NatureScot

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Scotland's Nature Agency
Buidheann Nàdair na h-Alba

Memo / Meòrachan

To / Gu	[redacted] (Marine Scotland)
cc	[redacted] (Marine Scotland)
From / Bho	[redacted]
Date / Latha	2nd August 2022
Subject / Cuspair	**Kames Fish Farming – Licence to disturb EPS as a result of ADD use at an aquaculture site - Various**

European Protected Species Licence Application - Acoustic Deterrent Device - North Moine, Shuna Castle, Kames Bay East, Kames Bay West, Ardifuir and Pooltiel West – 00009937

Thank you for consulting us on this application. We are cognisant that this is the first application under the Marine Scotland EPS ADD guidance and so we set out our responses to your specific questions first, and follow with our detailed assessment of the application (Appendix 1).

NatureScot view with regard to the assessment methods undertaken by or on behalf of the applicant.

1. Do they follow the guidance provided to applicants?

Guidance: Information Note and Frequently Asked Questions for the Operators of Finfish Farms on the use of Acoustic Deterrent Devices and the requirement for a European Protected Species Licence]

The modelling method presented follows the guidance in terms of the equations used. However, they do not predict the number of impacted individuals based on the maximum potential output of the system (i.e. worst case) but instead use the methods to estimate the area within which less than one individual is at risk of disturbance and set site specific source levels accordingly.

There are numerous documents presented, and these lack clear identification of an order. This makes the assessment of the submission more difficult as it is not immediately obvious where some of the information has come from.

Following our review, we do not consider that sufficient independent evidence is supplied. There is not sufficient site specificity in terms of the Alternatives discussion, nor supporting evidence for efficacy. These are clearly requested in the MS guidance.

2. As the application covers several sites, can you advise if there is an issue with cumulative impacts and if sufficient information has been provided to allow consideration of this?

Cumulative impacts have not been considered, probably due to the methodology used in the assessment. We consider that cumulative impacts should be considered more fully, in particular

for the southern Argyll cluster. It is stated that there will only be one ADD device on any one farm at any one time, and that the timings of the systems will mean that there is no overlap in signal. This does not consider the overall signal output in the area. Each system could fire in the other system's gaps and so there needs to be better consideration of the cumulative impact. Particularly as it would appear the systems will be in place and active for each entire stocked duration.

There is little information on the management protocol for ADD use, other than the decisions regarding the use of the system rests with individual site managers. There appears to be company oversight, but no detail on how these might be managed cumulatively. It is stated that AceAquatec logs can be supplied, and these will be a useful review, however, it is not clear that any protocol exists that would prevent any site manager from increasing the sound level where a seal problem persists.

3. Does NatureScot have any relevant views or information in regard to the evidence provided to address test one – licensable purpose? The applicant has applied for a licence to prevent serious damage to property.

We note that the purpose is "*for preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber to any other form of property, or to fisheries"*, and so we think this application fits within this purpose.

One query we have is that it is also stated that an acoustic deterrent is needed to keep seal away from the pens due to the stress to stock caused. We are not clear if stress can be classed 'serious damage' under the purpose?

4. In particular, we are seeking views on the efficacy of ADDs.

There remains a lack of evidence relating to the efficacy of ADDs. There is peer reviewed evidence in the public domain relating to a competitor system (*i.e.* GenusWave), but none that we are aware of specific to the Ace Aquatec suite of devices.

The applicant has noted that they have found the RT1s to be effective at reducing seal predation by up to 75%, but not supported this with any evidence. This is based on the company's experience, however, there are no references for any statements made and so difficult to assess other than at face value.

5. Does NatureScot have any relevant views or information in regard to the evidence provided to address test two – no satisfactory alternative?

There is little evidence with regard to satisfactory alternatives. The text supplied is generic rather than site specific. The conclusion is that there are no satisfactory alternatives to acoustic deterrents, because the aim is to keep seals away from the pens (stress), as well as stop the predation.

The argument presented is based on the status quo of the industry and there is no consideration of potential new methods, *e.g.* closed containment, or semi-closed containment pens which have been mentioned by the MS led project (*i.e.* SAIC workshop on non-lethal methods to prevent seal depredation).

6. Although it is for MS-LOT to determine if an applicant has met the requirements of the licensing tests, we would welcome any additional views or information that would assist us. If you consider that the applicant has provided insufficient information in relation to this, do you have a view on what information it would be reasonable to expect the applicant to provide?

We consider the information relative to Test 2, satisfactory alternatives, is a weak on supporting evidence. It is general and not site specific (as per the MS Guidance).

In terms of our consideration for test 3, favourable conservation status, the applicant has presented modelled and opinion as information. Whilst we can make a judgement based on this and on casework experience across all industries, we believe it is reasonable to expect any and all statements and conclusions made by the applicant to be supported by independent evidence.

7. If the proposal is capable of having an adverse impact on the favourable conservation status of the European Protected Species concerned.

Based on the information supplied, we advise that this proposal is not capable of having an adverse impact on FCS (see Appendix 1, page 11).

8. If all the species capable of being disturbed by the activity have been correctly identified by the applicant

Species identifies are the harbour porpoise, minke whale and bottlenose dolphin. In addition the EPS licence should include short beaked common dolphin, killer whale and Rissos dolphin.
https://whaletrack.hwdt.org/sightings-map/
(The applicant has also included the seal species on the applications – seals are not EPS).

9. I would also be grateful if you could advise if the activity is likely to have a significant effect on the qualifying interests of any European site or is capable of affecting, other than insignificantly, the protected features of any MPA.

We advise LSE for the Inner Hebrides and the Minches SAC, and that management measures are needed for the Sea of Hebrides NC MPA (see Appendix 1, page 10/11).

NS recommendations for the applicant

- Supporting documents could be cross-referred using links and references to aid navigation to make the presentation of related information clearer and the resulting assessment process more efficient/faster.
- Present missing appendices, and include Alex Corum paper (if being relied on for evidence), plus evidence for efficacy.
- Evidence required to support non-impulsive assessment thresholds used. It is not clear how the ASR using a fast rise time, short pulses with relatively large gaps between pulses is 'non-impulsive'.
- Present predictions for injury and disturbance using max system output (as worst case scenario).
- Consider cumulative disturbance, for the Argyll cluster, using worst case scenario.
- Present site specific discussion regarding alternatives, including consideration of any new alternative methods.
- Provide ADD deployment plans (wrt. Harbour porpoise SAC and minke whale NC MPA).
- Provide clearer/stronger, measureable/reportable triggers for activation/deactivation.
- Provide the protocol for keeping the device output in line with the limited source levels as suggested within this application. How this would be enforced.

Question for MS LOT

- Should this be one EPS licence application, or should it be one for the Pooltiel site, and one for the Argyll cluster?

Appendix 1.

The submission contains a number of documents:

1. EPS Application form

2. Site specific appendix1. This is a tabulated submission that details the position (Lat and Lon) and licence information relevant for each farm included in this application.

3. Mooring containment maps – one pdf for each farm, showing the mooring locations.

4. Ace Aquatec ASR report. This is a submission provided by J. Lines, and is an assessment of the impact of using AceAquatec (AA) RT1 and US3. It includes disturbance and injury predictions.

5. Ace Aquatec Neptune SEL measurements. This pdf is badged as an AA submission. It is confused in content, as the title states SEL, but then the sub heading is RMS SL measurements. It talks about the experimental set up for the RT1, but then provides information for the RT1, FS1 and the US3. The information provided are given in RMS. It also suggested that the requirement for 'average' levels has come from the Regulator. This is not correct, this has been promoted by AA themselves.

6. Ace Aquatec Site Specific modelling. This document provides Google maps of each finfish farm location, and the area considered for the disturbance risk.

7. Sound propagation modelling – General Introduction. This document covers the requirement for the EPS licencing processing. Information of AA and the development of their ADD systems. It details appendices that are not included. It references work done by Alex Corum relating to the noise outputs of the AA systems, also not included but stated it's in press for publication. Included is the methodology using google earth pro to identify disturbance zones within which <1 HP is at risk of disturbance. It details, what AA call 'permitted zones'. This is the area AA have calculated within which there is a risk to <1 animal. From this they detail the max source level they can use without going over these 'permitted areas' (nothing actually on sound propagation modelling).

8. ADD Sound Zones. This is an excel workbook, provided as an example of how the disturbance zones, numbers of disturbed, SEL levels And PTS zones. This spreadsheet has been checked and agreed by MSS

9. EPS Risk Assessment. This word document, sets out the approach Kames have taken, including their view on 'alternatives'. They set out their view that in using the 'permitted' area approach and corresponding source level limit, that they do not need an EPS licence. This looks like a generic documents as they have included information on a Sound of Harris farm, which is not included in this application.

10. png files - for the Google map with disturbance zone for each of the fish fam sites.

Fin fish sites covered in the Application

This EPS licence covers a number of sites:

- North Moine
- Shuna Castle
- Kames Bay West & East
- Ardifuir
- Pooltiel west

All except Pooltiel are grouped south of Oban, in the Loch Melfort - Kilmartin area. Pooltiel is west Skye (Figure 1).

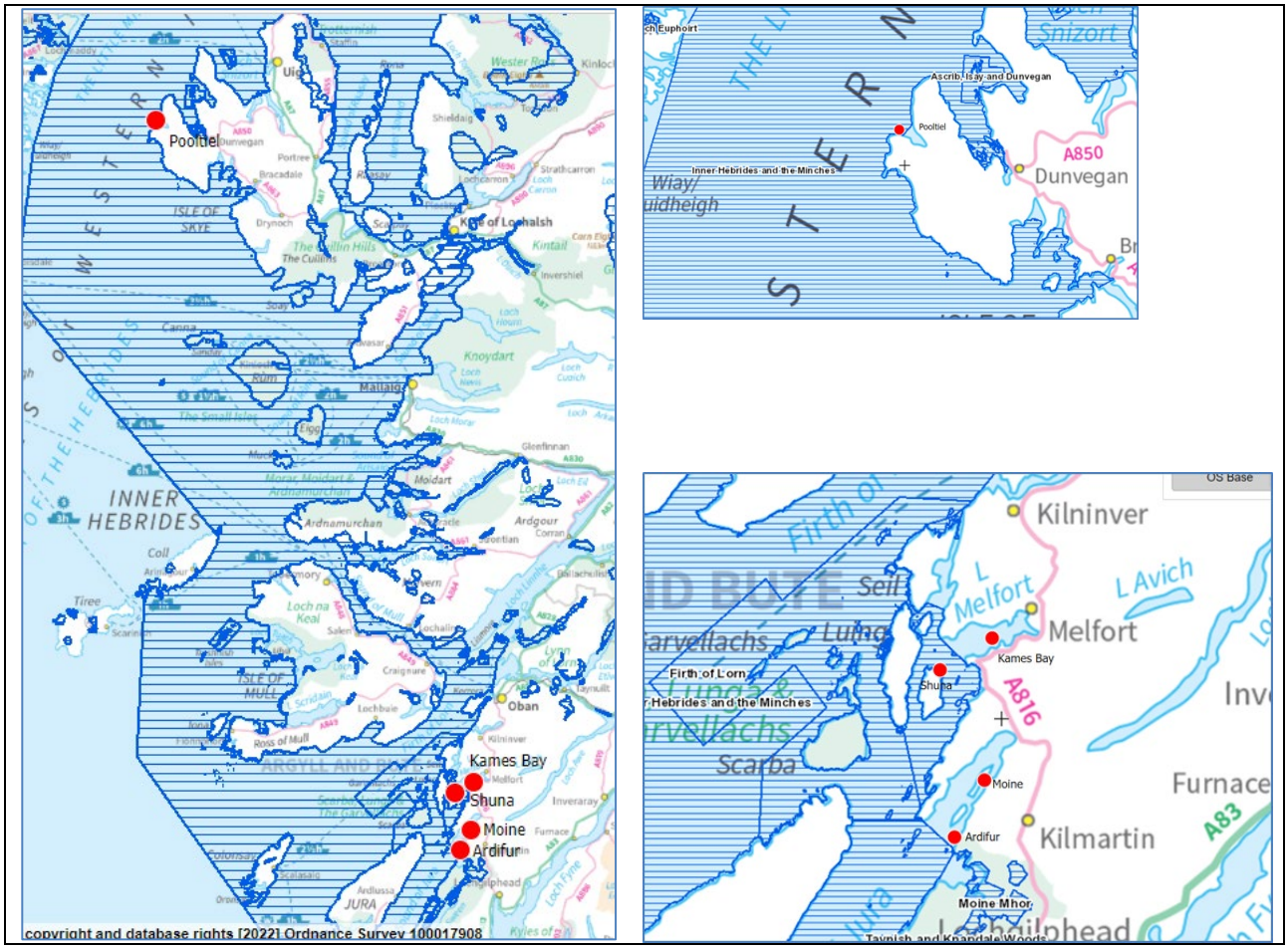

Figure 1 - locations of fin fish farms included in the Kames EPS licence application (NatureScot Geoview- hatchings denote protected areas)

ADD equipment planned

Total equipment on hire from Ace Aquatec are four RT1s and one US3 – no more than one device installed on any one sites at a time. The US3 will only be used in the event that the RT1s are not deterring the seals.

Device characteristics:

RT1	175-181 SPLrms	0.8 – 1.2 kHz	Random 2.8 sec bursts	Avg. duty cycle <5%
US3	175-181 SPLrms	8-11 kHz	Random 2.6 sec bursts	Avg. duty cycle <5%

Application is for one year – from 1/6/2022 to 1/6/2023 (one year - in line with MS guidance).

Intended pattern of use

It is stated that no more than one device is installed on any one site at a time. The main ADD type installed will be the RT1. The US3 will only be used if the RT1s are not effective. It is not clear how this might work in reality, nor what the decision process may be. What is the process if more than one farm is thought to require the US3, for example.

They state ADDs will be activated when the farms are stocked and there is the potential for seals at the site. It will only be deactivated if divers in the water, if a seal is trapped in the cage, if mortality numbers are not reduced (no timescale given). Decisions on use will be taken by the farm site manager. Detail on the management of the system is light. There is no specific cue mentioned, nor measurable/reportable trigger for activating the ADD system. The Risk Assessment document notes that devices will be deactivated when the site is fallow, or when there is no seal interaction evident.

We recommend a clear protocol, on system management to be adopted consistently by managers across all sites including agreed:

- Cues
- Reportable triggers
- Information about adjustments to sound levels made by site managers (sound level/duration)
- Deactivation timescales if mortality not reduced.

Our understanding of this submission is that the system, in reality, will be active most of the time the farms are stocked.

Efficacy

The Application (1) notes that the RT1 reduces seal mortalities by 75%. It is also mentioned that since the removal of the ADD system at Kames sites, there have been an increase in losses due to seals. They note 6884 seal attack mortalities. It would be useful to understand what the level of seal attach mortalities was before the removal of the last ADD system. **There is no supporting evidence included for efficacy.**

Satisfactory Alternatives

The application mentions the suite of mitigations that can be used, and include:

- The regular removal of moribund stock
- Keeping stocking densities low
- Tensioned HDPE pen nets
- Use of top nets
-

However, they state in the Application (1) and the EPS Risk Assessment (9) that these are complimentary methods, rather than a hierarchy nor alternatives. They mention that fish are stressed by the presence of seals near the pens and as such, currently in their view **there is no satisfactory alternative to acoustic deterrence.**

The argument put forward is that these are existing sites and so moving to alternative sites is not an option. Alternate dates/timings is also not an option, as deterrence will be needed when the farms are stocked.

The detail provided here is generic. The MS guidance states that if there is no satisfactory alternative, "*the applicant needs to demonstrate why lower risk alternatives have been discounted" "evidence must be provided that is site specific".* **The information supplied is not sufficiently detailed in relation to the MS guidance.**

Assessment methodology

The information within this application is fragmented. The submitted documents are inter-related; they use and present information taken from other documents, but the inter-links are not referenced. There is no signposting and therefore it is difficult to follow the methodology, without lots of revisiting the documents. That said, our understanding of the modelling presented is as follows.

The MS guidance has been used for their calculations. The Excel spreadsheet has been checked by MS and agreed. I have also worked my way through the calculations, and **can agree that the MS methods have been followed.**

PTS risk (injury assessment)

The method as advised by MS has been used to estimate the SEL levels. The appropriate injury thresholds have been used. It looks like the ranges to the PTS threshold have been calculated from the excel spreadsheet (8).

The PTS sea area (km^2) have been calculated using πR^2 and the number at risk, is outcome of the area multiplied by the density. We have not checked all figures, but the selected few looked at agree.

However, it is not clear if/how this has been accommodated when multiple devices are being used. For example, table A-3 details potential PTS figures using 3 RT1 devices, however, the resulting area and number of porpoise (in this example) are the same for one instance of the RT1 sound emission as they are for 3x RT1.

Tables are presented to predict the risk from 1US3, but when compared to the 1US3 and 3 RT1 devices the predictions are the same? It looks like the worst case of either the RT1 or US3 (single) has been taken to represent the multiple scenarios.

It is also not clear why these scenarios have been chosen. Pooltiel is the northern site, and on its own, so the applicant has stated that only one device will be activated at any one time on a farm. The southern farms are a cluster, here there are 5 sites, so potentially there could be 5 devices active in the area. The scenarios suggested therefore do not cover the worst case scenario. It is stated that only one device per site, and that they will be set to never overlap in sound. However, this does not cover the potential for a staggered noise emission, what we mean here is that different devices could be sounding in the 'gaps' of others. This is not made very clear in the submission.

Having said that, even if the predicted number of individuals at risk of PTS is multiplied by 5, the number remains <1, and so **we can agree with the conclusion that an EPS licence for injury is not needed.**

Disturbance assessment
The disturbance ranges have been calculated using the equations as set out by MS. However, instead of using the maximum output from the system to determine the disturbance range as the worst case scenario, they have worked out the area where less than one individual is at risk of disturbance. This range has then been applied to the site locations, and the area determined by subtracting any land area, from the total area ((7) pg 8 – table with SPL and resulting Radius; (10) for individual google maps for the area calculated).

For the disturbance area calculations, they have used '*line of sight'* to define the area. However, they have assumed that any island will completely block the noise emission. This is not the case, as some noise will leak around (Table 1). The MS guidance does recommend the removal of land from the area calculated and we agree; however, this is mainly referring to mainland, or large islands. Having said that, the areas excluded may not make a significant difference.

Table 1

Site	**Limited SPLrms**	**Comment**
Moine	181 dB	okay
Shuna	176 dB	okay
Kames Bay East	181 dB	Potential underestimate – sound leakage round the headlines
Kames Bay West	178 dB	Potential underestimate – disagree with the removal of the small island shadow.
Ardifuir	177 dB	Potential underestimate – disagree with the removal of the small island shadow.
Pooltiel	175 dB	okay

Because the approach taken is to limit the source level, all predictions for animals at risk of disturbance are lower than one!

<u>Supporting evidence</u>
The MS guidance requires a high level of supporting evidence, because of the general lack of information available and resulting uncertainty on ADD noise output and efficacy. This application does not supply any independent evidence. The Neptune Sonar report, may be independent, but it is badged as an AA report. We assume this must be from Neptune; however, this is not stated and so there is no audit trail for this paper.

The documents presented are primarily authored by the ADD manufacturer.

The MS guidance states that "*any document presented as an evidence base for consideration would ideally be peer-reviewed" "if this is not possible, it must have gone through a robust Q&A process with an external body/individual" "and be publicly available".*

Dr J lines excel spreadsheet has been checked by MSS (we believe).

The sound propagation modelling – general introduction, has appendices missing. It is stated that the US3 and the RT1 have been mapped in the water by Neptune Sonar in March 2020, but this information is not supplied.

It is stated that the systems have been independently evaluated by Jeff Lines and Alex Coram, and that there is a paper in press, but there is no further information supplied for our review.

It is stated that the devices are non-impulsive, and whilst it is true that the MS guidance treats all ADD types as non-impulsive, this has not been defined as yet. The Sound propagation modelling – general introduction () states that the devices have a high rise time, of less than 12 milliseconds. That together with the low duty cycle means it is difficult to see this type of signal as non-impulsive. This needs to be evidenced so that we can be confident that the correct injury thresholds have been used.

Therefore, **there does not appear to be any independent supporting information supplied with this application, and therefore falls short of the requirements as states in the MS guidance.**

Further general comments

- Seals are included on the EPS licence – but they are not EPS.
- Two EPS applications might be more appropriate due the distance from the southern Argyll cluster of sites to Pooltiel, Isle of Skye.
- We consider that the cumulative scenario has not been considered well enough.
    - PTS - They have presented tables that detail impact of multiple ADD systems, but (as noted above) the ranges and numbers of individuals seem to represent the worst case for which ever device type, no matter how many the scenario is set to cover.
    - Cumulative for disturbance has not been looked at, presumably because they are limiting the disturbance zone (in theory) to less than one individual.
- The excel worksheet has a category detailing MMPA compliance. To our knowledge what constitutes MMPA compliance has not yet been agreed. The tool, as referenced, published by NOAA was for consultation purposes only. Therefore, we don't think MMPA compliance can be relied on as yet.
- The application relies solely on modelled information.
- The method of limiting the device output such that <1 individual can be disturbed, was not recommended by the MS guidance. In theory, if this was adhered to, the argument could be made that they do not need an EPS licence; however, we have concerns with this approach.
    - There is no guarantee that the system would not be operated above these limits if seal attacks persist.
    - There is no guarantee that all available systems would not be used if the site manager deems it necessary.
    - This does not predict the 'worst case' scenario, and possibly highlights a misunderstanding of the EPS process, in that the licence 'allows' the activity to disturb over the duration of the licence period.

Protected sites comments

Inner Hebrides and the Minches SAC (Harbour Porpoise)
(Shuna, Pooltiel)
Underwater noise is highlighted in the Conservation and Management Advice[1] as a pressure needing consideration for the SAC. EPS licence considerations form part of the management advice for the site.

Conservation objectives for the site:

[1] https://apps.snh.gov.uk/sitelink-api/v1/sites/10508/documents/59

Inner Hebrides and the Minches SAC
Qualifying species: Harbour porpoise (*Phocoena phocoena*)
1. To ensure that the Inner Hebrides and the Minches SAC continues to make an appropriate contribution to harbour porpoise remaining at favourable conservation status. 2. To ensure for harbour porpoise within the context of environmental changes, that the integrity of the Inner Hebrides and the Minches SAC is maintained through 2a, 2b and 2c: 2a. Harbour porpoise within the Inner Hebrides and the Minches are not at significant risk from injury or killing. 2b. The distribution of harbour porpoise throughout the site is maintained by avoiding significant disturbance. 2c. The condition of supporting habitats and the availability of prey for harbour porpoise are maintained.

The main CO for consideration in this case is 2b, where interpretation of 'significant disturbance' is needed. Supplemental information states that this does depend on the context, *but that it should be interpreted to mean disturbance that affects the integrity of the site through alteration of the distribution of the harbour porpoise within the SAC such that recovery cannot be expected. The effects of plans or projects that last beyond the average generation time of harbour porpoise are more likely to constitute significant disturbance and to have an impact on site integrity. It is expected that significant disturbance will lead to more than a transient effect on the distribution of harbour porpoise. It may result in the following effects:*

- *Contributes to the long-term decline in the use of the site by harbour porpoise.*
- *Changes to the distribution of harbour porpoise on a continuing or sustained basis.*
- *Changes to harbour porpoise behaviour such that it reduces the ability of the species to survive, breed or rear their young.*

For example, a localised, short term disturbance away from the coast may not be considered to cause levels of disturbance that would raise concern, whereas continual disturbance in a sea loch or sound may do.

We class any use of an acoustic deterrent is **likely to have a significant effect (LSE) and therefore an Appropriate Assessment is required.**

We advise that continuous use of any ADD system within the SAC is not acceptable. **The applicant needs to supply an ADD Deployment Plan**, which includes a decision tree/ flow chart to specify triggers for ADD activation, and cues for deactivation, that are measurable and reportable. Logs of usage are required to be kept and available for review.

Our advice for ADD use, states that if seal predation has not been decreased after two weeks of use then the ADD system is not effective and should be switched off and alternatives sought.

We advise, provided the flow chart is supplied and agreed, that it is likely the use of the RT1 for short periods of time (due to the frequency content and the low duty cycle) that this device will not result in significant disturbance in the context of the Conservation Objectives, and therefore will not result in an adverse impact of site integrity.

The use of the US3 due to the frequency content (8-11 KHz) should only be used for short periods of time.

This usage, together with the limitation of the source levels, should ensure no adverse effect on site integrity.

Loch Sunart to the Sound of Jura MPA
(Shuna, Kames Bay, East and West)
There is no impact pathway for consideration in this MPA. No LSE.

Sea of Hebrides MPA (minke whale & basking shark)
(Pooltiel)
Basking shark are thought to have a low sensitivity to noise. Therefore we advise this proposed activity is not capable of affecting basking shark other than insignificantly.

Minke whales are sensitive to underwater noise. Both proposed devices overlap with the hearing range of minke whale. There is evidence from McGarry et al (2007)[2] shows a response to an ADD signal (*Lofitech – source root mean square (rms) sound pressure level of 198 dB re 1 µPa re 1m, for a fundamental frequency of 14.6 kHz. The pulse length had an average of 752 ms)*. We are aware that this is a different device to the RT1 and the US3, however, there is a lack of evidence to support a lack of response to the Ace Aquatec devices, other than from theoretical calculations.

Our advice [3]for the use of ADDs in aquaculture within the MPA is to reduce or limit pressure. Therefore **the ADD deployment plan developed for the Inner Hebrides and the Minches SAC should also apply for minke whales in the Sea of Hebrides MPA.**

We advise there is no pressure connectivity for;

- **Kames Bay, East & West** (*approx. 2.5km from Inner Hebrides and the Minches SAC boundary)*
- **Ardifuir** – (*approx. 1km from Inner Hebrides and the Minches SAC and Loch Sunart to the Sound of Jura MPA boundary*)
- **Moine** – *(approx. 5km from Inner Hebrides and the Minches SAC and Loch Sunart to the Sound of Jura MPA boundary*)

Favourable Conservation Status (FCS) comments

Harbour porpoise – Overall Conservations Status – Unknown - https://jncc.gov.uk/jncc-assets/Art17/S1351-UK-Habitats-Directive-Art17-2019.pdf

Minke whale – Overall Conservation Status – Unknown - https://jncc.gov.uk/jncc-assets/Art17/S2618-UK-Habitats-Directive-Art17-2019.pdf

Bottlenose Dolphin - Overall Conservations Status – Unknown - https://jncc.gov.uk/jncc-assets/Art17/S1349-UK-Habitats-Directive-Art17-2019.pdf

The status' are currently set at 'unknown' because there is not sufficient data to be able to determine trends.

[2] McGarry, T., Boisseau, O., Stephenson, S., Compton, R. (2017) Understanding the Effectiveness of Acoustic Deterrent Devices (ADDs) on Minke Whale (Balaenoptera acutorostrata), a Low Frequency Cetacean. ORJIP Project 4, Phase 2. RPS Report EOR0692. Prepared on behalf of The Carbon Trust. November 2017.
[3] https://sitelink.nature.scot/site/10508 Sea of Hebrides MPA Conservation and Management Advice.

"Favourable Conservation Status: UK Statutory Nature Conservation Bodies Common Statement 2018"
https://hub.jncc.gov.uk/assets/b9c7f55f-ed9d-4d3c-b484-c21758cec4fe

FCS relates to the long term distribution and abundance of the populations of species in their natural range. We interpret FCS at UK level as making a contribution to achieving FCS throughout the natural range of the species. The natural range for the UK is the Atlantic and Marine Atlantic regions. However, the concept of FCS can be applied at different geographic scales, and therefore in this case we can look at the West Coast of Scotland region, and the management units relevant for these key species. The concept of FCS is broader that the parameters used in Article 17 reporting. Ultimately, our advice on FCS is a value judgement.

We advise, based on the information provided that even if the ADDs are active continuously, that the disturbed areas are small in terms of FCS, and therefore we can confirm that there will be no impact on FCS from this application.

We caveat this, with the understanding that this may need to be reviewed if there are more EPS applications for ADD use within the same area.

End.

Marine Scotland Science

T: +44 (0)131 244 2500
E: MSS_Advice@gov.scot

[redacted]
Marine Scotland Licensing Operations Team
Marine Laboratory
375 Victoria Road
Aberdeen
AB11 9DB

09 August 2022

Dear [redacted]

KAMES EPS LICENSE APPLICATION

Marine Scotland Licensing Operations Team (MS-LOT) asked Marine Scotland Science (MSS) the following questions in relation to this European Protected Species (EPS) licence application. The MSS responses are provided below each of the MS-LOT questions.

In addition to these responses, MSS note that two of the sites applied for are within the Inner Hebrides and the Minches Special Area of Conservation (SAC), and that one of those is also in the Sea of the Hebrides Marine Protected Area (MPA). The remaining sites are in close proximity to both of these designated sites. Therefore, MSS advise MS-LOT that it is likely an Appropriate Assessment (AA) and an assessment of effects to the MPA, will be required for these applications.

LOT Questions to MSS

"We are seeking views in regard to the assessment methods undertaken by or on behalf of the applicant.

1. *Do they follow the guidance provided to applicants? faq_adds_and_eps_including_annex_1_and_annex_2_-_version_5_-october_2021_-_final.pdf (marine.gov.scot)*
2. *If not, is the applicant using an appropriate method for assessment?*
3. *Has the applicant provided sufficient information to allow an understanding of the impact of the devices? If not, what further information is required?*
4. *As the application covers several sites, can you advise if there is an issue with cumulative impacts and if sufficient information has been provided to allow consideration of this?*
5. *Does MSS have any relevant views or information in regard to the evidence provided to address test one – licensable purpose? The applicant has applied for a licence to prevent serious damage to property.*
6. *In particular, we are seeking views on the efficacy of ADDs.*
7. *Does MSS have any relevant views or information in regard to the evidence provided to address test two – no satisfactory alternative?*
8. *Although it is for MS-LOT to determine if an applicant has met the requirements of the licensing tests, we would welcome any additional views or information that would assist us. If you consider that the applicant has provided insufficient information in relation to this, do you have a view on what information it would be* ***reasonable*** *to expect the applicant to provide?"*

MSS responses

1. *Do they follow the guidance provided to applicants?*

No. The applicant has chosen to assess the effect of their use Acoustic Deterrent Devices (ADDs) in a different way to the guidance, although some of the information from the guidance has been used to support their conclusions.

2. *If not, is the applicant using an appropriate method for assessment?*

The applicant's method takes the underlying information from the guidance and then changes the source level of the ADD to bring the number of harbour porpoise disturbed by the ADD under one, presumably with the intention of avoiding the requirement for an EPS licence. MSS raised concerns with this approach in previous advice to MS-LOT (22 October 2021). Our main concern with this strategy is that the underlying data sources (the noise propagation model and the density estimates) are too coarse to support such fine resolution decision making. Additionally, modifying the outputs of the ADDs in this way raises the question about whether they will be effective at deterring seals at reduced source levels.

We advise that the applicant should simply assess the potential effects of ADDs operating at the standard source level, as detailed in the guidance, including providing the number of cetaceans impacted under a worst case scenario.

3. *Has the applicant provided sufficient information to allow an understanding of the impact of the devices? If not, what further information is required?*

No. The information provided by the applicant gives the frequency range for the devices. The source level for the ADDs has been changed for each location. However, at these frequency ranges and source levels, MSS would typically screen activities into the EPS process.

The application does not consider the potential interaction between sounds from ADDs at nearby sites, and while the specification sheets for the ADDs are mentioned in the Sound Propagation Modelling document (https://marine.gov.scot/sites/default/files/ace_aquatec_sound_propagation_modelling_-_general_introduction.pdf) they have not been provided. This information is required.

4. *As the application covers several sites, can you advise if there is an issue with cumulative impacts and if sufficient information has been provided to allow consideration of this?*

MSS advise that there is a potential issue with cumulative impacts and that insufficient information has been provided to allow consideration of this. The applicant has not undertaken a cumulative impact assessment (CIA). MSS have not been presented with any information on other activities producing underwater noise levels capable of disturbing cetaceans in the area, either from ADD use at other aquaculture sites or from other industries. The CIA would benefit from consideration of all other activities capable of causing disturbance or injury, however as noted in the MS guidance document currently only impacts from other fish farms using ADDs are required to be considered. As highlighted by NatureScot in their advice (dated 02/08/2022), of particular relevance to the CIA is the cluster of fish farms in Southern Argyll. More information on the recommended approach to a CIA can be found in the FAQ guidance document.

In the Sound Propagation Modelling documents (General Introduction), the applicant states that the ASR devices are a smart system which knows when other devices are in the vicinity. However, more information would be required to inform our understanding of this (e.g. the operating distance of the system, how the controls are implemented, whether time delay is accounted for in terms of animal movement between sites).

5. *Does MSS have any relevant views or information in regard to the evidence provided to address test one – licensable purpose? The applicant has applied for a licence to prevent serious damage to property.*

The MSS advice provided here has been generated by advisors working primarily on marine mammals and underwater noise. Advisors within the MSS Aquaculture and Fish Health Programme may be in a position to provide more insight into the damage that seals cause to Aquaculture. We are also aware that advice has been sought from veterinary experts on the potential effects of seal predation on fish health.

6. *In particular, we are seeking views on the efficacy of ADDs.*

The evidence concerning the efficacy of ADDs, specifically in terms of their ability to reliably prevent depredation from grey and harbour seals at aquaculture sites around Scotland, is equivocal. This subject has been recently reviewed by the Scottish Government in a Parliamentary Report[4], which drew on findings from two published Marine Scotland reports[5] [6].

Efficacy of ADDs is difficult to define and standardise, with different metrics reported, ranging from assessment of fish yields, numbers of damaged fish, to numbers of seals in the vicinity of a fish farm or fishery. However, the studies that have been carried out suggest that while most ADDs are able to show some evidence of efficacy, there is much disparity and context is critical to whether an ADD is effective or not. This means that variables such as food-motivation of seals, prior exposure of seals to ADDs, and site-specific background noise and noise propagation are likely to have a strong influence on whether an ADD effectively deters seals from predating or disturbing fish at an aquaculture site.

Since there are no published reports on the efficacy of the Ace Aquatec RT1 device, which is the primary ADD type proposed to be used by the applicant, MSS cannot comment on the efficacy of this specific device, although we note that the applicant claims these devices have been effective at reducing depredation in the past. Additionally, there is no information provided on the efficacy of the ADD at reduced source level. It is therefore difficult to provide advice on whether the applicant's approach to the assessment, which varies the source level SPL between 175 dB and 181 dB re 1 µPa (RMS), will enable the ADDs to be effective. We recommend that further justification is requested from the applicant regarding efficacy, including at reduced source levels.

A review of the reported acoustic characteristics of different models of ADD was carried out in 2017 by JNCC[7], and demonstrated there are often significant differences between the source levels of a specific device reported by the manufacturer and the levels measured in the field. There are also frequently differences between field measurements, both within and between studies. This variation in source levels has often been identified as a potential explanation for the disparate responses of target and non-target species.

7. *Does MSS have any relevant views or information in regard to the evidence provided to address test two – no satisfactory alternative?*

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[4] Scottish Government (2021). Acoustic Deterrent Device (ADD) Use in the Aquaculture Sector. Parliamentary Report. ISBN 9781800047310.
https://www.gov.scot/publications/acoustic-deterrent-device-add-use-aquaculture-sector-parliamentary-report/documents/

[5] Coram, A., Ragnarsson, V., Thomas, L. and Sparling, C.E. (2022). Use and efficacy of Acoustic Deterrent Devices (ADDs) in Aquaculture. Report to Scottish Government. ISBN 9781804350690.
https://www.gov.scot/publications/use-efficacy-acoustic-deterrent-devices-adds-aquaculture/pages/

[6] Thompson, D., Coram, A.J., Harris, R.N. and Sparling, C.E. (2021). Review of non-lethal seal control options to limit seal predation on salmonids in rivers and at finfish farms. Scottish Marine and Freshwater Science Vol 12 No 6, 136pp. DOI: 10.7489/12369-1
https://data.marine.gov.scot/dataset/review-non-lethal-seal-control-options-limit-seal-predation-salmonids-rivers-and-finfish

[7] McGarry, T., De Silva, R., Canning, S., Mendes, S., Prior, A., Stephenson, S. & Wilson, J. (2020). Evidence base for application of Acoustic Deterrent Devices (ADDs) as marine mammal mitigation (Version 2.0). JNCC Report No. 615, JNCC, Peterborough. ISSN 0963-8091.

MSS note that the applicant has stated that several alternative anti-depredation measures are already in place at their farms including regular removal of dead fish, maintaining low stocking densities and the use of tensioned HDPE pen-nets and top-nets. These techniques are to be used in a combined approach in conjunction with ADDs. The applicant states that prior to the implementation of ADDs at their sites, the mortality rates were as high as 10%. Since the removal of ADDs last year the applicant states there have been 6,884 mortalities. MSS note that the applicant has not provided figures for comparison, either prior to or following the cessation of ADD use. However, the applicant also states that the use of the RT1 ADD at their sites has reduced depredation by 75%. Taken at face value, these figures would suggest that the alternative measures currently employed are less effective without ADDs. However, we note that no historic evidence of depredation rates with and without ADDs has been provided. MSS acknowledge that at present it is not possible to gather this evidence, as the use of ADDs requires an EPS licence. We recommend that should a licence be issued, conditions should be put in place to require ADD users to gather evidence of ADD use and corresponding depredation rates, in order to better understand the efficacy of these devices going forward[8].

MSS recommend more evidence is provided to justify why the currently used alternative measures (i.e. regular removal of dead fish, maintaining low stocking densities and HDPE pen-nets / top-nets) are not effective. For example, the applicant has not stated how regularly dead stock is removed; the Aquaculture: Code of Practice[9] recommends this is done daily. In addition, MSS recommend justification of why other alternative measures available[10] would also not be effective. Examples that have shown success at other fish farms in Scotland include Anti-Predator Netting (APN), seal blinds and false bottom cages. MSS note that APN refers to an additional layer of netting to provide physical separation, and not just the use of thicker single netting (e.g. HDPE). The use of APN at fish farms in Scotland has increased from around 20% in 2016 to over 40% in 2020[11], and MSS recommend an explanation of why this method has not been implemented is provided by the applicant.

MSS acknowledge that whilst there are other alternative measures available (as outlined above) to deter seals from depredation in addition to those used at Kames sites, the efficacy of many of these are even less well understood than ADDs. A comprehensive evaluation of the full suite of currently available alternatives measures, some of which include those currently employed by the applicant, can be found in Thompson et al. (2021)[7].

8. *Although it is for MS-LOT to determine if an applicant has met the requirements of the licensing tests, we would welcome any additional views or information that would assist us. If you consider that the applicant has provided insufficient information in relation to this, do you have a view on what information it would be* ***reasonable*** *to expect the applicant to provide?*

To summarise the information MSS consider lacking in the current application:

- MSS recommend more evidence is provided to justify why currently used alternative measures and those not trialled by the applicant (including Anti-Predator Netting (APN), seal blinds and false bottom cages) are, or would not be, effective.

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[8] Coram, A., Ragnarsson, V., Thomas, L. and Sparling, C.E. (2022). Use and efficacy of Acoustic Deterrent Devices (ADDs) in Aquaculture. Report to Scottish Government. ISBN 9781804350690. https://www.gov.scot/publications/use-efficacy-acoustic-deterrent-devices-adds-aquaculture/pages/

[9] Aquaculture: Code of Practice https://www.gov.scot/publications/aquaculture-code-practice-containment-prevention-escape-fish-fish-farms-relation-marine-mammal-interactions-2/documents/

[10] Thompson, D., Coram, A.J., Harris, R.N. and Sparling, C.E. (2021). Review of non-lethal seal control options to limit seal predation on salmonids in rivers and at finfish farms. Scottish Marine and Freshwater Science Vol 12 No 6, 136pp. DOI: 10.7489/12369-1 https://data.marine.gov.scot/dataset/review-non-lethal-seal-control-options-limit-seal-predation-salmonids-rivers-and-finfish

[11] Marine Scotland (2020). Second review of the operation of the seal licensing system under the Marine (Scotland) Act 2010. Available at https://www.gov.scot/publications/marine-european-protected-species-protectionfrom-injury-and-disturbance/

- MSS recommend the devices are assessed at their tested effective source level (the standard output of the ADD), and a revised impact assessment is provided with realistic numbers of animals predicted to be disturbed.

- If the applicant is intent on using the device with lowered source levels, MSS request further information on the resultant efficacy of these devices for their intended purpose.

- MSS are unclear exactly how the four RT1 devices will be employed across the six sites, and how the applicant will assess their effectiveness. We request more information on the reasoning behind the decision to also employ the alternative US3 device, with respect to the comparative efficacy between the devices. More information is required on which specific scenarios the devices will be activated upon. This should be in the form of a detailed deployment plan with evidence-based justifications for use.

MSS have also seen and reviewed the advice provided by NatureScot and agree with their comments.

Hopefully these comments are helpful to you. If you wish to discuss any matters further, then please contact the REEA Advice inbox at MSS_Advice@gov.scot.

Yours sincerely,

Renewable Energy Environmental Advice group
Marine Scotland Science

Scottish Government Directorate for Agriculture and Rural Economy

Dear [redacted]
I have been asked to comment from a veterinary perspective on the justification for use of ADDs proposed in the European Protected Species licence application: https://marine.gov.scot/ml/european-protected-species-licence-acoustic-deterrent-device-north-moine-shuna-castle-kames-bay, particularly in relation to the stress response of farmed salmon to the presence of seals. I have recently been considering the use of ADDs by fish farms in general with the Scottish Animal Welfare Commission working group which is preparing a report on the subject.

I note the applicant suggests that the use of ADDs would be complementary to other measures to reduce interactions with seals, including regular removal of moribund fish and physical measures including tensioned HDPE pen nets and top nets. They suggest that these measures alone would not provide a satisfactory alternative to ADDs as they would not mitigate against the sub-lethal effects of stress and flight behaviour caused by seal presence around the farm even if direct predation did not occur. They suggest that these effects have significant negative impacts on reduced feeding, growth and survival, fish health, disease and parasite risk and fish welfare.

Regarding the effects of stress in general, it is known that fish have a similar neuroendocrine stress response mechanism to mammals, involving the hypothalamic – pituitary- interrenal gland axis and the release of cortisol which can be measured in faeces and surrounding water. The importance of minimising stress in farmed fish due to various environmental factors including changes in water quality, high stocking density, handling and transport is widely accepted. The effects of acute and chronic stress in general on immune function, feeding, growth, susceptibility to disease and welfare have been extensively studied in many species and there has been some relevant research on this specifically in Atlantic salmon, for example Stress in Atlantic salmon: response to unpredictable chronic stress | Journal of Experimental Biology | The Company of Biologists and ISAAH 2018 - Sveen - Wound healing in post-smolt AS.pdf (uib.no)

Regarding stress due to predators, there are a few recently published papers that indicate that fish show an acute physiological stress response in the presence of a predator. There is also evidence from mammalian species that suggests chronic stress occurs in prey animals when exposed to the constant or frequent presence of a predator. I have not been able to find any published evidence specifically on the effects of seals close to farmed salmon as distinct from losses due to direct attacks, however it would be very surprising if the close proximity of a predator did not cause a significant stress reaction in salmon considering the evolutionary benefit of this response in avoiding predators. It is certainly the opinion of fish veterinarians and farm managers that continued seal presence around pens causes stress in farmed salmon that can contribute to significant reductions in feeding and growth, and increased incidence of disease. The degree of stress caused is likely to be related to the frequency and duration of the presence of seals as well as their behaviour.

In my view therefore it is justified for the applicant in this case to say that there is no satisfactory alternative to the proposed minimal use of ADDs to try to keep seals away from the area around the pens and avoid the potentially significant economic losses and negative welfare impacts due to reduced feeding, growth and increased susceptibility to disease associated with the likely effects of stress due to their presence.
Please let me know if you would like to discuss this further. I am expecting advice from SAWC to be available in the next few days and will ask for this to be passed this to you.

Regards

[redacted] BVM&S MRCVS
Scottish Government Veterinary Head of Animal Welfare / Spur P / Saughton House / Broomhouse Drive / Edinburgh / EH11 3XD / Tel: [redacted]

Scottish Animal Welfare Commission - proximity of seals to farmed fish: response to Marine Scotland can be found here