

**COMPLAINT TO THE COMMISSION OF THE EUROPEAN COMMUNITIES  
CONCERNING THE FAILURE OF THE UNITED KINGDOM (UK) TO COMPLY  
WITH THE HABITATS DIRECTIVE (92/43/EEC) IN RESPECT OF ATLANTIC  
SALMON (*Salmo salar*).**

**The failure of the UK, pursuant to Article 4, to designate an adequate number  
and coverage of SACs for Atlantic salmon on the north-west coast of Scotland**

**The failure of the UK, pursuant to Article 4, specifically to designate the  
Ullapool River as an SAC for Atlantic salmon**

**The failure of the UK, pursuant to Article 6(2) and (3), sufficiently to protect  
those SACs already designated for Atlantic salmon from the impacts of marine  
salmon farming**

**The failure of the UK, pursuant to Article 6(2) and (3), to ensure that marine  
salmon farming activity does not threaten the integrity of the Little Gruinard  
and Langavat SACs**

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**On behalf of Mr Ewen and Mrs Jenny Scobie of the Rhidorroch Estate, near  
Ullapool in Ross-shire, Scotland, UK**

**Mr and Mrs Scobie would like to thank all the many fisheries scientists, proprietors, lawyers, conservation and fisheries organisations and others, both in Scotland and elsewhere, who have provided information and invaluable comment on the substance of this Complaint.**

<b>Contents</b>	<b>Page</b>
Executive Summary of Complaint	4 - 8
Summary of Complaint Recommendations	9
Supporting Organisations	10
Part 1	11
Part 2	18
Part 3	32
Part 4	59
Glossary	82

## **Executive Summary of Complaint**

The complaint is in four Parts.

### **Part 1: The failure of the UK, pursuant to Article 4, to designate an adequate number and coverage of SACs for Atlantic salmon on the north-west coast of Scotland**

The UK's Atlantic salmon population is important in a European context. The Habitats Directive requires that this should influence the selection of SACs in the UK.

Yet the UK appears to be heavily under-represented within the EU list of those SACs designated for Atlantic salmon. Scotland has just 17 SACs out of an EU total of 145 SACs where Atlantic salmon is listed as an interest feature yet Scotland is home to over half of the EU stock of spawning salmon. This is contrary to the requirements of Article 4.

The only practical way to rectify this paucity is for a new tranche of SACs to be designated for Atlantic salmon on the west coast of Scotland as soon as practicably possible.

Documents obtained pursuant to the Council Directive 2003/4/EC on public access to environmental information, show that the Scottish Government has unlawfully closed the door on the designation of further SACs for salmon, contrary to Article 4(1) which requires the UK to propose adaptation of its SAC list in the light of improved knowledge and understanding.

### **Recommendation:**

The UK should designate further SACs for the protection of Atlantic salmon, based on the priority river systems identified by Butler & Watt (2003)<sup>1</sup>.

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<sup>1</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in "Salmon on the Edge" (ed D Mills), pp 119 – 128, Blackwell, Oxford.

## **Part 2: The failure of the UK, pursuant to Article 4, specifically to designate the Ullapool River as an SAC for Atlantic salmon**

In May 2009, the owners of the Rhidorroch Estate, which includes almost all of the Ullapool River, proposed the designation of the Ullapool River as an SAC for salmon.

The Ullapool River has an unusual salmon stock amongst Scottish west coast rivers, including a significant spring run, which is likely to be a unique genetic character of the stock. The 168km<sup>2</sup> catchment is largely pristine, exploitation of the spring stock has been minimised by the implementation of a catch and release policy by the owners of the rod fishing since 1998 and virtually the whole of the catchment accessible to salmon is under single ownership. The owners are keen to pursue a designation for the river. Part of the catchment is already designated as the Rhidorroch Woods SAC for Northern Atlantic wet heaths and Caledonian Forest. There are at least 13 other Annex 1 habitats or Annex 2 species within the catchment.

The negative response to the proposal from the Scottish Government is at odds with the duty in Article 4(1) of the Habitats Directive which requires the UK to propose adaptation of the list. The Scottish Government has unlawfully closed the door on the designation of the Ullapool River as an SAC for salmon, despite the requirements of Article 4(1).

### **Recommendation**

The UK should designate the Ullapool River as an SAC for Atlantic salmon.

**Part 3: The failure of the UK, pursuant to Article 6(2) and (3), sufficiently to protect those SACs already designated for Atlantic salmon from the impacts of marine salmon farming**

Article 6(2) requires that the UK should establish measures to protect wild Atlantic salmon populations in SACs from, inter alia, (i) raised sea lice burdens emanating from marine salmon farms and (ii) the influence of escapee farmed fish.

Farming of Atlantic salmon in floating cage farms in coastal waters on the north-west coast of Scotland has had a negative impact on stocks of wild salmonid fisheries (wild Atlantic salmon and sea trout); this is no longer reasonably contested, even by the Scottish Government, which concedes that it is likely that impacts of aquaculture, and most probably the effects of sea lice and escapes of farmed fish, have contributed to the decline in stocks and may have slowed recovery of stocks in some rivers.

Even with greater access to effective sea lice treatment agents, it is uncertain that total lice numbers can be brought down to low enough levels to protect wild salmonids. Existing sea lice treatments are becoming less effective as tolerance and resistance to these treatments increases.

Further, escapee farmed salmon can and do interbreed with wild stocks potentially causing lowered fitness, with repeated escapes causing cumulative fitness depression and potentially an extinction vortex in wild salmon populations.

Both sea lice and escapes pose a threat to SACs already designated for Atlantic salmon on the west coast of Scotland. It is therefore arguable whether the UK has properly applied the test in Waddensea when licensing salmon farming operations near SACs designated for Atlantic salmon, pursuant to Article 6(3).

It is patent that all the research, whether related to escapes or to sea lice, is flowing in one direction. The lack of scientific certainty, upon which basis Scottish

Government has apparently decided not to act, should, on the contrary, be the basis for adopting a strict precautionary approach to the siting and management of fish farms in accordance with the European Union's Communication (2000) on the application of the precautionary principle.

### **Recommendations:**

The UK Government should revise its management of the accepted threats of marine salmon farms to wild salmon and therefore salmon SACs.

For salmon SACs, on a precautionary basis, this should entail:

- i) no marine salmon farms within 25km (by sea) of salmon SAC river mouths to minimise lice infection risk to emigrating wild fish, implying the early relocation of any already within 25km and, in the interim,
  - 1. the use of alternative production cycles; and
  - 2. enforced zero ovigerous lice per farmed salmon; and
  - 3. enforced synchronised production of all marine farm sites.
- ii) a presumption against further expansion of farm production within 30km by sea of any salmon SAC to minimise the impact of both sea lice and escaped farmed fish

#### **Part 4: The failure of the UK, pursuant to Article 6(2) and (3), to ensure that marine salmon farming activity does not threaten the integrity of the Little Gruinard and Langavat SACs**

Salmon farming in proximity to the two north-west coast SACs designated for Atlantic salmon, the Little Gruinard SAC and the Langavat SAC, has not met the policy level targets, aims and objectives, threatening the conservation status of those SACs contrary to Article 6(2).

Requests made to statutory bodies pursuant to Directive 2003/4/EC on public access to environmental information show the gulf between the reality 'on the ground' and the Scottish Government's vision of fishfarms compliant with the Code of Good Practice, keeping lice numbers within levels that do not threaten wild fish (with a target of zero ovigerous lice) and suffering minimal escapes.

#### **Recommendations:**

The UK Government should revise its management of the threats of marine salmon farms to the Little Gruinard and Langavat SACs. This should entail:

- i) no marine salmon farms within 25km (by sea) of both the Little Gruinard or Langavat SACs (or the proposed Ullapool River SAC) to minimise lice infection risk to emigrating wild fish, implying the early relocation of any already within 25km and, in the interim,
  - a. the use of alternative production cycles; and
  - b. enforced zero ovigerous lice per farmed salmon; and
  - c. enforced synchronised production of all marine farm sites.
- ii) a presumption against further expansion of farm production within 30km by sea of both the Little Gruinard or Langavat SACs (or the proposed Ullapool River SAC) to minimise the impact of both sea lice and escaped farmed fish.



## **Summary of Complaint Recommendations**

The designation of further SACs for the protection of Atlantic salmon, based on the priority river systems identified by Butler & Watt (2003).

The designation of the Ullapool River as an SAC for Atlantic salmon.

The revision of the UK Government's management of the accepted threats of marine salmon farms to wild salmon and therefore salmon SACs.

For all salmon SACs, existing and future, including the Little Gruinard and Langavat SACs and the proposed Ullapool River SAC, on a precautionary basis, this should entail:

- no marine salmon farms within 25km (by sea) of salmon SAC river mouths to minimise lice infection risk to emigrating wild fish, implying the early relocation of any already within 25km and, in the interim,
  - the use of alternative production cycles; and
  - enforced zero ovigerous lice per farmed salmon; and
  - enforced synchronised production of all marine farm sites.
- a presumption against further expansion of farm production within 30km surrounding any salmon SAC to minimise the impact of both sea lice and escaped farmed fish.

## **Supporting Organisations**

This Complaint is supported by:

The Salmon and Trout Association, a UK-wide membership-based charity, registered also in Scotland, which aims to conserve the aquatic environment and its dependent wild fish species.

The Association of District Salmon Fishery Boards, which aims to protect, preserve and develop salmon fisheries in Scotland. The Association is the representative body which attends to the interests of its members - Scotland's 41 District Salmon Fishery Boards (DSFBs) – which enjoy statutory powers under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003.

The Wester Ross Area Salmon Fishery Board (the WRASFB district covers the Two Brooms, Little Gruinard SAC and Ullapool River)

The Kyle of Sutherland District Salmon Fishery Board

Salmon Watch Ireland, a membership-based private organisation dedicated to the restoration of salmon abundance in Ireland.

[In 2009, Salmon Watch Ireland has made a complaint to the Commission concerning the protection of wild salmon from harm caused by aquaculture in Ireland

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<http://www.salmon.ie/files/Salmon%20Watch%20Ireland%20makes%20complaint%20to%20the%20EU%20Commission%20about%20Irish%20salmon%20farms.pdf>]

The Scottish Gamekeepers Association, a private membership organisation representing gamekeepers, ghillies, wildlife managers and rangers in Scotland, promoting their professional role in the management of the Scottish environment and highlighting the contribution country sports make to the Scottish rural economy.

## **Part 1:**

### **The failure of the UK, pursuant to Article 4, to designate an adequate number and coverage of SACs for Atlantic salmon on the north-west coast of Scotland**

The Atlantic salmon is one of a list of wild fish species that were once common in Scotland and adjacent waters and contributed greatly to the economy of Scotland.

Largely as a result of public pressure, there is now a much higher level of protection for terrestrial mammals and birds than for wild fish populations. This is despite the fact that wild fish populations are of particularly high economic and cultural, as well as of conservation importance. The Atlantic salmon is a keystone species for Scotland.

It is listed on Annex II of the Habitats Directive (a status it enjoys in freshwater only). The Directive therefore requires of Member States the designation of SACs in accordance with the criteria provided in Article 4 of the Directive.

Member States are required to propose a list of sites to protect those species listed in Annex II of the Directive.

Sites were selected in the UK on the basis of adult abundance (based on both rod and net catches where applicable), the presence of multiple life history types and geographical location.

The UK salmon population is important in a European context. The Directive requires that this should influence the selection of SACs in the UK. Scotland hosts about 80% of the UK Atlantic salmon resource and the 17 SACs in Scotland include about 40% of this<sup>2</sup>.

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<sup>2</sup> Answer given by Roseanna Cunningham, Minister for the Environment in Scotland, to PQ dated 4<sup>th</sup> June 2009

However, the UK appears to be heavily under-represented within the EU list of those SACs designated for Atlantic salmon.

Scotland has just 17 SACs out of an EU total of 145 SACs where Atlantic salmon is listed as an interest feature yet an ICES working group on North Atlantic salmon reported in 2008 that Scotland is home to over half of the EU stock of spawning salmon<sup>3</sup>.

While the Atlantic salmon is a widespread species in the UK, and may once have been found in several hundred rivers, some still enjoying adult runs in excess of 1000 fish, the latest estimates of the UK spawning populations are, however, about 50% down on the ten-year average.

The species is subject to many pressures, including pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality. For example, the Scottish Government acknowledges that there is concern about the reduction in the run of multi-sea-winter fish in Scottish rivers<sup>4</sup>.

On the north-west coast of Scotland (including the Western Isles), there are **only two** SAC designated for the conservation of Atlantic salmon<sup>5</sup>.

The pattern of very few north-west coast SACs matches geographically the Government's presumption in favour of salmon farming over wild fishery interests on the north-west coast<sup>6</sup>.

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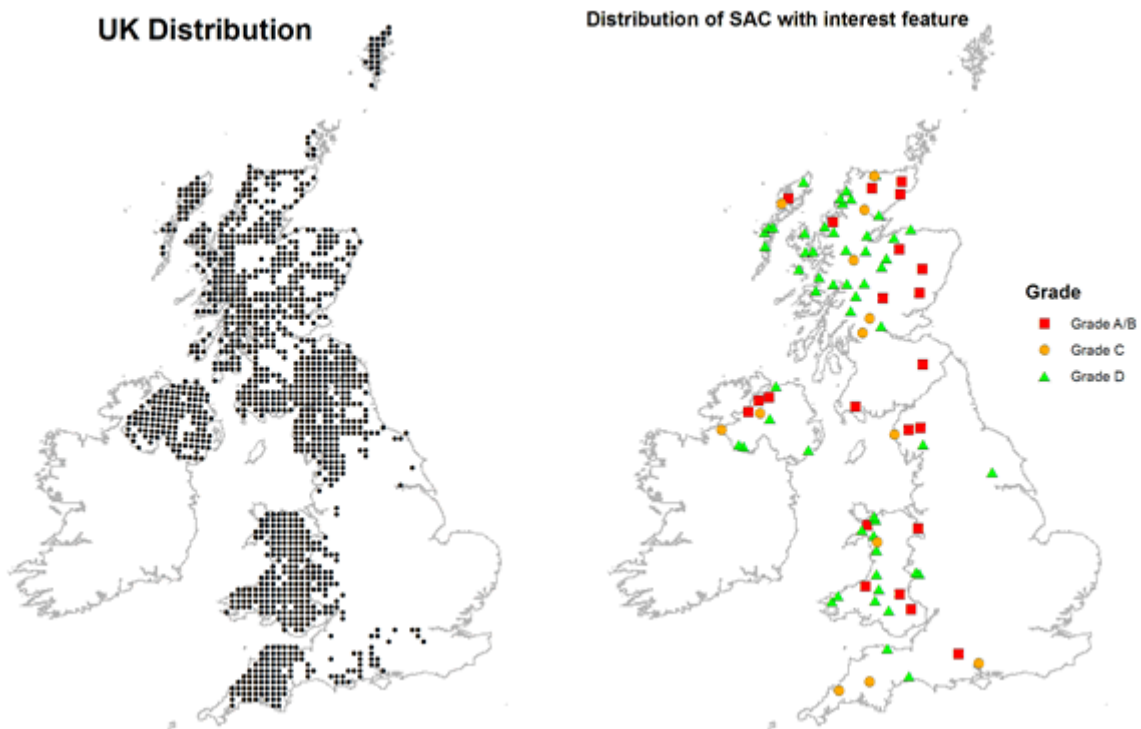
<sup>3</sup> Solomon, D (2009) The Ullapool River and its remarkable stock of salmon – why it deserves SAC status. Report commissioned by Rhidorroch Estate. 5<sup>th</sup> May 2009.

<sup>4</sup> Scottish Government Marine Directorate (2008) Ad Hoc Review Group Implementation Plan for Meeting the Objectives of North Atlantic Salmon Conservation Organisation (NASCO) Resolutions and Agreements

<sup>5</sup> JNCC website - <http://www.jncc.gov.uk/protectedsites/sacselection/species.asp?FeatureIntCode=S1106>

<sup>6</sup> Paragraph 5.10 of the Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie 'B', Little Loch Broom; Report by Director of Planning and Development

This striking paucity of SACs designated for Atlantic salmon on the north-west coast of Scotland is perhaps most clearly illustrated by a visual comparison of the maps of 'salmon SACs' with that of the distribution of the Atlantic salmon across the whole UK, taken from the UK Government's JNCC website<sup>7</sup>. Note that the red squares on the second map (Grade A/B) are the 'salmon SACs' actually designated.



Guidance issued by Scottish Natural Heritage<sup>8</sup> on the need for appropriate assessment of plans or projects affecting SACs for Atlantic salmon notes that salmon “show strong homing to their natal stream and this has led to the development of genetically distinct populations, both between and within individual catchments”. This is particularly believed to be the case on the west coast of Scotland.

<sup>7</sup> [http://www.jncc.gov.uk/publications/JNCC312/species\\_comparison.asp?FeatureIntCode=S1106](http://www.jncc.gov.uk/publications/JNCC312/species_comparison.asp?FeatureIntCode=S1106)

<sup>8</sup> Scottish Natural Heritage (2006) Guidance for Competent Authorities when dealing with proposals affecting SAC freshwater sites January 2006.

This view was echoed by the Fisheries Research Services: “Under natural conditions, the larger Scottish river catchments contain many or several somewhat separate types of salmon that show systematic variation in their relative run timings. The differences are driven by genetics and maintained by the accurate homing of the majority of spawners to the near vicinity of their original rearing locations. The large, natural range of run-timings adds substantial value to fisheries and all the various runs should be supported in appropriate ways”<sup>9</sup>.

A report commissioned by Scottish Natural Heritage in 2007, which looked at the genetics of salmon in salmon SAC rivers, noted that “understanding of west coast rivers, particularly the small ones that are currently under threat, is limited. These rivers, potentially at least, may contain many hundreds of distinct breeding populations.....what information is available from rod catches, net fisheries and surveys of juvenile population density, indicates that numbers of salmon in many rivers have declined precipitously, giving rise to serious concerns for their long-term viability”.<sup>10</sup>

The SNH report also looked at the genetics of salmon in both the Little Gruinard and Langavat SACs and concluded that “contrary to expectations, high levels of genetic diversity and population differentiation exist in Atlantic salmon in West Coast SACs”.

As well as there being genetically different populations as between rivers, genetically distinct populations may also exist within a single river. The Loch Feochan genetics study in 2007 demonstrated that even within small west coast river systems there may be more than one separate salmon population<sup>11</sup>.

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<sup>9</sup> Fisheries Research Services (2007) Hatchery work in support of salmon fisheries Report No 65 2007

<sup>10</sup> SNH (2007) Genetic variability of Atlantic salmon (*Salmo salar*) populations within west coast SACs. Contract Report, FRS Freshwater Lab.

<sup>11</sup> Thompson, C. Verspoor, E. and A. Kettle-Whyte (2007) Loch Feochan salmon genetic study, Atlantic Salmon Trust Journal, Winter, 2006-2007;

The Atlantic Salmon Trust-sponsored Salmon Genetic Project (SALGEN) is predicated on the understanding that “taking on board the importance of genetic differences could make all the difference between saving a river’s stock and losing it”. Distinct genetic populations may have formed variously over decades, centuries or millennia and are the basic biological units controlling local species characteristics and abundance. As such, the SALGEN authors argue that these distinct genetic populations “must be the central focus of species management and conservation”<sup>12</sup>.

These studies, and the recent FASMOP study<sup>13</sup>, illustrate the need for a wider geographical coverage of SACs for salmon than is currently the case and suggests that the paucity of north-west coast SACs mean that the genetic diversity of Atlantic salmon is insufficiently protected at present, as against the headline aims and objectives of the Habitats Directive.

There have been specific proposals to remedy the lack of SACs on the west coast. Butler and Watt (2003) pointed to “the requirements of the Habitats and Birds Directives, and NASCO's precautionary principle” to propose the designation of the “15 largest and potentially most genetically diverse salmon rivers on the west coast”<sup>14</sup>. The 15 rivers proposed, per Table 9.4 (page 113), are:

Grimersta	Dionard
Laxford	Inver
Ullapool	Gruinard
Little Gruinard	Ewe
Ling	Shiel
Lochy	Awe
Fyne	Leven
Clyde	

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<sup>12</sup> AST (2010) “Why the genes should fit” - Atlantic Salmon Trust Journal

<sup>13</sup> Focusing Atlantic Salmon Management on Populations (FASMOP) genetics project - a collaborative project between the Scottish Government’s Fisheries Research Services, District Salmon Fishery Boards and the Rivers and Fisheries Trusts of Scotland (RAFTS)

<sup>14</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in “Salmon on the Edge” (ed D Mills), pp 119 – 128, Blackwell, Oxford.

While two of these rivers have since been designated as salmon SACs (Little Gruinard and Langavat / Grimersta), the remaining 13 may warrant designation as SACs with Atlantic salmon as a primary feature.

The only practical way to rectify this paucity is for a new tranche of west coast SACs to be designated for Atlantic salmon as soon as practicably possible.

However, any further designations appear to have been unlawfully ruled out, correspondence between the Scottish Government and its agencies indicating that the Government would “like to gently but firmly discourage any aspirations that we might consider designating ..... anywhere else for Atlantic salmon on the basis that it is our understanding that the UK SAC representation for the species is sufficient”<sup>15</sup>.

“we’re not in the game of looking for more Atlantic salmon sites because we believe Scotland and the UK to be sufficient as far as Atlantic salmon SACs go...”<sup>16</sup>.

“we’d wish to avoid encouraging this proposal. We are under no current EC pressure to designate more sites for Atlantic salmon. It seems highly unlikely that the C’ion [sic] would run with this if it made its way to their door....”<sup>17</sup>

In effect, the Scottish Government has closed the door on the designation of further SACs for salmon, contrary to the requirements of Article 4(1) which requires the UK to propose adaptation of its SAC list in the light of improved knowledge and understanding.

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<sup>15</sup> Email from Steven Dora, Landscapes and Habitats Division of Rural Directorate of Scottish Government to various SNH staff 27/04/09

<sup>16</sup> Email from Steven Dora, Landscapes and Habitats Division of Rural Directorate of Scottish Government to other Scottish Government staff 27/04/09

<sup>17</sup> Email from Steven Dora, Landscapes and Habitats Division of Rural Directorate of Scottish Government to various SNH staff 13/05/09



## Recommendation

The UK should designate further SACs for the protection of Atlantic salmon, based on the priority river systems identified by Butler & Watt (2003)<sup>18</sup>.

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<sup>18</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in "Salmon on the Edge" (ed D Mills), pp 119 – 128, Blackwell, Oxford.

## Part 2:

### The failure of the UK, pursuant to Article 4, specifically to designate the Ullapool River as an SAC for Atlantic salmon

#### Introduction

In May 2009, the owners of the Rhidorroch Estate, which includes almost all of the Ullapool River (below), proposed the designation of the Ullapool River as an SAC for salmon.



The proposal was made by way of a letter to the competent authority, Scottish Natural Heritage<sup>19</sup> and to the relevant Minister<sup>20</sup>. The Ullapool River had earlier been proposed for designation by Butler and Watt (2003)<sup>21</sup>.

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<sup>19</sup> Letter to Ian Jardine, Scottish Natural Heritage dated 8<sup>th</sup> May 2009

<sup>20</sup> Letter to Roseanna Cunningham, Minister for the Environment in Scotland, 8<sup>th</sup> May 2009

The proposal was supported by a wide range of fisheries scientists and biologists, including:

Peter Cunningham, fisheries biologist, Wester Ross Fisheries Trust 2001 - present

Dr Peter Cosgrove, expert in freshwater pearl mussels

Jon Gibb, Clerk and fisheries scientist to Lochaber District Salmon Fishery Board

Professor Peter Maitland, Fish Conservation Centre

David Hay – ex- Fisheries Research Services, Pitlochry

Dr Andy Walker – ex- Fisheries Research Services, Pitlochry

Dr Jon Watt, Waterside Ecology, formerly biologist to Lochaber Fisheries Trust

Paul Knight, Chief Executive of Salmon and Trout Association

Dr Dick Shelton, Research Director at Atlantic Salmon Trust, formerly i/c Fisheries Research Services, Pitlochry

Unfortunately, the reply from Scottish Natural Heritage, supported by the Minister in her reply, was negative, although it did note the opinion of Professor Maitland, that had more been known about the Ullapool River at the time of the selection of the UK's SAC list, then the Ullapool River would have been designated. Professor Maitland had stated that “if I had had your proposal on the Ullapool River available to me then, I would certainly have included it [in the original list of Scottish salmon rivers than went to JNCC]”<sup>22</sup>. Unfortunately, Scottish Natural Heritage position, contrary to Article 4(1), is that “we can't turn the clock back and Government has implemented decisions to include certain small river systems as representative of certain river types”<sup>23</sup>.

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<sup>21</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in “Salmon on the Edge” (ed D Mills), pp 119 – 128, Blackwell, Oxford.

<sup>22</sup> Letter from Professor P S Maitland to Dr David Solomon 5<sup>th</sup> May 2009.

<sup>23</sup> Letter from Ian Jardine, Chief Executive of Scottish Natural Heritage, 11<sup>th</sup> June 2009

## **The Solomon Report – why the Ullapool River should be designated under the Habitats Directive**

The proposal was based on an expert report commissioned by the Estate from Dr David Solomon<sup>24</sup>.

In his report, Dr Solomon listed the following observations which supported the case for designation of the Ullapool River:

1. The salmon stock in the river is most unusual amongst Scottish west coast rivers in that it has a significant spring run, which is a genetic attribute of the population.
2. This stock characteristic has been recognised for more than a hundred years.
3. There is a remarkable detailed record of rod catch in the river with the weight and date of catch of every fish caught since the end of the 19<sup>th</sup> Century.
4. A detailed study of the salmon stock of the river in the 1920's established the remarkable sea-age structure and provides an invaluable analysis of the stock at that time.
5. The spring component of the stock is still present, albeit at a reduced proportion, in spite of the current poor marine survival in the Atlantic as a whole and some limited restocking with fish from outside the catchment in the past.
6. Appropriate management of the river and its fishery should allow conservation of the unique genetic character of the stock.
7. The 168km<sup>2</sup> catchment is largely pristine with just one house in permanent occupation upstream of the A835, almost no roads, and no commercial forestry.

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<sup>24</sup> Solomon, D (2009) The Ullapool River and its remarkable stock of salmon – why it deserves SAC status. Report commissioned by Rhidorroch Estate. 5<sup>th</sup> May 2009.

8. There is no local fishery that exploits the stock.
9. Virtually the whole of the catchment accessible to salmon is under the ownership of a single family and the owners are keen to pursue a designation for the river.
10. Part of the catchment is already an SAC for its woodland interest.
11. Although the Atlantic salmon should be the primary feature of the designation there are at least 13 other Annex 1 habitats or Annex 2 species within the catchment.
12. Scotland is under-represented in the UK and EU lists of SACs for salmon.

One of the most important reasons Dr Solomon recognises for supporting the designation of the Ullapool River is that “very few west coast Scottish rivers have major spring runs of fish, though several of the large east coast rivers, of course, do so. Of those very few, the Ullapool River is the most remarkable for the almost total dominance of spring running (at least historically) and the small size of the river and its catchment”. Dr Solomon notes that the Wester Ross Fishery Trust has developed a Fisheries Management Plan for the catchment which recognises the unique nature of the Ullapool River population of salmon and its environment and that the potential for improved management of the site would be “greatly enhanced by a conservation designation”.

The unique nature of the Ullapool salmon population has been supported by early findings from the Focusing Atlantic Salmon Management on Populations (FASMOP) project, which includes the Scottish Government’s Fisheries Research Services scientists. The genetic marker studies of wild salmon have shown that while “most sites within Wester Ross show genetic differences from one another...the Ullapool River shows some of the larger differences to other sites”<sup>25</sup>.

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<sup>25</sup> Wester Ross Fisheries Trust (20101) Review May 2010

The Ullapool River has previously been proposed for designation. Butler and Watt (2003) pointed to “the requirements of the Habitats and Birds Directives, and NASCO's precautionary principle” to propose the designation of the “15 largest and potentially most genetically diverse salmon rivers on the west coast”, including the Ullapool River <sup>26</sup>.

The Ullapool River has supported a fishery for ‘spring’ salmon for over 100 years. This unusual population may have evolved in response to the Ness Falls, an impressive but not quite impassable falls situated downstream from the main spawning areas on the river<sup>27</sup>.

The river was noted in the 1950s for its early spring run of salmon; even though grilse have dominated catches in recent years, the Ullapool does maintain a spring run<sup>28</sup>. Of 44 salmon caught in 2005, 8 were spring fish - these spring fish were caught under only light fishing pressure, suggesting that spring fish constitute a higher proportion still than the figures otherwise suggest<sup>29</sup>.

The Ullapool has a much lower than expected proportion of escapee farmed fish, believed to be due to the impassable Ness Falls limiting access for farmed fish<sup>30</sup>.

An equally compelling reason supporting the designation of the Ullapool River as an SAC is the existence of the Rhidorroch Woods SAC for Northern Atlantic wet heaths and Caledonian Forest. The Rhidorroch Woods SAC which borders the Ullapool

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<sup>26</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in “Salmon on the Edge” (ed D Mills), pp 119 – 128, Blackwell, Oxford.

<sup>27</sup> Wester Ross Fisheries Trust (2006) Ullapool River Fisheries Management Plan 2006-2010

<sup>28</sup> Letter from Wester Ross Fisheries Trust to Highland Council 4<sup>th</sup> March 2008

<sup>29</sup> Wester Ross Fisheries Trust (2006) Ullapool River Fisheries Management Plan 2006-2010

<sup>30</sup> Wester Ross Fisheries Trust (2006) Ullapool River Fisheries Management Plan 2006-2010

River was designated on 3<sup>rd</sup> May 2000, the SAC being centred upon the “unmodified Rhidorroch river system”<sup>31</sup>.

The Ullapool River catchment is also home to endangered species including freshwater pearl mussel, otter, red-throated diver, black-throated diver, golden eagle, merlin, peregrine, dotterel and golden plover. The Wester Ross Fisheries Trust Ullapool River Fishery Management Plan 2006 – 2010 notes that “at least 14 habitats and species listed under EU Habitats Directive occur within the Ullapool catchment, including the Atlantic salmon. Five of these, freshwater pearl mussel, otter, red-throated diver, black-throated diver and alder woodland would benefit directly from action to conserve the catchment’s fish stocks and riverine habitats”.

### **The significance of Atlantic salmon for freshwater pearl mussels**

The presence of the freshwater pearl mussel in the Ullapool River is of particular importance. This globally-endangered species has declined throughout Scotland but surveys of the Ullapool in 2008 have found evidence of juvenile recruitment.

These mussels are entirely dependent on healthy populations of host salmonid fish. There are very few rivers where the species is known to be recruiting successfully as it is in the Ullapool<sup>32</sup>.

The Scottish Environment Protection Agency has recently tried to “raise awareness of the dangers to freshwater pearl mussels”<sup>33</sup>. This followed Scottish Natural Heritage reporting “significant criminal damage at 75% of internationally important freshwater pearl mussel sites” in Scotland<sup>34</sup>.

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<sup>31</sup> JNCC website - Rhidorroch Woods SAC Site Details – [www.jncc.gov.uk/protectedsites/SACselection](http://www.jncc.gov.uk/protectedsites/SACselection)

<sup>32</sup> Solomon, D (2009) The Ullapool River and its remarkable stock of salmon – why it deserves SAC status. Report commissioned by Rhidorroch Estate. 5<sup>th</sup> May 2009 at page 6, para 2.11

<sup>33</sup> SEPA Press Release “Agencies raise awareness of dangers to freshwater pearl mussels” 3<sup>rd</sup> September 2010

<sup>34</sup> SNH Press Release “Operation Caesar launched as pearl mussel sites see appalling damage” 24<sup>th</sup> May 2010

A report by Dr. Cosgrove for the owners of the Rhidorroch Estate has indicated that the Ullapool River contains a functional or viable population of freshwater pearl mussels based on the reproductive capability of the individuals found. As there are now very few rivers where freshwater pearl mussels are currently recruiting successfully – estimated at around 130 known rivers globally – the Ullapool River is considered of at least national importance given the low number of rivers with recruitment<sup>35</sup>. The importance of the Ullapool River may in fact be underestimated due to the lack of detailed survey work in the upper stretches. While two of the three criteria for an assessment of favourable condition applied by JNCC and Scottish Natural Heritage have been met in the Ullapool River, with 20% of the population being < 65 mm long and at least one < 30mm long, it may well be that areas of river bed yet to be surveyed will also meet the third criteria, with population density reaching >5 mussels / square metre<sup>36 37</sup>.

In Scotland, the number of rivers supporting healthy pearl mussel populations has declined over the past 200 years. Freshwater pearl mussels are extinct and not reproducing in approximately two thirds of Scottish rivers in which it was originally found and now only 62 Scottish rivers are known to have functional freshwater pearl mussel populations. Recent estimates suggest that these represent approximately half the world's known remaining functional populations.

Long-term survival of freshwater pearl mussel populations is known to be dependent on the availability of Atlantic salmon and trout including the migratory sea trout. As

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<sup>35</sup> Cosgrove P & Farquhar J (2008) Freshwater pearl mussel survey of the Ullapool River and Rhidorroch River, North West Scotland. Report commissioned for Rhidorroch Estate.

<sup>36</sup> Cosgrove P & Farquhar J (2008) Freshwater pearl mussel survey of the Ullapool River and Rhidorroch River, North West Scotland. Report commissioned for Rhidorroch Estate, at page 13, final paragraph

<sup>37</sup> Langan, S, Cooksley, S, Young, M, Stutter, M, Scougall, F, Dalziel, A, Feeney, I, Lilly, A and Dunn, S (2007) The management and conservation of the freshwater pearl mussel in Scottish catchments designated as Special Areas of Conservation or SSSIs. Scottish Natural Heritage Commissioned Report No. 249, at page 18.



the European ranges of brown trout and Atlantic salmon stocks have reduced in many rivers in recent years, these declines have been matched by recruitment failures in freshwater pearl mussel populations; this may pose a serious, but yet largely unstudied threat. Indeed, one of the geographically closest SACs designated for the protection of freshwater pearl mussels, on the Isle of Harris, is believed to be threatened by the lack of an appropriately sized host salmonid population<sup>38</sup>.

### **The overarching purpose of the Habitats Directive**

The clear purpose behind the Habitats Directive was and remains to provide across the European Union a network of SACs capable of protecting the wildlife interest of the community as a whole.

The benefits of a wide and contiguous designation of both the Rhidorroch Woods and the Ullapool River, to include so many species listed in Annex II of the Directive and habitats listed in Annex I, are obvious.

In addition, the willingness of the owners of the Ullapool River and Rhidorroch Estate, in 2010, the International Year of Biodiversity, to entertain and, indeed, positively welcome designation under the Habitats Directive was not given sufficient weight by Scottish Natural Heritage and the Scottish Government.

As the Commission will be well aware, many SACs have been reduced in terms of their geographical coverage as a result of negotiations and difficulties agreeing the extent of a designation. To have an area of land and river for which the private owners embrace European designation, and which fulfils the biological criteria for designation as part of the Natura 2000 sites, is rare and should be welcomed.

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<sup>38</sup> Langan, S, Cooksley, S, Young, M, Stutter, M, Scougall, F, Dalziel, A, Feeney, I, Lilly, A and Dunn, S (2007) The management and conservation of the freshwater pearl mussel in Scottish catchments designated as Special Areas of Conservation or SSSIs. Scottish Natural Heritage Commissioned Report No. 249.

## **The failure of the UK to designate an adequate number and coverage of SACs for Atlantic salmon on the west coast of Scotland**

As discussed in Part 1, it is significant that the UK has heavily under-represented within its list of SACs those designated for Atlantic salmon. Scotland has just 17 out of an EU total of 145 SACs where Atlantic salmon is listed as an interest feature, but the ICES working group on North Atlantic salmon reported in 2008 that Scotland is home to over half of the EU stock of spawning salmon and up to 68% of the EU stock of multi-sea-winter (MSW) fish, a particular feature of the Ullapool River<sup>39</sup>.

There is a particular paucity of SACs for Atlantic salmon on the north-west coast of Scotland, with only one on the mainland between the Mull of Kintyre and Cape Wrath, despite there being over 50 salmon rivers on the mainland west coast.

The failure of the UK to designate sufficient SACs for Atlantic salmon is not acceptable and requires additional designations.

In the light of this, the two options available for the Ullapool River, namely the designation of a new Ullapool River SAC for Atlantic salmon, freshwater pearl mussel, otter etc or the inclusion of the Ullapool River within the existing Rhidorroch Woods SAC, deserve far greater attention from the UK than has been forthcoming at present. Designation of an SAC for Atlantic salmon, with freshwater pearl mussel and otter also a primary feature, as for the River Dee SAC<sup>40</sup>, also remains an option for the Ullapool River.

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<sup>39</sup> Solomon, D (2009) The Ullapool River and its remarkable stock of salmon – why it deserves SAC status. Report commissioned by Rhidorroch Estate. 5<sup>th</sup> May 2009 at page 6, para 2.12

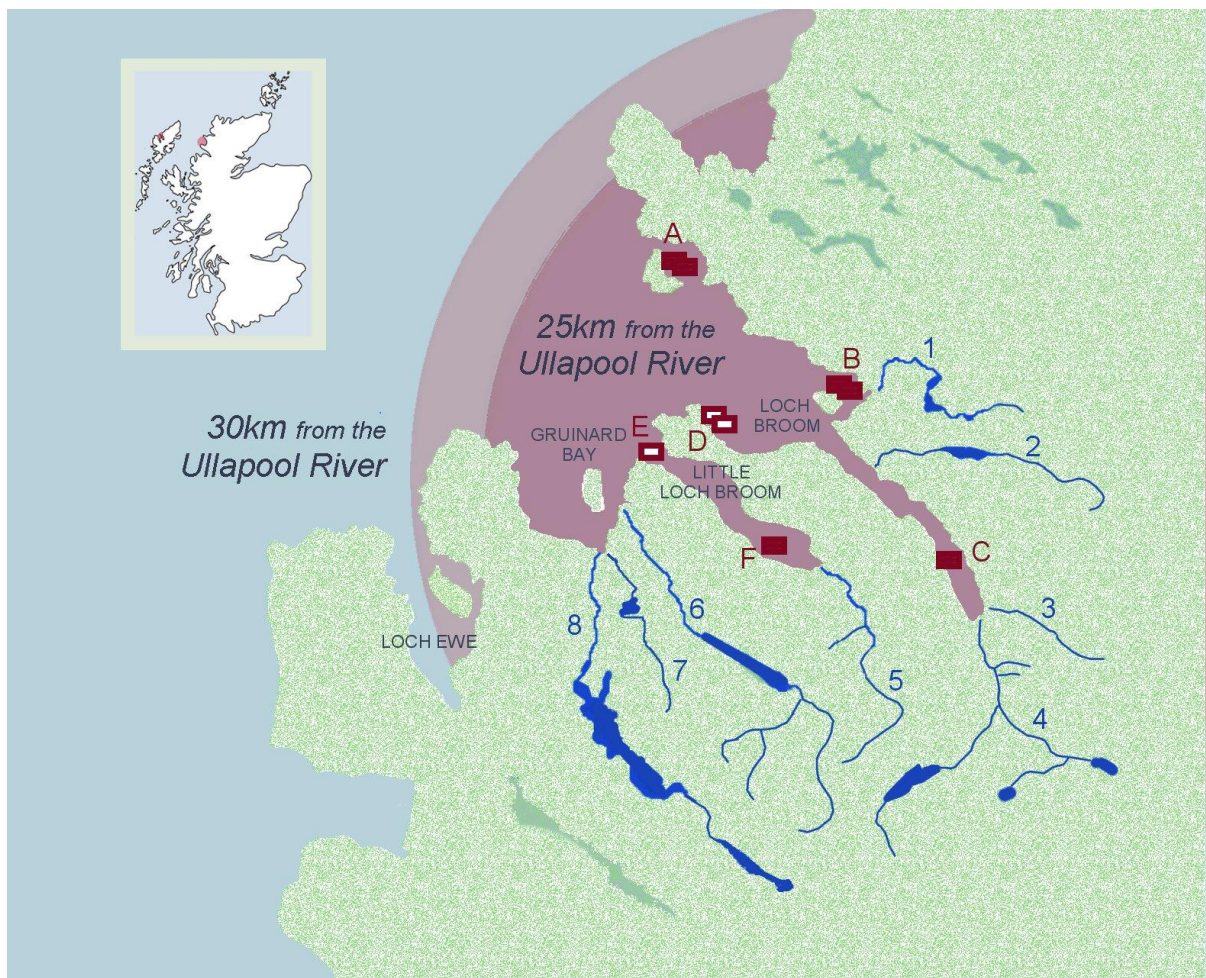
<sup>40</sup> JNCC website – River Dee SAC site details – [www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030251](http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030251)

## Salmon farming near the Ullapool River and the need for designation

That the integrity of the salmon population of the Ullapool River is threatened by the nearby salmon farming operations is clear.

The same generic threats that exist for the Little Gruinard and Langavat SACs exist for the Ullapool River – see Parts 3 and 4.

Approximate distances of farms from the Ullapool River mouth to nearby salmon farms are Corry 5km, Ardmail 10km, the Summer Isles 12km and Ardessie at 22km. The closest fishfarm at Corry is only 5km from the Ullapool River. Proposed sites at Annat Bay and Stattic Point are 7km and 17km distant respectively.



## **Rivers**

- 1 Kanaird
- 2 Ullapool
- 3 Lael
- 4 Broom
- 5 Dundonnell
- 6 Gruinard
- 7 Inverianvie
- 8 Little Gruinard

## **Fish Farms**

- A. Tanera 1 and 2
- B. Ardmail sites
- C. Corry sites
- D. Proposed Annat Bay sites
- E. Proposed Stattic Point site
- F. Ardessie sites

The Wester Ross Fisheries Trust has noted that “from the late 1980s the total [Ullapool River] catch of salmon declined with the lowest recorded catches in 2000 and 2002. During this period, catches of salmon and sea trout in nearby rivers also collapsed. Early-returned post-smolt sea trout infested with sea lice were recorded in the Broom and Kanaird estuaries nearby. It is likely that sea lice also infected salmon smolts emigrating from the Ullapool River. Subsequent research demonstrated that sea lice epizootics were associated with salmon farming”<sup>41</sup>.

Such epizootics have continued to occur regularly; the fyke net at the mouth of the nearby Dundonnell river has demonstrated lice levels on wild fish exceeding epizootic levels on a number of occasions <sup>42</sup>. The Wester Ross Fisheries Trust has detailed why the Corry site is sensitive for wild salmonids, and has predicted that future sea lice epizootics would inevitably damage wild fisheries in the Ullapool River.

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<sup>41</sup> Wester Ross Fisheries Trust Ullapool River Fishery Management Plan 2006 – 2010

<sup>42</sup> Cunningham P (2009) The occurrence of the parasitic sea louse (*L. salmonis*, Kroyer) on sea trout (*Salmo trutta*) in the Wester Ross Fisheries Trust area in 2007 and 2008 with recommendations for monitoring and management; Wester Ross Fisheries Trust April 2009, with amendments November 2009.

## What does the Habitats Directive require ?

The formal reply to the proposal that the Ullapool River be designated, from Scottish Natural Heritage, the statutory nature conservation body for Scotland – and supported by the Scottish Government - noted the opinion of some, that had more been known about the Ullapool River at the time of the selection of the UK's SAC list, then perhaps the Ullapool River would have been designated – “we can't turn the clock back and Government has implemented decisions to include certain small river systems as representative of certain river types”<sup>43</sup>.

This reply is firmly at odds with the duty in Article 4(1) of the Habitats Directive which requires “where appropriate, Member States shall propose adaptation of the list in the light of the results of the surveillance referred to in Article 11”. Article 11 requires Member States to undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and priority species.

It is clear acknowledgement that surveillance, howsoever conducted, has brought and continues to bring to light the importance of the Ullapool River, both in itself and as an example of a small west coast salmon river. For example, the report commissioned by Scottish Natural Heritage itself in 2007, which looked at the genetics of salmon in salmon SAC rivers noted that “understanding of west coast rivers, particularly the small ones that are currently under threat, is limited. These rivers, potentially at least, may contain many hundreds of distinct breeding populations whose survival at least with respect to the local populations of pearl mussel (*Margaritifera margaritifera* L.) for which it is a host of the early larval phase is crucial, given their international importance. What information is available from rod catches, net fisheries and surveys of juvenile population density, indicates that numbers of salmon in many rivers have declined precipitously, giving rise to serious concerns for their long-term viability”.<sup>44</sup>

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<sup>43</sup> Letter from Ian Jardine, Chief Executive of Scottish Natural Heritage, 11<sup>th</sup> June 2009

<sup>44</sup> SNH (2007) Genetic variability of Atlantic salmon (*Salmo salar*) populations within west coast SACs. Contract Report, FRS Freshwater Lab.

The Scottish Government also acknowledges that there is concern about the reduction in the run of multi-sea-winter fish ['spring fish'] in Scottish rivers, of which the Ullapool River retains a good surviving population<sup>45</sup>.

### **A policy against further designations of 'salmon' SACs ?**

The refusal by the Scottish Government and Scottish Natural Heritage to consider further the designation of the Ullapool River appears to ignore the duty under Article 4(1) and the 'surveillance' as defined by Article 11, which together require the UK to consider proposing the Ullapool River as an SAC for Atlantic salmon.

The firm intention in the Scottish Government to reject from the outset the proposal is revealed in emails obtained as part of a request made by the owners of the Rhidorroch Estate to the Scottish Natural Heritage pursuant to the Council Directive 2003/4/EC on public access to environmental information.

Staff at the Habitats Division of the Scottish Government Rural Directorate indicated to Scottish Natural Heritage staff that: "I'd like to gently but firmly discourage any aspirations that we might consider designating the River Ullapool (or anywhere else) for Atlantic salmon on the basis that it is our understanding that the UK SAC representation for the species is sufficient"<sup>46</sup>

"we're not in the game of looking for more Atlantic salmon sites because we believe Scotland and the UK to be sufficient as far as Atlantic salmon SACs go..."<sup>47</sup>

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<sup>45</sup> Scottish Government Marine Directorate (2008) Ad Hoc Review Group Implementation Plan for Meeting the Objectives of North Atlantic Salmon Conservation Organisation (NASCO) Resolutions and Agreements

<sup>46</sup> Email from Steven Dora, Landscapes and Habitats Division of Rural Directorate of Scottish Government to various SNH staff 27/04/09

<sup>47</sup> Email from Steven Dora, Landscapes and Habitats Division of Rural Directorate of Scottish Government to other Scottish Government staff 27/04/09

“we’d wish to avoid encouraging this proposal. We are under no current EC pressure to designate more sites for Atlantic salmon. It seems highly unlikely that the C’ion [sic] would run with this if it made its way to their door....”<sup>48</sup>

In effect, the Scottish Government has unlawfully closed the door on the designation of further SACs for salmon despite the requirements of Article 4(1) which requires that “where appropriate, Member States shall propose adaptation of the list in the light of the results of the surveillance referred to in Article 11. This ‘surveillance’ must include the recent findings of research on salmon population genetics in the Ullapool River, the presence of a recruiting population of freshwater pearl mussels in the river and the increased recognition of the threats now posed to both by salmon aquaculture.

In the author’s view, this requires the European Commission to remind the UK of its obligations under the Directive.

## **Recommendation**

The UK should designate the Ullapool River as an SAC for Atlantic salmon.

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<sup>48</sup> Email from Steven Dora, Landscapes and Habitats Division of Rural Directorate of Scottish Government to various SNH staff 13/05/09

### **Part 3:**

**The failure of the UK, pursuant to Article 6(2) and (3), sufficiently to protect those SACs already designated for Atlantic salmon from the impacts of marine salmon farming**

#### **The requirements of the Directive**

The abundance of Atlantic salmon has declined markedly since the 1970s despite major reductions in fishing effort and other measures to protect wild fish populations. Increased natural mortality at sea appears to be a major factor in this decline, potentially associated with climate change. Other threats include river pollution, overfishing and dams. Commercial salmon farms also pose threats, including elevated levels of pathogens, while escaped farm salmon may interbreed with wild salmon<sup>49</sup>.

The Atlantic salmon is listed on the IUCN Red List of Threatened Species.

The Habitats Directive aims “to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest” – Article 2(2).

Article 1(i) of the Directive defines the conservation status of a species as “the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2”.

In the context of this complaint, the Article 1(i) definition certainly encompasses the influence of (a) dramatically raised sea-lice levels and (b) escapee farmed fish on wild Atlantic salmon, which is an Annex II species.

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<sup>49</sup> <http://www.iucnredlist.org/sotdfiles/salmo-salar.pdf>



Article 6 requires that “Members States shall establish the necessary conservation measures ....and appropriate statutory, administrative or contractual measures which correspond to the ecological requirements of the... species in Annex II present on the site”.

The Directive therefore requires, inter alia, that the UK should establish measures to protect Atlantic salmon in designated SACs from (i) raised sea lice burdens emanating from marine salmon farms and (ii) the influence of escapee fish.

Despite scientific consensus on the threats, and contrary to the precautionary principle, the UK has failed adequately to do so.

### **The impacts of salmon farming on wild salmonids**

That aquaculture, more specifically the growing of farmed Atlantic salmon in floating cage farms in coastal waters on the west coast of Scotland, has had a negative impact on stocks of wild salmonid fisheries (wild Atlantic salmon and sea trout) is no longer contested, even by the Scottish Government, which concedes that “it is likely that impacts of aquaculture, and most probably the effects of sea lice and escapes of farmed fish, have contributed to the decline in stocks and may have slowed recovery of stocks in some rivers”<sup>50</sup>.

However, Scottish Government policy is currently framed by a renewed strategic framework for Scottish aquaculture<sup>51</sup>. It is clear that the industry continues to enjoy over-riding political support and is seen as an important part of the Scottish economy. For example, Scottish Government Planning Policy for fish-farming requires that “planning authorities should use the development process to support

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<sup>50</sup> Scottish Government Marine Directorate (2008) Ad Hoc Review Group Implementation Plan for Meeting the Objectives of North Atlantic Salmon Conservation Organisation (NASCO) Resolutions and Agreements

<sup>51</sup> Marine Scotland / Scottish Government (2009) A Fresh Start – the renewed Strategic Framework for Scottish Aquaculture

and encourage the continued growth of fish farming”<sup>52</sup>. The Ministerial Foreword to the Strategic Framework itself states, inter alia, that “supporting aquaculture – production, processing and associated businesses – is a vital role for Marine Scotland...” and that “Scotland’s coastal waters provide excellent conditions for further growth of finfish farming.....the industry is here to stay and grow....”

Most recently, the Scottish Government has argued that “an opportunity has been identified by the industry for further growth over the next five years, increasing their market share and providing more much needed employment in the process - “the Scottish Government needs to ensure that there are no unnecessary barriers to impede that growth”<sup>53</sup>. That ‘opportunity’ has been brought about by the collapse of the Chilean salmon farming industry due to disease.

Such is the strength of the political support the industry enjoys, the interpretation by the Scottish Government of the scientific consensus is heavily qualified and, arguably, reveals a deep reluctance on the part of Government to address substantively the threats posed to wild fish. This is exhibited even at or near those sites where those wild fish are protected under the Habitats Directive.

As a result of this apparent bias in favour of the industry, there have been two major petitions delivered to the Scottish Government asking for greater protection for wild fish from the impacts of salmon farming. The Salmon and Trout Association’s petition “calls on the Scottish Government to take immediate action in recognition of its international responsibilities and overwhelming scientific evidence, from both the UK (including some of its own leading fisheries scientists) and abroad, with regard to the massive damage that is being caused to wild salmon and sea trout stocks from inappropriate fish farm activities”<sup>54 55</sup>.

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<sup>52</sup> Scottish Executive (2007) SPP22 Planning for Fish Farming. Summary.

<sup>53</sup> Scottish Government (2010) Delivering Planning Reform for Aquaculture. February 2010.

<sup>54</sup> Public Petitions Committee 15/11/06 Petition PE941 by Frank Buckley, Society for the Protection of Salmon and Sea Trout – “to urge the Scottish Executive to ensure greater protection for the rivers, streams and lochs of Scotland , such as Loch Broom and the River Gruinard, from fish farm developments”.

## Sea lice

It is now widely accepted by all fisheries scientists that raised levels of sea lice emanating from salmon farms are a significant threat to wild salmonid populations<sup>56</sup>, causing death in emigrating salmon and sea trout smolts or 'early returning behaviour' whereby sea trout (both smolts and older fish) in poor condition return early to freshwater to shed their load of lice (which drop off in freshwater)<sup>57</sup>. Wild fish, in the first days or weeks after they transfer to sea water, are still entering bays and sea lochs containing salmon farms that produce an abundance of juvenile sea lice some orders of magnitude above natural background levels. The effect on wild sea-trout has been well-documented<sup>58</sup>, including in relation to the collapse of the Loch Ewe / Loch Maree sea-trout population<sup>59</sup>.

A review of the environmental impacts of salmon farming carried out for the Scottish Government<sup>60</sup> concluded that:

*"4.3 Sea lice infestations are endemic in most salmonid culture areas and, in recent years, declines in wild salmonid populations have led to the widespread belief that there is a link between farming and this decline. In Scotland, the main focus has been on the marked population declines of wild sea trout *Salmo trutta*,*

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<sup>55</sup> Salmon and Trout Association – "calls on Scottish Government to act without delay – by relocating salmon farms away from the estuaries of major salmon rivers" - [www.salmon-trout.org/save\\_petition](http://www.salmon-trout.org/save_petition)

<sup>56</sup> Costello M J (2009) How sea lice from salmon farms may cause wild salmonid declines in Europe and North America and be a threat to fishes elsewhere. *Proc R Soc B* 2009 276, 3385-3394

<sup>57</sup> FRS (2007) Seventh Annual Report of the Shieldaig Sea Trout Project

<sup>58</sup> SJ Middlemas, JA Raffell, DW Hay, M Hatton-Ellis and J D Armstrong (2010) Temporal and spatial patterns of sea lice levels on sea trout in western Scotland in relation to fishfarm production cycles *Biol. Lett.* 23 August 2010 **vol. 6 no. 4** 548-551

<sup>59</sup> Butler JRA, Walker AF. 2006. Characteristics of the sea trout *Salmo trutta* L. stock collapse in the River Ewe (Wester Ross, Scotland) in 1988-2001. In: *Sea Trout: Biology, Conservation and Management*, pp. 45-59 (eds N.J. Milner & G.S. Harris). Blackwell Publishing Ltd., Oxford, UK.

<sup>60</sup> Scottish Executive (2002) Review and Synthesis of the Environmental Impact of Aquaculture. Scottish Executive Central Research Unit

*particularly in the north-west where salmon culture is concentrated. On their first visit to sea in the spring of the year following hatching, sea trout may be confronted with very high concentrations of infective sea lice larval stages and quickly become infested with lice. Although these fish may choose to return to fresh water to avoid the parasite it is likely that many are severely compromised. A burden of only 10 adult lice is thought to be sufficient to cause mortality, especially in immature fish already under stress.*

*4.4 The position is less clear with wild Atlantic salmon *Salmo salar*, also in general decline. Smolts of this species migrate directly to the ocean without remaining in the coastal or estuarine zone, as is the case with sea trout. It was previously thought that wild salmon would not be exposed to the same degree of infestation owing to the limited period of contact. However, it is now suggested that, particularly in long sea loch systems with several fish farms, salmon may receive sufficient infestation to compromise their survival....The results from a co-operative research project between the Institute of Marine Research, Bergen, Norway and the University of Bergen indicate that more than 86% of the wild postsmolts of Atlantic salmon migrating out of the Sognefjord, and between 48.5% and 81.5% of the postsmolts from the Nordfjord were killed as a direct consequence of sea lice infections during the spring of 1999. The surviving fish were probably weakened because of the infection. Only two fjords were investigated at that time, but it seems probable that postsmolts from other fjords also experience the same problem and **there is every likelihood that a similar situation may exist in some of the longer sea lochs in Scotland** (emphasis added).*

*4.5 Although the relationship between sea lice infection and the decline of wild populations is striking, and is additional to the widespread decline of migratory salmonids in areas without fish farms, there is as yet no absolute proof of a causal link. In spite of this, and owing to the increasing body of supporting (although as yet inconclusive) evidence, the burden of opinion has recently begun to swing in favour of accepting the likelihood that lice from farms constitute a direct threat to wild salmonids."*

That individual wild fish can be killed by a heavy sea lice infestation is uncontested. Studies on salmon post-smolts indicate that infestations of between 11 and 30 lice can cause fish mortality soon after the lice reach the pre-adult stage and that lower levels may cause significant stress<sup>61</sup>. In Loch Linnhe, a long Scottish north-west coast sea loch containing fishfarms, the data have already been shown to be “consistent with the hypothesis that salmon post-smolts from the River Lochy suffer significant louse-induced mortality on their outward migration<sup>62</sup>. Sea lice have also been linked to the collapse in the Loch Maree sea-trout fishery<sup>63</sup>.

Butler (2002)<sup>64</sup> explains more fully the dangers posed to wild fish by sea lice emanating from fish farms:

*“The sea louse (Lepeophtheirus salmonis Krøyer) is a major health problem for both farmed and wild salmonids. This paper investigates louse epidemiology and management in the salmon-farming zone of western Scotland. Based on a review of the marine ecology of wild salmon (Salmo salar L) and sea trout (Salmo trutta L), and catch and farm production statistics, best estimates were made for numbers of wild and farm hosts present in coastal waters in March-June 2000. Applying data for ovigerous female louse infections and fecundity, the sources and risks of larval transmission to wild salmon and sea trout were modelled. Farm salmon in the second spring of production were the primary host group (98% of fish), while numbers of wild salmonids (<1%) and escaped farm salmon (2%) were relatively insignificant. Farm salmon produced 97% of louse eggs at high levels (eight ovigerous lice per fish), and 78% at low levels (one per fish). Wild*

<sup>61</sup> Grimnes and Jakobsen (1996) and Finstad et al (2000) referenced in Watt J, Birkeland K and Kettle-White A (2006) Area Management in Scotland; Lessons and Challenges In ‘Wild and Farmed Salmon, Working Together’, NASCO, Edinburgh

<sup>62</sup> Watt J, Birkeland K and Kettle-White A (2006) Area Management in Scotland; Lessons and Challenges. In ‘Wild and Farmed Salmon, Working Together’, NASCO, Edinburgh

<sup>63</sup> Butler JRA, Walker AF. 2006. Characteristics of the sea trout *Salmo trutta* L. stock collapse in the River Ewe (Wester Ross, Scotland) in 1988-2001. In: Sea Trout: Biology, Conservation and Management, pp. 45-59 (eds N.J. Milner & G.S. Harris). Blackwell Publishing Ltd., Oxford, UK.

<sup>64</sup> Butler JRA (2002) Wild salmonids and sea louse infestations on the west coast of Scotland: sources of infection and implications for the management of marine salmon farms. Pest Management Science 58 : 595 - 608

*salmonids produced <1% of eggs under both scenarios, but escaped farm salmon produced 3% and 21%, respectively. All hosts potentially cross-infect one another, but farm salmon are more likely to infect wild and farm smolts, and also other farm salmon. Monitoring of lice on sea trout in June 1998-2000 by the Association of West Coast Fisheries Trusts corroborated the model's conclusions. Localised epizootics occurred every year and coincided with the presence of ovigerous lice on local farms. In areas of mixed-year class production on farms, epizootics were evident every spring, but occurred every second spring in areas of single-year class production. In 1998-2000 at least 14-40% of sea trout were infected with potentially lethal infestations of lice. Ovigerous louse levels of <0.005 per fish were required on farm salmon in the spring of 2000 to produce less eggs than those emitted by wild salmonids. With the industry's continued expansion, and thus increased numbers of farm salmon, a target of zero ovigerous lice will be required on farms to minimise impacts on wild salmonids. Due to the limited long-term efficacy and availability of louse medicines, management strategies are discussed which will improve control, including single-year class production over large areas, alternate S1-S1/2 smolt inputs, and 11-month production cycles."*

Fisheries biologists have been trying to model both the temporal and spatial distribution of the subsurface 'cloud' of juvenile lice emanating from salmon farms and threatening migrating wild fish. Pentson et al (2008) concluded that greatest densities of nauplii [sea lice] were recovered from a Scottish sea loch at stations adjacent to farms "indicating that local salmon farms were a likely source of larvae at times during the production cycle". They also suggested that temporal variations in lice densities correlated with stocking and harvesting in the fishfarms and that "larvae can be transported several kilometres from the point of release"<sup>65</sup>. Studies in both Scotland and Ireland have shown that average sea lice infestations on sea trout are highest at survey sites within 25 kilometres (by sea) of a marine fishfarm<sup>66 67</sup>. Murray

<sup>65</sup> Penston MJ, Millar CP, Zuur A and IM Davies (2008) Spatial and temporal distribution of *L. salmonis* (Kroyer) larvae in a sea loch containing Atlantic salmon, *Salmo salar* L., farms on the north-west coast of Scotland. *Journal of Fish Disease* 2008, 31, 361-371.

<sup>66</sup> Gargan , Tully and Poole (2002) The relationship between sea lice infestation, sea lice production and sea trout survival in Ireland, 1992 – 2001, in "Salmon on the Edge" (ed D Mills), Blackwell, Oxford.

and Gillibrand (2005) concluded that “particle movements are strongly influenced by winds, which can lead to formation of lice concentrations in coastal areas several kilometres from the source”. They also noted that “detailed analysis of simulations forced with real wind data is required to assess areas that larval lice from these sources are likely to reach. Further field and experimental work on the availability of lice is required to assess infection risk”<sup>68</sup>. It is regrettable that such real analysis does not yet seem to have been published (or gathered ?) in relation to fish farms near SACs designated for Atlantic salmon on the west coast of Scotland.

Generally, independent fisheries scientists appear to go much further than the Scottish Government in their assessment of the damage being caused at a population level to wild fish by the sea lice being released from fish farms. Juvenile surveys carried out at 230 sites in 35 rivers in 1997, 1999 and 2001 and reviewed by Butler and Watt (2003) showed that west coast of Scotland rivers with fish farms present had 62-82% and 44-62% lower mean abundances of salmon fry and parr, respectively, 86% of predicted smolt runs were depleted in rivers with farms, versus 26% in rivers without farms. Severe stock collapses were evident in 14 (50%) of rivers with farms, where only remnant populations remained. Applying the NASCO Rivers Database classifications, they concluded nine of these salmon populations were considered “threatened with loss”, and five may be ‘lost’.<sup>69</sup>

A number of researchers have, for some years, linked a rapid decline in the number of sea trout returning to rivers and the premature return to rivers of heavily lice-infested sea trout smolts to the location of fish farms<sup>70</sup>. Wild salmon are also similarly affected<sup>71</sup>.

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<sup>67</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in “Salmon on the Edge” (ed D Mills), pp 119 – 128, Blackwell, Oxford.

<sup>68</sup> Murray AG and PA Gillibrand (2005) Modelling salmon lice dispersal in Loch Torridon, Scotland. Marine Pollution Bulletin 2005

<sup>69</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in “Salmon on the Edge” (ed D Mills), pp 119 – 128, Blackwell, Oxford.

<sup>70</sup> At page 6 of Salmon Watch (2009) Complaint to the Commission of the European Communities on the Government of Ireland’s failure to comply with Community Law as regards the Habitats

These findings are consistent with international studies. The 2005 SUMBAWS report, a major study of the impact of sea lice on wild salmon in Norway, Scotland and Ireland, found very strong links between elevated levels of sea lice infestation and high wild salmon smolt mortality<sup>72</sup>.

The Salmon Aquaculture Dialogue Working Group on Salmon Disease<sup>73</sup>, following an extensive global literature review, reported in March 2009 that “we believe that the weight of evidence is that sea lice of farm origin can present, in some locations and for some host species populations, a significant threat. Hence, a concerted precautionary approach both to sea lice control throughout the aquaculture industry and to the management of farm interactions with wild salmonids is expedient”.

A global assessment of salmon aquaculture impacts on wild salmonids also found correlations between the presence of marine salmon farming and reductions in wild salmonid marine survival and abundance<sup>74</sup>.

A recent letter (sent in relation to an application for planning permission for a salmon farm at Broad Bay on the east coast of the Isle of Lewis)<sup>75</sup> provides the most up-to-date summary of the state of play in relation to scientific understanding of the sea lice issue.

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Directive and the EIA Directive for the species Atlantic salmon etc. Legal Complaint Reference Number 2006/4652 SG(2006) A/6058

<sup>71</sup> Martin Krkosek, Mark A. Lewis and John P. Volpe (2005) Transmission dynamics of parasitic sea lice from farm to wild salmon. *Proc Biol Sci.* 2005 April 7; 272(1564): 689–696.

<sup>72</sup> SUMBAWS (2005) Sustainable management of the interaction between aquaculture and wild salmonid fish (Q5RS/2005/00730/SUMBAWS)

<sup>73</sup> The Salmon Aquaculture Dialogue Working Group on Salmon Disease, draft 3<sup>rd</sup> March 2009 at <http://www.worldwildlife.org/what/globalmarkets/aquaculture/salmon-additionalresources.html>

<sup>74</sup> Ford, J.S. and Myers, R. A. (2008) A global assessment of salmon aquaculture impacts on wild salmonids. *PLoS Biology* 6 (2)(33)

<sup>75</sup> Letter to Isle of Lewis Department for Sustainable Communities from fisheries biologists (24<sup>th</sup> March 2010) re Broad Bay, Isle of Lewis



Supported and signed by both a former senior research scientist and the former Head of the Freshwater Fisheries Laboratory (now part of Marine Scotland), as well as many highly qualified fisheries biologists, including from all bar one of Scottish west coast fisheries trusts, it states:

*“The general case or hypothesis that lice generated by fish farms can damage wild salmonid populations relies on a number of causal links:*

*1) Farmed salmon initially become infected by wild salmonids in shared waters*

*This is widely accepted by scientists.*

*2) Farmed salmon then become part of a dynamic host-parasite system involving farmed and wild salmonids*

*This is widely accepted by scientists.*

*3) As a result of the large numbers of farmed hosts, infection pressure on wild salmonids is increased over background levels*

*This is widely accepted by scientists.*

*4) The increase in infection levels on wild fish increases mortality levels*

*There is ample evidence from laboratory studies and from fish farms that lice have the potential to cause disease and mortality in their hosts. Given the high lice burdens on wild fish proximate to fish farms the balance of evidence is that high levels of lice infection will cause disease and increased levels of mortality of wild sea trout and salmon.*

*5) The level of louse induced mortality is sufficient to explain a high proportion of observed regional declines in numbers of wild salmonids*

*Since this is the most controversial element of the general hypothesis let us examine whether it meets the tests of simplicity, predictive power, robustness against falsification and conservatism.”*

The letter concludes that the four tests are all passed. The particular farm application in question provoked 1600 other objections.

## **The chemical treatment of sea lice**

Sea lice on farmed salmon are currently controlled by either bath-type or in-feed therapeutic agents licensed in the Scotland by the UK's Veterinary Medicines Directorate (VMD). The bath-type treatments use active ingredients such as pyrethroids or organophosphates while the most popular in-feed treatment, brand name Slice, is based on emamectin.

There is an inherent contradiction in the industry's use of sea-lice treatments between controlling lice on farmed fish to keep that level below the level at which economic damage occurs to the farmed fish and the need to reduce the number of lice per farmed fish to a lower level as is required to protect wild salmonids in adjacent waters from an artificially raised abundance of juvenile sea lice in the water column. Whether such economic infestation thresholds will be sufficient to protect wild salmonids from the greater abundance of sea lice from farms is not clear, but the fear must be that they are not, the choice appearing to be between allowing more lice to persist on each farmed fish or the generation of resistance in sea lice to the anti-lice treatments.

While the industry's 'target' - "the objective of continuously achieving zero ovigerous salmon lice"<sup>76</sup> – is welcome, it is uncertain whether this is practically achievable.

Scottish Government policy is based upon non-zero ovigerous lice targets contained within the Code of Good Practice. The Code sets higher treatment trigger levels than the TWG 'target' of zero, the levels being 0.5 ovigerous lice per fish February to June, 1 per fish July to January<sup>77</sup>.

These Code trigger levels for ovigerous lice target clearly need to be qualified by the number of farmed fish present. Bigger farms with similar levels of lice per fish will patently present a bigger threat to wild stocks, yet this appears to be ignored by the

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<sup>76</sup> TWG (2000) Tripartite Working Group Concordat and Report, Annex 2

<sup>77</sup> Code of Good Practice, para 3.4.3.8 page 19

Code. There is no discussion of farm size / biomass or the number of farms per management area.

There is some concern that very frequent treatment of farmed fish to achieve these targets causes stress in the fish, with farmers reluctant to treat as regularly as the zero target requires, quite apart from the treatment costs involved.. In addition, current in-feed treatments may not be effective in warmer water temperatures with fish not willing to feed, or with licey fish less likely than relatively un-licey fish to secure a sufficient intake of medicated feed<sup>78</sup>. Indeed, the VMD has disclosed, pursuant to a request by the owners of Rhidorroch Estate made under Directive [2003/4/EC](#) on public access to environmental information, a UK Assessment Report for Renewal for Slice which notes that “reduced feed intake (and thus active substance intake) reduces optimal dosing, and as a result lice populations are not cleared and may develop a tolerance or resistance to emamectin”. <sup>79</sup>.

There have been increasing reports of reduced efficacy in all sea-lice treatments, ranging from full-blown resistance to significant tolerance or reduced clearance of sea-lice after treatment. UK Government Assessment Reports note that drug resistance has developed to some of the avermectins in terrestrial parasites and so “it could be expected that sole reliance of a sea lice avermectin [Slice] would increase the selection pressure to develop a tolerant strain. This has already been seen with the organophosphate dichlorvos.....”.The Product Literature is then quoted – “treatment should only be initiated when the number of sea lice per fish reached an accepted economic infestation threshold”<sup>80</sup>. The initial optimism that Slice would keep lice levels low does not appear to have been warranted. Government scientists have shown that elevated lice levels on wild sea trout smolts have been recorded in Loch Shiel that are “similar to those seen prior to the introduction of Slice and

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<sup>78</sup> Letter from Wester Ross Fisheries Trust to Highland Council re Corry fish farm; 4<sup>th</sup> March 2008.

<sup>79</sup> UK Assessment Report for Renewal of Slice as disclosed by VMD letter of 25<sup>th</sup> June 2010.

<sup>80</sup> UK Assessment Report Mutual Recognition Procedure, UK/V/0143/01/00/00.

synchronised treatments and fallows”, with some smolts spending as little as 4 to 5 days at sea before returning to freshwater with heavy lice burdens<sup>81</sup>.

There is also increasing concern that Slice may be becoming less effective at clearing lice. The VMD holds 20 adverse reaction reports for Slice. This suggests resistance or tolerance to the emamectin-based anti-lice treatment is becoming more problematic, leading to inadequate clearance of sea-lice from farmed fish.

Resistance or tolerance to the active ingredients of all the other licensed sea-lice treatments, Excis (cypermethrin)<sup>82</sup> and AMX (deltamethrin)<sup>83</sup> have also been reported<sup>84</sup>.

The Scottish Government is aware from its own research that “even with greater access to effective sea lice treatment agents it is uncertain that total lice numbers can be brought down to low enough levels to fully protect wild salmonids. This is a consequence of the continuously increasing numbers of fish entering culture: the numbers of farmed fish far exceeds the collective size of wild populations. Any decrease in lice numbers occurring through a lowering of acceptable lice levels on farmed fish is likely to be compensated for through future increases in production. Given that there will always be economic and environmental constraints on the frequency of therapeutic application, it would appear that if lice from salmon farming

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<sup>81</sup> Fisheries Research Service (2007) Shieldaig Project Review June 2006 – June 2007.

<sup>82</sup> Excis Variation Application UK Assessment Report (2006) states that “following three reports of a lack of efficacy of the product against sea lice and after discussions with the Irish Medicines Board (IMB), the applicant wishes to add the following statement... “intensive use or misuse of Excis can give rise to resistance. ... efficacy of this product against sea lice is reduced if cypermethrin resistance strains are present”.

The report also details cases of suspected resistance to Excis in Scotland in September 2005, in the Republic of Ireland, also in September 2005, as well as February, March, April and May 2005.

<sup>83</sup> The Alphamax Mutual Recognition Procedure New Assessment Report, from Norway, dated 2008 states that “reduced efficacy due to a change in the sensitivity towards deltamethrin in the parasite is seen after the use of Alphamax in sea lice treatments...”.

<sup>84</sup> Request made to VMD 28<sup>th</sup> April 2010, replies, with enclosures, from the VMD 17<sup>th</sup> and 25<sup>th</sup> June 2010.

are a major contributor to declines in wild populations, we will have to await a much more radical solution e.g. a totally effective vaccine”<sup>85</sup>.

There is no such vaccine and therefore, if tolerance and resistance to existing lice treatments increases, and the biomass of farmed fish per farm and number of farms also increases, the threat of sea lice to wild fish can only grow.

### **Increased risk in 2<sup>nd</sup> year of the production cycle: alternative production cycles**

It is widely recognised that sea lice numbers around salmon farms tend to increase dramatically during the second year of the production cycle on the farm.

Data collected by the Shieldaig Sea Trout Project and various fisheries trusts on the west coast have shown a relationship between larval louse densities, post-smolt sea trout infestation and fish farm production years, indicating that the prevalence of sea lice on sea trout post-smolts and lice densities are higher in the second year of fish farm production.

Netting of wild sea trout and salmon for sea lice counts in Kanaid Bay, close to the Ardmair salmon farm, and carried out under the TWG, also follows this pattern, with lice counts on wild fish being higher during Ardmair’s second year of production. In 2008, very heavily liced wild salmon were netted in June, although the TWG paper reporting the results inexplicably appears not to have considered the possible link to on-farm ovigerous lice<sup>86</sup>. The following year, 2009, TWG sweep netting in Kanaid Bay recorded no lice at all<sup>87</sup>, with nearby Ardmair fishfarm in the first year of its production cycle.

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<sup>85</sup> Scottish Executive (2002) Review and Synthesis of the Environmental Impact of Aquaculture. Scottish Executive Central Research Unit

<sup>86</sup> TWG (2008) Monitoring of sea trout from sea lice infestations West Sutherland and Wester Ross 2008

<sup>87</sup> Wester Ross Fisheries Trust (2010) Review May 2010

Recent work conducted by Marine Scotland and published in 2010 has effectively indicated consensus that increased lice levels on salmon farms in the second year of two year production cycles are correlated with increased infestation of wild fish and an increased number of wild fish above a critical level of infestation during those years. These are findings mirrored across the Scottish west coast<sup>88</sup>, corroborating earlier findings by west coast fisheries trusts at a regional and local scale, and Marine Scotland in Loch Shiel.

The importance of keeping lice numbers on salmon farms to near zero ovigerous lice during the second year of production is therefore of great importance. However, in the absence of sufficiently efficacious lice treatments or regular enough treatment, it is doubtful whether a zero ovigerous target can be achieved. Certainly, without synchronised production and synchronised treatment for sea lice across all farms in a management area, the control of lice numbers in the second year of production is more difficult, yet there is no legal requirement for synchronisation.

In sensitive locations a particular solution has been proposed by a number of scientists including by Butler (2002)<sup>89</sup>. These include single year class production over large areas or alternate S1-S1/2 smolt inputs and eleven month production cycles. The latter strategy would prevent the build up of ovigerous lice in the second year of production, thus effectively protecting wild salmonid smolt runs every year. However, this has not been trialled and consequently the potential costs to commercial salmon farms have not been assessed.

Where relocation of existing inappropriately sited farms is to take place, such alternative production strategies should be considered as an interim measure to reduce the risk of lice infection to wild fish. In elongated sea lochs where wild salmon

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<sup>88</sup> Middlemas SJ, Raffell JA, Hay DW, Hatton-Ellis M and JD Armstrong (2010) Temporal and spatial patterns of sea lice levels on sea trout in western Scotland in relation to fish farm production cycles, *Biol. Lett* 2010, 6, 548-551

<sup>89</sup> Butler JRA (2002) Wild salmonids and sea louse infestations on the west coast of Scotland: sources of infection and implications for the management of marine salmon farms. *Pest Manag Sci* 58 : 595 - 608

are at risk even from salmon farms more than 25km from the river mouths, alternative production strategies may have to be adopted by all farms. .

### **Escapee farmed salmon**

It is known and accepted on all sides of the debate that wild salmon have a high level of genetic diversity both within and between populations<sup>90</sup>. There are many distinct populations of salmon in west coast rivers, with a relatively low rate of mixing between them.

In stark contrast to this, farmed salmon arise from relatively few wild strains and thus show lower overall variability. Farmed fish are selected intentionally for high growth rates and for the particular environment that exists in culture situations: high stocking densities, easy access to food, reduced stress during handling and isolation from predation.

Farmed fish are much less fit for survival in the wild than wild salmon.

However, it is likely that if farmed fish escape early in their life cycle, those fish that survive to adulthood will have at least learned to catch prey and avoid predation. When farmed fish escape they can breed with wild fish leading ultimately to much lower fitness and productivity.

The Scottish Government acknowledges that<sup>91</sup>:

“It is quite easy to see that even where escaped fish are reproductively inferior *i.e.* less able to participate in breeding or having poorer quality or fewer gametes (eggs and sperm), large numbers of escapes may dwarf local wild populations which may only have relatively few breeding adults in any one year.....continued escapes, if maintained over several years can have very serious effects on wild populations....to

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<sup>90</sup> SNH (2007) Genetic variability of Atlantic salmon (*Salmo salar*) populations within west coast SACs. Contract Report, FRS Freshwater Lab.

<sup>91</sup> Scottish Executive (2002) Review and Synthesis of the Environmental Impact of Aquaculture. Scottish Executive Central Research Unit

put the problem in context, if 1% of the farmed population escapes each year then, for the west coast of Scotland only, that will amount to over 200,000 fish (in 2000), which vastly exceeds the total catch of the wild population. The total wild catch for the fish farming regions - North West, West, Clyde Coast and Outer Hebrides - was 8,459 salmon by all methods in 2000. This is probably in the region of 15% of the wild population and so it is easy to calculate that a 1% loss from aquaculture exceeds not only the catch from wild fish but also probably the total adult population in this region. The actual reported loss from escapes in 2000 for the whole of Scotland was 411,433 salmon, although more than half of this came from one incident in the Northern Isles....escapes of the scale currently experienced will inevitably increase the degradation of genetic diversity already present, with potential losses of genes that are important for the fitness of populations in the wild”.

Ferguson et al (2007)<sup>92</sup> produced a useful tabular summary of the phenotypic traits found in domesticated and wild salmon:

<b>Trait</b>	<b>Observation</b>
Growth rate	Domesticated salmon parr outgrow wild salmon
Growth rate	Domesticated salmon parr outgrow wild salmon in natural habitat
Aggression	Domestic salmon parr more aggressive than wild salmon
Domination	Domestic salmon parr dominate wild salmon
Predator response	Time elapsed before reappearance after exposure to predator model shorter in domesticated salmon than in wild
Predator response	Domesticated salmon parr had lower heart rate and less pronounced flight and heart responses to a model predator at attack
Growth hormone	Higher levels of growth hormone in domesticated than in wild salmon

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<sup>92</sup> Ferguson A, IA Fleming, K Hindar, O Skaala, P McGinnity, T Cross and P Prodohl (2007) Farm Escapes. Chapter 12 in The Atlantic Salmon; Genetics Conservation and Management. Edited by Eric Verspoor, Lee Stradmeyer and Jennifer L Nielsen. Blackwell Publishing, table 12.2 at page 366



Perhaps most worryingly, McGinnity et al (2003) raised concerns about the impact of escapes of farmed salmon causing “lowered fitness, with repeated escapes causing cumulative fitness depression and potentially an extinction vortex in vulnerable populations”<sup>93</sup>. A major publication edited by Scottish Government scientists argued that to minimise damage cause by escapes, marine cages should not be situated within 30km of major salmon rivers<sup>94</sup>.

Between 1990 and 2001, escaped farm fish constituted, on average, 9% of Scottish rod-caught salmon in systems with fishfarms present, versus only 2% in those without farms <sup>95</sup>.

Reported farmed salmon escapes in Scotland between 2002 and 2010 reached just under 2 million fish, easily dwarfing the total catch of wild fish on the west coast.

Year	No of escapes
2002	309,996
2003	151,853
2004	90,594
2005	877,883
2006	155,653
2007	154,466
2008	58,641
2009	131,971
2010	17,987 <sup>96</sup> .

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<sup>93</sup> McGinnity P, Prodhol P, Ferguson A, Hynes R, O’ Maoileidigh N, Baker N, Cotter JD, O’Hea B, Cooke D, Rogan G, Taggart J and Cross T (2003) Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farmed salmon. *Proc R Soc Lond B* (2003) 270, 2443-2450

<sup>94</sup> Ferguson A, IA Fleming, K Hindar, O Skaala, P McGinnity, T Cross and P Prodohl (2007) Farm Escapes. Chapter 12 in *The Atlantic Salmon; Genetics Conservation and Management*. Edited by Eric Verspoor, Lee Stradmeyer and Jennifer L Nielsen. Blackwell Publishing

<sup>95</sup> Butler JRA and J Watt (2003) Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation; in “*Salmon on the Edge*” (ed D Mills).

<sup>96</sup> <http://www.scotland.gov.uk/Resource/Doc/1062/0099761.pdf>

## 2009 Recorded farmed Atlantic salmon escapes in Scotland

Site Name	Region	Water Type	Size	Number	Cause of Escape
Aird	Highland	SW	2.5kg	17766	Hole in Net (Unknown)
Kingairloch	Highland	SW	3.5kg	1	Human Error
Marulaig Bay	Western Is	SW	3.5kg	10534	Human Error
Groatay	Western Is	SW	5.8kg	315	Equipment failure
Loch Linnhe	Highland	SW	3.7kg	621	Equipment failure
Loch Frisa	Argyll	FW	55g	34,227	Hole in Net (Predator)
Howietown	Dunblane	FW	30g	9700	Hole in Net (Predator)
Strone Point	Argyll	SW	700g	58,800	Hole in Net (Unknown)
Ardnish	Highland	SW	1Kg	7	Human error

It is important to note that the figures above are for reported escapes. Less is known about the number of fish escaping during the daily handling of fish, but it has been estimated that their total number from all aquaculture facilities may be as large as the large-scale accidents in a few net pens.<sup>97</sup>

There is an acknowledged and existing threat from escapee farmed salmon to SACs already designated for Atlantic salmon on the west coast of Scotland. For example, an Appropriate Assessment carried out in 2005 for the Crown Estate [in relation to the proposed fishfarm at Annat Bay, Loch Broom] states that “the available evidence indicates that escaped fish from Annat Bay would likely migrate up several local rivers including the Little Gruinard River – **as escapees currently do from other sites** (emphasis added). The proposed site is 15km from the Little Gruinard River and is within the distance recorded by escaped fish migrating up north-west coast rivers. The impact these escapes might have on wild salmon populations is less clear, but all potential consequences for wild salmon are a cause for concern when

<sup>97</sup> Ferguson A, IA Fleming, K Hindar, O Skaala, P McGinnity, T Cross and P Prodohl (2007) Farm Escapes. Chapter 12 in *The Atlantic Salmon; Genetics Conservation and Management*. Edited by Eric Verspoor, Lee Stradmeyer and Jennifer L Nielsen. Blackwell Publishing, page 361

considering the potential impact on the integrity of the SAC wild Atlantic salmon feature”<sup>98</sup>.

When coupled with research showing that in some rivers escapee fish from salmon farms can constitute over ¼ of spawners and can successfully spawn – in this case on the River Ewe<sup>99</sup> – the risk of escapees from Two Brooms salmon farms causing damage to the integrity of the Little Gruinard SAC cannot be ruled out.

It is therefore arguable whether the UK has properly applied the test in Waddensee when licensing salmon farming operations near ‘salmon SACs’<sup>100</sup>. This illustrates the failure of the UK, pursuant to Article 6 (2), to adopt a sufficiently precautionary approach to the protection of the Little Gruinard SAC against the threat posed to the wild salmon population by escaped farmed fish.

The Wester Ross Fisheries Trust is currently conducting work with Marine Scotland that will show the extent to which farmed salmon may have spawned within Wester Ross rivers (including the Little Gruinard SAC) and may thus have already altered the genetic composition of ‘native’ populations of wild salmonids<sup>101</sup>.

### **The UK Government’s response to these threats**

When considering the response of the Scottish Government to these two threats – lice and escapes - it is worth noting that the Government has introduced and still

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<sup>98</sup> The Crown Estate (2005) Proposed Finfishfarm, Annat Bay, Loch Broom (XX100/80B): Appropriate Assessment of the implications for the conservation interests of the Little Gruinard River Special Area of Conservation

<sup>99</sup> Butler JRA, PD Cunningham and K Starr (2005) The prevalence of escaped farmed salmon, *Salmo salar* L., in the River Ewe, western Scotland with notes on their ages, weights and spawning distribution. Fisheries Management and Ecology, vol 12, pp 149-159.

<sup>100</sup> European Court of Justice in Case C-127/02 *Waddense* - Article 6(3) of the Habitats Directive must be interpreted as meaning that any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site’s conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects.

<sup>101</sup> Wester Ross Fisheries Trust (2009) Fisheries Management Plan 2009+

maintains a presumption against further aquaculture development on the north and east coasts of Scotland.

Introduced in 1999, as a precautionary measure to safeguard migratory fish species, the extent of the north coast is defined as that area of the coast to the east of Cape Wrath. The Government stated that:

“having regard to the precautionary approach, the presumption against development of marine finfish farming developments on the north and east coasts will continue to apply until possible effects of new species development on wild salmonid populations can be more fully assessed or new and appropriate technologies are developed to reassure maintenance of no impact on wild salmonids and other fish species”<sup>102</sup>.

Patently, the same precautionary approach has not been applied on the west coast, which co-incides with the obvious under-representation of west coast wild salmon populations in the UK SAC list.

It is particularly incongruous that those SACs that have been designated on the west coast do not enjoy the protection of a similar precautionary geographical restriction on the salmon farming industry as those SACs on the east coast, nor have they been given greater protection as the body of evidence of the damaging impact of sea lice and escapes from salmon farms has become so persuasive, arguably persuasive enough to satisfy the relevant tests to ‘activate’ a more precautionary approach, as described in the 2000 Communication from the European Commission on the Precautionary Principle<sup>103</sup>.

A report commissioned by Scottish Natural Heritage in 2007, which looked at the genetics of salmon in a number of SACs, including both the Little Gruinard and

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<sup>102</sup> Scottish Executive (2007) SPP22 Planning for Fish Farming, paragraph 58

<sup>103</sup> Commission of the European Communities (2000) on the Precautionary Principle COM (2000) 1 02.02.2000

Langavat SACs, concluded that “patterns of genetic differentiation within and among individuals in samples from the ‘simple’ river systems [ie the west coast SACs] showed distortions characteristic of the occurrence of recent population declines, something not detected in the larger [east coast] rivers ”<sup>104</sup>.

This suggests that Atlantic salmon populations in west coast rivers are suffering some decline that has not occurred on the east coast of Scotland; arguably, the biggest single differentiating factor is the presence of the salmon farming industry on the west coast.

Salmon farms are believed to produce up to 98% of sea lice in the west coast salmon farming zone <sup>105</sup>; in the circumstances, it would be seem to be appropriate to adopt a precautionary approach to the management of endangered wild salmonid stocks in west coast SACs to achieve the maintenance and achievement of favourable conservation status as required by the Directive. This requires that the threat posed by sea lice from aquaculture is not only closely managed by the Scottish Government, but that decisions on the siting and continued licensing of existing fishfarms near SACs are taken from a precautionary standpoint in line with European law.

Although the Scottish Government’s Strategic Framework (2009) talks of “the desire of stakeholders for the relocation of sites away from important salmon rivers and migratory routes”<sup>106</sup>, there has been no commitment from Government to consider this formally, including moving farms away from west coast salmon SACs.

Locational Guidance for the Authorisation of Marine Fish Farms in Scottish Waters deals only with the benthic (loch-bed) impact of fish farms. Produced by Marine

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<sup>104</sup> SNH (2007) Genetic variability of Atlantic salmon (*Salmo salar*) populations within west coast SACs. Contract Report, FRS Freshwater Lab.

<sup>105</sup> Butler JRA (2002) Wild salmonids and sea louse infestations on the west coast of Scotland: sources of infection and implications for the management of marine salmon farms. *Pest Management Science* 58 : 595 - 608

<sup>106</sup> Marine Scotland / Scottish Government (2009) A Fresh Start – the renewed Strategic Framework for Scottish Aquaculture, page 18

Scotland, the Guidance is only based on the existing levels of nutrient loading and localised associated benthic impact from finfish developments, identifying three categories of coastal water bodies (category 1: where the development of new or the expansion of existing marine fish farms will only be acceptable in exceptional circumstances; category 2: where new development or expansion of existing sites would not result in the area being re-categorised as category 1; and category 3: where there appear to be better prospects of satisfying nutrient loading and benthic impact requirements, although the detailed circumstances will always need to be examined carefully). The presence or not of migratory wild salmonids or SACs is not considered.

Nor does the Scottish Environment Protection Agency (SEPA), which regulates discharges from the farms under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (pursuant to Directive 2000/60/EC establishing a framework for Community action in the field of water policy), address the sea lice issue - “SEPA does not consider that it is bound, as a matter of law, to take the existence of sea lice into account”. This despite that admission that “SEPA have acknowledged that sea lice released from fish farms may pose a risk to the survival of wild salmonids in the vicinity”<sup>107</sup>.

The Scottish Government’s approach to the control of sea lice is essentially to encourage the fish-farming industry voluntarily to manage fish farms in the same loch systems to reduce sea lice burdens. This involves the promotion of, but not a strict requirement for, synchronous fallowing and treatment of sea lice on farmed fish in an attempt to reduce sea lice levels emanating from fishfarms. The Scottish Government relies primarily on the industry adhering to a voluntary Code of Good Practice (<http://www.scottishsalmon.co.uk/dlDocs/CoGp.pdf>) to address the sea lice issue, but this is subject to widespread scepticism outside Government and industry. For example, the Code’s targets for lice per farmed fish take no account of the size or biomass of farmed fish held in each farm, nor of the numbers, biomass or

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<sup>107</sup> SEPA (2005) Regulation and monitoring of marine cage fish farming in Scotland – a manual of procedures – section 5 Setting consent limits, para 5.3.4, version 1.3, 18<sup>th</sup> May 2005

locations of nearby farms that may also be adding to sea lice numbers in coastal waters.

The Scottish Government has introduced what it calls a regulatory back-stop to the Code in the form of the Aquaculture and Fisheries (Scotland) Act 2007 which gives inspection and enforcement powers to Marine Scotland in relation to escapes and sea lice control, although the Code remains “voluntary”<sup>108</sup>. Further, although it was anticipated that the Code would “be reviewed and updated in 2009”<sup>109</sup>, this has not yet occurred.

It is clear that the Code, even if complied with, does not ensure that fishfarms pose only an acceptable risk – independent fisheries biologists concluded recently that “the siting of a fish farm in close proximity to an important and healthy wild salmonid population constitutes a significant threat to the long-term viability of that population..... this is so even if the fish farmer abides by the aquaculture Code of Good Practice”<sup>110</sup>.

A further layer of the voluntary approach favoured by the Scottish Government exists by way of the Tripartite Working Group. (TWG), a voluntary partnership promoted by Government between the fishfarming industry, the regulators and the wild fishery sector. The TWG produced a concordat in 2000 which detailed the various Area Management Groups (AMGs) which would administer Area Management Agreements (AMAs) between farmed and wild fish sectors<sup>111</sup>. This concordat reiterated the target of zero ovigerous lice on farmed fish between February and June inclusive (being wild smolt migration periods) as well as the relocation of some fish farm sites in particularly sensitive areas. It also seeks to promote synchronised

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<sup>108</sup> Marine Scotland (2008) Guidance to Fish Health Inspectors Enforcing the Provisions in Relation to the Control of Parasites. Version 1.1, issued 02/12/08

<sup>109</sup> Marine Scotland / Scottish Government (2009) A Fresh Start – the renewed Strategic Framework for Scottish Aquaculture, page 10

<sup>110</sup> Letter to Isle of Lewis Department for Sustainable Communities from fisheries biologists (24<sup>th</sup> March 2010) re Broad Bay, Isle of Lewis

<sup>111</sup> Tripartite Working Group (2000) Concordat and Report

production in areas. AMGs are set up under the auspices of the TWG. The future of further Government funding of the TWG is unclear.

Most AMAs have a target of zero ovigerous lice particularly between February and June on farmed fish<sup>112</sup>, but this is often missed, is not a statutorily enforceable target, has no penalty attached and is, arguably, not achievable in practice with the current range of anti-lice treatment agents available.

Watt et al (2006) concluded that there are a number of generic weaknesses and practical problems that undermine both the effectiveness of existing initiatives and the development of AMAs<sup>113</sup>. It is also central to this approach that the 'areas' are drawn by applying biological criteria and not to take into account existing farms and any difficulty the current operators may have in achieving synchronised production.

Even where AMAs exist, louse infestations remain a serious threat during year 2 of the production cycle at salmon farms<sup>114</sup>. Nor do AMAs cover the whole of the west coast. There is no AMA in the Loch Broom area (which includes the Little Gruinard SAC). There is some collection of data on sea lice numbers on farmed fish under the auspices of AMGs. However, most AMAs require any data gathered by the AMG to be held confidential. The confidentiality of the AMA process and the data it generates has been challenged, pursuant to Directive [2003/4/EC](#) on public access to environmental information, by Fish Legal<sup>115</sup>.

The Government's Ministerial Group on Aquaculture was due to examine "proposals for a strengthened process for the collection of sea lice data to ensure the

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<sup>112</sup> Area Management Agreement for Loch Roag para 7.2 (a) – July 2006

<sup>113</sup> Watt J, Birkeland K and Kettle-White A (2006) Area Management in Scotland; Lessons and Challenges In 'Wild and Farmed Salmon, Working Together', NASCO, Edinburgh

<sup>114</sup> Watt J, Birkeland K and Kettle-White A (2006) Area Management in Scotland; Lessons and Challenges In 'Wild and Farmed Salmon, Working Together', NASCO, Edinburgh

<sup>115</sup> Scottish Information Commissioner Decision 046/2010 Fish Legal and Scottish Natural Heritage Fish farming operations in Loch Ewe; Reference No: 200901255; Decision Date: 15 March 2010



development of a national understanding of the nature and extent of this problem”<sup>116</sup>. That the Scottish Government is still in this position in 2010 suggests either a failure over many years to get to grips with the sea lice issue, or perhaps a deliberate desire to prolong the status quo.

In conclusion, while the Scottish Government’s Strategic Framework refers to the desire for “integrated sea lice management” and a “strategy developed for effective control of sea lice supported by a transparent, robust and fair inspection regime to ensure satisfactory measures are in place and impact on the wider environment is minimised”<sup>117</sup>, the practical reality of fishfarming is rather different, as Part 4 demonstrates in relation to the two SACs designated for Atlantic salmon on the west coast.

It is patent that all the research, whether related to escapes or to sea lice, is flowing in one direction. The lack of scientific certainty, upon which basis Scottish Government has decided not to act, should, on the contrary, be the basis for adopting a precautionary approach to the siting and management of fish farms in accordance with the European Union’s Communication in 2000 on the precautionary principle<sup>118</sup>.

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<sup>116</sup> Marine Scotland / Scottish Government (2009) A Fresh Start – the renewed Strategic Framework for Scottish Aquaculture, page 10

<sup>117</sup> Marine Scotland / Scottish Government (2009) A Fresh Start – the renewed Strategic Framework for Scottish Aquaculture, page 17

<sup>118</sup> Commission of the European Communities (2000) on the Precautionary Principle COM (2000) 1 02.02.2000

## **Recommendations**

The UK Government should revise its management of the accepted threats of marine salmon farms to wild salmon and therefore salmon SACs.

For salmon SACs, on a precautionary basis, this should entail:

- i) no marine salmon farms within 25km (by sea) of salmon SAC river mouths to minimise lice infection risk to emigrating wild fish, implying the early relocation of any already within 25km and, in the interim,
  - 1. the use of alternative production cycles; and
  - 2. enforced zero ovigerous lice per farmed salmon; and
  - 3. enforced synchronised production of all marine farm sites.
- ii) a presumption against further expansion of farm production within 30km by sea of any salmon SAC to minimise the impact of both sea lice and escaped farmed fish

#### **Part 4:**

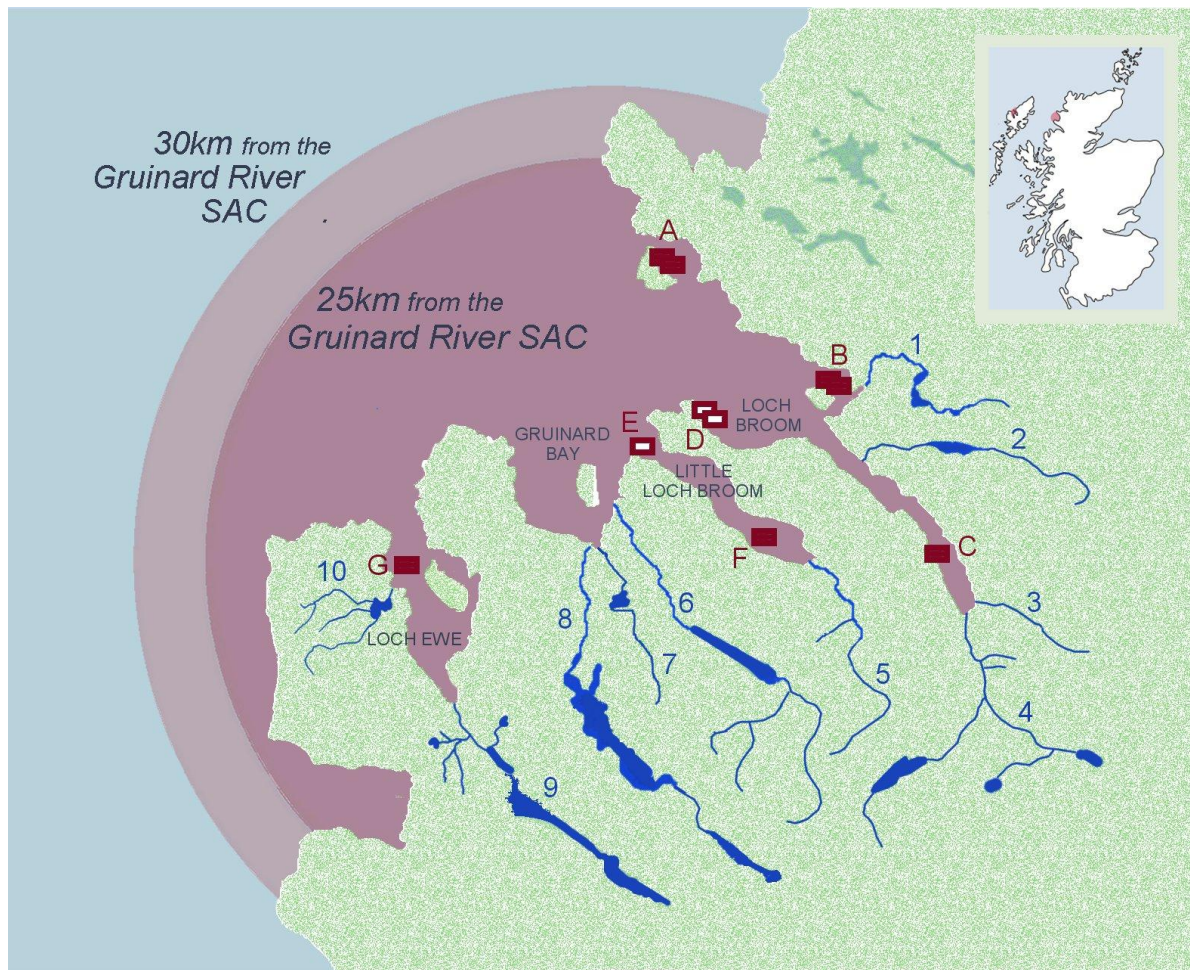
### **The failure of the UK, pursuant to Article 6(2) and (3), to ensure that marine salmon farming activity does not threaten the integrity of the Little Gruinard and Langavat SACs**

Much of the information contained in this Part flows from requests made to statutory bodies pursuant to Directive 2003/4/EC on public access to environmental information.

Without full disclosure from the industry itself, it is impossible to obtain a complete picture of the real farm situation.

However, this Part attempts to illustrate the reality of the salmon farming industry ‘on the ground’ and in proximity to the two west coast SACs designated for Atlantic salmon, the Little Gruinard SAC and the Langavat SAC, in contrast to the policy level targets, aims and objectives.

## Little Gruinard SAC



### **Rivers**

- |               |                   |
|---------------|-------------------|
| 1 Kanaird     | 2 Ullapool        |
| 3 Lael        | 4 Broom           |
| 5 Dundonnell  | 6 Gruinard        |
| 7 Inverianvie | 8 Little Gruinard |
| 9. Ewe        | 10 Squod          |

### **Fish Farms**

- A. Tanera 1,2
- B. Ardmair, Kanaird sites
- C. Corry sites
- D. Proposed Annat Bay sites
- E. Proposed Stattic Point site
- F. Ardessie sites

The Little Gruinard SAC is characterised by an unimpacted freshwater environment and relatively open access to the sea for emigrating smolts.

However, the departing salmon smolts from the Little Gruinard SAC pass through the waters of the Gruinard Bay, Loch Broom and Little Loch Broom.

It is at this stage of emigration that fisheries science suggests that wild fish are at their most vulnerable to sea lice emanating from fish farms.

While approximate distances from the mouth of Little Gruinard SAC to these salmon farms are:

<u>Farm</u>	<u>Distance by sea from Little Gruinard SAC</u>	<u>Grid ref</u>
Ardessie (Little Loch Broom)	16km	NH039906
Corry (Loch Broom)	30km	NH155905
Ardmair (Loch Kanaird)	c.20km	NH103995
Tanera (Summer Isles)	c.20km	NB995075
Fada, (Summer Isles)	c.20km	NB976076

There are also farms proposed, and in the planning system, for:

Stattic Point (Little Loch Broom)	8km	NH973963
Annat Bay (Loch Broom)	16km	NH040962

The sensitivity of the Little Gruinard SAC (and indeed other small salmonid rivers in the Two Brooms area, including the Ullapool River) has already been recognised by the Highland Council's Coastal Plan for the Two Brooms Area, published in September 2006. Significantly, participants in this Interreg 3B-funded project included not only the Highland Council but also Scottish Natural Heritage, the Crown

Estate and local community groups such as the Scoraig Community, the Loch Broom Community Council and the Ullapool and Assynt Boatowners Association<sup>119</sup>.

The Plan recommended that “any new finfish farming sites should be located away from the inner sea loch areas (Little Loch Broom, Loch Broom inland of Rhue)...to minimise the risk to the local wild salmonid populations”, that “new sites should be relocated away from the vicinity of the Little Gruinard River which is a designated SAC”. The potential for sea lice and escaped farmed salmon to damage wild fish was and remains at the heart of this concern.

The Plan also “...encourages measures to relocate existing finfish farms away from inner sea loch areas and the mouths of rivers, where possible...” and made specific recommendations for many of the farms already in the Two Brooms area. These were and remain all welcome. Indeed, Scottish Natural Heritage has always made reference, however qualified, to the need to relocate farms away from rivers, although this has not yet occurred in practice.

However, since the production of the Plan, the Scottish Government has given planning authorities, such as the Highland Council, statutory planning powers for aquaculture developments in marine waters. The Town and Country Planning (Marine Fish Farming) (Scotland) Order 2007 replaced the previous 'interim scheme' which had been in operation since the late 1990s. The grant of permissions can now be permanent, whereas leases and permissions granted by the Crown Estate previously were time-limited, typically for periods of less than 20 years.

The analysis of information retrieved from various statutory and public authorities that follows shows the practical reality with respect both to active farms and to those proposed at Annat Bay and Stattic Point, which arguably pose the greatest threat to the salmon populations of the Little Gruinard SAC due to their proximity to the routes taken by emigrating wild smolts.

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<sup>119</sup> Highland Council (2006) Coastal Plan for the Two Brooms Area – Interreg 3B:Coastatlantic – September 2006

## **Proposals for ‘new’ sites**

### **Annat Bay**

In 2003, the Kanaird District Salmon Fishery Board recommended rejection of an application made for a lease of the sea bed for salmon farming in Annat Bay<sup>120</sup>, only 16 km from the Little Gruinard SAC, citing the likely impact on wild salmonids, the failure to agree synchronised stocking of farms in the Two Brooms area and the likely build-up of resistance to Slice, the main therapeutic agent used on fishfarms to kill sea lice.

In 2004, the Highland Council’s Director of Planning and Development recommended refusal of an application for a fishfarm at Annat Bay, even though, at the time, it was suggested that only one year of salmon production would occur, followed by a switch to producing cod. Scottish Natural Heritage advised against approval because the proposal could affect the Little Gruinard SAC<sup>121</sup>. On appeal, the Reporter overturned this refusal<sup>122</sup>.

In 2005, an appropriate assessment<sup>123</sup> carried out for the Crown Estate (then the competent planning authority) agreed with SNH that “based on the nature of the proposed fish farm operation, it is considered that the Annat Bay site has the potential to have a significant impact on the qualifying features of the Little Gruinard River SAC for the one salmon cycle proposed.”

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<sup>120</sup> Letter to Crown Estate 4<sup>th</sup> August 2003 from Kanaird DSFB

<sup>121</sup> Highland Council (2004) Report by Director of Planning and Development – proposal for Crown Estate sea bed lease for Annat Bay – RP/64/04

<sup>122</sup> SEIRU (2005) Report into Application by Annat Bay Marine Ltd. to establish a Finfish Farm at Annat Bay, near Ullapool. Reporter: John H Henderson BA DipTP MRTPI Date of Site Inspection: 11 August 2005

<sup>123</sup> The Crown Estate (2005) Proposed Finfishfarm, Annat Bay, Loch Broom (XX100/80B): Appropriate Assessment of the implications for the conservation interests of the Little Gruinard River Special Area of Conservation

In summary, Scottish Natural Heritage and the Broom DSFB (now merged into the Wester Ross ASFB) raised six issues as being those with the potential to affect the integrity of the Little Gruinard River SAC, these being:

- (1) the high numbers of sea lice associated with the proposed development
- (2) the proposed site potentially lies on the migratory route of wild salmon
- (3) escapes of fish and genetic implications for wild populations,
- (4) the possibility of disease transfer from farmed fish to wild fish
- (5) the failure of local fish farm operators to successfully synchronise production within a proposed Area Management Agreement in a way that minimises possible risk to farmed and wild fish, and
- (6) cumulative fish farm operations.

Note that, in 2010, no synchronised production and fallowing, nor enforced co-ordinated lice treatment exists in the Two Brooms area. It is not clear whether the industry proposes to press its application for a farm at Annat Bay, although the landlord, the Crown Estate, has indicated in June 2010 that negotiations between fish farmer and 'relevant authorities' are carrying on to attempt to agree 'mitigation measures'<sup>124</sup>.

## **Stattic Point**

This site was originally approved by the Crown Estate in 1988, although the site was only 'activated' in 2002, and then only for two years of salmon production. The current situation is that the temporary planning permission for this site is being considered by the Scottish Government with a view to making it permanent.

An Appropriate Assessment of the existing, although inactive site, was carried out for the Crown Estate in 2006 and indicated that the salmon farm at Stattic Point, Little Loch Broom could significantly impact on the qualifying features of the Little Gruinard SAC, due to the raised sea lice impact on migrating Little Gruinard salmon smolts and the possible impact of escapes. Scottish Natural Heritage specifically pointed

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<sup>124</sup> Email from Alex Adrian , Crown Estate, dated 14<sup>th</sup> June 2010.



out that “no detailed information is available on the routes that Atlantic salmon use in migrating from the open sea to the Little Gruinard River. However, it is inevitable that in entering or leaving the Gruinard Bay some may pass very close to Stattic Point”<sup>125</sup>.

If any plans for renewed permission come forward, an Environmental Statement is likely to be required, but it is unclear whether a new Appropriate Assessment will be required<sup>126</sup>.

Scottish Natural Heritage has “justifiable concerns about the proximity of the development to the Little Gruinard SAC”. Staff from the Scottish Government’s Marine Scotland are concerned that “if lice numbers could not be controlled the prevailing winds could carry the infective stages of lice up to 15km. This would cover the areas of Gruinard and Little Loch Broom. This would not only affect the migrating salmon smolts in spring but also coastal sea trout at all stages and at any time of year....synchronous treatments may be difficult if opportunities to treat fish at Stattic Point are limited due to the exposed position”<sup>127</sup>. In 2008, Government scientists had already noted that “the reactivation of the site at Stattic Point would bridge management areas 10b and 10d and therefore would not be recommended by the Scottish Government”<sup>128</sup>.

As Stattic Point is only some 8km from the Little Gruinard SAC (closer than Annat Bay) and is an exposed site (making escapes more likely), it is hard to see how this could ‘pass’ any Appropriate Assessment, but it is arguably a failure of Scottish

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<sup>125</sup> Crown Estate(2006) Salmon Farm, Little Loch Broom (RC1-20-4\_ Appropriate Assessment of the implications for the conservation interests of the Little Gruinard SAC (April 2006)

<sup>126</sup> Letter from Scottish Govt to Rhidorroch Estate, 1<sup>st</sup> May 2009

<sup>127</sup> Email from Matthew Gubbins, Marine Lab to John O’Brien , Scottish Government dated 16<sup>th</sup> November 2009.

<sup>128</sup> Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie site “B”, Little Loch Broom. Report by Director of Planning and Development – at para 4.8

Government policy not to make it properly clear that such proximity to SACs designated for wild salmon should not be permitted.

### **Existing farm sites**

#### **Ardessie**

The farm site at Ardessie has been in operation on Little Loch Broom since the 1980s. In 2002<sup>129</sup>, in response to expansion proposals at Ardessie, the Highland Council approved expansion, despite there being no Area Management Agreement in place, but suggested that there should be no further expansion of Ardessie, or indeed of any farms in the Two Brooms area, until a formal Area Management Agreement had indeed been made to deal with the sea lice issue and to consider relocation of fishfarm sites away from salmon-river mouths.

Further, and still in the absence of a Two Brooms Area Management Agreement, the Council recommended the approval, in 2008, of a further application for expansion at Ardessie<sup>130</sup>, to grow smolts and transfer them to other sites in the Two Brooms area to grow on (although, as the Highland Council accepted, there was nothing to bind the operator not to return to full on-growing production at the site<sup>131</sup>). There was no discussion of relocation as envisaged by the Two Brooms Coastal Plan. Government scientists were concerned that if Ardessie was to be stocked again there would be “adverse implications with regard to moving live fish from one management area to another...such movements increase the risk of spreading disease and are therefore against the Code of Good Practice”<sup>132</sup>.

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<sup>129</sup> Per Bob Shannon, Head of Planning Policy and Europe, Highland Council, letter to Crown Estate, 2002

<sup>130</sup> Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie ‘B’, Little Loch Broom; Report by Director of Planning and Development

<sup>131</sup> ASFB objections to expansion of Ardessie ‘B’ as reported in Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie ‘B’, Little Loch Broom; Report by Director of Planning and Development

<sup>132</sup> Paragraphs 4.8 and 5.10 of the Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie ‘B’, Little Loch Broom; Report by Director of Planning and Development

Already, two years on, the proposed 4-5 months fallow period as proposed in 2008<sup>133</sup> has been reduced to only 3 months<sup>134</sup> and growing stock in their second year of production are transferred from other Two Brooms sites (Corry and Ardmail) to Ardessie for growing on<sup>135</sup>.

The Wester Ross Fisheries Trust reported that sea trout with high numbers of sea lice have been recorded in Loch Broom<sup>136</sup>. The Trust also concluded that a sea lice study may show that “some areas are naturally more prone to sealice epizootics than others (e.g. Little Loch Broom)”<sup>137</sup>. The Trust<sup>138</sup> also recorded very high levels of sea lice on sea trout in Little Loch Broom in the late 1990s to 2001 and lice epizootics were reported elsewhere in the Two Brooms in this period. The fyke net at the mouth of the Dundonnell river, close to Ardessie fish farm has demonstrated recent lice levels on wild fish exceeding lethal epizootic levels<sup>139</sup> and has also demonstrated the movement of sea trout between Little Loch Broom and Gruinard Bay<sup>140</sup>.

The failure to agree an AMA to try to address the sea lice issue in the Two Brooms area is blamed mainly upon the failure of farm operators to agree synchronisation of farm production cycles in the face of proposals for large scale expansion in farm

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<sup>133</sup> Paragraph 2.2 of Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie ‘B’, Little Loch Broom; Report by Director of Planning and Development

<sup>134</sup> Stocking Plan for Ardessie Site A 2011 – 2013 – as shown 6th Annual Sea Lice Review Meeting, Ullapool, 28<sup>th</sup> June 2010

<sup>135</sup> Email to Rhidorroch Estate from Gilpin Bradley, Wester Ross Fisheries Limited (operator of Ardessie farm) 9<sup>th</sup> July 2010

<sup>136</sup> Wester Ross Fisheries Trust (2009) Wester Ross Fisheries Trust Review, page 18

<sup>137</sup> Wester Ross Fisheries Trust (2009) Wester Ross Fisheries Trust Review, page 25

<sup>138</sup> Wester Ross Fisheries Trust (2009) Fisheries Management Plan 2009+, Part 5

<sup>139</sup> Cunningham P (2009) The occurrence of the parasitic sea louse (*L. salmonis*, Kroyer) on sea trout (*Salmo trutta*) in the Wester Ross Fisheries Trust area in 2007 and 2008 with recommendations for monitoring and management; Wester Ross Fisheries Trust April 2009, with amendments November 2009.

<sup>140</sup> Butler JRA (1999) Wester Ross Fisheries Trust Review 1998–1999

salmon production. However, as the failure and collapse in 2010 of the Lorne AMA shows, after persistent failures of the industry parties to live up to their part of the agreement, AMAs are no guarantee of proper management of salmon farms.

A study by the Wester Ross Fisheries Trust and Ardessie Salmon (the farm operator at the time) concluded that “because of the greater numbers of farmed salmon up to 95% of the [lice] larvae produced in the loch probably emanate from the farm”<sup>141</sup>.

Despite this, in 2008, the Highland Council recommended the granting of permanent planning approval involving a change in cage configuration and an expansion of Ardessie fish farm. In doing so, the Council acknowledged that no Area Management Agreement was in place and that the recommendation ran counter both to the relocation proposed by the 2006 Coastal Plan<sup>142</sup> and to warnings from Wester Ross Fisheries Trust that the expansion would further threaten the wild fish in the Dundonnell River (already showing high levels of lice) and Gruinard Bay [and hence the Little Gruinard SAC]. It also noted that Scottish Natural Heritage was not clear how the granting of permanent planning permission would affect the relocation policy of the Coastal Plan for the Two Brooms, with the clear implication that any decision to grant planning permission would be contrary to that Plan<sup>143</sup>.

A further application for expansion has been submitted for planning approval in January 2011<sup>144</sup>.

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<sup>141</sup> Butler JRA (1999) Wester Ross Fisheries Trust Review 1998 –1999

<sup>142</sup> Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie site “B”, Little Loch Broom. Report by Director of Planning and Development

<sup>143</sup> Highland Council (2008) Proposed change of cage configuration and expansion of fish farm at Ardessie site “B”, Little Loch Broom. Report by Director of Planning and Development, paragraph 4.5

<sup>144</sup> Application no 11/00006/FUL to Highland Council 6<sup>th</sup> January 2011

## **Corry**

The fish farm at Corry has been in operation since 1982.

Due to the long-standing nature of the Corry site, it has never been the subject of an Environmental Statement or Appropriate Assessment<sup>145</sup>, although it could be expected to have a broadly similar impact on the Little Gruinard SAC as the proposed fishfarm at Annat Bay, which was subject to such an Assessment.

Corry is 30km away from the Little Gruinard SAC (by sea) and is, again, in an area that the Two Brooms Coastal Plan had indicated from which the Council should “encourage relocation....to help safeguard and regenerate wild salmonid stocks in the River Broom” and “to better flushed, more open water”.

A Screening Opinion carried out by the Crown Estate in 2007<sup>146</sup> in response to the proposed renewal and modification of the development consent for Corry concluded that an Environmental Statement was not required, despite being alerted to the Two Brooms Coastal Plan recommendation for relocation of the farm at Corry to a better flushed outer loch site, the need for an Area Management Agreement and the lack of public consultation.

The Highland Council submitted a qualified favourable view<sup>147</sup> to the Crown Estate in 2008 relating to the proposed modification and renewal of the lease at Corry, Loch Broom. This case just pre-dated the transfer of planning powers from the Crown Estate to the Highland Council and involved a small increase in cage size. The Council also noted that “there has been relatively little progress by the Scottish Government in facilitating relocation of fish farms from locations where there is a

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<sup>145</sup> Highland Council (2008) Proposed renewal and modification of salmon farm lease at Corry A, Corry D and Corry B, Loch Broom. Report No PLR-080-08

<sup>146</sup> Crown Estate (2007) Screening Opinion of Crown Estate. Dated 29<sup>th</sup> March 2007.

<sup>147</sup> Highland Council (2008) Proposed renewal and modification of salmon farm lease at Corry A, Corry D and Corry B, Loch Broom. Report No PLR-080-08

perceived conflict of interest with game fisheries”, a position that still pertains in 2010.

Scottish Natural Heritage questioned whether the farm operator would be required as part of the 2007 application to consider alternative sites for the farm<sup>148</sup>, although no such consideration appears to have been given to alternative sites according to the Highland Council<sup>149</sup>.

The Wester Ross Fisheries Trust has detailed why the Corry site is sensitive for wild salmonids, predicting that future sea lice epizootics would inevitably damage wild fisheries in the nearby Ullapool River. The Trust has also drawn particular attention to the failure of Wester Ross Fisheries Limited to synchronise production at their other sites in the Two Brooms area (Corry and Ardair), contrary to good practice. There is no move by Government to compel such synchronisation.

Fish from Corry are transferred in year two of the production cycle to Ardair, increasing the risk of the spread of disease. This transfer is made from one management area (10b) to another (10d) which carries with it a risk of spreading disease<sup>150</sup>. The site currently farms both salmon (401,500 fish) and sea trout (20,000)<sup>151</sup>.

## **Ardair**

There are two farm sites at Ardair in Loch Kanaird, known as the Isle Martin and River Kanaird sites (less than 0.5 km from the river mouth). The Ardair farms have been operating since 1978.

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<sup>148</sup> Letter to Paul Bancks, Crown Estate from Tamara Lawton, SNH dated 16<sup>th</sup> March 2007

<sup>149</sup> Email from Colin Wishart Highland Council 16<sup>th</sup> June 2009, quoting from Ross, Skye and Lochaber Planning Applications and Review Committee, 5<sup>th</sup> August 2008.

<sup>150</sup> Marine Scotland Science (2010) Management Area Maps April 2010

<sup>151</sup> FRS Fish Health Inspectorate Case Sheet. Date of visit 15/6/10

The Crown Estate lease for the two Ardmail farms was renewed in 2004.

Initially, the Highland Council recommended refusal of the renewal application due, inter alia, to the proximity of the farm to the mouth of the River Kanaird and hence the threat to wild fish.

Scottish Natural Heritage considered that benthic surveys of both sites showed degraded community structures and high levels of organic pollution and were concerned about the location of the farm within 0.5 km of the mouth of the River Kanaird and the resultant threat to wild salmonids. This river also holds a population of freshwater pearl mussels, the survival of which depends entirely upon there being a sufficiently healthy and viable population of wild salmonid hosts.

Production at the Ardmail sites is not synchronised with the other salmon farms in the Two Brooms area, confounding co-ordinated lice treatment efforts and synchronous production - there is no Two Brooms Area Management Agreement requiring synchronous fallowing or co-ordinated lice treatment (although the value of such agreements has been called into question by the collapse of the Lorne AMA in 2010).

The Ardmail sites were seen at the time as obvious candidates for relocation away from the river mouth. However, despite numerous objections, the decision against renewal was appealed and the Reporter overturned the refusal and ordered the granting of the development consent.<sup>152</sup>

The Wester Ross Fisheries Trust has reported badly-liced wild fish (up to 180 lice per fish) in a sample caught by rod and line from the sea pool at the mouth of the Kanaird in 2007 near to the Ardmail farms<sup>153</sup>. In May 2008 sweep netting by the Tripartite Working Group's Regional Development Officers in Loch Kanaird found an

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<sup>152</sup> Inquiry Reporters Unit (2004) Report of an accompanied site inspection on 10<sup>th</sup> March 2004 in relation to a request by Wester Ross Salmon Limited for a review of the decision not to renew development consent for one of two sites at Loch Kanaird, Wester Ross. Dated 26<sup>th</sup> April 2004.

<sup>153</sup> Wester Ross Fisheries Trust Review (2008)

average infestation of 53 lice per sea trout, with a maximum of 150, far exceeding potentially lethal levels for sea trout smolts. Almost all of these were juvenile lice indicating local and recent infection. A subsequent survey in June 2008 captured four adult wild salmon, presumably returning to the River Kanaird, with average infestations of 600 lice per fish, the majority of which were juvenile lice indicating very recent and localised infection<sup>154</sup>.

An inspection and sea lice audit of Ardmair farm on 10<sup>th</sup> November 2009 by the Fish Health Inspectorate showed that weekly sea lice counts were above Code of Good Practice trigger levels for 4 weeks, with trigger levels not being reached until August 2009<sup>155</sup>. Although “some treatments were co-ordinated with SSF [another fish farm operator]”, on inspection by Marine Scotland, there was no record of correspondence with other operators and there is “no formal written agreement for 10b [the Two Broom area]”. Nevertheless, Marine Scotland felt able to conclude that “sea lice are being effectively managed on the site in question”.

A subsequent inspection reported that sea lice levels were not below the threshold in the Code of Good Practice (0.5 adult females Feb to June, 1 adult female July to January) during the November 2009 and June 2010 period, although the extent and duration, during this time period, of the lice problem is not clear from the reports. The site was treating with Alphamax during the inspection visit and the site manager is also reported as stating that “treatments not as effective as in past”<sup>156</sup>.

### **Summer Isles (Tanera and Fada)**

The two Summer Isles farms are approximately 20km from the mouth of the Little Gruinard SAC.

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<sup>154</sup> Wester Ross Fisheries Trust (2008)

<sup>155</sup> FRS Inspection of Ardmair farm 10<sup>th</sup> November 2009

<sup>156</sup> FRS Inspection record sheets. Date of visit 15<sup>th</sup> June 2010.



A Fish Health Inspectorate inspection in November 2009<sup>157</sup> was unable to check sea lice treatment records at Tanera. The same inspection revealed 20-30cm holes in cages where feed pipes entered the cages; the farm was not therefore satisfactory with respect to the containment provisions of the Aquaculture and Fisheries (Scotland) Act 2007.

A subsequent inspection in June 2010 reported that the holes have not been reinforced. That inspection also showed that Tanera held 337,641 salmon of just under 1kg and had reported “grumbling IPN” [Infectious Pancreatic Necrosis] during March and April in the farmed fish. The inspection further recorded that the site has had otter predation problems as cage 19 is close to a small island where otter family lives. Sea lice numbers were reported as increasing and the site was treating these with Alphamax<sup>158</sup>.

The Summer Isles farms do not operate under an Area Management Agreement (and the same caveats as mentioned earlier concerning the value of AMAs still apply) and are not synchronised with all the other farms in the Two Brooms area.

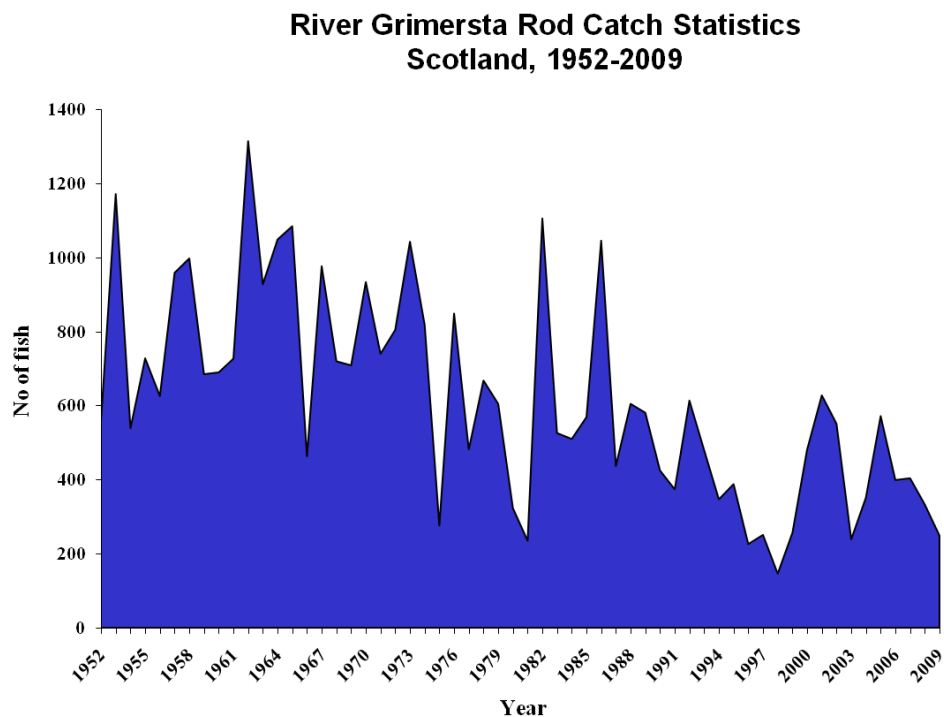
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<sup>157</sup> Inspection records disclosed by Marine Scotland, by email of 16<sup>th</sup> April 2010

<sup>158</sup> FRS Inspection records Case Sheet Date of visit 16<sup>th</sup> June 2010

## Langavat SAC

The Grimersta River (Langavat SAC) river empties into the Loch Roag system. The rod catches for the Grimersta River show a long term decline in the salmon population.



The departing smolts from the Grimersta pass through water that contain a number of active salmon farms, both in West and East Loch Roag, with the potential to influence the SAC on the Grimersta and the integrity of the wild Atlantic salmon population. The salmon farms include:

### West Loch Roag:    NGR

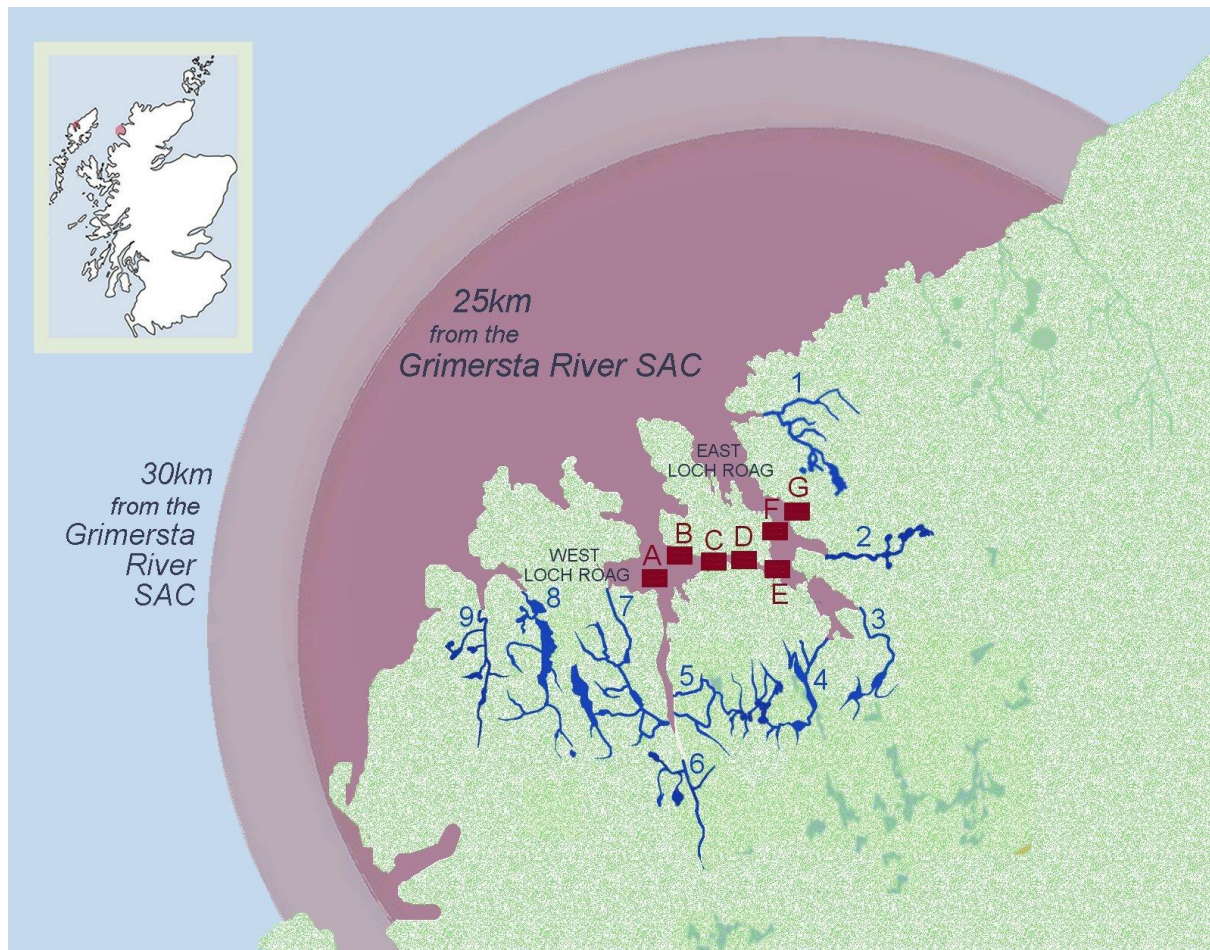
Vuia Beg	NB121331
Gousam	NB111339
Vuia Mor	NB125343
Vuia	NB137355

East Loch Roag:

Taranish NB177372

Vacasay NB193361

Tolsta NB207378



**Rivers**

- |               |                         |
|---------------|-------------------------|
| 1. Carloway   | 2. Breasclete           |
| 3. Blackwater | 4. Grimersta / Langavat |
| 5. Suirstavat | 6. Morsgail             |
| 7. Croistean  | 8. Fhorsa               |
| 9. Red River  |                         |

**Fish Farms**

- |             |             |
|-------------|-------------|
| A. Gousam   | B. Vuia     |
| C. Vuia Beg | D. Vuia Mor |
| E. Vacasay  | F. Taranish |
| G. Tolsta   |             |

Although a Loch Roag Area Management Agreement (AMA) appears to date from July 2006<sup>159</sup>, the AMA Report of March 2010<sup>160</sup> is still speaking of terms of what the AMA “will” do, despite there having been detailed analysis of the entire aquaculture industry in Loch Roag in 2005<sup>161</sup> with proposals for site optimisation, including some relinquishing of existing fishfarm consents, inter alia, to protect the Langavat SAC salmon.

It is unclear to what extent the recent reorganisation of Loch Roag farms had improved farm management in Loch Roag. .

## Escapes

There have been numerous reported escapes in Loch Roag in the last five years according to figures reported to and held by Marine Scotland.

Farm:	No of fish reported:	Date:
Vuia	500	17/10/2002
Greinam Island	12000	14/01/2005
Tolsta	8500	02/12/2005
Gousam	20,928	11/01/2005
Vuia Beg	12,943	11/01/2005
Tolsta	3900	11/01/2006
Loch Langavat	1293 (into freshwater)	21/02/2006
Tolsta	2500	31/03/2006
Vuia	100	13/09/2006

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<sup>159</sup> Loch Roag Area Management Agreement (July 2006)

<sup>160</sup> TWG (2010) Loch Roag AMA Report March 2010

<sup>161</sup> Western Isles Aquaculture Association (2005) A proposed rationale for the ratification of the Site Optimisation Plan for farming in Loch Roag, Lewis, Western Isles. A Report by the Fish Vet Group

Vuia	1000	06/08/2007
Vuia Mor	1629	14/09/2007
Taranaish	7437	29/08/2008
Vacasay	2766	13/11/2010

## **Taranaish**

On 2<sup>nd</sup> November 2005, the sea lice infection rate on the farmed fish had been 4 lice per fish.

An inspection of Taranaish farm on 16<sup>th</sup> April 2008 revealed “a number of fish observed with sea lice damage...Slice has reportedly been less effective...all fish sampled observed with sea lice at least 3 adults per fish”.

The farm experienced what appear to be considerable difficulties with their control of sea lice in 2008. In March and April 2008, the farm reported 4,530 mortalities that had been “mainly caused by lice damage”. The farm treated with Alphamax on four occasions between July and November, azimethiphos on three occasions between July and September and Slice twice (in late May / early June and late October / early November).

Despite this regime of lice treatment, average counts per farmed fish as at 17<sup>th</sup> November 2008 were:

Gravid females - 23

Adult males – 6

Pre-adult – 23

Juveniles – 5

Caligus - 3

The inspectors reported that, on 12<sup>th</sup> December 2008, “lice levels [were] still bad on site, although latest treatment has had an effect”.

In the middle of these sea lice difficulties, Taranaish suffered an escape of 7,437 fish on 29<sup>th</sup> August 2008.

The Fish Health Report sent to the farmer recommended that “veterinary advice should continue to be obtained regarding sea lice management strategies employed on site to ensure that sea lice levels fall with the recommended limits of section 3.4.3.8 of the CoGP”.

## **Gousam**

Information from an Inspection made on 15<sup>th</sup> April 2008 of Gousam farm<sup>162</sup> showed “problems with sea lice; lice treatment with Slice was not effective; recent mortality – 6,700 for previous 5 months until fallow mainly due to sea lice problems and seal predation”. The Inspection Report records that “lice treatment with Slice was not effective” (the original words “were resistant to” appear to have been edited post-inspection). A “plan to have a single year class in the loch” was also recorded, showing that by end 2008 there was still no actual co-ordination between farms in the loch on production cycles.

Gousam has a poor lice control record. In the previous year, an inspection of 10<sup>th</sup> May 2007 had recorded sea lice per fish counts as high as 50 adults per fish.

Two years earlier, a report from 1<sup>st</sup> February 2005 states that “fish a bit licey on site”, this following an escape on 11<sup>th</sup> January 2005 of c. 50,000 salmon of between 1 and 1.6 kilos each.

## **Vuia**

Vuia fishfarm reported mortalities in Sept 2007 of 4,753 due to “lice and seals” and 4,193 in January 2008 again due to “lice and seals”.

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<sup>162</sup> Marine Scotland spreadsheet provided to Guy Linley-Adams Solicitor 16<sup>th</sup> April 2010.

## **Vuia Mor**

Vuia Mor reported 3,830 mortalities due to “seal and lice” in September 2007.

## **Vacasay**

Inspections of Vacasay fishfarm on 5<sup>th</sup> December 2006 reported “lice problems...Slice apparently ineffective against lice”. On 16<sup>th</sup> April 2008, “the majority of fish had sea lice infections....treatments with Slice have been becoming less effective. Sea lice observed on all fish sampled (at least 3 adults/fish)”.

In 2008, the farm did not record weekly lice counts contrary to the Code of Good Practice and increasing lice numbers were reported in February 2009<sup>163</sup>.

On 13 November 2010, the farm suffered an escape of 2,766 salmon of average weight 2.5 kg each<sup>164</sup>.

## **Vuia Beg**

An inspection of Vuia Beg fishfarm on 15<sup>th</sup> April 2008 showed that “mortalities mainly due to sea lice damage or seal predation. Had problems with sea lice prior to fallowing, tried treatment with Slice (4 for cycle) and Excis (14 for cycle) which were ineffective. Recent mortalities - 13,173 from the previous 5 months until fallowing - were “mainly due to sea lice problems or seal predation”.

## **Resistance to sea lice treatments in Loch Roag farms**

There are clear indications of resistance to, or decreased efficacy of sea lice treatments in Loch Roag farms.

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<sup>163</sup> Fisheries Research Services Fish Health Inspectorate Inspection Report 12 May 2009.

<sup>164</sup> Marine Scotland record of escapes at <http://www.scotland.gov.uk/Resource/Doc/1062/0109986.pdf>

Slice resistance has been reported in the western isles in Scotland as well as in Chile ('widespread'), Ireland and Norway<sup>165</sup> - "it is not a question of if resistance to Slice will occur, but rather when and what can be done to manage it". Reports from Ireland in 2005 suggest difficulties experienced in complying with sea lice levels required by the Irish Government at Killary<sup>166</sup>.

Loch Roag farms have suffered from reduced efficacy of sea-lice treatments in 2005, 2006 and 2007. Requests made to the Veterinary Medicines Directorate in June 2010 by the Rhidorroch Estate, pursuant to Directive 2003/4/EC on public access to environmental information have revealed that Gousam (2007), Vuia Mor (2007), Linngeam (2005) Vuia (2005, 2006 and 2007), Tolsta (2005), Vacasay (2006) have reported reduced efficacy of anti-sea lice treatments<sup>167</sup>.

Redactions applied by VMD to the disclosure of the information requested are now the subject of a formal referral to the Information Commissioner pursuant to the Environmental Information Regulations 2004, which implement Directive 2004/4/EC in the UK.

## **Conclusion**

As the above analysis of available information concerning the farms near to the two SACs designated for Atlantic salmon that exist within the area of operation of the salmon-farming industry shows, there is an obvious contrast between, on the one hand, the vision of fishfarms compliant with the Code of Good Practice, keeping lice numbers within levels that do not threaten wild fish (with a target of zero ovigerous lice) and suffering minimal escapes, and the reality on the ground.

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<sup>165</sup> Intervet (2009) Sea Lice Susceptibility to SLICE – Powerpoint Presentation

<sup>166</sup> McHenery J (2005) Investigation of reported lack of clearance of salmon lice from salmon treated with Slice mediated feed at Celtic Atlantic Salmon (Killary) Limited

<sup>167</sup> Letter to Guy Linley-Adams from David Rayner, VMD 2<sup>nd</sup> September 2010



## Recommendations

The UK Government should revise its management of the threats of marine salmon farms to the Little Gruinard and Langavat SACs. This should entail:

- i) no marine salmon farms within 25km (by sea) of both the Little Gruinard or Langavat SACs (or the proposed Ullapool River SAC) to minimise lice infection risk to emigrating wild fish, implying the early relocation of any already within 25km and, in the interim,
  - a. the use of alternative production cycles; and
  - b. enforced zero ovigerous lice per farmed salmon; and
  - c. enforced synchronised production of all marine farm sites.
- ii) a presumption against further expansion of farm production within 30km by sea of both the Little Gruinard or Langavat SACs (or the proposed Ullapool River SAC) to minimise the impact of both sea lice and escaped farmed fish.

## **GLOSSARY**

### **Association of District Salmon Fishery Boards (ASFB)**

The ASFB is the representative body for Scotland's 41 District Salmon Fishery Boards, which enjoy statutory powers under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003.

### **Atlantic Salmon Trust**

The Atlantic Salmon Trust is a UK based charity with Atlantic wide interests which champions the wild salmon and sea trout.

### **Fisheries Research Services**

See Marine Scotland Science below

### **The International Council for the Exploration of the Seas (ICES)**

ICES coordinates and promotes marine research on oceanography, the marine environment, the marine ecosystem, and on living marine resources in the North Atlantic. Members of the ICES community include all coastal states bordering the North Atlantic and the Baltic Sea, with affiliate members in the Mediterranean Sea and southern hemisphere.

### **The International Union for the Conservation of Nature (IUCN)**

IUCN is the world's oldest and largest global environmental network - a democratic membership union with more than 1,000 government and NGO member organizations, and almost 11,000 volunteer scientists in more than 160 countries.

### **Joint Nature Conservation Committee (JNCC)**

JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.

### **Marine Scotland Science**

Marine Scotland is the directorate of Scottish Government responsible for the integrated management of Scotland's seas. Established on 1 April 2009, Marine

Scotland brings together the functions and resources of the previous SG Marine Directorate, Fisheries Research Services ( Marine Scotland Science) and Scottish Fisheries Protection Agency ( Marine Scotland Compliance).

### **North Atlantic Salmon Conservation Organization (NASCO)**

NASCO is an international organization, established by an inter-governmental Convention in 1984. The objective of NASCO is to conserve, restore, enhance and rationally manage Atlantic salmon through international cooperation taking account of the best available scientific information.

### **Salmon and Trout Association (S&TA)**

Formed in 1903, the Salmon & Trout Association (S&TA) has a UK-wide membership of game anglers, fishery owners/managers, affiliated trades and members of the public with an interest in conserving the aquatic environment and its dependent species, addressing all issues relevant to fisheries legislation and regulation, together with environmental and species management and conservation.

### **Scottish Environmental Protection Agency (SEPA)**

The Scottish Environment Protection Agency (SEPA) is Scotland's environmental regulator. SEPA is a non-departmental public body, accountable through Scottish Ministers to the Scottish Parliament.

### **Scottish National Heritage (SNH)**

SNH is the Scottish Governmental body charged with nature conservation functions.

### **Tripartite Working Group (TWG)**

The TWG is chaired by the Scottish Government to address problems common to salmon farming and wild salmon fisheries. Area Managements Agreements (see below) are set up under the auspices of the WTG.

### **Area Management Agreements**

Area Management Agreements are made between the aquaculture industry and some wild fisheries interests on the west coast and Western Isles and cover a range

of objectives, including single year class management and synchronised production/fallowing cycles, synchronised lice treatments and adherence to industry Codes of Practice. They have come in for increasing criticism and the Lorne AMA has recently collapsed after industry failures to live up to AMA commitments.

### **Veterinary Medicines Directorate (VMD)**

The VMD is an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra). The VMD has UK wide responsibility for the responsible, safe and effective use of veterinary medicinal products.

### **Wester Ross Fisheries Trust**

The Wester Ross Fisheries Trust (WRFT) was established in 1996 in response to the need for solutions to fisheries problems and to improve the management of wild fisheries, carrying out work focused on migratory fish species such as salmon and sea trout, brown trout, char and lamprey.

**This complaint is made by Guy Linley-Adams, Solicitor,  
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**On behalf of Mr Ewen and Mrs Jenny Scobie of the Rhidorroch Estate, near  
Ullapool in Ross-shire, Scotland, UK**