**Environment, Climate Change and Land Reform Committee**

**Environmental impacts of salmon farming**

**Written submission from David and Jean Ainsley**

David and Jean have run diving and wildlife trips for 30 years in the Firth of Lorne SAC, which is part of the Loch Sunart to Sound of Jura MPA and the Inner Hebrides and Minches cSAC (designated for harbour porpoise). We have worked with community groups to bring about the protections the area now enjoys, including a European complaint which ended scallop dredging. This two minute BBC Blue Planet video has been seen by two million people and celebrates the dramatic recovery following protection - <https://www.facebook.com/bbcearth/videos/1784731658227049/>

Tourism is Scotland’s biggest industry with a turnover of approx 11bn which is expected to rise to £25bn by 2025 (Scotsman report 2017). It employs around 250,000 people, fish farms employ around 1500 people directly. Fish farming is economically important but currently fails to comply with Scottish Environmental Legislation. The salmon industry is directly, unlawfully and unnecessarily affecting wildlife tourism in our area by shooting seals and disturbing cetaceans.

With regard to the use of Acoustic Deterrent Devices (ADDs) on farms we contend that:

1. There is a wealth of science which shows that ADDs disturb, exclude and can cause hearing damage to porpoise and other cetaceans. One study demonstrates 85% of porpoise were excluded from a 990 square kilometre area by a single ADD.
2. It is against Scottish Law to disturb any individual porpoise, dolphin or whale, and a boat skipper or swimmer would be liable to prosecution for so doing. However, a reported 130 fish farms disturb cetaceans over wide areas by using ADDs.
3. Porpoise are a European Protected Species (EPS) and it is illegal to disturb an EPS without a licence. We have submitted a FOI / EIR request to determine how many salmon farms within the Inner Hebrides and Minches cSAC (designated for porpoise) use ADDs and how many, if any hold European Protected Species Licences.
4. Farms would not pass any of the components of the tripartite test to get an EPS licence.
5. There are alternatives to the use of ADDs and shooting seals to prevent predation by seals. These alternatives are properly tensioned strong nets, anti-predator nets or close containment systems. These are used successfully worldwide including Canada where ADDs are banned.
6. The Aquaculture Stewardship Council requires that certified farms cannot use ADDs or kill marine mammals. In Norway, a total of 115 salmon farms are certified, including 49 Marine Harvest farms. In Scotland only 2 are certified. Can the inquiry determine why Scottish farms do not comply by the same standards as Norway to protect wildlife?
7. If Scottish farms were to fit anti-predator nets or closed containment there would also be no need to shoot seals. The seal shooting license states that seals should only be shot ‘as a last resort’, so any farmer that shoots seals without having fitted the best technology is breaking license conditions.
8. According to a recent ICES report, sea lice and escapes from farmed salmon are the two most important causes of the decline in wild salmonids. Anti-predator nets would minimise escapes, closed containment would solve both problems.
9. Appropriate Assessments should have been carried under Article 6(3) of the Habitats Directive for each farm using / applying for Planning consent to use ADDs within the Inner Hebrides and Minches cSAC. The cumulative effects of all the ADDs within the cSAC should also have been Appropriately Assessed. We have FOI/EIR requests to determine how many Appropriate Assessments have been carried out.
10. We support further scientific work into meeting the dual legal duties to stop disturbance to cetaceans and ensure that seals should only be shot as a genuine’ last resort’ however this must not be used as an excuse to delay compliance with the law.
11. **We request the enquiry to determine why the competent authorities are failing to enforce the multiple laws protecting cetaceans from disturbance, critical habitat exclusion and potential hearing injury.**

We have read the SAMS Research Services Ltd Report and agree with the following therein;

Page 104 *- Marine mammals are protected under the following legislations:*

*- Conservation (Natural Habitats, &c.) Regulations 1994 in combination with the Nature Conservation (Scotland) Act 2004 and the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007, which implement species protection requirements of the European Union (EU) Habitats Directive (92/43/EEC) in Scotland, on land, inshore and offshore waters;*

*- Wildlife and Countryside Act 1981;*

*- The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 (which devolved authority for marine planning and conservation powers in the offshore region (12-200 nm) to Scottish Ministers).*

*All species of cetacean occurring in UK waters are listed in Annex IV (species of community interest in need of strict protection) of the EU Habitats Directive as European Protected Species (EPS), whereby the deliberate killing, disturbance or the destruction of these species, or their habitat, is banned (this is reflected in their inclusion on Schedule 2 of the Habitats Regulations). Furthermore, two species, the harbour porpoise and bottlenose dolphins, are listed in Annex II under the EU Habitats Regulations, which means that these native species should be conserved through the designation of Special Areas of Conservation (SACs).*

*Cetaceans are listed in Schedule 5 of the Wildlife and Countryside Act 1981 which prohibits their deliberate killing or disturbance. The Nature Conservation (Scotland) Act 2004 makes amendments to the Wildlife and Countryside Act 1981 in Scottish waters, including the addition of ‘reckless’ acts to species protection which make it an offence to intentionally or recklessly disturb a cetacean.*

**The report states that disturbing a cetacean is an offence under the** *The Nature Conservation (Scotland) Act 2004***.** It does not mention Habitats Regulation 39(2) which states that, ‘it is an offence to deliberately or recklessly disturb ***any*** dolphin, porpoise or whale (cetacean).’

**The report also quotes some of the science which clearly shows that ADDs disturb porpoise (we cite further studies later). However, it does not reach the obvious conclusion that any fish farm using one or more ADD(s) is committing an offence and the competent authorities and ultimately Scottish Ministers should uphold the law and stop their use.**

**We understand the need to keep submissions to 4 pages, however we have a detailed legal and scientific opinion on the use of ADDs with full citations. We urge readers to refer to this. We have incorporated some of the points below, however, we would urge readers to read the full text with citations instead of the precis that follows.**

**<../ADD Legal and Scientific Opinion.docx>**

Harbour porpoise are acoustic predators using echolocation clicks to locate and capture prey, they are warm-blooded marine mammals with a relatively high surface-to-volume ratio. Therefore, even a small decrease in foraging opportunity or efficiency due to disturbance and exclusion from fishing grounds will have detrimental effects on individuals. Hearing damage will lead to further reduced ability to find food and probable reduction in life expectancy.

**The Precautionary Principle, the Habitats Regulations and the Habitats Directive**

**A: The Precautionary Principle**

The *Waddenzee*case made clear that the precautionary principle is one of the foundations of the European Community’s policy on the environment, and environmental law must be read in the light of it. A risk to the environment exists if it ‘cannot be excluded on the basis of objective information that the plan or project will have significant effects on the site concerned.’ The aim of European environmental regulation, therefore, is to ensure that risks to the environment do not materialise, ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora.

**B: Disturbance to any cetacean – Habitats Regulations**

The Habitats Regulation 39(2) states that, ‘it is an offence to deliberately or recklessly disturb ***any*** dolphin, porpoise or whale (cetacean).’

Providing further guidance as to interpretation, Marine Scotland’s ‘The Protection of Marine European Protected Species from injury and disturbance’ offers:

‘Regulation 39(2) […] provides further protection to cetaceans through an additional *catch-all disturbance offence* […] The purpose of this regulation is to provide cetaceans with protection *at all times* regardless of the circumstances of the mammal at the time of the disturbance in question[.]’

SNH provides further clarification on its website that in Scottish inshore waters, it is an offence to intentionally or recklessly:

Kill, injure, capture, disturb or harass a cetacean.

The Scottish Marine Wildlife Watching Code provides similar guidance to the Habitats Regulations, making it clear that, ‘it is an offence to deliberately or recklessly disturb or harass ***any***whale, dolphin, porpoise, marine turtle or otter[.]’

When read with the precautionary principle, it is evident from the above that the Habitats Regulations create a comprehensive offence, aimed at tackling cetacean disturbance at the individual level.

Although the SAMS report lists a number of scientific papers in support of their assertion that ADDs disturb cetaceans there are several more which we have cited in the attached **<../ADD Legal and Scientific Opinion.docx>**

confirming that ADDs disturb and exclude porpoise from larger areas than the SAMS report state and at lower volumes than any of the ADDs used on Scottish farms. KoK 2017 demonstrated that there was disturbance at 100Db, Brandt et al demonstrated that 95% of porpoise were excluded from around 21km in typical Scottish propogation conditions for a single Terecos ADD. An aerial survey showed that a single Lofitech ADD excludes 85% porpoise from 990 square kilometres.

ADDs are used to protect porpoise from hearing damage from pile driving, by excluding them from wind farm construction sites.

**Porpoise are being disturbed in large areas of the cSAC which is nominated specifically for porpoise. It is madness that the government can set up an cSAC for a species and then allow fish farms within that SAC to break the law specifically created to protect these species.**

Cormac Booth (2010) produced a sound map from field data showing the SE Sound of Mull to be completely ensonified by ADDs with levels above 105 dB re 1 µPa (RMS). . When the farm at Fuinary began using an ADD for the first time in 2008 porpoise were excluded from the width of the Sound (2.5 to 3.5 km) and the nearest porpoise detected was 4 kms from the new ADD.

Marine Scotland commissioned a study by Coram et al in 2014. The report includes a sound map of the west coast of Scotland showing a 3.5km *minimum* zone of deterrence (based on Olesiuk 2002 who did not sample distances greater than 3.5Kms) and a 10km zone of audibility. This sound map shows that inshore waters and sealochs are almost completely ensonified within the cSAC with porpoise exclusion over a significant area of the cSAC.Coram’s map was based on considerably smaller zones of deterrence and audibility than recent work and the need to apply the precautionary principle under Article 6 (3) would indicate, however it demonstrates a clear adverse impact on the integrity of the cSAC.

Brandt et al (2012) and Kok et al (2017) demonstrated that porpoise are disturbed and excluded from much greater distances than 3.5km. A sound map drawn with the zone of deterrence based on the Kok et al., observed sound level of 100dB re 1 µPa (RMS) and a zone of 95% exclusion based on Brandt’s field results at a sound level of 113dB re 1 µPa (RMS).would fulfil the requirement to use the best avalible evidence to inform an Article 6(3) Appropriate Asessement.

The output from a single Terecos ADD falls to 113dB dB re 1 µPa (RMS) at a range of21.5km in typical Scottish propagation conditions. The distance for the output to fall to KoK’s threshold for disturbance of 100 dB re 1 µPa (RMS) would be much greater. Some farms use louder makes of ADDs in multiple arrays. It is obvious that such a sound map showing all farms which use ADDs within the cSAC would show very significant disturbance to porpoise (and other cetaceans) within the Inner Hebrides and the Minches cSAC**.**

**Based on scientific evidence currently available it is not credible to argue that the current use of ADDs in not adversely affecting the integrity of the cSAC.**

**The potential for hearing injury**

SNH’s commissioned report Lepper et al 2014 ‘Establishing the sensitivity of cetaceans and seals to acoustic deterrent devices in Scotland’, addresses the evidence of porpoise disturbance, exclusion and potential for hearing damage by ADDs.  The final summary pointof that paper states that:

‘Modelling of the exposure time to exceed injury criteria for seals and porpoises at given ranges from active ADDs suggest that there is a credible risk of exceeding injury criteria for both seals and porpoises. Thus, *the risk that ADDs at Scottish aquaculture sites is causing permanent hearing damage to marine mammals cannot be discounted*.’

The SNH commissioned report explains that auditory systems can be damaged both by instantaneous exposure to loud sounds and by cumulative exposure over a period of time. The report predicts the time to reach the threshold for hearing injury for a porpoise would be 2.5 hours if the porpoise stayed at 100m from a single Terecos device and that the safe range for 24-hour exposure would be beyond 500m based on a 6.7% duty cycle.

There is currently no ADD type used on Scottish Farms that do not disturb porpoise, this includes Terecos devices. There was a study that suggested that these might disturb less than other makes, however the scientists who carried out the study put in a caveat to their report which stated that further work would have to be done to ascertain whether the results which were accurate. The instruments used had proved to be malfunction and they had not had an opportunity to repeat their experiments

**EUROPEAN PROTECTED SPECIES LICENCE**

Under Regulation 39(2) of the Habitats Regulations, disturbance to European Protected Species can only take place if a European Protected Species licence (**‘EPS licence’**) is granted. SNH’s ‘Marine mammals and licencing’ paper offers further guidance, stating that, ‘if injury or disturbance [to cetaceans] were likely… to result from the activity a licence would be required in order for that activity to be carried out legally.’

There is a tri-partite test for an EPS licence, each stage of which must be passed for an EPS licence to be granted. It is our contention that that the proposed use of ADDs by fish farmsfails not one, but all, of these tests.

**Test 1: Licensable Purpose**

The first part of the test is that a ‘licensable purpose’ is required. This must relate to one of the purposes enumerated in Regulation 44(2). Because the Inner Hebrides and the Minches cSAC hosts porpoise, priority species no. 1351, the only licensable purposes which could apply are: (a) human health and public safety; (b) over-riding beneficial consequences for the environment; or (c) for other imperative reasons if the opinion of the European Commission has been given. It is plainly evident that fish farms do not meet any of these criteria, and thus fail the first stage of the tri-partite test.

**Test 2: No satisfactory alternatives to the use of ADDs**

The second part of the test requires that there be ‘no satisfactory alternatives.’ EC Guidance states ‘Where another solution exists any argument that it is not “satisfactory” will need to be strong and robust’.ADDs fail this test, as there are satisfactory alternatives to their use.

The issue of satisfactory alternatives to the use of ADDs is also pertinent to the ongoing shooting of seals by salmon farmers. The shooting of seals is licenced under the Marine (Scotland) 2010 Act. Guidelines to the Act state that seals can only be shot ‘as a last resort’.

**The technology to completely separate seals and farmed salmon obviating the need to use ADDs or shoot seals, already exists and is used worldwide.**

Double nets have been found to be the only fully effective solution negating the use of ADDs and shooting of seals. These anti-predator nets are being used successfully in Canada,Turkey, British Columbia,and Tasmania. Closed circulation also provides effective separation of seals and farmed salmon.

The Aquaculture Stewardship Council requires that certified farms worldwide comply with strict requirements for responsible farming. Certified farms cannot use ADDs or kill marine mammals. In Norway, a total of 115 salmon farms are certified, including 49 Marine Harvest farms whereas in Scotland only 2 are certified, one of which is in freshwater where there are no seals or cetaceans.

The industry maintains that anti-predator nets trap wildlife: this might be the case if large mesh nets were used, but could not be a problem if similar mesh to the existing single nets is used. Even if anti-predator nets were to reduce water flow a little, this would be an economic issue and economic issues are not a consideration where a European Protected Species is concerned.

The use of single nylon nets is widespread in Scotland, this is the lowest cost of construction, but seals can bite into a salmon through the mesh. Most seal damage is by biting the fish without breaking the net. Dead fish (morts) accumulate at the cage bottom as illustrated by this underwater video,and if these are not regularly removed, seals are encouraged by an easy meal. Many farms using these cheaper nets shoot seals and use ADDs.

Iwama et al (1997) concluded that ADD effectiveness diminished with time and that pinniped attacks continued to occur, even when ADDs were present. They recommended the prohibition of ADDs and this recommendation appears to have been adopted by the Canadian Department of Fisheries and Oceans for the British Columbia aquaculture industry, as they are no longer issuing the letters of authority required for installation of an ADD.

**Test 3: Favourable conservation status**

The third and final stage of the test requires that the ‘actions authorised will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range.’ Given that the Inner Hebrides and the Minches cSAC is designated to protect harbour porpoise, it must be conceded that this is an important area for their conservation.

**US Policy regarding aquaculture**

The US Department of Commerce’s National Oceanic and Atmospheric Administration has issued guidance regarding this policy to the European Union, stating that ‘the harvesting nation must demonstrate that all aquaculture operations…. sited in marine mammal habitat are prohibited from intentional killing or serious injury of marine mammals.’

If the claimed £200 million worth of exports of Scottish farmed salmon to the US are to continue, seal shooting and injury to marine mammals will have to stop by 1 January 2020.

The pressure from outside Scotland to cease aquaculture that negatively impacts upon marine mammals is clear. We would like to take this opportunity to implore Scottish Ministers to uphold their duties under domestic and European law, by preventing the use of ADDs and requiring that fish farms in Scottish waters use the only techniques that avoid the killing, injury or disturbance of marine mammals: closed circulation or anti-predator nets.

For full legal references see our full report - **<../ADD Legal and Scientific Opinion.docx>**

We fully support submissions from other members of the Salmon Aquaculture Reform Network Scotland on the environmental impacts of salmon farming and the failure to regulate such impacts.