

Second review of the operation of the seal licensing system under the Marine (Scotland) Act 2010

September 2020



Scottish Government
Riaghaltas na h-Alba
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REPORT OF THE SECOND REVIEW OF THE OPERATION OF THE SEAL LICENSING SYSTEM

SEPTEMBER 2020

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Executive Summary

Section 129 of the Marine (Scotland) Act 2010 requires that Scottish Ministers must review and publish a report on the operation of the seal licensing regime every five years. The first review was published in September 2015, with this review due for publication in September 2020.

The current review found that the seal licensing system operates effectively. Many of the recommendations from the last review have been implemented including improvements to the application and returns process, with the development of the online seal management portal which has streamlined both application completion and reporting of seals. Support has also been provided to the aquaculture and river fisheries sectors to improve the availability and efficacy of non-lethal measures, although more work is anticipated to be completed on this front. As a lower priority recommendation, the implementation of application fees has not been fully considered in this review period.

Four main areas have been identified as recommended for further action which are summarised below and set out in full within the document:

1. Seal licence application forms - a new form which encompasses all licensable purposes should be developed for any future applications to kill or take under the provisions of S110 of the Marine (Scotland) Act 2010.
2. Seal Carcass Recovery - further work is required to encourage recovery of seals killed and reporting to the Scottish Marine Animal Strandings Scheme (SMASS)
3. Seal Management Code of Practice – the code of practice should be updated to reflect the most up to date science and the changes to the purposes for which licences can be granted.
4. Non-lethal measures - work should continue in the aquaculture and river fisheries sectors to improve the efficacy of non-lethal measures in deterring seal predation.

Scottish Government will now consider and develop proposals on how best to pursue the recommendations listed above.

1. Introduction

Section 129 of the Marine (Scotland) Act 2010 requires that Scottish Ministers must review and publish a report on the operation of the seal licensing regime every five years. This is the second such review to have been carried out, the first being completed in September 2015.

This review covers the period from February 2015 to August 2020 and considers all aspects of the operation of the seal licensing system, including all developments and improvements made following the recommendations of the [2015 review](#). It also assesses the current operation of the licensing system.

2. The seal licensing system in Scotland

Part 6 of the [Marine \(Scotland\) Act 2010](#) makes it an offence to kill, injure or take a live seal except in accordance with a licence issued for killing or taking of seals. The seal licensing system has been in operation since 31 January 2011, when the first licences were issued.

Licences may be granted for one of the ten licensable purposes listed in [section 110\(1\) of the Marine \(Scotland\) Act 2010](#). In the review period, licences were issued for the following purposes listed in the Act;

- For scientific, research or educational purposes (S110(1)(a)),
- To protect the health and welfare of farmed fish (S110(1)(f)),
- To prevent serious damage to fisheries or fish farms (S110(1)(g)).

2.1 Forthcoming changes to the seal licensing system

On 17 June 2020, [Animals and Wildlife \(Penalties, Protections and Powers\) \(Scotland\) Act 2020](#) passed its final stage in the Scottish Parliament. The Act contains new provisions to improve the conservation and welfare prospects of seals by amending the Marine (Scotland) Act 2010 to increase the penalties associated with the offence of killing, injuring or taking seals (intentionally or recklessly) in line with other serious wildlife crimes, and to remove two grounds for which Scottish Ministers can grant licences authorising the taking or killing of seals. Therefore, from the commencement date of these provisions, Scottish Ministers will no longer issue licences to take or kill seals under sections 110 (1)(f) and 110 (1)(g) of the Marine (Scotland) Act 2010 (for purposes of protecting the health and welfare of farmed fish and preventing serious damage to fisheries or fish farms). However, this report completes the existing requirement to carry out a review.

2.2 Licences for scientific, research or educational purposes

In the review period, licences for scientific, research or educational purposes have been granted only to take seals. The number of licences granted is shown in Table

1. Taking of seals refers to capture in the wild to;

- temporarily restrain in order to remove disabling objects or to conduct scientific experiments,
- transport to and temporarily hold in an appropriate captive facility or rescue centre, or
- transport to another location, before releasing back into the wild.

There is no pro-forma for submitting applications for this type of licence so application is made by letter to MS-LOT.

2.3 Licences to protect health of farmed fish and welfare or prevent serious damage to fisheries or fish farms

In the last five years, licences to kill seals have been granted under subsections (f) and (g). The number of licences granted is shown in Table 1.

Table 1: Number of licences granted under each provision from 2015 to 2020

Licence Year	2015	2016	2017	2018	2019	2020
Health and welfare of farmed fish	29	28	28	27	27	27
Serious damage to fisheries or fish farms	22	18	20	18	18	20
Scientific, research or educational purposes	1	1	1	1	1	1

Applications under (f) and (g) are submitted in October of each year for the next licensing period which runs from 1 February to 31 January. Typically, aquaculture operators apply for licences to kill seals under ‘protection of health and welfare of farmed fish’ and river fisheries apply under ‘prevention of serious damage to fisheries and fish farms’.

For applications for ‘prevention of serious damage’, as required by section 110(2) of the Marine (Scotland) Act 2010, Scottish Ministers must have regard to any information they have about;

- Damage seals have done to the fishery or fish farm, and
- Effectiveness of non-lethal methods to preventing seal damage to the fish farm or fishery.

Therefore, all applications under this provision must be accompanied by a survey which details the last 12 months of operation and levels of seal predation. MS-LOT also collects this information for applications to protect health and welfare. Applicants are required to demonstrate that shooting of seals will only be used as a last resort by providing evidence of any other non-lethal methods employed and their effectiveness in deterring seal predation.

2.4 Determination of applications

Marine Scotland Licensing Operations Team (MS-LOT) considers applications. Consultation on seal licence applications is required by section 116 of the Marine (Scotland) Act 2010, which requires United Kingdom Research and Innovation (UKRI) and NatureScot (the operating name of Scottish Natural Heritage) to be consulted. Sea Mammal Research Unit (SMRU) at the University of St Andrews acts on behalf of UKRI in providing information on seal populations. NatureScot provide information in relation to protected areas. MS-LOT may also seek advice from Marine Scotland Science (MSS). MSS may provide additional details on fish farm operations and river fishery catches.

2.5 Seal licences

After determination of the applications, MS-LOT issues all licences on 1 February of each year. Licence validity can vary in length up to a maximum of one year. Licensees are required to re-apply for a seal licence annually as the numbers of seals permitted to be taken or killed under the licences must be considered yearly based on the current seal populations and trends. For each management area, SMRU provides information from the Special Committee on Seals (SCOS) on the annual maximum number of seals which could be removed from the population by all anthropogenic means (based on the Potential Biological Removal (PBR) calculation), while maintaining the population above its “Optimal Sustainable Population (OSP) size.

2.6 Reporting under licence

Licensees are required to report any seal killed within 48 hours using the online seal management portal. Failure to comply with a licence condition is an [offence](#). Licensees also confirm the number of seals killed on a quarterly basis. Marine Scotland publishes the numbers of seals killed on a quarterly basis on the [Scottish Government website](#).

3. Requirements of the review

Under section 129 of the Marine (Scotland) Act 2010, Scottish Ministers are required to review and publish a report on the operation of the seal licensing regime every five years. The first review was published on 3 September 2015, therefore the second review must be published within five years or by September 2020 at the latest.

Section 129(2) states that when carrying out a review, Scottish Ministers must have regard to scientific evidence on seal biology, welfare and behaviour, and on other matters they consider relevant.

3.1 Scope of review

This review considers the operation of the licensing system for the period from February 2015 to August 2020 and makes recommendations for the future licensing system.

The review will consider all aspects of the operation of the seal licensing system including all developments and improvements that took place during the period, previous reviews into the operation of the system and any significant changes made in the light of all of these.

3.2 Review methodology

The review was led by the Marine Planning and Policy Division within Marine Scotland, which is responsible for seal licensing policy. Evidence on each of the review topics was collected from Marine Scotland, the seal management portal, published data on seal licensing, and external sources.

4. Previous review

The first review was published in September 2015, following the first four years of operation of the seal licensing system. That review considered the various aspects of the system, with five recommendations for further improvements made under the following topics which are described in detail below. Each section outlines the original recommendation and an overview of the action taken. Further details about each element are further discussed under the section headings later in this review.

SMRU were consulted on the review, on behalf of UKRI, and the resulting comments have been taken into account in the final review.

4.1 Seal licence applications

4.1.1 Recommendation

MS- LOT to continue to seek to improve information collection including through improvements to the application forms and survey process.

4.1.2 Progress

The seal licence application process has undergone considerable improvement since 2015 including the creation of an online management portal for applicants to complete the survey and report seals killed. This has increased the quantity and quality of data provided during the application process and made the processing of applications more comprehensive. The online portal can only be accessed by applicants and MS-LOT staff to maintain data protection and privacy. However, key information is still published regularly on the Scottish Government website.

4.2 Non-lethal measures

4.2.1 Recommendation

MS-LOT to continue to work closely with the industry and others to improve various existing options in this field and to develop new non-lethal measures.

4.2.2 Progress

Scottish Government is supporting the aquaculture and river fisheries sectors in improving access to and use of non-lethal measures to deter seals. Research has been commissioned which seeks to reduce interactions between river fisheries and seals, including increasing the efficacy of non-lethal measures and improving technology for monitoring and recognising individual seals which travel upriver to predate upon salmon. Further research, led by Scottish Government and funded by Crown Estate Scotland, is reviewing the availability of non-lethal measures in rivers and at fish farms and will make recommendations for future areas of investigation.

The aquaculture industry continues to [improve net technology](#) to combat the risk of escapes often due to damage from seals and in utilising other [non-lethal measures](#), although there has been some questions raised about the efficacy of Acoustic Deterrent Devices (ADDs) (Coram et al., 2014) and their potential for impacts on other non-target species, mainly cetaceans (Findlay et al., 2018). This is also the subject of an ongoing research project.

4.3 Seal licence returns

4.3.1 Recommendation

MS-LOT to consider improvements in the frequency of seal licence returns.

4.3.2 Progress

Licensees are required to report every seal killed within 48 hours, in addition to completion of a quarterly report. This process has also been improved through integration into an online management system providing easy and quick access for all reporting.

Improvements have resulted in automatic alerts being generated when a report of seal shooting is submitted out with the 48 hour review period. This means Marine Scotland have, where appropriate, been able to quickly follow up late reporting through their compliance function. Ultimately, the increase of attention and focus on reporting is having a positive impact on the timing of returns.

4.4 Carcass recovery

4.4.1 Recommendation

MS-LOT to consider how to improve the carcass recovery process in discussions with Scottish Marine Animal Stranding Scheme (SMASS), licensees and others.

4.4.2 Progress

It remains a condition of licences that carcasses should be recovered, where it is possible to do so. Furthermore, licensees are reminded through MS-LOT that, in addition to recovery, all carcasses should be reported to SMASS where possible. Despite this, the number of carcasses recovered by licensees is still low.

4.5 Seal licence fees

4.5.1 Recommendation

MS-LOT to consider possible future introduction of fees to cover administrative costs of seal licensing system.

4.5.2 Progress

To date, there are no application fees for a seal licence. This remains under review by Marine Scotland.

5. Review of the current operation of the seal licensing system

This review covers the operation of the seal licensing system from February 2015 to August 2020. This includes application data from the 2015 to 2020 licensing period and licensing data up to the end of the 2019 licence period.

5.1 Application process

5.1.1 Seal licence applications

Since 2015, further improvements have been made to the licence application process such as the creation of the online seal management portal. The portal allows applicants to complete the application survey online and retains the information from year to year which streamlines the process for applicants, allowing MS-LOT to

review the current survey data against previously submitted data, to inform licensing decisions. All information is managed online, saving time, but also allowing corrections or additional information to be added by the applicant quickly and easily. It also provides secure storage for this information. The online portal has also recently been upgraded to improve usability. Tables 2 and 3 provide an overview of the number of seals requested and granted on licences in the review period, and numbers killed under licence.

Table 2: Number of seals requested, granted and killed on licences to protect health and welfare of farmed fish (e.g., aquaculture).

Licence Year	Number of seals		
	Requested on licence applications	Granted on licences	Killed under licence
2015	906	510	66
2016	756	271	61
2017	755	253	44
2018	684	225	53
2019	632	235	63
2020	672	216	*

*Information is not currently available.

Table 3: Number of seal requested, granted and killed on licences to prevent serious damage to fisheries or fish farms (e.g., river fisheries).

Licence Year	Number of seals		
	Requested on licence applications	Granted on licences	Killed under licence
2015	625	379	66
2016	419	126	38
2017	288	115	28
2018	287	108	36
2019	277	111	34
2020	297	114	*

*Information is not currently available.

Application forms can be completed either electronically or by hand, allowing flexibility for applicants. The questions and format of application forms have remained consistent since that last review. Currently, there is a separate application form for each of the two types of licences issued (protection of health and welfare, and prevention of damage to fisheries) due to the different types of information required from fish farms and river fisheries. It should be noted there is currently no proforma for applications for research purposes. Applications for research licences are made by letter to MS-LOT providing the relevant information. Since 2015, five licences have been granted to take (capture) seals for scientific, research or educational purposes. All information provided on application forms is assumed to be true and is not externally verified.

New provisions in the Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act 2020 has removed two licensable provisions in the Act – namely protecting the health and welfare of farmed fish (S110(1)(f)) and preventing serious damage to fisheries or fish farms (S110(1)(g)).

It is recommended that a new application form which encompasses all licensable purposes is developed for any future applications to kill or take under the provisions of S110 of the Marine (Scotland) Act 2010.

5.1.2 Consultation process

There have been no changes to the statutory consultation process since the last review. Consultation is undertaken with SMRU (on behalf of UKRI) for advice on seal populations (using PBR developed by SCOS) and NatureScot for advice on protected sites. Additionally, advice is sought from MSS on information about river fisheries and fish farms. Consultees are provided with copies of the applications (with personal information removed) and provide MS-LOT with any comments or particular conditions.

Under the [Conservation \(Natural Habitats, &c.\) Regulations 1994](#) (the Habitats Regulations), Habitats Regulations Appraisal (HRA) is required where there is likely significant effect on a European site. There have been some improvements in the process for undertaking HRA where these are required. Current practice by MS-LOT is to undertake a HRA for all applications with sites in the vicinity of Special Areas of Conservation (SACs) for seals, as advised by NatureScot.

5.1.3 Potential Biological Removal

Potential Biological Removal (PBR) provides key scientific support for the seal licensing system by setting an upper limit for anthropogenic losses in each seal management region. This allows the seal licensing system to ensure that numbers permitted to be taken or killed under licence would not cause the wider seal population to decline to less than the optimum sustainable population size in each region. It should be noted that PBR in a given region includes all anthropogenic losses. The increasing amount of marine activities, including renewable energy construction, means the numbers of seals permitted to be taken through the seal licensing system must be managed accordingly, especially in areas with declining populations, which lead to very low PBR (e.g. Orkney for harbour seals).

MS-LOT uses the PBR to consider the appropriate number of seals of each species to grant in each of the management areas, while maintaining a suitable buffer for other anthropogenic impacts. In certain areas, the number of seals applied for, may exceed the PBR, however MS-LOT does not grant more seals than the PBR allows, and aims to keep well below the PBR.

5.1.4 Application fees

There has been no change to seal licence application fees since the last review. There is no cost associated with applying for a seal licence. This is being remains under review by Marine Scotland.

5.1.5 Appeals

There has been no change to the process of appeals since the last review. Appeals are carried out by a panel made up of persons external to MS-LOT, usually a balance of people from within the seal licensing policy function within Marine Scotland and from other areas to ensure impartiality. The panel reviews the licensing information and appeal request. Once a decision is reached, MS-LOT and the

appellant are notified. Any changes to a licence as a result of an appeal are carried out by MS-LOT, using their normal process.

There have been five appeals since February 2015, in response to which two were upheld and three were rejected.

5.2 Licences

5.2.1 Seal licences

There have been no changes to the content of the seal licences since the last review.

Licences include a number of standard and bespoke conditions. These include the number of seals granted, the methods permitted for shooting (including firearm type and location), and specifications on numbers of seal which can be killed or taken near designated sites or in certain seasons.

5.2.2 Seal licence returns

Since 2015, seal licence returns have been moved to the online seal management portal and the requirement to report a seal killed within 48 hours has also been introduced. Marine Scotland Compliance is notified of occurrences of a licensee's failure to report seals killed within 48 hours and this information is used to investigate and consider any action required.

Licensees are reminded to complete the quarterly returns at the end of each quarter. These communications have been improved to clarify the potential penalties for failure to complete returns. If a return is not made, the relevant information is passed to Marine Scotland Compliance division to take appropriate measures.

All the information provided in seal licence returns is published on the Scottish Government website, as soon as possible after the returns period is over. This includes the dates of seals killed, site, and licence holder. Aggregated data by species and seal management area is also published.

5.3 Shooting of seals

5.3.1 Training of marksmen

There have been no changes to the training of marksmen since the last review.

Marksmen are required to complete a Professional Development Award (PDA) in seal management which assesses their skills and experience for operating as marksmen under the seal licensing system.

5.3.2 Checking of marksmen

In order for a marksman to be suitable to participate in the seal licensing scheme, they must hold a PDA in seal management (see above) and an appropriate firearms certificate. Until 2018, MS-LOT checked that both of these elements were in place with the relevant issuing authority.

After discussions with Police Scotland in 2018, MS-LOT has ceased the process of checking fire arm certificates, as it was agreed to be unnecessary under the

requirements of the licensing system. Similarly checking the PDA certificate has also been stopped. As with all other application information, it is implied by the signing of the application form, that applicants have provided correct and valid information throughout including marksmen details.

5.3.3 Carcass recovery

There have been no changes to the carcass recovery requirements or process since the last review. It should be noted that this was an element requiring improvement at the time of the last review.

It is a condition of the seal licence that, where possible, reasonable steps should be taken to recover carcasses. In this context, recovery refers to retrieval of carcasses by licensees, who are also encouraged to report the carcass to the Scottish Marine Animal Strandings Scheme (SMASS), who may collect the carcass. The number of carcasses recovered remains low with between one and three carcasses (3-4% of killed seals) recovered annually between 2015 and 2018. A total of 11 carcasses (11% of killed seals) were recovered in 2019, showing this trend may be improving.

Seal carcasses can provide important information on seal populations and post-mortem can be used to confirm the animal was killed humanely. Even if the licensee cannot recover or SMASS is unable to collect the carcass, either due to resource limitations or carcass quality, the shooting should still be reported so it can be noted and this can be cross-checked if the carcass is later recovered or found elsewhere.

As part of efforts to make improvements, MS-LOT issued a further reminder letter alongside the 2020 licences issued in February 2020. This letter reminded licensees of their duty to recover carcasses and details of how to do so, in addition to reminding to report recovered carcass to SMASS.

It is recommended that further work is required to encourage recovery of seals killed and reporting to the Scottish Marine Animal Strandings Scheme (SMASS).

5.4 Code of practice

The latest version of the Seal Management Code of Practice was published in 2018, with updated contact information. The content of the code has not been updated for some time and some information remains out of date. The information in the code itself remains relevant but should be reviewed to ensure that the scientific understanding underpinning it is still up to date. The code also requires updating to reflect the changes in licensable purposes allowed since the passage of the Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act 2020.

It is recommended that the Seal Management Code of Practice should be updated to reflect the most up to date science and the changes to the purposes for which licences can be granted.

6. Non-lethal measures

6.1 Overview

Information on non-lethal measures (NLMs) is considered by MS-LOT in its determination of a seal licence application. NLMs include use of particular types of management or equipment which deter seals from farms or rivers, or reduce seal interactions with farmed fish or river fisheries. NLMs typically used in fish farming include Acoustic Deterrent Devices (ADDs), net tensioning, and seal blinds. River fisheries sometimes also use ADDs, as well as ad-hoc methods such as shouting.

Applicants must demonstrate the use of the NLMs to meet the aim of the licensing system which states that shooting should be undertaken as a last resort. Most NLMs are considered not to have any negative environmental impacts. For example the use of correctly tensioned nets at fish farms can reduce the risk of seal attacks without increased environmental impacts.

6.2 Acoustic deterrent devices

ADDs are used to deter seals through the introduction of noise into the marine environment. Devices will vary in their design, intended use and acoustic properties and a full summary of these is beyond the scope of this report. Through the seal licensing regime, the usage of ADDs at fish farms and in rivers has been reported. The efficacy of devices in deterring seals has not been widely studied, however a Scottish Government-funded research project is currently seeking to assess both the use and efficacy of ADDs used within the aquaculture sector.

ADDs typically work by producing loud, low frequency sounds (usually 1 - 20kHz). Operators may set these devices to a range of duty cycles such as always on or on a timed cycle. ADD technology is continuously under improvement to focus frequency of sound to target species, and to reduce duty cycles to minimise unwanted disturbance to non-target species (Gotz & Janik, 2016).

The Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act places a statutory commitment on Scottish Ministers to lay a report before the Scottish Parliament on the use of ADDs at fish farms no later than 1 March 2021. The Scottish Government welcomes this commitment and is already actively progressing an element of this work through an ongoing review of the current management and regulation of ADD use at fish farms.

6.3 Other types of non-lethal measure

While ADDs are one of the most frequently used NLMs in aquaculture, a number of other measures can be used to reduce the incidence of seal predation events at fish farms and in rivers.

Good husbandry practices, such as adequate net tensioning and prompt removal of dead fish ('morts'), are commonly used in aquaculture to reduce predation by seals. Other pieces of equipment such as seal blinds (thicker netting which covers the bottom of nets to disguise dead fish) and anti-predator nets can also be used. Anti-predator nets can create a number of issues, which include the potential to entangle marine mammals (including seals) and birds (Northridge et al., 2013). Use of

electrified nets or electric fields have been developed and trialled (MMO, 2018) although Scottish Government is not aware of many farms in Scotland employing these methods. In recent years, use of [Sapphire SealPro™ nets](#) has gained popularity in the Scottish aquaculture sector with farms reporting a significant [reduction in seal predation events](#).

The use of NLMs in rivers tends to be more difficult than in aquaculture due to the wider spread of fishing sites and hydrological features of rivers, which are not conducive to noise transmission. River fisheries have attempted to use ADDs (either single or multiple devices) at the mouths of rivers to discourage seals from entering. Evidence suggests that seals who forage in rivers may be classed as ‘specialists’ (Graham et al., 2011) and seals with a strong urge to forage upriver may not be deterred by most NLMs. Electric field barriers were tested in a river in Canada but the costs were high and results were inconclusive (Forest et al., 2009). Other measures such as visual and acoustic disturbance do not provide a long-term solution in a river environment, so river fisheries are left with a limited suite of options to reduce seal predation. Mostly these involve ad-hoc use of noise to drive seals away when they are seen. Scottish Government is leading a Crown Estate Scotland-funded project to review the options available to river fisheries to deter seals and reduce interactions between river fisheries and seals. This project will consider all available options and produce options for future testing within the sector.

6.4 Use of non-lethal measures

6.4.1 Fish farms

As reported in the application survey, the number of sites reporting use of NLMs has increased over the review period (2015 – 2020). The number of farms using anti-predator nets has increased from below 20% in 2016 to over 40% in 2020 (Figure 1). The use of seal blinds and ADDs has remained fairly constant with around one-third and two-thirds of farms using the measures, respectively (Figures 2 and 3). Almost no sites (<5%) report using electrified nets. There has been a sharp increase in reported use of ‘other non-lethal measures’, rising from under 10% to over half of farms reporting these (Figure 4), with the majority of reported measures under this category in 2020 applications were the use of Sapphire SealPro nets.

On 2020 applications, only five out of 237 sites, across four licences, reported not using any of the NLMs described above. The reason given for the lack of measures at these sites was that seal predation events were too rare to justify use, use of ADDs were restricted by NatureScot, measures were not effective, or measures were not allowed by company policies. Licences covering these sites were granted.

Increase in use of some types of NLMs has not led to a decrease in number of seals requested or killed in the review period. The numbers of seals killed at fish farms appears to have remained relatively constant since 2015 (Figure 5). In the first five years of the licensing system, seals killed at fish farms each year reduced from over 242 animals to 66. Since 2015, numbers have fluctuated but remain similar with 61 animals killed in 2015 and 63 killed in 2019, which represents less than 27% of the total number granted each year.

6.4.2 Netting stations

The [Conservation of Salmon \(Scotland\) Regulations 2016](#) introduced legislation to protect declining salmon stocks by, amongst other things, prohibiting the retention of salmon caught in coastal waters. Therefore, since 2015, only a small number of netting stations have remained on seal licences within the Moray Firth as part of the Moray Firth Seal Management Plan (Butler et al., 2008) with applications stating that sites could be required for salmon tagging studies. No seals have been reported killed at these sites in the review period.

6.4.3 River fisheries

In river fisheries, less than 10% of sites reported use of ADDs between 2016 and 2020. Reported use of other non-lethal measures was constant at around one-third of sites until 2019 but has increased to 45% in 2020 (Figure 6). Other non-lethal measures include scaring from river bank by shouting, waving arms and firing warning shots from firearms. Use of boats and general human presence are also reported to deter seals.

Only a small number of river fisheries use ADDs, likely because of the variable efficiency and difficulties of installing and maintaining devices in rivers. Over half of sites (21 out of 40) do not use any non-lethal measures. Reasons given for not using any NLMs include the expense and inefficacy of using ADDs. There is a lack of other proven options for river fisheries. Research into providing additional non-lethal options to river fisheries is discussed below.

As with fish farms, numbers of seals reported killed or taken under licence by river fisheries has remained constant since 2016 (Figure 7). Between 2011 and 2016, seals reported killed each year under licence in rivers reduced from 219 to 39. Numbers from 2016 to 2019 varied but have remained similar with 38 seals killed in 2016 and 34 seals killed under licence in rivers in 2019, which represents about 30% of the total number granted each year.

6.5 **Future work to improve non-lethal measures**

The Scottish Government continues to support research aimed at improving understanding of seal interactions with river fisheries and investigating NLMs to address seal predation in both aquaculture and river fisheries. Below is a summary of research supported since 2015.

- Marine Mammal Scientific Support Research Programme ([2015-2020](#), complete).
- Improving understanding of the use, impact and efficacy of acoustic deterrent devices in Aquaculture (2019 – 2020, ongoing).
- Non-lethal measures to address seal predation at fish farms (2020, ongoing).

It is recommended that work should continue in the aquaculture and river fisheries sectors to improve the efficacy of non-lethal measures in deterring seal predation.

7. Other impacts on seals

7.1 Welfare of seals

Conditions on the seal licence dictate the method of killing that may be used and detail the type of firearm and ammunition, weather conditions and distance from the animal. The licence also states that the marksman should 'take all reasonable steps to take away suffering of injured seals, by locating and humanely killing such animals as soon as possible, and without delay, following their being injured'.

One of the purposes for which carcass recovery is required is to ensure that seals are being killed in compliance with these conditions and in the most humane way possible. As discussed earlier, recovery of carcass killed under licence is rare meaning that this duty cannot be fulfilled.

Since February 2015, 38 seal carcasses (30 grey, six harbour and two unknown) have been collected (i.e. found stranded or collected from site) by SMASS. Of these, SMASS has undertaken full post-mortem on five individuals; one juvenile harbour seal, three juvenile grey seals and one pregnant female grey seal. All reported results indicated seals had been shot correctly and died instantaneously, with indicators of otherwise healthy animals (e.g. recent feeding). SMASS is only able to collect and post-mortem a small proportion of seal carcasses however an additional grey seal carcass is awaiting post-mortem.

7.2 Impacts on seal populations

The total numbers of seals for which licences have been issued in each Seal Management Area have not reached a level that may adversely impact on local seal populations. The number of seals killed or taken, by species, over the licensing scheme is shown in Figure 8. The number of seals killed compared to the annual PBR is shown in Table 4, indicating the number of seals killed is substantially below the PBR for each species.

Table 4: Number of seals granted and killed by species, and annual PBR for each species, from 2015 to 2020.

Licence Year	Grey seals			Harbour Seals		
	Granted	Killed	PBR	Granted	Killed	PBR
2015	662	118	2830	197	42	627
2016	284	82	3136	113	17	733
2017	253	53	3584	115	19	805
2018	228	64	5979	105	25	804
2019	235	75	6370	111	22	1143
2020	228	-	6079	102	-	1147

Overall, less harbour seals than grey seals are killed or taken. The likely reason for this is that the grey seal population in Scotland is around three times larger than the harbour seal population, and the low PBR for harbour seals in certain management areas (Morris et al., 2020). In the review period, the number of seals killed or taken has remained broadly constant.

Each year, the Special Committee on Seals (SCOS), on behalf of UKRI provides advice to all UK administrations of the status of seals. According to the latest advice from SCOS counts of harbour seals in Scotland have increased from 20,800 in the 2007-2013 survey period to 26,900 in the 2015-2018 period (Duck et al., 2020). This equates to an estimated total minimum population in Scotland of 37,300 seals. Grey seal pup production in Scotland has also increased from approximately 44,100 in 2010 to 54,750 in 2016, equating to an estimated total population of 122,500 grey seals in Scotland in 2018 (SCOS, 2020).

7.3 Seals in cages

The SCOS 2019 advice (SCOS, 2020) provided information on the potential options for removal of seals which have entered and become trapped in fish farm cages. Historically this has been a rare occurrence, therefore no tested methods exist for removing seals which have entered fish farm cages without killing them. It is possible that providing an escape route could be an option. However it is not clear how this would work in practice, without also allowing escapes of fish. Inside cages, seals have the potential to damage large numbers of fish very quickly, so fast removal is crucial to minimise risk to salmon and seals. Methods to lure a seal into an escape route are likely to be prove difficult due to the stressed nature of the seal. Capture of a seal is also likely to prove risky for both the animal and staff, so is therefore unlikely to be a desirable option.

SCOS therefore recommended that ensuring cages are adequately protected with physical barriers is the best way to mitigate against seals entering cages, as it is unlikely that an effective method of non-lethal removal will be developed in the near future.

8. Impacts on wild and farmed salmon

8.1.1 Wild salmon populations

Stocks of wild salmon in Scotland have been in long-term decline, Scottish Government recognises the problem is down to a range of complex factors and have identified 12 high-level groups of pressures on wild salmon, which include predation.

The option to offset increasing mortality of salmon at sea by reducing catches in coastal net fisheries has been exhausted now that those fisheries have closed. Consequently, further declines in numbers of salmon returning from sea are now causing direct reductions in spawning stocks. Rod catch is an indicator of the wild salmon spawning stock. The total reported rod catch (retained and released) of [wild salmon for 2019](#) is 47,515, the fourth lowest since records began in 1952.

There has been a year-on-year decrease in the numbers of rivers in which salmon stocks are achieving acceptable conservation status, as assessed under the Conservation of Salmon (Scotland) Regulations 2016. These regulations enforce a [system](#) to manage the killing of Atlantic salmon in inland waters by river fisheries. In 2019, 98% of rod caught spring [multi sea-winter](#) fish (taken before 1 May) were released, as were 92% of the annual rod catch (for wild salmon).

Reduction in levels of predation (including that from seals) can be expected to increase the conservation status of salmon stocks in many Scottish rivers. While

Scottish Government continues to proactively explore new and novel non-lethal deterrent methods as outlined above, there may be a need for some limited lethal management of seals for conservation purposes in the future, where non-lethal alternatives have failed.

8.1.2 Health and welfare of farmed fish

The health and welfare of farmed fish is of crucial importance and improving the health and reducing losses is a long-term objective of the Farmed Fish Health Framework. Farmed fish are also protected from 'unnecessary suffering' by the [Animal Health and Welfare \(Scotland\) Act 2006](#).

It is important to consider that nets do not keep seals away from farmed fish altogether and even if a seal cannot get direct access to predate stock in pens, the presence of a predator in close proximity may create stress which can lead to other health and welfare issues such as increased susceptibility to disease. The presence of predators such as seals can also bring about a flight response, panic swimming and with no way of escape it can cause crowding and reductions in oxygen that promote further health and welfare concerns.

9. Summary and recommendations

In summary, the seal licensing system as set out in the Marine (Scotland) Act 2010 continues to operate effectively. Many of the recommendations from the last review have been implemented including improvements to the application and returns process, with the development of the online seal management portal which has streamlined both application completion and reporting seals. Support has been provided to the aquaculture and river fisheries sectors to improve the availability and efficacy of non-lethal measures, although more work is anticipated to be completed on this front. As a lower priority recommendation, the implementation of application fees has not been fully considered in this review period.

Four main areas have been identified as recommended for further action including:

- Seal licence application forms – a new form which encompasses all licensable purposes should be developed for any future applications to kill or take under the provisions of S110 of the Marine (Scotland) Act 2010.
- Seal Carcass Recovery – further work is required to encourage recovery of seals killed and reporting to the Scottish Marine Animal Strandings Scheme (SMASS)
- Seal Management Code of Practice – the code of practice should be updated to reflect the most up to date science and the changes to the purposes for which licences can be granted.
- Non-lethal measures – work should continue in the aquaculture and river fisheries sectors to improve the efficacy of non-lethal measures in deterring seal predation.

10. Next Steps

Scottish Government will now consider and develop proposals on how best to pursue the recommendations for further work listed above.

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Annex 1: Figures

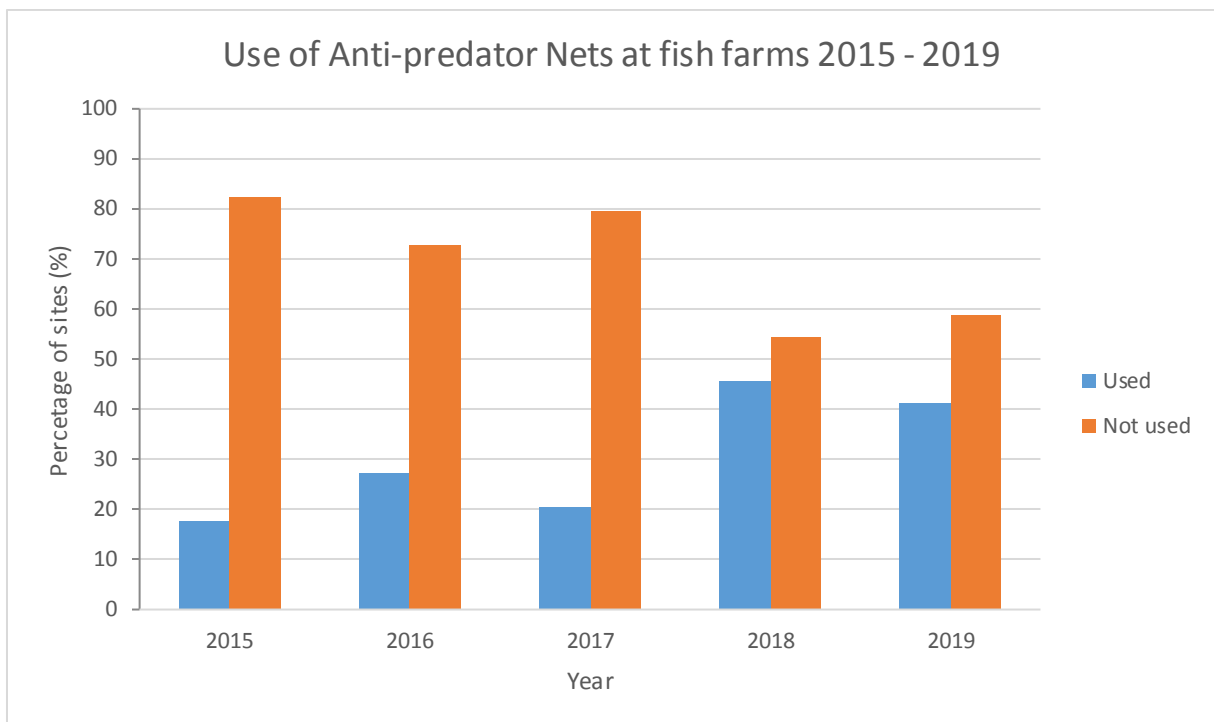


Figure 1: Percentage of sites reporting anti-predator net usage at fish farms, as stated in seal licence applications, 2015-2019¹.

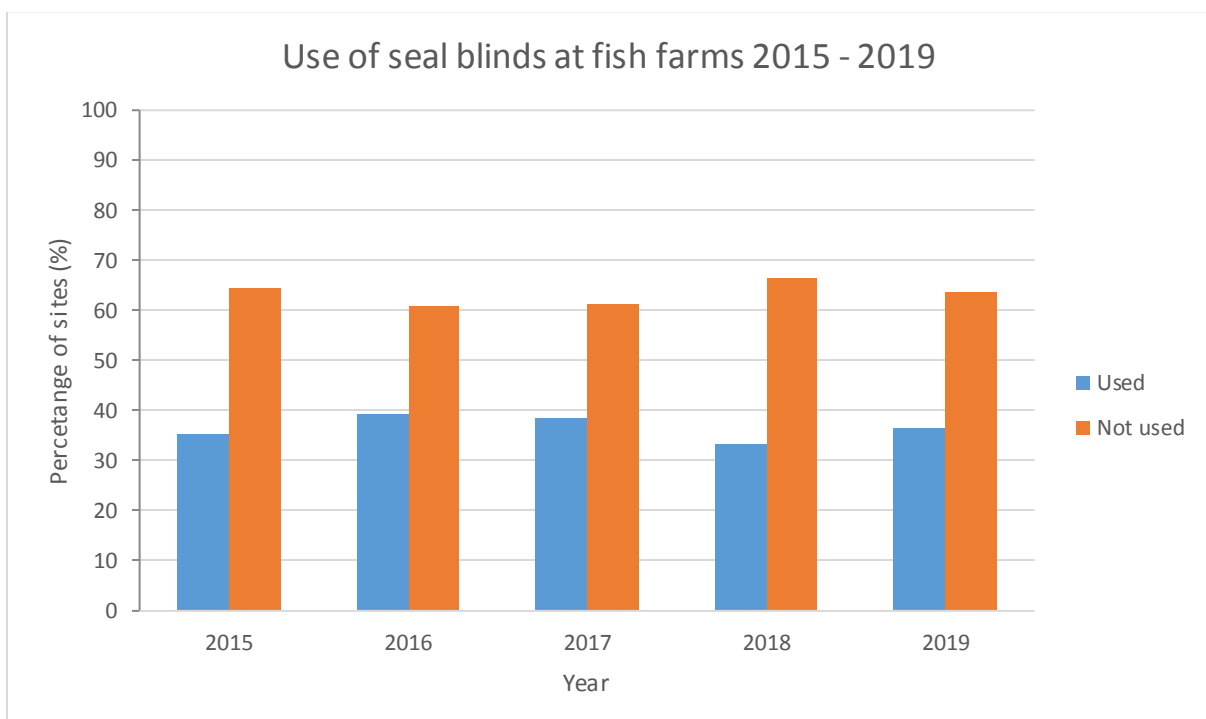


Figure 2: Percentage of sites reporting use of seal blinds at fish farms, as stated in applications, 2015-2019¹.

¹ Data collected refers to the year preceding application. Therefore, "Year" represents the year of operation referred to on application (one year earlier than equivalent licence year applied for). Data is not available before 2015.

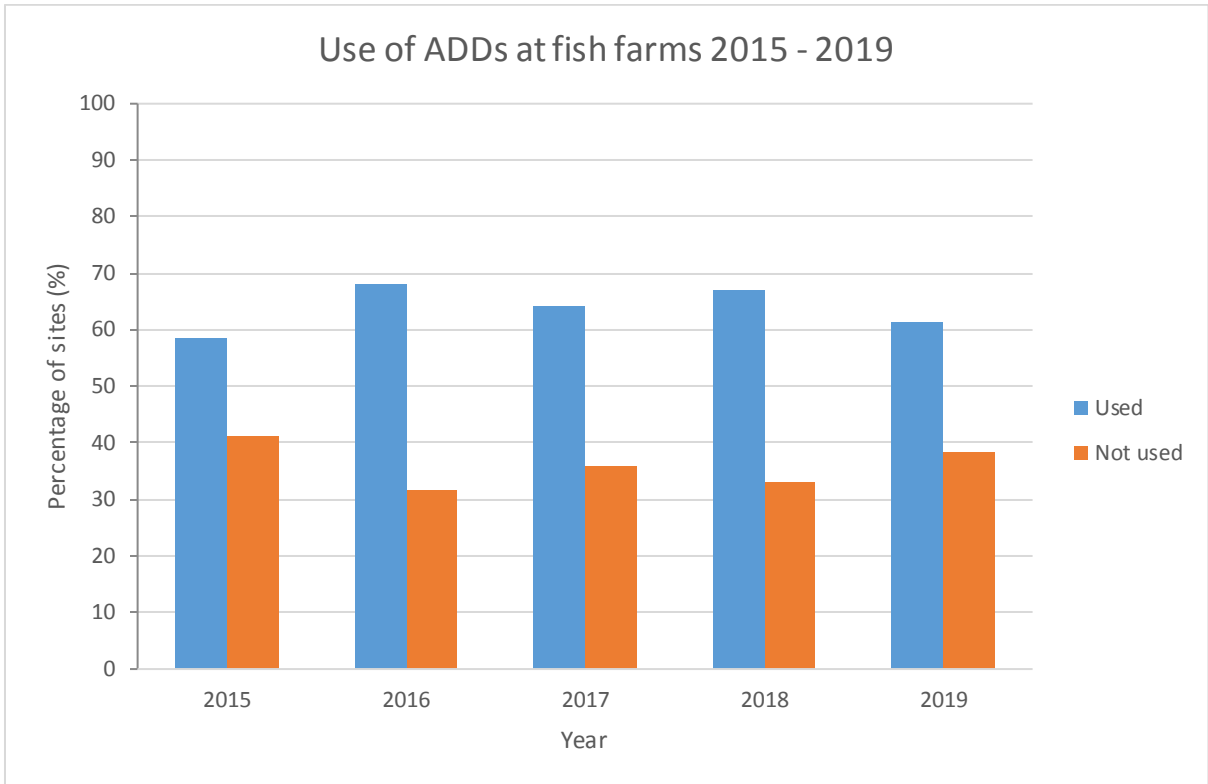


Figure 3: Percentage of sites reporting use of ADDs at fish farms, as stated in applications, 2015-2019¹.

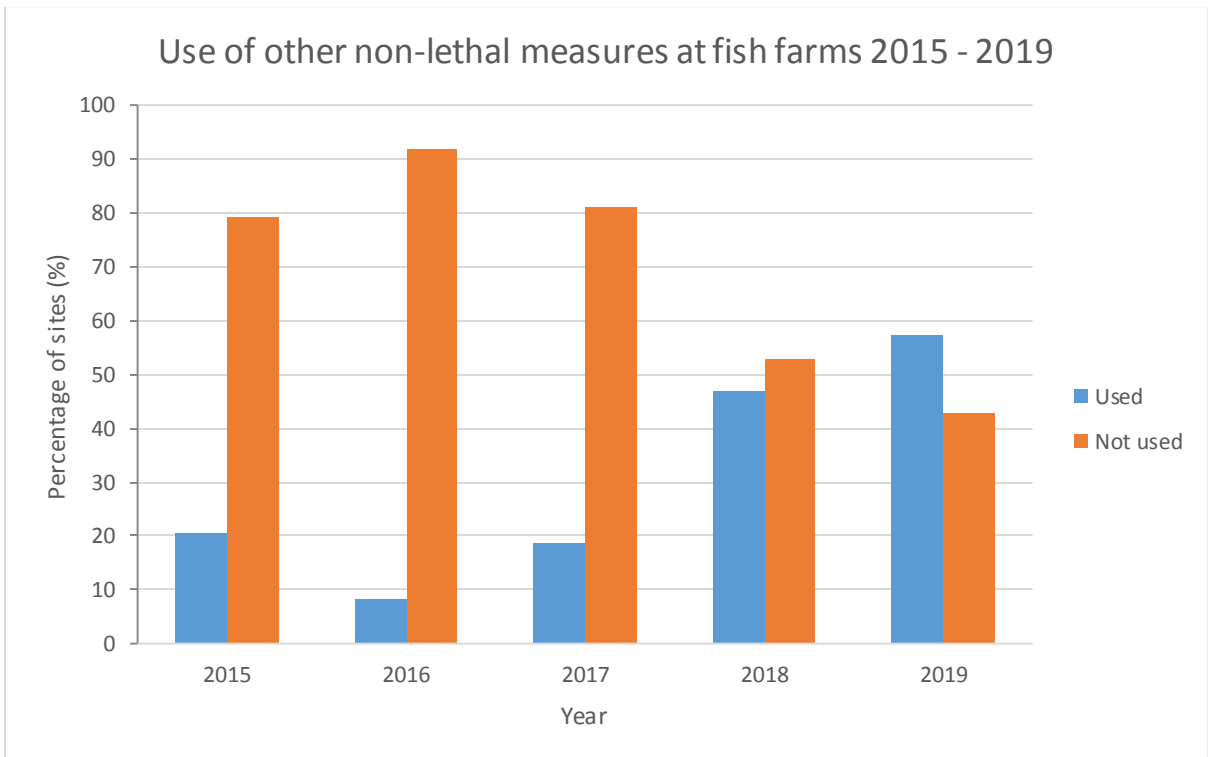


Figure 4: Percentage of sites reporting use of other non-lethal measures at fish farms, as stated in applications, 2015-2019¹.

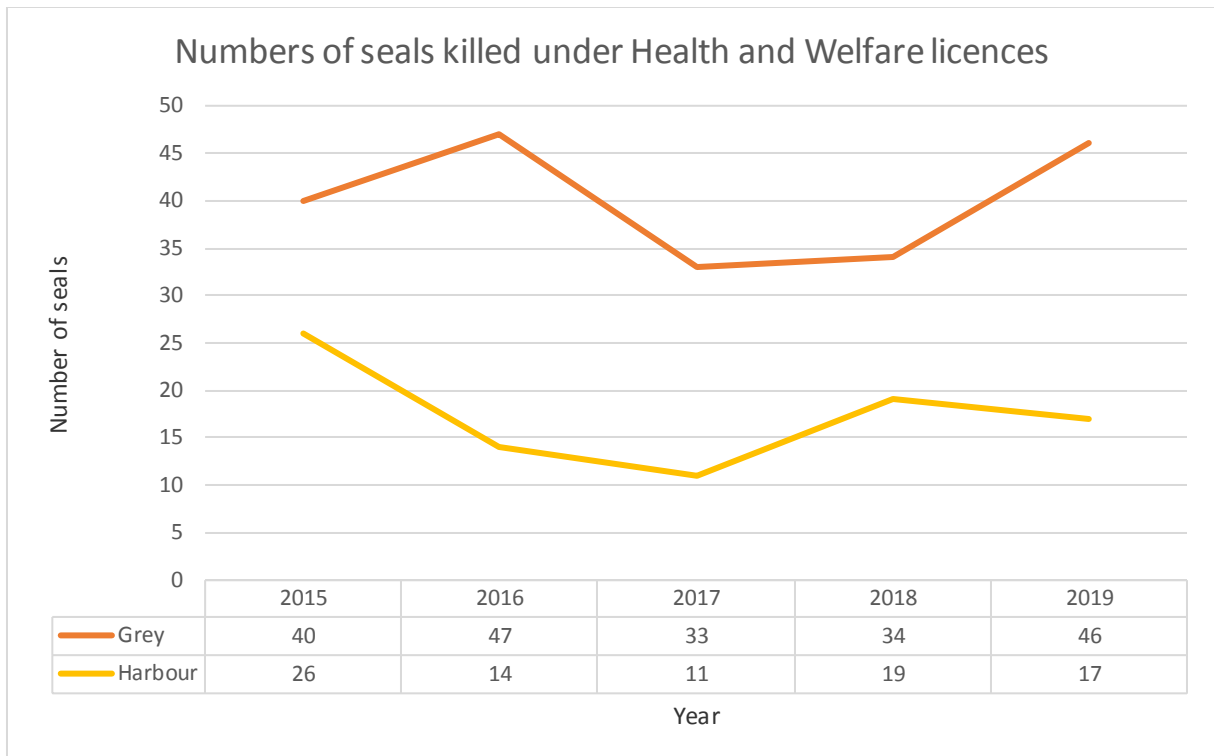


Figure 5: Number of seals killed under licences to Protect Health and Welfare of Farmed Fish, 2015-2019².

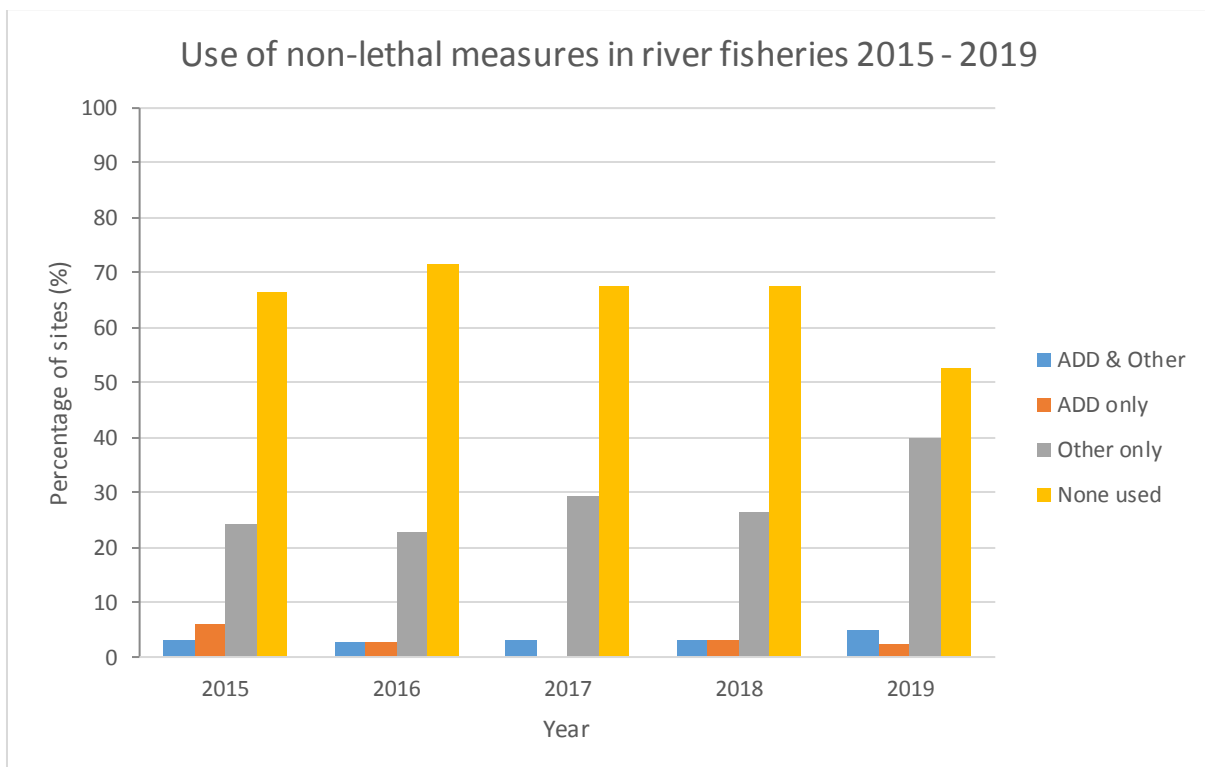


Figure 6: Proportion of sites reporting use of non-lethal measures at rivers, as stated in applications, 2015-2019¹.

² Year represents licensing year (e.g. 2015 = Feb 2015 – Jan 2016 etc.)

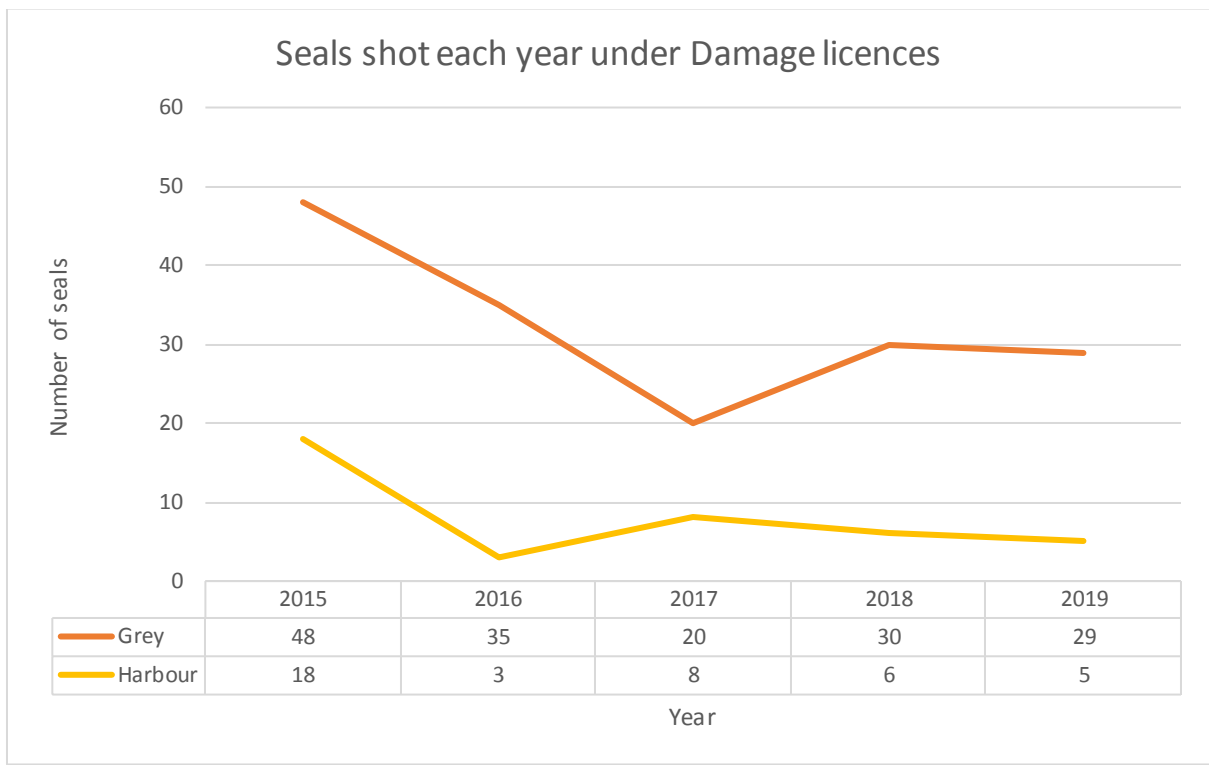


Figure 7: Numbers of seals killed under licence to Prevent Serious Damage to Fisheries, 2015-2019².

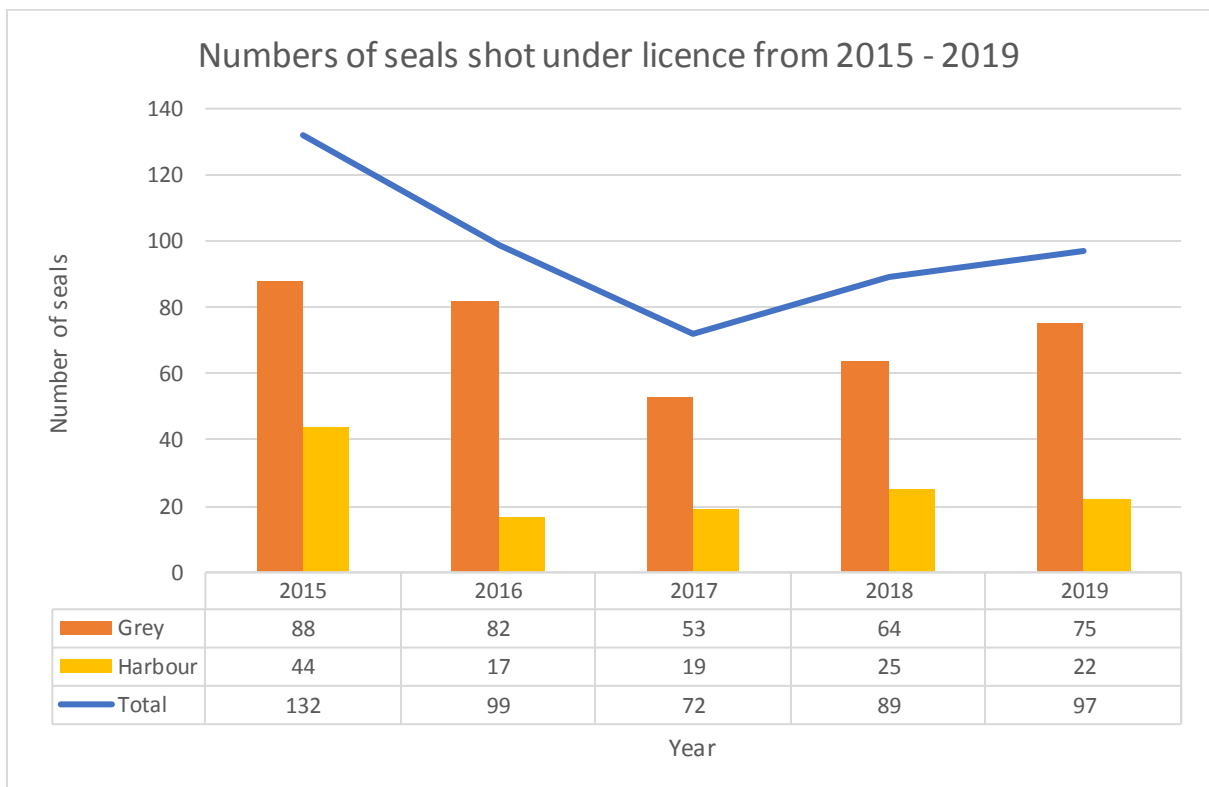


Figure 8: Total number of seals killed under all licences, 2015-2019².

Annex 2: Information Tables

Table 5: Number of seals granted and killed by species in each management area, and annual PBR for each species (2015).

Seal Management Area	Grey seals applied for	Harbour seals applied for	Grey seals PBR	Harbour seals PBR	Grey seals granted	Harbour seals granted	Grey seals killed	Harbour seals killed
East Coast	92	14	297	1	66	0	6	0
Moray Firth	120	15	201	16	70	5	32	5
Orkney & North Coast	315	37	1240	11	220	0	39	0
Shetland	89	5	235	18	82	3	10	0
Southwest Scotland	65	82	57	35	15	18	1	0
Western Isles	183	71	386	82	89	34	12	1
West Scotland	183	260	414	464	120	137	18	36
Grand Total	1047	484	2830	627	662	197	118	42

There were 29 licences issued for protection of health and welfare, covering a total of 214 individual fish farms in 2015, and one issued for prevention of serious damage.

The maximum number of seals granted in 2015 was 662 grey and 197 harbour seals. This maximum represents less than 0.7% of the grey seal population of 101,000 and 1% of the minimum harbour seal population of 20,700.

Table 6: Number of seals granted and killed by species in each management area, and annual PBR for each species (2016).

Seal Management Area	Grey seals applied for	Harbour seals applied for	Grey seals PBR	Harbour seals PBR	Grey seals granted	Harbour seals granted	Grey seals killed	Harbour seals killed
East Coast	46	8	327	1	14	0	2	0
Moray Firth	45	6	81	4	18	0	18	0
Orkney & North Coast	215	20	1234	11	64	0	12	0
Shetland	72	5	235	18	55	3	11	0
Southwest Scotland	79	55	57	35	15	17	1	1
Western Isles	153	73	574	82	42	19	12	1
West Scotland	149	232	628	582	75	76	20	20
Grand Total	759	399	3136	733	283	115	76	22

There were 28 licences issued for protection of health and welfare, covering a total of 212 individual fish farms in 2016, and 18 issued for prevention of serious damage.

The maximum number of seals granted in 2016 was 283 grey and 115 harbour seals. This maximum represents less than 0.1% of the grey seal population of 101,000 and 0.1% of the minimum harbour seal population of 23,400.

Table 7: Number of seals granted and killed by species in each management area, and annual PBR for each species (2017).

Seal Management Area	Grey seals applied for	Harbour seals applied for	Grey seals PBR	Harbour seals PBR	Grey seals granted	Harbour seals granted	Grey seals killed	Harbour seals killed
East Coast	33	9	352	1	14	0	2	0
Moray Firth	40	6	294	4	18	0	17	0
Orkney & North Coast	128	13	1245	11	56	0	1	0
Shetland	54	4	239	20	44	3	8	0
Southwest Scotland	54	78	57	50	12	13	1	0
Western Isles	165	63	620	82	37	16	14	3
West Scotland	182	204	777	637	64	81	10	16
Grand Total	656	377	3584	805	245	113	53	19

There were 28 licences issued for protection of health and welfare, covering a total of 215 individual fish farms in 2017, and 20 issued for prevention of serious damage

The maximum number of seals granted in 2017 was 245 grey and 113 harbour seals. This maximum represents less than 0.1% of the grey seal population of 120,000 and 0.1% of the minimum harbour seal population of 25,400.

Table 8: Number of seals granted and killed by species in each management area, and annual PBR for each species (2018).

Seal Management Area	Grey seals applied for	Harbour seals applied for	Grey seals PBR	Harbour seals PBR	Grey seals granted	Harbour seals granted	Grey seals killed:	Harbour seals killed
East Coast	21	10	882	2	12	0	1	0
Moray Firth	40	6	289	5	18	0	18	0
Orkney & North Coast	131	13	2249	8	47	0	10	0
Shetland	48	6	360	20	37	3	13	0
Southwest Scotland	32	40	86	50	12	13	0	2
Western Isles	153	76	941	82	43	17	9	2
West Scotland	187	209	1172	637	59	72	11	20
Total	612	360	5979	804	228	102	62	24

In 2018 there were 27 licences issued for protection of health and welfare, covering a total of 210 individual fish farms, and 18 issued for prevention of serious damage.

The maximum number of seals granted was 228 grey and 102 harbour seals. This maximum represents 0.2% of the minimum grey seal population of 99,739 and 0.4% of the minimum harbour seal population of 25,149.

Table 9: Number of seals granted and killed by species in each management area, and annual PBR for each species (2019).

Seal Management Area	Grey seals applied for	Harbour seals applied for	Grey seals PBR	Harbour seals PBR	Grey seals granted	Harbour seals granted	Grey seals killed	Harbour seals killed
East Coast	21	12	845	2	12	0	1	0
Moray Firth	40	6	275	5	18	0	18	0
Orkney & North Coast	112	10	2249	8	47	3	12	0
Shetland	44	5	360	20	37	3	8	0
Southwest Scotland	30	28	86	50	12	13	2	1
Western Isles	149	59	1336	105	43	17	23	8
West Scotland	166	195	1219	667	59	72	11	13
Total	562	315	6370	857	228	108	75	22

In 2019 there were 27 licences issued for protection of health and welfare, covering a total of 215 individual fish farms and 18 issued for prevention of serious damage.

The maximum number of seals granted was 228 grey and 108 harbour seals. This maximum represents 0.2% of the minimum grey seal population of 106,250 and 0.4% of the minimum harbour seal population of 26,565.

Table 10: Number of seals granted and killed by species in each management area, and annual PBR for each species (2020).

Seal Management Area	Grey seals applied for	Harbour seals applied for	Grey seals PBR	Harbour seals PBR	Grey seals granted	Harbour seals granted	Grey seals killed	Harbour seals killed
East Coast	24	10	871	2	14	0	*	*
Moray Firth	40	6	178	5	18	0	*	*
Orkney & North Coast	123	10	2249	8	45	0	*	*
Shetland	40	4	360	20	34	3	*	*
Southwest Scotland	30	28	119	71	11	12	*	*
Western Isles	177	66	1336	105	47	17	*	*
West Scotland	200	211	966	936	59	70	*	*
Total	633	335	6079	1147	228	102	*	*

* Information not yet available.

In 2020 there were 27 licences issued for protection of health and welfare, covering a total of 213 individual fish farms and 21 issued for prevention of serious damage.

The maximum number of seals granted was 228 grey and 102 harbour seals. This maximum represents 0.2% of the minimum grey seal population of 106,250 and 0.4% of the minimum harbour seal population of 26,565.



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The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

ISBN: 978-1-80004-093-9 (web only)

Published by The Scottish Government, September 2020

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS754506 (09/20)

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