpinus*

3.6.1 Distribution

The Arctic charr of Wester Ross are assumed to be descended from sea-going ancestors which entered the river systems of the area at the end of the last period of glaciation some 10,000 years ago. They are magnificent fish, often turning bright red and black at spawning time. The WRFT area is a stronghold for arctic charr populations in the United Kingdom. There are at least 25 lochs where charr have been recorded, and at least 27 separate populations (Table 3.6.1).

Table 3.6.1 Lochs where Arctic charr have been recorded in Wester Ross (listed north to south). The date given is of the most recent record known to WRFT.

	Name	Morphs	Easting	Northing	Date	Status	Source	Comment
1	Loch na Maoile (Kanaid)	1	215700	900000	2007	healthy	A Williams (pcom)	stocked by UAC
2	Loch a' Choire	1	186800	895400	unknown	unknown	A Stephen (pcom)	
3	Loch nan Clachan Geala	1	185700	895300	1970	unknown	FCC (G Friend)	literature
4	Loch an Draing	1	177500	890500	2006	healthy	P Cunningham (WRFT)	gill net
5	Loch na Sealga (Gruinard)	2	203000	883300	2007	unknown	R Greer (pcom)	gill net
6	Loch Toll an Lochain (Dundonnell)	1	207400	883200	2000	unknown	J Butler (2000c)	
7	Loch Ghuibhsachain (Gruinard)	1	200500	882000	1998	unknown	J Butler (2000b)	observed
8	Loch Kernsary (Ewe)	1	187600	880700	2006	unknown	P Cunningham (WRFT)	gill net
9	Loch Tollie (Ewe)	1	184000	878500	2006	unknown	P Maitland (WRFT)	gill net
10	Fionn Loch (Little Gruinard)	1	196000	876500	1991	unknown	A Walker (1992)	gill net
11	Loch Bad na h-Achlaise	1	177000	873600	unknown	unknown	B Sandison (1997)	
12	Loch Clair	1	177300	871800	unknown	unknown	A Stephen (pcom)	rod
13	Lochan Fada (Ewe)	1	202300	871000	1970	unknown	FCC (G Friend)	literature
14	Loch Braigh Horrisdale	1	179800	870500	unknown	unknown	A Stephen (pcom)	rod
15	Loch Garbhaig (Ewe)	1	200000	870500	unknown	unknown	J Butler (2002)	from estate records
16	Loch Maree (Ewe)	2	196300	869300	2007	unknown	R Greer (pcom)	gill net
17	Loch a' Bhealaich (Badachro)	1	186500	864200	unknown	unknown	A Stephen (pcom)	angling
18	Loch Clair (Ewe)	1	200000	857200	2007	unknown	N Morrison (WRFT)	fyke net
19	Loch Coulin (Ewe)	1	201500	855200	2007	stable	P Cunningham (WRFT)	observed spawning
20	Loch Sgamhain (Carron)	1	210000	852900	2000	unknown	B Kindness (pcom)	
21	Lochan Uaine (Ewe)	1	196800	852400	1997	stable	J Butler (2002)	Adams <i>et al</i>
22	Loch Dughail (Shieldaig)	1	182800	851200	1979	unknown	FCC (R Campbell)	field
23	Loch Damp (Balgy)	1	186300	850900	2003	unknown	A Pearson (WRFT)	rod caught
24	Loch Coire Lair (Carron)	1	197500	850500	1981	unknown	FCC (R Campbell)	field - angling
25	Loch Dughail (Carron)	1	199800	847200	2000	unknown	B Kindness (pcom)	field
26	Loch a' Mhuilinn (Carron)	1	192200	846000	1970	unknown	FCC (G Friend)	literature
	Number of populations	28						

[note: anecdotal reports of charr in Loch Lundie have recently been received, July 2008]

In addition to lochs, arctic charr have also been recorded in nearby streams. At least two of these are known to be spawning places. Details have been removed from this draft for reasons of protecting sites. Please contact WRFT for further information.

Charr provided by Wester Ross Salmon were introduced to the Dam Lochs including Loch na Maoile by Ullapool Angling Club in the early 1990s (Butler, 2000). These were thought to have died out by 1994, but in 2007 a local angler caught several charr in Loch na Maoile.

It seems possible that charr in other high altitude lochs (e.g. Loch Toll an Lochain, Loch Uaine) are populations which are of stocked origin.

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Figure 3.6.1 Lochs where arctic charr have been recorded in Wester Ross. Note that the Charr in Loch na Maoile (Kanaird) are of stocked origin.



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3.6.2 Population structuring

Little is known about population structuring of charr in Wester Ross, though some work has been done on phenotypic variation Alexander and Adams (2000). Each loch is assumed to have one or more distinct populations. Two morphologically distinct populations of Arctic charr are known to occur in Loch Maree, Loch Dughaill and possibly also Loch na Sealga (Greer, 2008 pers comm.).

[Further discussion regarding stream spawning char populations has been removed from this draft to protect sites.]

Size of charr

Charr in different lochs vary in size at maturity. Charr seen in Loch an Draing and at Coulin (River Clair) were mostly between 20 and 25cm in length. A charr of 3.25 lb was caught in Loch Clair in 1990, and several charr of 1lb were taken during the period when salmon cages were present in the loch (1986 – 1992). Subsequently, such large fish have not been seen (Butler, 2002). Large charr to over 3lb in weight have also been taken in Loch Damh, where there are salmon cages. In Loch Maree, pelagic charr of 35 cm were taken in 2005 and 2006. Charr in Loch Kernsary and Allt Doire an Fhuaran (Loch na Sealga pelagic) were of around 30cm in length. In contrast, the big-eyed benthic charr of Loch Maree are typically only 15cm in length.

3.6.3 Trends in abundance

Virtually nothing is known about trends in abundance of arctic charr populations in Wester Ross. Further discussion relating to stream spawning populations has been removed from this draft but may be available on request.

It is possible that the arctic charr population in the Loch Dughaill (Shieldaig) system has been lost.

3.6.4 Charr fisheries

There are anecdotes of charr being netted historically in Loch Kernsary and from Loch Maree in the 'late autumn' (Dixon, 1886). It is likely fish were taken from their spawning ground, although the exact location has yet to be determined.

Char have been caught by rod and line from Loch Tollie, Loch Damh and some of the smaller hill lochs. Very few have been taken from Loch Maree in recent years. In the 1970s they were taken '*in the last part of May or June . . . on fly in the half light of a West Highland night*' (McLaren & Currie, 1972).

The pelagic charr of Loch Maree are beautiful fish. Following further investigations of population status, including exploration of spawning areas (and appraisal of FRS hydro-acoustic survey 2007 data), there may be potential for promotion of a carefully regulated rod fishery in Loch Maree partly as a means of raising awareness of the population.

Arctic charr were formerly netted in the autumn in Loch Maree (Dixon, 1886). The location of the netting site is not known to WRFT and is of great interest as a possible spawning site. There are also local anecdotes that charr were netted in Loch Kernsary in the autumn. WRFT is seeking further information about both of these sites.

Charr are caught by rod anglers in some waters. In 2007, the WRFT biologist received reports and photographs from Andy Williams of Ullapool Angling Club of catching charr in one of the Dam Lochs above Strath Kanaird, including 8 charr in 2hrs in September 2007. These charr were of stocked origin, stocked by Wester Ross Salmon in the early 1990s. The stocked fish have evidently spawned successfully.

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Charr were also taken in Loch Maree on the fly in years gone by (MacLaren and Currie, 1972); Loch Maree is perhaps the one loch where a fishery for charr could possibly be established in the future, pending an assessment of the status of the population.

Charr of up to 3lb have been caught in Loch Damh since 2000. As elsewhere in Scotland where unusually large charr are caught, Loch Damh has salmon smolt production cages, and the feeding is enriched. Charr are also caught from time to time in Loch Tollie which has salmon cages though none have been recorded of unusually large size.

Arctic charr from spawning stream above Loch na Sealga, October 2005



3.7 American brook charr *Salvelinus fontinalis*

Brook charr are found in Lochan Uaine, a hill loch draining into the Coulin River. This is one of few lochs where brook charr have become firmly established (Butler, 2002). They were introduced in the 1890s. It is suspected that brook charr are out competed by Brown trout, and consequently most self sustaining populations occur where trout are absent. This is certainly the case in Lochan Uaine, where they share the loch with Arctic charr.

Brook charr spawn successfully at the outflow, and reach a size of 8oz. The trout may be of particular genetic interest as they may represent a relict wild North American strain. Although an alien species, the inability of brook trout to compete with brown trout successfully ensures that they are unlikely to become established elsewhere in the system. The species is therefore not regarded as a threat to other native species.

3.8 Eurasian minnow *Phoxinus phoxinus*

3.8.1 Distribution and abundance

Within the Wester Ross Fisheries Trust area, the Minnow is considered to be a non-native species that has been introduced to the areas by anglers as discarded live bait. Maitland (2007) suggests that minnows are able to arrive in new streams by their own efforts, or even on bird's feet (Maitland, *pers comm.*). The Minnow has become more widely distributed in Wester Ross over the past 10 years, and has been recorded in electro-fishing catches in the Kanaird (Runie), Dundonnell, Gruinard and Shieldaig (by Loch Torridon) systems for the first time within the past 5 years.

Minnows have become very abundant in Loch Maree (Cunningham, 2005) where many were found to be disfigured with a parasitic tapeworm (see Box 3.8.1). So far as fisheries management is concerned, the main concern is the extent to which juvenile trout (including sea trout fry) have been competitively displaced by minnows. Electro-fishing of shallow margins of Loch Maree in 2005 produced very few trout. In contrast, only trout were found at loch sites surveyed in Loch Coulin and Loch Clair in the upper Ewe catchment. Minnows are also known to eat charr eggs (Greer, *pers comm* 2008)

Minnows may not be all bad news. They are considered to be of value as food for other wildlife, including Black-throated diver and Otter, for which Loch Maree is a designated Special Protected Area and Special Area of Conservation respectively under EU Habitats Directive 1992. However, if juvenile salmonid populations have been depressed as result of minnows, there may be little benefit to breeding divers for which the abundance of larger salmonids (10 -15cm) may be of greater importance (Jackson, 2006).

3.8.2 Proposed actions

Little is known about the impacts of minnow colonisation on other fish populations, nor indeed about the status of juvenile fish populations in lochs prior to colonisation. The proposed inventory gill net surveys of lochs aim to provide basic information on fish occurrence and relative abundance at selected waters.

Minnows can be readily caught in traps made from bottles. However, even after much trapping in a Sutherland loch, a reduction in minnow populations was not detectable (Marshall, *pers com.*). Once minnows arrive in a watershed, it seems that little if anything can be done to control them.

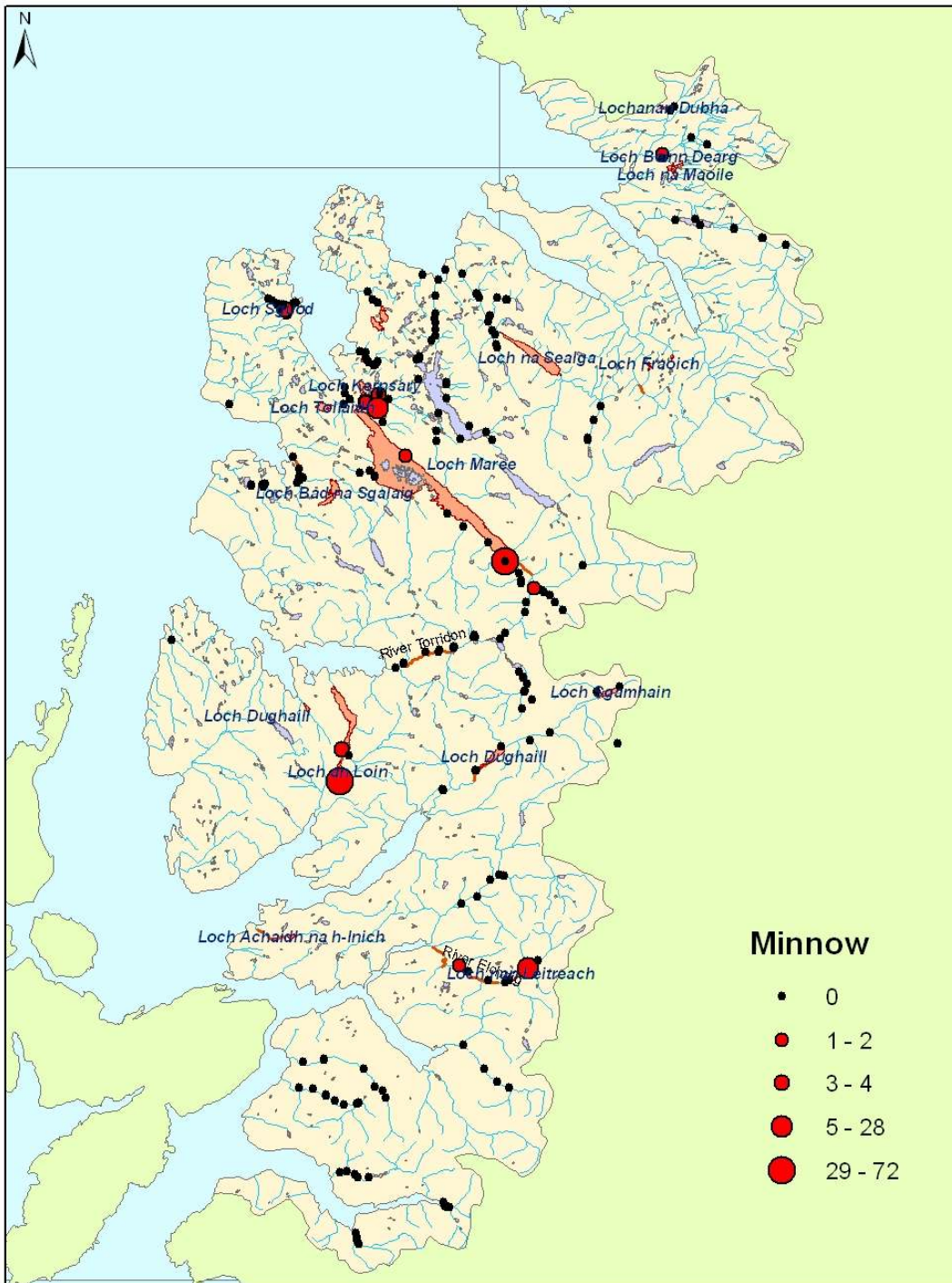


Box 3.8.1 Many of the larger minnows in Loch Maree especially those from loch sites had grossly distended bellies (Cunningham 2005). Sub-samples dissected at Tollie Bay, Slattadale and Taagan Bay showed them to be infected by tapeworm.

If this parasitic tapeworm is *Ligula intestinalis* (to be confirmed), its lifecycle includes a bird (Black throated diver?) and copepod zooplankton as intermediate hosts. Parasitic tapeworms were not found in small trout.

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Figure 3.8.1 Known occurrence of minnows within the WRFT area. Lochs where minnows have been recorded are shaded red. Sections of river where minnows have been recorded are shown in red. The circles relate to the total numbers of minnows caught at a stream electrofishing site during a single fishing (usually between 5 and 15 minutes).



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3.9 Three-spined stickleback *Gasterosteus aculeatus*

3.9.1 Distribution and abundance

Sticklebacks are widely distributed within Wester Ross, occurring in the lower reaches of most river systems, and also in many freshwater lochs. They are likely to have been under-recorded during electro-fishing surveys because of the type of habitat (shallow run-riffle) usually surveyed.

In 2005 they were found at most electro-fishing sites within the shallow margins of Loch Maree, but not in Lochs Clair or Coulin. They were particularly abundant relative to other fish at weedy sites in the Loch na Fideil burn near Talladale.

Sticklebacks have also been encountered in many smaller trout lochs, particularly large sticklebacks possibly of about 8cm in length were found in Loch na h-Uamhaidh Moire (NGR 179800 891700) in 2006.

Other rivers with relatively high abundance of sticklebacks include cemetery burn in the Dundonnell River

WRFT has no information about trends in abundance.

3.9.2 Proposed actions

The stickleback is a common species in Scotland, and there are no specific conservation needs (Maitland, 2007). Sticklebacks are good fish for laboratory studies and aquaria, and there may be potential for developing school based projects using local populations of sticklebacks. WRFT will, continue to document and catalogue stickleback populations during other survey work.

3.10 Pike *Esox lucius* [and Perch *Perca fluviatilis*]

3.10.1 Distribution and abundance

Pike were introduced to **Loch Bad na Sgalaig** in the River Kerry catchment sometime during the 19th century (Dixon, 1886) where they became established. The loch, since connected with the Dubh Loch as part of the Kerry falls hydro-electric project in the 1950s, currently sustains a winter pike fishery which is valued by a number of local anglers. Several pike in the teens of pounds in weight are caught each year, and pike of over 20lb have been taken. A few pike are also taken from time to time below the loch in the River Kerry.

The other pike population is in **Loch Achaidh na h-Inich** at the top of the Duirinish Burn near Plockton. This loch also supports a fishery for pike which is valued by local residents and some anglers who travel from further afield to fish the loch.

3.10.2 Threats and proposed actions

To date, Pike have not been recorded in any of the major salmon and sea trout river systems. The River Ewe and the River Carron systems are perhaps most vulnerable to the spread of pike from lochs at the top of the River Conon system.

As highlighted in the River Ewe Fisheries Management Plan 2002-2006 (Butler, 2002) the potential risk of pike introductions to other neighbouring systems is great. If such an introduction were to occur into Loch Maree, the ecological implications would be severe for both the depleted stocks of salmon and sea trout, and for breeding Black-throated diver (chicks would be taken by large female pike). Every effort should be made to minimise the risk of such an introduction occurring.

3.10.3 Perch *Perca fluviatilis*

Perch are also present in lochs in river catchments bordering the WRFT area to the east, including Loch Glascarnoch, Loch Fannich and Loch a' Chroisg. So far they have not been recorded in the WRFT area. Perch eat many of the food items taken by trout, so would compete with them. Although minnows can represent a large portion of the diet of perch, small trout might be as readily consumed. As for pike, the spread of perch into the WRFT would also be detrimental to salmonid fisheries.

3.11 Flounder *Platichthys flesus*

Flounders are widespread in the estuaries around the WRFT area. In freshwater, they are sometimes taken as far as 500m above the tidal limit. They are recorded routinely during e-fishing surveys. To date, catch data has not been analysed.

Some of the juvenile flatfish taken in Charleston Harbour (Flowerdale River) estuary in 2007 were intermediate in appearance between Flounder and Plaice, and may have included hybrids. Both species are potential of value for inshore rod fisheries.

WRFT wishes to alert FRS to the possibilities of routinely obtaining data relating to juvenile flatfish populations during sweep netting for sea trout.

3.12 Sea bass *Dicentrarchus labrax*

The Sea bass has been recorded around the shores of Wester Ross. Maitland (2007) quotes F. G. Aflalo of sea bass occurring in Loch Carron, Ross-shire. In 2005, sea bass 'schoolies' were taken by anglers fishing at Red Point, in Loch Gairloch and in Gruinard Bay (Jeffries *pers comm.*; Kerrison, *pers comm.*). The WRFT biologist is yet to encounter a sea bass despite several attempts with rod and line .

Further information on the occurrence of sea bass in NW Scotland would be useful.

3.13 References

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