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European Commission
B-1049 Brussels
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Email: ENV-E03-ARES@ec.europa.eu

7 May 2017

Dear Director General,

Complaint re. ADD use in Scotland - "deliberate & reckless disturbance" of cetaceans (European Protected Species); breach of Habitats Regulations 1994 and breach of Inner Hebrides & the Minches candidate Special Area of Conservation

Please consider this a formal complaint by the [Global Alliance Against Industrial Aquaculture](#) (GAAIA) against the UK Government and the Scottish Government for the "deliberate & reckless disturbance" of cetaceans ([European Protected Species](#)) via the use of Acoustic Deterrent Devices (ADDs) on salmon farms in Scotland - including the breach of [The Conservation \(Natural Habitats, &c.\) Regulations 1994 \(as amended in Scotland\)](#) and breach of [the Inner Hebrides and the Minches candidate Special Area of Conservation \(cSAC\) for harbour porpoise submitted to the European Commission in 2016](#).

Please also find attached a letter to Scottish Natural Heritage (SNH), the Scottish Government and UK Government.

GAAIA's complaint is set out below and is sourced from a recent FOI reply from SNH together with peer-reviewed scientific research and newly presented research on "[Large-scale underwater noise pollution from Acoustic Deterrent Devices \(ADDs\) on the west coast of Scotland](#)".

GAAIA maintains that the use of ADDs is clearly 'deliberate' and 'reckless' and therefore constitutes a breach of the law:

Policy Context:

As [European Protected Species](#) (EPS) all cetaceans are protected under national and EU wildlife legislation. Specifically, [deliberate or reckless disturbance](#) of any cetacean could constitute an offence under [The Conservation \(Natural Habitats, &c.\) Regulations 1994 \(as amended in Scotland\)](#).

The Scottish Government [submitted the Inner Hebrides and the Minches candidate Special Area of Conservation \(cSAC\) for harbour porpoise to the European Commission in 2016](#).

New Scientific Research Detailing "Large-Scale Underwater Noise Pollution" from ADDs Used on Salmon Farms off the West Coast of Scotland:

A scientific paper - "[Large-scale underwater noise pollution from Acoustic Deterrent Devices \(ADDs\) on the west coast of Scotland](#)" - presented on 1 May 2017 at the [European Cetacean Society conference in Denmark](#) (read conference abstracts [online here](#)) detailed "the increasing ensonification of the Scottish coastline which includes multiple protected areas for marine mammals" and "the large-scale extent of ADD noise pollution and its overlap with marine mammal habitat":



Monday 1 May 2017

Large-scale underwater noise pollution from Acoustic Deterrent Devices (ADDs) on the west coast of Scotland

Denise Risch³, Charlotte Rose Findlay^{1,2}, Hayden Ripple², Steven Benjamins³, Ben Wilson³, Frazer Coomber⁴

(1) Joint Nature Conservation Committee, Aberdeen, AB, United Kingdom.

(2) University of St Andrews; Scottish Association for Marine Science.

(3) Scottish Association for Marine Science.

(4) Hebridean Whale and Dolphin Trust.

Expansion of the aquaculture industry off Scotland has led to conflicts with marine predators such as seals, which predate species bred in aquaculture facilities and cause damage to equipment. To mitigate this, non-lethal management tools have been developed, the most popular of which are Acoustic Deterrent Devices (ADDs) or 'seal scarers'. ADDs broadcast loud, aversive sounds within the hearing range of the target species (i.e. seals). However their success in addressing the issue has been variable. In addition their unregulated use in Scotland could pose unintended ecological impacts to non-target species such as the harbour porpoise (*Phocoena phocoena*). This study aimed to address the gap in knowledge on the extent of ADD use in the Scottish aquaculture industry, and to quantify the scale of their acoustic presence in Scottish waters. Acoustic data collected during cetacean line-transect surveys carried out by the Hebridean Whale and Dolphin Trust (HWDT) were used to map the acoustic presence of ADDs across the west coast between 2006 and 2015. Results found a significant spatial and temporal increase in ADD presence across the west coast study regions (detections per unit effort; 2006 = 0.5%; 2015 = 15.3%). This study highlights the large-scale extent of noise from ADDs use at fish farms across Scotland and illustrates its gradual increase over the study period. The increasing ensonification of the Scottish coastline which includes multiple protected areas for marine mammals, due to these devices may pose a risk to both target and non-target species (e.g. odontocete cetaceans) that use these areas either seasonally or year round. This study is one of the first to highlight the large-scale extent of ADD noise pollution and its overlap with marine mammal habitat. This information is crucial in order to effectively address European legislation related to underwater noise and marine species protection.

Scottish Natural Heritage referred to this research [in an internal email in August 2016](#). Reporting to SNH colleagues, Dr. Caroline Carter of SNH said:

"The Sound of Mull and Loch Linnhe were completely ensonified, and that the ADD signal can be detected all the way across the Minch. There was preliminary analysis of how the levels dropped with distance (from two locations) - from Portree the signal could be detected

out to 20km from source, in Lochmaddy the signal could be detected out to 30km. This is in keeping with literature which suggests the signal can travel up to 50km."

From: Caroline Carter

Sent: 26 August 2016 13:19

To: George Lees; Suzanne Henderson; Liam Wright; Jane Dodd; Fiona Manson; Karen Hall; Katie Gillham

Subject: ADD use on the west coast of Scotland

Hi All,

I was at a meeting yesterday at SAMS where the two MSc students working with HWDT acoustic data were to present their findings. The focus of the studies was to investigate ADD use throughout the HWDT survey area. The intention was to have both students presenting, but unfortunately one missed the bus – so didn't make it!

This may be of interest to us, so I've noted some key points below for info;

- [REDACTED] looked at data from 2011 – 2015. She initially checked the volunteer ADD signal presence/absence logs by re looking at the sound files in PAMGuard. She found that the volunteers were pretty successful in identifying an ADD signal in real time (ie when they were listening on survey) but [REDACTED] analysis extended the occurrence of ADD as she could pick out the quieter signals. (She wanted to check this – I think – so that the analysis can be stretched further into the past where volunteer logs exist – but the acoustic files don't).
- She found that over the years there had been a significant increase in ADD presence. An increase of 0.084 to 0.153 was identified (the metric used was a standardised figure, i.e. number of ADD identifications divided by the number of listening stations).
- She could identify three types of ADD in use (Airmar; Terecos and Ace-Aquatec) and that the increase over time was primarily due to more Airmar signals.
- Presence/absence of detectable ADD signal were mapped in 10km square blocks (this shows where a ADD signal can be identified, but not how many signals were there – nor the level of the signal(s)).
- The maps showed the extent that ADDs were detectable, in particular you could see that the Sound of Mull and Loch Linnhe were completely ensonified, and that the ADD signal can be detected all the way across the Minch.

- There was preliminary analysis of how the levels dropped with distance (from two locations) From Portree the signal could be detected out to 20km from source, in Lochmaddy the signal could be detected out to 30km. This is in keeping with literature which suggests the signal can travel up to 50km. The rate of decline is location specific but the majority of decay is in the first 5km.
- This project highlights presence/absence of signal, it does not give an indication of absolute level. The analysis was done on a relative dB scale rather than absolute (due to an absence of calibration info).
- This work shows how prevalent the ADD signal is in the area (in itself this does not tell us the effect on species of interest, it also does not show where the signal came from – just that it was present).
- They hope to turn this work into a publication (from a marine pollution angle) – I've asked if we can be kept in the loop on that, and in the meantime, I've asked if we could have copies of their thesis' (if we can, they need to go through the university process...)
- [REDACTED] hopes to continue work in this area – and look at determining absolute levels and then using the data to ground truth a propagation model, and there may be potential for working on this with [REDACTED] (provided funding can be found).
- Also there may be scope to look at the acoustic data in conjunction with concurrent HWDT sightings data which may highlight any fine scale disturbance effects – this is something that they would like to consider in addition.

I think this work is useful in that it is highlighting the increase over time and prevalence of the ADD signal on the west coast, but to be of more use it I think we would need absolute levels, and some comparative analysis with marine mammal data. There is clearly more that can be done, but this was only a three month project and I think [REDACTED] did a good job with the time she had.

Any questions on the above – please shout.

Best,
Caroline

Dr. Caroline Carter
Policy and Advice Officer - Marine Ecology
Scottish Natural Heritage, Battleby, Redgorton, Perth, PH1 3EW
01738 458562 | www.snh.gov.uk

The above document was obtained by GAAIA via FOI on 25 April 2017 (read SNH's covering letter [online here](#)) - the FOI documents are available via:

- [Download SNH FOI 25 April 2017 document #1](#)
- [Download SNH FOI 25 April 2017 document #2](#)
- [Download SNH FOI 25 April 2017 document #3](#)
- [Download SNH FOI 25 April 2017 document #4](#)
- [Download SNH FOI 25 April 2017 document #5](#)
- [Download SNH FOI 25 April 2017 document #6](#)
- [Download SNH FOI 25 April 2017 document #7](#)

Challenged in Court:

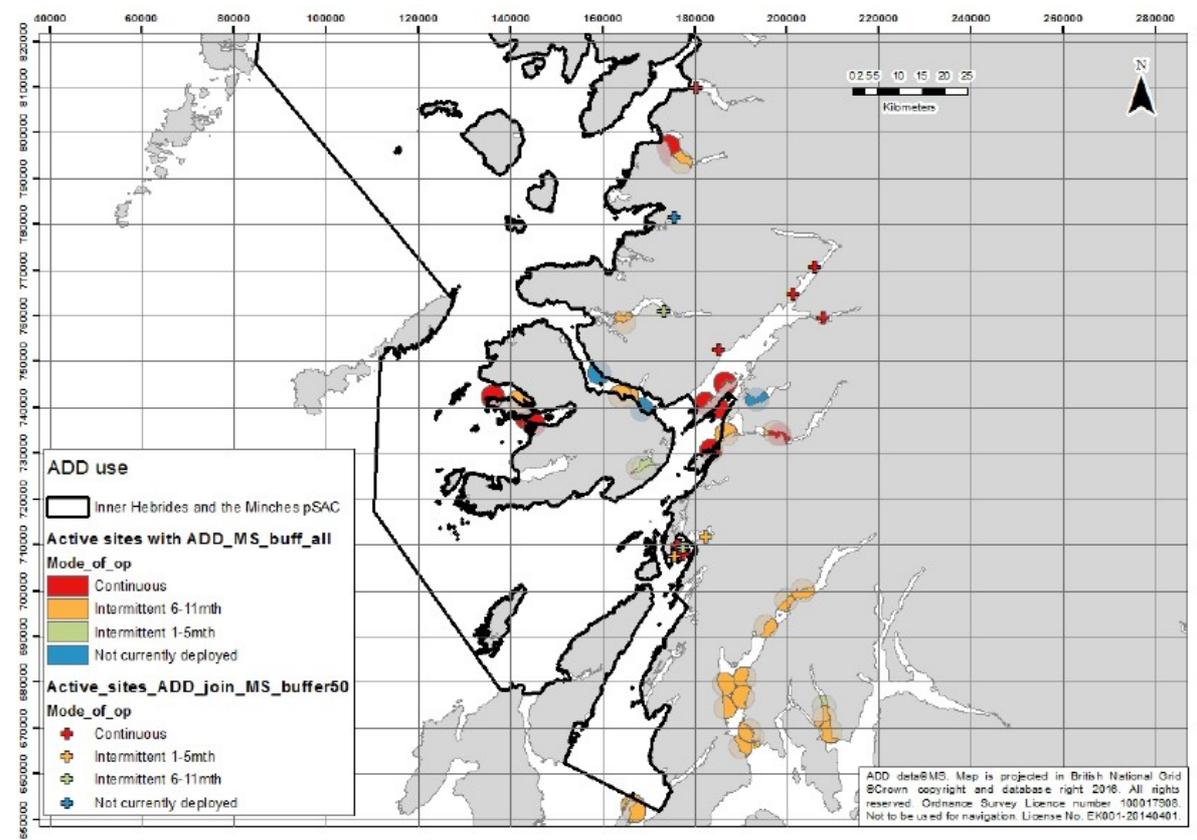
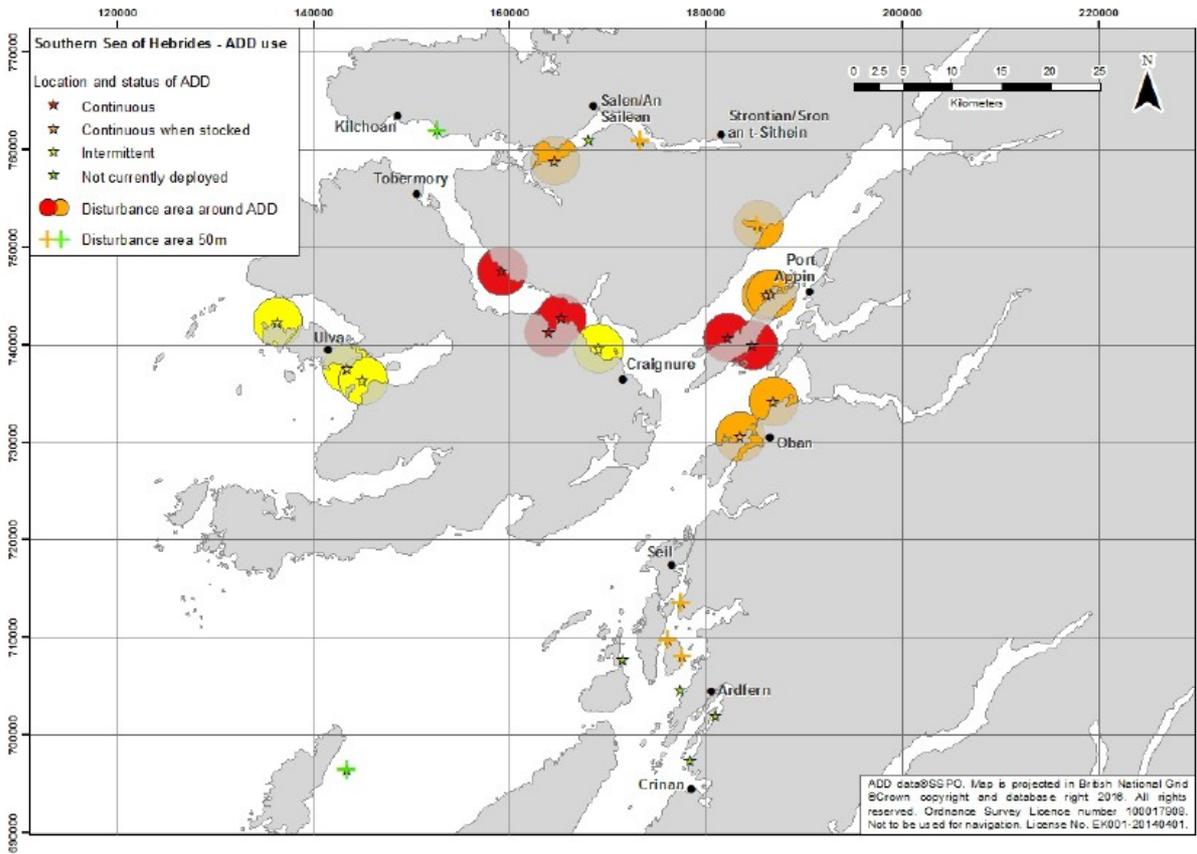
A report to Marine Scotland - "[Investigations on Seal Depredation at Scottish Fish Farms](#)" - published in 2013 stated:

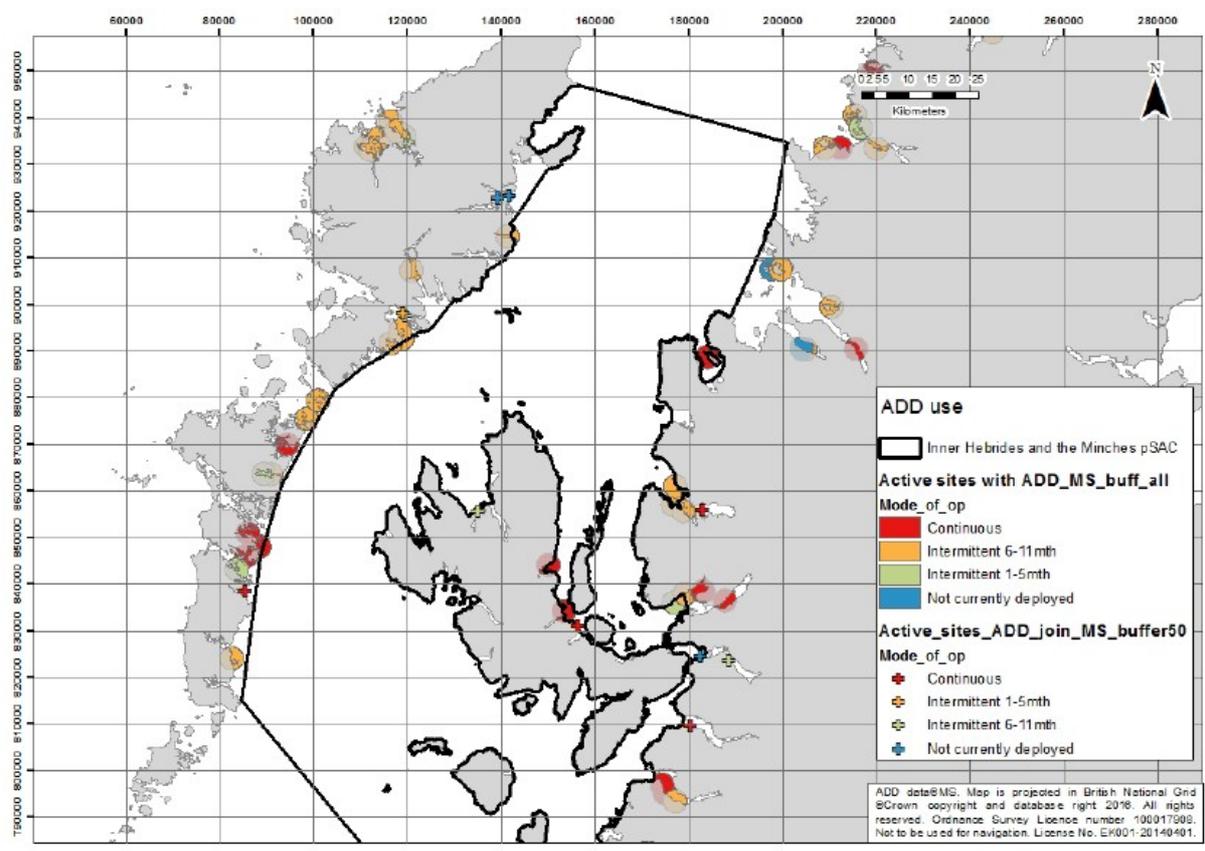
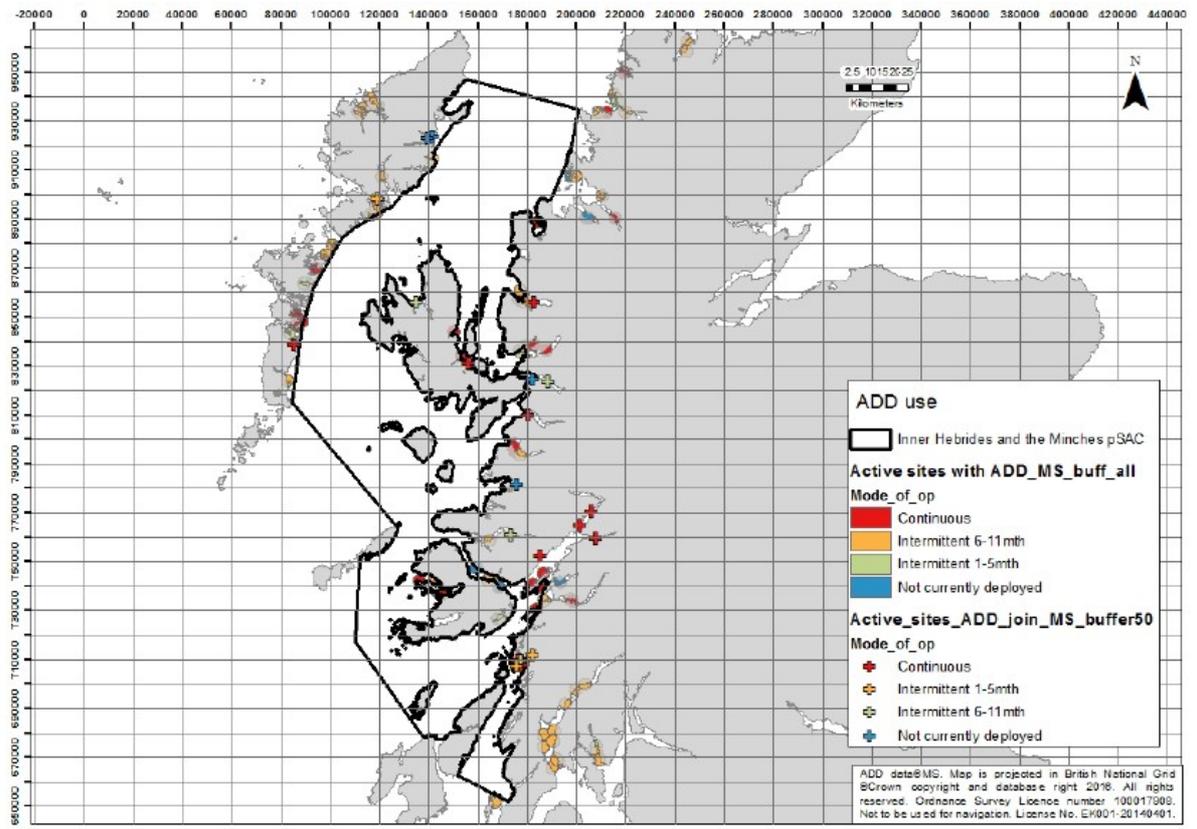
Under EU and domestic legislation, the deliberate or reckless disturbance of cetaceans (and other European Protected Species) in Scotland is prohibited. At present Scottish Natural Heritage (SNH), as the statutory nature conservation body, is consulted on fish farm site licence applications in Scotland. SNH policy towards the use of ADDs used at new sites is currently based on whether or not the site is considered important for cetaceans. However, it is still unclear whether or not the use of ADDs more widely might be construed as the deliberate or reckless disturbance of cetaceans, and the uncertainty seems unlikely to be clarified until the current interpretation is challenged in court. This means that it is conceivable that the existing permitted use of ADDs in Scotland could be challenged, perhaps leading to more widespread restrictions on their use. Furthermore, under recently agreed Global Standards for Salmon Aquaculture, initiated by the WWF and agreed by over 500 international stakeholders, ADDs are intended to be phased out in salmon aquaculture within three years of the publication of the Salmon Aquaculture Dialogue¹³ (SAD) by those companies that sign up to the Standards. The SAD proscription of ADDs appears to be based on the assumption that all such deterrents are inimical to cetacean conservation. An exception to this may be granted where new technologies can be shown to present less risk to non-target populations.

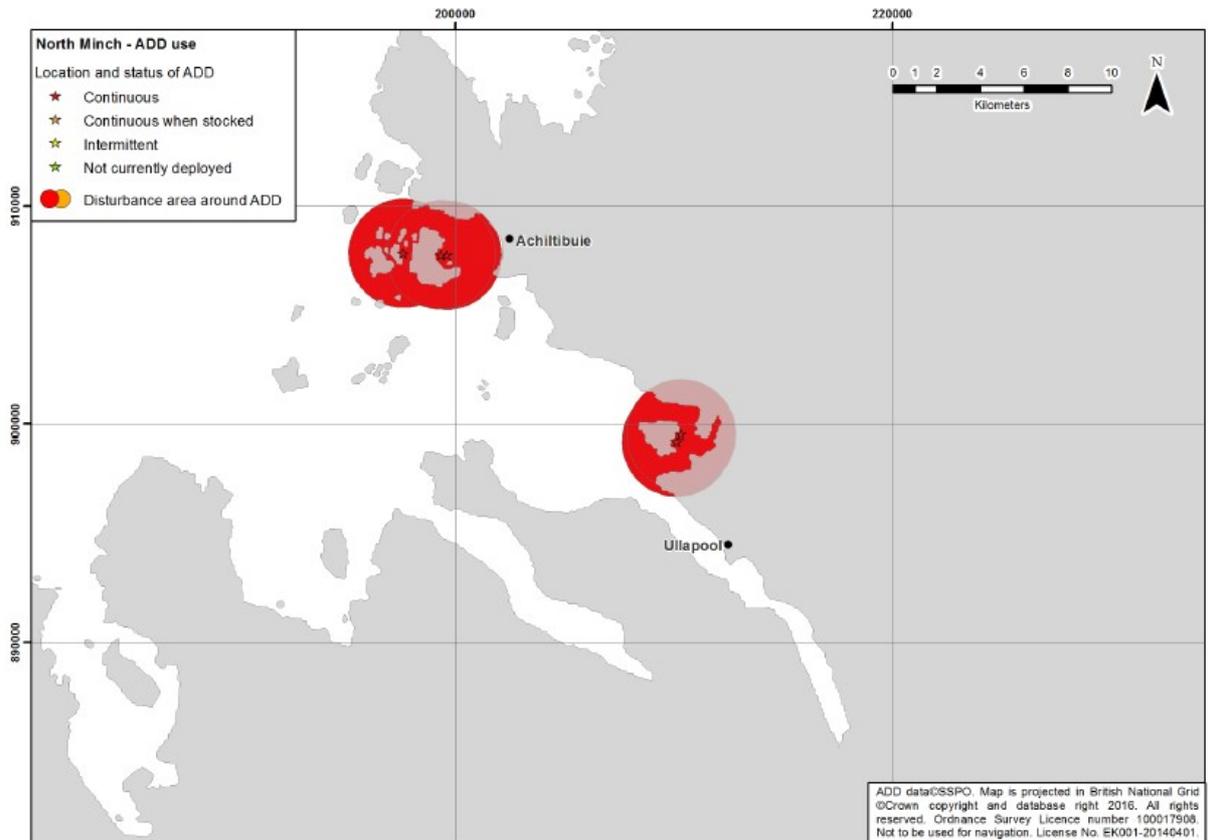
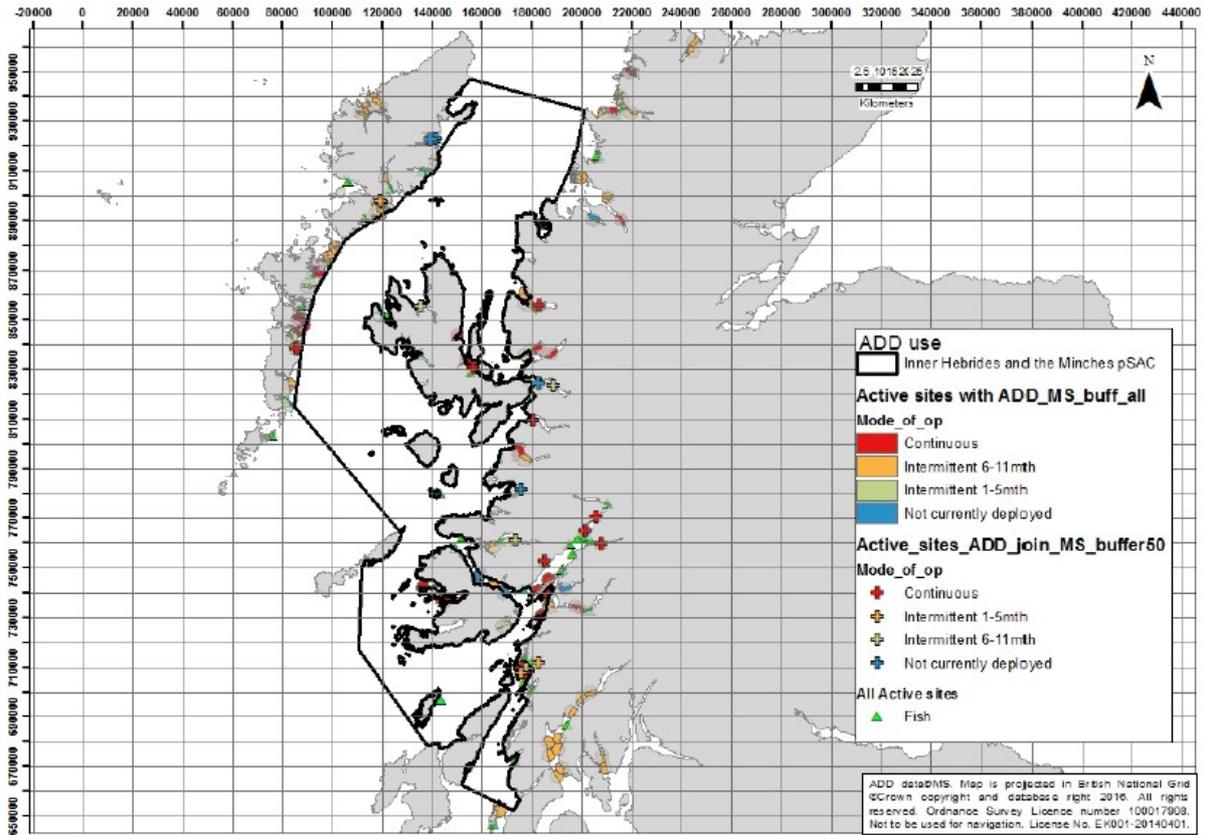
Evidence of ADD Use on Salmon Farms as "Reckless Disturbance":

In 2015, Scottish Natural Heritage (SNH) and Marine Scotland (MS) [raised the issue](#) of whether the use of Acoustic Deterrent Devices (ADDs) on salmon farms could be deemed an offence via 'reckless disturbance'. SNH expressed the view that mitigation measures could be applied but in practice "all would have logistical or financial implications for aquaculture companies that would render them, for the most part, infeasible to apply". It was suggested that the tightening of ADD specifications and guidance on ADD use with the salmon farming industry's best practice guidelines "may not be palatable to the industry".

In 2016, SNH drafted various 'disturbance zone maps' showing ADD use on salmon farms in the Inner Hebrides and the Minches SAC. "We tentatively identified the area that we thought would be highest cumulative risk to ADD use currently based on this information - as Sound of Mull, Lismore, West of Mull and Raasay, but we did say there may be more," [said SNH](#).

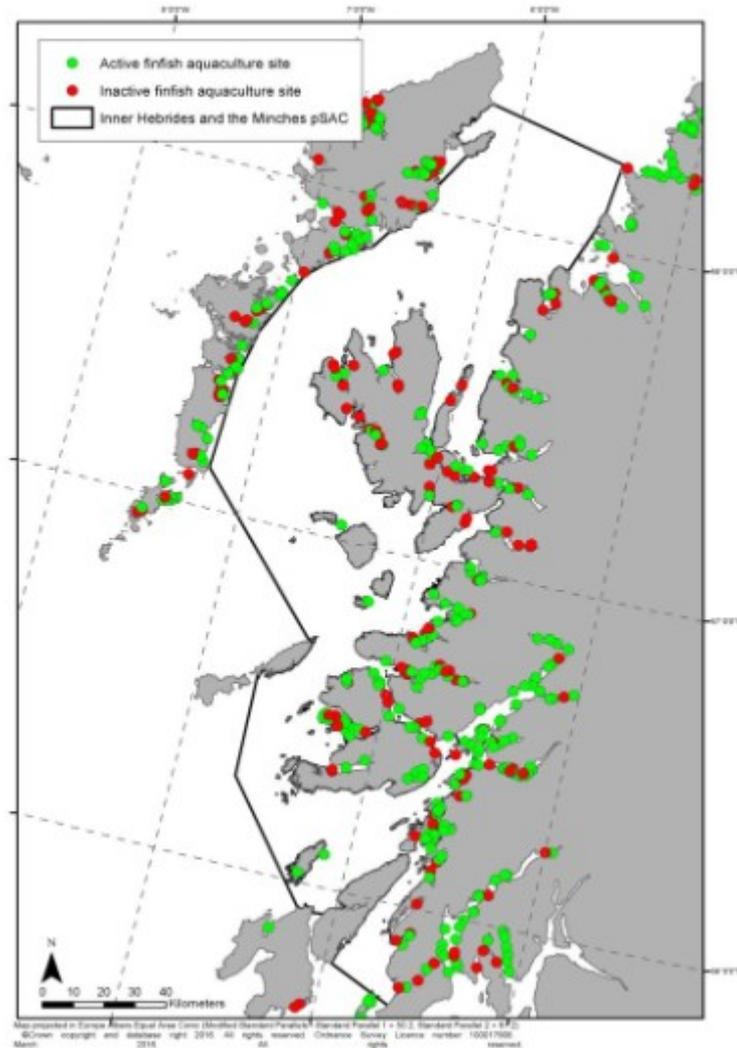






Here's a map - published by SNH and the Scottish Government via "[Inner Hebrides and the Minches Proposed SAC - advice to support management](#)" - showing dozens of salmon farms within the Inner Hebrides and the Minches SAC:

Map 2. *Finfish aquaculture sites in relation to the Inner Hebrides and the Minches pSAC*



Juxtapose the location of salmon farms with a map ([published by SNH](#)) of sightings of harbour porpoise calves and juveniles and the problem becomes clear:

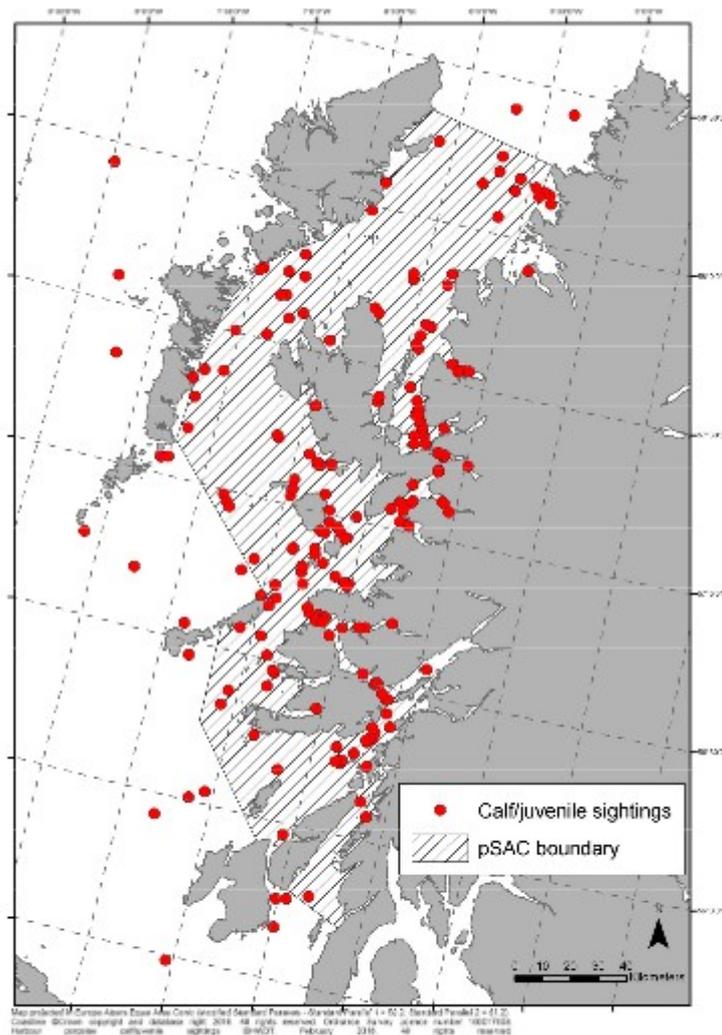


Figure 9. Map showing recorded sightings of calves and juveniles overlain on map of the site boundary. Note that these data show the locations at which harbour porpoise calves and juveniles were recorded as part of HWDT surveys. These data have not been corrected for effort.

"It is our view that continuous noise emission from ADDs at fish farm sites is not best practice," stated the undated report "[Inner Hebrides and the Minches Proposed SAC - advice to support management](#)" published by SNH and the Scottish Government. "In areas of higher cumulative risk to the Conservation Objectives (e.g. areas with larger numbers of fish farms within straits, sounds and embayments where ADD use may limit access to these areas), further measures to reduce ADD noise emission should be considered via ongoing discussions with industry". "The use of ADDs for predator control at salmon farms may require an EPS licence," [stated the report](#) (believed to be dated 2016).

In November 2016, [SNH suggested to the SSPO](#) that "we don't believe noise emitting constantly is best practice" and that "no noise emitting constantly....would appear to be quite a big ask for lots of farms?"

In November 2016, [SNH presented in a meeting with Marine Scotland](#) "maps illustrating the range of audibility of ADDs in NW Scotland, and increasing persistent detection over the last decade; Areas within cSAC which recent studies have identified as being ensonified".

In November 2016, [minutes of a meeting between SNH and Marine Scotland](#) reported that "recent legal advice received by Marine Scotland on the definition of 'reckless'....was not definitive but, in case law, implied 'culpable indifference and blameless disregard'". "Examples of recklessness in a driving context were also given," [reported the minutes](#). "It was Marine Scotland's opinion, on the basis of this advice that ADD use by the aquaculture sector, is not 'reckless', the intention of ADD use being different for aquaculture to that for other industries where ADDs may be applied to 'deliberately' scare/disturb EPS (cetaceans)."

"Marine Scotland considered that, unless there was an identified negative effect of ADDs used in aquaculture upon EPS species, and that operators had been made aware of the negative consequences of their actions, potentially via guidance which informed operators that what they were doing could disturb cetaceans, and provided them with routes by which they might avoid this, it would be difficult to infer recklessness," continued the [minutes of a meeting between SNH and Marine Scotland in November 2016](#). "Further to this, [named redacted] argued that since ADD use for aquaculture was (in Marine Scotland opinion) not, by this token, reckless and not therefore a criminal offence, there was no basis for introducing an EPS licensing regime. Rather, regulators should promote good practice to help achieve safeguard of EPS."

The [minutes of a meeting between SNH and Marine Scotland in November 2016 continued](#):

SNH questioned this interpretation, indicating that the objective of the EPS legislation was to minimise or avoid disturbance and harm to protected species and, given our understanding of the potential risks to cetaceans from exposure to certain levels of underwater noise, that a reasonable interpretation of the legislation and accompanying guidance would conclude that disturbance through ADD use (irrespective of the sector employing it) falls within its scope. SNH further queried the interpretation of 'reckless / deliberate' for use of ADDs, where there has been widespread discussion with industry on potential risks to EPS, such that an operator would be 'aware of the likelihood that disturbance would result from his actions...'.
Action 1. MS (■ or ■). To provide SNH with a copy of the legal question raised by MS and the advice received from lawyers on defining reckless behaviour and written confirmation of how MS interpret that advice (as set out in the meeting). Also in relation to Reg 39 (2) issue raised later.
Action 2. SNH (CT). To investigate the potential for SNH to obtain a separate legal opinion on defining 'reckless / deliberate behaviour' (in the context of the EPS) and perhaps also in relation to Reg 39 (2), noting that SNH lawyers may not wish to offer advice on the same question asked by MS.

■ & ■ indicated that legal advice received on the definition of 'reckless' within the MS Marine EPS Guidance would, need to be fully considered.

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"Marine Scotland expressed concern at introducing an administrative process, without clear understanding of the effects of ADDs on EPS and what positive outcomes are expected, against a backdrop of reducing the administration of other aspects of fish farming control," [continued the minutes of a meeting between SNH and Marine Scotland in November 2016](#).

The [minutes of a meeting between SNH and Marine Scotland in November 2016 continued](#) (CT = Cathy Tilbrook of SNH):

CT (and others) outlined three objectives:

- Securing a mechanism for monitoring and managing the use of ADDs, so as to safeguard EPS (and especially HP within the cSAC) in the face of growing use of ADDs, increasing scientific evidence of their potential to cause disturbance and a growing aquaculture industry;
- Reducing or preventing the risk of legal challenge / infraction of MS, in relation to non-delivery of its statutory functions, under the Habitats Regulations (insofar as they apply to EPS) and noting high levels of public/ NGO scrutiny on such issues;
- Consistency with other industries in Scotland that are using or planning to use ADDs.

The [minutes of a meeting between SNH and Marine Scotland in November 2016 continued](#) (SH = Sue Henderson of SNH; LW = Liam Wright of SNH):

■ observed that, in relation to fish-farm management we (collectively) are trying to manage a range of competing impacts, namely: escaped fish, shot seals and disturbed cetaceans. By changing the approach we take to management of any one of these (eg cetacean disturbance) we risk increasing other, undesirable impacts. ■ emphasised that improved management may be better delivered through guidance than a legislative approach.

SH & LW suggested that, as the cSAC has policy protection, measures to protect the qualifying species would need to be enforceable, and hence the need for a legislative approach (whether that be via EPS legislation, planning legislation or another mechanism). **Action 4. SNH (SH/LW)** to confirm with Greg Mudge.

■ noted that Scottish Govt is strongly advocating the streamlining of aquaculture regulation and that any introduction of a new licensing regime (irrespective of the justification or otherwise for that) would be inconsistent with this. ■ also indicated that any new EPS licensing regime would be a huge administrative burden for MSLOT and effectively undeliverable with current resources.

The [minutes of a meeting between SNH and Marine Scotland in November 2016 concluded](#):

- **Action 7. SNH (CT/All)**. To compile a list of questions for MS and also to include, for further discussion, our initial views on possible approaches that could be implemented (whether via EPS legislation or otherwise) to address the concerns we are raising. See Annexes 1 and 2.
- SNH emphasised the opinion that ADD use by the aquaculture industry, and the associated EPS licensing issues, is an issue of growing concern, that needs to be addressed to ensure safeguard of HP and compliance with European legislation.
- **Action 8. MS** To provide a timetable to SNH for addressing the points raised at today's meeting.

George Lees.
8 December 2016.

The [Annexes included](#):

Annex 1. Actions / questions for Marine Scotland in relation to ADD use by the aquaculture sector.

1. MS to provide SNH with a copy of the legal question posed and the advice received from lawyers on defining reckless behaviour (and on Reg 39 (2)) and provide written confirmation of how MS interpret that advice (Actions 1 and 6).
2. The aquaculture industry widely acknowledges that ADDs can impact cetaceans. Our understanding is that the legal advice received by MS regarding the definition of reckless is 'culpable indifference and blameless disregard'. Does MS conclude that an ADD left on continuously throughout the production cycle, with no mitigation, and given common understanding of potential risk to cetaceans, is not a reckless action which could result in the disturbance of cetaceans? If so then what is the justification for this conclusion?
3. MS to clarify which parts of the Marine EPS guidance they intend to update e.g. the definition of reckless and/ or description of Reg 39(2); and set out timescales / process for this revision (Action 3).
4. In areas of higher cumulative pressure it seems logical that there is an increased risk to cetacean species. In some areas this could theoretically result in their exclusion from significant areas for significant periods of time. Do MS agree this is a reasonable conclusion and if so what are the implications in relation to Regulation 39 (and within the HP cSAC, the ability to achieve Conservation Objectives on avoiding significant disturbance and maintaining access to all parts of the cSAC)?
5. Does MS consider that the concerns raised by SNH regarding ADD use for aquaculture inside and outwith the cSAC, require to be addressed? If not, what is the basis for that decision? If so, does this justify changes to current regulatory practices and do the options in annex 2 merit further consideration? Can MS clarify their timescale for providing a clear and formal policy statement that sets out the government position (Action 5 and 8)

Annex 2. Potential approaches for addressing concerns about impact of ADD use on cetaceans and ensuring compliance with legislative requirements.

- Options for EPS licensing for all aquaculture ADDs:
 - Introduce a 'general licence' which permits the use of ADDs in less sensitive locations, provided that they comply with general mitigation conditions (e.g. advertised on website and promoted to industry). Note that this approach does not require any application process and therefore no information on devices is submitted, which would make future monitoring of cumulative impacts more difficult. An offence is still committed if non-compliance with conditions can be demonstrated.
 - Introduce a 'class licence' which permits use of ADDs in less sensitive locations, subject to registering devices with regulator and providing certain information (such as model, location, whether or not linked to triggering mechanism etc). Operation is permitted subject to general terms and conditions applicable to all devices covered by the Licence. An offence is committed if these conditions are not complied with. This approach may provide a good trade-off between provision of information and potential for compliance monitoring via a light-touch and simple approach to licensing process.
 - Individual EPS licence may still be required for sensitive / higher risk locations, with specific mitigation conditions attached to the licence.
- Using planning conditions as first stage mitigation
 - Condition 'best practice' mitigation at all sites through planning (likely to be through an Environmental Management Plan).
 - Any breach of these conditions would breach planning consent (enforcement action?) but could also be considered reckless disturbance and a potential offence, leading to requirement for an EPS licence?.
 - For sensitive locations, 'best practice' mitigation may not be sufficient and so additional mitigation may be required (potentially including no ADDs without an EPS license or that use of ADDs would be inappropriate in certain locations).
 - Issues with this approach are that it is not deemed competent for planning conditions to cover matters that are dealt with under other legislation, and LA may be reluctant to condition issues over which they have little control / experience. This approach could only be applied gradually as sites apply for planning consent for other aspects, so would mean a piecemeal approach to managing ADDs and difficulties in monitoring and managing any cumulative issues.

Potential mitigation conditions (currently under discussion with industry):

- No continuous use of ADDs at any site.
- Use of automatic triggered devices (with some guidance on frequency / duration of triggering)
- Use of low frequency devices
- Reporting requirements (to be agreed)
- Use of strategic area-wide approach to ADD deployment?
- Seasonal restrictions on ADD use?
- Consideration of cumulative impacts and possible further restriction / no ADD use in areas of highest risk (NB Further work and discussion is required to clarify the location of such areas and the basis for their identification).

In November 2016, [SNH suggested in an internal email](#): "We perhaps need to get to the bottom of how we feel about the level of noise emitting from triggered devices in 'high risk' areas.....My thoughts are that cumulative issues might be more tricky to deal with, particularly in the higher risk areas - perhaps the farms need to work together to have suitable mitigation in place....?"

"One question I would be keen to ask Marine Scotland is the whole issue about higher risk areas (in terms of both EPA and the harbour porpoise SAC)," wrote SNH's Dr. Suzanne Henderson in an [internal email to SNH staff in November 2016](#). "Higher numbers of farms using ADDs in areas where there could be a restriction in movement/disturbance to harbour porpoises (in terms of the Conservation Objectives and the EPS tests for elsewhere) seems to suggest higher risk, particularly cumulative risk....do they agree?"

"I feel that our stance should be no ADD unless the need is substantiated, or that the applicant is using a device that specifically targets seals and has no effect on cetaceans (i.e. the new ones - hopefully in the future," [said SNH in an internal email in October 2016](#). "To cut down on noise pollution no device (low frequency or other-wise) should be deployed continuously."

In December 2016, action points and notes of an industry workshop on ADD use attended by SNH, SSPO, the Scottish Salmon Company, Marine Harvest Scotland and Scottish Sea Farms included:

Action points and notes from: SNH & SSPO industry workshop on ADD use

Tuesday 13th December, Oban

Present: Suz Henderson, Caroline Carter, Liam Wright (all SNH); [REDACTED] (TSSC); [REDACTED] (MHS); [REDACTED] (SSF); [REDACTED] (SSPO)

1. Update on HP SAC/Conservation Objectives

The SAC for harbour porpoise has been submitted to the EU as a candidate site and therefore is now legally protected.

Two masters projects on ADD noise surveys have been undertaken.

ACTION: SNH to distribute these to the group when they are published.

2. Discussion on current ADD use and how they are used (e.g. definition of continuous/triggered).

Current use in Sound of Mull area discussed, including how and why. Managers decisions and technical capacity of the equipment are key. Ultimate aim is to minimise noise levels in general.

ACTION: SSPO to speak to the ADD manufacturers about low frequency devices, logging use and impact on HP.

Widespread & Increasing ADD Use on Salmon Farms in Scotland:

Data disclosed by SNH via an Excel spreadsheet ([Download SNH FOI 25 April 2017 document #6](#)) details companies and regions which use and do not use ADDs:

| Region | Company | ADD |
|----------------------------|--------------------|--|
| Shetland | Cooke | Don't use |
| Shetland | Hjatland | Don't use |
| South West | Hjatland | Don't use |
| Outer Hebrides | Scottish Salmon Co | Ace aquatec US3 |
| South West | Scottish Salmon Co | Ace aquatec US3 |
| West Scotland | Scottish Salmon Co | Airmar, OTAQ Sealface, Ace aquatec US3 |
| South West | Scottish Salmon Co | Airmar, Ace aquatec |
| South West | Marine Harvest | Mon aqua, Terecos |
| Outer Hebrides | Marine Harvest | Don't use |
| West Scotland | Marine Harvest | Terecos, Airmar, Mohn aqua |
| Orkney and the North Coast | Scottish Sea Farms | Airmar, Ace aquatec |
| Shetland | Scottish Sea Farms | Mohn AquaMAG, Ace aquatec US3 |
| West Scotland | Scottish Sea Farms | Mohn aqua, Airmar |
| West Scotland | Loch Duart | Airmar, Mohnaqua, Ace aquatec |
| Shetland | Balta | Ace aquatec, Lofitech |
| South West | Dawnfresh | Mon Aqua |

A Scottish Government report - "[Evaluating and Assessing the Relative Effectiveness of Acoustic Deterrent Devices and other Non-Lethal Measures on Marine Mammals](#)" - published in 2014 stated that: "At least five different types of ADD are used in Scotland....About half of all fish farm sites appear to use ADDs, but there is no register of which sites are using what devices".

Table 2 Acoustic Characteristics of Acoustic Deterrent Devices Used at Scottish Aquaculture Sites

| Manufacturer | Device | Source Level (dB) | | Frequency (kHz) | Reference |
|------------------|----------------------|-----------------------|---------------------------|-----------------------------|------------------------------|
| | | Scientific Literature | According to Manufacturer | | |
| Airmar | dB Plus II | 192 (RMS) | 198 (RMS) | 10 (tonal – with harmonics) | Lepper <i>et al.</i> (2004) |
| Lofitech | Universal Scarer | 193 (RMS) | 189 (Unknown) | 14 (tonal – with harmonics) | Shapiro <i>et al.</i> (2009) |
| Ace Aquatec | Universal Scrammer 3 | 193 (RMS) | 194 (Unknown) | 10 – 65 (broadband) | Lepper <i>et al.</i> (2004) |
| Terecos | DSMS-4 | 179 (RMS) | None given | 2 – 70 (broadband) | Lepper <i>et al.</i> (2004) |
| Ferranti-Thomson | 4X | 166 (Unknown) | 200 (Unknown) | 7 – 95 (broadband) | Terhune <i>et al.</i> (2002) |

Data disclosed by SNH via Excel spreadsheets ([Download SNH FOI 25 April 2017 document #5](#) and [Download SNH FOI 25 April 2017 document #7](#)) effectively provides a register of salmon farms using and not using ADDs. The ADDs reported as being in use during 2015 and 2016 (and ongoing during 2017) included:

ACE Aquatec
 ACE Aquatec US 3
 Air Db Plus 11
 Airmar Db Plus 11
 AIRMAR / MAG - MOHN AQUA GROUP
 Airmar DB2
 Lofitech universal scrammer
 Mohn Aqua
 Mohn Aqua Airmar ADD 2000
 Mohn Aqua Airmar DB II
 Mohn Aqua MAG Seal Deterrent
 OTAQ SealFence
 OTAQ SF3
 Terecos DSMS 4

Of the 119 salmon farms which reported the use of ADDs during 2015*, 69 salmon farms used an [Airmar/Mon Aqua](#); 26 salmon farms used an [Ace Aquatech](#), 22 salmon farms used a [Terecos](#), one salmon farm used a [Lofitech](#) and one salmon farm used an [OTAQ](#).

* 1 October 2015 to 30 September 2016 is listed as the 'Application Period'; October 2015 is listed as a 'Creation Date' and 1 February 2016 to 31 January 2017 is listed as the 'Licence Period'.

Note that the [latest Scottish Government fish farm production survey 2015](#) - published in September 2016 - reported 254 salmon farm sites but only 139 were active (i.e. 115 reported zero production). In other words, it seems that the vast majority of active salmon farms use ADDs.

More specifically, the Excel spreadsheet ([document #5](#)) includes 86 salmon farms where ADDs were not used during 2015* - with various reasons listed why ADDs are not used:

| 1 | FishFarmName | Registrati | SiteOwner | ADDNotUsedReason |
|----|--------------------|------------|-------------------------|--|
| 2 | Bay of Vady | FS1020 | Cooke Aquaculture Scotl | Use not allowed by SNH due to cetaceans, an EPS license would be required if deployed. |
| 3 | Chalmers Hope | FS0993 | Cooke Aquaculture Scotl | Use not allowed by SNH due to cetaceans an EPS license would be required. |
| 4 | Snarraness | FS0400 | Scottish Sea Farms Ltd | They will be installed at a lter date so will confirm manufacturer then |
| 5 | HELLISAY | FS1261 | Marine Harvest (Scotlan | Stored on site, for deployment when required |
| 6 | MacLean's Nose | FS0599 | Marine Harvest (Scotlan | Stored at shore base ready for deployment if required |
| 7 | Shuna | FS0695 | Scottish Sea Farms Ltd | SNH has not allowed use of ADDs |
| 8 | Bagh Dail Nan Cean | FS0805 | Marine Harvest (Scotlan | Site not yet in operation |
| 9 | Setter Voe | FS0316 | Hjaltland Seafarms Ltd | Site not stocked |
| 10 | Kames Bay (west) | FS0271 | Kames Fish Farming Ltd | Site near homes which would be disturbed by ADD |
| 11 | Groatay | FS1083 | Marine Harvest (Scotlan | Site fallow at present |
| 12 | Maragay Mor | FS1304 | The Scottish Salmon Cor | Site currently not stocked |
| 13 | SEAFORTH | FS1042 | Marine Harvest (Scotlan | Site currently fallow |
| 14 | Bay of Ham | FS0122 | Cooke Aquaculture Scotl | Seal-scarers not allowed by SNH due to cetacean movements. An EPS license would requ |
| 15 | Loch Ba | FS0429 | Scottish Sea Farms Ltd | seals are a rare occurrence in the loch |
| 16 | Linga | FS1027 | Hjaltland Seafarms Ltd | SAC for common seals, use requires permission from SNH |
| 17 | Bomlo | FS1076 | Hjaltland Seafarms Ltd | SAC for common seals, use of ADDs requires permission from SNH |
| 18 | Bight of Foraness | FS0292 | Hjaltland Seafarms Ltd | SAC for common seals, use of ADD requires permission from SNH |
| 19 | Swinning Voe 3 | FS0903 | Hjaltland Seafarms Ltd | SAC for common seals, requires permission of SNH to use |
| 20 | Poseidon | FS0408 | Hjaltland Seafarms Ltd | Requires permission from SNH |
| 21 | Baigh Chlann Neill | FS0051 | The Scottish Salmon Cor | Predator net used |
| 22 | Eilean Grianain | FS1176 | Marine Harvest (Scotlan | Planning condition |
| 23 | Cole Deep | FS0489 | Hjaltland Seafarms Ltd | not required or effective |
| 24 | Hogan | FS1053 | Cooke Aquaculture Scotl | Not required or cost effective with current predation levles |

| | | | | |
|----|----------------------|---------|--------------------------|---|
| 25 | Bow of Hascosay | FS0477 | Cooke Aquaculture Scotl | Not required at present |
| 26 | Djubawick | FS0656 | Cooke Aquaculture Scotl | Not required at present |
| 27 | Stead of Aithness | FS0637 | Cooke Aquaculture Scotl | Not required at present due to low predation levels |
| 28 | Flaeshins | FS1275 | Cooke Aquaculture Scotl | Not required at present and not allowed by Whole foods accreditation scheme |
| 29 | Belmont | FS0472 | Cooke Aquaculture Scotl | Not required at present and not allowed by accreditation scheme whole foods |
| 30 | Carness Bay | FS0390 | Cooke Aquaculture Scotl | Not required at present along with the requirement to apply and hold an EPS license due to cetacean movements |
| 31 | Bastaness | FS1279 | Cooke Aquaculture Scotl | Not required at present |
| 32 | Copister | FS1043 | Cooke Aquaculture Scotl | Not required at present |
| 33 | Vatsetter | FS/0407 | Cooke Aquaculture Scotl | Not required at present |
| 34 | Bastavoe South | FS0074 | Cooke Aquaculture Scotl | Not required |
| 35 | Sandwick | FS0710 | Thompson Bros Salmon l | Not required |
| 36 | Kirkabister | FS0802 | Thompson Bros Salmon l | Not required |
| 37 | East Vope Laxfirth | FS0333 | Hjaltland Seafarms Ltd | not required |
| 38 | Gletness | FS1099 | Hjaltland Seafarms Ltd | not required |
| 39 | Taing of Railbrough | FS0501 | Hjaltland Seafarms Ltd | not required |
| 40 | Corlarach | FS1287 | Hjaltland Seafarms Ltd | not required |
| 41 | Gob na Hoe | FS1175 | Hjaltland Seafarms Ltd | not required |
| 42 | Leinish | FS0800 | Hjaltland Seafarms Ltd | not required |
| 43 | Bay of Cleat North | FS1080 | Cooke Aquaculture Scotl | Not permitted by accreditation scheme (Label Rouge and Soil Association) |
| 44 | Bloody Bay | FS0964 | Scottish Sea Farms Ltd | not permitted |
| 45 | Muck | FS1286 | Marine Harvest (Scotlan) | Not permitted |
| 46 | Cloudin | FS0088 | Cooke Aquaculture Scotl | Not cost effective at present. |
| 47 | Noust Geo | FS0823 | Scottish Sea Farms Orkni | Not allowed by SNH/Planning |
| 48 | Bring Head | FS1023 | Scottish Sea Farms Orkni | Not allowed by SNH/planning |
| 49 | Toyness | FS1024 | Scottish Sea Farms Orkni | Not allowed by SNH/Planning |
| 50 | Wyre | FS1294 | Scottish Sea Farms Orkni | Not allowed by SNH/Planning |
| 51 | Pegal Bay | FS0031 | Cooke Aquaculture Scotl | Not allowed by SNH due to Cetaceans. An EPS license would be required. |
| 52 | South Cava | FS1198 | Cooke Aquaculture Scotl | Not allowed by SNH due to cetaceans. An EPS license would be required . |
| 53 | Quanterness | FS/0908 | Cooke Aquaculture Scotl | Not allowed by SNH due to cetaceans. An EPC license would be required. |
| 54 | Kirknoust | FS0645 | Cooke Aquaculture Scotl | Not allowed by SNH due to cetaceans, EPS license required for use. |
| 55 | Lyrawa Bay | FS0054 | Cooke Aquaculture Scotl | Not allowed by SNH due to cetaceans & EPS license would be required to use. |
| 56 | West Fara | FS/1017 | Cooke Aquaculture Scotl | Not allowed by SNH due to cetaceans. EMS license required if deployed |
| 57 | Ouseness | FS1209 | Cooke Aquaculture Scotl | Not allowed by Label Rouge and Soil association |
| 58 | Vestness | FS/1210 | Cooke Aquaculture Scotl | Not allowed by accreditation schemes Label Rouge and Soil association. |
| 59 | Turness | FS0451 | Cooke Aquaculture Scotl | Not allowed by accreditation scheme, whole foods. |
| 60 | Vee Taing | FS/1057 | Cooke Aquaculture Scotl | Not allowed by accreditation scheme Whole Foods. Not cost effective at current predation levels. |
| 61 | Burkwell | FS0960 | Cooke Aquaculture Scotl | Not allowed by accreditation scheme Whole Foods. |
| 62 | Mula | FS/0896 | Cooke Aquaculture Scotl | Not allowed by accreditation scheme whole foods. |
| 63 | Winna Ness | FS0871 | Cooke Aquaculture Scotl | Not allowed by accreditation scheme Whole foods & not cost effective at current predation levels. |
| 64 | Baltsound Harbour | FS0449 | Balta Island Seafare Ltd | no fish on site |
| 65 | Meil Bay | FS0597 | Cooke Aquaculture Scotl | Insufficient mortality to warrant use. SNH restriction on use due to Cetaceans likely and EPS requirement. |
| 66 | Score Holm | FS0948 | Hjaltland Seafarms Ltd | inefficient |
| 67 | Hamnavoe | FS1144 | Hjaltland Seafarms Ltd | ineffective and requires permission from SNH |
| 68 | East of Papa Little | FS1278 | Hjaltland Seafarms Ltd | ineffective |
| 69 | Goe of Valladale | FS1115 | Hjaltland Seafarms Ltd | ineffective |
| 70 | Hamar Sound | FS1114 | Hjaltland Seafarms Ltd | ineffective |
| 71 | Langa Isle (East) | FS0433 | Hjaltland Seafarms Ltd | ineffective |
| 72 | North Havra | FS0674 | Hjaltland Seafarms Ltd | ineffective |
| 73 | North Papa | FS0515 | Hjaltland Seafarms Ltd | ineffective |
| 74 | North Voe | FS0946 | Hjaltland Seafarms Ltd | ineffective |
| 75 | Olna South | FS0764 | Hjaltland Seafarms Ltd | ineffective |
| 76 | Spoose Holm | FS0785 | Hjaltland Seafarms Ltd | ineffective |
| 77 | West of Burwick | FS0937 | Hjaltland Seafarms Ltd | ineffective |
| 78 | Etive 3 (Port na Min | FS1101 | Dawnfresh Farming Ltd | Funding required for site development |
| 79 | Etive 4 | FS1112 | Dawnfresh Farming Ltd | Funding required for site development |
| 80 | Inverawe (East) Etiv | FS1067 | Dawnfresh Farming Ltd | Funding for the development of the site |
| 81 | Uyea Isle | FS0382 | Cooke Aquaculture Scotl | Due to accreditation scheme |
| 82 | Colonsay | FS1296 | Marine Harvest (Scotlan) | Condition of planning |
| 83 | Caolas A Deas | FS1291 | Marine Harvest (Scotlan) | Available to be deployed if required |
| 84 | LOCHALSH | FS0016 | Marine Harvest (Scotlan) | Available if required |
| 85 | Marulaig Bay | FS0865 | Marine Harvest (Scotlan) | available for deployment if required |
| 86 | SOAY | FS0646 | Marine Harvest (Scotlan) | Available for deployment if deemed necessary |
| 87 | CAIRIDH | FS0252 | Marine Harvest (Scotlan) | ADD's were used but were moved to neighbouring site to double up on resources there - |

Reasons listed why ADDs were not used included:

- "The use of ADDs has been refused by SNH due to cetacean movements in Scapa Flow. An EPS license is required."
- "SNH have prohibited the use of ADDs in Rousay sound due to cetaceans. Prior to use an EPS license is required."
- "Not allowed by Wholefoods accreditation scheme for which this site is part of."
- "Not allowed by SNH or planning authority due to perceived potential impact on Cetaceans."

[Download SNH FOI 25 April 2017 document #5 ADDs NOT used](#)

* 1 October 2015 to 30 September 2016 is listed as the 'Application Period'; October 2015 is listed as a 'Creation Date' and 1 February 2016 to 31 January 2017 is listed as the 'Licence Period'.

However, there were 119 salmon farms where ADDs were used and 103 salmon farms where ADDs were "always on":

| 1 | FishFarmName | Registr. | SiteOwner | SiteStatus | ADDUsed | ADDAlwaysOn | ADDCount | ADDModel | ADDFreque | ADDOutp. |
|----|------------------------------|----------|-------------------------------|------------|---------|-------------|----------|-------------------------|-----------|------------|
| 2 | Aird | FS0594 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 | Airmar db 11 plus | 6.50 | 198 |
| 3 | Ardcastle | FS0818 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 | ACE AQUATEC - US3 | 20.00 | 195 |
| 4 | Ardgadden | FS0851 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 | ACE AQUATEC - US3 | 20.00 | 195 |
| 5 | Ardyne | FS0559 | The Scottish Salmon Company | Existing | TRUE | TRUE | 8 | Ace Aquatech - US3 | 20.00 | 194 |
| 6 | Badcall Bay | FS0067 | Northern Salmon Management | Existing | TRUE | TRUE | 18 | Airmar Db Plus 11 | 60.00 | 180 |
| 7 | Bight of Bellister, Dury Voe | FS1121 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 10 | Ace Aquatec US3 | 12.00 | 195 to 197 |
| 8 | Calbha | FS0068 | Northern Salmon Management | Existing | TRUE | TRUE | 14 | Airmar Db Plus 11 | 60.00 | 180 |
| 9 | CAMAS GLAS | FS0413 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 8 | Airmar | 10.00 | 198 |
| 10 | CREAG AN T SAGAIRT | FS0605 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 6 | Terecos DSMS4 | 9.30 | 135-178 |
| 11 | Druimyeon Bay | FS0336 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 | ACE AQUATEC - US3 | 20.00 | 195 dB re |
| 12 | Drumbeg (Loch Dhrombaig) | FS0487 | Northern Salmon Management | Existing | TRUE | TRUE | 6 | Airmar Db Plus 11 | 6.00 | 180 |
| 13 | DUICH | FS0248 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 8 | Terecos DSMS4 | 9.30 | 135-178 |
| 14 | Dunstaffnage | FS0299 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 9 | Mohn Aqua Airmar DB11 | 10 | 197 |
| 15 | Dury Voe | FS0033 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 | Ace Aquatec US3 | 12.00 | 195 to 197 |
| 16 | East Tarbert Bay | FS1010 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 | ACE AQUATEC - US3 | 20.00 | 195 |
| 17 | Etive 6 | FS1288 | Dawnfresh Farming Ltd | Existing | TRUE | TRUE | 10 | Mohn Aqua | 10.00 | 192 dB re |
| 18 | Eughlam | FS1233 | The Scottish Salmon Company | Existing | TRUE | TRUE | 15 | ACE AQUATEC US3 | 20.00 | 195 |
| 19 | Fada | FS0858 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 | Mohn Aqua Airmar DBII | 10 | 197 |
| 20 | Foreholm | FS0936 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 10 | Mohn aqua MAG | 10.00 | 198 |
| 21 | Furnace | FS0567 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 | ACE AQUATEC - US3 | 20.00 | 195 |
| 22 | Geasgill | FS0839 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 | Airmar dB Plus 11 | 6.50 | 198 |
| 23 | Glenan Bay | FS0590 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 | ACE AQUATEC US3 | 20.00 | 195 |
| 24 | Gob a Bharra | FS0683 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 | ACE AQUATEC US3 | 20.00 | 195 |
| 25 | Gometra | FS1267 | The Scottish Salmon Company | Existing | TRUE | TRUE | 15 | ACE AQUATEC US3 | 20.00 | 195 |
| 26 | Gousam | FS0998 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 | Airmar dB Plus 11 | 6.50 | 198 |
| 27 | Gravir | FS0242 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 | Airmar dB Plus 11 | 6.50 | 198 |
| 28 | Greanamul | FS1282 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 | Airmar db 11 plus | 6.50 | 198 |
| 29 | GRESHORNISH | FS0015 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 12 | Terecos DSMS4 | 9.30 | 135-178 |
| 30 | Grey Horse Channel | FS1122 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 14 | Mon Aqua | 10.00 | 198 |
| 31 | Holms Geo | FS0749 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 | Mohn aqua | 10.00 | 198 |
| 32 | Inch Kenneth | FS0593 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 | Airmar dB Plus 11 | 6.50 | 198 |
| 33 | INVASION BAY | FS0212 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 1 | Terecos DSMS4 and Air | 9.30 | 135-178 |
| 34 | ISLE EWE | FS1084 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 8 | Mon Aqua | 10.00 | 198 |
| 35 | Kempie Bay | FS0359 | Scottish Sea Farms Orkney and | Existing | TRUE | TRUE | 4 | Airmar dB 11 | 10.30 | 192 |
| 36 | Kenmore | FS0050 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 | Airmar db11 plus | 6.50 | 198 |
| 37 | Kerrera B | FS0663 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 13 | Mohn Aqua AirmarDB11 | 10 | 197 |
| 38 | KINGAIRLOCH | FS0241 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 1 | Terecos DSMS4 | 9.30 | 135-178 |
| 39 | Kishorn A (South) | FS0709 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 | Airmar DBII | 10 | 197 |
| 40 | Kishorn B (North) | FS0804 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 16 | Mohn Aqua Airmar DBII | 10 | 197 |
| 41 | Kishorn West | FS1274 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 | Mkohn Aqua Airmar DBIII | 10 | 197 |
| 42 | Kyles Vuia | FS0927 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 | Airmar dB Plus 11 | 6.50 | 198 |
| 43 | Lamlash Bay | FS0423 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 | Ace Aquatec US3 | 20.00 | 195 |
| 44 | LEVEN | FS0244 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 2 | Terecos DSMS4 | 9.30 | 135-178 |
| 45 | LINNHE | FS0240 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 3 | Terecos DSMS4 | 9.30 | 135-178 |
| 46 | Lippie Geo | FS0850 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 10 | Mohn Aqua MAG | 10.00 | 198 |
| 47 | Lismore North | FS0745 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 10 | Mohn Aqua Airmar DB Pl | 10 | 197 |

| | | | | | | | | | |
|-----|-------------------------------|--------|-------------------------------|----------|------|-------|-----------------------------|-------|------------|
| 48 | Lismore West | FS0914 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 10 Mohn Aqua Airmar DB11 | 10 | 197 |
| 49 | Loch A Chairn Bhain | FS0621 | Northern Salmon Management | Existing | TRUE | TRUE | 14 Airmar Db Plus 11 | 60.00 | 180 |
| 50 | Loch Carnan | FS1280 | Loch Duart Ltd | Existing | TRUE | TRUE | 18 Airmar | 10.00 | 198 |
| 51 | Loch Creran (B) | FS0426 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 14 Mohn Aqua Airmar DB II | 10 | 197 |
| 52 | Loch Laxford | FS0065 | Northern Salmon Management | Existing | TRUE | TRUE | 18 Airmar Db Plus 11 | 60.00 | 180 |
| 53 | Loch Spelve (A) | FS0634 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 10 Mohn Aqua airmar DB11 | 10 | 197 |
| 54 | Loch Spelve (B) | FS0253 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 8 Mohn Aqua Airmar | 10 | 197 |
| 55 | Lochmaddy | FS0853 | Loch Duart Ltd | Existing | TRUE | TRUE | 16 Airmar | 10.00 | 198 range |
| 56 | Loura Voe | FS0699 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 20 Mohn Aqua MAG | 10.00 | 198 |
| 57 | MAOL BAN | FS0519 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 8 Terecos DSMS4 | 9.30 | 135-178 |
| 58 | Meall Mhor | FS0091 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 ACE AQUATEC US3 | 20.00 | 195 |
| 59 | Nevis A | FS0430 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 Mohn Aqua airmar DB II | 10 | 197 |
| 60 | Nevis B | FS0616 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 12 Mohn Aqua Airmar DBII | 10 | 197 |
| 61 | Nevis C (Ardintigh) | FS0546 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 9 Mohn Aqua Airmar DBII | 10 | 197 |
| 62 | Oldany | FS0933 | Northern Salmon Management | Existing | TRUE | TRUE | 10 Airmar Db Plus 11 | 60.00 | 180 |
| 63 | Ornish | FS0531 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 2 Terecos DSMS4 | 9.30 | 135-178 |
| 64 | Outer Eport | FS1254 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 Airmar db11 plus | 6.50 | 198 |
| 65 | Petersport | FS0340 | The Scottish Salmon Company | Existing | TRUE | TRUE | 14 OTAQ SealFence | 20.00 | 195 |
| 66 | Plocrapol | FS1256 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db 11 plus | 6.50 | 198 |
| 67 | Polle Na Gille | FS0629 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 8 Terecos DSMS4 | 9.30 | 135-178 |
| 68 | Port Na Cro | FS0859 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 4 Terecos DSMS4 | 9.30 | 135-178 |
| 69 | Portree | FS0708 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Ace Aquatech US3 | 20.00 | 195 |
| 70 | Puldrite | FS0813 | Scottish Sea Farms Orkney and | Existing | TRUE | TRUE | 10 Airmar dbII | 10.30 | 192 |
| 71 | Quarry Point | FS0698 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 ACE AQUATEC US3 | 20.00 | 195 |
| 72 | Raineach | FS1263 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 2 Terecos DSMS4 | 9.30 | 135-178 |
| 73 | Reibinish | FS1277 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 Airmar db11 plus | 6.50 | 198 |
| 74 | Rubha Stillaig | FS0894 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 ACE AQUATEC US 3 | 20.00 | 195 |
| 75 | Scadabay | FS1293 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 Airmar db11 plus | 6.50 | 198 |
| 76 | SCONSER | FS0602 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 12 Ace Aquatet | 0.00 | 0 |
| 77 | Scotasay | FS0502 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 2 Terecos DSMS4 | 9.30 | 135-178 |
| 78 | Sgeir Dughall | FS1262 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db 11 plus | 6.50 | 198 |
| 79 | Sgian Dubh | FS1281 | The Scottish Salmon Company | Existing | TRUE | TRUE | 8 Ace Aquatech - US3 | 20.00 | 194 |
| 80 | Shapinsay | FS0860 | Scottish Sea Farms Orkney and | Existing | TRUE | TRUE | 8 Ace Aquatec US3 | 20.00 | 195 |
| 81 | Sian Bay | FS0361 | Scottish Sea Farms Orkney and | Existing | TRUE | TRUE | 10 Airmar dBII | 10.30 | 192 |
| 82 | Slocka Ronas Voe | FS1018 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 14 Ace Aquatec US3 | 12.00 | 195 to 197 |
| 83 | Sound of Harris | FS1260 | Loch Duart Ltd | Existing | TRUE | TRUE | 2 Mohnaqua | 10.00 | 198 range |
| 84 | South Sound | FS0183 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 14 Mohn aqua MAG | 10.00 | 198 |
| 85 | Strome | FS0570 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 ACE AQUATEC US3 | 20.00 | 195 |
| 86 | Strondoir Bay | FS1019 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar dB Plus 11 | 6.50 | 198 |
| 87 | Strone | FS1056 | The Scottish Salmon Company | Existing | TRUE | TRUE | 8 Ace Aquatech - US3 | 20.00 | 194 |
| 88 | STULAIGH | FS1259 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 16 Airmar | 10.00 | 198 |
| 89 | Tanera | FS0549 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 24 Mohn Aqua MAG seal det | 10 | 197 |
| 90 | Taranaish | FS0752 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db Plus 11 | 20.00 | 198 |
| 91 | Tarbert South | FS0767 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 ACE AQUATEC US3 | 20.00 | 195 |
| 92 | Teisti Geo | FS1093 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 14 Mohn Aqua MAG | 10.00 | 198 |
| 93 | TORRIDON | FS0234 | Marine Harvest (Scotland) Ltd | Existing | TRUE | TRUE | 4 Terecos DSMS4 | 9.30 | 135-178 |
| 94 | Trenay | FS0796 | The Scottish Salmon Company | Existing | TRUE | TRUE | 2 Airmar db 11 plus | 6.50 | 198 |
| 95 | Trilleachan Mor | FS1118 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 Airmar dB Plus 11 | 6.50 | 198 |
| 96 | Tuath | FS0617 | The Scottish Salmon Company | Existing | TRUE | TRUE | 3 Airmar dB Plus 11 | 6.50 | 198 |
| 97 | Uiskevagh | FS1255 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db11 plus | 6.50 | 198 |
| 98 | Vacasy | FS1091 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db 11 Plus | 20.00 | 198 |
| 99 | Vidlin North | FS0608 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 20 Mohn aqua MAG | 10.00 | 198 |
| 100 | Vuia Beag | FS0411 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db 11 Plus | 6.50 | 198 |
| 101 | Vuia Mor | FS1103 | The Scottish Salmon Company | Existing | TRUE | TRUE | 4 Airmar db 11 plus | 6.50 | 198 |
| 102 | Walters (East Lismore) | FS0875 | Scottish Sea Farms Ltd | Existing | TRUE | TRUE | 9 Mohn Aqua Airmar DB pl | 10 | 197 |
| 103 | Wester Ross Fisheries | FS0056 | Northern Salmon Management | Existing | TRUE | TRUE | 14 Airmaar Db Plus 11 | 10.00 | 198 |
| 104 | Wester Ross Fisheries | FS0057 | Northern Salmon Management | Existing | TRUE | TRUE | 12 Airmaar Db Plus 11 | 1.00 | 198 |
| 105 | Ardchattan Bay | FS0197 | Dawnfresh Farming Ltd | Existing | TRUE | FALSE | 6 Mohn Aqua | 10.00 | 192 dB re |
| 106 | ARDINTOUL | FS0245 | Marine Harvest (Scotland) Ltd | Existing | TRUE | FALSE | 4 Terecos DSMS4 | 9.30 | 135-178 |
| 107 | Ardnish | FS0249 | Marine Harvest (Scotland) Ltd | Existing | TRUE | FALSE | 1 Terecos DSMS4 | 9.30 | 135-178 |
| 108 | Balta Island | FS0717 | Balta Island Seafare Ltd | Existing | TRUE | FALSE | 3 ace aquatec us3 | 10.20 | 195 |
| 109 | Baltsound Pier | FS1102 | Balta Island Seafare Ltd | Existing | TRUE | FALSE | 1 lofitech universal scamrn | 14.00 | 189 |
| 110 | Fishnish (A) | FS0427 | Scottish Sea Farms Ltd | Existing | TRUE | FALSE | 8 Mohn Aqua airmar DB Pl | 10 | 197 |
| 111 | Fishnish (B) | FS0694 | Scottish Sea Farms Ltd | Existing | TRUE | FALSE | 6 Airmar DB Plus II | 10 | 197 |
| 112 | Gorsten | FS0237 | Marine Harvest (Scotland) Ltd | Existing | TRUE | FALSE | 2 Terecos DSMS4 | 9.30 | 135-178 |
| 113 | Kames Bay (east) | FS0462 | Kames Fish Farming Ltd | Existing | TRUE | FALSE | 1 Terrecos Ultrasonic Seals | 0.00 | 0 |
| 114 | North Shore | FS1033 | Marine Harvest (Scotland) Ltd | Existing | TRUE | FALSE | 1 Terecos DSMS4 | 9.30 | 135-178 |
| 115 | Scallastle | FS0209 | Scottish Sea Farms Ltd | Existing | TRUE | FALSE | 6 Mohn Aqua MAG seal det | 10 | 197 |
| 116 | Shuna Castle | FS0465 | Kames Fish Farming Ltd | Existing | TRUE | FALSE | 1 Terrecos Ultrasonic Seal | 0.00 | 0 |
| 117 | Shuna SW (Rubhan Trilleachan) | FS1290 | Kames Fish Farming Ltd | Existing | TRUE | FALSE | 4 Terrecos Ultrasonic Seals | 0.00 | 0 |
| 118 | Swarta Skerry | FS0814 | Balta Island Seafare Ltd | Existing | TRUE | FALSE | 1 ace aquatec scammer | 10.20 | 195 |
| 119 | Tabhaigh | FS1297 | Marine Harvest (Scotland) Ltd | New | TRUE | | 1 Terecos DSMS4 | | |
| 120 | Wester Ross Fisheries | FS0675 | Northern Salmon Management | New | TRUE | | 8 Airmaar Db Plus 11 | | |

[Download data on ADD's used for the licensing period 1 February 2016 to 31 January 2017 via [Download SNH FOI 25 April 2017 document #5 New version for ADDs only LIST of all sites using ADDs](#)]

Of the 135 salmon farms which reported the use of ADDs in 2016*, 67 salmon farms used an [Airmar/Mon Aqua](#); 33 salmon farms used a used a [Terecos](#); 32 salmon farms used an [Ace Aquatec](#) and 3 salmon farm used an [OTAQ](#).

* 1 February 2017 to 31 January 2018 is listed as a 'Licence Period' and 1 October 2016 to 30 September 2017 is listed as the 'Application Period'.

In total, there are 135 salmon farms listed as using ADDs and 70 not using ADDs (9 sites have no data available for ADD use). Of the 135 salmon farms using ADDs, 84 are listed as "ADD Always On" and 50 as not "ADD Always On" (one site has no data re. the question "ADD Always On").

Here's the 135 salmon farms listed as using ADDs (including 84 listed as "ADDs Always On") - read the full list via [Download SNH FOI 25 April 2017 document #7 ADDs used only](#):

| 1 | FishFarmName | Reg # | SiteOwner | ADDUsed | ADDCount | ADDModel | ADDFreq | ADDOutput | ADDAlwaysOn |
|----|------------------------|--------|-------------------------------|---------|----------|-------------------|----------|------------|-------------|
| 2 | Aird | FS0594 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 12 | 195 to 197 | FALSE |
| 3 | Ardcastle | FS0818 | The Scottish Salmon Company | TRUE | 2 | ACE AQUATEC US3 | 14 | 195 to 197 | FALSE |
| 4 | Ardchattan Bay | FS0197 | Dawnfresh Farming Ltd | TRUE | 6 | Mohn Aqua | 10.00 | 192 dB re | FALSE |
| 5 | Ardgadden | FS0851 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 14 | 195 to 197 | FALSE |
| 6 | ARDINTOUL | FS0245 | Marine Harvest (Scotland) Ltd | TRUE | 6 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 7 | Ardnish | FS0249 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | FALSE |
| 8 | Ardyne | FS0559 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 16 | 194 to 197 | TRUE |
| 9 | Badcall Bay | FS0067 | Northern Salmon Management Co | TRUE | 18 | Air Db Plus 11 | 60 | 180 | TRUE |
| 10 | Bagh Dail Nan Cean | FS0805 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 11 | Bay of Cleat North | FS1080 | Cooke Aquaculture Scotland | TRUE | 10 | Ace Aquatec | 10-20KHz | 195dbre10 | TRUE |
| 12 | Bight of Bellister, Du | FS1121 | Scottish Sea Farms Ltd | TRUE | 12 | Ace Aquatec US3 | 12 | 195 to 197 | TRUE |
| 13 | Burrastow | FS0666 | Cooke Aquaculture Scotland | TRUE | 6 | Ace Aquatec | 10-20KHz | 195dbre10 | TRUE |
| 14 | CAIRIDH | FS0252 | Marine Harvest (Scotland) Ltd | TRUE | 8 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 15 | Calbha | FS0068 | Northern Salmon Management Co | TRUE | 14 | Airmar Db Plus 11 | 60 | 180 | TRUE |
| 16 | CAMAS GLAS | FS0413 | Marine Harvest (Scotland) Ltd | TRUE | 20 | Airmar | 10 | 0 | TRUE |
| 17 | Cloudin | FS0088 | Cooke Aquaculture Scotland | TRUE | 12 | Ace Aquatec | 10-20KHz | 195dbre10 | FALSE |
| 18 | CREAG AN T SAGAIR | FS0605 | Marine Harvest (Scotland) Ltd | TRUE | 4 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 19 | Druimyeon Bay | FS0336 | The Scottish Salmon Company | TRUE | 4 | ACE Aquatec US3 | 14 | 195 to 197 | FALSE |
| 20 | Drumbeg (Loch Dhro | FS0487 | Northern Salmon Management Co | TRUE | 6 | Airmar Db Plus 11 | 6 | 180 | TRUE |
| 21 | DUICH | FS0248 | Marine Harvest (Scotland) Ltd | TRUE | 8 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 22 | Dunstaffnage | FS0299 | Scottish Sea Farms Ltd | TRUE | 9 | Airmar DB2 | 10 | 197 | TRUE |
| 23 | Dury Voe | FS0033 | Scottish Sea Farms Ltd | TRUE | 10 | Mohn aqua MAG | 10 | 198 | TRUE |
| 24 | East Tarbert Bay | FS1010 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 14 | 195 to 197 | FALSE |

| | | | | | | | | | |
|----|---------------------|--------|---------------------------------|------|----|--------------------|------------|------------|-------|
| 25 | Eilean Coltair | FS0777 | Kames Fish Farming Ltd | TRUE | 1 | Terecos DSMS 4 | 9.3 | 179 | FALSE |
| 26 | Eilean Griainain | FS1176 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS4 | 9.3 | 135-178 | TRUE |
| 27 | Etive 6 | FS1288 | Dawnfresh Farming Ltd | TRUE | 10 | Mohn Aqua | 10.00 | 192 dB re | TRUE |
| 28 | Eughlam | FS1233 | The Scottish Salmon Company | TRUE | 15 | ACE Aquatec US3 | 20 | 195 to 197 | TRUE |
| 29 | Fada | FS0858 | Scottish Sea Farms Ltd | TRUE | 12 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 30 | Fishnish (A) | FS0427 | Scottish Sea Farms Ltd | TRUE | 8 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 31 | Fishnish (B) | FS0694 | Scottish Sea Farms Ltd | TRUE | 8 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 32 | Fiunary | FS0696 | Scottish Sea Farms Ltd | TRUE | 8 | Mohn Aqua MAG Se | 10 | 197 | FALSE |
| 33 | Foreholm | FS0936 | Scottish Sea Farms Ltd | TRUE | 10 | Mohn aqua MAG | 10 | 198 | TRUE |
| 34 | Furnace | FS0567 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US 3 | 12 | 195 to 197 | FALSE |
| 35 | Geasgill | FS0839 | The Scottish Salmon Company | TRUE | 12 | OTAQ SF3 | 10 | 196 | FALSE |
| 36 | Glenan Bay | FS0590 | The Scottish Salmon Company | TRUE | 3 | Ace Aquatec US 3 | 12 | 195 to 197 | FALSE |
| 37 | Gob a Bharra | FS0683 | The Scottish Salmon Company | TRUE | 2 | Ace Aquatec US 3 | 12 | 195 to 197 | FALSE |
| 38 | Gometra | FS1267 | The Scottish Salmon Company | TRUE | 15 | ACE Aquatec US3 | 12 | 195 to 197 | TRUE |
| 39 | Gorsten | FS0237 | Marine Harvest (Scotland) Ltd | TRUE | 12 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 40 | Gousam | FS0998 | The Scottish Salmon Company | TRUE | 4 | Airmar db Plus 11 | 6.5 | 195 to 198 | FALSE |
| 41 | Gravir | FS0242 | The Scottish Salmon Company | TRUE | 3 | Airmar dB Plus 11 | 6.5 | 195 to 198 | FALSE |
| 42 | Greanamul | FS1282 | The Scottish Salmon Company | TRUE | 4 | Airmar db 11 plus | 6.5 | 195 to 198 | FALSE |
| 43 | GRESHORNISH | FS0015 | Marine Harvest (Scotland) Ltd | TRUE | 12 | Terecos DSMS 4 | 9.3 | 135-180 | TRUE |
| 44 | Grey Horse Channel | FS1122 | Marine Harvest (Scotland) Ltd | TRUE | 7 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 45 | Groatay | FS1083 | Marine Harvest (Scotland) Ltd | TRUE | 14 | Terecos DSMS4 | 9.3 | 135-178 | TRUE |
| 46 | HELLISAY | FS1261 | Marine Harvest (Scotland) Ltd | TRUE | 2 | mon aqua airmar II | 10 | 135-178 | TRUE |
| 47 | Holms Geo | FS0749 | Scottish Sea Farms Ltd | TRUE | 12 | Ace Aquates US3 | 12 | 195-197 | TRUE |
| 48 | Inch Kenneth | FS0593 | The Scottish Salmon Company | TRUE | 3 | AIRmar bb PLUS 11 | 1.8 per ch | 198 | FALSE |
| 49 | INVASION BAY | FS0212 | Marine Harvest (Scotland) Ltd | TRUE | 3 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 50 | ISLE EWE | FS1084 | Marine Harvest (Scotland) Ltd | TRUE | 12 | MON AQUA AIRMAR | 10 | 135-178 | TRUE |
| 51 | Kames Bay (east) | FS0462 | Kames Fish Farming Ltd | TRUE | 1 | Terecos DSMS4 | 5 | 179 | FALSE |
| 52 | Kames Bay (west) | FS0271 | Kames Fish Farming Ltd | TRUE | 1 | DSMS4 Terecos | 5 | 179 | FALSE |
| 53 | Kempie Bay | FS0359 | Scottish Sea Farms Orkney and E | TRUE | 4 | Airmar dbII | 10.3 | 192 | TRUE |
| 54 | Kenmore | FS0050 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 12 | 195 to 197 | FALSE |
| 55 | Kerrera B | FS0663 | Scottish Sea Farms Ltd | TRUE | 13 | Mohn Aqua Airmar | 10 | 197dB | TRUE |
| 56 | KINGAIRLOCH | FS0241 | Marine Harvest (Scotland) Ltd | TRUE | 1 | Terecos DSMS4 | 9.3 | 135-178 | TRUE |
| 57 | Kishorn A (South) | FS0709 | Scottish Sea Farms Ltd | TRUE | 12 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 58 | Kishorn B (North) | FS0804 | Scottish Sea Farms Ltd | TRUE | 16 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 59 | Kishorn West | FS1274 | Scottish Sea Farms Ltd | TRUE | 14 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 60 | Kyles Vuia | FS0927 | The Scottish Salmon Company | TRUE | 4 | Airmar dB Plus 11 | 6.5 | 195 to 198 | FALSE |
| 61 | Lamlash Bay | FS0423 | The Scottish Salmon Company | TRUE | 2 | Ace Aquatec US3 | 12 | 195 to 197 | FALSE |
| 62 | LEVEN | FS0244 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 63 | LINNHE | FS0240 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 64 | Lismore North | FS0745 | Scottish Sea Farms Ltd | TRUE | 4 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 65 | Lismore West | FS0914 | Scottish Sea Farms Ltd | TRUE | 10 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 66 | Loch A Chairn Bhain | FS0621 | Northern Salmon Management C | TRUE | 14 | Airmar Db Plus 11 | 60 | 180 | TRUE |
| 67 | Loch Carnan | FS1280 | Loch Duart Ltd | TRUE | 12 | AIRMAR / MAG - MC | 10 | 198 | TRUE |
| 68 | Loch Creran (B) | FS0426 | Scottish Sea Farms Ltd | TRUE | 14 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 69 | Loch Creran (D) | FS1047 | Scottish Sea Farms Ltd | TRUE | 14 | Mohn Aqua Airmar | 10 | 197 | FALSE |
| 70 | Loch Laxford | FS0065 | Northern Salmon Management C | TRUE | 18 | Airmar Db Plus 11 | 60 | 180 | TRUE |
| 71 | Loch Spelve (A) | FS0634 | Scottish Sea Farms Ltd | TRUE | 10 | Airmar DBII | 10 | 197 | TRUE |
| 72 | Loch Spelve (B) | FS0253 | Scottish Sea Farms Ltd | TRUE | 10 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 73 | Lochmaddy | FS0853 | Loch Duart Ltd | TRUE | 20 | AIRMAR / MAG - MC | 10 | 198 | TRUE |
| 74 | Loura Voe | FS0699 | Scottish Sea Farms Ltd | TRUE | 10 | Mohn Aqua MAG | 10 | 198 | TRUE |
| 75 | MacLean's Nose | FS0599 | Marine Harvest (Scotland) Ltd | TRUE | 1 | Terecos DSMS4 | 9.3 | 135-178 | FALSE |
| 76 | MAOL BAN | FS0519 | Marine Harvest (Scotland) Ltd | TRUE | 8 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 77 | Marulaig Bay | FS0865 | Marine Harvest (Scotland) Ltd | TRUE | 4 | Terecos DSMS4 | 9.3 | 135-178 | TRUE |
| 78 | Meall Mhor | FS0091 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US 3 | 12 | 195 to 197 | FALSE |
| 79 | Mid Taing | FS0167 | Cooke Aquaculture Scotland | TRUE | 6 | Ace Aquatec | 10-20KHz | 195dbre1u | TRUE |
| 80 | Nevis A | FS0430 | Scottish Sea Farms Ltd | TRUE | 12 | Mohn Aqua airmar | 10 | 197 | TRUE |
| 81 | Nevis B | FS0616 | Scottish Sea Farms Ltd | TRUE | 12 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 82 | Nevis C (Ardintigh) | FS0546 | Scottish Sea Farms Ltd | TRUE | 12 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 83 | North Moine | FS0356 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | FALSE |
| 84 | North Shore | FS1033 | Marine Harvest (Scotland) Ltd | TRUE | 6 | Terecos DSMS-4 | 9.3 | 135-178 | TRUE |
| 85 | Oldany | FS0933 | Northern Salmon Management C | TRUE | 10 | Airmar Db Plus 11 | 60 | 180 | TRUE |
| 86 | Ornish | FS0531 | Marine Harvest (Scotland) Ltd | TRUE | 2 | ACE AQUATEC | 10 | 135 -180 | TRUE |
| 87 | Ouseness | FS1209 | Cooke Aquaculture Scotland | TRUE | 10 | Ace Aquatec | 10-20KHz | 195dbre1u | TRUE |
| 88 | Outer Bay (Loch Dro | FS0671 | Northern Salmon Management C | TRUE | 6 | Airmar Db Plus 11 | 60 | 180 | TRUE |
| 89 | Outer Eport | FS1254 | The Scottish Salmon Company | TRUE | 2 | Airmar db11 plus | 6.5 | 195 to 198 | FALSE |

| | | | | | | | | | |
|-----|----------------------|--------|---------------------------------|------|----|--------------------|------|------------|-------|
| 90 | Petersport | FS0340 | The Scottish Salmon Company | TRUE | 14 | OTAQ SealFence | 20 | 195 | FALSE |
| 91 | Plocrapol | FS1256 | The Scottish Salmon Company | TRUE | 4 | Airmar db 11 plus | 6.5 | 195 to 198 | FALSE |
| 92 | Polle Na Gille | FS0629 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 93 | Port Na Cro | FS0859 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135-178 | TRUE |
| 94 | Portree | FS0708 | The Scottish Salmon Company | TRUE | 4 | ACE Aquatec US3 | 12 | 195 to 197 | FALSE |
| 95 | Puldrite | FS0813 | Scottish Sea Farms Orkney and E | TRUE | 10 | Airmar dbII | 10.3 | 192 | TRUE |
| 96 | Quarry Point | FS0698 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US 3 | 12 | 195 to 197 | FALSE |
| 97 | Raineach | FS1263 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS4 | 9.3 | 135-178 | TRUE |
| 98 | Reibinish | FS1277 | The Scottish Salmon Company | TRUE | 2 | Airmar db11 plus | 6.5 | 195 to 198 | FALSE |
| 99 | Rubha Stillaig | FS0894 | The Scottish Salmon Company | TRUE | 2 | Ace Aquatec US 3 | 12 | 195 to 197 | FALSE |
| 100 | Scadabay | FS1293 | The Scottish Salmon Company | TRUE | 2 | Airmar db11 plus | 6.5 | 195 to 198 | FALSE |
| 101 | Scallastle | FS0209 | Scottish Sea Farms Ltd | TRUE | 8 | Mohn Aqua Airmar | 10 | 197dB | FALSE |
| 102 | SCONSER | FS0602 | Marine Harvest (Scotland) Ltd | TRUE | 12 | Terecos DSMS 4 | 9.3 | 135-178 | FALSE |
| 103 | Scotasay | FS0502 | Marine Harvest (Scotland) Ltd | TRUE | 2 | Terecos DSMS-4 | 9.3 | 135-178 | TRUE |
| 104 | SEAFORTH | FS1042 | Marine Harvest (Scotland) Ltd | TRUE | 2 | TERECOS DSMS-4 | 9.3 | 135-178 | TRUE |
| 105 | Sgeir Dughall | FS1262 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 12 | 195 to 197 | FALSE |
| 106 | Sgian Dubh | FS1281 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 16 | 194 to 197 | FALSE |
| 107 | Shapinsay | FS0860 | Scottish Sea Farms Orkney and E | TRUE | 8 | Ace Aquatec US3 | 20 | 195 | TRUE |
| 108 | Shuna Castle | FS0465 | Kames Fish Farming Ltd | TRUE | 1 | Terecos DSMS4 | 5 | 179 | FALSE |
| 109 | Shuna SW (Rubhan T | FS1290 | Kames Fish Farming Ltd | TRUE | 2 | Terecos DSMS 4 | 9.3 | 135 – 178 | TRUE |
| 110 | Sian Bay | FS0361 | Scottish Sea Farms Orkney and E | TRUE | 10 | Airmar dbII | 10.3 | 192 | TRUE |
| 111 | Slocka Ronas Voe | FS1018 | Scottish Sea Farms Ltd | TRUE | 14 | Mohn aqua MAG | 10 | 198 | TRUE |
| 112 | Snarraness | FS0400 | Scottish Sea Farms Ltd | TRUE | 8 | Ace Aquatec US3 | 12 | 195 to 197 | TRUE |
| 113 | Sound of Harris | FS1260 | Loch Duart Ltd | TRUE | 14 | AIRMAR / MAG - MC | 10 | 198 | TRUE |
| 114 | South Sound | FS0183 | Scottish Sea Farms Ltd | TRUE | 14 | Mohn Aqua Mag | 10 | 198 | TRUE |
| 115 | Strome | FS0570 | The Scottish Salmon Company | TRUE | 4 | ACE AQUATEC US3 | 12 | 195 to 197 | FALSE |
| 116 | Strone | FS1056 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec US3 | 16 | 194 to 197 | FALSE |
| 117 | STULAIGH | FS1259 | Marine Harvest (Scotland) Ltd | TRUE | 16 | Airmar | 10 | 135-178 | TRUE |
| 118 | Tabhaigh | FS1297 | Marine Harvest (Scotland) Ltd | TRUE | 4 | Terecos DSMS-4 | 9.3 | 135-178 | TRUE |
| 119 | Tanera | FS0549 | Scottish Sea Farms Ltd | TRUE | 24 | Mohn Aqua MAG Se | 10 | 197 | TRUE |
| 120 | Taranaish | FS0752 | The Scottish Salmon Company | TRUE | 4 | Airmar dB Plus 11 | 12 | 195 to 198 | TRUE |
| 121 | Tarbert South | FS0767 | The Scottish Salmon Company | TRUE | 2 | ACE Aquatec | 12 | 195 to 197 | FALSE |
| 122 | Teisti Geo | FS1093 | Scottish Sea Farms Ltd | TRUE | 14 | Mohn aqua MAG | 10 | 198 | TRUE |
| 123 | TORRIDON | FS0234 | Marine Harvest (Scotland) Ltd | TRUE | 10 | Terecos DSMS4 | 9.3 | 135-178 | TRUE |
| 124 | Trenay | FS0796 | The Scottish Salmon Company | TRUE | 2 | Airmar db 11 plus | 6.5 | 198 | FALSE |
| 125 | Trilleachan Mor | FS1118 | The Scottish Salmon Company | TRUE | 3 | Airmar dB Plus 11 | 6.5 | 194 to 198 | FALSE |
| 126 | Tuath | FS0617 | The Scottish Salmon Company | TRUE | 12 | OTAQ SF3 | 10 | 196 | FALSE |
| 127 | Uiskevagh | FS1255 | The Scottish Salmon Company | TRUE | 4 | Airmar db11 plus | 6.5 | 198 | FALSE |
| 128 | Vacasay | FS1091 | The Scottish Salmon Company | TRUE | 4 | Airmar dB Plus 11 | 12 | 195 to 198 | FALSE |
| 129 | Vidlin North | FS0608 | Scottish Sea Farms Ltd | TRUE | 20 | Mohn Aqua MAG | 10 | 198 | TRUE |
| 130 | Vuia Beag | FS0411 | The Scottish Salmon Company | TRUE | 2 | Airmar dB Plus 11 | 6.5 | 195 to 198 | FALSE |
| 131 | Vuia Mor | FS1103 | The Scottish Salmon Company | TRUE | 4 | Airmar dB Plus 11 | 6.5 | 195 to 198 | FALSE |
| 132 | Walters (East Lismor | FS0875 | Scottish Sea Farms Ltd | TRUE | 11 | Mohn Aqua Airmar | 10 | 197 | TRUE |
| 133 | Wester Ross Fisherie | FS0057 | Northern Salmon Management C | TRUE | 12 | Airmaar Db Plus 11 | 1 | 198 | TRUE |
| 134 | Wester Ross Fisherie | FS0517 | Northern Salmon Management C | TRUE | 8 | Airmaar Db Plus 11 | 10 | 198 | TRUE |
| 135 | Wester Ross Fisherie | FS0675 | Northern Salmon Management C | TRUE | 8 | Airmaar Db Plus 11 | | | |
| 136 | Wester Ross Fisherie | FS0056 | Northern Salmon Management C | TRUE | 14 | Airmar Db Plus 11 | 10 | 198 | TRUE |

A [document circulated by the Sea Mammal Research Unit of St. Andrews University](#) to the Salmon Aquaculture & Seals Working Group in April 2016 included:

Had hoped to help and follow the commercialisation of a new acoustic deterrent system: this has become mired in problems concerning finance, engineering and patents, but is ongoing.

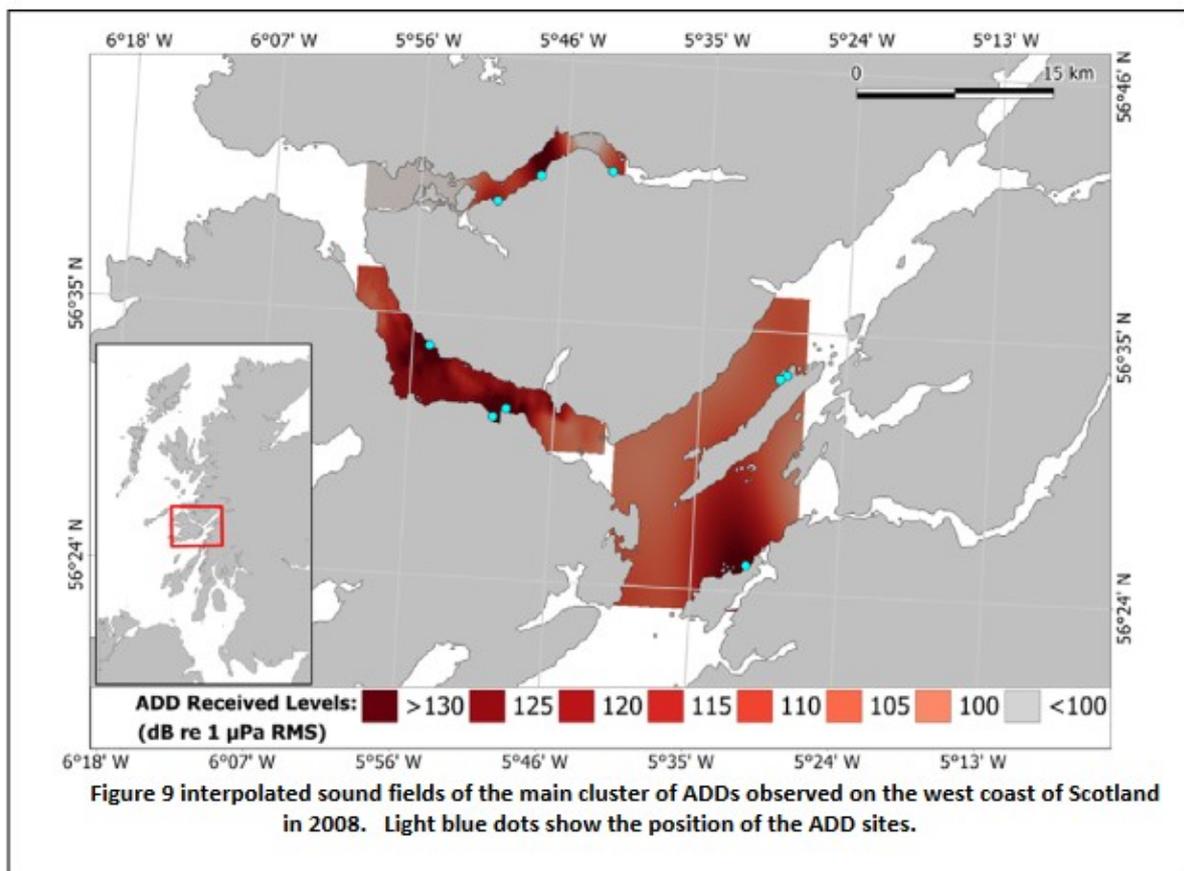
We have engaged with WWF and SNH about possible curtailment of ADD use, which might result in increased levels of depredation, damage and shooting.

Further Scientific Research Detailing Impacts of ADDs Used on Salmon Farms on Cetaceans:

Scientific research [published by the Scottish Aquaculture Research Forum in 2010](#) showed that ADDs could be detected by porpoises 14.7 km from the sound source (i.e. salmon farm).

2.3.2.1 Sound Fields

Figure 9 shows a map of ADD received levels in the Sound of Mull in 2008. It is clear that received levels were elevated well above background at ranges of many km from fish farm sites. From this and from Figure 9 it is clear that ADDs can be detected at ranges of up to 14.7 km and that with several fish farms using ADDs there, ADDs can be detected through most of the Sound of Mull. Previous studies of the effects of ADDs on porpoise distributions have not measured received levels directly however research in the Bay of Fundy (Johnston, 2002) estimated that porpoises would be excluded from an ADD at received levels of 125dB.



A Scottish Government report - "[Evaluating and Assessing the Relative Effectiveness of Acoustic Deterrent Devices and other Non-Lethal Measures on Marine Mammals](#)" - published in 2014 included:

At least five different types of ADD are used in Scotland, but many more devices are available and may be marketed for other purposes. We have tabulated all devices that we are aware of as of 2013 within this review.

About half of all fish farm sites appear to use ADDs, but there is no register of which sites are using what devices, and little information on their effectiveness. Source levels, signal characteristics, duty cycles and modes of operation are all likely to have significant bearings on how effective they are and also on the extent to which they have an impact on non-target species such as cetaceans. Harbour porpoises are known to avoid areas where Airmar and Lofitech ADDs are being used, but the maximum range that cetaceans are likely to be impacted by these or other ADDs is not currently known.

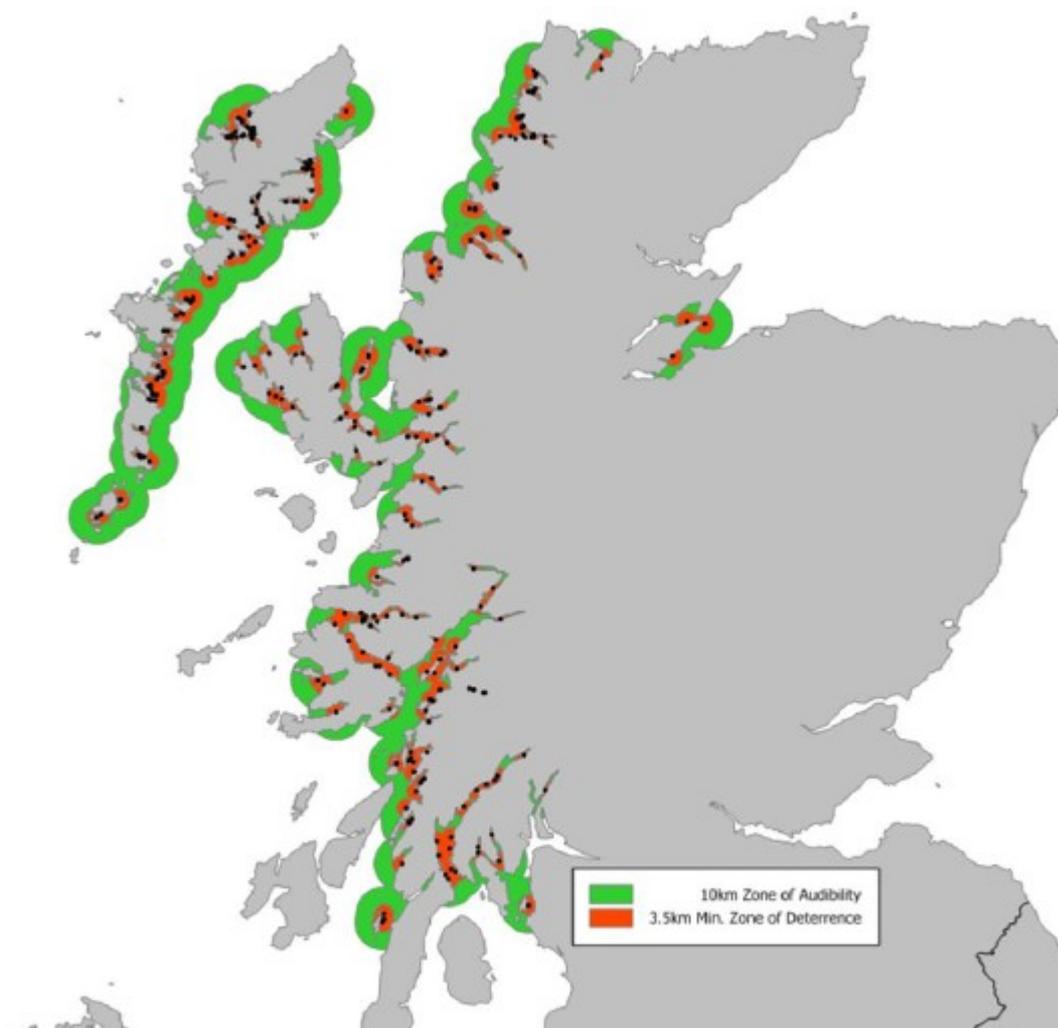


Figure 5 Map of Potential Extent of ADD Audibility to Harbour Porpoise (Mainland and Hebrides)

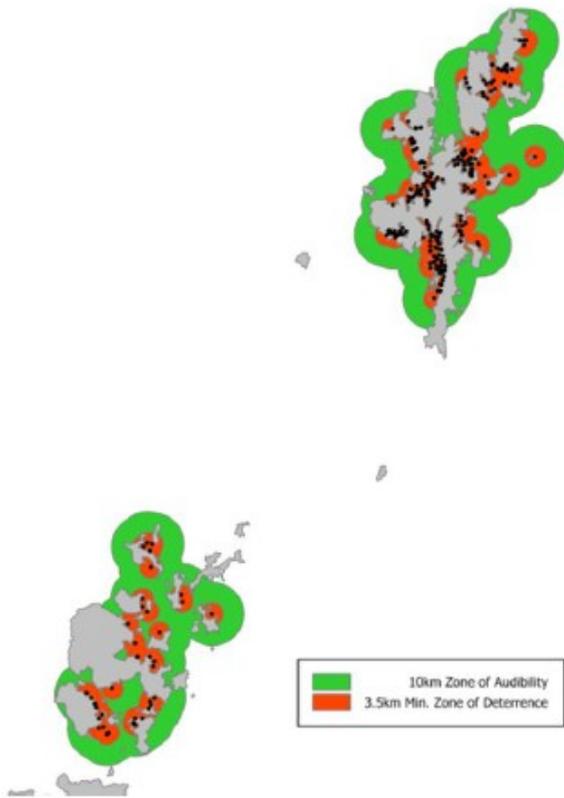


Figure 6 Map of Potential Extent of ADD Audibility to Harbour Porpoise (Northern

And:

Lepper *et al.* (In Review) provides an exhaustive analysis of the source levels of ADDs used at Scottish salmon farms and the propagation losses (especially within 500m) predicted by appropriate propagation models for a range of typical Scottish salmon farm sites. They compared the “sound fields” that would be expected from these with the thresholds for auditory damage sound exposure from Southall *et al.* (2007) and from the more recent findings of Lucke *et al.* (2009).

Moreover:

7.3.1 Harbour Porpoises

One of the earliest, and still one of the most comprehensive investigations on the effects of ADDs on harbour porpoises was carried out in 1994 by the Department of Fisheries and Oceans, Canada, in British Columbia. Results were presented in both a research report (Olesiuk et al., 1995) and a peer reviewed paper (Olesiuk *et al.*, 2002). The field site for this study was in the Broughton Archipelago, an area of sheltered and enclosed deep water, not unlike many fish farm sites on the west coast of Scotland. Olesiuk and colleagues used a floating platform to establish an observation position with a 6.4 m eye-height close to an existing salmon farm site. The study took place over an 18 week period (29th June to 31st October 1994) during which observers made systematic scans with the naked eye and binoculars and measured ranges to sighted porpoises using a combination of reticule binoculars and known land marks. An Airmar ADD array was established about 80m offshore from the observation station and could be turned on or off under the control of the research team. The study period was divided into three six week sampling periods. In each of these the first three week period was a control, with no ADD, while for the second three weeks the Airmar ADD was active. This design, with its repeated alternating trials, helped to control for seasonal changes in porpoise density and sighting conditions.

The results were clear and striking. As soon as the ADD was activated a substantial and significant decline in porpoise sighting rates was evident. The mean sightings per scan fell to between 1.7% and 3.7% of control values for scans with the naked eye and binoculars respectively. Porpoises were also visible for shorter periods with the number of sightings during the tracking of a porpoise pod falling from around 13 per track to around 1.5, suggesting that animals that were in the area were spending less time there. No porpoises were seen within 200 m of the device when it was active and the proportion seen at ranges of 200 to 399, 500 to 599 m, 600 to 2499 m and 2500, 3500 m were 0.2%, 1.4%, 2.5%, 3.3% and 8.1% respectively of those seen in the same zones during control periods. The local topography meant that 3500 m was the maximum range at which observations could be made and it is clear that this is unlikely to represent the full extent of these effects. There was no sign of habituation or a reduction in the size of effects over the three week duration of any of the trials. However, sighting rates recovered within a few days of the ADD being switched off.

And:

7.4 Summary

Most published reports have shown significant and long lasting behavioural responses from cetaceans to ADDs. Harbour porpoises seem to be particularly vulnerable, with good evidence that densities can be reduced substantially at ranges of many kilometres for at least two devices types in multiple locations. The majority of studies have investigated responses of animals to one particular type of ADD, the Airmar dB Plus II. Responses to other devices may be quite different. There are indications that harbour porpoises may respond even more strongly to the Lofitech seal scarer while the Terecos ADD may have much smaller impacts. From a Scottish perspective, there is an obvious requirement to measure responses to the range of devices available to Scottish salmon farms including the newly developed "cetacean friendly" ADD (Götz, 2008).

It is clear that some, if not all, of the ADDs currently being used on Scottish salmon farms have an effect on local densities of porpoises (and possibly some other species). This raises two questions: is this likely to be of any biological significance for local cetacean populations, and how should these devices be managed and permitted under existing regulations?

And:

For coastal locations, such as most current aquaculture sites, another situation in which displacement might be particularly harmful would be if animals were excluded from 'movement corridors' required to access large areas of suitable habitat, for example exclusion from the mouth of a sea loch might exclude access to the whole of the loch itself. Similarly, disruption in channels or at headlands might make it difficult for animals to move between habitats at either side of them.

The Habitats Directive prohibits reckless disturbance of individuals of Annex II species (which includes all cetaceans). However, derogation can be granted provided this disturbance at the individual level does not affect the status of the species concerned, does not affect local populations and it can be shown that there are no feasible alternatives to the activity of concern.

And:

8.2.1.5 Anti-Predator Nets

This project has highlighted that while anti-predator nets are rarely deployed in Scotland, they are routinely used in other salmon-producing countries. The reasons for this difference are not clear and should be investigated (R5).

Research approaches: Dialogue with salmon producers and researchers working with anti-predator nets (and related techniques) in other countries, for example, in Canada, Chile and Australia into the effectiveness of these nets. A critical comparison of anti-predator net structure used abroad with those (previously) used in Scotland, followed by controlled trials of any promising modifications or new devices at one or more appropriate sites in Scotland.

And:

From a legislative perspective, deliberate disturbance of European Protected Species, such as cetaceans, contravenes the Habitats Directive (Conservation (Natural Habitats, &c.) Regulations 1994 as amended in Scotland). The question of whether and in what circumstances the use of ADDs will need to be licenced is still being deliberated by regulators such as Marine Scotland and SNH. If the use of ADD's in particular circumstances requires a licence, it will be important to demonstrate the efficacy of ADDs. At present there is evidence that ADDs can work, at least for short periods of time, in deterring some seals from the proximity of river mouths and from salmon trap-net fisheries and that the use of ADDs at salmon trap net fisheries can reduce the amount of damage to fish that are caught, but these results cannot necessarily be extrapolated to infer anything about long-term use of such devices at salmon farm sites. There is anecdotal evidence to suggest that ADDs can reduce seal depredation at aquaculture sites but there has as yet been no independent and objective assessment of how effective ADDs are in managing seal depredation at Scottish aquaculture sites. Such information would greatly facilitate an objective assessment of the costs and benefits of ADD use.

A report - "[Establishing the sensitivity of cetaceans and seals to acoustic deterrent devices in Scotland](#)" - published by SNH in 2014 included:

Main findings

- A survey of the status of aquaculture sites in Scotland has been conducted indicating that the majority of ADD systems in use are from three manufacturers (Terecos, Ace Aquatec and Airmar).
- 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 site is causing permanent hearing damage to marine mammals cannot be discounted.

The report stated:

Most studies on the effects of ADDs have collected data from harbour porpoises, and the largest concerted effort was a series of experimental exposures reported by (Olesiuk *et al.*, 2002). This research team established an observation station overlooking an area of

protected waters close to a fish farm site in a region of high porpoise density on Canada's west coast. A team of visual observers recorded porpoise sightings in the observation area over an 18 week period during which an Airmar ADD was alternately active or inactive for blocks of three weeks at a time. Comparison between active and inactive periods revealed striking differences. During active periods, porpoises were completely excluded within 400m of the ADD and densities between 2,500 and 3,500 m were less than 1/10th of those observed in the same areas during non-active periods. The maximum range observed was 3.5 km and there is no reason to expect that responses did not occur at greater distances than this. In a complimentary study, Johnston (2002) tracked individual porpoises from a cliff top in the Bay of Fundy using a theodolite. Johnston showed that animals swam away from ADDs when they were activated and no individuals were ever seen closer than 645 m (at which SPL received levels were estimated to be 128 dB re 1µPa) when the ADD was active. Research in Scotland using passive acoustic porpoise logging devices (PODs) to measure porpoise presence and relative abundance around operating fish farms has generally supported this (Northridge *et al.*, 2010). For example, at a monitoring site 4km from a fish farm, porpoise detection rates were nine times higher when ADDs were inactive at the farm site than when they were active. Northridge *et al.* (2010) observations are particularly pertinent here in that they are from the west coast of Scotland, the core area for fish farming in Scotland. This is also an area where ADDs are almost continuously active at many sites. Booth (2010), for example, mapped extensive ADD noise fields around several sites in the region. Thus, these results show a lack of habituation and an indication that habitat exclusion from ADDs is a long term phenomenon.

The report concluded:

Porpoises are more vulnerable to auditory damage than seals and other small cetaceans. They seem to show strong avoidance (of Airmar devices at least). If this holds generally then concerns for porpoises may focus on longer term exposures at greater ranges (which are not covered by the propagation models predicted here) and of course the long range disturbance and habitat exclusion that has already been shown for this species.

There is insufficient data to inform the extent to which behavioural change is affected by received noise level, or for the use of sound fields from this report to provide reliable predictions of ranges for behavioural effects at specific Scottish fish farm sites. However, sufficient data does exist for responses to one ADD type, for regulators to be able to move forward in assessing whether this level of habitat exclusion and disturbance of a European Protected Species is of concern. Further field studies should be undertaken to measure the extent of responses to other ADD types used in Scotland.

A report - "[The necessity of Management Options for effective harbour porpoise conservation in the UK: Case studies of emerging Areas of Concern](#)" - published by Whale & Dolphin Conservation in 2015 stated:

4.2.3.1 Current management: Acoustic Deterrent Devices (ADDs)

ADDs are frequently used in fish farms to prevent seals from damaging pens leading to fish escaping or being damaged or removed, rather than more benign and robust solutions such as tension nets.

Direct impacts to harbour porpoise relating to aquaculture include the use of commercially available ADDs that can cause injury, stress, hearing damage and behavioural disturbance (displacement) (Lepper *et al.*, 2014), i.e. to deter non-target species such as porpoises from their natural habitat; and entanglement in anti-predator nets. 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 (Lepper *et al.*, 2014).

Northridge *et al.* (2010) noted that acoustic signals from ADDs can be detected at more than 14km from the sound source. However, acoustic propagation losses are site specific and quite variable, and it appears that porpoises can become desensitized or accustomed to ADDs over time (e.g. porpoises appeared to avoid one area where ADDs had recently been installed, but to be less averse to other areas where ADDs had been used for several years). This may be influenced by environmental factors such as the situation of a fish farm in a preferred habitat, i.e. habitat modelling links porpoise distribution most closely to water depth and seabed slope. In addition, the authors noted that it is possible that fish farm sites are in fact attractive to wild porpoises in that they are thought to aggregate wild fish species. The extent to which this degree of exclusion may have significant effects on the foraging success or the conservation status of porpoises remains a question to be answered. Consequently, these risks are increased where fish farms are located in harbour porpoise AoC.

Current commercially available ADDs emit sound at high duty cycles and high source levels, and long-term and large-scale habitat exclusion has been found for odontocetes around operating ADDs at relatively low received levels (e.g. Morton and Symonds 2002; Olesiuk *et al.*, 2002)). More recently, research studies (Janik and Gotz, 2013) have utilised a startle ADD prototype²² showing that this was successful at preventing seal predation without affecting the distribution of harbour porpoises in the area. The advantage of these devices is they can be tuned to affect only certain species in the

²² Sounds produced by current ADDs are not based on biological concepts of aversiveness, but aim to transmit loud sound to the target animal, whereas the startle ADD prototype uses an autonomous, acoustic startle reflex (ASR) to induce controlled and sustained flight responses.

environment, and they have significantly less impact on wildlife than other tested devices. The fact that brief, isolated pulses were emitted at only moderate levels means that noise pollution was greatly reduced, and the potential for masking of communication signals or hearing damage is low. Janik and Gotz (2013) recommended the use of this novel technology at fish farms.

Under the Nature Conservation (Scotland) Act of 2004, and under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland), ADDs may be deemed to represent a deliberate or reckless disturbance of cetaceans and could constitute an offence.

To reduce the risk of predator attacks to fish stocks, e.g. seal attacks, recommendations are to use modern tensioned nets for pen construction, where appropriate and effective, plus additional netting or screening systems where they are effective.

In some parts of Scotland, current types of ADD are 'not permitted' as a condition on planning consent because of their potential disturbance to cetaceans. In these areas, farmers are recommended to keep a watching brief on ADD development, and to seek to have the planning condition lifted if an appropriate ADD comes onto the market (Code of Good Practice Management Group, 2010).

The use of ADD in fish farm installations is discretionary, and there is currently no intention by the Scottish government to license them (Letter from Minister, 2013). As outlined above, current AAD represent a potential risk to harbour porpoise conservation, primarily in terms of a potential barrier to movement/exclusion from preferred habitat but they can also cause injury.

A HWDT report - "[Cetacean Conservation in Scotland](#)" - published in 2000 included:

4.6.5. Acoustic deterrents

The fish farm industry suffers to a large extent from predation by seals. In response to this, 'seal scarers' have been developed to deter

seals from fish farming areas. The devices are designed to frighten and induce pain to seals in order to permanently displace them from fish farming areas and have become known as Acoustic Harassment Devices (AHDs). There is growing concern over the effect of AHDs on non-target species such as cetaceans. The hearing of many odontocetes species is believed to be more sensitive than pinnipeds (Richardson *et al.*, 1995). The level of noise pollution associated with AHDs may negatively impact cetaceans especially coastal species of harbour porpoise and bottlenose dolphin which utilise coastal areas where fish farms are located (Johnston & Woodley, 1998). It is suggested that harbour porpoises are excluded within 400m of an AHD, and abundance is significantly reduced within 3.5 km of the device (Olesiuk *et al.*, 1996). A study of AHD's in Canada observed a decline in a range of cetacean species, including killer whales, minke whales and harbour porpoise using areas where AHD's are deployed (Morton, undated).

There are 211 (SEPA, pers. comm) fish farm licenses in the Hebrides and an unknown number of these farms utilise AHDs. Evidence from local fish farm managers suggests that AHDs are used routinely even if the area does not have seal predation problems or if AHDs are ineffective. The reason for this unwarranted use is for insurance purposes, so that fish farms are seen to be taking action to protect stocks in the event of predation occurring. If this is the prevailing view, it is feasible that many of the West Scotland fish farms will use AHDs. Extrapolating from data presented by Olesiuk (1996), that AHDs would exclude cetaceans from an area of 50,2654 m² around each fish farm and would have acoustic impacts over an area of 38.4 km² around each site, if all the fish farms in West Scotland used AHDs the area affected by AHDs would total 8,102 km². This would represent a major loss of cetacean habitat.

Read more via:

Shrimpton, J. 2001. The Impacts of Fish Farming on the Harbour Porpoise. Hebridean Whale and Dolphin Trust, Tobermory, Mull. 1-23.

A scientific paper - "[The effect of acoustic harassment devices on harbour porpoises \(*Phocoena phocoena*\) in the Bay of Fundy, Canada](#)" - published in 2002 concluded:

Harbour porpoises may not be the only non-target marine mammal species affected by the use of AHDs on salmon farms. For example, a recent decline in Pacific white-sided dolphin occurrence on the West coast of Canada was recently correlated with the introduction of AHDs on salmon farms in the area (Morton, 2000). Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) are relatively sensitive to the frequencies produced by the AHDs used in that region (Tremmel et al., 1998) and the observed decline in dolphin occurrence could indicate avoidance of habitat influenced by AHD sound (Morton, 2000). As well, Morton and Symonds (2002) correlated a significant decrease in the occurrence of killer whales (*Orcinus orca*) in the same area while AHDs were active.

The results of the present study support Johnston and Woodley's (1998) hypothesis that AHDs used on salmon farms in the lower Bay of Fundy may exclude porpoises from important habitat. For example, Johnston and Woodley (1998) found that many aquaculture sites in the Bay of Fundy are located in or near habitat that historically has been important for foraging porpoises (Watts and Gaskin, 1984; Gaskin et al., 1985) including lactating females nursing calves (Smith and Gaskin, 1983). Also, some salmon farms with active AHDs are located near narrow passages which connect larger portions of porpoise habitat that historically

supported large numbers of porpoises (Gaskin, 1983; Gaskin et al., 1985). The continued use of AHDs in such areas will likely exclude harbour porpoises from important portions of their habitat and may restrict their movement between adjacent areas.

A scientific paper - "[Effect of the sound generated by an acoustic harassment device on the relative abundance and distribution of harbour porpoises in Retreat Passage, British Columbia](#)" - published in 2002 concluded:

Our study has indicated that the sounds generated by the powerful AHDs now commercially available and in widespread use can have far-ranging effects on the behavior of non-target species such as the harbor porpoise. Since we were unable to recognize individual animals and little is known concerning porpoise movements or turnover rates in the study area, it is impossible to assess what effect AHDs might have on distribution and ultimately population productivity. However, avoidance within a radius of several kilometres of salmon farms operating AHDs could represent appreciable habitat loss for these animals, and might also impede normal movements through the many narrow channels and passages that characterize this region. Similar concerns have been raised over the utilization of AHDs on the east coast and Europe (Strong *et al.* 1995, Taylor *et al.* 1997, Johnston and Woodley 1998). Johnston (2002) also reported a strong avoidance response by harbor porpoises in the Bay of Fundy to an AHD when it was activated. Moreover, there is nothing unique about the hearing capabilities of harbor porpoise to suggest that the effects would be limited to this species. For example, the hearing of killer whales (*Orcinus orca*), another cetacean that commonly occurs in the Broughton Archipelago (Morton 1990), at 10 kHz is about 5 dB more sensitive than that of harbor porpoise (Anderson 1970, Hall and Johnson 1972), and there is some evidence this species was also displaced from the Broughton Archipelago when the AHDs were deployed (Morton and Symonds 2001). A decline in sightings of white-sided dolphin (*Lagenorhynchus obliquidens*) in the Broughton Archipelago may also have been associated with the deployment of AHDs (Morton 2002). The development and uncontrolled proliferation of these powerful AHDs may represent a potentially important source of noise pollution, and further research is required on their short- and long-term impacts on marine fauna.

Significance of Scotland to Cetaceans in Europe:

According to the [Hebridean Whale & Dolphin Trust](#), the waters of the Hebrides are one of the most important marine habitats in Europe, home to nearly 70% of its whale, dolphin and porpoise species, in addition to basking sharks and seals. Watch a recent BBC News report [online here](#):



HWDTs Science Officer, Dr Lauren Hartny-Mills, on the BBC Breakfast Sofa

A SNH report - "[The use of harbour porpoise sightings and acoustic data to inform the development of the Inner Hebrides and the Minches draft Special Area of Conservation on the west coast of Scotland](#)" - shows how the West coast of Scotland is vitally important for harbour porpoises in particular:

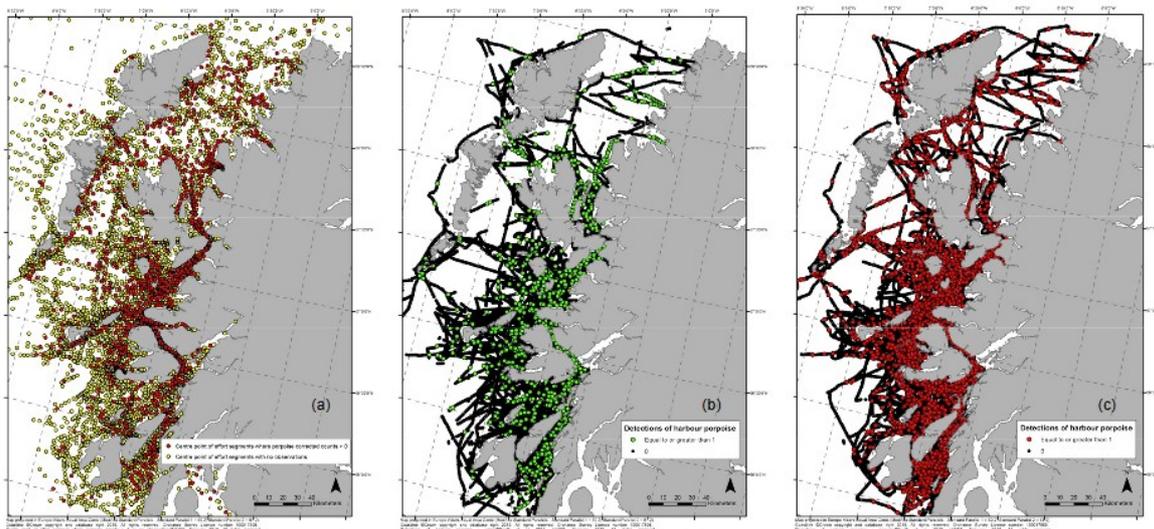


Figure 1a-c. Maps showing (a) Heinänen and Skov (2015a) 'sightings' data (effort segments with harbour porpoise corrected counts >0); (b) Booth *et al.* (2013) sightings of harbour porpoise during visual surveys (black dots indicate where no animals were sighted, and green dots indicate where one or more animals were sighted); (c) Booth (2010) detections of harbour porpoise during acoustic surveys (black dots indicate where no animals were detected, and red dots indicate where one or more animals were detected).

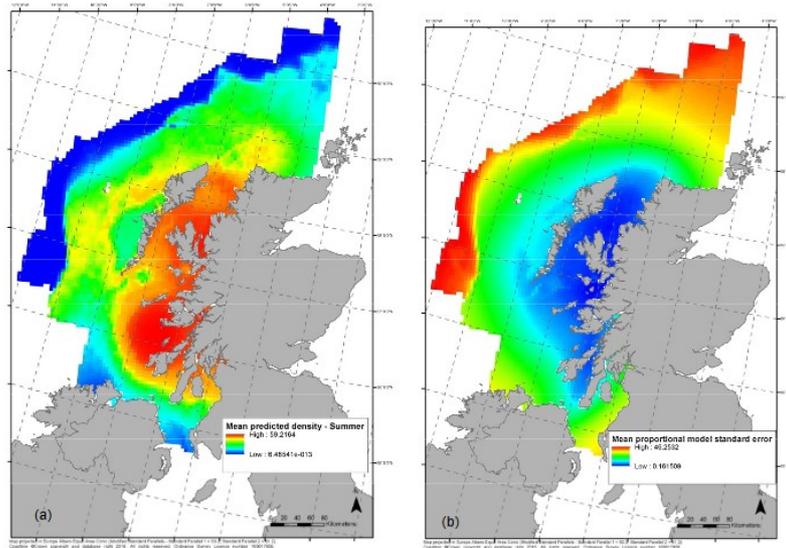


Figure 4: (a) Mean predicted density for all years (1994-2011) during summer in West Scotland MU (increasing density from blue to red); (b) Model confidence - mean proportional model standard error³ with decreasing confidence from blue to red (from Heinänen and Skov (2015b)).

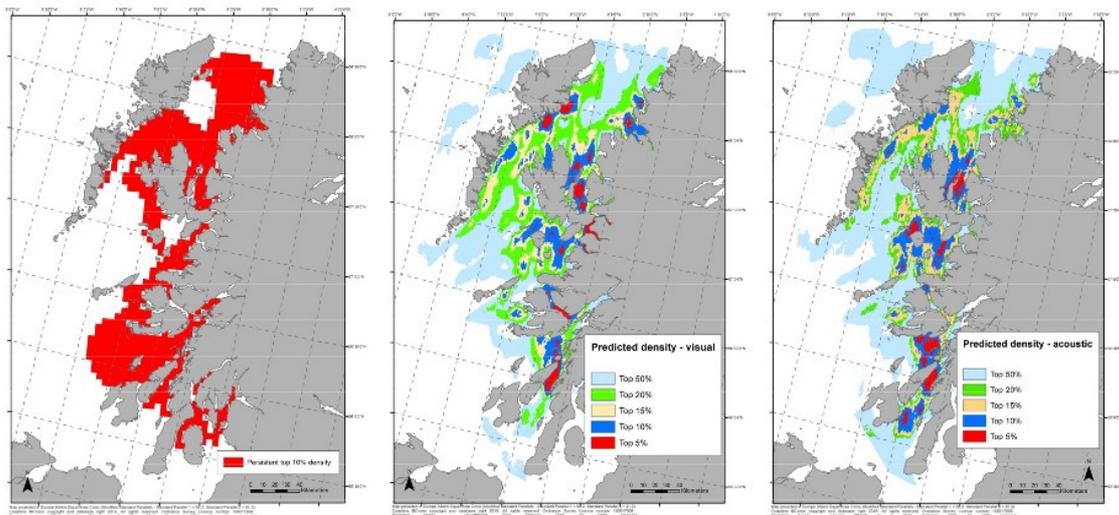


Figure 6. Outputs from West Scotland shelf (left, Heinänen & Skov, 2015) and west coast of Scotland analyses (Booth *et al.* 2013) showing areas of predicted high density of harbour porpoise

Hence in 2016 a Special Area of Conservation for harbour porpoise (Inner Hebrides & the Minches) was [submitted via SNH](#) to the EC:

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Harbour porpoise candidate SAC

Following on from the public consultation led by Scottish Natural Heritage, the Scottish Government have now confirmed that the Inner Hebrides and Minches candidate Special Area of Conservation (cSAC) for harbour porpoise has been submitted to the European Commission.

The cSAC is the largest protected area in Europe for harbour porpoise and covers over 13,800 km² and supports over 5000 individuals.

The protected area will help maintain the favourable conservation status of harbour porpoise by providing protection to them and the habitats that support them in Scottish waters.

Links to the consultation reports and responses are available:

[Consultation report](#) 

[Consultation process report](#) 

[Consultation responses](#) 

[Selection assessment document](#) 

Please contact porpoiseSAC@snh.gov.uk if you have any queries.

Related links

- [Gaelic webpage](#) 
- [Marine Scotland](#) 

Supporting Documents

- [Boundary map](#) 
- [Overview](#) 
- [Advice to Support Management \(update coming soon\)](#) 
- [Site summary](#) 
- [Business and Regulatory Impact Assessment](#) 
- [Proposed Conservation Plan](#) 
- [Questions & Answers](#) 



Humpback Whale Mortality in Sound of Mull Salmon Farm in 2014:

In 2014, it was [revealed](#) that "Scottish Rural College vets believe that a young humpback whale found drowned off the coast of Mull died after swimming into a fish farm".



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Humpback Whale Post Mortem Suggests Entanglement in Salmon Farm

Published Friday, 4th July 2014 in SAC Consulting news

SRUC vets believe that a young humpback whale found drowned off the coast of Mull died after swimming into a fish farm.

The post mortem results suggest the animal became trapped under a salmon pen and subsequently drowned.

Aided by staff from the Hebridean Whale and Dolphin Trust and Aberdeen University's Lighthouse Field Station, the post mortem was carried out by Dr Andrew Brownlow from Scotland's Rural College, which coordinates the **Scottish Marine Animal Stranding Scheme**. Every year over 400 marine mammals are stranded around the coast of Scotland and any cases suitable for post mortem are examined by the project.

There have only been six recorded humpback whale strandings in Scotland since 1992 (17 in the UK) and this is the first where a post mortem has been carried out. The whale was a juvenile male, almost 7m long (23ft) and weighing just under seven tonnes (6900kg). The stomach lining suggested little solid food had been ingested in the past so it is possible that the whale was still receiving milk from his mother.

The animal was found dead beneath the nets of a salmon pen. Due to the logistics involved in recovery it was around 36 hours after discovery before the animal could be post mortemed, however it was still in relatively fresh condition and therefore a reasonably confident diagnosis could be reached. The post mortem findings are consistent with a peri-weaning, maternally-attached animal which underwent an acute death. The observed pathology and stranding history would be consistent with the whale becoming trapped beneath a salmon pen and subsequently drowning.

The report also notes that young humpback whales are very inquisitive creatures which could explain why the animal was attracted to the salmon farm located at Fishnish on Mull.

"The observed pathology and stranding history would be consistent with the whale becoming trapped beneath a salmon pen and subsequently drowning," [reported](#) the Press & Journal (5 July 2014). "The report also notes that young humpback whales are very inquisitive creatures which could explain why the animal was attracted to the salmon farm located at Fishnish on Mull".

NEWS

5 July 2014

Humpback Whale died after swimming into fish farm



The humpback whale died after swimming into a fish farm

By [Rita Campbell](#)

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A young humpback whale found drowned off the coast of Mull died after swimming into a fish farm, vets believe.

Scotland's first post-mortem of a humpback whale was carried out by Dr Andrew Brownlow from Scotland's Rural College (SRUC). The results suggest the animal became trapped under a salmon pen and subsequently drowned.

BBC News [reported](#) (4 July 2014):

4 July 2014 Last updated at 15:38



Humpback whale drowned off Mull 'after getting trapped'



The young whale was examined in Scotland's first post-mortem on a humpback

A young humpback whale found dead in the sea off Mull may have drowned after it got trapped under a fish farm pen, the results of a post-mortem suggest.

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Whale trapped in salmon nets dies

kathleen nutt

Saturday 5 July 2014

A YOUNG humpback whale found drowned off the coast died after swimming into a fish farm and becoming trapped, a post mortem examination has suggested.

The 22ft long, eight-tonne male calf, which was probably under a year old and still suckling, was examined by vets from the Hebridean Whale and Dolphin Trust (HWDT) and Scotland's Rural College.

It was the first time a post-mortem examination had been carried out on a humpback in Scotland. HWDT said the results pointed to the animal being entangled underneath the salmon pen nets at Fishnish off Mull and drowned.

The post mortem was carried out on 26 June 2014 - here's a photo courtesy of the [Hebridean Whale & Dolphin Trust](#):



Read more via "[Salmon Farming Kills Whales!](#)"

Alternatives to ADDs:

There exist a raft of alternatives to ADDs - including anti-predator nets such as [Eco-Nets](#); relocation to land via closed containment on land; translocation of seals; and startle devices. The latter is detailed in a scientific paper - "[Target-specific acoustic predator deterrence in the marine environment](#)" - published in 2014:

Target-specific acoustic predator deterrence in the marine environment

T. Götz & V. M. Janik

Sea Mammal Research Unit, School of Biology, University of St Andrews, St Andrews, UK

Keywords

acoustic deterrent device (ADD); pinnipeds predation; seal scarer; startle response; harbour porpoise; aquaculture; fish farm; habitat exclusion.

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Editor: Trevor Branch
Associate Editor: Rob Williams

Received 13 February 2014; accepted 22 May 2014

doi:10.1111/acv.12141

Abstract

Acoustic deterrent devices (ADDs) have often been considered a benign solution to managing pinniped predation. However, ADDs have also been highlighted as a conservation concern since they can inflict large-scale habitat exclusion in toothed whales (odontocetes). We tested a new method that selectively inflicted startle responses in harbour seals (*Phoca vitulina*) at close ranges to the loud-speaker but not in a non-target species, the harbour porpoise (*Phocoena phocoena*), by using a frequency range where porpoise hearing was less sensitive than that of phocid seals. The sound exposure consisted of isolated 200 ms long, 2–3 octave-band noise pulses with a peak frequency of 1 kHz, which were presented at a source level of ~180 dB re 1 μ Pa. Field tests were carried out within a 2-month period on a fish farm on the west coast of Scotland where marine mammal behaviour was observed within three distance categories. Seal numbers dropped sharply during sound exposure compared with control observation periods within 250 m of the sound source but were unaffected at distances further away from the farm. A Poisson regression model revealed that the number of seal tracks within 250 m of the device decreased by ~91% during sound exposure and was primarily influenced by sound exposure with no evidence for a change in the effect of treatment such as habituation, throughout the experiment. In contrast to seals, there was no shift in the number of porpoise groups in each distance category as a result of sound exposure and porpoises were regularly seen close to the device. We also sighted six common minke whales during sound exposure while only one was seen during control periods. Our data demonstrate that the startle method can be used to selectively deter seals without affecting porpoises.

The study concluded:

Conclusions

Our study demonstrated that startling noise pulses presented at low duty cycles are effective in reducing the number of seals in an area up to 250 m around a transducer. The advantages of using the startle reflex in acoustic deterrence are that short isolated pulses can be used, avoidance responses are limited to a defined area and noise pollution can be minimized by using a low duty cycle (0.8%). Additional applications include temporary exclusion of animals from marine installations (e.g. tidal turbines) or industrial activities which may cause hearing damage (pile driving). In these applications, the startle pulse could be centred within a different frequency band depending on the auditory sensitivity of the species that have to be deterred.

We showed that inter-species differences in frequency-dependent hearing sensitivity hold some potential for developing deterrent devices, which target one taxon while not affecting others. Adverse impacts of current acoustic deterrent devices on harbour porpoise, such as prolonged habitat exclusion shown in previous studies can be mitigated. Future studies will have to test whether startle stimuli are capable of reducing predation losses. Our data showed that the described method has the potential to address conservation concerns related to acoustic deterrent devices and therefore extend the range of management tools available to the industry.

Another scientific paper - "[Non-lethal management of carnivore predation: long-term tests with a startle reflex-based deterrence system on a fish farm](#)" - published in 2016 reported:

FEATURE PAPER

Non-lethal management of carnivore predation: long-term tests with a startle reflex-based deterrence system on a fish farm

T. Götz & V. M. Janik

Sea Mammal Research Unit, Scottish Oceans Institute, University of St Andrews, St Andrews, Scotland, UK

Keywords

predation management; carnivore; acoustic deterrent device; startle response; aquaculture; *phocid* seal; porpoise; pinniped.

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Editor: Iain Gordon

Associate Editor: Mads Heide-Jørgensen

Received 15 June 2015; accepted 30 October 2015

doi:10.1111/acv.12248

Abstract

Carnivore depredation on human livestock is a worldwide problem with few viable solutions. Non-lethal management tools such as acoustic devices show highly varying success and often pose a conservation risk due to noise pollution and habitat degradation. We tested the long-term effectiveness of a deterrence system which harnesses an autonomous reflex (startle) to selectively inflict avoidance responses in a target species (*phocid* seals) by emitting band-limited noise pulses with sharp onset times. Seal predation was monitored at a marine salmon farm (test site) over a full production cycle (19 month) with a multi-transducer deterrent system deployed for the final year. Predation was also monitored for several months at two control sites and additional short-term tests were carried out at sites which suffered higher predation rates. Generalized linear (mixed) models revealed that sound exposure caused a 91% reduction in lost fish when comparing predation levels within the test site and 97% when comparing the test site against both control sites. Similarly, sound exposure led to a 93% reduction in the number of fish lost due to seal damage at a short-term test site. Visual monitoring of marine mammals around the long-term test site showed that the number of seal surfacings within 100 m from the loudspeakers was only slightly lower during sound exposure. Harbour porpoise and otter distribution around the farm was not affected by sound exposure. By adjusting the frequency composition of startle stimuli, our method has the potential to provide solutions for managing human-wildlife conflicts in terrestrial and marine habitats by selectively deterring target species.

In summary, please consider this a formal complaint by the [Global Alliance Against Industrial Aquaculture](#) (GAAIA) against the UK Government and the Scottish Government for the "deliberate & reckless disturbance" of cetaceans ([European Protected Species](#)) via the use of Acoustic Deterrent Devices (ADDs) on salmon farms in Scotland - including the breach of [The Conservation \(Natural Habitats, &c.\) Regulations 1994 \(as amended in Scotland\)](#) and breach of [the Inner Hebrides and the Minches candidate Special Area of Conservation \(cSAC\) for harbour porpoise submitted to the European Commission in 2016](#).

GAAIA will be filing further FOI requests on this vital issue and encourages the European Commission to access further details from the Scottish Government and SNH in particular.

You can read more via [Press Release: "Cetaceans Sound Alarm On Salmon Farms - new research sparks EC complaint & call to ban Acoustic Deterrent Devices"](#) (7 May 2017)

And in today's [Sunday Herald: "Health of whales, dolphins and porpoises put at risk by underwater alarms"](#)

If you require any further information please do not hesitate to contact me.

Yours sincerely,

Don Staniford

Director, [Global Alliance Against Industrial Aquaculture](#)