

Environment, Climate Change and Land Reform Committee

Environmental impacts of salmon farming

Written submission from Hebridean Whale and Dolphin Trust

The Hebridean Whale and Dolphin Trust (HWDT) has been leading the way for the conservation of cetaceans in the waters of western Scotland for over two decades, conducting scientific research on the abundance and distribution of the regions marine mammals as well as monitoring the anthropogenic impacts effecting them. Cetaceans serve as charismatic flagship species underpinning many financially important ecotourism activities in the region, such as whale watching, which in 2015 generated an estimated £3.7 million in indirect revenue from an estimated 51,200 whale-watching passengers on vessels operating on Scotland's west coast (Conor et al. 2018).

We commend the Scottish Parliament for conducting this review into the environmental impacts of salmon farming in Scotland and we welcome the opportunity to provide our comments on the SAMS report to the ECCLR committee. HWDT recognises that salmon farming is an important industry on the west coast of Scotland, providing employment and investment in rural communities but we have concerns about the avoidable impacts the industry is having on marine mammals.

Our comments relate specifically to section 7.1 of the report on the impact of salmon farming on marine mammals. We consider this section of the report to be comprehensive, covering the main issues and providing a useful review of the scientific literature. As summarised by the report, the main impacts of salmon farming on marine mammals in Scotland is the underwater noise pollution generated by the widespread use of Acoustic Deterrent Devices (ADDs) and direct mortalities through the shooting of seals. Our response focuses on these two key issues as these are our primary areas of concern for marine mammals in relation to salmon farming.

ADD's

Acoustic Deterrent Devices (ADDs) are widely used by the aquaculture industry in Scottish waters in an attempt to prevent seal depredation on finfish in aquaculture pens. They are powerful acoustic devices that emit loud acoustic signals. The sound output frequencies (2 – 40 kHz) for devices currently used throughout Scotland overlap the audible range of other non-target marine animals including cetaceans (Lepper et al. 2014). Cetaceans depend on sound for foraging, communication, navigation and detecting predators or threats and as a result have excellent underwater hearing. Therefore, even though cetaceans do not pose a threat to aquaculture facilities, they are at risk of disturbance and habitat exclusion from ADDs. These impacts have been shown to affect a range of species that can be found in close proximity to aquaculture facilities in Scotland and elsewhere including harbour porpoises (*Phocoena phocoena* - Johnston 2002; Olesiuk et al. 2002; Booth 2010; Northridge et al. 2010; Brandt et al. 2013; Lepper et al. 2014; Dähne et al. 2017; Mikkelsen et al. 2017), killer whales (*Orcinus orca* - Morton and Symonds 2002) and minke whales (*Balaenoptera acutorostrata* - McGarry et al. 2017). In particular, we would like to draw the committee's attention to the recently published

report by McGarry et al. (2017) on minke whale responses to Lofitech ADDs, which was not cited in the report. In the scoping reports for many salmon farm facilities, minke whales are often considered to show a limited response to ADDs. It is argued that their hearing sensitivity to high frequencies will be lower than that of dolphins and porpoises, yet this work clearly demonstrates pronounced avoidance to ADDs at considerable ranges.

All cetacean species are protected under both EU (Habitats Directive) and national (Nature Conservation (Scotland) Act) legislation and a range of international agreements to which the UK is signatory (ASCOBANS, OSPAR). Underwater noise is a recognised form of pollution that needs to be addressed, including through the EU Marine Strategy Framework Directive. Under the Nature Conservation (Scotland) Act, it is an offence to deliberately or recklessly disturb or harass any species of cetacean. As evidenced above, ADDs are known to disturb cetaceans and this has been confirmed by many scientific studies, yet many aquaculture facilities are situated in critical areas of habitat such as within the candidate Special Area of Conservation (cSAC) for harbour porpoise (Evans and Prior 2012; Dolman et al. 2013) and a proposed Marine Protected Area for minke whales (Paxton et al. 2014).

Moreover, the effectiveness of such devices for deterring seals from fish farms has not been consistently demonstrated, with seals frequently seen around facilities using these devices and no convincing peer-reviewed evidence available to show they are effective in reducing seal depredation; in some cases they may even attract seals (Götz and Janik 2013). Seals frequenting farms with active ADDs lead Lepper et al. (2014) to suggest that seals, perhaps highly motivated by feeding opportunities, expose themselves to levels of sound which would cause long-term damage to their hearing. Here we are confronted by an activity with no proven benefit but many well established negative impacts on protected wildlife.

Reports published by Marine Scotland (Coram et al. 2014) and Scottish Natural Heritage (Northridge et al. 2013) have outlined many knowledge gaps regarding the use and unintended effects of ADDs in the marine environment. Based on the best available evidence and the knowledge gaps highlighted in these reports, HWDT has serious concerns about the following:

1. It is not known whether any ADD devices are fit in terms of reducing salmon losses to seals. Further, there is no agreement on best practice for the use of these devices, to either maximise their deterrence effects on seals or minimise the disturbance they cause other wildlife.
2. Disturbance effects on cetaceans have only been studied for a few species and a small subset of the models of ADDs currently in use in Scottish waters. Only devices whose effects have been measured and agreed to be acceptable by regulators should be licenced.
3. The ecological consequences of underwater noise on cetaceans (and their prey) are not well understood. In particular, the distributions, densities and population trajectories of populations of sensitive species in Scottish waters are very poorly known.

4. Impacts from ADDs are cumulative. They cannot be considered in isolation, as they act in concert with a range of other environmental effects and changes impacting these species

Given the proximity of many aquaculture sites to areas with a high diversity of protected features prone to displacement or injury due to noise pollution (Dolman et al. 2013; Lepper et al. 2014), efforts should be made to predict the number of animals likely to be affected. This is a function of both sound propagation, which is well understood, and animal densities, which are very poorly studied at the fine spatial scale required (Coram et al. 2014).

Aquaculture developers should demonstrate that the use of ADDs will not have an adverse effect on areas of importance for cetaceans. HWDT is very well aware from its own acoustic monitoring data that the use of ADDs has increased significantly in recent years. More sites are using them and more devices are being deployed at each site. This trend will only accelerate as industry production increases in line with Scotland's National Marine Plan.

Until it can be shown that ADDs actually do reduce seal depredation in a sustainable manner and that they represent a better alternative to the many other antipredator solutions available, the use of ADDs in such a sensitive area should not be permitted. If a case for their use can be made this should only go forward in the context of studies to understand the legal, welfare and ecological consequences of their impacts on other wildlife and the development of safe and effective codes of best practice.

Seal shooting

Fish farm operators can apply for licences to shoot the two native species of seal (grey *Halichoerus grypus* and common *Phoca vitulina*) even though they are protected by Scottish¹ and EU² legislation. It is clear that the reporting and carcass recovery system requires significant improvement (Nunny et al. 2016). The SAMS report also highlights the animal welfare implications of shooting. Necropsies could not confirm that animals had been dispatched humanely and the large number of pregnant females being shot is especially concerning

Lethal removal only makes sense as a management strategy if there are a few "rogue" animals that can be reliably identified and humanely removed. In this respect, we are surprised that pregnant females constitute such a large proportion of the aquaculture shooting mortality. This observation is at odds with anecdotal information that old male seals are more likely to be the rogue animals causing depredation events. Further, we find it shocking that there seems to have been no concerted effort to investigate whether the animals being shot had in fact been feeding on farmed salmon.

Seal predation problems can most effectively be addressed by engineering solutions involving weighted and tensioned nets alongside careful consideration of the location of fish farms away from seal haul out sites. Coram et al. (2014) also outline other

¹ Marine (Scotland) Act 2010.

² Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

potential solutions. As highlighted in the SAMS report, under United States import regulations³, future exports of Scottish salmon to the major export market in the US will no longer be possible if any exported fish have come from fish farms where seals have been deliberately shot. Therefore, predator control that does not involve killing seals will soon become a necessity and we recommend a commitment to phasing out granting of licences to shoot seals at fish farms by 2022 establishing Scotland as a responsible producer of salmon.

To achieve this, the industry must be encouraged to consider more effective, non-invasive mitigation measures to decrease predation, which include more effective physical barriers to exclude seals and more careful consideration on the locations of aquaculture sites to ensure they are placed away from important areas for seals and cetaceans.

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³ Fish and Fish Product Import Provisions of the Marine Mammal Protection Act. United States Federal Register 81(157).

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