WEST OF ORKNEY WINDFARM

Compensation Measures Plan

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West of Orkney Windfarm

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Role	Company	Name	Aconex Signature
Author	MacArthur Green	RMG	N/A
Checker	OWPL	JF	N/A
Acceptor	OWPL	SK	N/A

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1	17/07/2023	First draft issued for review
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Contents

1. Introduction

The Applicant, Offshore Wind Power Limited (OWPL) is proposing the development of the West of Orkney Windfarm ('the Project'), an Offshore Wind Farm (OWF), located at least 23 km from the north coast of Caithness and 28 km from the west coast of Hoy, Orkney. Crown Estate Scotland (CES) awarded OWPL the Option Agreement Area (OAA) in January 2022 for the development of the Project following the ScotWind leasing round which began in late 2019.

The Applicant has produced a Report to Inform Appropriate Assessment (RIAA). Based on the approach taken, following the advice and guidance from NatureScot, the RIAA concluded that an adverse effect on site integrity of three Special Protection Areas (SPAs) could not be excluded for:

- East Caithness Cliffs SPA;
- North Caithness Cliffs SPA; and
- Sule Skerry and Sule Stack SPA.

Four qualifying features designated under these SPAs may be impacted by the Project. The number of birds (rounded up to the nearest whole bird) of each of the four key species predicted in to be impacted by the development of the Project include:

- Common guillemot = 174 individuals;
- Atlantic puffin = 1 individual;
- Black-legged kittiwake = 12 individuals; and
- Great black-backed gull = 1 individual.

The RIAA states that while it was not possible to conclude no adverse effect on site integrity for the above SPAs using the advice and guidance from NatureScot, by applying additional "best scientific knowledge in the field" (Section 6.23.1 in the RIAA) it is highly likely that predicted impacts on the four qualifying species would be greatly reduced, both from the Project alone and in-combination. Depending on the conclusions presented in the Appropriate Assessment prepared by the Scottish Ministers, compensation measures may or may not be required to offset the impact of the Project on these four key species. Proposed compensation measures for the Project are provided without prejudice.

1.1 Aims and objectives of compensation measures

The Applicant has proposed compensatory measures that are proportionate to the predicted impacts and have been selected through a rigorous iterative process involving careful consideration and testing of options, stakeholder consultation and refinement. There is sufficient evidence to support the rationale for the final selection, which is rat eradication, feral cat removal and biosecurity measures on one island in Orkney.

The compensatory measures will provide significant additional kittiwakes, guillemots, razorbills and puffins into the UK population – with total numbers far in excess of those required to offset the impacts from the Project. These measures are substantial and provide a comprehensive solution that will maintain and enhance the national site network.

This Compensation Measures Plan reviews the available compensation measures for the species potentially requiring compensation in order to maintain the integrity of the UK SPA network for those features.

Once potential measures are identified this report provides the available evidence that implementing these measures will result in a net benefit to the SPA network for each qualifying feature.

For the available measure(s), this report aims to identify suitable locations to implement the measure(s) and what additional benefits might be provided to other SPA features.

1.2 Purpose of this document

This document provides the available scientific information on the potential measures to compensate for the predicted impacts from the Project alone, if required by the Scottish Ministers.

This document provides information to enable the Scottish Ministers to be satisfied that compensatory measures proposed by the Applicant can be delivered in a timely manner and can be relied upon to secure the overall coherence of the National

Site Network. Information about monitoring, reporting, programming and adaptive management are provided in separate reports.

2. Potential compensation measures

Potential compensation measures for seabirds were identified and reviewed by Furness et al. (2013) and updated by Furness (2021). These reports formed the primary source of information used to create a long list of potential measures that could be applied to the Project. Each species was considered separately, with the aim of identifying a measure or measures that could be applied to all four species requiring compensation.

2.1 Kittiwake

Furness et al. (2013) identified seven potential compensation measures that could benefit kittiwake populations:

- Closure of sandeel and sprat fishing close to breeding area SPAs or throughout UK waters;
- Eradication of American mink;
- Eradication of feral cats;
- Eradication of rats;
- Exclusion of foxes from colonies;
- Exclude great skuas from buffer zone around kittiwake colonies; and
- Construction of artificial structures to support kittiwake colonies.

Among these measures, “closure of sandeel and sprat fishing close to breeding area SPAs or throughout UK waters” and “construction of artificial structures to support kittiwake colonies” were considered to be highly likely to be effective with a high confidence in the assessment based on evidence. However, there was a lack of evidence for the other measures at that time. Furness (2021) presented additional evidence on closure of sandeel and sprat fisheries in UK waters in relation to kittiwake, evidence on provision of artificial structures for new kittiwake colonies and evidence relating to impacts of predators on breeding kittiwakes. There was a good deal of evidence that closure of sandeel fisheries in the North Sea would have very important benefits for kittiwake populations in general. Artificial structures have clearly been shown to benefit kittiwakes where natural habitats are limiting, including offshore, where productivity is likely to be higher than at coastal colonies. This is likely due to the proximity to foraging areas. Finally, the evidence that predator eradications (particularly rat eradications) would benefit kittiwakes was weak.

2.2 Great black-backed gull

Furness et al. (2013) identified five potential compensation measures that could benefit great black-backed gull populations:

- End culling;
- Eradication of American mink;
- Exclusion of foxes from colonies;
- Closure of sandeel and sprat fishing close to breeding area SPAs; and
- Eradication of rats.

Among these measures, all except “closure of sandeel and sprat fishing close to breeding area SPAs” were considered to be highly likely to be effective with a high confidence in the assessment based on evidence. This was reviewed by Furness (2021) who found that there was little additional evidence to add to these and no contradictory evidence. Furness (2021) noted that great black-backed gull was removed from the General Licence in 2019 so birds cannot be killed without a specific license (to prevent serious damage to agriculture).

2.3 Guillemot

Furness et al. (2013) identified four potential compensation measures that could benefit guillemot populations:

- Closure of sandeel and sprat fishing close to breeding area SPAs or in all UK waters;
- Closure of sandeel and sprat fishing in areas where these species are aggregated in winter;

- Eradication of rats; and
- Prevent risk of major oil spills near to SPAs.

Only the "prevent risk of major oil spills near to SPAs" was considered highly likely to be effective with high confidence in that assessment based on evidence. However, it was noted that oil spills have largely been prevented now, so this is unlikely to be a practical option. Furness (2021) presented additional evidence on closure of sandeel and sprat fisheries in UK waters and eradication of rats and other invasive mammal predators. There was a good deal of new evidence presented by Furness (2021) to show the benefits of closure of sandeel fisheries on guillemot populations. In addition, analyses by McGregor et al. (2022) have shown a strong likelihood of sandeel fisheries closures having a positive effect on guillemot populations in the North Sea. Furness (2021) points out recent analyses of the effect of rat removal from Lundy having a positive effect of the guillemot populations, while rat removal from Canna did not show such a positive effect, which was thought to be due to other pressures on the population.

2.4 Puffin

Furness et al. (2013) identified three potential compensation measures that could benefit puffin populations:

- Closure of sandeel and sprat fishing close to breeding area SPAs or in all UK waters;
- Eradication of rats; and
- Prevent risk of major oil spills near to SPAs.

None of these potential measures were considered highly likely to be effective with high confidence in that assessment based on evidence. It was recognised that strong efforts have made to prevent oil spills and the very extensive nonbreeding distribution of puffins across the North Atlantic made this measure less appropriate for this species – so this is unlikely to be a practical option. While there was strong evidence that closure of sandeel and sprat fisheries would benefit related seabird species, there was a lack of evidence in this regard specifically for puffin. There was a lack of clear evidence that this species would benefit from eradication of rats, but that was considered a highly practical measure if new evidence indicated this to be an effective measure. Furness (2021) presented additional evidence on closure of sandeel and sprat fisheries in UK waters and eradication of rats and other invasive mammal predators. There was a good deal of new evidence presented by Furness (2021) to show the benefits of closure of sandeel fisheries on puffin populations. Furness (2021) points out recent analyses of the effect of rat removal from Lundy having a positive effect of the puffin populations. Rat removal from Canna also showed a positive effect through colonisation of parts of the island previously accessible to rats. Eradication of rats from Ailsa Craig has resulted in puffins recolonising the island.

2.5 Potential compensation measures available to the Project

Among the potential measures reviewed by Furness et al. (2013) and updated by Furness (2021) the potential measures available in relation to the West Orkney Windfarm are closure of sandeel and sprat fisheries (for kittiwake, guillemot and puffin with only weak evidence for great black-backed gull) and eradication of terrestrial predators (for all species, although with weak evidence for kittiwake).

The creation of artificial nesting structures for kittiwakes has been excluded as natural nesting habitat is not limited in the region that includes the Project. Furness (2021) stated that, "*use of artificial nest sites in Scotland should therefore not be completely ruled out just because Scotland has lots of available natural habitat*" which is due to the strong competition for nesting sites and density dependent competition for nest sites and food around large colonies. However, the kittiwake colonies in the north of Scotland and the Northern Isles have all been declining for some time, so the likelihood is low that the provision of artificial nest sites would be successful in the short to medium term.

While closure of sandeel fisheries in the North Sea are likely to be provide sufficient benefit as compensation, this is considered to be best delivered as a strategic level measure. The closure of this fishery within the UK Exclusive Economic Zone (EEZ) would require UK Government agreement. In addition, the Project and many of the seabird SPA colonies with connectivity occur within Sandeel Area 7 (SA7). There was a strong decline of sandeels in the area through the 1980's with the fishery being closed in 1990 (Poloczanska et al. 2004). Following strong recruitment in 1991, the fishery was re-opened in 1995 but takes since then have been, at most, extremely small (e.g. 1,300 tonnes landed in 2001). In the absence of a fishery for sandeels in SA7, the closure of the fishery for the population of sandeels would unlikely provide a suitable compensation measure for seabirds at present.

Eradication of terrestrial predators from offshore islands was therefore considered as the most likely measure with available evidence to support an assessment of efficacy of the measure to overcome the potential impacts.

3. Evidence for benefit

Furness (2021) and Furness et al. (2013) reviewed the available evidence assessing whether each compensation measure would likely, or not, be able to provide a benefit to each species.

For compensation measures involving the eradication of terrestrial predators from offshore islands, the evidence presented in the Furness (2021) and Furness et al. (2013) reports are summarised below for each of the four species potentially requiring compensation due to the predicted impacts from the Project.

In addition, for islands where invasive terrestrial predator eradication has been attempted in the past, the available seabird colony counts from the Seabird Monitoring Programme (SMP) database were collated where colony count data was available both before and after the eradication date. These were collated and presented for each species requiring compensation from the following islands:

- Calf of Man, Isle of Man;
- Canna, Hebrides;
- Handa, Sutherland;
- Lundy, Wales;
- Puffin Island, Wales; and
- Ramsay Island, Wales.

Where productivity plots were also available from these islands spanning the periods before and after invasive alien vertebrate eradication, these were also collated and plotted for each species.

These data provide further information on the potential for eradication of invasive alien vertebrates as a suitable compensation measure for the Project.

3.1 Eradication of rats

3.1.1 Kittiwake

Furness et al. (2013) identified only a single published report investigating predation of a kittiwake nest by a rat and one by a feral cat. Evidence from islands where rats have been eradicated was concluded by Furness (2021) to be weak. There was no evidence presented by Furness et al. (2013), Furness (2021) or a review of recent literature undertaken for this report to present direct empirical evidence on the effects on breeding kittiwake colonies on the removal of feral cats.

The available information on change in population size of breeding kittiwake colonies in the UK following eradication of rats is summarised for each island where there were data both before and after rat eradication.

3.1.1.1 Calf of Man

Rats were eradicated from the Calf of Man in 2012. Despite a long series of colony counts from the Calf of Man prior to rat eradication there was only a single year with any counts following eradication, in 2013 (Figure 3-1). By this point there were very few breeding kittiwakes left on the Calf of Man with three pairs counted in 2012 and thirteen in 2013. JNCC reported[1] that the colony had been extirpated by 2017.

[1] https://jncc.gov.uk/our-work/black-legged-kittiwake-rissa-tridactyla/

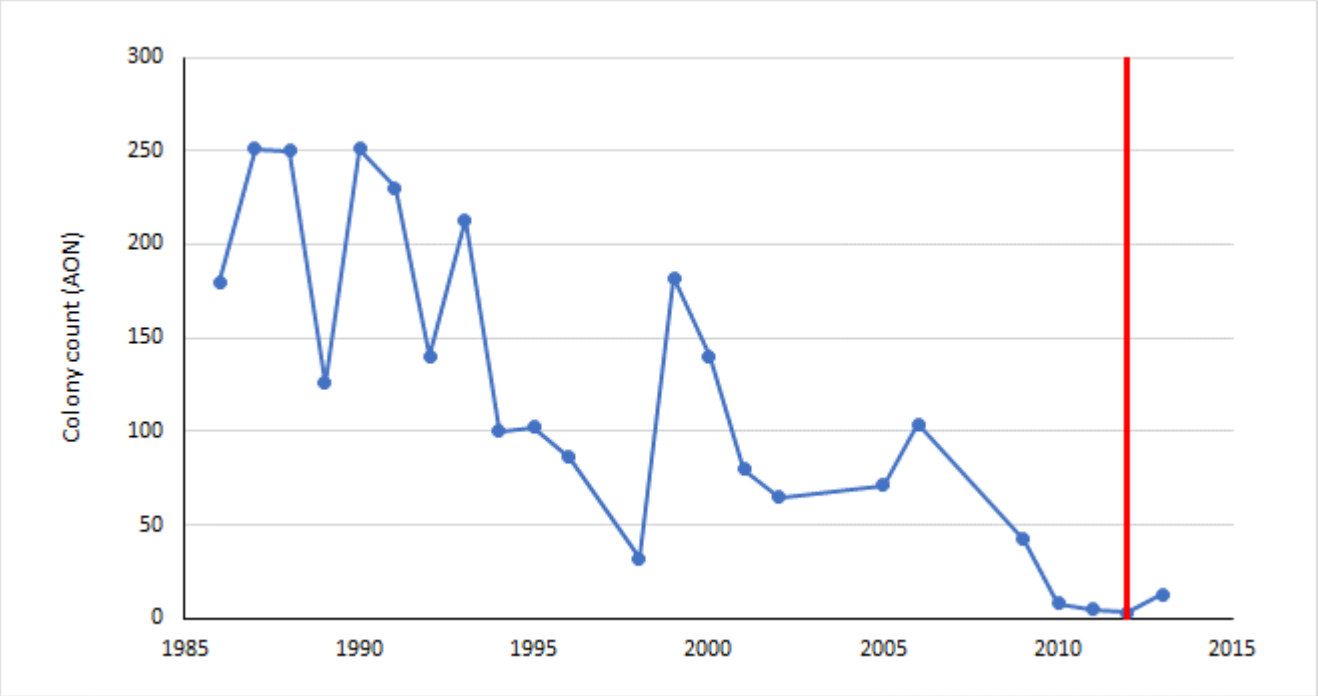


Figure 3-1 Change in the colony counts of kittiwakes at the Calf of Man between 1986 and 2013. Red line indicated the year in which rats were eradicated.

3.1.1.2 Canna

Rats were eradicated from Canna in 2005. The kittiwake colony on Canna has been increasing across the span of available data (1986 – 2022). Kittiwake numbers were increasing prior to rat eradication and appeared to decrease quickly around the time that rats were eradicated from the island, followed by a continued increase (Figure 3-2).

The Canna and Sanday counts were compared with those from islands in the same region where there was a similar span of available count data. At the Ceann a' Mhara colony on Tiree, the general pattern was similar to Canna: an increase from the mid-1980's to the mid-2000's, followed by a decline in the following 10 years and then a steady increase. Another colony with suitable data was on Lunga and Sgeir a' Chaisteil in the Treshnish Isles. The pattern there differed with a steady decline across the whole period with perhaps a sign of some recovery in the last count (2018).

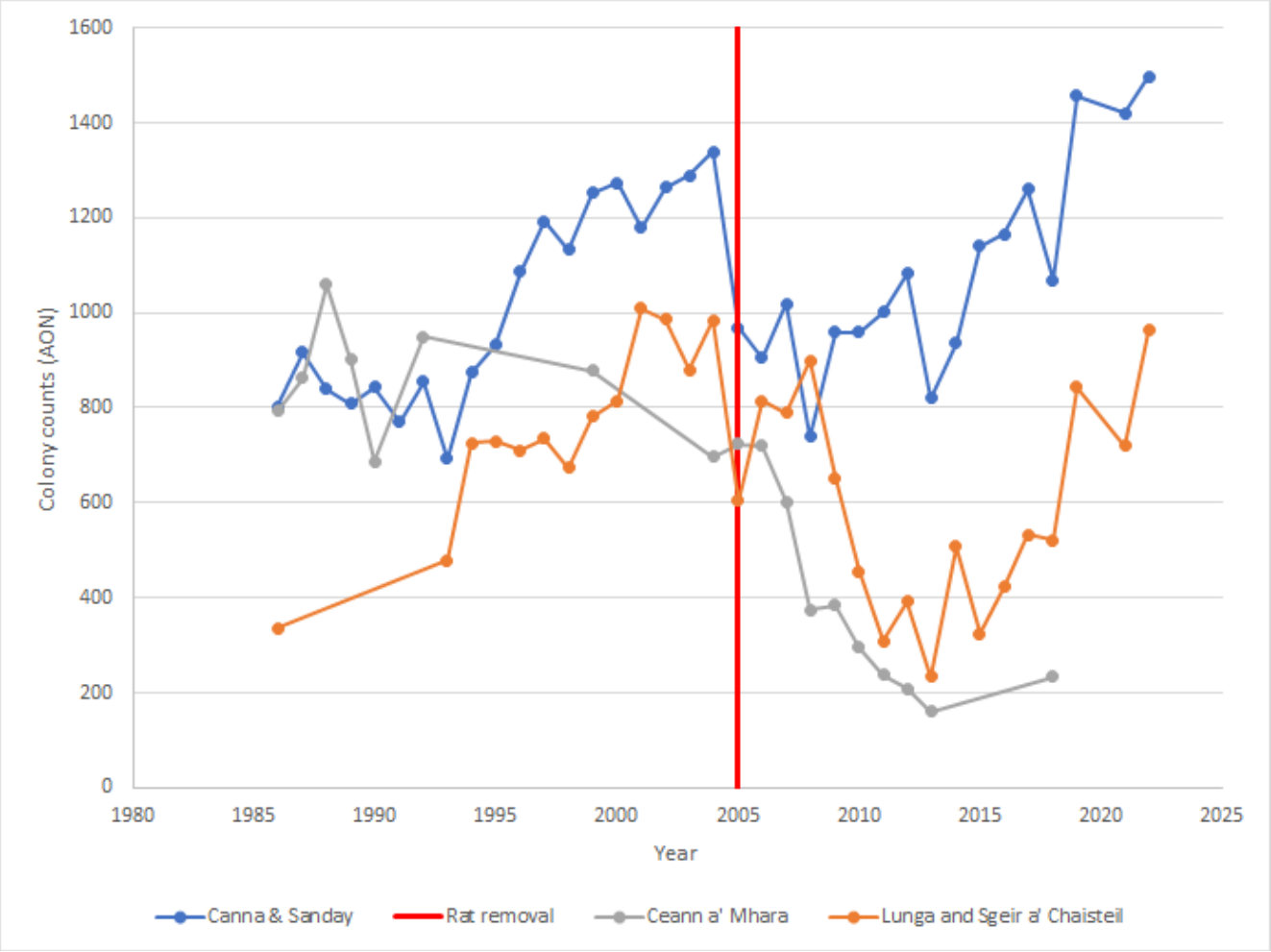


Figure 3-2 Change in the colony counts of kittiwakes on Canna & Sanday, Ceann a' Mhara (Tiree) and Lunga and Sgeir a' Chaisteil (Treshnish Isles) between 1986 and 2022. Red line indicated the year in which rats were eradicated on Canna.

In addition to colony counts, productivity plot counts were also available for kittiwakes on Canna before and after rat eradication (Figure 3-3). Productivity appears to be largely the same as before and after eradication, with a great deal of inter-annual variation.

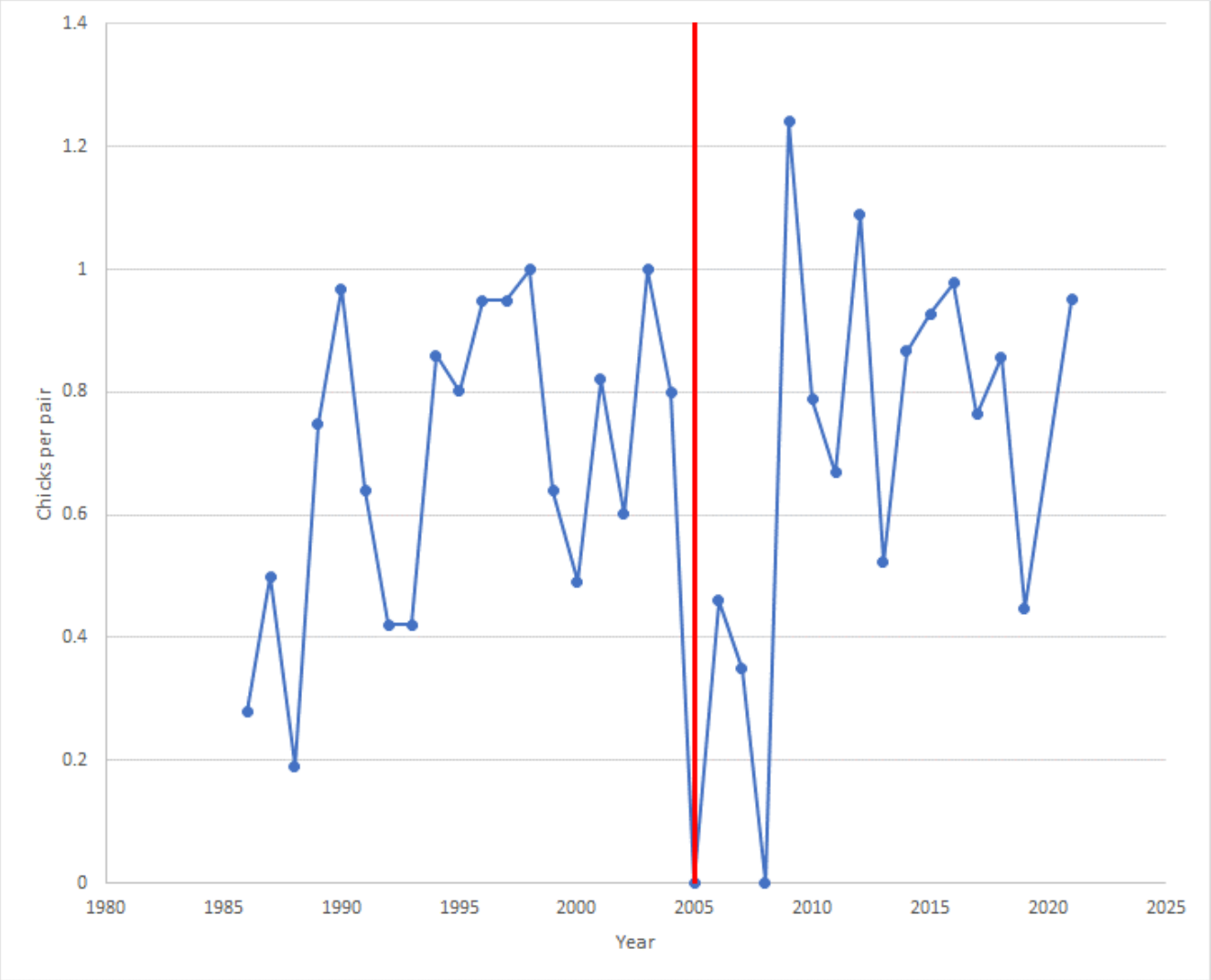


Figure 3-3 Productivity of kittiwakes on Canna between 1986 and 2021. Red line indicated the year in which rats were eradicated.

3.1.1.3 Handa

No suitable comparative counts from other kittiwake colonies could be found in the SMP database for comparisons with kittiwake counts from Handa. Following eradication of rats from Handa in 1997 kittiwake numbers declined, and only increased after rat re-invaded Handa in 2012 (Figure 3-4). This suggests that, on Handa at least, there were stronger drivers of population change than the presence of rats on the island.

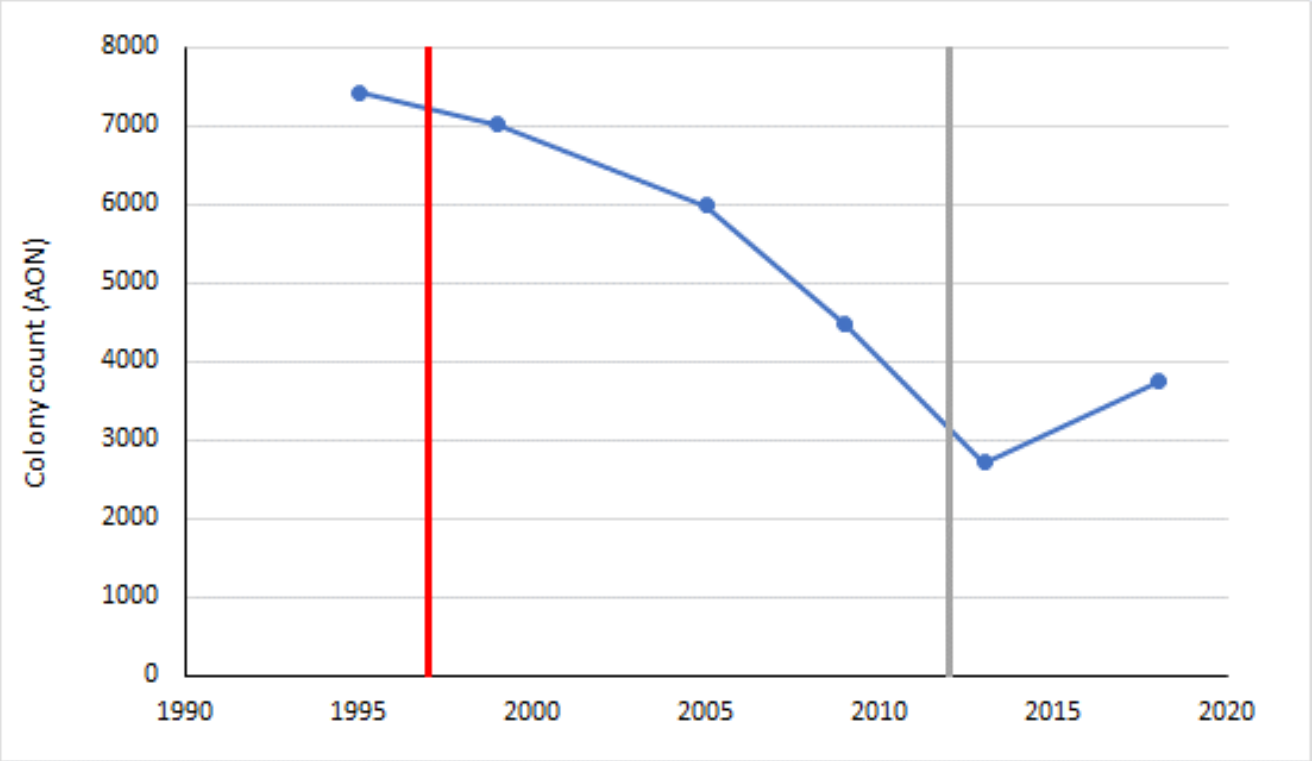


Figure 3-4 Change in the colony counts of kittiwakes on Handa between 1995 and 2018. Red line indicated the year in which rats were eradicated and the grey line when rats re-invaded the island.

In addition to colony counts, productivity plot counts were also available for kittiwakes on Handa before and after rat eradication (Figure 3-5). Productivity began to decline after eradication, but dropped sharply between 2006 and 2008, before recovering back to previous levels across the period that rat re-invaded the island.

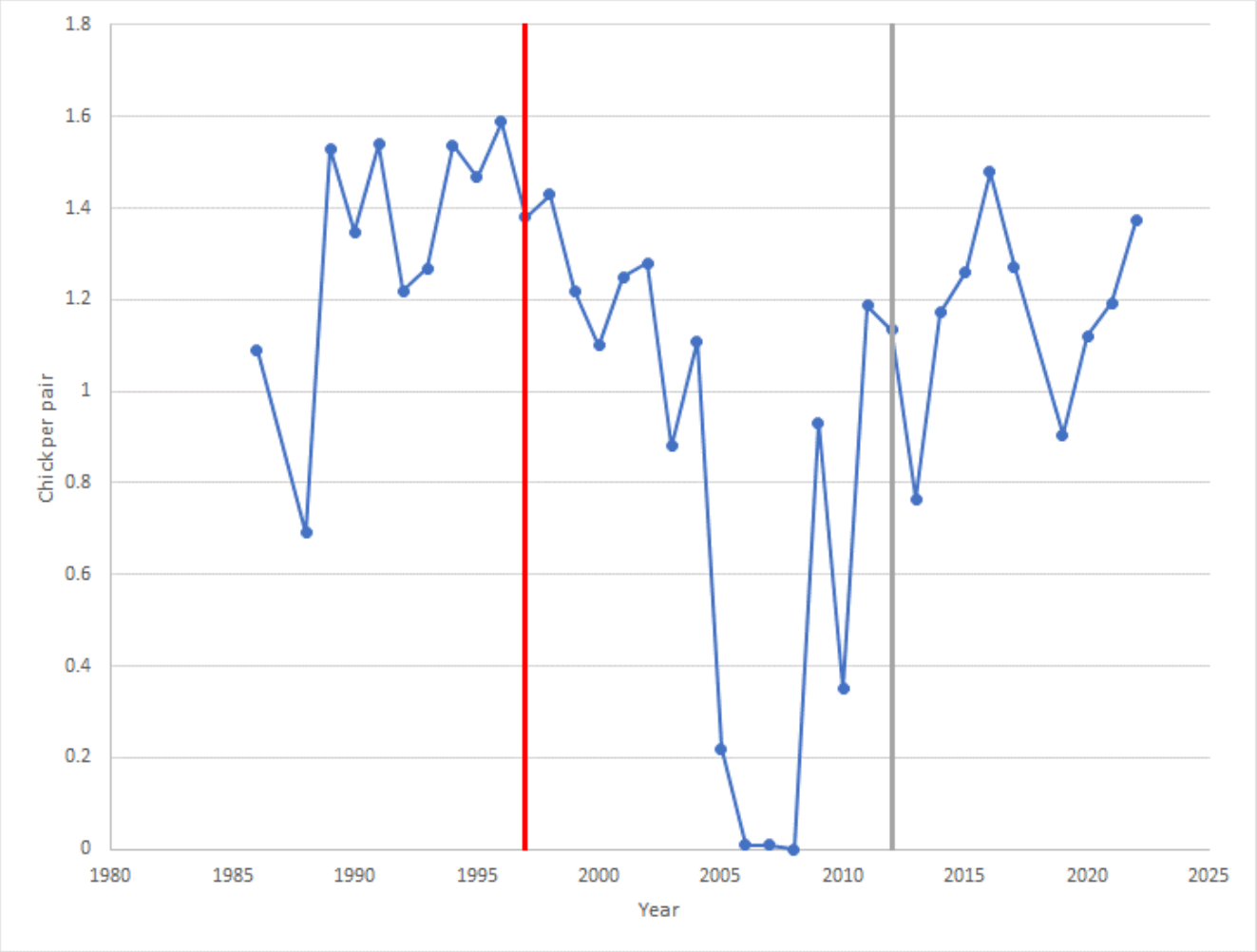


Figure 3-5 Productivity of kittiwakes on Handa between 1986 and 2021. Red line indicated the year in which rats were eradicated and the grey line when rats re-invaded the island.

3.1.1.4 Lundy

Rats were eradicated from Lundy in 2003. Prior to eradication, the kittiwake population was declining (Figure 3-6). Following eradication, the decline slowed, and the last two colony counts (in 2017 and 2021) have shown small increases. Whether this response was due to the removal of rats is uncertain. There were no suitable colonies for comparison with Lundy, although the changes shown on Skomer and Skokholm could be used (see Section 3.1.1.6).

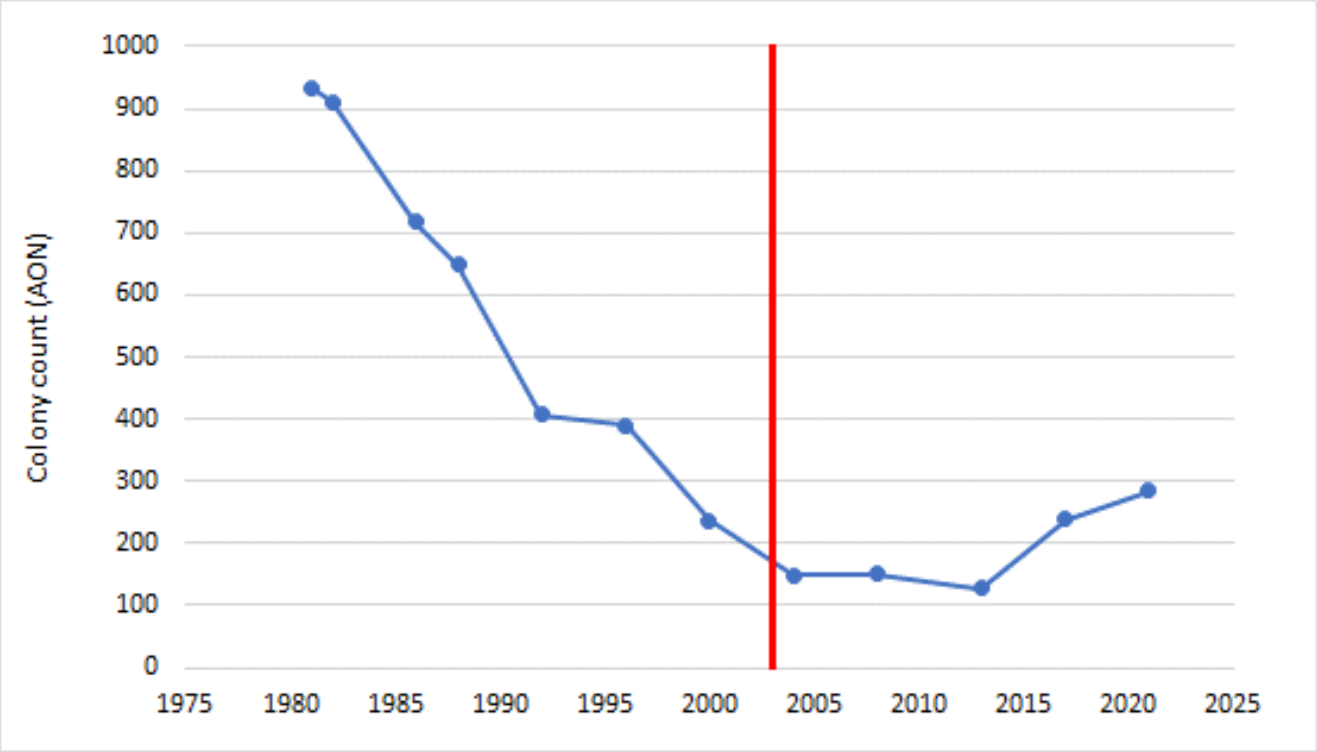


Figure 3-6 Change in the colony counts of kittiwakes on Lundy between 1981 and 2021. Red line indicated the year in which rats were eradicated.

In addition to colony counts, productivity plot counts were also available for kittiwakes on Lundy before and after rat eradication (Figure 3-7). Productivity varied considerably in the period before eradication. There was a decline in productivity across the period when eradication occurred followed by an increase, although with a lot of inter-annual variation.

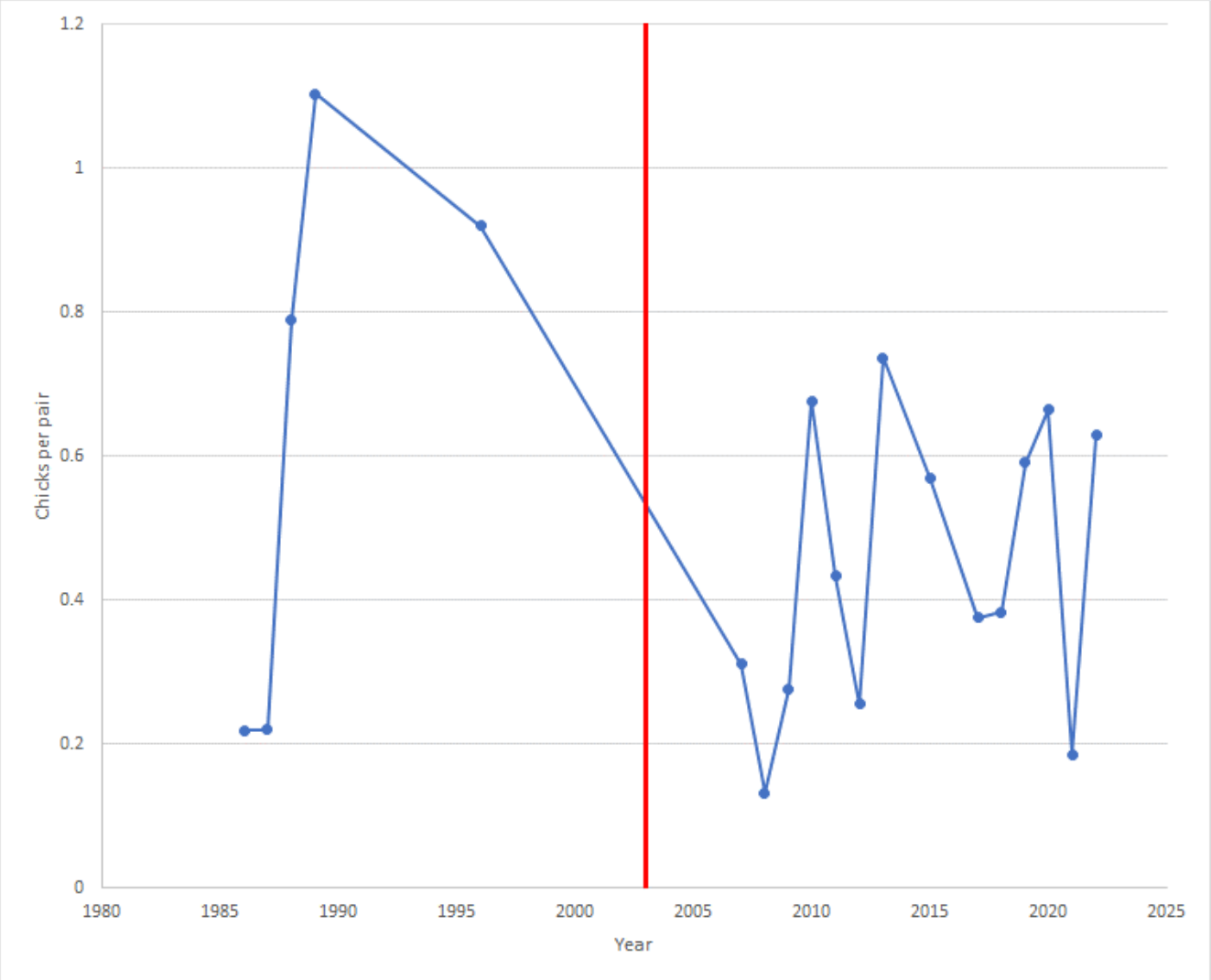


Figure 3-7 Productivity of kittiwakes on Lundy between 1986 and 2022. Red line indicated the year in which rats were eradicated.

3.1.1.5 Puffin Island

Rats were removed from Puffin Island, Gwynedd, in 1998. Kittiwakes had been increasing prior to rat eradication but have declined steadily since the year following eradication (Figure 3-8). However, the general decline in kittiwake abundance has also occurred on the nearby colony of Great Orme and Little Orme, where rats are potentially present, as this is a mainland site.

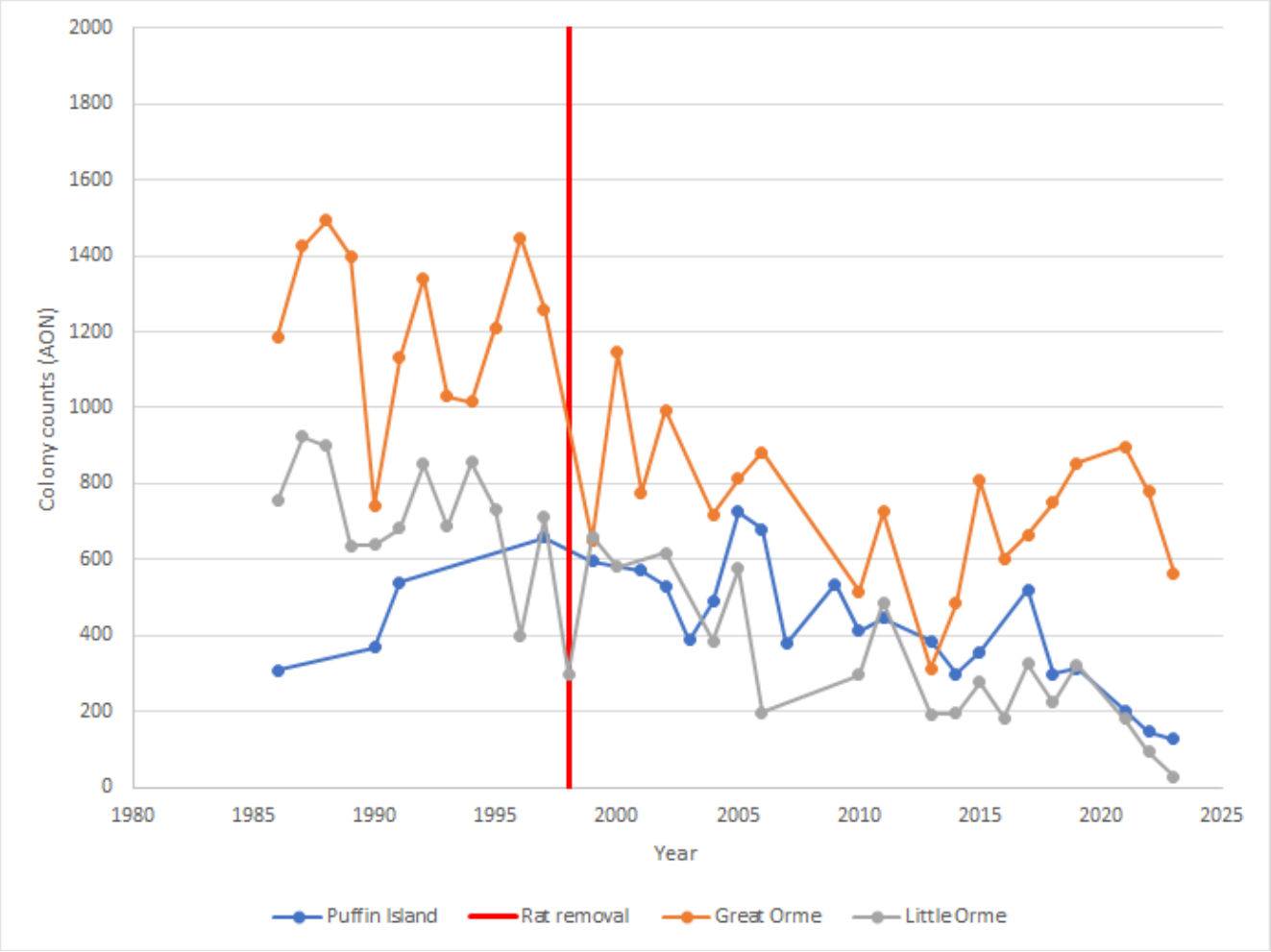


Figure 3-8 Change in the colony counts of kittiwakes on Puffin Island, Great Orme and Little between 1986 and 2023. Red line indicated the year in which rats were eradicated.

3.1.1.6 Ramsay Island

Rats were eradicated from Ramsay Island in 1998. Following eradication, kittiwake numbers have declined steadily (Figure 3-9). However, this was also the case for the kittiwake colony on nearby Skomer, where there has been a steady decline since the earl 2000's despite a lack of rats on Skomer.

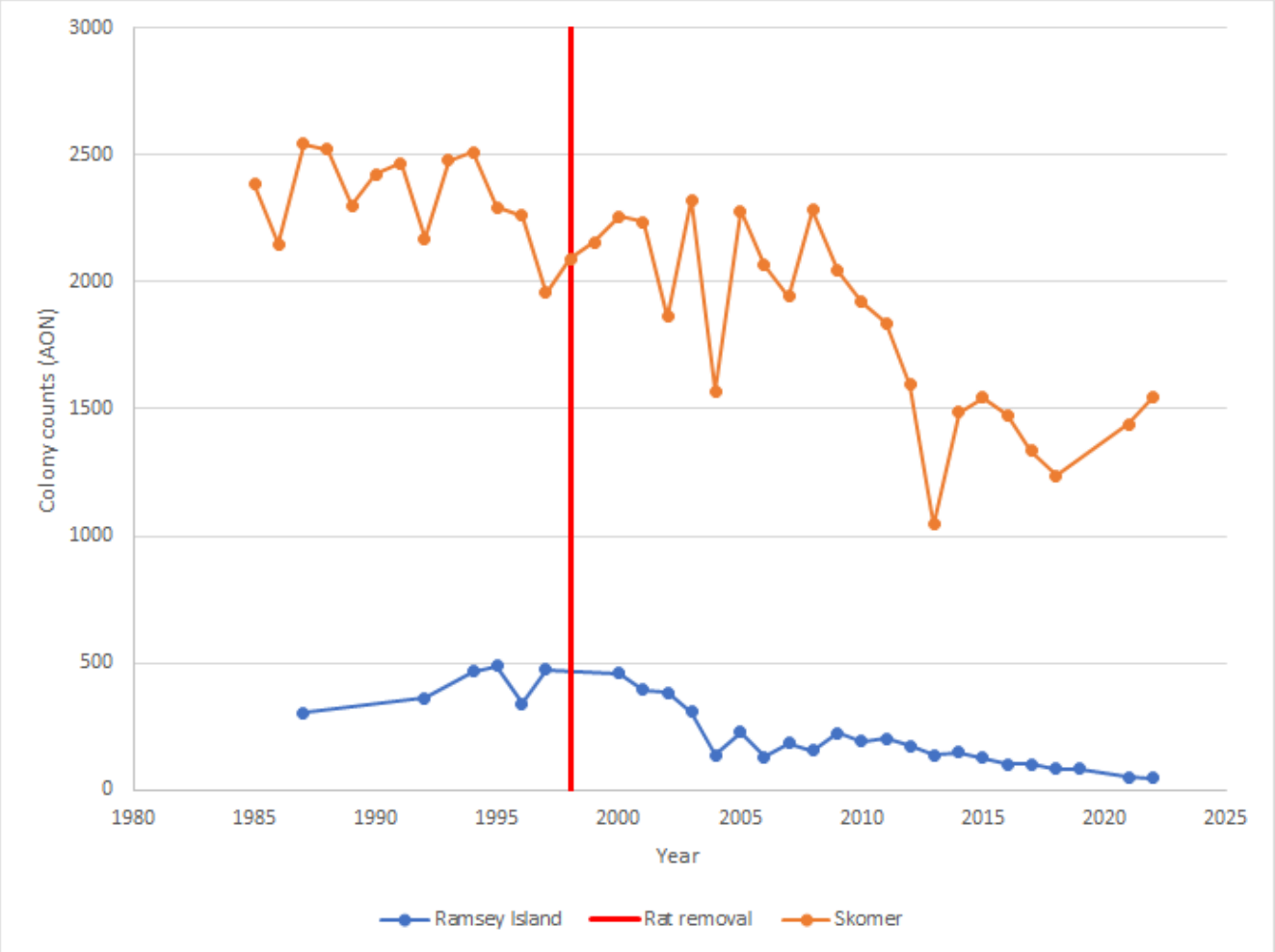


Figure 3-9 Change in the colony counts of kittiwakes on Ramsay Island and Skomer between 1985 and 2022. Red line indicated the year in which rats were eradicated.

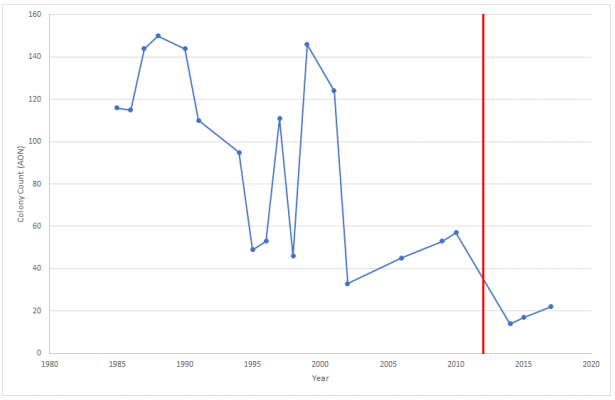
3.1.1.7 Conclusion

Furness et al. (2013) and Furness (2021) found from their review that there was little evidence that rat's predate kittiwake adults, chicks or eggs and little evidence that colonies recovered following rat eradication. It is apparent from the data above that most kittiwake colonies have been in decline over the time spans around the times of most rat eradications, so there are likely stronger drivers of population change than the effects of rats on kittiwake colonies. At both Canna and Lundy kittiwakes have increased following rat eradication. However, this is also, to some extent, reflected in the changes in colonies at similar nearby colonies where rats were already absent.

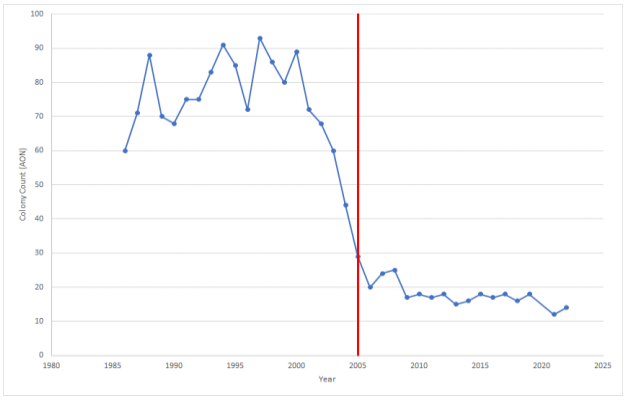
Whether rat eradication would benefit kittiwakes, either through a loss of predation or a loss of available nesting habitat, remains unclear. While Furness et al. (2013) listed the "evidence of success" of feral cat eradication as "low" for kittiwake, the authors did note that the "evidence for similar species" was "high".

3.1.2 Great black-backed gull

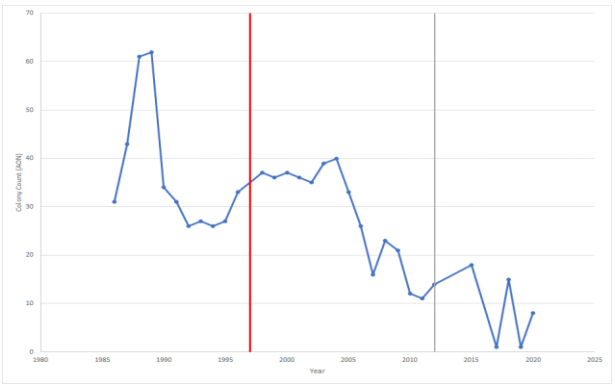
Great black-backed gulls are not a species that has been the aim of rat eradication on offshore islands. Changes in great black-backed gull populations on the six islands where rats have been removed and seabird colony data in the SMP database are available were plotted (Figure 3-10). Four of these islands have shown declines in great black-backed gull numbers, while two (Puffin Island and Ramsay Island) have shown increases in numbers. There is little indication from these data that the removal or rats had an important direct benefit to great black-backed gulls.



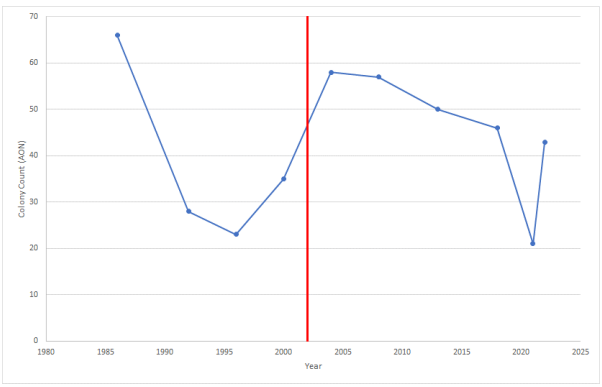
Calf of Man



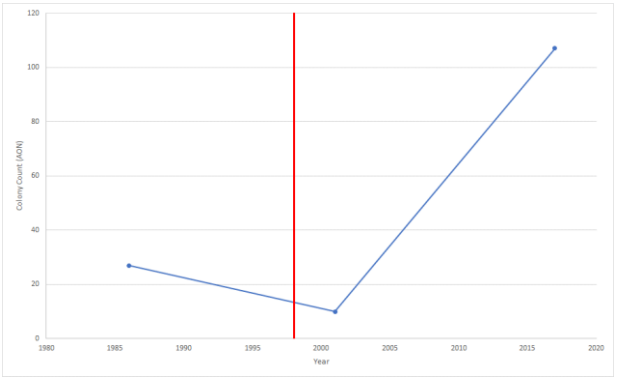
Canna & Sanday



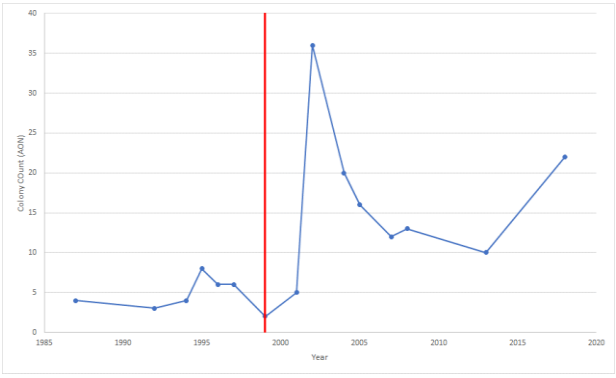
Handa



Lundy



Puffin Island



Ramsay Island

Figure 3-10 Change in the colony counts of great black-backed gulls at the islands of interest for other species. Red line indicated the year in which rats were eradicated.

Productivity plot counts for great black-backed gulls on Handa were available before and after rat eradication. Prior to rat eradication, great black-backed gull productivity declined and then has generally increased following eradication.

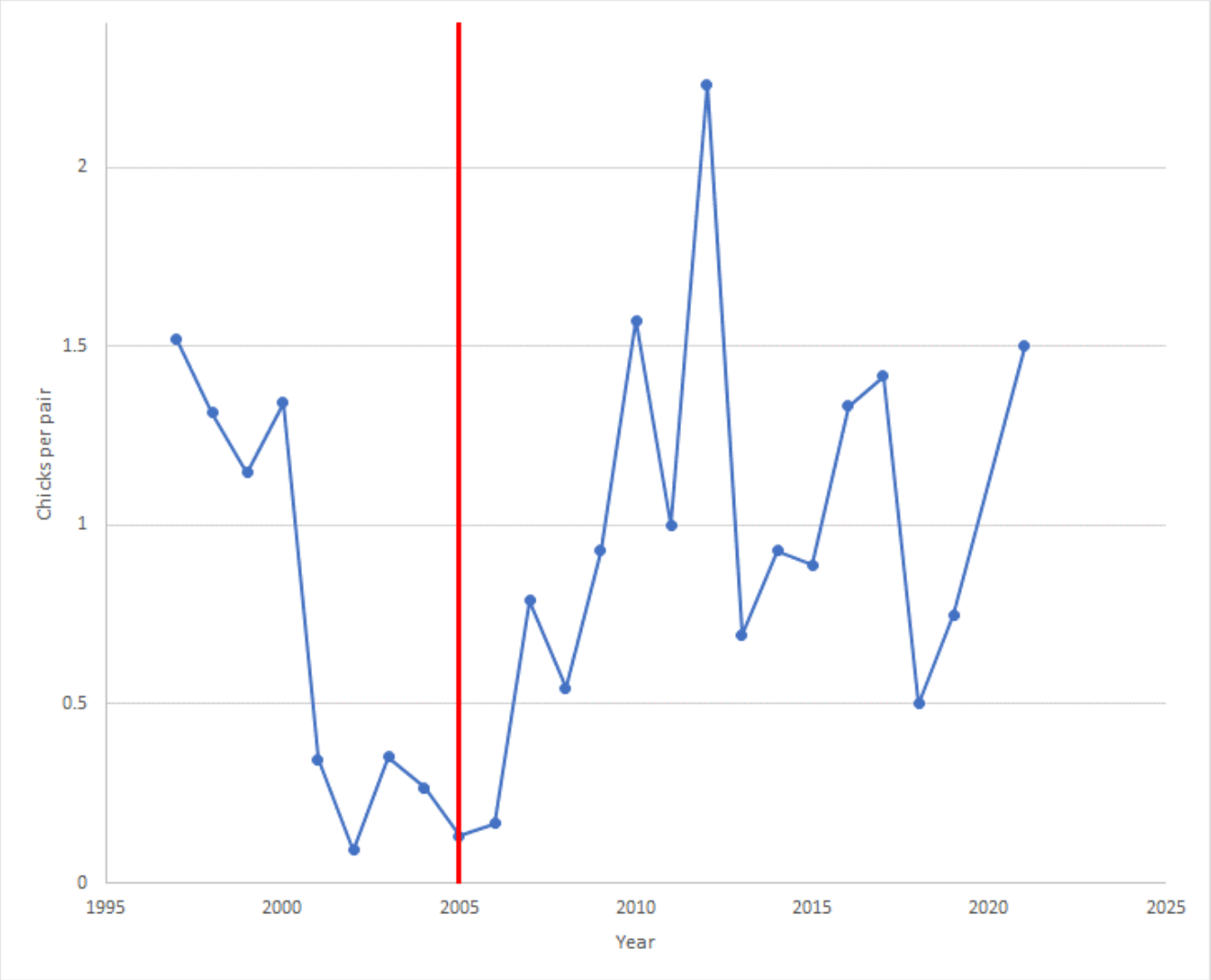


Figure 3-11 Productivity of great black-backed gulls on Handa between 1997 and 2021. Red line indicated the year in which rats were eradicated.

3.1.2.1 Conclusion

As with kittiwake, it is difficult to conclude that rat eradication would certainly positively affect great black-backed gull populations, as it is likely that there are other, stronger, drivers of population change. However, the change in productivity on Handa, and the population increases on Puffin Island and Ramsay Island are perhaps indications of some level of impact from rats on breeding great black-backed gulls.

While Furness et al. (2013) listed the “evidence of success” of feral cat eradication as “low” for great black-backed gull, the authors did note that the “evidence for similar species” was “high”.

3.1.3 Guillemot

Furness (2021) noted that there was good evidence on the benefit of rat eradication to guillemots from Lundy, while evidence from Canna suggested that guillemots did not benefit from rat eradication. On Lundy, removal of rats provided guillemots access to habitats other than sheer cliffs to nest on, resulting in an increase in population size.

The available information on change in population size of breeding guillemot colonies in the UK following eradication of rats is summarised for each island where there were SMP data both before and after rat eradication.

3.1.3.1 Calf of Man

Rats were eradicated from the Calf of Man in 2012. Despite a long series of colony counts from the Calf of Man prior to rat eradication, there was only a single year with any counts following eradication, in 2017 (Figure 3-12). There has been a steady decline in guillemots on the Calf of Man since the 1980s, it appears that the population in 1972 was also very small (count of 36 individuals).

Whether removal of rats from the Calf of Man will result in a long-term positive population trend remains to be seen, as the population may take some time to recover, particularly if there are other population pressures driving population change.

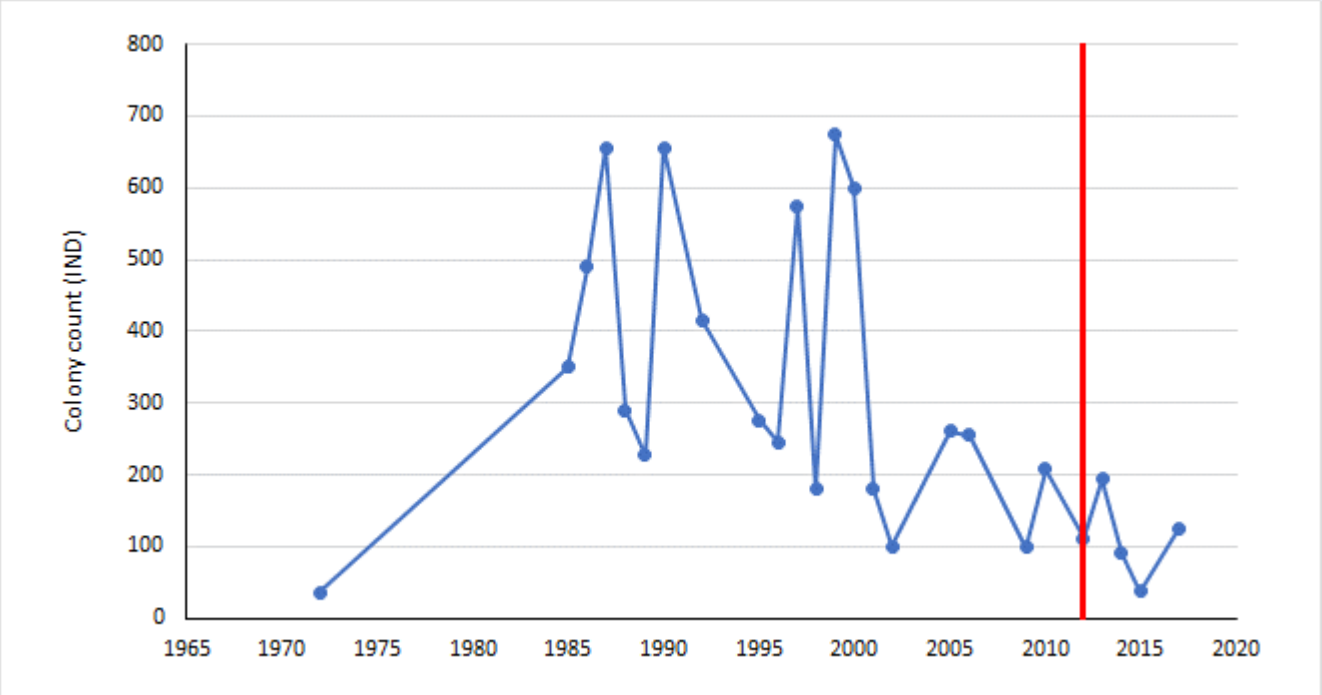


Figure 3-12 Change in the colony counts of guillemots at the Calf of Man between 1986 and 2013. Red line indicated the year in which rats were eradicated.

3.1.3.2 Canna

Rats were eradicated from Canna in 2005. Despite this, guillemot numbers have declined (Figure 3-13). However, this is based on only two counts (in 1999 and 2018). At the nearby colony of Ceann a' Mhara, the general trend of the guillemot population has been positive, although with the large dip in the mid-2000s. At the colony on Lunga and Sgeir a' Chaisteil, the population has fluctuated to some extent but has overall remained fairly level since the 1990's.

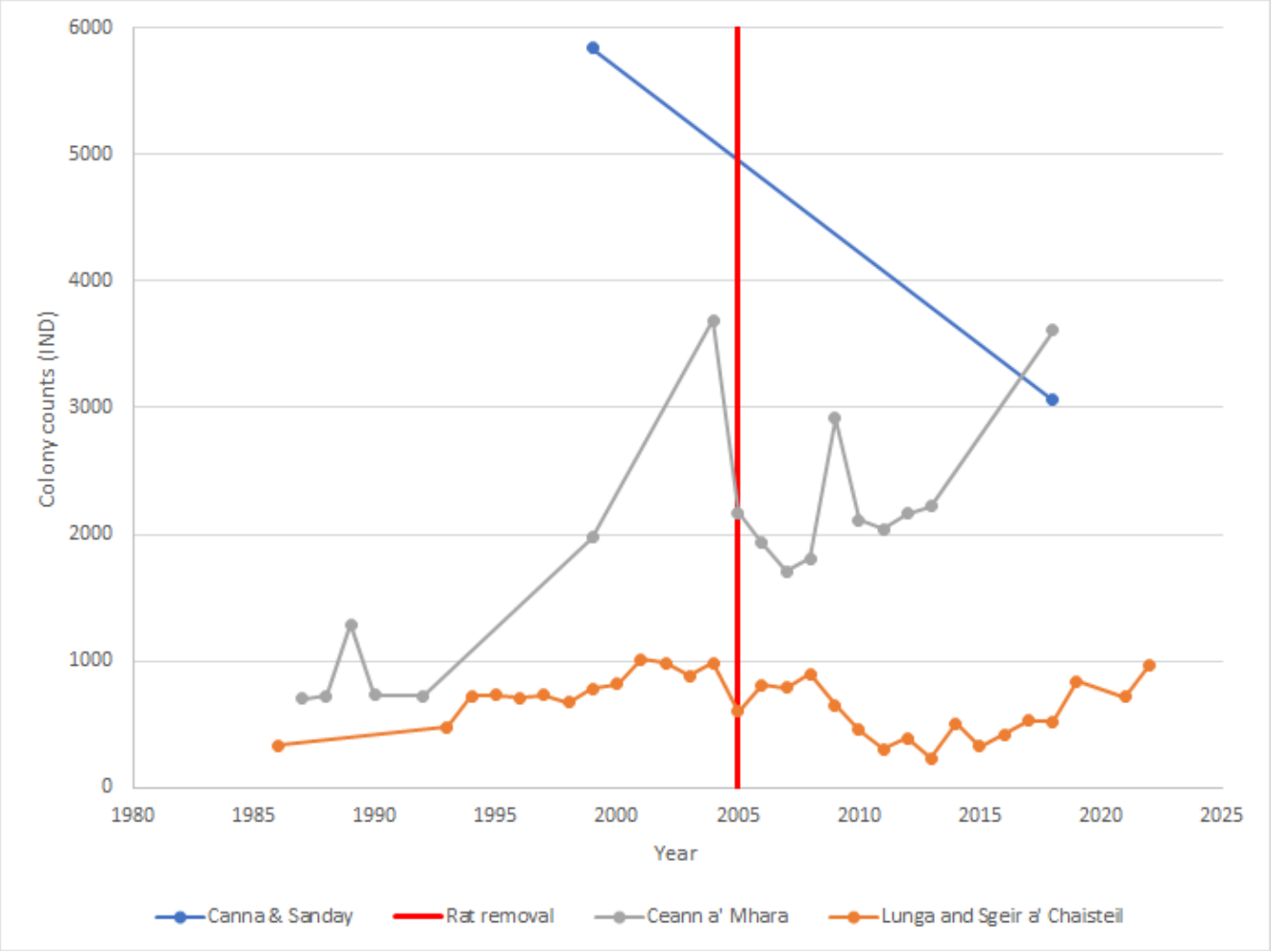


Figure 3-13 Change in the colony counts of guillemots on Canna & Sanday, Ceann a' Mhara (Tiree) and Lunga and Sgeir a' Chaisteil (Treshnish Isles) between 1986 and 2022. Red line indicated the year in which rats were eradicated.

3.1.3.3 Handa

No suitable comparative counts could be found in the SMP database for comparisons with the counts from Handa. Following eradication of rats from Handa in 1997 guillemot numbers declined, and only increasing slightly after the count in 2016 (Figure 4 3). This suggests that, on Handa at least, there were stronger drivers of population change than the presence of rats on the island.

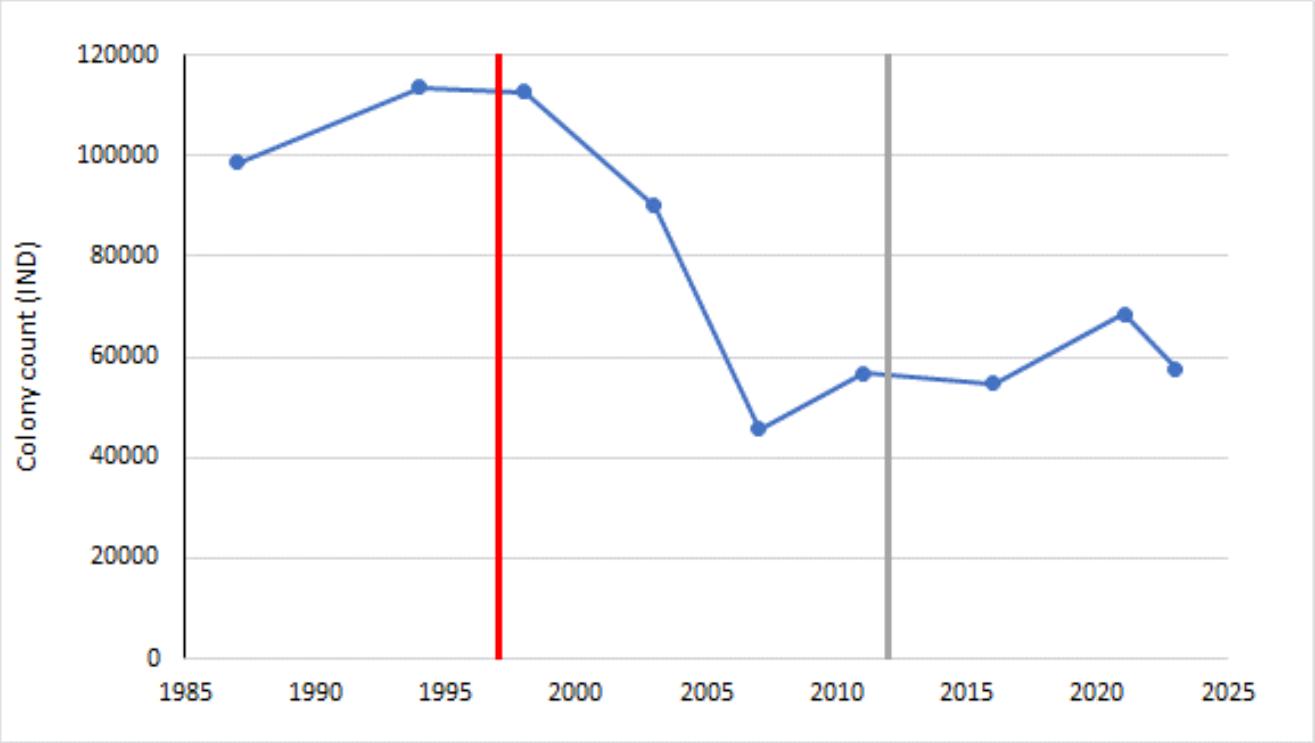


Figure 3-14 Change in the colony counts of guillemots on Handa between 1995 and 2018. Red line indicated the year in which rats were eradicated and the grey line when rats re-invaded the island.

In addition to colony counts, productivity plot counts were also available for guillemots on Handa before and after rat eradication (Figure 3-15). Productivity remained largely the same as before and immediately after eradication, but dropped sharply between 2006 and 2008, before recovering back to previous levels across the period that rat re-invaded the island.

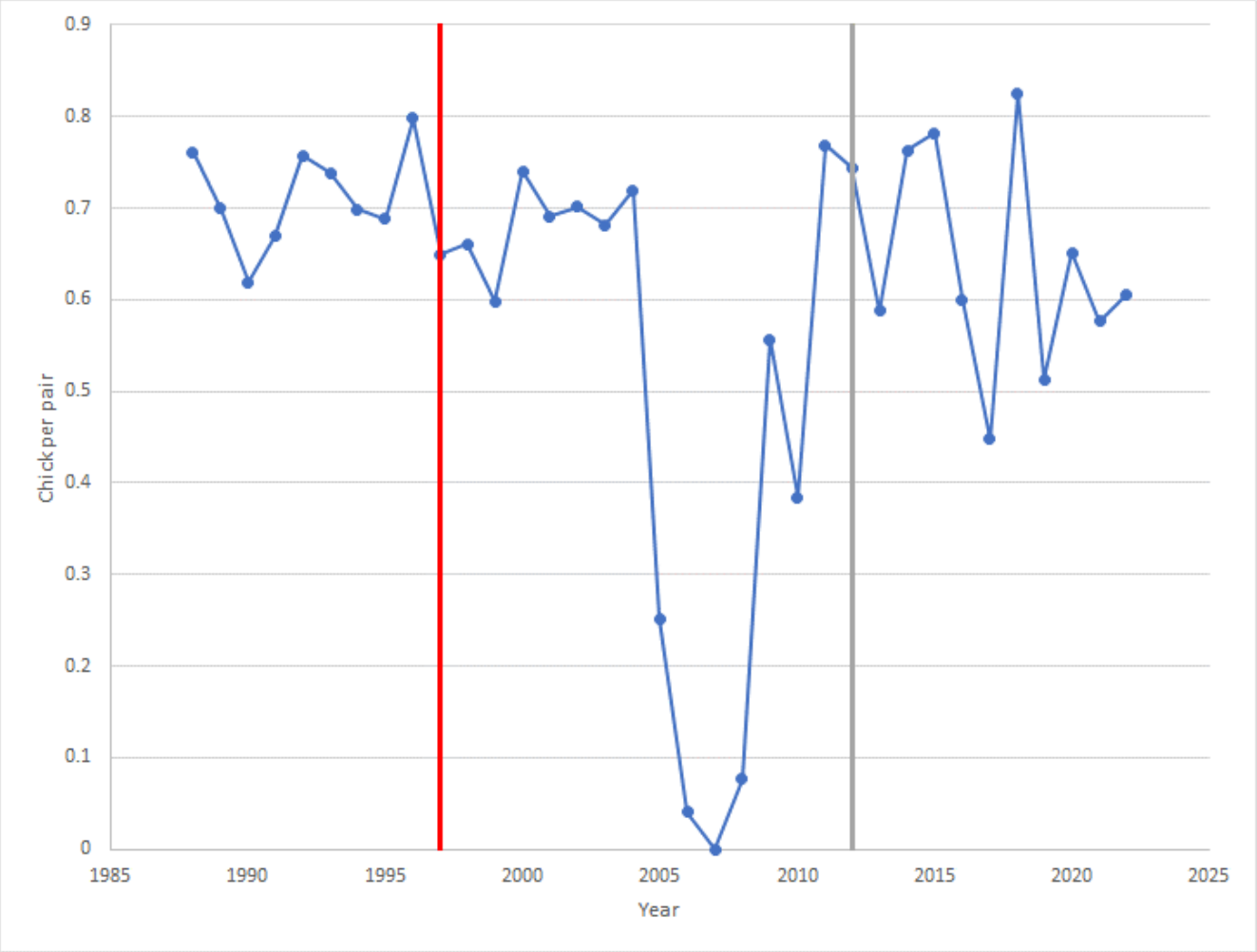


Figure 3-15 Productivity of guillemots on Handa between 1986 and 2021. Red line indicated the year in which rats were eradicated.

3.1.3.4 Lundy

Rats were eradicated from Lundy in 2003. Prior to eradication the guillemot population did not vary much (Figure 4 4). Following eradication, the population has grown strongly, and this is likely due to the removal of rats. There were no suitable colonies for comparison with Lundy, although the changes shown on Skomer and Skokholm could be used (see Section 3.1.3.6).

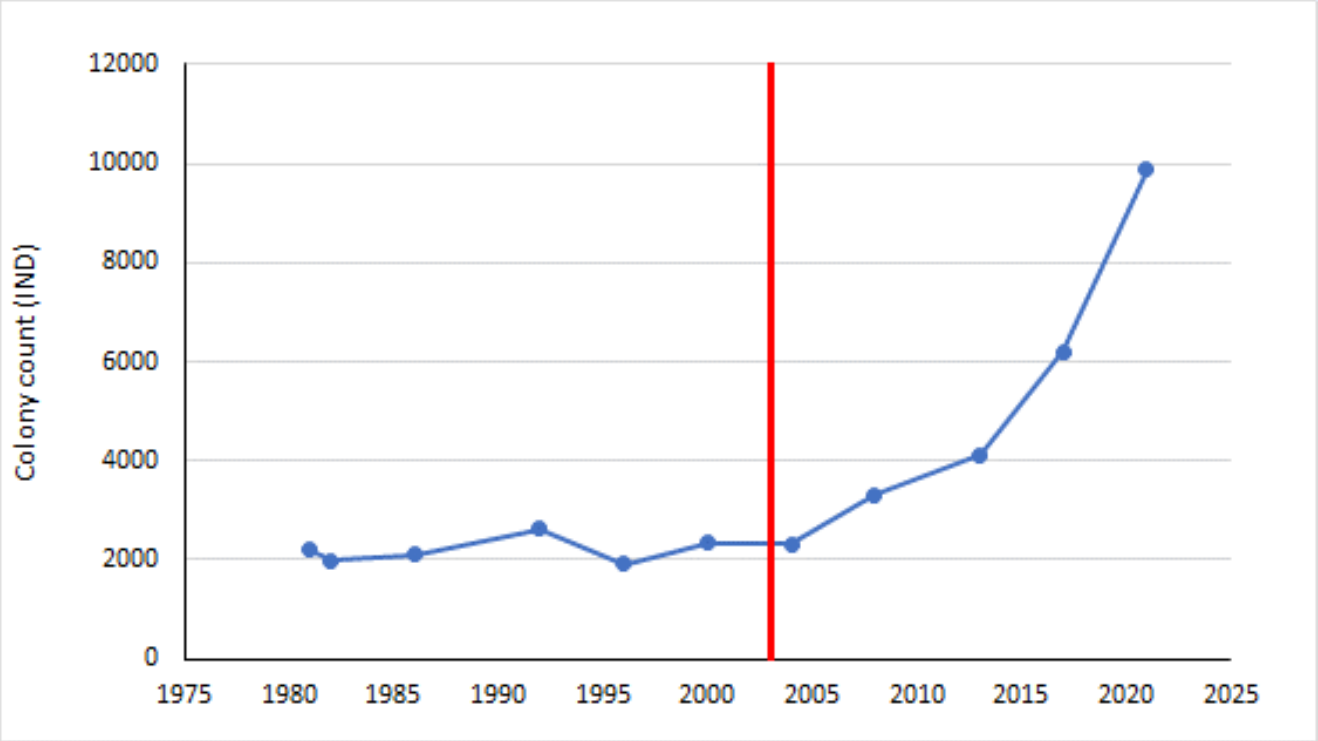


Figure 3-16 Change in the colony counts of guillemots on Lundy between 1981 and 2021. Red line indicated the year in which rats were eradicated.

3.1.3.5 Puffin Island

Rats were removed from Puffin Island, Gwynedd, in 1998. Guillemots had been increasing prior to rat eradication and have increased steadily since the year following eradication (Figure 3-17). At the nearby colony of Great Orme, where rats are potentially present, as this is a mainland site, the population has also increased, albeit more slowly. At the Little Orme colony there has been variation in the guillemot population, but no increasing trend as seen at Great Orme or Puffin Island.

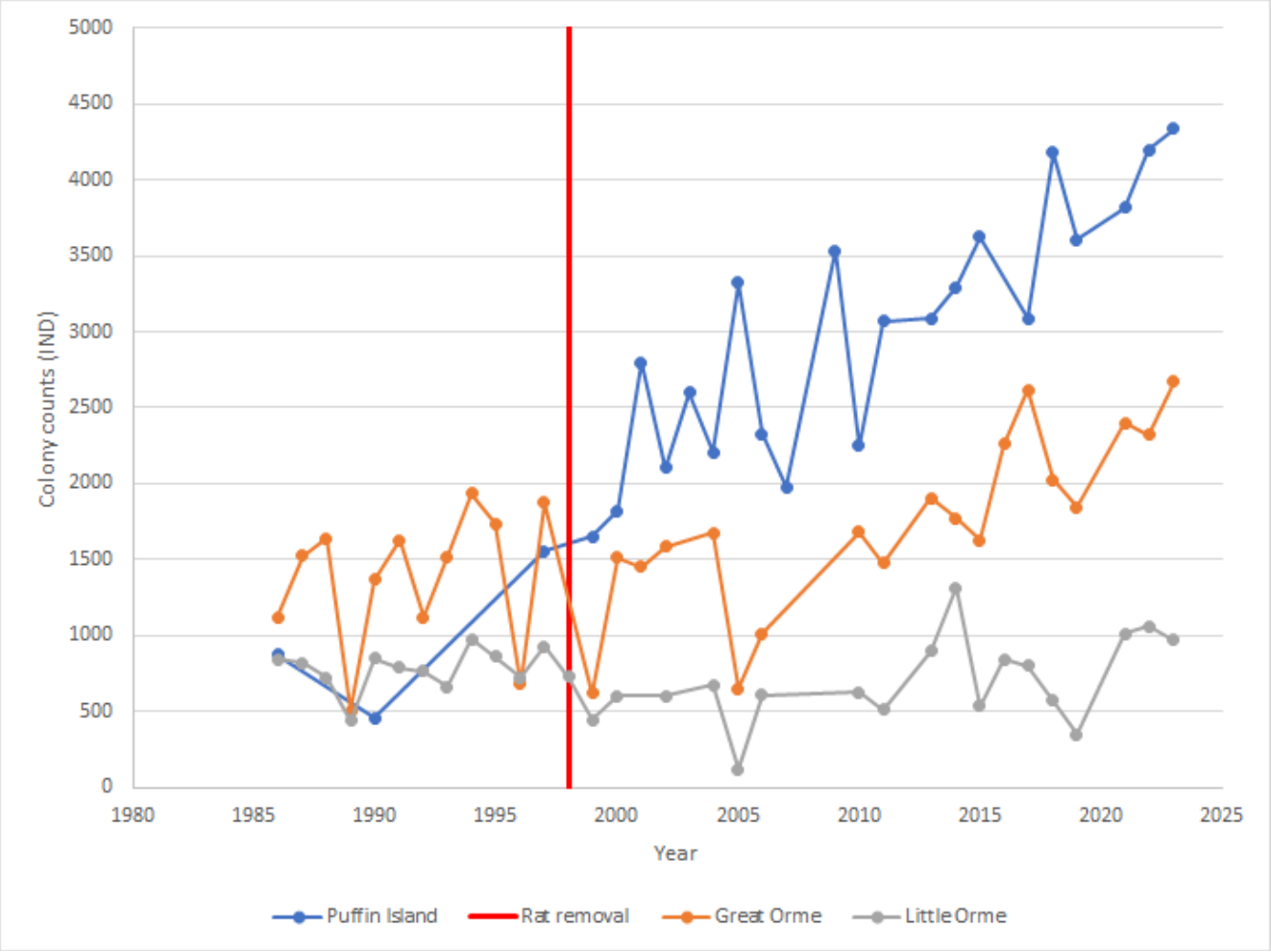


Figure 3-17 Change in the colony counts of guillemots on Puffin Island, Great Orme and Little between 1986 and 2023. Red line indicated the year in which rats were eradicated.

3.1.3.6 Ramsay Island

Rats were eradicated from Ramsay Island in 1998. Following eradication, guillemot numbers continued to increase at an approximately similar rate (Figure 3-18). However, this was also the case for the guillemot colonies on nearby Skomer and Skokholm, where there has been a steady increase across the same time period, despite a lack of rats on Skomer.

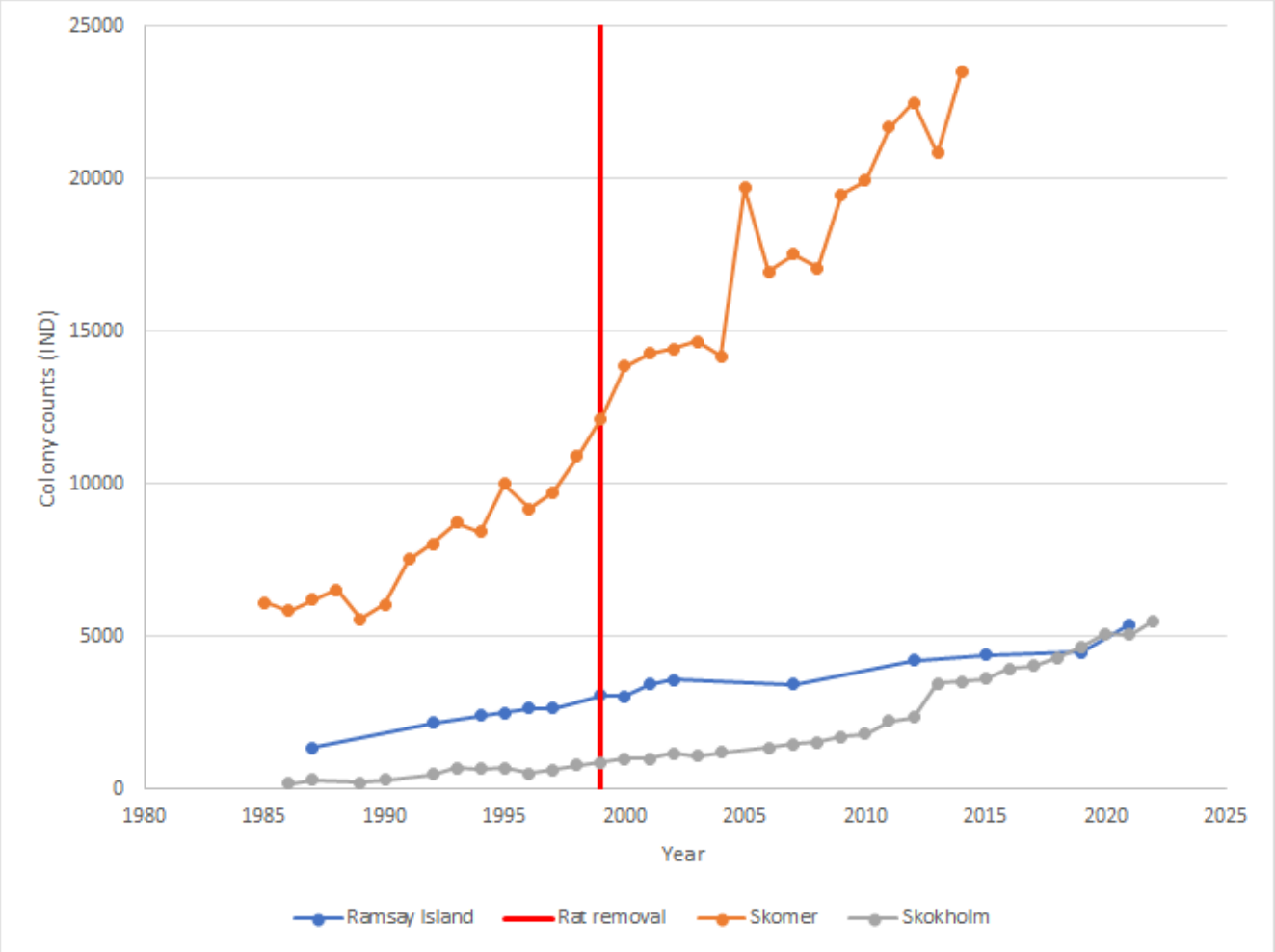


Figure 3-18 Change in the colony counts of guillemots on Ramsay Island, Skomer, and Skokholm between 1985 and 2022. Red line indicated the year in which rats were eradicated.

3.1.3.7 Conclusion

Based on the conclusions of Furness (2021) there is good evidence from Lundy that removal of rats can result in guillemots spreading to habitats that rats can access. This may have also been the reasons for the increases in the other Welsh islands (Puffin Island and Ramsay Island). However, where there are other pressures on the population, rats may not be limiting guillemot populations by enough that their removal has positive benefits, at least in the short term.

3.1.4 Puffin

Furness (2021) noted that there was “clear evidence that eradication of rats can be highly beneficial for puffin populations”. This benefit to puffins was from eradications on Lundy, Canna and Ailsa Craig. On Canna, puffins had been restricted to offshore stacks but birds re-colonised the mainland following rat eradication. Puffins had been extirpated from Ailsa Craig but have re-colonised the island since rats were removed.

The available information on change in population size of breeding puffin colonies in the UK following eradication of rats is summarised for each island where SMP data exists both before and after rat eradication.

3.1.4.1 Calf of Man

The only puffin counts from the Calf of Man were between 1986 and 1990 and the population was small (4 – 56 AON). This was prior to rat eradication in 2012. Following these counts, puffins were extirpated from the island at some point prior to rat eradication. There were indications that puffins may be returning to the island in 2021[2] as a result of management to attract puffins back. Decoys and colony sound playback have been used to attract puffins back to the island.

3.1.4.2 Canna

Rats were eradicated from Canna in 2005. Despite few counts, it appears that puffin numbers have increased (Figure 3-19). At the nearby colony of Lunga and Sgeir a' Chaisteil the population has similarly increased since the early 2000's. The Lunga and Sgeir a' Chaisteil colony is also free from rats, and this may indicate that rats would have prevented the increase in population size seen on Canna.

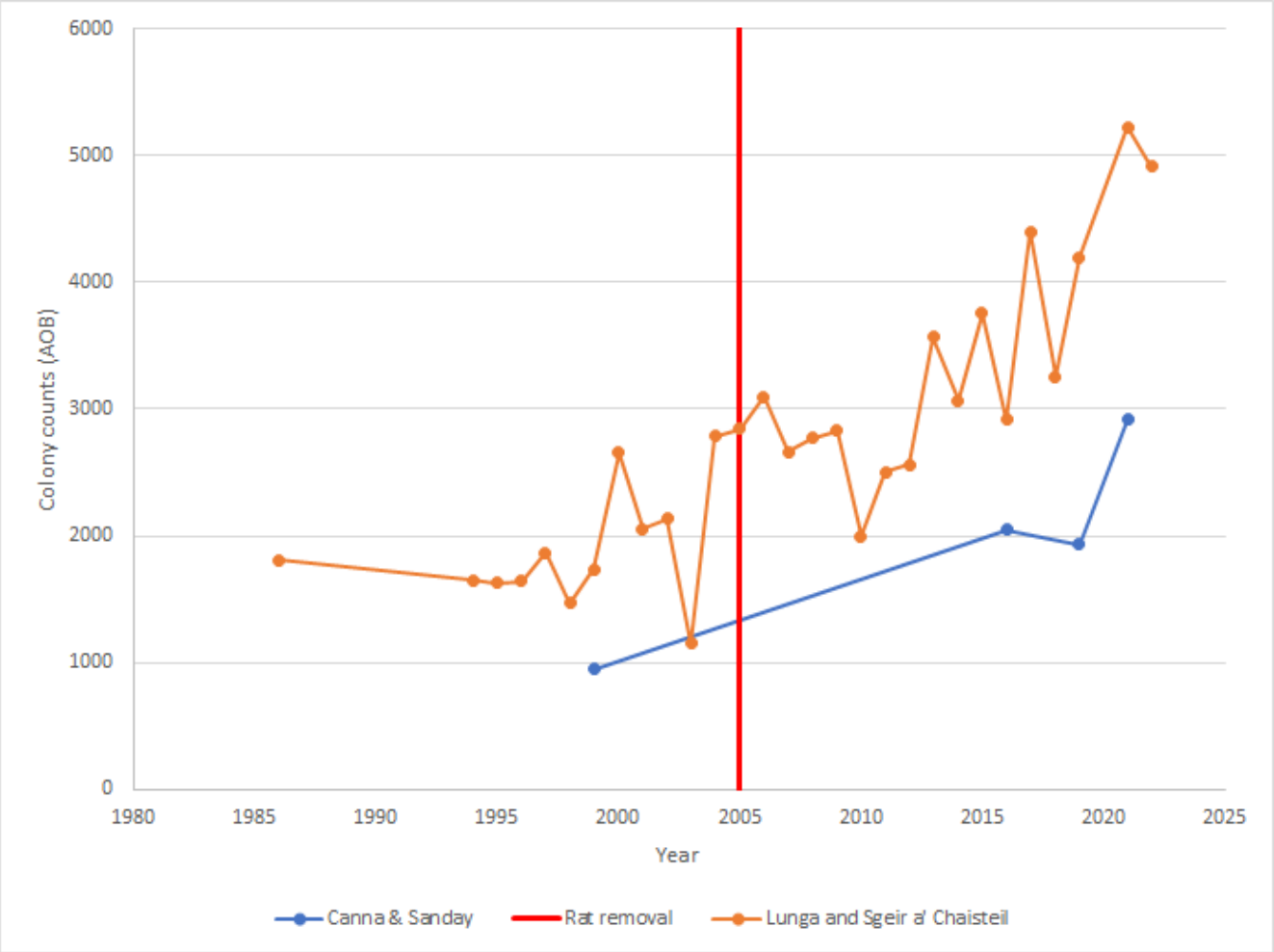


Figure 3-19 Change in the colony counts of puffins on Canna and Lunga and Sgeir a' Chaisteil (Treshnish Isles) between 1986 and 2022. Red line indicated the year in which rats were eradicated.

3.1.4.3 Handa

No suitable comparative counts could be found in the SMP database for comparisons with the counts from Handa. Following eradication of rats from Handa in 1997, puffin numbers initially increased and then declined (Figure 3-20). Following re-

[2] https://manxnationalheritage.im/news/puffins-return-to-the-calf-of-man/

invasion of the island by rats the population initially remained low and then suddenly increased in 2020. This suggests that, on Handa at least, there were stronger drivers of population change than the presence of rats on the island.

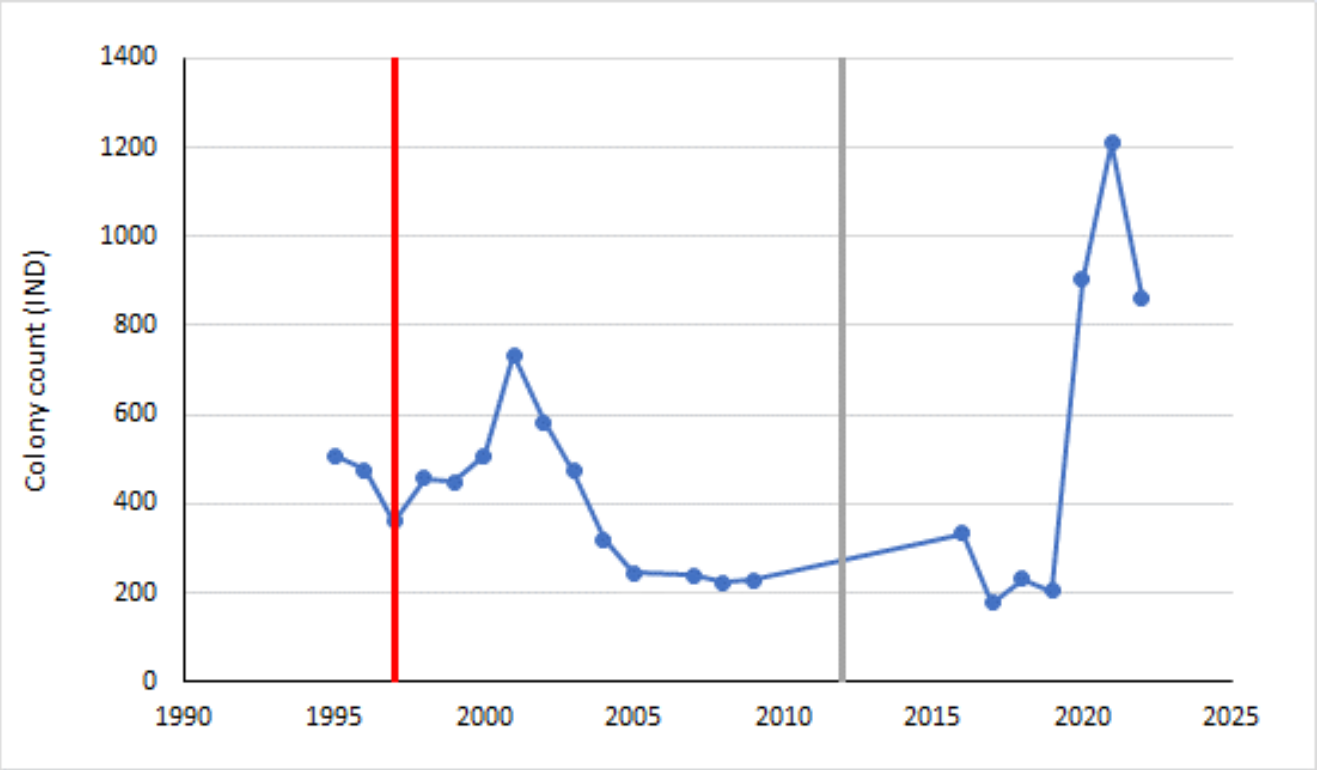


Figure 3-20 Change in the colony counts of puffins on Handa between 1995 and 2018. Red line indicated the year in which rats were eradicated and the grey line when rats re-invaded the island

3.1.4.4 Lundy

Rats were eradicated from Lundy in 2003. Prior to eradication, the puffin population was small and had been in decline declining to a very small population (Figure 3-21). Following eradication, the population has grown strongly, and this is likely due to the removal of rats. There were no suitable colonies for comparison with Lundy, although the changes shown on Skomer and Skokholm could be used (see Section 3.1.4.6).

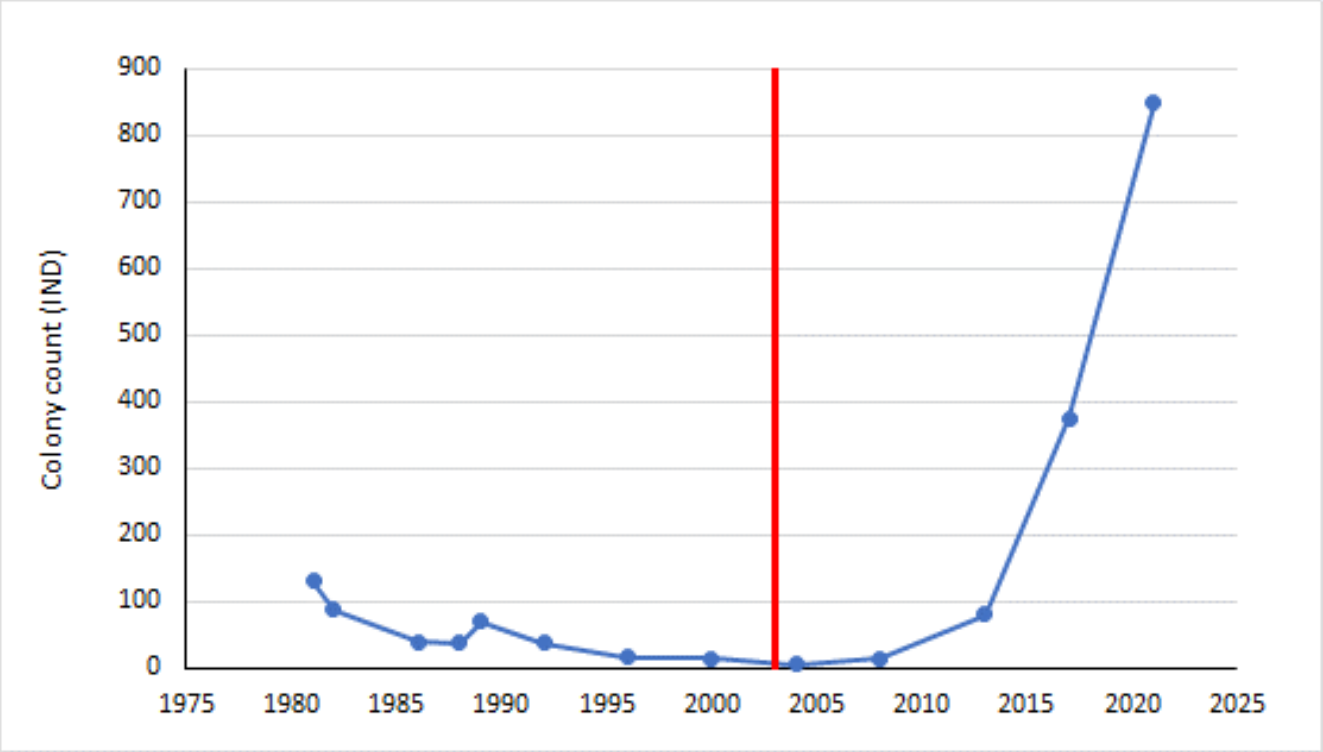


Figure 3-21 Change in the colony counts of puffins on Lundy between 1981 and 2021. Red line indicated the year in which rats were eradicated.

3.1.4.5 Puffin Island

Rats were removed from Puffin Island, Gwynedd, in 1998. Puffins declined almost to extirpation between 1990 and 1999, when only one pair was recorded (Figure 3-22). Since eradication the population has recovered, albeit not to pre-eradication numbers. Numbers of puffins on the island were relatively small before eradication (about 40 birds) and remain relatively small.

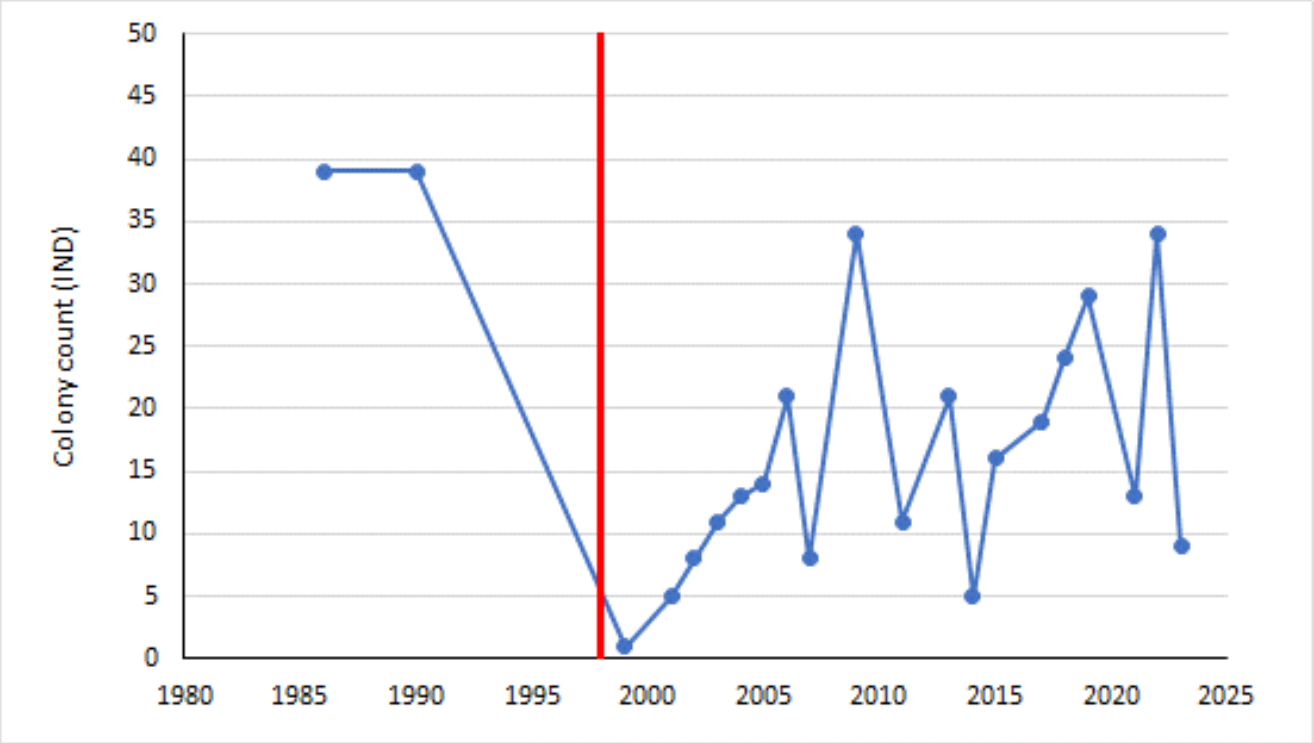


Figure 3-22 Change in the colony counts of puffins on Puffin Island between 1986 and 1998. Red line indicated the year in which rats were eradicated.

3.1.4.6 Ramsay Island

Rats were eradicated from Ramsay Island in 1998. There were only two counts of AOB available for Ramsey Island before and after eradication. While this shows an increase in puffins nesting on the island (Figure 3-23) numbers are small.

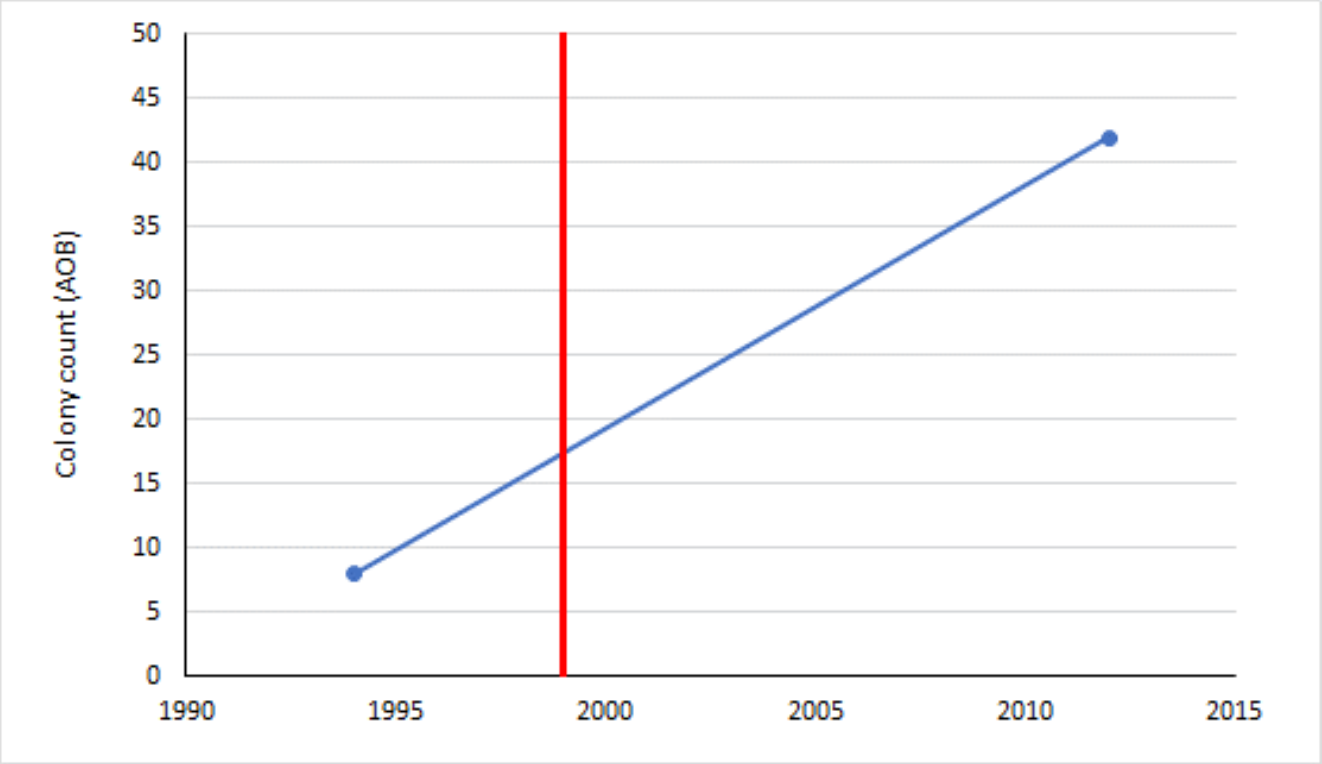


Figure 3-23 Change in the colony counts of puffins on Ramsay Island between 1985 and 2022. Red line indicated the year in which rats were eradicated.

3.1.4.7 Conclusion

Based on the conclusions of Furness (2021) there is good evidence from Lundy, Canna and Ailsa Craig that removal of rats can result in puffin populations increasing partly due to predation and partly due to spreading to habitats that rats can access.

3.2 Eradication of feral cats

There is no evidence from the UK which shows that eradication of feral cats benefits seabird colonies. Furness et al. (2013) noted that eradication of feral cats can be more complex than eradication of rats, especially where there is a resident human population with pet cats, as experienced on Ascension Island (Ratcliffe et al. 2009).

The review by Furness et al. (2013) found that cats had been successfully eradicated from many islands. Nogales et al. (2004) provide a useful tabulation of data from 48 islands where eradication of feral cats has been carried out and summary information on these eradication programmes, indicating that most programmes are now completed within 1-3 years. The majority of these projects were in the southern hemisphere or the tropics. A few of these were in the North Atlantic: the Canary Isles and Madiera. Furness et al. (2013) point out that, “feral cats … act as ‘superpredators’ the removal of their populations from islands should be especially targeted as it is likely to have a greater benefit than removal of rats alone.”

In addition to the eradication of only feral cats, or only rats, there is good evidence from studies outside the UK that eradication of multiple invasive alien vertebrates can have important benefits. There are two important elements to multiple species eradications. Firstly, eradicating rats from islands where feral cats are also present could result in an increased predation pressure from cats, as they no longer have rats to forage on. Secondly, eradicating cats from islands where rats are also present could release the rat population from predation pressure from cats (e.g. Rayner et al. 2007) increasing predation on seabirds or their offspring. Thus, where both species are present, eradicating both species is important to increasing seabird populations.

Where rats and cats (as well as house mice and mongoose) were eradicated from within a fenced area on the island of O’Ahu, Hawai’I, Young et al. (2012) reported “record numbers” of wedge-tailed shearwaters and Laysan albatrosses fledged

chicks. The authors concluded that, “predator fences can be a cost-effective method of protecting natural resources, and multiple species of predators can be eradicated with traps and first-generation anti-coagulants”.

Predator-proof fencing has been used successfully as a conservation measure to protect globally endangered Chatham petrels on the Chatham Islands, New Zealand from introduced feral cats (and pigs)[3]. Further examples of applying predator proof fencing to protect breeding seabirds from predators, including feral cats, are provided by Cooper (2013[4])

3.3 Conclusions

While there may be mixed evidence for the benefits of the eradication of rats and feral cats having a benefit to the species requiring compensation, when the additional evidence from other studies around the world are included, it is clear that eradication of these predatory species from islands where seabirds breed has generally led to increases in seabird populations. The mixed evidence from the studies in the UK are potentially due to other drivers of demographic change, particularly food availability. These strong effects may mask any potential benefit from predator eradication, as populations are in decline anyway. Removal of predators may, or may not, reduce the decline for some species at some colonies. However, in the event of population recovery, predator removal would most likely result in greater population increase than at similar colonies where predators are present. There are no examples of seabird colonies in the UK where the pressure from both rats and feral cats has been removed, although examples from elsewhere in the world suggest that greater population responses from seabirds are likely. It is important to note that the aim of compensation is to maintain the coherence of the UK SPA network. Where seabird colonies are declining due to a lack of food for adults and chicks, colonies may continue to decline even when predators are removed. As a compensation measure, removal of predators from seabird colonies could result in fewer adults or chicks being killed, thus achieving the aim of the measure, but other drivers would still cause the colony to decline. The absence of predators from colonies would seem likely to increase the resilience of seabird colonies facing declines due to other pressures, or the measures may allow more rapid colony growth should other population pressures be relieved.

[3] https://chathams.co.nz/chatham-petrel-recovery/
[4] https://www.acap.aq/news/news-archive/2013-news-archive/predator-proof-fences-are-helping-to-protect-procellariiform-seabirds-including-acap-listed-albatrosses-and-petrels

4. Identification of suitable locations for compensation

Stanbury et al. (2017) reviewed and prioritised offshore islands in the UK with invasive alien vertebrates, ranking these islands based on a set of criteria that included potential and realistic conservation value, natural reinvasion risk and the eradication benefit. This identified 25 islands where invasive alien vertebrate eradication should be prioritised for conservation benefit (Table 4-1).

Table 4-1 Summary of islands identified and ranked by Stanbury et al. (2017) with invasive non-native species present.

Rank position	Island	Resident human population	Island area (ha)	No. of benefit species found on island	Feral cat	Brown Rat	Black Rat	Mink
1	Foula, Shetland	38	1302	26	Y			
2	Fair Isle	68	786	28	Y			
3	Westray, Orkney	588	4742	35	Y			
4a	Garbh Eilean and Eilean an Taighe, Shiants	0	141	17			Y	
4b	Rousay, Orkney	216	4697	31	Y	Y		
4c	Rathlin Island, Northern Ireland	100	1438	25	Y	Y		
7a	Colonsay and Oronsay, Inner Hebrides	132	4549	29	Y	Y		
7b	Unst, Shetland	632	12,135	32	Y	Y		
9	Yell, Shetland	966	21,103	32	Y			
10	Rum, Small Isles	22	10,726	26	Y	Y		
11	Papa Westray, Orkney	90	858	32	?			
12a	Fetlar, Shetland	61	4042	34	Y			
12b	Inchkeith, Forth Estuary	0	23	16		Y		

Rank position	Island	Resident human population	Island area (ha)	No. of benefit species found on island	Feral cat	Brown Rat	Black Rat	Mink
14	Hoy, Orkney	419	14,360	32	Y	Y		
15	Flotta, Orkney	80	938	27	Y	Y		
16a	Tiree, Inner Hebrides	653	7920	28	?	?		
16b	Inchmarnock, Clyde Islands	0	247	17		?		?
18a	Stronsay, Orkney	349	3362	27	Y	Y		
18b	Eilean Mhuire, Shiant Islands	0	32	14			Y	
20a	Gairsay, Orkney	3	270	26	Y	Y		
20b	North Ronaldsay, Orkney	72	766	22	Y			
22	Muck, Small Isles	27	523	22	?	Y		
23	Housay, Out Skerries	50	155	20	?	Y		
24	South Havra, Shetland	0	58	22	?			
25	Herm, Channel Islands	60	143	11	Y	Y	Y	

European Commission guidance[5] on compensation measures states that, “Compensatory measures should be located to accomplish the highest effectiveness in maintaining the overall coherence of the Natura 2000 network”. Consequently, three levels of hierarchy of preferred locations are given as:

- “Compensation within the Natura 2000 site”;
- “Compensation outside the Natura 2000 site concerned, but within a common topographical or landscape unit”; and
- “Compensation outside the Natura 2000 site, in a different topographical or landscape unit”.

The three Natura 2000 sites identified in the RIAA as requiring compensation (East Caithness Cliffs SPA, North Caithness Cliffs SPA and Sule Skerry and Sule Stack SPA) were not identified by Stanbury et al. (2017) as the highest priority sites for invasive alien vertebrates eradication, as they are either not islands (East Caithness Cliffs SPA & North Caithness Cliffs SPA) or there are no invasive alien vertebrates present (Sule Skerry and Sule Strick SPA). Thus, the first level of hierarchy cannot be achieved using the compensation measure that was identified. At the second level of the hierarchy, the seabird colonies in the immediate region around the Project (Sutherland, Caithness and Orkney) are those that would be most likely to meet the preference recommended by the European Commission guidance. Based on the islands identified by Stanbury et al. (2017), one, or more, of the islands in Orkney may be suitable:

- Westray;
- Rousay;
- Papa Westray;
- Hoy;
- Flotta;
- Stronsay;
- Gairsay; and
- North Ronaldsay.

Among these islands, it is not confirmed that Papa Westray has feral cats, and it does not have brown rats (Stanbury et al. 2017). Neither Westray nor North Ronaldsay has brown rats, though feral cats are confirmed as present. Among the remaining islands, Gairsay only has records of great black-backed gull on the island. Among the remaining islands both feral cats and brown rats are present and the four seabird species potentially requiring compensation are (or have been) present, according to the SMP database. Thus, the short-listed islands for compensation through removal or brown rats and cats from seabird colonies are:

- Rousay;
- Hoy;
- Flotta;
- Stronsay; and
- Gairsay.

Based on the evidence reviewed above, the two most appropriate measures to apply to one, or more, of these islands, would be total eradication of both rats and feral cats from the whole island(s), or installation of predator proof fencing on some part of the island(s).

Given the presence of human populations and agriculture on all of these short-listed islands, predator proof fencing would be the most likely solution to increase both the likelihood of eradicating predators from seabird colonies and preventing predators from re-invading the islands. Where agriculture is present, the likelihood of rat re-invasion would likely be high through imports of hay or grain. Where there is a human population, there is a high likelihood of pet and farm cats being present and these would represent a predation risk and a source of future feral cat populations on the island. However, exclusion using predator proof fences would allow areas to be fenced, and predators removed, that do not include agricultural or human inhabited areas. Thus, the likelihood of eradication success and maintenance of predator free status

[5] https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/new_guidance_art6_4_en.pdf

on the protected colonies would be much higher. In addition, the relatively small level of compensation that may be required would mean that whole island eradication would not be needed to achieve the aims of the compensation measures.

Thus, the preferred method of predator control is the construction, and maintenance, of predator proof fences on one, or more islands listed above.

5. Conclusions

Compensation measures may be required to maintain the coherence of the UK SPA network for kittiwake, great black-backed gull, guillemot and puffin.

A range of potential compensation measures were considered. Based on the available evidence, and the scale of compensation that may be needed, the removal of brown rats and feral cats from offshore islands is likely to be the measure that would be able to provide the level of compensation needed with a good likelihood of success.

The islands that meet the requirements for the application of predator eradications were identified as Rousay, Hoy, Flotta, Stronsay and Gairsay as these have, or have had, the species requiring compensation present and the presence of terrestrial predators.

Given the scale of compensation that may be required and the presence of both human habitation and agriculture on the short-listed islands, the application of predator proof fences is likely to be the measure that would provide the highest likelihood of success in protecting breeding seabirds from rats and feral cats.

Implementation and monitoring plans will be produced to determine how fences would need to be installed and maintained, and how monitoring would show that the applied measure was successful at maintaining the coherence of the UK SPA network for the features identified.

An adaptive management plan will be produced to ensure that where monitoring shows the applied measures have not provided the level of compensation required that additional measures are put in place to maintain the coherence of the UK SPA network.

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West of Orkney
Windfarm