

From [REDACTED]
To: SASWG Members

Please find my analysis for SASWG 17 of the Seal Licence figures provided by Marine Scotland 2011-15 inclusive, and my predictions for 2016:

1. Total Seals reported shot 2011-15 = 1,531
 - **Total seals shot: 1,245 Grey and 286 common**
 - **Average number shot is 306 seals per year**

2. Reported shootings fell from 461 in 2011 to 160 in 2015
 - **Overall reduction in seals shot 2011-15 is 65%**

3. Total licences granted: 66 in 2011 to 53* in 2015
*(incl 2 pending in 2015 (POSD))
 - **The overall reduction in licences granted 2011-15 is 20%**

2011: 66 licences: 32 PHW and 34 PSD
2015: 53 licences: 29 PHW and 24 PSD

 - **Reduction in licences: 9% for POHW and 29% for PSD**

4. Reductions in grey and common shootings are:

2011: 368 grey and 93 common (461)
2015: 118 grey and 42 common (160)

 - **Reduction in grey seals shot is 68%**
 - **Reduction in common seals shot is 64%**

5. In 2011, 241 (52%) seals were shot across 235 fish-farms
In 2011, 218 (48%) seals shot over 40 fisheries and netting stations.

In 2015, 79 (49%) were shot across 214 fish farms
In 2015, 81 (51%) were shot at over 40 fisheries and netting stations

6. % seals shot by aquaculture by FF accredited farms
 - **In 2011: c 60+ seals* c26%**
 - **In 2015: 41 seals 52%**

*(no definite figure provided)

7. During 2015 the greater number of seals shot were by:

- | | |
|--|-----------|
| 1. Moray Firth Management Group: | 28 |
| 2. Usan Fisheries (Scottish Wild Salmon Company): | 22 |
| 3. Marine Harvest (FF accredited) | 18 |
| 4. Scottish Seafarms: (FF accredited) | 15 |
| 5. Scottish Salmon Company: (supply Waitrose) | 11 |

8. In 2011, 32% of licence holders shot no seals
In 2015, 44% of licence holders shot no seals.

- **Number of licence holders not shooting seals has risen from 32% - 44%**

9. Total shooting by area and species 2011-15, with % increase or decrease:

<u>Area</u>	<u>Species</u>	<u>%+-</u>
East Coast:	133 grey + 0 common	(-87%)
Moray Firth:	159 grey + 30 common	(+68%)
Orkney and North Coast:	497 grey + 9 common	(-77%)
Shetland:	234 grey + 7 common	(-86%)
SW Scotland:	9 grey + 23 common	(-91%)
W Scotland:	115 grey + 201 common	(-42%)
W Isles:	98 grey + 16 common	(-67%)

10. Shooting per area and species comparison 2011 to 2015:

	<u>2011</u>	-	<u>2015</u>
East Coast:	46 grey + 0 common	-	6 grey + 0 common
Moray Firth:	16 grey + 6 common	-	32 grey + 5 common
Orkney/N.Coast:	167 grey + 4 common	-	39 grey + 0 common
Shetland:	69 grey + 2 common	-	10 grey + 0 common
SW Scotland:	4 grey + 12 common	-	1 grey + 0 common
W.Scotland:	36 grey + 58 common	-	18 grey + 36 common
W Isles:	28 grey + 11 common	-	12 grey + 1 common

11. Shooting per area as % of total 2011-15 (1,531) and 2015 (160):

	<u>2011-15</u>	<u>2015</u>
Orkney/ N.Coast:	33%	24%
W Scotland:	21%	34% (+)
Shetland:	16%	6%
Moray Firth:	12%	23% (+)
W Isles:	7%	8% (+)
E Coast	9%	4%
SW Scotland	2%	0.6%

12. In April 2016, a three-year coastal netting ban was introduced to protect wild salmon. This will help protect wild stocks, but should also further significantly reduce shooting of seals. It will also focus more attention on aquaculture which was responsible for 49% of seals shot in 2015.

1. The biggest individual seal shooting companies in 2015 were both RSPCA - FF accredited salmon producers that supply both Sainsbury's and Waitrose
2. In 2014, (number to be provided by FF) almost 70% of seals shot by aquaculture were at FF accredited sites.
3. In 2015, 41 seals were reported shot to FF, 52% of those reported shot by aquaculture overall.
4. It would be a useful to compare the numbers reported shot on licence returns to Marine Scotland with the 41 reported to FF and SASWG members for 2015 to see if they correlate.

13. 2016 analysis 1st and 2nd quarters:

46 Seal Licences were granted in 2016: 28 for Protection of Health and Welfare (PHW) from 29 in 2015 (-3%), 18 for Prevention of Serious Damage (PSD) from 24 in 2015 (-25%)

- **46 Seal Licences were granted in 2016 (53 in 2015) a reduction of 13%**
- **PHW represents 63% of all licences granted in 2016**
- **PHW represented 48% of all licences granted in 2011**
- **PSD represents 37% of all licences granted in 2016**
- **PSD represented 52% of all licences granted in 2011**

Seal Licences for aquaculture**:

29 licences for PHW + 1 for PSD in 2015,
28 licences for PHW + 1 for PSD in 2016

*(**across 214 fish farms both years)*

- **PHW now represents 97% of all licences granted for aquaculture in 2016, only 3% for PSD**
- **PHW represented 48% of all licences granted for aquaculture in 2011, 52% for PSD**

Seals reported shot 1st and 2nd quarter of 2016:

- **36 grey + 7 common in 2016 = 43**
- **86 grey + 24 common in 2015 = 110**
- **This represents a reduction of 61% on 2015**

Prediction for 2016, total using quarters 3/4 (40 grey and 18 common) from 2015 as guide:

- **Predicted total for 2016 = 101 seals shot**
- **If correct, this would represent a 72% reduction on 2011 figures, but reduction may be greater still due to netting ban.**

Analysis of Seal Licence return shooting figures for 2015.

According to Scottish Government figures a total of 160 seals were shot under licence in 2015: 118 grey and 42 common or harbour seals

The new figures represent a 22% reduction from the number of seals shot in 2014 (205) and a 67% reduction on those shot in 2011 (459) when the scheme began. They also reveal a total of 1,531 seals have been shot during the first five years of the Seal Licence scheme, an average of 306 seals each year.

Highlights of the figures show:

- **reported shootings by aquaculture have declined from 241 in 2011 to 79 in 2015, a reduction of 67%**
- **reported shootings by fisheries and netting companies have declined from 218 in 2011 to 81 in 2015, an overall reduction of 63%.**

The new figures do not show any reduction in shooting by the fish-farming sector in the past two years, 2014 and 2015, when 80 and 79 seals were reported shot respectively.

During 2015 greatest numbers of seals shot were:

- 1. Moray Firth Management Group: 28 seals (Sports fishing)**
- 2. Usan Fisheries (Scottish Wild Salmon Company) of Montrose: 22 seals (Salmon netting)**
- 3. Marine Harvest: 17 seals Fish-farmers (Freedom Food label)**
- 4. Scottish Seafarms: 15 seals Fish-farmers (Freedom Food label)**
- 5. The Scottish Salmon Company: 11 seals (Waitrose)**

In April 2016, a three-year coastal netting ban will be introduced to protect wild salmon. This will help protect wild stocks of salmon and should lead to a further significant fall in the number of seals being shot. It will also focus more attention on the aquaculture sector.

Remarks:

1. The biggest individual seal shooting aquaculture companies in 2015 were both RSPCA-FF approved salmon producers that supply both Sainsbury's and Waitrose.
2. In 2014, almost 70% of seals shot by aquaculture were at RSPCA approved Freedom Food farms.
3. Would be useful to compare these numbers with the 2015 shooting figures reported to Freedom Food.

Rhoda Davidson

From: [REDACTED]@st-andrews.ac.uk>
Sent: 09 February 2016 10:52
To: [REDACTED] International Animal Rescue; [REDACTED]
[REDACTED]@thecrownestate.co.uk); [REDACTED], Sainsbury's;
[REDACTED] (Seal Protection Action Group); Cathy Tilbrook; [REDACTED]
[REDACTED] Marine Scotland; [REDACTED]
[REDACTED]@waitrose.co.uk); [REDACTED]@rspca.org.uk); [REDACTED]
[REDACTED] SSPO; [REDACTED]@bornfree.org.uk); [REDACTED]
[REDACTED]
Subject: Progressing SASWG

Dear SASWG,

When we last met in August we agreed to meet again – possibly by teleconference in February. I regret that this has not been and won't now be possible for me due to teaching commitments this month. However I am about to circulate a Doodle Poll for dates that are possible for me at present in March and half of April. Please could people fill in the poll and also advise whether a teleconference is feasible or desirable, and if not what alternatives people might have in mind.

I attach again the draft minutes of the last meeting FYI.

Action points were as follows:

Actions:

1. **RSPCA/SMRU to organise a meeting with marine Scotland to discuss FF 'last resort' requirement and its applicability to government license conditions**
2. **FF/SSPO to consider ways of improving information gathering on seal predation mitigation techniques and dissemination within industry**
3. **[REDACTED] to circulate list of issues, group to comment on points worth seeking industry feedback on**
4. **FF to circulate questions to industry members based on agreed key issues with a view to getting responses in time for December STAG meeting**
5. **FF (in consultation with MH/SMRU) to approach ADD manufacturers to follow-up on feedback on device innovation and monitoring, and arrange a meeting**
6. **MH to report back to group on its investigations into increased seal shooting incidents in 2015, and to feed back to FF on how standards might evolve in light of its findings**
7. **[REDACTED] encourage Waitrose/Aquascot to participate in the group**
8. **FF to inform the group on the agenda and outcomes of its October meeting with its members**

At least some of these actions points have been progressed; I attach the notes from a FF meeting held in November (AP8) and forwarded to me by [REDACTED] I gather FF will be organising another meeting soon that will explore seal issues in more detail with industry partners.

Waitrose/Aquascot have indeed agree to join the SASWG and have been included in this email (AP7).

Other news:

- Sainsbury's and MHS have agreed to fund us (SMRU) to do a small study to look at the issue of sound shadowing – that is to see if we can find areas around a farm site with ADDs where sound shadows might exist, and which seals might exploit. We have taken extensive acoustic measurements from one MHS site and my research assistant is currently working these data up – and is nearly done.

- We (SMRU) have just submitted a draft final report to SARF looking at seal behaviour in relation to nets in captivity –some interesting findings I hope we can share at the next meeting.
- I understand [REDACTED] has been to Canada and has asked industry people there about their approach to damage caused by seals – I understand from [REDACTED] that anti-predator nets are widely used; not so clear about ADDs.

If others have any news on the action points above – or any other issues of relevance to SASWG – please advise me or the group and I can prepare a draft agenda.

With best wishes

[REDACTED]

[REDACTED]
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St Andrews
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[REDACTED]

Rhoda Davidson

From: [REDACTED]@st-andrews.ac.uk>
Sent: 05 April 2016 17:24
To: [REDACTED], International Animal Rescue; [REDACTED]
[REDACTED]@thecrownestate.co.uk); [REDACTED] Sainsbury's; [REDACTED] (Seal
Protection Action Group); Cathy Tilbrook; [REDACTED], Marine
Scotland; [REDACTED]@waitrose.co.uk); [REDACTED]
[REDACTED]@rspca.org.uk); [REDACTED] SSPO; [REDACTED]
[REDACTED]@bornfree.org.uk); [REDACTED]
Cc: [REDACTED]@freedomfood.co.uk);
[REDACTED]@rspca.org.uk; [REDACTED]
Subject: Caroline Carter
SASWG 16

Dear All – a little later than I had hoped – please find attached a slightly revised version of the draft agenda I circulated two weeks ago.

I also attach three documents that address two of the action points from the last meeting and one of the current agenda items:

First – a summary of the latest shooting figures – compiled by [REDACTED]

Second– a report of the Freedom Food Members meeting was circulated some months ago

Third - a compilation of two documents I have circulated in the past – intended to address an action point on me to summarise the research options that the group has discussed over the years.

It represents my views only and much of it was initially drafted you may recall in the development of our website.

Finally- the unapproved minutes of the last meeting

I look forward to seeing you all tomorrow at 10:30 in Rosyth.

[REDACTED]

[REDACTED]
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Fife KY16 9TS
[REDACTED]

Previous roundups of research items and discussion points under the SASWG

From 2014 Subgroup report: Group's Opinions on Which Methods are Most Promising

<u>METHOD</u>	<u>Average Rank</u>
1. Modifications and improvements to ADDs (including triggered devices)	3.0
2. Improved understanding of how seals are able to damage fish without holing the net	3.3
3. Measures for validating acoustic deterrents functioning properly	4.3
4. Analysis of existing data on site characteristics and seal damage and seal shooting	4.5
5. Improvements to net tensioning	4.8
6. Trialling new netting materials	5.0
7. Approaches in other countries	5.3
8. Use of lower frequency transducers (maybe should be included in mods to ADDs above)	6.0
9. Use of electric fields as a deterrent	6.5
10. Lighting or not lighting as a deterrent	9.0
11. Aversive tastes	9.8

From paper circulated

Main themes and benefits of SASWG (SN view (2012)):

ToRs drafted and agreed. **Built confidence and understanding** among various interested parties. **Improved dialogue to help better address the issues.** Membership expanded to include Scottish Government, SSPO, other fish farming companies.

Focused attention on a wide variety of concerns about how and why seals cause damage to farms.

Explored numerous ideas and options for minimising seal damage and the motivation for seal shooting: these have included -

- Use of ADDs
- Novel acoustic measures ([REDACTED] device)
- Dummy killer whales and killer whale noises (no effect – [REDACTED])
- Best practice in using ADDs (check they are working)
- Anti-predator nets
- Net tensioning
- New netting materials – Dyneema – Aquagrid and Micanti, copper nets (MH)
- Avoiding proximity to seal haul out sites
- Bubble curtains
- Emetics
- Electric fields ...

Explored factors that may contribute to elevated damage levels and risk of shooting:

- Proximity to seal haul outs
- Wider geographical location
- Stage of production cycle
- Season
- Species?

Monitoring and encouraging:

- Industry trials of new procedures / equipment
- Licencing scheme process and RSPCA guidelines and Freedom Food verification: 'best practice'
- Relevant academic research and development

Have developed a work plan that currently includes four themes:

- Collating information (via FF and licencing scheme) on
 - o shooting incidents to understand what is not working in such circumstances and why
 - o fish farm practices at sites with and without shooting to identify what is working
- Investigating seal behaviour to better understand successful seal attacks occur
- Promote development of ADD testing kit to ensure ADDs are functioning as expected
- Promote urgent development of more effective, more porpoise friendly, ADDs.

In more detail, we:

- Have reviewed what processes seem to be most effective in reducing seal damage – these mostly involve better attention to husbandry techniques – properly tensioned nets, frequent and effective mort removals, use of seal blinds, proper use and maintenance of ADDs etc.
- Included Marine Scotland in the group and discussed with them the information being collected on the licence application forms and how that might be analysed.
- Have reviewed and commented on the licencing process that controls the number of seals salmon farms are allowed to shoot, and in particular made recommendations about the need to collect information on seal damage and net types as part of the licencing procedure. Specifically – details of the numbers of fish damaged or killed, whether or not ADDs were being used and what type, what methods of tensioning are in use and what cage type is being used.
- Had hoped to help and follow the commercialisation of a new acoustic deterrent system: this has become mired in problems concerning finance, engineering and patents, but is ongoing.
- Noted and followed work of the containment group – a part of the Marine Scotland Aquaculture Framework Review process. Draft report now produced and is being discussed by SASWG.
- Encouraged trials on electric fields – now funded by SARF.
- Contacted SSPO to see if we could build a better picture through them of what measures are being used at each site and how those measures are related to damage levels.
- We have engaged with WWF and SNH about possible curtailment of ADD use, which might result in increased levels of depredation, damage and shooting.
- Have followed up questions about why anti-predator nets are generally not in favour.
- Have pressed for the development of a testing device to check that ADDs are functioning correctly.
- Have reviewed trends in kill numbers and damage levels over recent years and explored why these have been coming down so rapidly.
- Have pressed for timelier reporting under the seal licence scheme
- Have noted an apparent change in the seal haulout of numbers close to farm sites in the Strathclyde region – though no overall decline – which deserves closer investigation.
- Have investigated differences in damage levels between and among farm sites; proximity to seal haul outs does not seem to be related to damage levels; damage most frequent after

first 7 or 8 months in a production cycle; damage appears to be most prevalent in certain areas. Peak damage is around month 10 of the cycle. No obvious relationship between how long a site has been operational and damage levels.

- Have focused on why and how seal attacks occur. Have noted stereo typical bite types suggesting attack from below – further suggesting bottom of the nets are the weak point, and noted that contrary to previous speculation, seals are not specifically targeting salmon livers; more likely they bite the easiest part of the fish they can reach.
- Have raised concerns about when shooting seals may be justified – and whether fish welfare is an adequate reason in the absence of any actual depredation; FF scheme requires evidence of actual damage.
- Discussions have led to RSPCA revising their guidelines, and FF consequently requiring further demonstration of need to shoot seals as last resort.
- Have agreed that it is important to collate information on what has happened each time it is deemed necessary to shoot a seal to better understand what goes wrong when seals are shot. Discussing how best to do this.
- Have agreed that it is also useful to see what is being done on sites and at times when no damage is being caused; ongoing discussion.
- Have agreed that research into how, why and when seals attack salmon pens is important and useful.
- Have agreed that where ADDs are deployed it is very important to know if they are functioning correctly and that suitable testing equipment needs developing
- Have funded development of a prototype testing device to measure source level (output volume) for each transducer (FF funded).
- Have agreed that new designs of ADD that are less disturbing to cetaceans are needed and have tried to assist in the market development of one such device.

Seal shooting: Key issues to address and consider taking forward

Funding

- 1) How do we go about managing funds for getting research done?
 - Possible routes – use RSPCA as a front for funding – to hold funds on an ad hoc basis
 - See if SASWG itself could be a funding body – what legal admin constraints
 - SARF – possible links – could we co-opt them
 - **Best option may be to fund a PhD studentship (an experienced candidate is available) – which would have advantages of :**
 - a) probably being cheaper than commissioned research
 - b) enabling one person to get to grips with several issues at the same time

Other issues

- 2) **Carcass collection** – can we improve the carcass collection scheme – but maybe via Marine Scotland?
- 3) **Investigative team** - What do we do to investigate promptly when high levels of damage occur at a site precipitating shooting.... who will or can investigate and how? What resources are needed or available? What are the constraints?

Research topics

- 4) Analysis of data on damage and shooting
 - Company records - analyse data going back years (don't forget effect of lights)
 - Ongoing data collection / interviews by FF / RSPCA
 - Licencing scheme data from Marine Scotland
 - Feedback from companies about other approaches e.g. Econet

Explore funding some research analysis on each and all of the above areas by, or in co-operation with, Industry / RSPCA / Scot Gov.

- 5) **Cameras on site** - Get cameras on sites with problems to find out more about seal behaviour. This would require complete cooperation from industry and would need to address any industry concerns about footage of seals damaging fish, but there are ways of doing so.

6) **Net trials** - Do more trials in the SMRU seal pool to explore how different netting materials affect the ability of seals to take fish from behind them (e.g. net stretchiness or how easy it is to manipulate) -

7) **ADD testing stick** – explore this further and get a better prototype developed for wider use.

8) **Electric fields** - Possible further work either testing or developing deterrent

7) **Taste or texture aversion** - Can we make nets taste or feel bad enough that seals do not want to touch them.

8) **Computer modelling** – to look at net design, deformation and tensioning

(9) **Seal trap** – develop a seal trap and possible relocation programme, tagging and release to see if animals return. Trial would mean zero kills and possibly offer solution to predation issue as habituated seal most likely to be caught and removed. Thought needed re lactating females, however capture may per se deter further attacks

(10) **Other countries** - What's going on in other countries –something the aforementioned student could undertake as part of a PhD programme? Methodical search required – personal contacts needed. This work would be best focused on countries that do not allow lethal control.

Salmon Aquaculture and Seal Working Group Meeting 16

6th April 2016

10:30-15:00*

Marine Harvest Scotland, Admiralty Park

Admiralty Road, Rosyth, Fife KY11 2YW

Attendees:

Confirmed attendees

1. [REDACTED] -Marine Harvest
2. [REDACTED] -Waitrose
3. [REDACTED] - Aquascot
4. [REDACTED] – Born free Foundation
5. [REDACTED] – International Animal Rescue
6. [REDACTED] – Seal Protection Action Group
7. Caroline Carter as alternate for Cathy Tilbrook –Scottish Natural Heritage
8. [REDACTED] -Freedom Food
9. [REDACTED] – Freedom Food
10. [REDACTED] -RSPCA
11. [REDACTED] -RSPCA
12. [REDACTED] -RSPCA
13. [REDACTED] -RSPCA
14. [REDACTED] - Sea Mammal Research Unit
15. [REDACTED] - Sea Mammal Research Unit
16. [REDACTED] – SSPO

Making a presentation: [REDACTED] : Pulcea Ltd

Apologies

1. [REDACTED] - Marine Scotland
2. [REDACTED] - Crown Estates
3. [REDACTED] - Sainsbury's

* Time slightly flexible depending on arrival times from the airport and return flight timings may need to end earlier

DRAFT AGENDA

1. Opening matters (standing items):

- a. Introductions and Housekeeping
- b. Minutes from Meeting 15
- c. Working Group Operation and Membership
- d. Previous Actions.

2. Latest SG Seal Shooting Figures

Discussion paper by [REDACTED] circulated

3. Update from Marine Harvest [REDACTED]

Results of investigations into factors underlying seal shooting in 2015

4. Update from FF/RSPCA [REDACTED]

- a. Progress on liaison/discussions with members
- b. Improving information gathering on seal incidents

5. Progressing the aims of the SASWG – future directions.

6. (about 12:30) – “ADD’s - can we learn from the lessons of the past?”

Presentation by Pulcea – [REDACTED]

(Lunch provided by MHS - around 1pm or after Item 6)

7. Recent Research Results - SMRU ([REDACTED])

- a. Report on captive seal behaviour with nets & salmon, & tests on netting properties
- b. Report on sound field mapping of a site with ADDs and ongoing seal depredation

8 Any Other Business

9 Next meeting

Actions from last meeting August 2015

- 1. RSPCA/SMRU to organise a meeting with marine Scotland to discuss FF 'last resort' requirement and its applicability to government license conditions**
- 2. FF/SSPO to consider ways of improving information gathering on seal predation mitigation techniques and dissemination within industry**
- 3. ■ to circulate list of issues, group to comment on points worth seeking industry feedback on (document attached – research themes and discussion points)**
- 4. FF to circulate questions to industry members based on agreed key issues with a view to getting responses in time for December STAG meeting**
- 5. FF (in consultation with MH/SMRU) to approach ADD manufacturers to follow-up on feedback on device innovation and monitoring, and arrange a meeting**
- 6. MH to report back to group on its investigations into increased seal shooting incidents in 2015, and to feed back to FF on how standards might evolve in light of its findings**
- 7. ■ encourage Waitrose/Aquascot to participate in the group**
- 8. FF to inform the group on the agenda and outcomes of its October meeting with its members (document attached - FF members meeting)**

Salmon Aquaculture and Seals Working Group Meeting No 16

April 6th 2016, Marine Harvest, Rosyth

Draft Minutes for Approval at 17 meeting

Present:

██████████ (SMRU – Chair), ██████████ (Marine Harvest – Host), ██████████ (RSPCA), ██████████ (Aquascot), ██████████ (Waitrose), ██████████ (RSPCA), ██████████ (Seal Protection Action Group), ██████████ (RSPCA), ██████████ (Born free Foundation), ██████████ (International Animal Rescue), ██████████ (RSPCA), ██████████ (Freedom Food), ██████████ (Freedom Food), Caroline Carter (standing in for Cathy Tilbrook – Scottish Natural Heritage), ██████████ (SSPO), ██████████ (SMRU – minutes), ██████████ (SNH – remote)

Previous minutes:

██████████ had pointed out that AP 4 should not have been directed at FF. The substance of AP 4 is anyway subsumed into a wider initiative by FF to organise a workshop with members to address key issues.

Minutes approved subject to above.

Actions arising from previous meeting as listed:

1. RSPCA/SMRU to organise a meeting with marine Scotland to discuss FF 'last resort' requirement and its applicability to government license conditions
2. FF/SSPO to consider ways of improving information gathering on seal predation mitigation techniques and dissemination within industry
3. ██████████ to circulate list of issues, group to comment on points worth seeking industry feedback on (document attached – research themes and discussion points)
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7. ██████████ encourage Waitrose/Aquascot to participate in the group
8. FF to inform the group on the agenda and outcomes of its October meeting with its members (document attached - FF members meeting)

Presentation from [REDACTED] on recent research at SMRU – University of St Andrews

- SARF funded project using SMRUs captive seal facility to examine how seals manipulate fish through nets
 - Seals difficult to train to take fish through netting – not innately obvious to them
 - Seals prefer to use flippers to manipulate fish
 - Very hard to bite fish through meshes unless they can also hold them in a fold of netting ...
 - Seals able to exert a surprising amount of force (up to 1000N)
 - Mechanism mainly uses head lunges – neck/shoulder muscles not ‘ramming’
 - Even smaller animals expected to be able to move base of a typical net by around 30cm do to nylon elasticity.
- Marine Harvest & Sainsbury’s funded project looking at sound propagation of an Airmar and Ace-Aquatec device
 - Single transducer showed that sound shadowing can occur – a 3dB loss was found from one side of the site to the other due to netting and other infrastructure
 - But when 8 transducers in use – site was effectively saturated with signal
- **Action** [REDACTED] to circulate a copy of presentation, report and link to the videos

AOB

- [REDACTED] raised question of porpoise SACs – will they prevent the use of ADDs?
 - CC – SNH is currently consulting on plans for SAC, see website for consultation details and to contribute
 - See Management Options Paper (MOP) on website for reference as to where discussions have got to
 - SNH internal noise propagation modelling exercise considered the scale of potential HP disturbance zones.
 - Modelled disturbance zones were not large in comparison to the extent of the HP SAC – but highlighted potential barrier zones within narrows and straits (eg Sound of Mull)
 - They believe that there is no need to alter the status quo in any significant manner in response to the SAC
 - But they would like to continue to push toward more targeted devices, and SNH are currently supporting a project through SARF with this intention
- [REDACTED] asked for details on progress with startle response device
 - Concern that public money had been spent and the device is still not available
 - No-one aware of any progress since this was last discussed
 - [REDACTED] asked for a summary of history events – who should the group be asking/leaning on for details and to produce results?
 - **Action** [REDACTED] to circulate his own timeline on startle response device
 - **Action** [REDACTED] to make enquires about state of developments on the startle device within the University of St Andrews
- Future Directions for SASWG
 - AO concerned the group was not revisiting previous suggestions for research themes

- Eleven themes discussed*
 - It was felt that there is no suitable mechanism for the group to take action
- **Action** ■ to approach Knox nets and/or other net manufacturers to try to build on previous studies examining net deformation by seals in captivity
 - It was felt this could be an area where progress could be made

Next SASWG Meeting

- RSPCA offered facilities in Sussex for next meeting
- About 6 months' time
- **Action** ■ to consult with group on suitable dates later, and with ■ about venue availability
- ■ emphasised need for members to make extra effort to attend with the group's new biannual schedule.

Meeting closed at 1500

Draft Consolidated Action Points from SASWG 16

1. **Action** ■ to find regional figures for PBR calculations and circulate to group.
2. **Action** ■ to check dates the ADD system was changed at Sconser in 2015– did seal depredation cease once a new ADD system was installed – or before, or after?
3. **Action** ■ to circulate PDF of MHS presentation
4. **Action** ■ to take suggestions for further analysis of shooting incidents back to MHS
5. **Action** ■ to organise meeting with FF members to address seal concerns
6. **Action** ■ to circulate a copy of presentation, report and link to the videos
7. **Action** ■ to circulate his own timeline on startle response device
8. **Action** ■ to make enquires about state of developments on the startle device within the University of St Andrews
9. **Action** ■ to approach Knox nets and/or other net manufacturers to try to build on previous studies examining net deformation by seals in captivity
10. **Action** ■ to consult with group on suitable dates later, and with ■ about venue availability

* The eleven themes or areas for further work previously identified by the Group are:

Working Group's Opinions on Which Methods are Most Promising

METHOD	Average Rank
1. Modifications and improvements to ADDs (including triggered devices)	3.0
2. Improved understanding of how seals are able to damage fish without holing the net	3.3
3. Measures for validating acoustic deterrents functioning properly	4.3
4. Analysis of existing data on site characteristics and seal damage and seal shooting	4.5
5. Improvements to net tensioning	4.8

6. Trialling new netting materials	5.0
7. Approaches in other countries	5.3
8. Use of lower frequency transducers (maybe should be included in mods to ADDs above)	6.0
9. Use of electric fields as a deterrent	6.5
10. Lighting or not lighting as a deterrent	9.0
11. Aversive tastes	9.8