Rhoda Davidson

From: Caroline Carter
Sent: 18 January 2017 16:24
To: [redacted]@jncc.gov.uk
Cc: [redacted]@jncc.gov.uk
Subject: RE: ADD use in Scotland (MSFD UK Marine Noise Registry)

Hi [redacted]

[redacted]

I've spoken to a few key folk about your request to join in on any future meetings, and our feeling is that our meetings have not been a formal forum and are (still) at quite an early stage of discussion so they probably won't help you in trying to collect ADD usage data. We actually do not have another meeting timetabled at the moment.

I'm not surprised you have had trouble collecting this information - because it doesn't really exist. Fish farms include ADDs in their planning application as potential mitigation, and there are instances where this doesn't necessarily mean that they will be used; often the industry just want to keep their options open. Having said that, we think that most are using ADDs continuously as a 'just in case', and we are in discussion with Industry to try and improve our understanding of how fish farms use ADDs.

How ADDs are used at each fish farm is decided by the manager on site, and often the details of this use is not known beyond the site itself. We have had discussions with Industry environmental managers and they do not have a handle on exactly how the devices are used on their farms. Managers can supply the make and number of ADDs that they have, they can log whether they are used continuously – or triggered – but it's not necessarily clear what this means. For example continuous can mean 24/7 – or when the cages are stocked – or switched on when the workers are on site, and then switched off when they leave! Or switched on when the manager 'feels' that there may be a problem.

When fish farms apply for a licence to shoot seals, they have to disclose any ADD use. However, the application is via an on-line form and there's not a lot of detail requested on ADDs. Essentially it's only to establish that all mitigation methods have been tried and the fish farm still has a problem which requires permission to shoot the seal. Marine Scotland are responsible for managing seal licensing, and the person to contact at Marine Scotland is [redacted]@gov.scot). You could talk to MS and see if this data would be of any use. It won't be the whole story as there will be farms that do not apply for a shooting licence, but it may give you an indication.

One thing occurs to me in relation to the inclusion of Aquaculture ADDs on the noise register, is that although they are pulsed noise sources – can they be characterised as impulsive? I have seen them referred to as continuous noise sources, especially where there are more than one ADD installed on the cages and therefore there are essentially no quiet gaps in the sound. I guess this will depend on how you are defining impulsive??

I'm not entirely sure on what the output of the MNR will look like, or how we will be able to use it, but if you are detailing the location of these noise sources used within a calendar year, you could use the locations of the fish farms and assume that ADDs of some description was used during that year – it's a bit blunt I know. But my understanding is that it's just registering the block location of an impulsive sound? So there's no reference to how loud it is, nor how far the sound is likely to propagate?? (it would be good for us to understand this a bit better).

We'll keep you in the loop for sure, but please email or give me a ring if you would like to discuss further.

All the best,
Caroline

From: [redacted]@jncc.gov.uk [redacted]@jncc.gov.uk]
Sent: 12 January 2017 13:30
To: Caroline Carter
Cc: [redacted]@jncc.gov.uk
Subject: ADD use in Scotland (MSFD UK Marine Noise Registry)

Hi Caroline,

I hope you are well. I'm not sure if you will recognise me via this email, but it'[redacted] I have taken over the role of MSFD Noise Registry Adviser at JNCC while [redacted] which I believe you may have been informed about by my line manager[redacted]

I am emailing as I was recently informed by [redacted] that SNH and Marine Scotland are in talks about licensing/regulating the use of ADD at fish farms in Scottish waters. As part of the UK Marine Noise Registry (MNR) we are attempting to collect the time and source location of all anthropogenic impulsive noises, between 10 Hz and 10 kHz, produced in UK seas for each calendar year, but as of yet we have been unable to collect data associated with ADD use at fish farms [redacted]).

I wondered therefore if it would be possible for me to be included in any future meetings between SNH and Marine Scotland regarding ADD use at fish farms, and to work with both organisations to try and find a feasible method of collecting future ADD noise data for the Marine Noise Registry?

Could you let me know if you think this would be possible, as we would really like to start the process of recording ADD data in the MNR to ensure our data is inclusive of all impulsive noise sources.

Best wishes,

[redacted]

[redacted]
JNCC, Inverdee House, Baxter Street, Aberdeen, AB11 9QA
Tel: 01224 266550, Direct Dial: [redacted] Mobile: [redacted]
Email: [redacted]@jncc.gov.uk
My working days are: Monday to Friday

JNCC
jncc.defra.gov.uk

25 years delivering innovative solutions to realise the value of nature.

Centre however we can accept no responsibility once it has left our systems. The recipient should check any attachment before opening it.

Rhoda Davidson

From: [redacted]@aceaquatec.com>
Sent: 08 May 2017 14:01
To: Liam Wright
Subject: Re: Low Frequency Transducer - Proposed Trial and Monitoring in Orkney

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Liam,

I hope you're well.

I wondered if it might be a good time for me to come and give another presentation on the developments at Ace Aquatec regarding cetacean friendly acoustic deterrents? We're now part why through a trial on our 1-2Khz deterrent which was developed to avoid the sensitive hearing range of cetaceans and this seems to be going well. We're also about to deploy our sonar detection triggers on the base of our standard US3 deterrents which will allow general noise levels to be reduced across all of our rental sites. These will be tested over the summer in tank tests at SMRU.

I look forward to speaking further.

Best regards,

[redacted]

[redacted]
Ace Aquatec
[redacted]
www.aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Date: Monday, 3 October 2016 at 11:15
To: [redacted]
Subject: Low Frequency Transducer - Proposed Trial and Monitoring in Orkney

Hi [redacted]

Thanks for taking the time to discuss the proposed trials in Orkney.

As discussed, I'd be really grateful if you could provide some more information on the proposal to undertake cetacean monitoring as part of this trial in Orkney.

Kind regards,
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 01546 603611
E: liam.wright@snh.gov.uk

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Rhoda Davidson

From: Caroline Carter
Sent: 17 May 2017 09:41
To: Lynne Clark
Cc: Cathy Tilbrook; Katie Gillham; Mairi Cole; Eileen Stuart
Subject: RE: Enquiry for Peter Chapman MSP

Lynne,

Please find below the text for our response.

Best wishes,
Caroline & Cathy

Dear [redacted]

Thanks for your enquiry about SNH's position on acoustic deterrents to inform a response to a constituent.

Acoustic deterrents have been used by fin-fish farms on the west coast for about 30 years and a recent study has highlighted the increased extent of detectable underwater ADD noise in this area. It is important to note that a noise signal that is detectable above background levels does not necessarily equate to an impact on marine wildlife. However, available evidence shows that certain types of acoustic deterrents can disturb cetaceans and so SNH is actively involved in work to minimise these risks.

We are already in discussion with the aquaculture industry to reduce the risk of unintended impacts on cetaceans through the smarter use of acoustic deterrents. We are also talking to Marine Scotland about the potential options for regulation of ADDs in aquaculture. Finally, we are supporting further research which will inform our future advice on this topic.

An outright ban on the use of acoustic deterrents would be likely to lead to increased demand for seal shooting licences. We recommend that the better management of ADDs is a more appropriate step at this time.

We hope this clarifies SNH's position but would be happy to provide further details if needed.

From: Lynne Clark
Sent: 17 May 2017 08:47
To: Caroline Carter
Subject: RE: Complaint re. ADD use in Scotland

No problem, thanks for letting me know Caroline.

Lynne Clark | Policy & Advice Directorate Support

Scottish Natural Heritage | Great Glen House | Leachkin Road | Inverness | IV3 8NW | **t:** 01463 725256

From: Caroline Carter
Sent: 16 May 2017 17:32
To: Lynne Clark
Subject: RE: Complaint re. ADD use in Scotland

Hi Lynne,
Just a quick email to say that we are not going to be able to get this to you tonight, just giving chance for folk to agree comments. We should have something with you early morning tomorrow.

All the best,
Caroline

From: Lynne Clark
Sent: 10 May 2017 11:45
To: Cathy Tilbrook
Cc: Caroline Carter; Katie Gillham; Mairi Cole
Subject: RE: Complaint re. ADD use in Scotland

Cathy,

In Andrew's absence, can you please ensure Eileen is kept sighted on this? Eileen received an email on behalf of Peter Chapman MSP yesterday asking for SNH's stance on this, which I forwarded on yesterday. Caroline has agreed to draft something and send it back to me, by Tues 16th May and Eileen has asked if you could please sign it off, before I send the response?

Let me know if you need any further info.

Kind regards,

Lynne Clark | Policy & Advice Directorate Support

Scottish Natural Heritage | Great Glen House | Leachkin Road | Inverness | IV3 8NW | **t:** 01463 725256

From: Cathy Tilbrook
Sent: 10 May 2017 10:21
To: Caroline Carter; Karen Hall; Fiona Manson; George Lees; Suzanne Henderson; Liam Wright; David Maclennan; John Uttley; Laura Steel; Jane Dodd
Cc: Katie Gillham; Andrew Bachell; Alison Bell; Ian Jardine; Dominic Shann; Rhoda Davidson; John Baxter; Erica Knott
Subject: Complaint re. ADD use in Scotland

Hi all

Many of you will be aware of a recent FoI request we have been responding to from [redacted] relating to the use of acoustic deterrents in aquaculture. This was followed by a Sunday Herald article last weekend on 'ADDs putting the health of cetaceans at risk'. The article focuses on recent research on the increasing extent of underwater noise from ADDs on the west coast of Scotland and states that GAAIA will file a formal complaint to the EC on failure to protect cetaceans from 'deliberate and reckless disturbance' from ADDs. The piece includes an SNH quote from Caroline (see below) and comments from Whale & Dolphin Conservation, SAMS and SSPO.

We have now received the formal complaint letter against the Scottish and UK Governments, submitted to the EC on 7 May (attached). On the basis of alleged breaches in EU law, [redacted] call for an immediate ban at all salmon farms in Scotland, although this is later qualified to suggest that all farms using ADDs should apply for a licence containing detailed evidence that there are no satisfactory alternatives to use of ADDs. The Marine Scotland seal licensing return spreadsheets are heavily used in the complaint letter to contend that ADDs are used on the vast majority of farms, in some cases continually. The complaint also quotes from a SMRU 2013 report to MS that refers to uncertainty about whether the use of ADDs should be construed as 'deliberate or reckless disturbance of cetaceans' and that this would not be clarified until the current interpretation is challenged in court.

In response to the complaint, we will now discuss next steps with Marine Scotland and seek to conclude our earlier discussions on the need for EPS licensing for ADD use in aquaculture. We are already in close liaison with SSPO and individual operators within the Inner Hebrides and Minches cSAC about developing best practice use of ADDs to minimise risk to cetaceans. Indications from SSPO are that the recent media coverage should not affect industry willingness to continue this work. We will develop some further lines to take on this issue, to help staff deal with any follow-up queries, but in the meantime, the quote below provides the headline messages that we want to get across.

Dr Caroline Carter (SNH marine mammal advisor) said: This is an interesting study which highlights an increase over time in the area where seal scarers can be detected above background noise levels. We would note that a noise signal that is detectable above background levels does not necessarily equate to an impact. However, available evidence shows that certain types of acoustic deterrents can disturb cetaceans and therefore we are actively working on this issue. We are already in discussion with the aquaculture industry to develop smarter use of acoustic deterrents to reduce the risk of unintended impacts on cetaceans. We are also supporting further research which will help inform our advice on this topic.

Please get in touch with me or Caroline if you need any further information.

Thanks, Cathy

From: Liz Colmer
Sent: 08 May 2017 09:30
To: Cathy Tilbrook
Cc: Katie Gillham; Alison Bell; Andrew Bachell
Subject: RE: 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

Dear Cathy, Katie

To confirm that I have acknowledged receipt of [redacted] email and letter, which are saved at the attached link.

Best regards

Liz

Liz Colmer | Co-ordinator to the CEO

Scottish Natural Heritage | Great Glen House | Leachkin Road | Inverness | IV3 8NW
t: 01463 725003 (direct line)
e: liz.colmer@snh.gov.uk

From: [redacted]
Sent: 07 May 2017 09:16
To: Ian Jardine
Cc: Cathy Tilbrook; Caroline Carter; Liam Wright; Suzanne Henderson; George Lees
Subject: 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 note that earlier today the Global Alliance Against Industrial Aquaculture (GAAIA) filed a formal complaint with the EC against the Scottish and UK Governments 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.

Read GAAIA's complaint to the European Commission online here

The attached letter provides further background to GAAIA call that ADDs are banned immediately from use at all salmon farms in Scotland.

Please acknowledge receipt.

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"

Yours sincerely,

[redacted]

[redacted]

Read my blog via [redacted]

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ADD and Aquaculture – internal SNH teleconference
Notes taken by Fiona Manson
23 May 2017

	Topic for discussion	Notes and Actions
1.	Update on work with industry regarding Good Practice use of ADDs	Predator management: Industry-led principles paper Not currently able to circulate paper. SSPO to incorporate SNH's ideas and produce new version.
2.	Update on FOI and increased focus on ADD use	Any follow-up queries should go through Rhoda and Cathy
3.	Update MS/SNH EPS discussion	MS currently reviewing the marine EPS guidance. MS has requested SNH to submit formal advice on ADD use. **ACTION**: George to contact MS re timescales for this advice **ACTION**: Delivery of formal advice to MS (George to co-ordinate)
4.	Is planning the most appropriate mechanism? or EPS?	Options: 1) General EPS licence for less sensitive sites, site-specific licence where more sensitive (with conditions) 2) Management through planning consents (EMP) Currently is dealt with via EMP route, as MS unwilling to use EPS. Need to build in flexibility e.g. annual reviews (as for Portree). Propose that we continue to use planning option as an interim measure, but flag up to MS when we advise that an EPS licence is needed. **ACTION**: George to check with Sally Blyth whether this raises issues of Natura compliance **ACTION**: Erica to talk to John Uttley re whether this would require a conditioned objection from SNH
5.	Consideration of the baseline (Existing ADD usage)	Harbour porpoise cSAC designated based on data collected while ADDs in use, but we don't know where or when they are used. Baseline information could be used to detect trends, and to help in

		developing best practice. Baseline will improve if registration process for devices is implemented
6.	Consideration of the development of a register for logging ADD deployments and any linkage to the Marine Noise Register (JNCC)	Some information available from seal licensing scheme, but this is not very reliable, as not always filled in well in questionnaire. Need to be clear what data we want, and why. Could set up a contract to analyse the data once we get it. JNCC Noise Registry – could this be used to register aquaculture ADDs? (Already records pre-piling ADD use.) **ACTION**: Jane to calculate how many fish farm sites don't have seal licences (and therefore don't fill in the questionnaire). **ACTION**: Jane to identify inaccuracies in questionnaire returns and suggest improvements **ACTION**: follow-up work – discuss with Ian Walker how questionnaire can be improved to be more useful (and accessible) for us (lead person TBC).
7.	Assessment of cumulative impacts	Wait to see what comes out of underwater noise workshop in Newcastle (regulators).
8.	Information Note Comments	**ACTION**: Karen to add link to COs **ACTION**: discussion needed on which CMEU advisers should be point of contact for ops staff (paragraph 16)
9.	Guidance Note Comments (including suggested conditions and compliance questions)	**ACTION**: Liam, Suz and Laura to review previous cases against the decision tree. Following review – further consideration of the COs within the tree. **ACTION**: Caroline to follow up other comments individually. To work with Alex on text for scoping. It will be helpful if those with substantive comments on the current text can offer additional or alternative text where appropriate or requested.
10.	AOB - Message to take forward to SARF board and AGM	

Rhoda Davidson

From: [redacted]@aceaquatec.com>
Sent: 11 July 2017 13:49
To: Liam Wright
Subject: Re: Low Frequency Transducer - Proposed Trial and Monitoring in Orkney

Hi Liam,

I hope you're well.

I wondered if there would be an opportunity to present to snh again about the latest deterrents now being used around Scotland mitigating risk to non target species?

Best regards,

[redacted]

[redacted]
[redacted]@aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Sent: Friday, May 19, 2017 11:22:52 AM
To: [redacted]
Subject: RE: Low Frequency Transducer - Proposed Trial and Monitoring in Orkney

Hi [redacted]

Thanks for getting in touch. I think it would be useful and interesting to hear how the trials are going. I'll discuss this further with colleagues to see what would be best and then I'll get back to you.

Thanks,
Liam

From [redacted]@aceaquatec.com]
Sent: 08 May 2017 14:01
To: Liam Wright
Subject: Re: Low Frequency Transducer - Proposed Trial and Monitoring in Orkney

Hi Liam,

I hope you're well.

I wondered if it might be a good time for me to come and give another presentation on the developments at Ace Aquatec regarding cetacean friendly acoustic deterrents? We're now part why through a trial on our 1-2Khz deterrent which was developed to avoid the sensitive hearing range of cetaceans and this seems to be going well. We're also about to deploy our sonar detection triggers on the base of our standard US3 deterrents which will allow general noise levels to be reduced across all of our rental sites. These will be tested over the summer in tank tests at SMRU.

I look forward to speaking further.

Best regards,

[redacted]

[redacted]
[redacted]
Ace Aquatec
[redacted]
www.aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Date: Monday, 3 October 2016 at 11:15
To: [redacted]@[redacted]
Subject: Low Frequency Transducer - Proposed Trial and Monitoring in Orkney

Hi [redacted]

Thanks for taking the time to discuss the proposed trials in Orkney.

As discussed, I'd be really grateful if you could provide some more information on the proposal to undertake cetacean monitoring as part of this trial in Orkney.

Kind regards,
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 01546 603611
E: liam.wright@snh.gov.uk

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Rhoda Davidson

From: Suzanne Henderson
Sent: 17 August 2017 16:34
To: Liam Wright
Subject: catch up and Ace aquatec

Hi Liam,

I have just had a chat/catch up with Cathy – and looks like the idea of having smaller groups working on various aspects of aquaculture will happen – and its more than likely I won't be part of the main ADD group.

[redacted]

So - sorry –but not all that keen to organise an Ace aquatic presentation here – especially based on last time, and any other time I have organised externals presenting in GGH!! Not saying it isn't a good idea....

Also probably worth finding out who might be interested in attending first -as BBY might be more appropriate? (Caroline, you , Jane(?) George? Cathy?, GGH would suit Alex, but would he want/be allowed to come? What other ops staff might come?)

Happy to chat though, as I may see it all differently tomorrow!

Suz

Direct Dial: 01463 725238
Email: Suzanne.henderson@snh.gov.uk

From: Liam Wright
Sent: 16 August 2017 15:53
To: Suzanne Henderson
Subject: Ace aquatec - update on low frequency tirals in Orkney

Hi Suz,

I had [redacted] get in touch over the summer holidays about providing us with an update on how the low frequency transducer trials have been going in Orkney. He's keen to come and give another presentation which I'm sure would be interesting and I'm keen to organise something. However, I thought I should run it past you first as it's more than likely he will want to come to GGH which, assuming I VC, would mean you would probably be lumbered with the meeting and greeting and IT stuff – should it be required. If I go ahead and organise a room, date and attendees but would you be ok with this?

Happy to discuss.

Thanks,
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 01546 603611
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 7:30 – 17:30

Rhoda Davidson

From: Caroline Carter
Sent: 26 October 2017 17:07
To: [redacted]@scottishsalmon.co.uk; [redacted]
Cc: Cathy Tilbrook
Subject: [redacted] PhD Studentships on ADDs and Aquaculture

Dear [redacted]

As promised I am writing to update you on the two ADD/harbour porpoise PhDs a[redacted] Both Students have just started (this month) and have had their initial supervisory meetings. At the moment they are very much finding their feet and are starting their literature review on the topic.

[redacted] project is looking at the far field signal of ADDs throughout the west coast. How exactly this will be done is still being developed but it will more than likely use HWDT acoustic data to develop underwater noise maps, [redacted]

The second student, [redacted] project will focus on near-field interactions between fish farms and harbour porpoise, i.e. fine-scale activity and behaviour of harbour porpoises around fish farms. Probably using acoustic click detectors to monitor activity; looking for patterns in activity and investigating the reasons for any pattern found.

Both of these projects should add useful information on the subject. I can keep you updated with how these projects are developing, but am also keen to facilitate a meeting at an early stage. I was wondering therefore whether we would be able to organise a meeting in January? The [redacted] folk are content to travel over to Perth from Oban and I can arrange a meeting room here if that suits. Please let me know if this is something you would be interested in, and if you have any suggested dates and we can take it from there.

Any questions – please shout.

All the best,
Caroline

Dr Caroline Carter
Marine Advisor, Coastal and Marine Ecosystems Unit
Scottish Natural Heritage,Battleby, Redgorton, Perth, PH1 3EW
01738 458562 | www.snh.gov.uk

Rhoda Davidson

From: [redacted]@gov.scot
Sent: 31 October 2017 10:30
To: Eileen Stuart; George Lees
Cc: [redacted]@gov.scot; [redacted]@gov.scot [redacted]@gov.scot; [redacted]@gov.scot; [redacted]@gov.scot; Cathy Tilbrook
Subject: Impact of Acoustic Deterrent Device (ADD) Use on Cetaceans

Dear Ms Stuart

I refer to your letter of 28 July 2017 enclosing advice on the above issue.

We have now considered your advice but feel that it only provides a partial response to our request. We feel that more information on ADD use and its potential impacts on cetaceans is required if future management options are to be considered.

We accept that there is some evidence to show that some ADDs can cause disturbance or displacement in certain circumstances but do not feel that your advice explored this issue in sufficient detail. We appreciate that not all of the information that might be required to fill this gap is available but feel that particular pieces of work have not been included in the advice that may be useful in enabling us to make progress on this matter.

We agree that further assessment is required before the potential for hearing damage, stress and masking can be demonstrated and consider that this should be part of the further assessment process.

We consider that there still remains significant work to be done before it can be demonstrated that there is a case for managing ADD deployment and use.

In particular, there is a need for further research and assessment of:-

- the wide range of ADDs currently available and their potential for impact on cetaceans. For example, in your advice you consider four main devices that are used in the aquaculture industry and provide details on their potential impact on cetaceans. It would be helpful for you to consider the outputs of the ORJIP ADD Study (Sparling *et al.*, 2015; Herschel *et al.,* 2013) which found that the evidence of impacts related to displacement effects for the majority of the devices referred to in your advice was limited to certain species and, in some cases, relied on modelling alone. It would therefore be helpful to consider these findings, as well as wider issues of ADD use and impacts, in moving forward.

- a greater consideration of the merits and shortfalls of "cetacean friendly" devices (e.g., Genuswave) which may offer the best future option in this area. When considering this point, it would be helpful to hghlight particular ADDs that are not considered a cause for concern for cetaceans.

- the different possibilities for how ADDs could be used (i.e. continuous, manually triggered or automatically triggered) to reduce their potential impact.

- the context in which ADDs are used (i.e. open seas, enclosed sea lochs or restricted passages) especially in relation to any use of these same areas by cetaceans. The overlap between the higher than average concentrations of harbour porpoise in the SAC and ADD distribution would appear to argue against a negative impact.

- the possible impact of ADD noise in the context of other noise in the local marine environment. We are aware that future work proposed by SAMS, as well as the new COMPASS project may assist in providing some of this information.

- the identification of areas where there is specific concern about the potential cumulative impact of ADD noise. For example, in your advice you discuss the cumulative effects of ADD use in restricted areas such as straits and sounds, which could be a particular issue. More information on specific areas where you deem this to be a particular concern would be helpful.

- the level of sound from ADDs that may evoke a behavioural response in cetaceans (although you note this may be a difficult issue due to the lack of information).

This is the kind of work that we feel is essential to provide the necessary scientific evidence required to consider potential future management measures in this area. We need first to explore the above issues in order to be in a position to consider if effective practical management measures are necessary and, if so, what the options might be.

Furthermore, since ADDs are often known to be used continuously at some sites without evidence of their efficacy in deterring seals from the area, it would be helpful if SNH could consider the practicalities of developing best practice guidance in partnership with the industry on ADD use, although we do appreciate that further research and assessment (as highlighted above) would be required to maximise the full potential of such guidance.

We appreciate that it might take time to resolve some of these issues and that some may prove intractable. We consider, however, that it is important to establish as many facts as possible to ensure that the basis for any potential future management measures is, as far as possible, sound science.

We are happy to meet to discuss this issue further if it would be helpful.

[redacted]
Marine Scotland
Marine Planning & Policy
Area 1A- South
Victoria Quay
Edinburgh
EH6 6QQ

[redacted]
[redacted]@gov.scot

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

[redacted]
Marine Scotland – Marine Planning and Policy
Scottish Government
Area 1A South
Victoria Quay
Edinburgh
EH6 6QQ

Date: 28 July 2017

Dear [redacted]

IMPACT OF ACOUSTIC DETERRENT DEVICE (ADD) USE ON CETACEANS

In an email to SNH, dated 8 March 2017, you asked that, "*SNH submit formal statutory advice to Scottish Ministers on the impact of ADD use on cetaceans. This advice should be based on sound scientific evidence concerning the actual impacts of different ADDs on cetaceans.*" In more recent correspondence (1 June 2017), you clarified that this advice should "*focus on the scientific evidence regarding potential impacts of ADDs on cetaceans*" rather than discussing possible subsequent regulatory or management approaches.

Our advice is provided as requested and summarised below. In our view:

1. There is sufficient evidence, both empirical and modelled, to show that ADDs can cause disturbance and displacement of cetaceans.

2. There is sound, scientific evidence to expect that hearing damage, stress and masking may also occur but these are difficult to demonstrate empirically and would require further assessment.

Accordingly, we believe there to be a strong case for managing ADD deployment and use, and we would welcome further discussions with you on potential approaches to take this forward.

Should you have any questions in connection with this advice, please do not hesitate to contact George Lees at: george.lees@snh.gov.uk / 01738 458621.

Yours sincerely

[redacted]

Eileen Stuart
Head of Policy and Advice
Scottish Natural Heritage

cc [redacted]

Annex

Introduction

This paper considers the available evidence for interaction between use of acoustic deterrent devices (ADDs) by the aquaculture industry and potential impacts on cetaceans. It provides advice to Scottish Government in considering the need for management or regulation of the use of ADDs to reduce risk of impacts on cetaceans.

Cetaceans are protected under European legislation 'Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora' adopted in 1992 and commonly known as the Habitats Directive. This legislation is transposed into Scottish law by the 'Conservation (Natural Habitats, &c.) Regulations 1994' known as the Habitats Regulations. Bottlenose dolphin and harbour porpoise are both listed on Annex II of the Habitats Directive as species of Community interest whose conservation requires the designation of Special Areas of Conservation (SACs). All whales, dolphins and porpoises are listed on Annex IV of the Directive as species of Community interest in need of strict protection. Of relevance to this paper, it is an offence to deliberately or recklessly capture, kill, injure, harass or disturb any whale, dolphin or porpoise.

Acoustic Deterrent Devices (ADDs) used in Aquaculture

The term ADD refers to a variety of acoustic deterrent types that range from lower power 'pinger' types that are used for bycatch mitigation in fisheries, to higher power devices used in aquaculture and offshore wind farm construction. This paper focuses on the higher power devices commonly used in aquaculture. Different device types have different acoustic characteristics in terms of source level[1], frequency content[2], mode of operation[3] and duty cycle[4], and these differences are likely to have a bearing on both the effectiveness in deterring seals and the impact on non-target species.

There are three main types of acoustic transducer/system used in Scottish aquaculture, namely Airmar (dB+II, Mohn Aqua, Gaelforce, OTAQ), Ace-Aquatec, and Terecos (Table 1). The Lofitech device is included for completeness; although not typically used in Scotland, it is marketed for aquaculture and is being used for offshore wind piling mitigation. All of these devices emit sound well within the hearing ranges of cetaceans (*e.g* Götz & Janik, 2013) (Figure 1) and at levels well above underwater background noise levels at substantial distances from source (e.g.15-20 km - Calderan *et al.,* 2007; Findley *et al.,* 2017).

Table 1 - Source level and frequency characteristics of the main ADD types in use.

Manufacturer	Device	Source level dB re 1 µPa	Frequency
Mohn Aqua,	Airmar dB +II	192-198 dB (rms)	10 kHz (tonal with harmonics)

[1] Level of sound at source (in dB re 1µPa referred to 1m)

[2] Component frequencies used within the sound output in Hertz (Hz or kHz)

[3] E.g. on continuously

[4] The fraction of the period that the device is on in which the signal is active (*e.g.* a 60% duty cycle means the signal is active for 60% of the time, and 40% quiet)

Gaelforce, OTAQ			
Ace-Aquatec[5]	US3	195 dB (rms)	10-20 kHz
	Low frequency variant	190 dB (rms)	1-4 kHz
Terecos	DSMS-4	179 dB(rms)	2-70 kHz (broadband)
Lofitech	Universal Scarer	193 dB (rms)	14 kHz (tonal with harmonics)

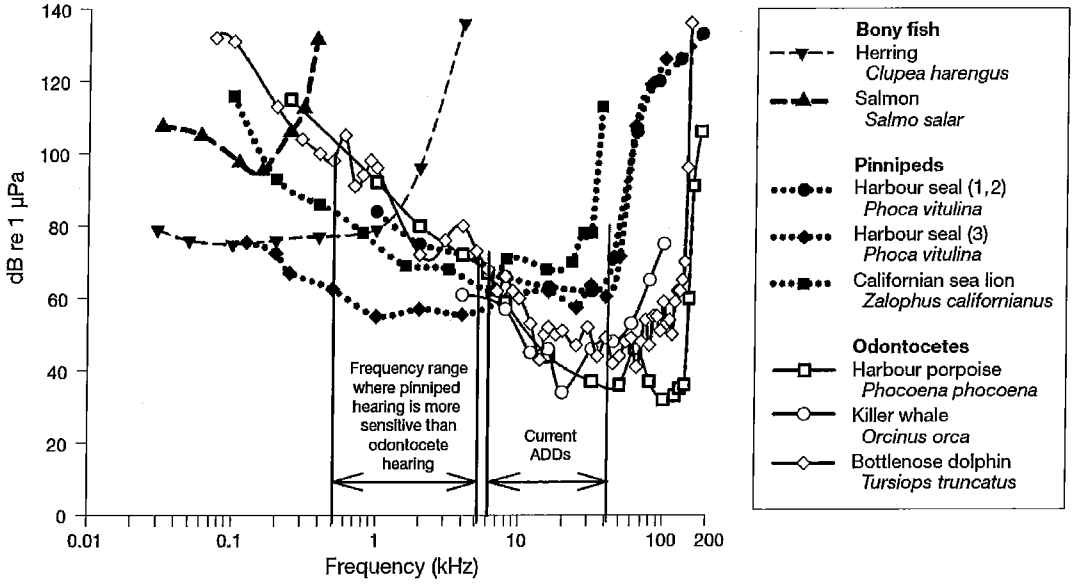

Figure 1 - Hearing thresholds for selected fish (blue dashed lines), pinnipeds (red dotted lines) and cetacean species (black solid lines) from Götz & Janik(2013). Suffixes 1-3, for Harbour seal, refer to data sources cited in Götz & Janik (ibid).

Acoustic deterrents have been used for predator control at fin-fish farms in Scotland since the mid-1980s (Coram *et al.*, 2014). During this time there have been many studies that have highlighted the potential unintended impact on cetaceans (Reviewed in - Gordon & Northridge, 2002; Gordon *et al.*, 2007; Northridge *et al.*, 2010; Götz & Janik, 2013, Coram *et al.*, 2014; Lepper *et al.*, 2014).

The acoustic signal from ADDs, particularly on the west coast of Scotland, is pervasive (Findley *et al.*, 2017). The area ensonified by ADDs has increased over time (ibid.) and is likely to continue to do so if recent trends persist. It is clear that the commonly used ADDs are well within the hearing range of cetaceans, and therefore there is overlap between this

[5] www.aceaquatec.com (US3 Spec) Web page accessed 07/06/2017

pressure and cetacean distribution, not least harbour porpoise within the Inner Hebrides and the Minches cSAC.

Potential negative ecological impacts on cetaceans from ADDs include: disturbance (leading to avoidance and habitat exclusion); hearing damage; masking of biologically significant sounds; and detrimental physiological changes (*e.g* increased stress)(Götz & Janik, 2013).

Disturbance

Avoidance responses to ADDs have been well studied for harbour porpoise and to a lesser extent on other cetacean species. Available studies are reviewed in a number of reports, for example:

- Coram *et al* (2014) Marine Scotland commissioned report – section 4.4.4 page 77; section 7.3 page 105
- Lepper *et al* (2014) SNH commissioned report – Section 3 page 42
- Götz & Janik (2013) review in Marine Ecology Progress Series – page 293
- Gordon *et al* (2007) COWRIE commissioned report – Section 5.4.1.3 page 30

These reviews all draw on the same primary literature and so are not explicitly re-reviewed here; however, key points are drawn out and detailed in Table 2. It is worth highlighting that behavioural reactions to a noise cue are highly context driven. Any response (or lack of) will depend on various factors, for example, the animal's age and previous experience of the noise, its activity when exposed to the noise and the biological value of the location to the individual.

Table 2 details some variability in terms of response distances; however, the general conclusion can be drawn that there is a zone of exclusion within a few hundred metres and a wider zone of disturbance up to several kilometres within which numbers of individuals decrease. The information also seems to suggest that different devices may stimulate different levels of response (or lack of) and this is most likely due to differing acoustic characteristics of the devices.

Table 2 - Summary of studies that have investigated disturbance effect of ADDs.

Device	Species of interest in study	Results	Source
Airmar	Harbour porpoise	When switched on abundance of HP in area (measured out to 3.5km) was less than 10% of abundance in control sessions. HP completely excluded from 400m.	Olesiuk *et al.*, 2002
Airmar	Harbour porpoise	HP excluded from 650-991m HP observed to move out of the area when ADD switched on.	Johnston, 2002

Lofitech	Harbour porpoise	HP density reduced to 1% of pre exposure within a 1km area. Avoidance responses within 1.9km	Brandt *et al.*, 2013
Lofitech	Harbour porpoise	Clear evidence of a reduction in detections, measured out to 7.5km and no indication that this was the maximum range of effect	Brandt *et al.*, 2012
Brand not specified	Killer whale	Considerable decrease in numbers on ADD activation. Recovery of sighting once deactivated. Study over 15 yrs – no habituation observed.	Morton & Symonds, 2002
Brand not specified	White sided dolphin	Abundance decreased.	Morton, 2000
Airmar	Harbour porpoise	Decreased abundance measured out to 2.5km.	Kyhn *et al.*, 2015
Lofitech	Minke whale	Clear movement away from ADD deployment site	ORJIP phase 2 project 4 – unpublished draft 2017[6]
Ace-Aquatec	Harbour porpoise	Model indicates deterrence of HP at ranges out to 1.2km, in absence of competing source of attraction	Kastelein *et al.*, 2010
Terecos	Harbour porpoise	Possible reduction in acoustic behaviour up to 1km	Northridge *et al.*, 2010
Terecos	Harbour porpoise	No significant effect	Northridge *et al.*, 2013
Genuswave[7]	Harbour porpoise	At frequencies tested (peak frequency at 1 kHz, source level 180 dB re 1µPa) - no response from HP	Götz & Janik, 2014

The available literature does not provide evidence that cetaceans habituate to acoustic deterrents (Götz & Janik, 2013). However, Northridge *et al* (2010) found that harbour porpoise were more likely to react to new ADDs than those in areas where there has been ADD use previously. They also found that animals returned to the area once the ADD was de-activated.

It is often mentioned by the Aquaculture Industry that cetaceans are observed in the vicinity of fish farms using active ADDs. However, there is a behavioural context involved in any reaction. The variety of ADD acoustic characteristics, as well as the biological value of the

[6] When published will be added to https://www.carbontrust.com/client-services/programmes/offshore-wind/offshore-renewables-joint-industry-programme-orjip/

[7] New device under development using frequencies that harbour porpoise are less sensitive to.

location to the individual(s) concerned, means that the response to these devices is complex and site specific.

Consideration of evidence – We believe there is sufficient evidence to conclude that cetaceans can be disturbed and displaced by certain types of ADDs. The same evidence pool has been used to support the use of acoustic deterrents as pre-piling mitigation (European offshore wind construction, and more recently for BOWL offshore wind farm) with the intention of disturbing marine mammals out of a potential injury zone.

Effects on hearing

Hearing damage has been widely speculated[8] both for seals and cetaceans that are frequently exposed to acoustic signals (Gordon & Northridge, 2002; Coram *et al.,* 2014, Lepper *et al.,* 2014). Hearing is considered to be damaged at the onset of permanent hearing threshold shift (PTS) *i.e.* a permanent reduction in hearing ability. Exposure to noise can also result in a temporary reduction in hearing ability (TTS) which could lead to permanent damage if it occurs repeatedly. Potentially, hearing damage could affect biological fitness and/ or survival. The reduction of an individual's ability to distinguish certain sound signals could result in reduced foraging success, reduced ability to perceive predators and reduced ability to communicate.

Lepper *et al.,* 2014 considered the risk of hearing damage and concluded that the risk should not be discounted. They also concluded (based on the modelling work conducted) that hearing could be damaged if an individual (seal or cetacean) was within a few hundred metres for a few hours, and that the more ADDs deployed in one location the shorter the time-span needed before the injury threshold is breached. A cumulative dose may be received if there are a number of fish farms in the same area or along a transit route, particularly in areas that are restricted (*e.g.* straits, sounds)(also see Götz & Janik, 2013).

Given the output noise levels of ADDs used in aquaculture, it is unlikely that hearing will be damaged by instant exposure; it is more probable that the risk of hearing damage is from cumulative exposure (Götz & Janik, 2013; Coram *et al.,* 2014; Lepper *et al.,* 2014).

Consideration of evidence – Based on the available evidence, we consider that hearing damage via instant or short-term exposure is a relatively low risk. However there may be risk of damage with repeated exposure. We therefore consider there to be a risk of cumulative exposure in restricted areas (*e.g.* straits, sounds) where there are multiple ADD sources.

Masking and stress

Masking occurs when the detection of one sound signal (*e.g.* communication between marine mammals) is hidden by a second sound signal (*e.g.* an ADD). This will only occur if the frequencies of the two sound signals are similar. Although cetaceans have excellent discrimination of different sounds the potential of masking remains, which would result in missed opportunities to react to relevant noise cues. There have not been any direct studies

[8] It is not possible to test hearing damage on cetaceans directly. It is inferred based on understanding of temporary hearing loss (see Southall *et al.,* 2007).

to our knowledge, but there has been work conducted indicating a likely reduction of communication space due to vessel noise (baleen whales – Clark *et al.,* 2009; delphinids – Erbe, 2002; Jensen *et al.,* 2009). Some ADDs generate noise within a similar frequency range to small boats highlighting the potential for a similar impact (Götz & Janik, 2013).

There is limited ability to study stress effects on marine mammals in the marine environment. One opportunistic study, (Rolland *et al.,* 2012) found the reduction of noise related to a temporary cessation of shipping traffic was associated with a reduction in stress hormones in right whales. We understand from terrestrial studies that individuals living in a noisy environment suffer with stress related conditions, ultimately affecting the individual's health (EU 2015). In addition there is the awareness that a lack of obvious response does not necessarily mean there is no effect.

Consideration of evidence – We consider that the possibility of masking and stress is real, but is difficult to demonstrate empirically and complicated by other noise sources in the same region (*e.g.* vessel noise). Further work would be needed to ascertain the significance of any impacts.

Conclusions

The balance of scientific evidence indicates that ADDs emit frequencies within the hearing range of cetaceans; can cause disturbance and displacement; and have the potential to cause injury, masking and stress (though these latter aspects are difficult to demonstrate empirically).

The consensus in academic opinion is that ADDs can deter animals from an area[9] which implies a risk of habitat exclusion arising from persistent ADD use. This is particularly relevant in restricted environments (e.g. straits or narrows), where cumulative ADD use could present a barrier to passage by cetaceans. The extent of any habitat exclusion may well be site and context specific, and any resulting impacts on individual foraging success or population level consequences are not yet well understood. However current legislative protection requires a precautionary approach where a risk cannot be discounted beyond scientific doubt.

There is currently little formal regulation or monitoring of ADD use in aquaculture and as such it is difficult to understand the actual level of anthropogenic noise being contributed to the environment from this source. Given the increase in the marine area ensonified by ADD use and growing attention to the potential impacts of underwater noise (e.g. MSFD- Indicator 11) we consider that management of persistent noise sources such as ADD use by aquaculture is necessary.

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[9] Note that the likelihood of such displacement is the reason why ADD use for pre-piling mitigation in the Moray Firth was agreed and why ADDs are being proposed as potential mitigation for tidal turbine operation impacts.

In summary, ADDs used in aquaculture are of the frequency range and level that has been shown to disturb and displace cetacean species in various scientific studies. SNH advises that the potential for these impacts is real and therefore the requirements for protection conferred upon these species through the Habitats Regulations need to be considered.

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Rhoda Davidson

From: Caroline Carter
Sent: 11 December 2017 14:11
To: Liam Wright
Subject: RE: ADD low frequency trials

You're right –think it's Prezi – it's not something I've ever used as it's far too much zoom in & out for me, but there were a few folks at SAMS that tried it while I was there, and I think that was how [redacted] presented to us last time – be good to have something for Karen and Alex to look at though if possible...
C

From: Liam Wright
Sent: 11 December 2017 14:05
To: Caroline Carter
Subject: RE: ADD low frequency trials

OK thanks. I think a conference TC would probably work fine. Will need to let Alex and Karen know the dial in details. I'll get in touch with [redacted] and see if he can get something sent across. I seem to remember last time it wasn't ppt, it was the other one, pressie it think it's called.
L

From: Caroline Carter
Sent: 11 December 2017 12:47
To: Liam Wright
Subject: RE: ADD low frequency trials

There will be a phone – but I'll be on site to make sure that we do before the meeting starts. Should we set up a conference TC as I think Karen Hall is also interested in phoning in? (rather than direct dial) In which case, we could probably do with having any presentation in advance that way we can send it on to those on TC (and we could run it through our system then as well and avoid any connection issues...)

From: Liam Wright
Sent: 11 December 2017 12:23
To: Caroline Carter
Subject: RE: ADD low frequency trials

Thanks Caroline. Alex T is hoping to join by TC as he has a dodgy VC. I take there is a phone line in the cherry room?

From: Caroline Carter
Sent: 11 December 2017 11:01
To: Liam Wright
Subject: RE: ADD low frequency trials

Hi Liam,

Sorry I meant to get back to you on Friday on this – but other stuff took over!

The Cherry Room has its own computer, so a USB would work. The Laptop should just plug and play - but this apparently depends on the connections – there have been problems with Mac's.

He would be better to bring a back-up – or we could load his presentation on one of our USBs and go through our system. I think we will be fine either way.

Caroline

From: Liam Wright
Sent: 11 December 2017 10:18
To: [redacted]
Cc: Caroline Carter
Subject: RE: ADD low frequency trials

Hi [redacted],

Just a quick email to suggest that if you have a ppt presentation etc then it would probably be easiest to bring it on a laptop rather than a usb stick. We would need to run virus / security checks on the usb stick before it could be used and even then sometimes we have other issues when trying to use non-internal usb drives on snh computers.

Hope this is ok.

Best regards,
Liam

From: [redacted]@aceaquatec.com]
Sent: 06 December 2017 19:50
To: Liam Wright
Subject: Re: ADD low frequency trials

Perfect! Thanks so much and apologies for the alteration!

Best regards,

[redacted]

[redacted]

[redacted]
W. www.aceaquatec.com
Ace Aquatec Ltd.
16B City Quay,
Dundee,
DD1 3JA

From: Liam Wright <liam.wright@snh.gov.uk>
Sent: Wednesday, December 6, 2017 17:28
Subject: RE: ADD low frequency trials
To: [redacted]@aceaquatec.com>

Hi [redacted]

I think Thursday the 14th should be ok. Shall we go for the same time i.e.start at 11?

Thanks,
Liam

From: [redacted]@aceaquatec.com]
Sent: 06 December 2017 07:54
To: Liam Wright
Subject: Re: ADD low frequency trials

Hi Liam,

Apologies for the late notice on this request: is there any possibility of moving our meeting to the 14th? I understand if it's not possible at this stage.

Best regards,

[redacted]

[redacted]
[redacted]@aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Sent: Thursday, November 9, 2017 10:21:57 AM
To: [redacted]
Subject: RE: ADD low frequency trials

Apologies – no rooms are available on morning of the 12th so it would have to be 11th, 13th or 14th Dec

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From: [redacted]@aceaquatec.com]
Sent: 09 November 2017 09:56
To: Liam Wright
Cc: Caroline Carter
Subject: Re: ADD low frequency trials

Hi Liam,

Thanks very much for the email. Yes, things are very busy but there's a lot of exciting developments underway which is nice.

I'd be pleased to catch up with you in Perth – just let me know the best date for you.

Best regards,

[redacted]

[redacted]
Ace Aquatec
[redacted]
www.aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Date: Thursday, 9 November 2017 at 09:36
To: [redacted]@aceaquatec.com>
Cc: Caroline Carter <Caroline.Carter@snh.gov.uk>
Subject: ADD low frequency trials

Hi [redacted]

I hope you're well. You seem to have been getting around a bit recently as I'm seeing you pop up in various aquaculture news articles on a fairly regular basis – you seem to be picking up awards here, there and everywhere!

We're still keen to hear a bit about how the low frequency transducer trials have been going, and also any updates on any other new innovations you're developing (such as the electric fish!). I see you're now based in Dundee, so perhaps our Perth (Battleby) office would be a better venue? Your obviously extremely busy at the moment but if you could spare us an hour or two at some point that would be really useful. If you could let me know your availability over the next month or 2 then we can see if we can finally get something in diary.

Thanks,
Liam

Liam Wright| Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 0131 316 2695
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 8:00 – 18:00

Rhoda Davidson

From: [redacted]@gov.scot
Sent: 13 December 2017 10:30
To: Liam Wright
Cc: Caroline Carter; Cathy Tilbrook
Subject: RE: Meeting with Ace Aquatec

Hi Liam,

I don't mean too much by it, just in the general sense of what the outcomes would have been had the meeting took place. He's obviously looking to get the device past various regulatory hurdles and so I'm interested in what, if any, issues SNH has with the device being used. I appreciate you've said before that you don't see SNH as having a significant role here and so even just knowing that this remains the case after your meeting with him would be helpful.

Thanks,
[redacted]

From: Liam Wright [mailto:Liam.Wright@snh.gov.uk]
Sent: 12 December 2017 17:07
To: [redacted]
Cc: Caroline Carter; Cathy Tilbrook
Subject: RE: Meeting with Ace Aquatec

Hi [redacted]

Unfortunately [redacted] of Ace-aquatec, had to cancel. He's giving us a presentation on Thursday instead. My understanding is that it's just to give us a quick update on how their trials up in Orkney have been going. I'm not entirely sure what the 'next steps' you refer to might be.

Any further clarification would be welcome.

Thanks,
Liam

From [redacted]@gov.scot [mailto[redacted]@gov.scot]
Sent: 12 December 2017 16:45
To: Liam Wright
Subject: Meeting with Ace Aquatec

Hi Liam,

You probably had this meeting yesterday. Any feedback on the device and next steps from SNH's point of view?

Thanks,
[redacted]

From: Liam Wright [mailto:Liam.Wright@snh.gov.uk]
Sent: 13 November 2017 09:34
To: [redacted]
Subject: RE: Your phone number

Hi [redacted]

Sorry, I was off on Friday so I didn't see your email until this morning. I'm not meeting Ace Aquatec until Mon 11th Dec.

Happy to discuss further – just tried calling you but there's no answer. See below for my new number.

Thanks
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 0131 316 2695
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 8:00 – 18:00

From: [redacted]@gov.scot [mailto[redacted]@gov.scot]
Sent: 10 November 2017 10:32
To: Liam Wright
Subject: Your phone number

Hi Liam,

Do you have a moment to speak at all this morning? I was going to call you but realised that I don't actually have your number! So if you could call me on the number below or let me know the best number to call you on please?

Two things I wanted to discuss with you: one is a brief update on the Loch Laxford audit application (you will need to cast your mind back for this!) and secondly the meeting I understand you're going to have with Ace Aquatec on Monday. Mr Ewing met them yesterday and so I wanted to provide a little feedback on that.

Thanks,
[redacted]

[redacted]
Marine Scotland – Aquaculture, Crown Estate, Recreational Fisheries, EMFF and Europe Division (ACRE)

T: [redacted]
E: [redacted]@gov.scot
W: http://www.scotland.gov.uk/marinescotland

eil e ceadaichte a chleachdadh ann an dòigh sam bith, a' toirt a-steach còraichean, foillseachadh neo sgaoileadh, gun chead. Ma 's e is gun d'fhuair sibh seo gun fhiosd', bu choir cur às dhan phost-d agus lethbhreac sam bith air an t-siostam agaibh agus fios a leigeil chun neach a sgaoil am post-d gun dàil. Dh'fhaodadh gum bi teachdaireachd sam bith bho Riaghaltas na h-Alba air a chlàradh neo air a sgrùdadh airson dearbhadh gu bheil an siostam ag obair gu h-èifeachdach neo airson adhbhar laghail eile. Dh'fhaodadh nach eil beachdan anns a' phost-d seo co-ionann ri beachdan Riaghaltas na h-Alba.
****

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Rhoda Davidson

From: Donna Yule
Sent: 13 December 2017 15:33
To: Liam Wright
Cc: Caroline Carter
Subject: RE: Ace-Aquatec - Low Frequency ADD

Hi Liam

Can I have a copy of the presentation as well incase our vc drops out?

Thanks

Donna Yule
Operations Officer, Orkney

From: Liam Wright
Sent: 13 December 2017 14:46
To: Donna Yule; Alex Turner; Karen Hall; Fiona Manson; George Lees
Cc: Caroline Carter
Subject: Ace-Aquatec - Low Frequency ADD

Hi all,

You have previously expressed an interest in attending the catch up with Ace-Aquatec wrt. ongoing trials of the device up in Orkney. The plan is to hopefully have a VC connection with Orkney and Lochgilphead, Alex and Karen join by TC (further details to follow) and whoever else that's available and interested will attend in person at BBY. I have asked [redacted] to provide us with a copy of the presentation so we can get it sent out to the folk attending by TC. I'll hopefully be able to forward it on to you by tomorrow morning at the latest.

The cherry room is booked from 10-14 but the plan is to aim for an 11 o'clock start. I imagine we'll almost certainly be done by 13:00.

Hope this is clear but just let me or Caroline know if you have any queries.

Thanks,
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 0131 316 2695
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 8:00 – 18:00

Rhoda Davidson

From: Caroline Carter
Sent: 13 December 2017 15:51
To: Liam Wright
Subject: RE: Ace aquatec

Hi Liam,
That's ok – I can do all the meet and greet.

But, there is a potential problem with a mix of TC and VC.... I've not set up the VC that can also take TC through the same system and I think I'm too late to do this now (I'm just back in from a meeting so sorry if this is a bit late)it's got to go through the virtual meeting process... We can set up the VC for you and Donna direct, but Karen and Alex will have to TC to a phone.

Do you want me to send round my TC code to folk?

Caroline

From: Liam Wright
Sent: 13 December 2017 14:14
To: Caroline Carter
Subject: Ace aquatec

Hi Caroline,

Still haven't received any presentation from [redacted] but he had hoped to get something across before tomorrow.

I'll be VC'ing in from Lochgilphead, Donna from Orkney and Alex / Karen(?) joining by TC.

Sorry feel as though I'm lumbering the meeting on you, I had thought to come in person but I couldn't justify the 6hr drive. I'll email folk shortly to let them know the plan. Let me know if there's any problems with this.

Thanks,
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 0131 316 2695
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 8:00 – 18:00

Rhoda Davidson

From: Caroline Carter
Sent: 13 December 2017 16:48
To: Liam Wright; Donna Yule; Alex Turner; Karen Hall; Fiona Manson; George Lees
Subject: RE: Ace-Aquatec - Low Frequency ADD

Hi Folks,

Liam & Donna – can you let me know which VC rooms you are using so that I can dial out to you both. What time do you guys want me to dial out to you? probably at least 10:45 so we can make sure the connection is going through – does that suit your room bookings?

For those want to TC – we might be too late to set this up through the VC system, I'll let you know in the morning – in the meantime here's the conference code we can use as a back-up...

Tel - [redacted]
Code - [redacted]

We might need those on VC to also dial into the conf code and have the VC on mute – I seem to remember an issue with using both at some point – but we can look at this tomorrow.

My mb – in case of technical hiccups - is [redacted]

Cheers,
Caroline

From: Liam Wright
Sent: 13 December 2017 14:46
To: Donna Yule; Alex Turner; Karen Hall; Fiona Manson; George Lees
Cc: Caroline Carter
Subject: Ace-Aquatec - Low Frequency ADD

Hi all,

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Thanks,
Liam

Liam Wright | Marine Policy and Advice Officer - Aquaculture
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Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 0131 316 2695
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 8:00 – 18:00

Rhoda Davidson

From: [redacted]@aceaquatec.com>
Sent: 14 December 2017 09:30
To: Liam Wright
Subject: Re: ADD low frequency trials
Attachments: SNH Deterrents 2.pptx

Hi Liam,

Please see presentation attached.

Best regards,

[redacted]

[redacted]

ACE AQUATEC

[redacted]
W. www.aceaquatec.com

Ace Aquatec Ltd.
16B City Quay,
Dundee,
DD1 3JA

WINNER OF INNOVATION AWARD 2016 AquacultureUK

WINNER OF INNOVATION AWARD AQUA NOR 2017

From: Liam Wright <Liam.Wright@snh.gov.uk>
Date: Monday, 11 December 2017 at 14:08
To: [redacted]@aceaquatec.com>
Subject: RE: ADD low frequency trials

Hi[redacted]

Thanks for this. That should be fine. I think we'll have a couple of folk joining by TC too. Would it be at all possible to get a copy of the presentation beforehand? That way we can forward it on to those joining by TC so they can view it while listening over the phone.

Thanks
Liam

From: [redacted]n@aceaquatec.com]
Sent: 11 December 2017 10:50
To: Liam Wright
Subject: Re: ADD low frequency trials

Hi Liam,

Yes – that's no problem.

I'll bring it on my macbook – hopefully that will be fine for communicating with your projector – I remember last time it took a while to get it working with your projectors?

Best regards,

[redacted]

[redacted]

ACE AQUATEC

[redacted]
W. www.aceaquatec.com

Ace Aquatec Ltd.
16B City Quay,
Dundee,
DD1 3JA

WINNER OF INNOVATION AWARD 2016 Aquaculture UK

WINNER OF INNOVATION AWARD AQUA NOR 2017

Registered office address: 16B City Quay, Camperdown Street, Dundee, DD1 3JA. Registered in Scotland No: SC335694
VAT Reg. No: 744 9498 79

From: Liam Wright <Liam.Wright@snh.gov.uk>
Date: Monday, 11 December 2017 at 10:48
To: [redacted]@aceaquatec.com>
Cc: Caroline Carter <Caroline.Carter@snh.gov.uk>
Subject: RE: ADD low frequency trials

Hi [redacted]

Just a quick email to suggest that if you have a ppt presentation etc then it would probably be easiest to bring it on a laptop rather than a usb stick. We would need to run virus / security checks on the usb stick before it could be used and even then sometimes we have other issues when trying to use non-internal usb drives on snh computers.

Hope this is ok.

Best regards,
Liam

From [redacted]@aceaquatec.com]
Sent: 06 December 2017 19:50
To: Liam Wright
Subject: Re: ADD low frequency trials

Perfect! Thanks so much and apologies for the alteration!

Best regards,

[redacted]

[redacted]

[redacted]
W. www.aceaquatec.com
Ace Aquatec Ltd.
16B City Quay,
Dundee,
DD1 3JA

From: Liam Wright <liam.wright@snh.gov.uk>
Sent: Wednesday, December 6, 2017 17:28
Subject: RE: ADD low frequency trials
To: [redacted]@aceaquatec.com>

Hi [redacted]

I think Thursday the 14th should be ok. Shall we go for the same time i.e.start at 11?

Thanks,

Liam

From: [redacted]@aceaquatec.com]
Sent: 06 December 2017 07:54
To: Liam Wright
Subject: Re: ADD low frequency trials

Hi Liam,

Apologies for the late notice on this request: is there any possibility of moving our meeting to the 14th? I understand if it's not possible at this stage.

Best regards,

[redacted]

[redacted]
[redacted]
[redacted]
[redacted]@aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Sent: Thursday, November 9, 2017 10:21:57 AM
To: [redacted]
Subject: RE: ADD low frequency trials

Apologies – no rooms are available on morning of the 12th so it would have to be 11th, 13th or 14th Dec

---

From [redacted]@aceaquatec.com]
Sent: 09 November 2017 09:56
To: Liam Wright
Cc: Caroline Carter
Subject: Re: ADD low frequency trials

Hi Liam,

Thanks very much for the email. Yes, things are very busy but there's a lot of exciting developments underway which is nice.

I'd be pleased to catch up with you in Perth – just let me know the best date for you.

Best regards,

[redacted]

[redacted]
[redacted]
Ace Aquatec
[redacted]
www.aceaquatec.com

From: Liam Wright <Liam.Wright@snh.gov.uk>
Date: Thursday, 9 November 2017 at 09:36
To: [redacted]@aceaquatec.com>

Cc: Caroline Carter <Caroline.Carter@snh.gov.uk>
Subject: ADD low frequency trials

Hi [redacted]

I hope you're well. You seem to have been getting around a bit recently as I'm seeing you pop up in various aquaculture news articles on a fairly regular basis – you seem to be picking up awards here, there and everywhere!

We're still keen to hear a bit about how the low frequency transducer trials have been going, and also any updates on any other new innovations you're developing (such as the electric fish!). I see you're now based in Dundee, so perhaps our Perth (Battleby) office would be a better venue? Your obviously extremely busy at the moment but if you could spare us an hour or two at some point that would be really useful. If you could let me know your availability over the next month or 2 then we can see if we can finally get something in diary.

Thanks,
Liam

Liam Wright| Marine Policy and Advice Officer - Aquaculture
Coastal and Marine Ecosystem Unit
Scottish Natural Heritage | 1 Kilmory Industrial Estate | Lochgilphead | PA31 8RR
T: 0131 316 2695
E: liam.wright@snh.gov.uk

Current working pattern Mon – Thu 8:00 – 18:00

Rhoda Davidson

From: [redacted]@aceaquatec.com>
Sent: 14 December 2017 13:41
To: Liam Wright
Subject: Ace meeting

Hi Liam,

Thanks very much for the meeting today. Apologies for going to the wrong venue - you clearly stated Perth early on! I'm afraid a cold is effecting my mental capacities today?!

I appreciate everyone taking the time to discuss our new developments and hope to feed [redacted] report through shortly.

Best regards,

[redacted]

[redacted]

[redacted]
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Ace Aquatec Ltd.
16B City Quay,
Dundee,
DD1 3JA

Rhoda Davidson

From: Caroline Carter
Sent: 20 December 2017 12:44
To: Sally Blyth; Karen Hall
Subject: RE: ADDs & cetaceans research published

Hi Sally,

Yes, but thank you for forwarding. This article is in response to the ORJIP (Offshore Renewables Joint Industry Programme) work on testing the efficacy of an ADD on minke whales... now published on the ORJIP web site.

https://www.carbontrust.com/offshore-wind/orjip/acoustic-detterents/

& Merry Christmas to you too,
Caroline

From: Sally Blyth
Sent: 20 December 2017 12:34
To: Karen Hall; Caroline Carter
Subject: ADDs & cetaceans research published

Hi there
Just checking you're both aware of this recently published research
https://www.scotsman.com/news/subsea-pulse-can-safeguard-whales-during-offshore-turbine-construction-1-4643253

Merry Christmas
Sally

Sally Blyth
Operations officer – species
National Operations Unit
Great Glen House
Inverness

01463 725 013
Please note that I work Monday to Friday mornings to early afternoon only

Rhoda Davidson

From: [redacted]@st-andrews.ac.uk>
Sent: 22 December 2017 15:11
To: Caroline Carter
Subject: ADD and sonar projects for 2018

Follow Up Flag: Follow up
Flag Status: Completed

Dear Caroline

Apologies for the long email! But read at your leisure - I'm not expecting a response any time soon for obvious reasons...

A bit of an update from our Orkney ADD project, and a couple of questions about new projects for the new year.

The low frequency ADD project we ran in Orkney went really well. I'm working on a write up for the funders now but wanted to give you a summary. We monitored porpoises with CPODs and soundtraps between 100m and 7km (from memory). I'm hoping to do a more in depth analysis and comparison of the noise data from the soundtraps if I get some time next year, but the cpods showed no effect of the ADD on porp detection rate. There was a slightly lower detection rate during the first 'ADD on' period, which could suggest a slight initial change in behaviour, but it was only for a week or two. The detection rate was quite high with a few detections most days.

Because we could remotely switch the ADD on and off, and use the soundtraps to double check it was active when we thought it was, it made a very powerful long-term on/off sound treatment relatively easy, and I'm keen to expand on this next year if we can find some more money. We also get the salmon mort records over the on/off periods as well, so should be able to answer the (in my opinion) more important question of whether ADDs prevent seal predation. It also has the great benefit of being a 'real-world' situation, rather than being at a study site, away from any farms, where the context for animal behaviour could be quite different.

[redacted] So I'm initially hoping to repeat this study but with the new signal, and possibly include some other test sounds (i.e. simulate different brands of ADD).

So first question is, will we be able to extend the SNH licence for that site (Wyre)? I know I will need to speak to the licencing dept, but just wanted to check with you if there is anything in particular I'll need to include. I have measurements (SPL and frequency spectrum) to confirm the new sound is what it should be.

I also thought it might be a good opportunity to think about what testing criteria, or metric might be appropriate when assessing/comparing ADDs. For example, are we more concerned about the size of any habitat exclusion, or, more complicated but maybe more important, any behavioural changes that might happen over a wider area.

[redacted] but no more than what [redacted] has been using (for example). I'm hoping to test this device at either the Isle of May or Tentsmuir from a

SMRU boat in late Jan/early Feb. [redacted] mentioned that you were involved in the licencing for his work so I though I'd mention it.

Anyway, sorry again for the long email - thought it was better than a long phone call on a Friday afternoon!

Have a nice holiday and happy new year,

Best,
[redacted]

--
[redacted]
Sea Mammal Research Unit
Scottish Oceans Institute
University of St Andrews
St Andrews, Fife, KY16 8LB
[redacted]

Rhoda Davidson

From: [redacted]
Sent: 30 December 2017 13:56
To: [redacted] Caroline Carter
Subject: Abstract for UKIRSC

Hi all,

Apologies for the delay in getting this to you, a combination of being unable to source any internet in the wilderness [redacted] put a damper on things!

Visiting Bloody Bay at the end of January sounds great [redacted] I hope everything went smoothly collecting the CPOD. I checked along at the Glenborrodale farm to see if I could pop in and say hello, but they seem to have taken down all the cages.

The abstract is to be 300 words, and I intend to present a 5 minute presentation.

The harbour porpoise (*Phocoena phocoena*) may be at risk of exposure to anthropogenic activities as it is highly abundant in coastal waters throughout its range. In Scotland the species may increasingly interact with an expanding Atlantic salmon (*Salmo salar*) aquaculture industry. Scottish salmon farms are mainly situated on the west coast, northern and western islands which also have some of the highest harbour porpoise densities in Europe. In response to this, the Minches and Inner Hebrides Candidate Special Area of Conservation (cSAC), proposes to protect 13,539km^2 of harbour porpoise habitat, which will show significant overlap with existing salmon farm sites.

The impacts of salmon farms on the harbour porpoise are not well established, and study efforts have mainly focused on the effect of Acoustic Deterrent Devices (ADDs) designed to prevent seal depredation. Research thus far indicates that some devices have the potential to induce habitat displacement in harbour porpoises, however it is unclear if all commercially available ADDs produce this effect. Additionally, the general effects of salmonid aquaculture in areas of porpoise habitat are little understood.

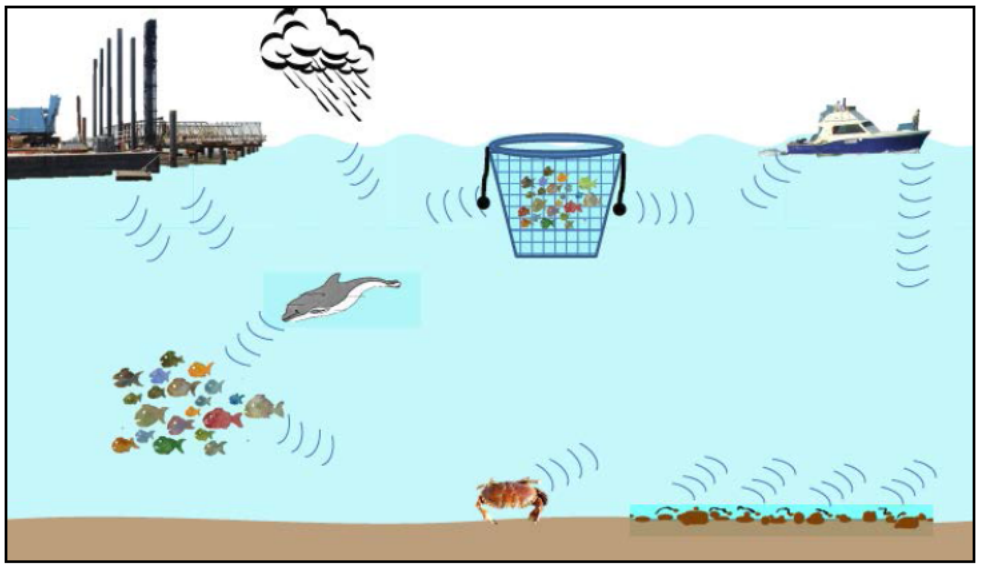
To address these knowledge gaps, the present study will identify if harbour porpoise use salmon farms as habitats on the Scottish west coast, and establish potential temporal or seasonal variation in usage patterns as well as the possibility for specific site preferences. Secondly, investigations will determine if porpoises exhibit discernible behavioural patterns around farms, such as foraging or socialising, and assess

potential attractants such as wild fish aggregations. Finally, the effects of ADDs and general farm activities on porpoise occurrence and behaviour will be assessed, providing an insight into potential population-level effects. The study will ultimately present multiple small-scale, site-specific examinations of the combined impacts of salmon aquaculture on harbour porpoises for the west coast of Scotland.

Speak soon and hope you all had a great Christmas!

[redacted]

Underwater noise; Acoustic deterrents & marine mammals



1. Underwater noise can be classified according to its source.

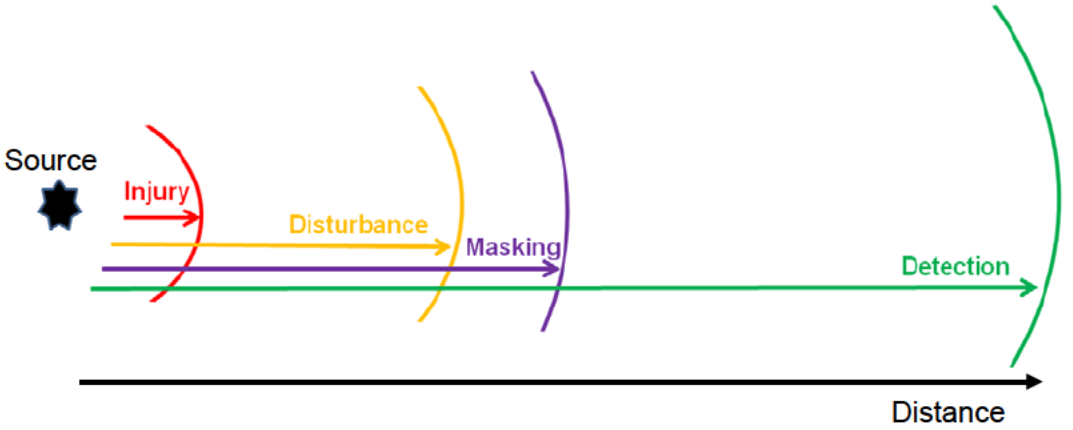
- Physical – wind, storms, waves, turbulence, earthquake, seabed, ice
- Biological – produced by animals, or as a by-product of their movement
- Man-made – human activities (boats, geological exploration, industry, military activity *etc.*)

2. Sound characteristics

- Two key characteristics – the sound level (volume) and the frequency content (pitch)
- The speed of sound is about five times faster in water than in air, which means sound can travel vast distances underwater (tens of km)
- In comparison, light can only travel a few hundred meters before it is absorbed or scattered

3. Importance of sound to marine mammals

- Because of the efficient sound propagation, and the relative inefficiency of light, hearing is marine mammals' primary sense
- Sound is used for orientation, finding food, locating partners, avoiding predators, and communication

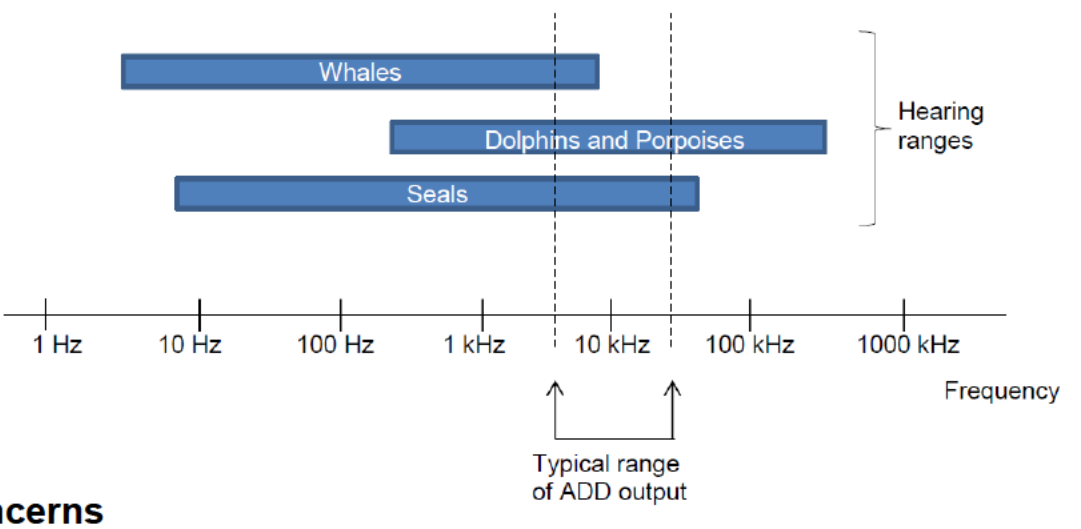


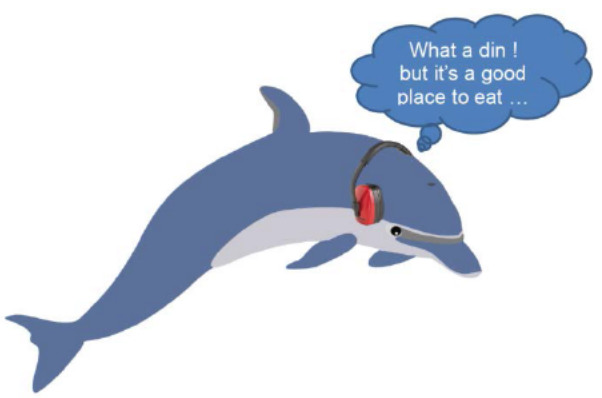
4. Potential issues with a noisy environment

- Depending on how loud the sound source is, it may result in physical injury, loss of hearing, masking (interference with the animal's ability to interpret a sound signal) and disturbance
- All of these could affect the an individual's ability to feed or protect itself

5. Marine mammals' hearing and ADD overlap

- Different marine mammals have different hearing ranges. For example humans can hear from about 20 Hz to 20 kHz (if we are not a bit deaf). Marine mammals have a much wider hearing range than us. The acoustic output of typical ADDs falls well within the hearing ranges of seals, whales and dolphins

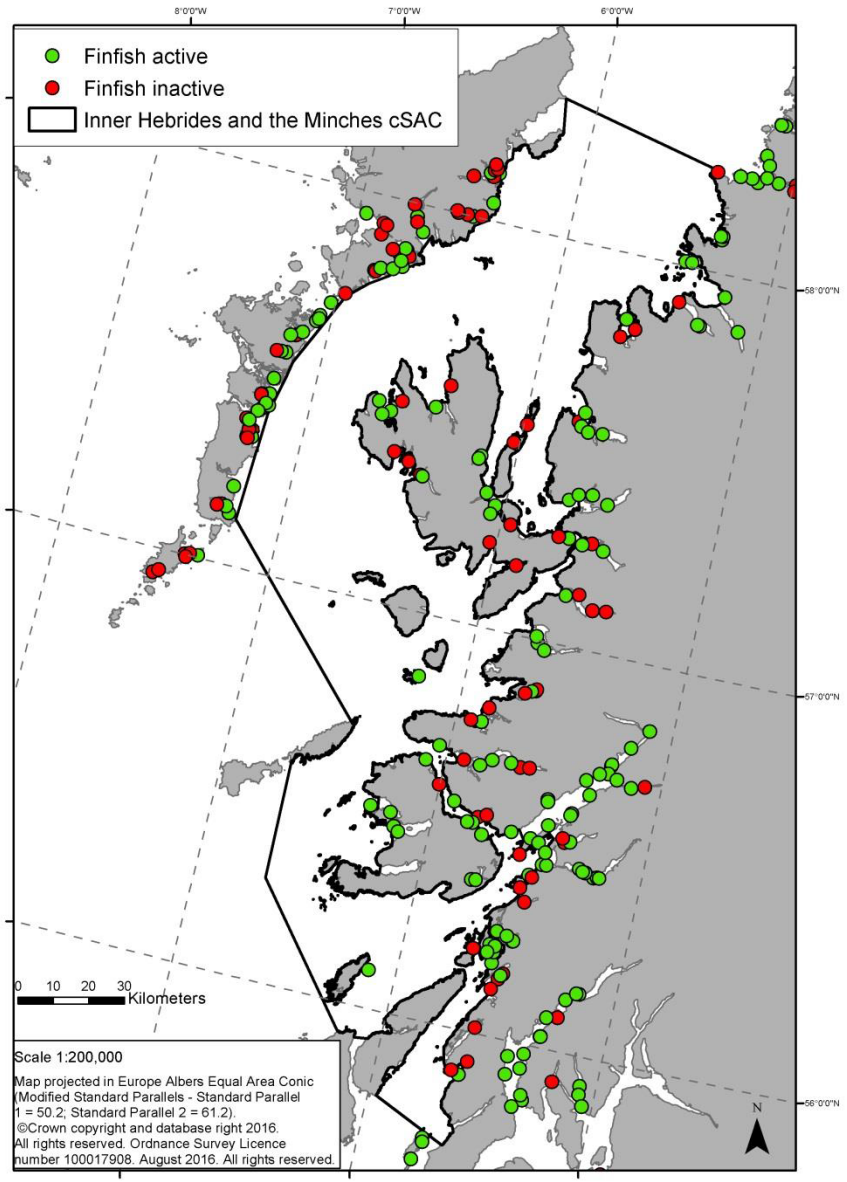




6. Concerns

- We know that ADD signals can be detected against background noise at distances potentially further than 10 km from source
- We know that some ADDs in some circumstances can disturb whales and dolphins between 2 and 7 km from source
- There is a growing concern about the impact of man-made noise in general on marine animals and therefore the ultimate aim is to minimise this impact by reducing unnecessary noise emissions into the marine environment

ADD usage in the Inner Hebrides and the Minches candidate SAC



Dr Caroline Carter
Policy & Advice officer

Concerns re ADD use -

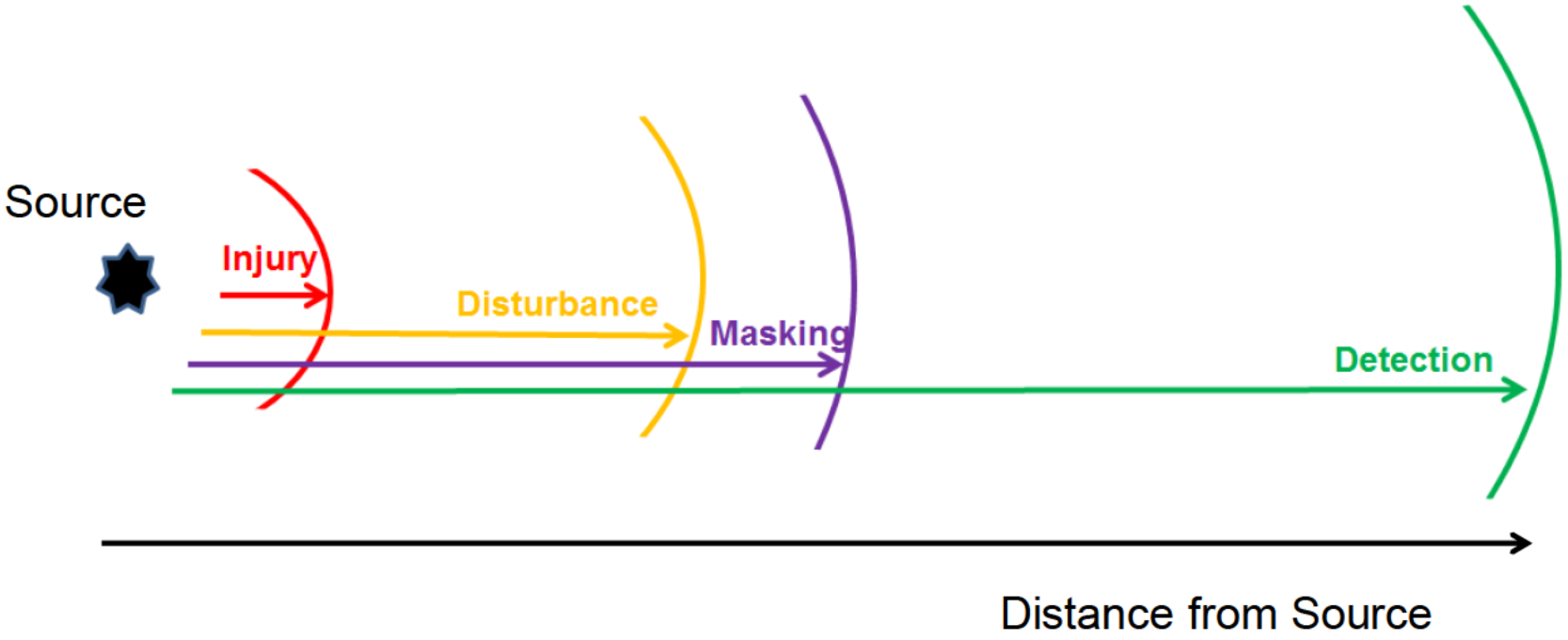
Underwater noise impact…

Hearing is marine mammals primary sense

- foraging
- navigation
- communication
- predator avoidance

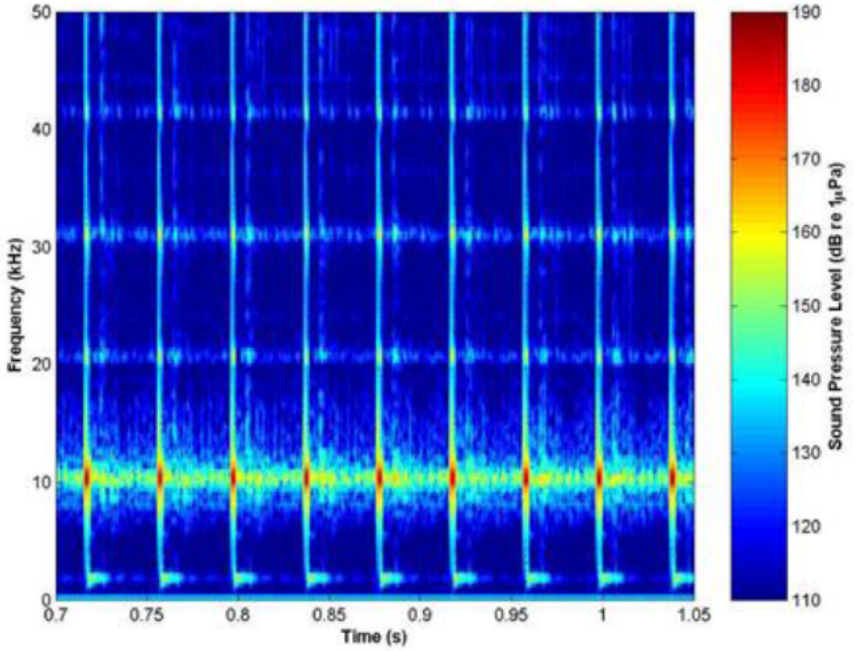
Concerns re ADD use -

Potential Impacts

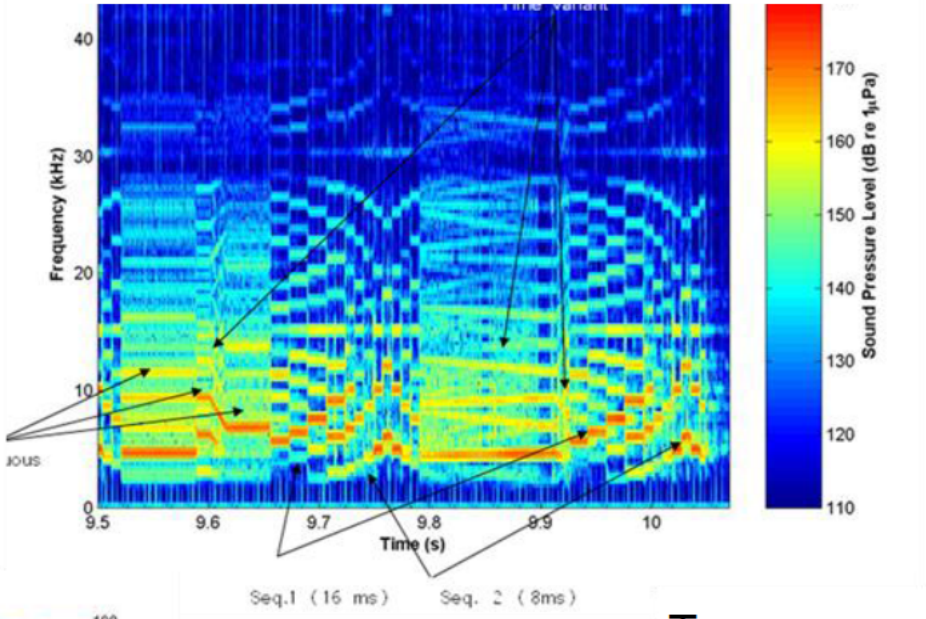


ADDs

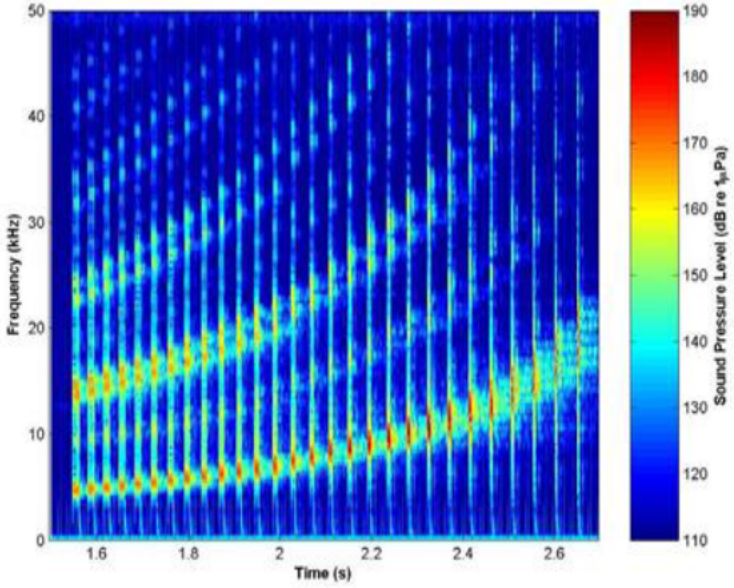
Manufacturer	Device	Source Level (dB)		Frequency (kHz)	Reference
		Scientific Literature	According to Manufacturer		
Airmar	dB Plus II	192 (RMS)	198 (RMS)	10 (tonal - with harmonics)	Lepper et al. (2014)
Lofitech	Universal Scarer	193 (RMS)	189 (Unknown)	14 (tonal - with harmonics)	Shapiro et al. (2009)
Ace Aquatec	Universal Scrammer 3	193 (RMS)	194 (Unknown)	10 - 65 (broadband)	Lepper et al. (2014)
Terecos	DSMS-4	179 (RMS)	None given	2 - 70 (broadband)	Lepper et al. (2014)
Ferranti-Thomson	4X	166 (Unknown)	200 (Unknown)	7 - 95 (broadband)	Terhune et al. (2002)
Fisheries pingers			130-155 (unknown)	10-160	
Dolphin Dissuasive Devices			162	2-500	



Airmar



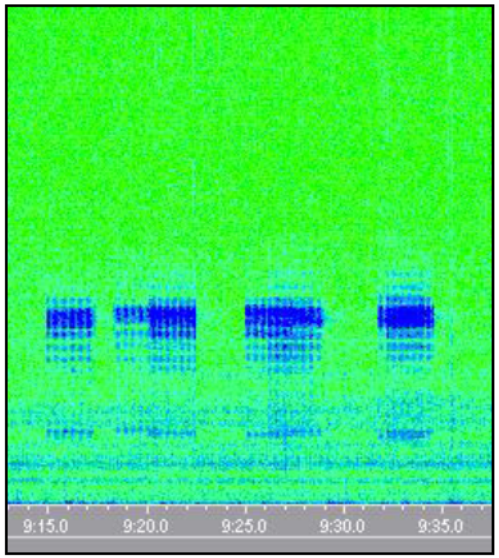
Terecos

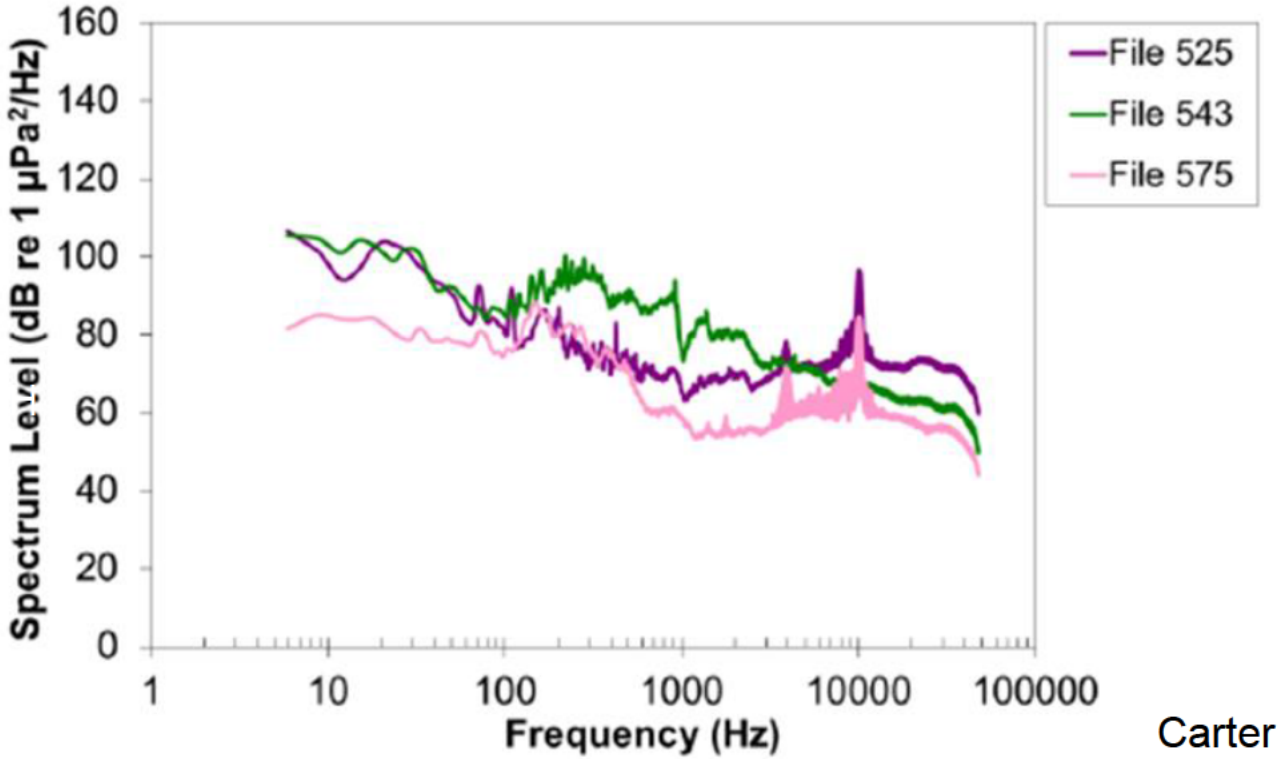


Ace-Aquatec

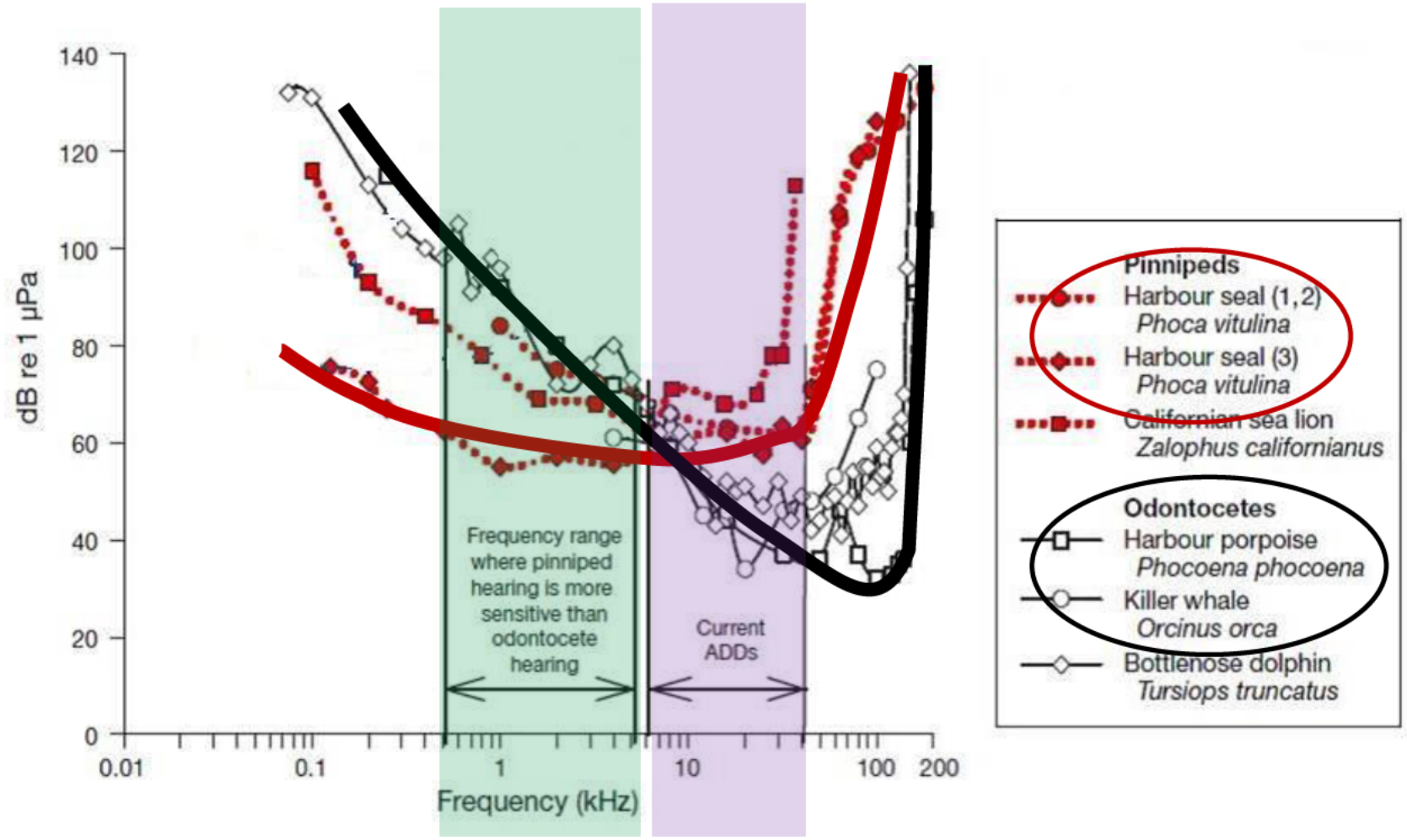
Lepper *et al*. (2014)

10 kHz

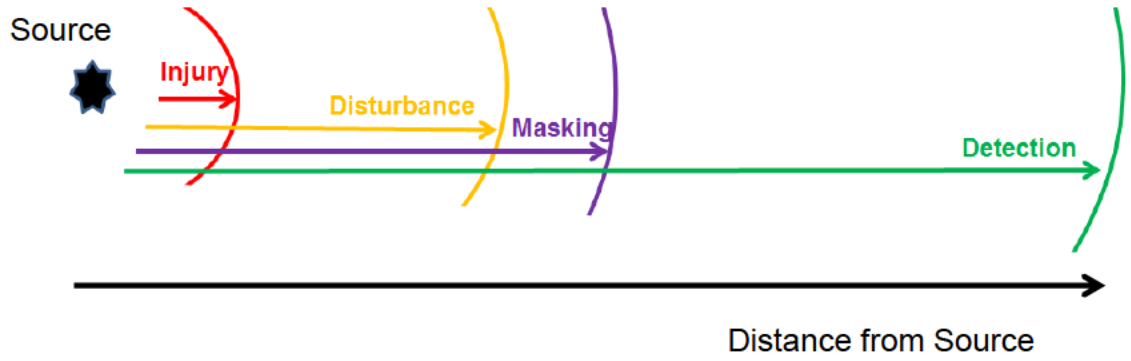




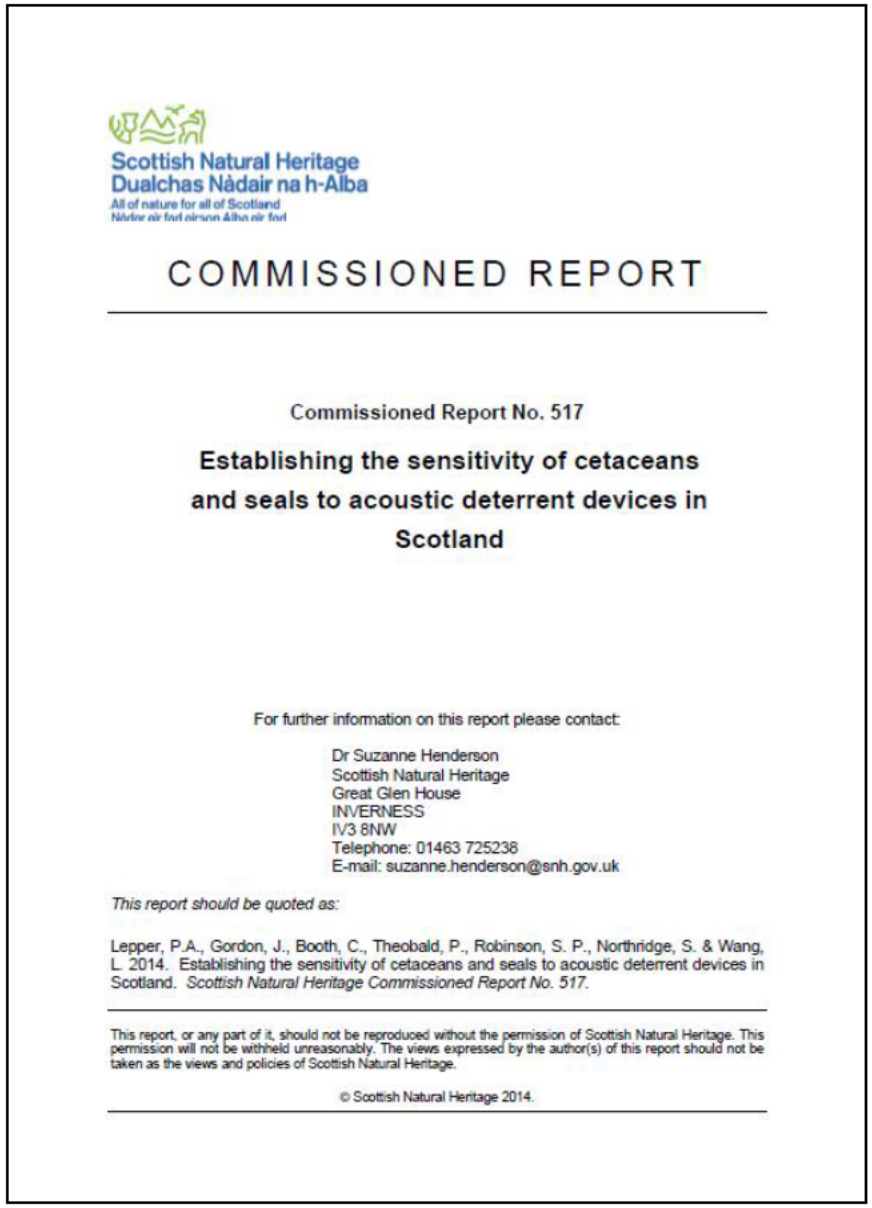
Carter (2013)



Gotz & Janik (2013)


Source
Injury
Disturbance
Masking
Detection
Distance from Source

Potential for hearing damage



Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland

COMMISSIONED REPORT

Commissioned Report No. 517

Establishing the sensitivity of cetaceans and seals to acoustic deterrent devices in Scotland

For further information on this report please contact:

Dr Suzanne Henderson
Scottish Natural Heritage
Great Glen House
INVERNESS
IV3 8NW
Telephone: 01463 725238
E-mail: suzanne.henderson@snh.gov.uk

This report should be quoted as:

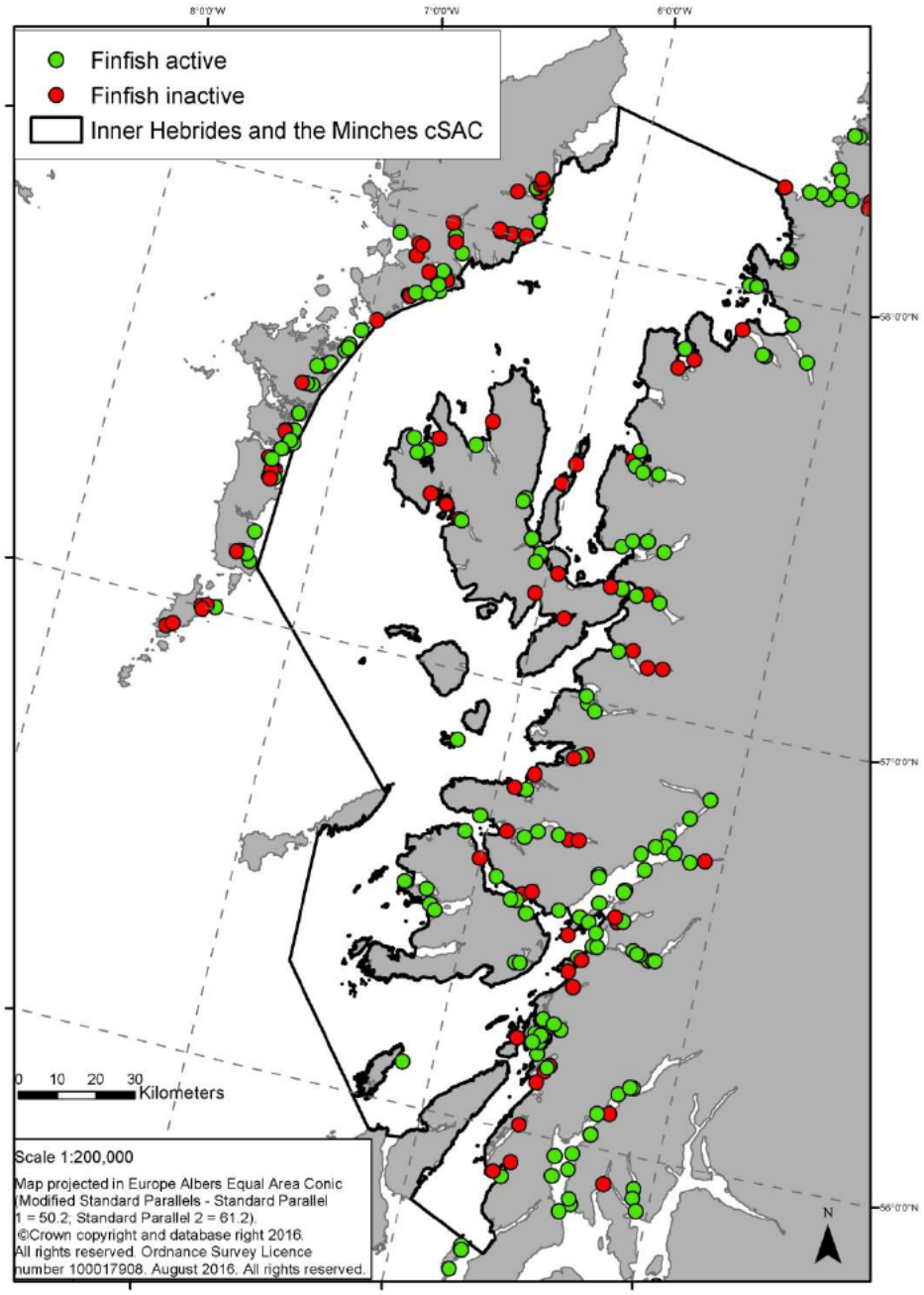
Lepper, P.A., Gordon, J., Booth, C., Theobald, P., Robinson, S. P., Northridge, S. & Wang, L. 2014. Establishing the sensitivity of cetaceans and seals to acoustic deterrent devices in Scotland. *Scottish Natural Heritage Commissioned Report No. 517.*

- Modelled sound propagation from an ADD source.
- Incorporated the hearing abilities of cetaceans and seals, and using current injury criteria thresholds to estimate the length of time taken for hearing damage to occur (only modelled out to 500m).
- Concluded that the risk of hearing damage to seals and cetaceans could not be discounted, if they stayed **within 100s of m for several hours.**
- Porpoises are more vulnerable than seals, but seem to show strong avoidance. Concerns may therefore focus on **longer term exposures, disturbance and habitat exclusion**.

Hearing damage also highlighted in Gordon & Northridge (2002); Gotz & Janik (2013) & Coram et al (2014)

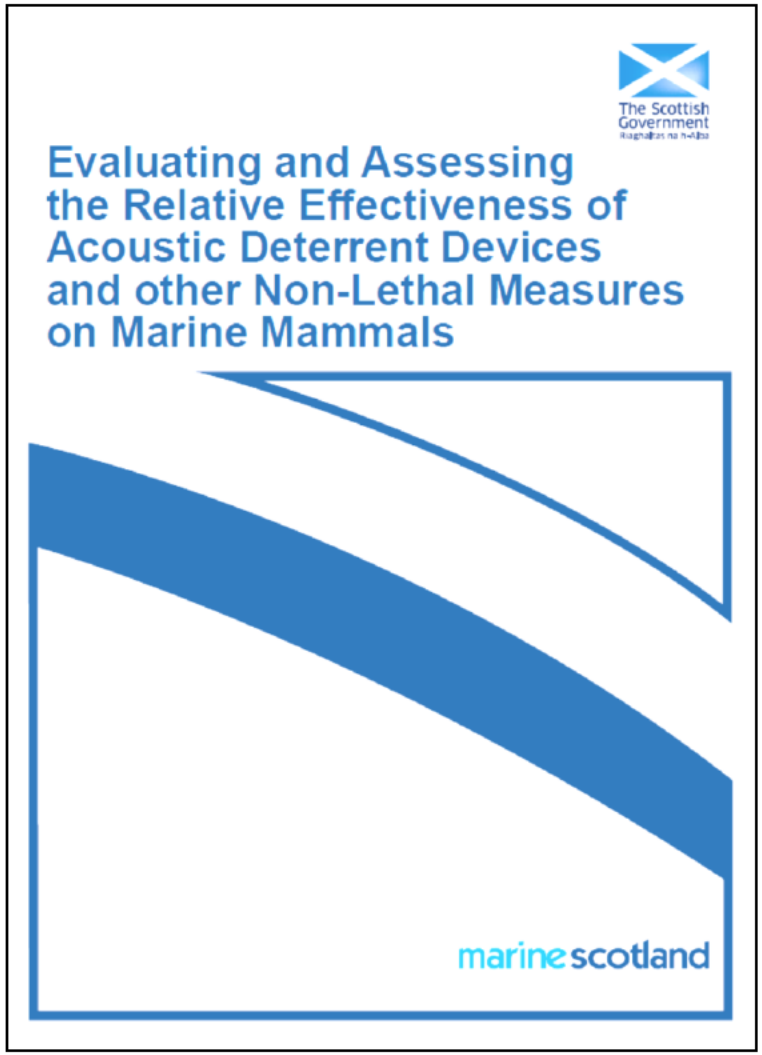
Our view:

- Given the output levels of available ADDs it is unlikely that hearing will be damaged by instant or short term exposure to the noise.
- But – we are concerned about cumulative exposure



Disturbance/ Habitat exclusion

- Review – published Nov 2014
- About half of all FF use ADDs – **but no register**
- HP known to avoid areas where Airmar and Lofitech
- Decrease in responsiveness over time
  - Habituation, hearing damage, learned strategies
  - Extent of habitat exclusion not well defined



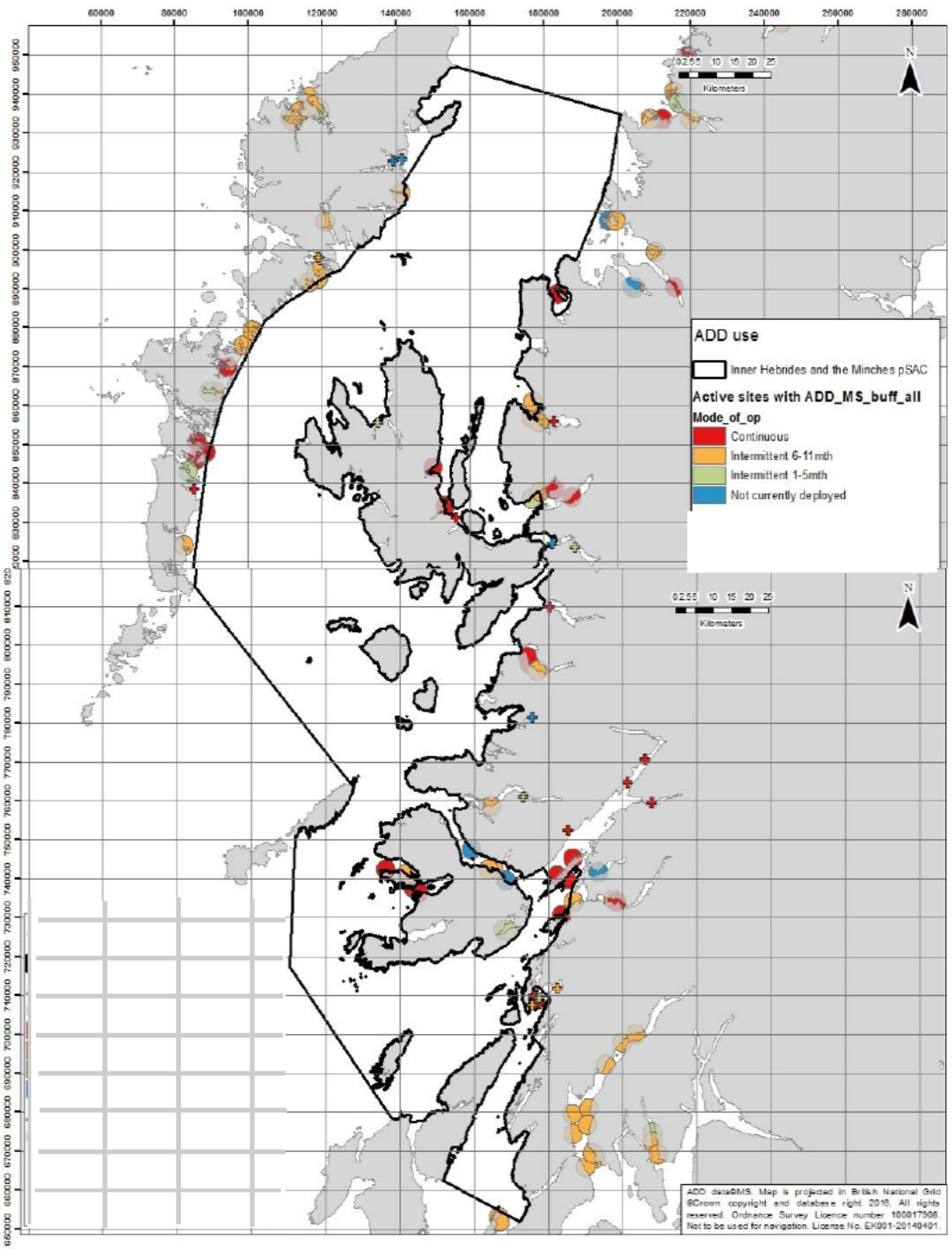
http://www.scotland.gov.uk/Resource/0046/00462305.pdf

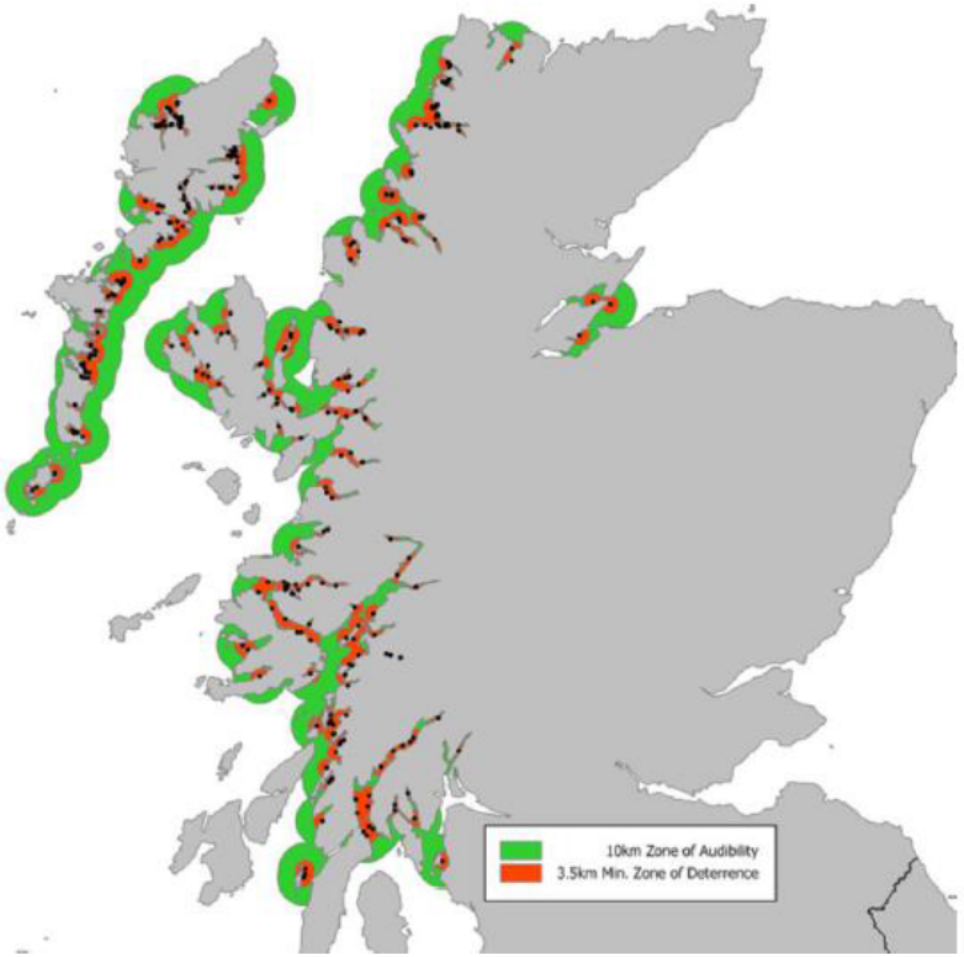
Data on Avoidance responses by harbour porpoises

Device	Response	Source
Airmar	Exclusion up to ~ 650m	Johnson 2002; Olesiuk 2002
?	Reductions in HP acoustic activity in Orkney in the vicinity of an ADD	Robertson 2004
Airmar	Evidence of avoidance, but not complete exclusion	Northridge, 1010
Lofitech	Significant reductions in hp detections out to 7.5km from source	Brandt et al, 2013
Airmar	Effective to 2.5 km	Kyhln 2015
Ace Aquatec	Likely to deter hp at ranges up to 1.2 km	Kastelein 2010
Terecos	Possible reduction in acoustic behaviour up to 1km	Northridge 2011
Terecos	No significant effect	Northridge 2013

Modelled Disturbance zones

- Airmar type – 2.5 km radius
- Terecos – 100's m radius





Coram et al, 2014

IH&M cSAC Draft Conservation Objectives

To avoid deterioration of the habitats or **significant disturbance** of harbour porpoise thus ensuring that the integrity of the site is maintained and it continues to make an appropriate contribution to harbour porpoise remaining at favourable conservation status in UK waters.

Harbour porpoise ©David Ainsley/SNH

So what does this mean?

- A new or change in application /consent will need to be considered under Habitats Regulation Appraisal (HRA)
- The use of ADDs is likely to have a Likely Significant Effect (LSE) so we will need information to ascertain whether or not there's an adverse effect on site integrity (assessed against conservation objectives)
- We consider significant disturbance to relate to duration and/or spatial extent and/or potential for cumulative / passage blocking

- In an application, we would –
  - Seek methods that minimise potential injury risk and disturbance from ADD use
  - Consider the location within the cSAC
  - Currently we are of the view that continuous use is not good practice -
    - only activated in response to a predation threat
    - using the lowest power possible to reduce disturbance zone
    - devices that use frequencies less disturbing to cetaceans (as new devices come on line)


Harbour porpoise ©David Ainsley/SNH

Thank you

Rhoda Davidson

[redacted]

From: Cathy Tilbrook
Sent: 09 August 2017 16:37
To: [redacted]
Cc: Suzanne Henderson; Liam Wright; [redacted]
Subject: DZR meeting and ADD advice

Hi [redacted]

As discussed, I have booked a room at Battleby with VC for our DZR meeting – Wed 13 Sept, provisionally 11-3. Let us know if there are other issues you want to discuss so we can firm up the timing (and order lunch if needed!).

Also as mentioned, please see attached the formal advice we were recently asked to provide to Marine Scotland, which assesses the available evidence on risks to cetaceans from ADD use. We were not asked to advise on potential ADD management approaches at this stage, but if MS want to follow this up then we would expect to discuss options for EPS licensing linked to the sort of 'best practice' ADD use we have been discussing with yourselves and industry reps recently. We can keep you informed on how this progresses.

See you in a few weeks.

Cheers, Cathy

From [redacted]@scottishsalmon.co.uk]
Sent: 09 August 2017 15:34
To: Cathy Tilbrook; Liam Wright; Suzanne Henderson
Cc: [redacted]
Subject: RE: Discussions around implications of DZR

Hi Cathy,

Yes, the 6th or 7th September would be fine for us. We could come across to Battleby. Let me know what fits in best and we can get it fixed in the diary.

Best Regards
[redacted]

From: Cathy Tilbrook [mailto:Cathy.Tilbrook@snh.gov.uk]
Sent: 09 August 2017 14:51
To: [redacted]@scottishsalmon.co.uk>; Liam Wright <Liam.Wright@snh.gov.uk>; Suzanne Henderson <Suzanne.Henderson@snh.gov.uk>
Cc: [redacted]@scottishsalmon.co.uk>
Subject: RE: Discussions around implications of DZR

Hi [redacted]

Thanks yes – all now getting back to normal after various holiday breaks. Hope you managed to get away too? I had a note from SEPA that the consultation had been extended which is helpful. Could we defer the requested discussion on DZR until early September? At present 5/6/7 look OK in all our calendars. Would any of those dates suit you? You're welcome to come to BBY if that suits you although others may wish to link by phone or VC.

Cheers, Cathy

Cathy Tilbrook
Head of Coastal & Marine Ecosystems Unit (job-share)
Scottish Natural Heritage, Battleby, Redgorton, Perth, PH1 3EW

Direct tel: 01738 458620
Mobile: [redacted] – please note new number

Please note I generally work Tues, Wed, Thur.
On other days, if urgent, please contact my job-share Katie Gillham (Katie.Gillham@snh.gov.uk) Tel 01463 725324.

From [redacted]@scottishsalmon.co.uk]
Sent: 09 August 2017 14:44
To: Cathy Tilbrook; Liam Wright; Suzanne Henderson
Cc: [redacted]
Subject: RE: Discussions around implications of DZR

Dear Cathy, Liam and Suz,

I expect you are all now back at your desks after the summer holidays and hopefully you all enjoyed getting a break. The consultation deadline for DZR has been delayed by a month, which allows a little more time to meet up and discuss this change in the regulatory landscape.
When would be an appropriate date for myself and [redacted] to have a discussion with you on this topic.

Best Regards

[redacted]
[redacted]
Scottish Salmon Producers' Organisation

Tel: [redacted]
Mb: [redacted]
Email: [redacted]@scottishsalmon.co.uk

From: [redacted]
Sent: 28 July 2017 16:16
To: 'Cathy Tilbrook (Cathy.Tilbrook@snh.gov.uk)' <Cathy.Tilbrook@snh.gov.uk>; Liam Wright <Liam.Wright@snh.gov.uk>; Suzanne Henderson <Suzanne.Henderson@snh.gov.uk>
Cc: [redacted]@scottishsalmon.co.uk>
Subject: Discussions around implications of DZR

Dear Cathy, Liam and Suz,

As you will be aware, SEPA launched their consultation on DZR at the end of July, with a closure date of 31st August. We would be interested to meet with you prior to the end of the consultation period to discuss the SNH position on DZR. Would you be available on any of the following dates: 16th, 18th, 22nd or 24th August to meet with the SSPO?

Best Regards

[redacted]
[redacted]
Scottish Salmon Producers' Organisation

Tel: [redacted]
Mb: [redacted]
Email: [redacted]@scottishsalmon.co.uk

Rhoda Davidson

[redacted]

From: Cathy Tilbrook
Sent: 01 June 2017 10:21
To: Caroline Carter; Donna Yule
Subject: FW: Acoustic deterrents in Orkney

Hi Caroline / Donna

This just in from [redacted]. Looks as though they are reverting to Toyness as preferred option for completing the trial. We had previously suggested that if they supplied a brief case that showed they had considered alternatives then we would re-consider Toyness. They have certainly considered and ruled out the Eday site, but I'm not sure if further justification would be needed. Please can one of you discuss with licensing team what would be required to progress this as an amendment to the EPS licence?

Given the potential wider benefits of this work for EPS I'm very keen that we facilitate this trial and provide a quick response.

Happy to discuss. Thanks, Cathy

From: [redacted]@st-andrews.ac.uk]
Sent: 01 June 2017 10:01
To: Cathy Tilbrook
Cc: [redacted]
Subject: Acoustic deterrents in Orkney

Dear Cathy,

As you know we have been trialling a new ADD that claims to be porpoise friendly at Wyre in Orkney.
You will recall we had hoped to run an experiment at two sites - the other being at Toyness.

The site at Wyre is now almost ready to go fallow as the last fish are harvested, and we will bring in the recording equipment in a couple of weeks.
The initial results from the first month of recordings are encouraging, but over two control and treatment periods, there was still a significant effect on porpoise click rates at the closest recording station (300m).
The difference in porpoise click detections at more distant sites (1500m and 3000m) during on and off periods were not significant.
This is very different from Airmar ADDs where the effect is evident at distances in excess of 3km, but still suggests a degree of displacement.

However, we detected a high frequency component to the signal that was not supposed to be there.
This is not part of the main signal, and is just a consequence of the switching in the device's circuitry, but it is right in the middle of the porpoise hearing sensitivity.
Because it's quite a low amplitude noise, it's possible that this explains the reaction we can see at close range.

The manufacturer is modifying the equipment to remove this unintended high frequency component.

So as a result we have a partial answer – but we will now need to test the modified equipment (which we will check before deployment for any stray high frequency signal components).
Wyre is no longer feasible, and we need a site where ADD use is restricted so we can control when it is on or off to satisfy the experimental needs and ensure we get a valid result.
At your suggestion we have proposed SSF's Eday site but we have been told that this site is not suitable as it will soon also be fallow and won't be restocked until February next year.

Further, therefore, to our previous request, I am wondering now if we could obtain permission to conduct a second phase of this experiment at Toyness.

I hope you will be able to consider this request,

With best wishes

[redacted]

[redacted]
Sea Mammal Research Unit
University of St Andrews
Bute Building
Queens Terrace
St Andrews
Fife KY16 9TS
[redacted]

Rhoda Davidson

[redacted]

From: Cathy Tilbrook
Sent: 18 May 2017 14:48
To: Caroline Carter; Karen Hall; Liam Wright; Erica Knott; Alex Turner; Laura Steel
Cc: Jane Dodd; Suzanne Henderson; Fiona Manson; George Lees; Katie Gillham
Subject: Parl motion on ADDs

Hi all

For info...this was in the Parl Monitoring summary today.... If it gets enough cross-party support would then be debated in the Chamber. Will keep an eye on it! Cheers, Cathy

Motion S5M-05663: Maurice Golden, West Scotland, Scottish Conservative and Unionist Party, Date Lodged: 17/05/2017
Sustainable Aquaculture

That the Parliament recognises the importance of aquaculture to the Scottish economy and supports measures to safely expand the industry; recognises the need for fish farms to deter predators; notes the potential adverse commercial impact on exports of lethal measures; calls for research to be conducted on the potential for noise pollution from acoustic deterrence devices (ADDs) to inadvertently affect marine wildlife, especially along the west coast of Scotland, and for research on alternatives to both lethal and ADD measures, and further calls for that research to inform both a review of licensing requirements for ADD use in areas of special conservation and in the issuing of a best practice guide on ADD use by Scottish Natural Heritage.

Supported by: Finlay Carson, Ross Thomson

Cathy Tilbrook
Head of Coastal & Marine Ecosystems Unit (job-share)
Scottish Natural Heritage, Battleby, Redgorton, Perth, PH1 3EW

Direct tel: 01738 458620
Mobile: [redacted] – please note new number

Please note I generally work Tues, Wed, Thur.
On other days, if urgent, please contact my job-share Katie Gillham (Katie.Gillham@snh.gov.uk) Tel 01463 725324.

Rhoda Davidson

[redacted]

From: Cathy Tilbrook
Sent: 18 May 2017 11:34
To: [redacted]
Subject: RE: FOI request (not from me)

Hi [redacted]

Hope this works!

Cheers, Cathy

PS Did you ever progress the ADD test for Orkney Toyness site?

From: [redacted]@st-andrews.ac.uk]
Sent: 17 May 2017 17:24
To: Cathy Tilbrook
Subject: RE: FOI request (not from me)

Hi Cathy – sorry but the attachment was dropped by our email security – I think they did not like the file name – would you mind changing it so there is no space before the pdf extension. Thanks
[redacted]

From: Cathy Tilbrook [mailto:Cathy.Tilbrook@snh.gov.uk]
Sent: 17 May 2017 16:31
To: [redacted]@st-andrews.ac.uk>
Subject: {Filename?} RE: FOI request (not from me)

Hi [redacted]

I attach a copy of the FoI response letter we sent in this case (we have to redact contact details), which includes the specific questions we were asked.

Hope that helps and happy to discuss.

Cheers, Cathy

Cathy Tilbrook
Head of Coastal & Marine Ecosystems Unit (job-share)
Scottish Natural Heritage, Battleby, Redgorton, Perth, PH1 3EW

Direct tel: 01738 458620
Mobile: [redacted] – please note new number

Please note I generally work Tues, Wed, Thur.