

Muir Mhòr Offshore Wind Farm

Derogation Case

Appendix E: Compensation Measures: Site Investigation
Report



| Revision No. | Date | Reason for Issue | Author | Reviewer | Approver |
|---------------------|-------------|-------------------------|---------------|-----------------------|-----------------|
| 01 | 22/11/2024 | Final | APEM Ltd. | GoBe Consultants Ltd. | MMOWF Ltd |

Document Information

| | |
|--------------------|----------------------------------|
| Document ID | MMH-GBE-A004-ENV-0006-607 |
| Revision | 01 |
| Date | 22/11/2024 |

Muir Mhòr Offshore Wind Farm Limited

Muir Mhòr Compensation Site Investigation Report

George Warwick, Mark Lewis, and Matt Rea

COMMERCIAL IN CONFIDENCE



Client: Muir Mhòr Offshore Wind Farm Limited

Address: 12 Alva Street

Edinburgh

Scotland

EH2 4QG

Project reference: P00011963

Date of issue: November 2024

Project Director: Chris Coleby

Project Manager: Matt Rea

Other: George Warwick, Mark Lewis, Constance Schéré

APEM Ltd

Riverview

A17 Embankment Business Park

Heaton Mersey

Stockport

SK4 3GN

Tel: 0161 442 8938

Fax: 0161 432 6083

Registered in England No. 02530851

Report should be cited as:

APEM (2024). Muir Mhòr Compensation Site Investigation Report P00011963. Muir Mhòr Offshore Wind Farm Limited.

Revision and Amendment Register

| Version Number | Date | Section(s) | Page(s) | Summary of Changes | Approved by |
|----------------|----------|------------|---------|--------------------|-------------|
| 1.0 | 23/08/24 | All | | Initial Draft | GW |
| 1.1 | 30/09/24 | All | | Review | CS |
| 1.2 | 30/10/24 | All | | Internal Amends | GW |

Contents

| | | |
|---------|---|----|
| 1. | Introduction..... | 1 |
| 1.1 | Project Background _____ | 1 |
| 1.2 | Site Descriptions_____ | 6 |
| 1.2.1 | Aberdeen to Stonehaven Sites..... | 6 |
| 1.2.1.1 | Burnbanks | 6 |
| 1.2.1.2 | Cove Bay..... | 6 |
| 1.2.1.3 | Cove Bay to Hare Ness | 7 |
| 1.2.1.4 | Hare Ness to Seal's Cove | 7 |
| 1.2.1.5 | Seal's Cove to Findon Ness..... | 7 |
| 1.2.1.6 | Findon Ness..... | 7 |
| 1.2.1.7 | Black Slough to Durn of Daff | 7 |
| 1.2.1 | Cromarty Firth Sites | 8 |
| 1.2.1.1 | North Sutor | 8 |
| 1.2.1.1 | South Sutor..... | 8 |
| 2. | Methods | 11 |
| 2.1 | Site Visit Timeframes _____ | 11 |
| 2.2 | Objectives _____ | 14 |
| 3. | Results – Seabird Present and Pressure Identification | 15 |
| 3.1 | Aberdeen to Stonehaven Sites _____ | 15 |
| 3.1.1 | Burnbanks | 15 |
| 3.1.1.1 | Habitat Condition and Adjacent Land Use..... | 15 |
| 3.1.1.1 | Anthropogenic Disturbance | 17 |
| 3.1.1.2 | Predation..... | 17 |
| 3.1.2 | Cove Bay..... | 20 |
| 3.1.2.1 | Habitat Condition and Adjacent Land Use..... | 22 |

| | | |
|---------|--|----|
| 3.1.2.2 | Anthropogenic disturbance | 23 |
| 3.1.2.3 | Predation..... | 23 |
| 3.1.3 | Cove Bay to Hare Ness | 25 |
| 3.1.3.1 | Habitat Condition and Adjacent Land Use..... | 27 |
| 3.1.3.2 | Anthropogenic disturbance | 27 |
| 3.1.3.3 | Predation..... | 27 |
| 3.1.4 | Hare Ness to Seal’s cove | 30 |
| 3.1.4.1 | Habitat Condition and Adjacent Land Use..... | 30 |
| 3.1.4.2 | Anthropogenic disturbance | 33 |
| 3.1.4.3 | Predation..... | 33 |
| 3.1.5 | Seal’s cove to Findon Ness | 35 |
| 3.1.5.1 | Habitat Condition and Adjacent Land Use..... | 37 |
| 3.1.5.2 | Anthropogenic Disturbance | 38 |
| 3.1.5.3 | Predation..... | 38 |
| 3.1.6 | Findon Ness..... | 40 |
| 3.1.6.1 | Habitat Condition and Adjacent Land Use..... | 42 |
| 3.1.6.2 | Anthropogenic disturbance | 42 |
| 3.1.6.3 | Predation..... | 42 |
| 3.1.7 | Black Slough to Burn of Daff | 46 |
| 3.1.7.1 | Habitat Condition and Adjacent Land Use..... | 48 |
| 3.1.7.2 | Anthropogenic disturbance | 48 |
| 3.1.7.3 | Predation..... | 48 |
| 3.2 | Cromarty Sites _____ | 50 |
| 3.2.1 | North Sutor | 50 |
| 3.2.1.1 | Habitat Condition and Adjacent Land Use..... | 50 |

| | | |
|---------|--|----|
| 3.2.1.1 | Anthropogenic disturbance | 50 |
| 3.2.1.2 | Predation..... | 51 |
| 3.2.2 | South Sutor..... | 53 |
| 3.2.2.1 | Habitat Condition and Adjacent Land Use..... | 53 |
| 3.2.2.2 | Anthropogenic disturbance | 53 |
| 3.2.2.1 | Predation..... | 54 |
| 4. | Limitations..... | 55 |
| 5. | Discussion..... | 56 |
| 5.1 | Seabird Populations _____ | 56 |
| 5.1.1 | Aberdeen to Stonehaven Sites..... | 56 |
| 5.1.2 | Cromarty Sites..... | 56 |
| 5.2 | Habitat Condition and Modification _____ | 57 |
| 5.2.1 | Aberdeen to Stonehaven Sites..... | 57 |
| 5.2.2 | Cromarty Sites..... | 58 |
| 5.3 | Anthropogenic disturbance mitigation _____ | 58 |
| 5.3.1 | Aberdeen to Stonehaven Sites..... | 58 |
| 5.3.1 | Cromarty Site | 60 |
| 5.4 | Predation impacts _____ | 60 |
| 5.4.1 | Avian..... | 60 |
| 5.4.2 | Mammalian | 61 |
| 6. | Conclusions and Recommendations | 62 |
| 6.1.1 | Aberdeen to Stonehaven Sites..... | 62 |
| 6.1.1.1 | Recommendations | 62 |
| 6.1.2 | Cromarty Sites..... | 63 |
| 6.1.2.1 | Recommendations | 63 |

| | | |
|----|-----------------|----|
| 7. | References..... | 64 |
| 8. | Appendix..... | 67 |

List of Figures

| | | |
|---------------------|---|-----------|
| Figure 1-1: | The locations of the two survey areas containing the nine survey sites on the East coast of Scotland. _____ | 5 |
| Figure 1-2: | The location of the seven sites situated between Aberdeen and Stonehaven. ___ | 9 |
| Figure 1-3: | The location of the two sites situated on the Cromarty Firth. _____ | 10 |
| Figure 3-1: | Seabird colony locations and habitat modification site one at Burnbanks. _____ | 16 |
| Figure 3-2: | North-facing cliff within the inlet supporting kittiwake colony and the location of habitat modification site one. Kittiwake AONs are pictured on the left, and the rock stack supporting herring gull colony a is pictured on the right. _____ | 17 |
| Figure 3-3: | A section of disused kittiwake nest cups along the cliff face within the inlet supporting kittiwake colony b. _____ | 18 |
| Figure 3-4: | Evidence of two small landslides on the embankment above disused kittiwake nests. _____ | 18 |
| Figure 3-5: | Large drainage outlet. Disused kittiwake nests pictured to the left. _____ | 19 |
| Figure 3-6: | An example of unsuitable breeding habitat for target species. Cliff face is sloped and vegetated. _____ | 19 |
| Figure 3-7 | A section of the Aberdeen Coastal Path, in close proximity to the cliff face. _____ | 20 |
| Figure 3-8: | Locations of seabird colonies and habitat modification site two at Cove Bay. ___ | 21 |
| Figure 3-9: | Example of suitable breeding habitat for kittiwake, guillemot, and razorbill, along the Cove Bay coastline. _____ | 23 |
| Figure 3-10: | Potential habitat modification site two; vegetated cliff face is pictured centrally, either side of breeding kittiwake. _____ | 24 |
| Figure 3-11: | Aberdeen Coastal Path along the Cove Bay coastline. _____ | 24 |
| Figure 3-12: | Locations of seabird colonies and habitat modification site three at Cove Bay to Hare Ness _____ | 26 |
| Figure 3-13: | Habitat Modification Site three. Vegetated cliff face is pictured centrally, above areas with breeding species. _____ | 28 |

| | |
|--|----|
| Figure 3-14: A closer perspective of Figure 16. Vegetated cliff ledges pictured above breeding kittiwake and guillemot. | 28 |
| Figure 3-15: Vegetated cliffs surrounding the Blackhills Quarry. Habitat unsuitable for breeding target species. | 29 |
| Figure 3-16: Anchor point attached to a boulder at the top of the cliff face. Possibility used for recreational abseiling. | 29 |
| Figure 3-17: Cliff face below the anchor point shown in Figure 19, with kittiwake colony h positioned directly beneath the anchor point. | 30 |
| Figure 3-18: Locations of seabird colonies and habitat modification site four at Hare Ness to Seal's Cove. | 32 |
| Figure 3-19: Location of target species observed along Hare Ness to Seal's Cove. | 33 |
| Figure 3-20: Habitat modification site four. Vegetated cliff face is pictured centrally, above areas with breeding species. | 34 |
| Figure 3-21: Suitable breeding habitat for kittiwake, guillemot, and razorbill. Steep rocky cliffs, with plenty of ledges and devoid of vegetation. | 34 |
| Figure 3-22: Locations of seabird colonies and habitat modification sites five and six at Seal's Cove to Findon Ness. | 36 |
| Figure 3-23: Coastline within the northern section of Seal's Cove to Findon Ness, location of habitat modification site five. Kittiwake colony j pictured centrally, left of the cave. Habitat consists of steep cliff and rocky shore. Findon Quarry pictured in the top left of the photo. | 38 |
| Figure 3-24: Large north facing cliff face containing guillemot colony g, predominately located on the left and the location of habitat modification site six. Patches of bare rock and vegetated areas on cliff face. Visibility obscured due to sea mist. | 39 |
| Figure 3-25: Clay pigeon trap positions to dispense targets seaward. Pictured in the background is a large cliff where kittiwake, guillemot, and razorbill were recorded. | 39 |
| Figure 3-26: Locations of seabird colonies and habitat modification site seven at Hare Ness to Seal's Cove. | 41 |
| Figure 3-27: Habitat modification site seven along with suitable breeding habitat utilised by kittiwake, guillemot, and razorbill. | 43 |
| Figure 3-28: Section of wet vegetated cliff recorded at Findon Ness, pictured within the red box, situated right of breeding kittiwake. | 43 |
| Figure 3-29: Climbing rope attached to and stashed under a boulder, directly adjacent to kittiwake colony k. | 44 |
| Figure 3-30: Puffin carcass remains found at Findon Ness above puffin colony b. | 44 |

| | |
|--|----|
| Figure 3-31: Predated guillemot egg found at Findon Ness. | 45 |
| Figure 3-32: Predated kittiwake eggs found at Findon Ness. Seemingly the remains of three different eggs. | 45 |
| Figure 3-33: Locations of seabird colonies at Black Slough to Burn of Daff. | 47 |
| Figure 3-34: May Craig, a small islet located along the Black Slough to Burn of Daff section of coastline. Islet supporting breeding herring gull and shag. | 48 |
| Figure 3-35: Rocky shore along the northern section of Black Slough to Burn of Daff. Unsuitable breeding habitat for target species. | 49 |
| Figure 3-36: Portlethen Harbour, containing a small artisanal and recreational fishing fleet. | 49 |
| Figure 3-37: Northeast facing coastline at North Sutor; the main area of guano-stained cliff observed at the site. | 51 |
| Figure 3-38: View of North Sutor from South Sutor. Red boxes highlight areas of guano-stained cliff. | 52 |
| Figure 3-39: A marker buoy in the middle of the entrance to the Cromarty Firth, instructing large vessels to pass north, towards North Sutor. | 52 |
| Figure 3-40: Wildlife tour boat in close proximity to cliff. It was later seen heading towards the guano-stained cliff containing breeding birds. | 53 |
| Figure 3-41: South Sutor, as viewed from North Sutor. | 54 |
| Figure 3-42: Observable southeastern steep cliffs of South Sutor. | 54 |

List of Tables

| | |
|--|----|
| Table 1: Weather conditions and timings of site visits. | 12 |
| Table 2: Seabird colonies observed along the Cove Bay stretch of coastline. | 22 |
| Table 3: Seabird colonies observed along the Seal's Cove to Findon Ness stretch of coastline. | 37 |
| Table 4: Site locations and colony counts of all target species recorded across the seven sites between Aberdeen to Stonehaven, along with locations of herring gull colonies and greater blacked-backed gull nests. | 67 |

1. Introduction

This document has been prepared as part of the ornithology compensation workstream for the Muir Mhòr Offshore Wind Farm (hereafter 'the Proposed Development'). This report provides the key findings from initial site investigation visits to nine short-listed non-Special Protection Area (SPA) seabird colonies located on the east coast of Scotland, undertaken in July 2024 (**Figure 1-1**). Seven of the sites are located between Stonehaven and Aberdeen. The remaining two sites are situated on either side of the entrance to the Cromarty Firth. The aim of these site visits was to identify any potential pressures affecting breeding Atlantic puffin (*Fratercula arctica*, hereafter 'puffin'), black-legged kittiwake (*Rissa tridactyla*, hereafter 'kittiwake'), common guillemot (*Uria aalge*, hereafter 'guillemot'), and razorbill (*Alca torda*) at the nine sites. The identification of these pressures is then used to explore the possibility of developing compensation measures across the short-listed sites.

1.1 Project Background

The Proposed Development is a joint venture between Fred. Olsen Seawind Limited and Vattenfall Wind Power Limited. The Proposed Development is located within the E2 PO area and approximately 63 km east of Peterhead on the east coast of Scotland. The Muir Mhòr Array Area covers approximately 200 km² and is anticipated to have a capacity of approximately 1 GW comprising floating offshore wind technology. The offshore elements of the Proposed Development are located within the Scottish Territorial Waters (extending to 12 nautical miles (nm) from shore) and the United Kingdom (UK) Exclusive Economic Zone (EEZ; between 12 and 200 nm).

An Appropriate Assessment (AA) is required for projects or plans which may affect European sites. If, during the Habitats Regulations Appraisal (HRA) process an Adverse Effect on Site Integrity (AEoSI) of a particular site cannot be excluded, a derogations process is undertaken during which any potential alternative solutions are assessed. Should no appropriate alternative solutions exist, and provided there are imperative reasons of overriding public interest (IROPI) in the project proceeding, the final stage of the derogations process is to develop compensation measures to ensure that overall coherence of the National Site Network (NSN) is protected.

Pending the Scottish Ministers AA conclusions, the derogation case is presented for the NSN sites and species where the Developer's Report to Inform Appropriate Assessment (RIAA) concludes that either an AEoSI cannot be ruled out; or, no AEoSI is concluded but it is considered there is a risk that Scottish Ministers may disagree with these conclusions. In the latter case, the derogation case is therefore presented "without prejudice" to the Developer's conclusions.

The Atlantic puffin is a small (approximately 430 g) pelagic seabird with a European nesting range extending from the high Arctic (Svalbard, Norway) to Brittany (France) (Burnham *et al.*, 2021; Major *et al.*, 2024). Puffins are currently listed as vulnerable by the International Union

for Conservation of Nature (IUCN), and their European population is predicted to decline by 50-79% by 2065 (Burnham *et al.*, 2021). Puffins are borrow-nesters, arriving in the UK in March for the breeding season to lay a single egg and heading back out to sea at the end of July (British Trust for Ornithology (BTO), 2024a). They are on the Red List of UK Birds of Conservation Concern and are classed as endangered Species of European Conservation Concern (BTO, 2024a). At sites with connectivity to the Proposed Development, the threats and pressures identified for puffins include climate change, fisheries management (prey availability – sandeels), and invasive alien species (NatureScot, 2024a). Historically, compensation measures have included closure of sandeel and sprat fisheries in all UK waters, rat eradication, and the prevention of oil spills (Furness *et al.*, 2013).

The black-legged kittiwake is a small (38-40 cm long) surface-feeding gull (Coulson, 2011). These pelagic birds arrive at breeding colonies in March to nest along sheer cliffs and depart in September, although some individuals may be recorded year-round (Coulson, 2011; Coulson, 2019; BTO, 2024b). Clutch size ranges from 1 to 3 eggs (Coulson, 2011). Kittiwakes are listed as vulnerable by the IUCN and as Species of European Conservation Concern, and they are Red-listed UK Birds of Conservation Concern (BTO, 2024b). At sites with connectivity to the Proposed Development, threats and pressures include climate change and fisheries management (prey availability) (NatureScot, 2024a). Potential compensation measures include closure of sandeel and sprat fisheries in UK waters, provision of artificial structures for new kittiwake colonies, mink eradication, feral cat eradication, rat eradication, fencing out foxes from colonies, and exclusion of great skuas (Furness *et al.*, 2013).

The common guillemot is a colonial seabird that breeds at higher densities than any other bird (Birkhead, 1977). Guillemots breed on low-lying flat-topped islands and stacks, as well as on broad and narrow cliff ledges although maximum densities are achieved on broad, flat areas (Birkhead, 1977). The breeding season occurs between April and July, resulting in a single egg clutch that may be replaced if eggs are lost early in the breeding season (Bennett *et al.*, 2022). Guillemots are Amber-listed UK Birds of Conservation Concern and are classed as of least concern by the IUCN and Species of European Conservation Concern (BTO, 2024c). At sites with connectivity to the Proposed Development area, threats and pressures include climate change, fisheries management (prey availability), and on-site management (NatureScot, 2024). Potential compensation measures traditionally have included closure of sandeel and sprat fisheries in all UK waters and in guillemot wintering areas, rat eradication, and the prevention of oil spills (Furness *et al.*, 2013).

The razorbill is a colonial auk often found breeding sympatrically with guillemots in the same colony (Chivers *et al.*, 2012). However, there are differences in their behavioural ecology, particularly in their foraging and nesting strategies as razorbills do not dive as deeply and as long as guillemots (Chivers *et al.*, 2012). Razorbills breed in discreet pairs on small, sheltered ledges or in crevices, although they too have a clutch size of a single egg (Chivers *et al.*, 2012). Their breeding season is from mid-March to early September, often laying from April to June (Harris and Wanless, 1989; Scottish Wildlife Trust, 2024). Razorbills are Amber-listed UK Birds of Conservation Concern and are classed as near-threatened by the IUCN and of least concern for Species of European Conservation Concern (BTO, 2024e). At sites with connectivity to the Proposed Development area, threats and pressures include climate change, fisheries

management (prey availability), recreational activities, and human disturbance (NatureScot, 2024a). Potential compensation measures may include closure of sandeel and sprat fisheries in all UK waters and in razorbill wintering areas, rat eradication, and the prevention of oil spills (Furness *et al.*, 2013).

A short-list of sites where compensation measures could be introduced were identified in a desk-based study (GoBe, 2024). Initially this study examined nearby marine protected areas (MPAs) including SPAs, SACs and Marine Conservation Zones (MCZs). However, MPAs are meant to be managed according to the designation type (Schéré *et al.*, 2020); therefore, there are limited options to provide additional management measures for designated features at these sites. Consequently, non-SPA colonies within foraging range of the Proposed Development were identified to seek out opportunities for compensation. To identify these colonies, the Seabird Monitoring Programme (SMP) online database was used. Initially, colonies were selected if recent counts revealed over 100 individual seabirds for at least one of the target species mentioned above. The search for potential sites was then expanded to include colonies less than 100 individuals, as these colonies may be so limited by pressures that they have not been able to grow to requisite threshold size. Site selection was further refined by considering if colonies are known to be affected by pressures and if there have been declines in target species. The outcome of this process was the identification of nine sites, containing one or more target species, for initial site investigation visits.

In tandem to the site selection process, a literature review of current population trends with connectivity to the proposed development, including threats and pressures, was conducted to better understand the dynamics at play on the east coast of Scotland and surrounding areas (GoBe, 2024). Threats and pressures currently impacting populations of seabirds on the east coast of Scotland include climate change, fisheries management (i.e., prey availability and by-catch), habitat condition, invasive alien species, human disturbance, and interspecific competition (NatureScot, 2024).

Due to the exploratory nature of the site visits, no preexisting list of compensation measures was produced. Instead, the initial site investigation visits were conducted to gather information that would help assess the suitability of implementing compensation measures across the nine sites. Therefore, surveys were conducted based on an understanding of known pressures affecting seabirds identified in the literature review and on known existing compensation measures (GoBe, 2024; Royal HaskoningDHV, 2024). Further details on the survey methods are provided in the Methods section.

Proposed compensation measures based on the desk-based investigations and subsequent surveys included artificial nesting structures (ANS), predator eradication, and reduction of human disturbance. Indeed, the surveys were carried out with human disturbances in mind, wherein surveyors were tasked with identifying human activities that could have a detrimental effect on seabird populations.

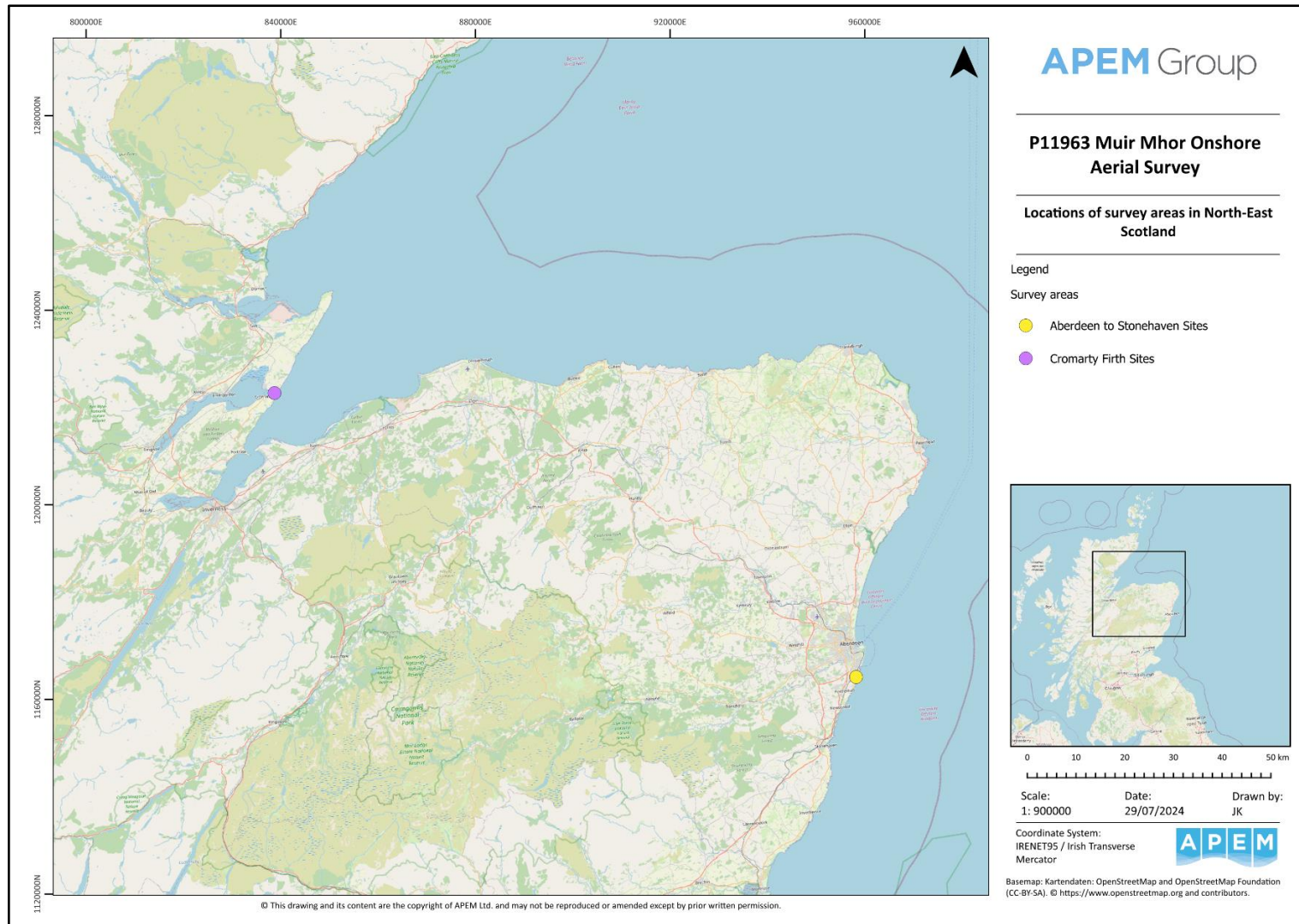


Figure 1-1: The locations of the two survey areas containing the nine survey sites on the East coast of Scotland.

1.2 Site Descriptions

Sites were selected based on the SMP online database, which provided point locations indicating where colonies are located. The names of these locations suggest that sites are either at a specific location or describe sections of coastline. Ultimately, the exact locations of seabird colonies within each site are not provided. To deal with this uncertainty, in the field, the stretches of coastline surrounding point locations were surveyed to allow for more extensive site investigations. Therefore, site descriptions refer to the sections of coastline surveyed, as opposed to the specific point location provided from the SMP online database. To further elucidate the exact locations of seabird colonies within sections, colonies have been labelled alphabetically and mapped within the results section. Site descriptions of each visited location are presented below.

1.2.1 Aberdeen to Stonehaven Sites

The seven sites investigated are located south of Aberdeen, along a 7.5 km stretch of east-facing coastline (**Figure 1-2**). The coastline varies from steep cliffs with multiple inlets and rock stacks to more shallow-angled cliffs and sections of rocky shoreline. The area surrounding this section of coastline is predominantly arable land used for pasture and agricultural crops. Additionally, there are various industrial areas and human settlements within the area. At the northern end of this section of coastline are the Altens Industrial Estate and the Aberdeen suburb of Cove Bay. Further south are two active quarries, Blackhills Quarry and Findon Quarry. Located at the end of this stretch of coastline are the villages of Findon and Portlethen.

1.2.1.1 Burnbanks

The section of coastline around Burnbanks consists of rocky cliffs, approximately 25 to 20 meters above sea level, interspersed with multiple small inlets and rock stacks. The Aberdeen Coastal Path runs along the cliff face. Pasture fields surround this section of coastline, and there is a scattering of derelict buildings within the area. To the west, the fields back onto a railroad track and the Altens Industrial Estate.

1.2.1.2 Cove Bay

Continuing south from Burnbanks, the coastline along Cove Bay remains steep and rocky, steadily increasing in height to around 30 meters above sea level before gradually decreasing in height and gradient as it transitions into rocky shore near Cove Bay Harbour. There are multiple inlets, which are generally wider than those at Burnbanks. In the surrounding landscape, the northern section of coastline features pastoral fields and coastal grasslands, while the suburb of Cove Bay is located in the south, approximately 150 meters from the coastline. Additionally, much of the southern section of coastlines is within the Cove Site of Special Scientific Interest (SSSI), although this site is designated for its coastal floral community and maritime cliffs, not seabirds (NatureScot, 2024b).

1.2.1.3 *Cove Bay to Hare Ness*

Cove Bay Harbour is located at the top of this section of coast. The harbour hosts a small artisanal fishing fleet and is also used for recreational activities. The coastline surrounding the harbour is sloped and vegetated. Further south, the cliffs increase in elevation and there are three large inlets with steep vegetated cliffs. The surrounding landscape is a mixture of pasture, herb-rich grassland, coastal heath, and bracken-dominated hills, with a few houses scattered along the coast. There is no footpath running parallel to the coastline. The majority of this stretch of coastline also falls within the Cove SSSI (NatureScot, 2024b).

1.2.1.4 *Hare Ness to Seal's Cove*

The Hare Ness to Seal's Cove section of coastline is positioned between Blackhills Quarry in the north and the start of Findon Quarry to the south. Both quarries are active, with industrial machinery and heavy goods vehicles in operation. The coastal cliffs are approximately 10 to 20 meters above sea level. The cliffs in the northern section are rocky but have a graded slope. In contrast, the southern section has steeper cliffs and several rocky inlets. The surrounding area consists of either pastoral fields or bracken-dominated hills. There are no residential buildings or footpaths within this section of the coast.

1.2.1.5 *Seal's Cove to Findon Ness*

Seal's Cove to Findon Ness is a relatively short stretch of coastline, less than 1 km long. The northern coastline runs parallel to Findon Quarry, which at some points is less than 50 meters from the coast. Directly south of the quarry is the Seal's Cove Shooting Ground. The shooting grounds consist of several buildings, conifer woodland, and wildflower meadows. The cliffs along this section of coast are tall, steep, and jagged, with many inlets, rock stacks, small islets, and caves. Of particular note is a large cave formation on an inlet parallel to the quarry and a prominent cliff face south of the shooting range.

1.2.1.6 *Findon Ness*

Findon Ness is a semi-circular landmass protruding eastwards. The coastline along Findon Ness is craggy and complex, featuring a series of sharp inlets with steep, rocky cliffs, along with low gradient sloping cliffs and rocky shore. The surrounding landscape includes a mixture of pasture, herb-rich grasslands, and the Findon Moor SSSI. The Findon Moor SSSI supports a diverse array of habitats and floral diversity and is designated for lowland coastal heathland (NatureScot, 2024c). West of Findon Moor is the small village of Findon, and there are multiple footpaths and trails crossing the moor and the coastline.

1.2.1.7 *Black Slough to Durn of Daff*

Black Slough to Durn of Daff is the southernmost stretch of coastline surveyed. This section of coastline is characterised by moderately inclined cliffs and rocky shore. Along the coastline, there are multiple inlets and rock stacks, with the moderately sized May Craig islet being of particular note. The surrounding land is primarily used for agricultural crops. A small industrial

complex is located along the northern section of the coastline, and the village of Portlethen is situated to the south.

1.2.1 Cromarty Firth Sites

The two Sutors are headlands located on either side of the entrance to the Cromarty Firth, approximately 1.3 km apart (**Figure 1-3**). The Cromarty Firth is a significant hub for both the oil and gas and renewable energy industries, with the ports of Cromarty and Nigg providing facilities and infrastructure to support these sectors. Tourism is also prominent in the area, with several wildlife tourism businesses operating in the Firth and cruise ships docking at the Port of Cromarty. Additionally, aquaculture is an important industry in the area, with shellfish and salmon farming taking place within the Firth.

Both sites are partially within the Rosemarkie to Shandwick Coast SSSI (NatureScot, 2024d). This SSSI is designated for multiple geological and biological features. While the SSSI is not designated specifically for the target species discussed in this report, breeding cormorants (*Phalacrocorax carbo*) are among its designated features. Furthermore, both sites are adjacent to the Moray Firth SPA (NatureScot, 2024e). However, this site is not designated for the target species within this report but is designated based on multiple duck (*Anatidae*), diver (*Gaviidae*) and grebe (*Podicipedidae*) species.

1.2.1.1 North Sutor

North Sutor rises to an apex of 147 meters. The site features a combination of vegetated sloping hills, primarily dominated by gorse (*Ulex europaeus*) and broom (*Cytisus scoparius*), and sheer rocky cliffs, which include multiple rock stacks. The area is historically significant, containing the remains of several military gun emplacements built in the early 20th century to defend the naval anchorage in the Cromarty Firth. Located 1.5 km to the west is the port of Nigg, which is home to one of the largest dry docks for the oil industry in the world.

1.2.1.1 South Sutor

South Sutor rises to 140 meters and is heavily vegetated, with sloping hills dominated by mature woodland, containing veteran Oak (*Quercus robur*) and Beech (*Fagus sylvatica*) trees. Despite this, there are still several patches of steep cliff in the area. The remaining area is a mix of pastoral fields and herb-rich grasslands. Like North Sutor, South Sutor is home to several disused military gun emplacements on the cliffside. The small town of Cromarty lies to the west.

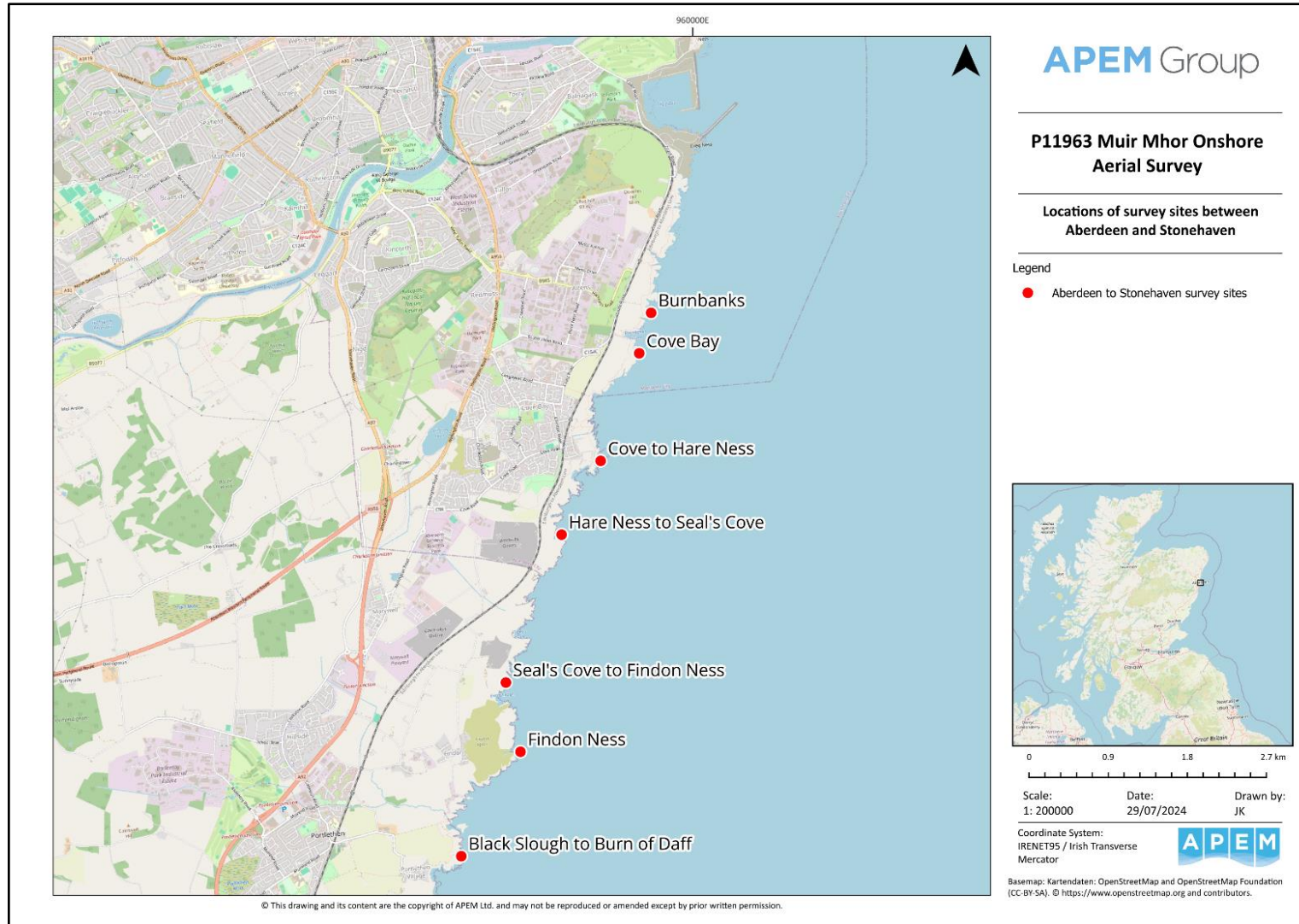


Figure 1-2: The location of the seven sites situated between Aberdeen and Stonehaven.

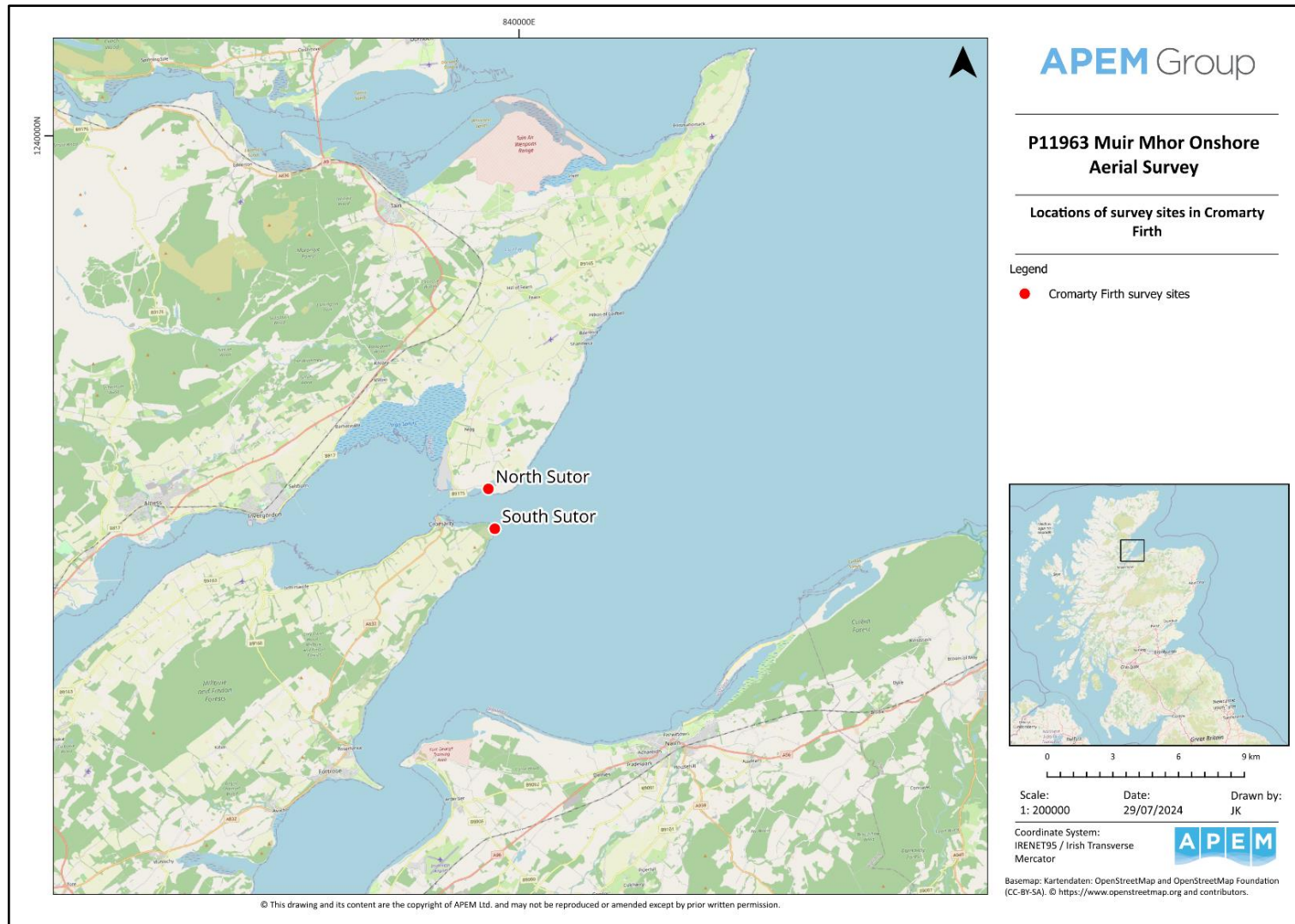


Figure 1-3: The location of the two sites situated on the Cromarty Firth.

2. Methods

2.1 Site Visit Timeframes

Initial investigative site visits to the sites located between Aberdeen and Stonehaven were conducted on the 9th, 10th and 11th of July 2024 and the sites located on the Cromarty Firth were visited on the 30th of July 2024. Surveys were conducted by APEM Groups' in-house ornithologists, George Warwick, Mark Lewis, and Matt Doyle. All surveyors have several years' experience of ornithological data recording and seabird monitoring. Full details of survey conditions and timings are presented in **Table 1**.

Table 1: Weather conditions and timings of site visits.

| Date | Site | Surveyors | Temp (°C) | Wind (Beaufort scale) | Visibility | Precipitation | Cloud Cover (x/8) | Start Time | End Time | Comments |
|--------------------------------------|---|-----------|-----------|-----------------------|------------|--|-------------------|------------|----------|--|
| Aberdeen and Stonehaven Sites | | | | | | | | | | |
| 09/07/2024 | Black Slough to Burn of Daff | ML & GW | 17 | NE BF1 | Good | Dry | 3 | 08:15 | 09:45 | Excellent Conditions |
| 09/07/2024 | Findon Ness | ML & GW | 19 | NE BF2 | Good | Dry | 2 | 10:05 | 12:15 | Excellent Conditions |
| 09/07/2024 | Seal's Cove to Findon Ness | ML & GW | 17 | NE BF3 | Good | Dry | 5 | 12:37 | 13:20 | Localised sea mist affecting visibility of the large cliff face south of shooting range. |
| 09/07/2024 | Hare Ness to Seal's cove, Cove Bay to Hare Ness | ML & GW | 14 | NE BF3 | Good | Dry | 7 | 13:45 | 14:30 | Survey started north of Blackhills Quarry, up to Cove Bay Harbour. Coastline north Cove Bay Harbour surveyed via optics. |
| 10/07/2024 | Burnbanks | ML & GW | 13 | NW BF4 | Good | Consistent light rain | 8 | 09:00 | 10:06 | |
| 10/07/2024 | Cove Bay, South of Cove Bay | ML & GW | 13 | NW BF4 | Good | Light, then heavy rain. Rained whole survey. | 8 | 10:06 | 12:10 | Surveyed coastline up till large KI colony. |
| 11/07/2024 | North of Seal's Cove, North of Hare Ness | ML & GW | 17 | NW BF2, 3 from 11:45 | Good | Mostly dry, light showers | 7 | 10:30 | 12:30 | |
| Cromarty Firth Sites | | | | | | | | | | |
| 30/07/2024 | North Sutor | GW & MD | 16 | SW BF4 | Good | Dry | 2 | 09:57 | 13:00 | Excellent Conditions |

| Date | Site | Surveyors | Temp (°C) | Wind (Beaufort scale) | Visibility | Precipitation | Cloud Cover (x/8) | Start Time | End Time | Comments |
|--|-------------|-----------|-----------|-----------------------|------------|---------------|-------------------|------------|----------|----------------------|
| 30/07/2024 | South Sutor | GW & MD | 17 | SW BF3 | Good | Dry | 2 | 14:30 | 16:00 | Excellent Conditions |
| *Surveyors, Mark Lewis, George Warwick, Matt Doyle | | | | | | | | | | |

2.2 Objectives

The main objective of the initial site investigation visits was to assess the feasibility of implementing compensation measures for the target species across the nine short-listed sites. To determine this, surveyors focused on detecting the presence of breeding target species and identifying any potential pressures on seabird colonies. To supplement observations, photographic evidence of landscapes, habitats, and breeding activity was also collected during the visits to aid in classifying breeding habitat availability and identifying pressures. The observations and data collected were then used to evaluate the suitability of all sites for possible compensation measures. The following data was recorded during site visits:

- Presence of any breeding evidence (chicks, adults on nests, guano stains, auk ledges, and kittiwake nest cups);
- Presence of native or invasive plants encroaching onto cliff faces;
- Presence of marine litter in or around nesting sites;
- Presence of potential disturbance stimuli near colonies;
- Signs of anthropogenic activities in the surrounding areas;
- Presence of avian predators (birds of prey, large gulls, and corvids);
- Presence or signs of potential mammalian predators near the colonies;
- Presence and locations of footpaths and information boards (if any) about nesting seabird colonies; and
- Signs of coastal erosion.

3. Results – Seabird Present and Pressure Identification

3.1 Aberdeen to Stonehaven Sites

3.1.1 Burnbanks

Burnbanks is situated approximately 4 km south of central Aberdeen. Based on data from the SMP database, this site historically supported 185 kittiwake Adults on Nests (AONs) in 1999 (BTO, 2024f). The most recent count in 2017 recorded 0 AONs, indicating that the colony had become extinct (BTO, 2024f). During the survey at the Burnbanks point location derived from the SMP database, no target species were present. However, further north, target species were present in two inlets. A total of 123 kittiwake AONs (**kittiwake colony a**) and a single razorbill (**razorbill colony a**) were recorded in the northernmost inlet (**Figure 3-1**). Additionally, within this inlet, a single shag (*Phalacrocorax aristotelis*) AON was recorded, along with a herring gull colony (*Larus argentatus*; **herring gull colony a**) positioned on a rock stack within the inlet (**Figure 3-2**). There had been four successful nesting attempts, with nine chicks, and four adults present.

Within the inlet directly south, a single kittiwake AON (**kittiwake colony b**) was recorded, although there were approximately ten disused kittiwake nest cups on the cliff faces within this inlet (**Figure 3-3**). As the nest cups are still present on the cliff face, it is likely that they are from failed breeding attempts this year. Additionally, further to the south, within a large inlet opposite a disused farmhouse, another herring gull colony was present (**herring gull colony b**), where 16 adults and two chicks were present.

3.1.1.1 Habitat Condition and Adjacent Land Use

Within the most northerly inlet, supporting kittiwake colony a, the majority of the cliff face is steep and bare of vegetation. There are sections of sheer cliff face, lacking ledges, within kittiwake colony a (**Figure 3-1**; **Figure 3-2**). These areas could be suitable for habitat modification, whereby artificial ledges could be installed. Additionally, within this area, there is a general lack of ledges suitable for breeding guillemot and razorbill.

Within the inlet supporting kittiwake colony b, there is evidence of multiple recent small landslides on the embankment above the cliff (**Figure 3-4**). The limited vegetation growth where the small landslides have occurred indicates that this was a recent event, likely this spring or summer. Whether this landslide contributed to the abandonment of the kittiwake nest would need to be determined by further surveys next breeding season to see if the kittiwakes return to this site. There is also a large drainage outlet within this inlet, although this does not appear to affect kittiwake nest sites (**Figure 3-5**).

Along the rest of the coastline within this section, the cliffs are generally unsuitable breeding habitats for target species, principally due to being too sloped (**Figure 3-6**).

The landscape surrounding this section of coast is primarily pastoral fields, and therefore adjacent land use is unlikely to cause disturbance to breeding seabirds.

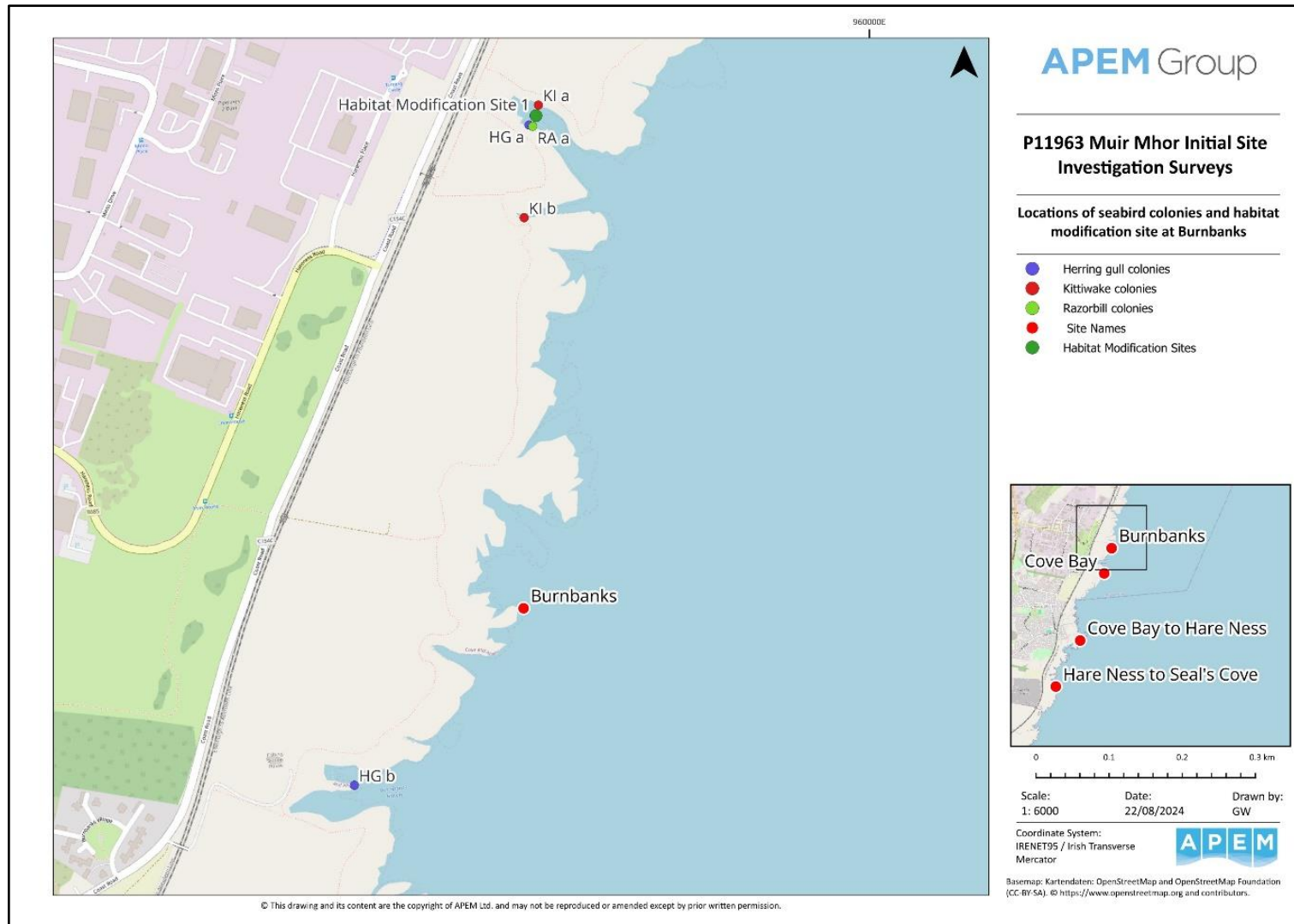


Figure 3-1: Seabird colony locations and habitat modification site one at Burnbanks.

3.1.1.1 Anthropogenic Disturbance

No anthropogenic disturbance events were recorded during the survey, although weather conditions at the time were poor, reducing the likelihood of encountering people using the area.

The Aberdeen Coastal Path runs directly along the coastline, often within 5 meters or less of the cliff edge, providing clear views of seabird colonies. The path is well-maintained and it appears to be visited regularly, as suggested by the clearly defined trail and Strava heatmap data, which shows significant use of the path (Strava, 2024). During favourable weather conditions, the path is likely to experience moderate footfall. (Figure 3-7).

Located to the west of this section of coastline is a railroad and the Altens Industrial Estate. However, given the distance between these features and the coastline, generally over 600 m away, it is unlikely that they disrupt breeding seabirds.

3.1.1.2 Predation

Evidence of predation was not recorded at this site during the survey. Along the Burnbanks stretch of coastline, two herring gull colonies were identified. Herring gulls are known to be predators of kittiwake and auk nests (Massaro *et al.*, 2001 Nisbet *et al.*, 2020).



Figure 3-2: North-facing cliff within the inlet supporting kittiwake colony and the location of habitat modification site one. Kittiwake AONs are pictured on the left, and the rock stack supporting herring gull colony a is pictured on the right.



Figure 3-3: A section of disused kittiwake nest cups along the cliff face within the inlet supporting kittiwake colony b.



Figure 3-4: Evidence of two small landslides on the embankment above disused kittiwake nests.



Figure 3-5: Large drainage outlet. Disused kittiwake nests pictured to the left.



Figure 3-6: An example of unsuitable breeding habitat for target species. Cliff face is sloped and vegetated.



Figure 3-7 A section of the Aberdeen Coastal Path, in close proximity to the cliff face.

3.1.2 Cove Bay

Cove Bay, a section of coastline approximately 1.5 km long, was surveyed. Historical count data from the SMP database provides a peak abundance of 1360 AONs in 1996 and a most recent count of 168 AONs in 2017 (BTO, 2024f). Most recent colony counts recorded 168 guillemot and 145 razorbill in 2017. Three puffin were recorded in 1999, whereas no puffin were recorded in the latest count in 2017.

Along Cove Bay, kittiwake, guillemot, and razorbill were observed at four separate points, in varying numbers. The locations of these colonies are presented, along with a potential location for habitat modification, in **Figure 3-8** and the number of birds within each colony is presented in **Table 2**. In total, 760 kittiwake AONs, 131 guillemot, and 13 razorbill were recorded. No puffin were recorded at this site. Additionally, a single shag and a single cormorant were recorded roosting.

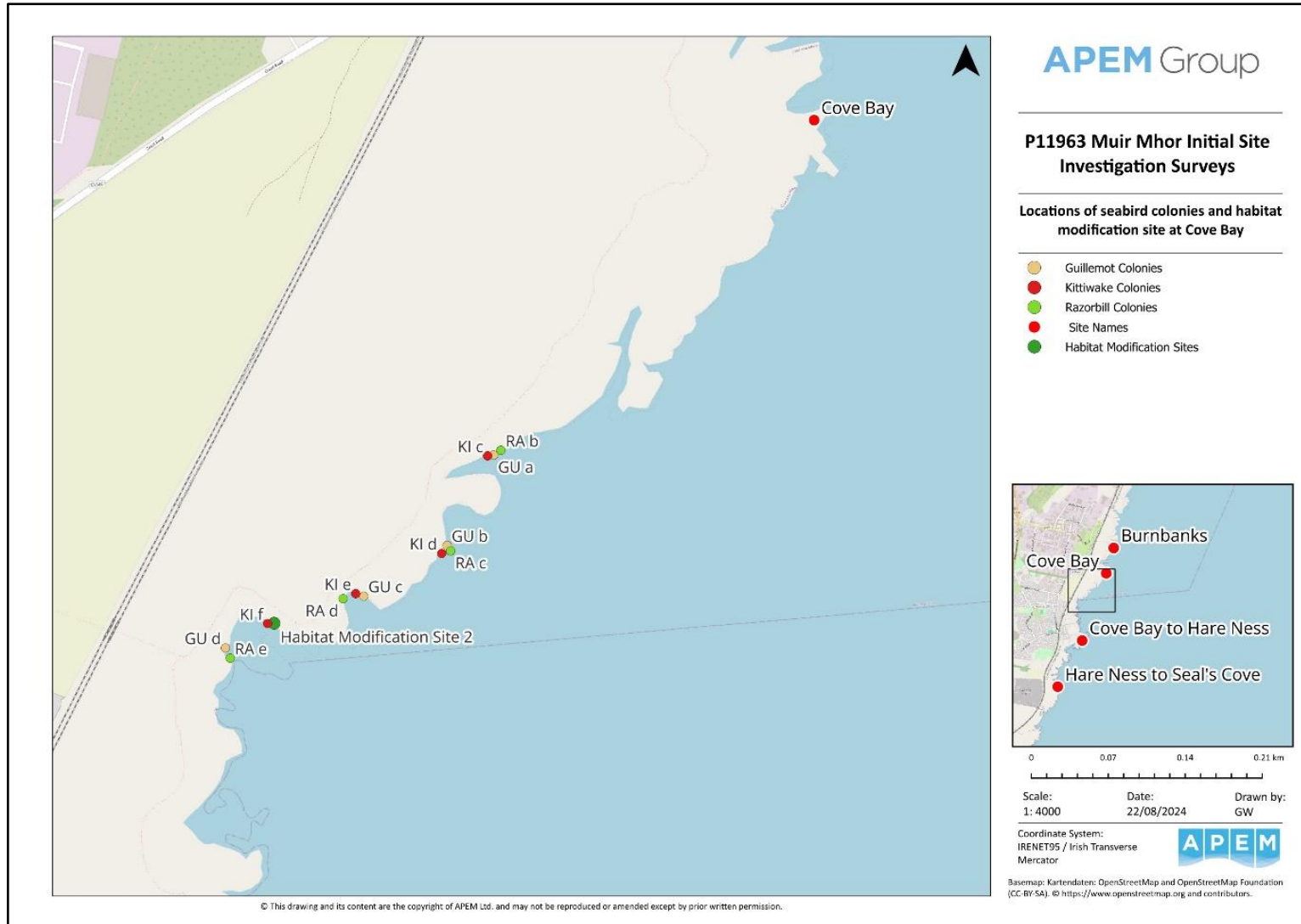


Figure 3-8: Locations of seabird colonies and habitat modification site two at Cove Bay.

Table 2: Seabird colonies observed along the Cove Bay stretch of coastline.

| Species | Colony Code | Count | Notes |
|-----------|--------------------|---------|--|
| Kittiwake | Kittiwake colony c | 108 AON | |
| Kittiwake | Kittiwake colony d | 17 AON | Limited views of colony. |
| Kittiwake | Kittiwake colony e | 43 AON | |
| Kittiwake | Kittiwake colony f | 592 AON | |
| Guillemot | Guillemot colony a | 25 | 21 adults, 4 chicks |
| Guillemot | Guillemot colony b | 2 | No chicks observed, limited views of colony. |
| Guillemot | Guillemot colony c | 42 | No chicks observed |
| Guillemot | Guillemot colony d | 66 | No chicks observed |
| Razorbill | Razorbill colony b | 2 | No chicks observed |
| Razorbill | Razorbill colony c | 1 | One individual observed carrying food to cliff face, limited view of colony. |
| Razorbill | Razorbill colony d | 4 | No chicks observed |
| Razorbill | Razorbill colony e | 6 | No chicks observed |

Kittiwakes were observed in high numbers at three sites, particularly at **kittiwake colony f**, where 592 AONs were recorded; the highest number observed at any site during this investigation. Additionally, kittiwake colony densities were high, with few empty ledges observed, suggesting that space is a limiting factor in the colony’s growth. Guillemots were observed in high numbers at **guillemot colonies c and d**, with four chicks observed at **guillemot colony a**. Razorbill were observed in low numbers across all four sites.

3.1.2.1 Habitat Condition and Adjacent Land Use.

Cove Bay features large sections of steep rocky cliff face, devoid of vegetation, which provide suitable breeding habitat for kittiwakes. At lower elevations, many of the inlets have rocky ledges that are ideal for guillemot and razorbill breeding (**Figure 3-9**). While there were good vantage points of the colonies within the inlets, it was difficult to view the seabirds and habitat on the east-facing cliffs. Boat surveys would be required to gain a better understanding of the seabird presence and habitat conditions along the seaward-facing cliffs.

Within **kittiwake colony f**, a section of cliff face approximately 50 to 70 meters long is heavily vegetated and devoid of kittiwakes (**Figure 3-10**). Kittiwakes are present either side of this section of cliff. This area presents an opportunity for habitat modification to create habitat for breeding kittiwakes by removing vegetation or installing an artificial nest structure (ANS) in the form of artificial ledges. The location of habitat medication site two is also presented on **Figure 3-8**.

Pastoral fields surround the northern section of Cove Bay, while the suburb of Cove Bay is located to the south. The surrounding land use seems unlikely to affect the breeding seabirds.

3.1.2.2 Anthropogenic disturbance

No anthropogenic disturbance events were recorded during the survey, although poor weather conditions at the time reduced the likelihood of encountering people in the area.

The Aberdeen Coastal Path continues from Burnbanks along the Cove Bay coastline (**Figure 3-11**), providing overlooking views of seabird colonies. Again, during favourable weather conditions, this path may experience moderate footfall.

3.1.2.3 Predation

Evidence of predation was not recorded at this site during the survey. However, herring gull were frequently observed flying along this stretch of coastline. Herring gulls are known to be predators of kittiwake and auk nests (Massaro *et al.*, 2001; Nisbet *et al.*, 2020)



Figure 3-9: Example of suitable breeding habitat for kittiwake, guillemot, and razorbill, along the Cove Bay coastline.



Figure 3-10: Potential habitat modification site two; vegetated cliff face is pictured centrally, either side of breeding kittiwake.



Figure 3-11: Aberdeen Coastal Path along the Cove Bay coastline.

3.1.3 Cove Bay to Hare Ness

Cove Bay to Hare Ness encompasses a stretch 1 km of coastline, starting at Cove Bay Harbour and ending next to the Blackhill quarry. The most recent counts on the SMP database found 361 kittiwake, 54 guillemot, and 151 razorbill in 2017 (BTO, 2024f). There is no record of puffin at this site.

Within this survey, target species found at two separate inlets along this section of coastline. The inlet directly south of Cove Bay Harbour, which consists of steep cliffs and a large cave positioned at the end of the inlet on the south facing side, 36 kittiwake AONs (**kittiwake colony g**), eleven guillemots (**guillemot colony e**), and 18 razorbills (**guillemot colony f**) were recorded. Guillemots and razorbills were observed flying into the large cave, where they could not be seen; therefore, it is likely that the survey counts for these species are an underestimate.

Within the subsequent inlet, 17 kittiwake AONs were recorded (**kittiwake colony h**), along with seven herring (**herring gull colony c**) and one great black-backed gull (*Larus marinus*) nesting (**GBBG nest a**). The location of target species colonies, along with a potential habitat modification location, are mapped in **Figure 3-12**. Target species were not recorded along the remaining stretch of coastline and puffin was not observed at all.

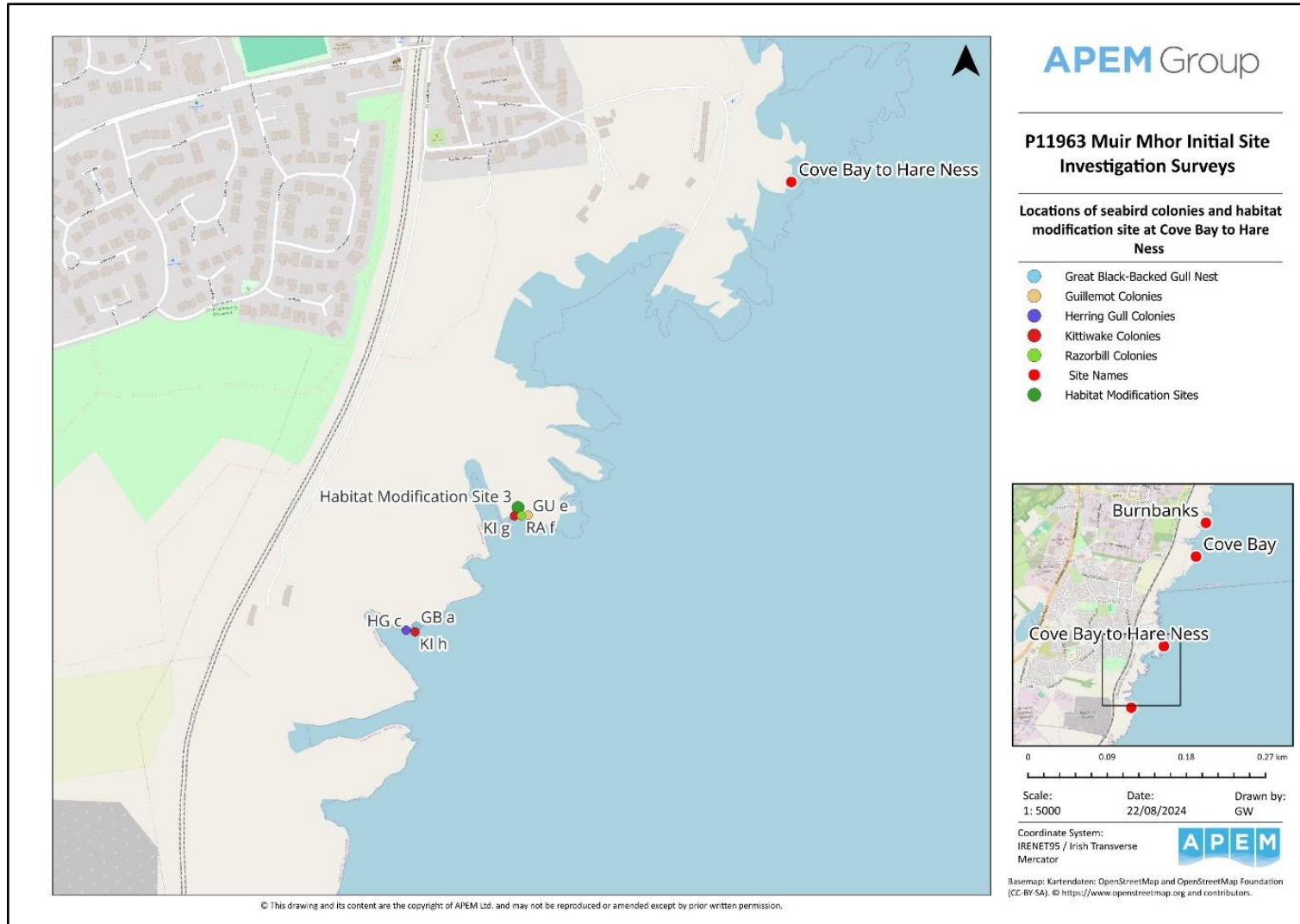


Figure 3-12: Locations of seabird colonies and habitat modification site three at Cove Bay to Hare Ness

3.1.3.1 *Habitat Condition and Adjacent Land Use*

With the exception of the two inlets supporting target species colonies, the majority of the Cove Bay to Hare Ness coastline is unsuitable breeding habitat for the target species as cliffs are predominantly characterised by a low gradient and are covered with vegetation.

Within the inlet directly south of Cove Bay Harbour, a third location for potential habitat modification was identified (**Figure 3-12**). This inlet features areas of habitat occupied by kittiwakes in the midsection of the cliff face, with suitable ledges further down occupied by guillemots and razorbills. However, among the suitable habitat are sections of the cliff covered in vegetation and sediment (**Figure 3-13**; **Figure 3-14**). The removal of sediment and vegetation from the cliff face or the installation of an ANS at this site could increase the breeding habitat available to the target species.

The surrounding landscape primarily consists of grasslands, pastoral fields, and residential areas. No visible impacts from these land uses were detected. At the southern end of this coastline section lies the Blackhills Quarry, which is operational, with industrial activities occurring.

3.1.3.2 *Anthropogenic disturbance*

No anthropogenic disturbance events were recorded during the survey, however, several features in the surrounding landscape were detected that can cause disturbance. The industrial activities occurring at the Blackhills Quarry will cause noise pollution across the surrounding landscape. However, the habitat adjacent to this quarry is not suitable for breeding target species and none were observed using this area (**Figure 3-15**).

A small artisanal fishing fleet is based in Cove Bay Harbour, although this unlikely to affect breeding seabirds. Recreational water sports, such as sea kayaking and paddleboarding, also occur from the Harbour. Heatmap data from Strava indicates that people explore the coastline south of the harbour, coming into proximity to the locations where breeding seabirds were recorded (Strava, 2024). The presence of people close to seabird colonies will disrupt and cause stress to breeding seabirds.

An anchor point attached to a large boulder above **kittiwake colony h** was observed (**Figure 3-16**; **Figure 3-17**). It is possible that this anchor point is used for recreational abseiling and climbing, although it is difficult to discern for certain. However, if people are abseiling down this section of the cliff face, it could be highly disruptive to the nesting kittiwake below, potentially flushing them and leaving their nests vulnerable to predation (Holzschuh, 2016; Huddart and Stott, 2019).

3.1.3.3 *Predation*

Evidence of predation was not recorded at this site during the survey. However, herring gull and great black-backed gull were observed at this site. Both species of gulls are known to predate on kittiwake and auk nests (Massaro *et al.*, 2001; Veitch *et al.*, 2016, Nisbet *et al.*, 2020).



Figure 3-13: Habitat Modification Site three. Vegetated cliff face is pictured centrally, above areas with breeding species.



Figure 3-14: A closer perspective of Figure 16. Vegetated cliff ledges pictured above breeding kittiwake and guillemot.



Figure 3-15: Vegetated cliffs surrounding the Blackhills Quarry. Habitat unsuitable for breeding target species.



Figure 3-16: Anchor point attached to a boulder at the top of the cliff face. Possibility used for recreational abseiling.



Figure 3-17: Cliff face below the anchor point shown in Figure 19, with kittiwake colony h positioned directly beneath the anchor point.

3.1.4 Hare Ness to Seal's cove

Hare Ness to Seal's Cove is a 1.2 km stretch of coastline situated between the Blackhills and Findon quarries. In the most recent colony count in 2017, 812 Kittiwake AONs, 628 guillemot, 254 razorbill, and three puffin were recorded at this site (BTO, 2024f). However, in this survey, target species were observed at only one location along the Hare Ness to Seal's Cove coastline, specifically on the north-facing cliff of the coastal inlet north of Findon Quarry (**Figure 3-18**). At this location, 55 kittiwake AONs (**kittiwake colony j**), 34 guillemots (guillemot colony f), and 15 razorbills (**razorbill colony g**) were recorded, with no puffins observed. This survey indicates a large decrease in the number of target seabird species since 2017. The survey taking place early-to-mid July, however, may have an impact on recorded numbers.

3.1.4.1 Habitat Condition and Adjacent Land Use

The inlet where target species were observed (**Figure 3-18; Figure 3-19**) also contains large areas of vegetated cliff face (**Figure 3-20**). Therefore, habitat modification through removing vegetation or constructing an ANS could be implemented as a measure to create additional breeding habitat.

Apart from the inlet where target species were recorded, the remaining section of coastline is of mixed suitability as breeding habitat for target species. Certain sections of the coastline were more akin to rocky shore than cliff face, with a gentle gradient. Other sections of the cliff face were heavily vegetated, covered in grasses. However, there were also sections of unused suitable habitat. Pictured in **Figure 3-21** is the coastline within the northern section of this site. The coastline here is characterised by steep cliffs, which are devoid of vegetation and contain a multitude of rocky ledges. Nevertheless, no target species were observed here, nor were there any guano stains, which would have indicated that the site had been used in previous years.

Hare Ness to Seal's Cove stretch of coastline is bookmarked by two fully operational quarries. During the survey industrial machinery and heavy goods vehicles were observed, producing loud noises and vibrations. No pressures were detected from the surrounding land, which is low-intensity farmland, where grazing sheep (*Ovis aries*) were observed, along with bracken-dominated hills interspersed with areas of heath and grassland.

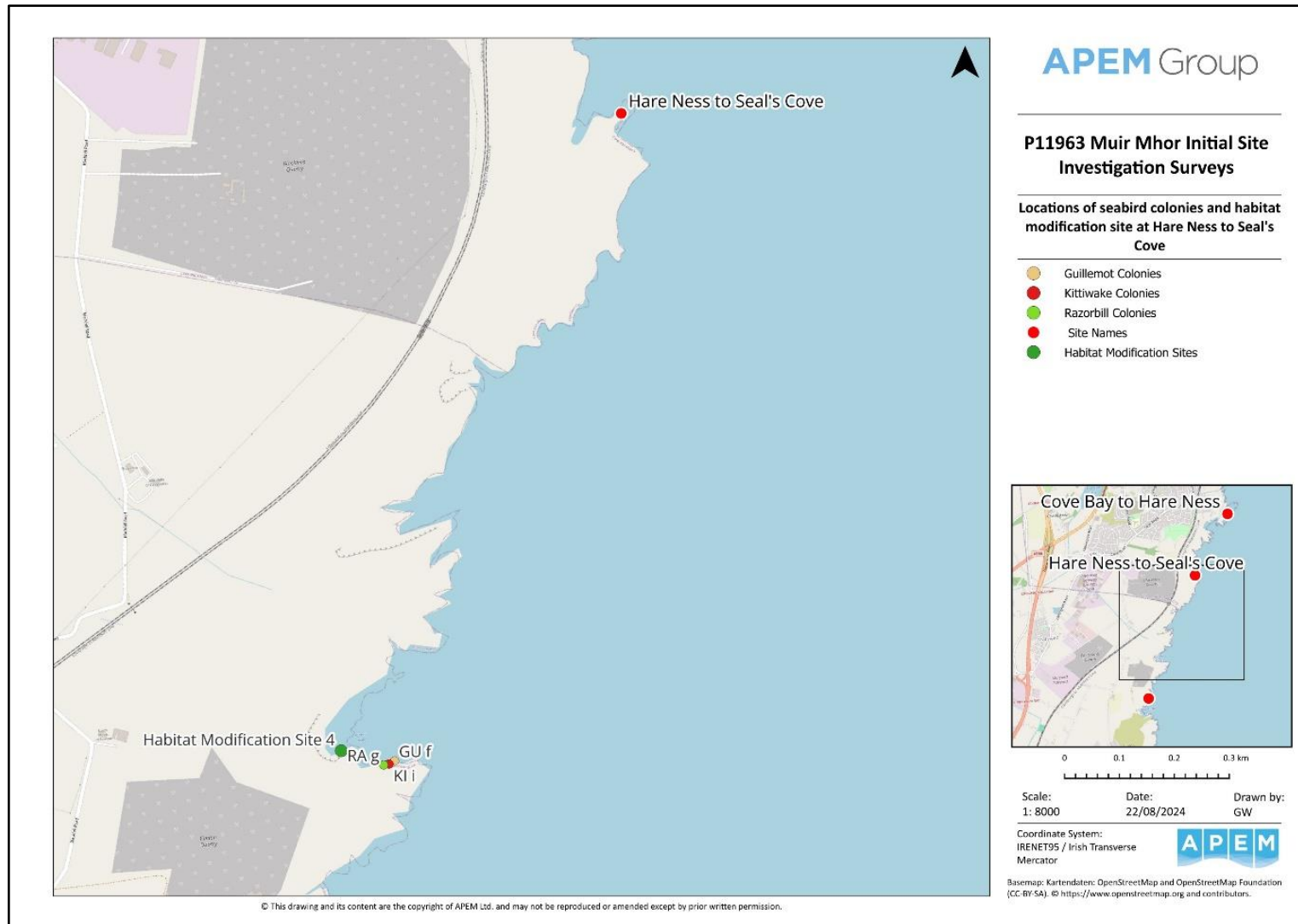


Figure 3-18: Locations of seabird colonies and habitat modification site four at Hare Ness to Seal's Cove.

3.1.4.2 Anthropogenic disturbance

Industrial activities from both operational quarries located along this stretch of coastline were recorded emitting noise pollution into the surrounding landscape. Although, no observations of noise population impacting the target species was observed.

No additional disturbances were recorded, nor were there any other obvious signs of anthropogenic disturbance in the area, as no residential areas or trails were present along this section of the coastline.

3.1.4.3 Predation

No predation events were recorded at this site during the survey; however, a great black-backed gull and multiple herring gulls were observed flying along the coast. Both species of gulls are known to predate on kittiwake and auk nests (Massaro *et al.*, 2001; Veitch *et al.*, 2016, Nisbet *et al.*, 2020). Additionally, a common raven (*Corvus corax*) was heard calling near Findon Quarry.



Figure 3-19: Location of target species observed along Hare Ness to Seal's Cove.



Figure 3-20: Habitat modification site four. Vegetated cliff face is pictured centrally, above areas with breeding species.



Figure 3-21: Suitable breeding habitat for kittiwake, guillemot, and razorbill. Steep rocky cliffs, with plenty of ledges and devoid of vegetation.

3.1.5 Seal's cove to Findon Ness

Seal's Cove to Findon Ness is a short stretch of coastline, approximately 600 meters long, located east of Findon Quarry. It runs parallel to Seal's Cove Shooting Ground and ends at Findon Ness. In the latest colony count, conducted in 2017, 285 kittiwake AONs, 549 guillemots, 630 razorbills, and seven puffins were recorded (BTO, 2024f).

Within this survey, target species were recorded at three locations along this stretch of coastline. The locations of these colonies, along with two potential habitat modification sites, are shown in **Figure 3-25**, and the number of birds within each colony is summarised in **Table 3**. In total, 76 kittiwake AONs, 82 guillemots, 41 razorbills, and one puffin were recorded. These survey results indicate considerable declines in kittiwake, guillemot, and razorbill numbers compared to the 2017 colony counts.

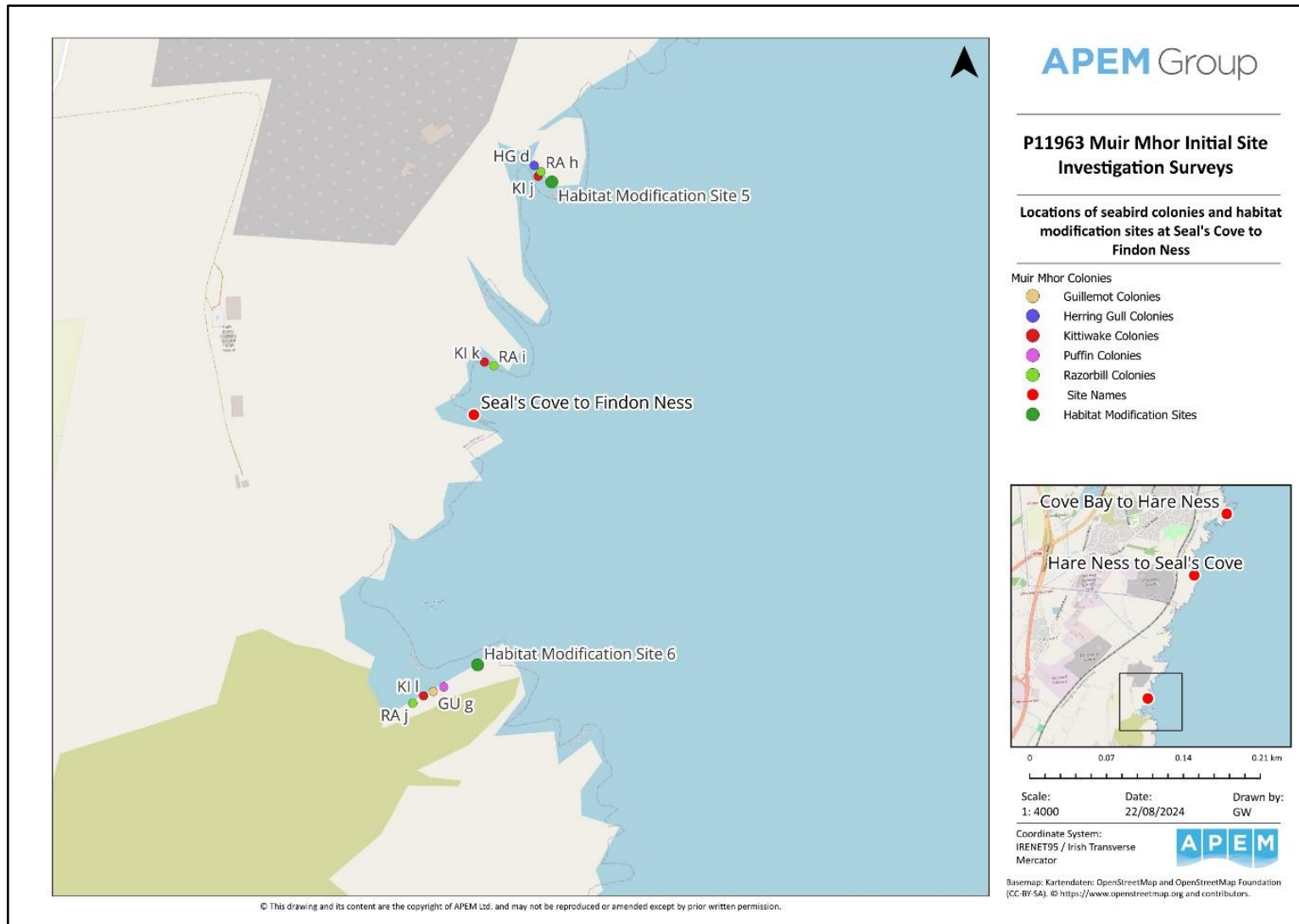


Figure 3-22: Locations of seabird colonies and habitat modification sites five and six at Seal’s Cove to Findon Ness.

Table 3: Seabird colonies observed along the Seal’s Cove to Findon Ness stretch of coastline.

| Colony Code | Count | Notes |
|--------------------|--------|---|
| Kittiwake colony j | 23 AON | Likely undercount due to limited vantage point. |
| Kittiwake colony k | 30 AON | |
| Kittiwake colony l | 23 AON | Sea mist affecting visibility. |
| Guillemot colony g | 82 | Sea mist affecting visibility, no chicks observed. |
| Razorbill colony h | 5 | Likely undercount due to limited vantage point. |
| Razorbill colony i | 6 | No chicks observed, additional RA rafting in water. |
| Razorbill colony j | 30 | No chicks observed. |
| Puffin colony a | 1 | Sea mist affecting visibility. Eight PU rafting in the water. |

The accuracy of colony counts at this site was limited by sea mist, which reduced visibility at **guillemot colony g**, and by restricted views of the seaward-facing cliffs along this section of coastline. However, these limitations alone are unlikely to solely account for the discrepancy between the findings of this survey and the 2017 colony counts.

A herring gull roost consisting of eleven adults was also recorded (**herring gull colony d**) at Seal’s Cove to Findon Ness.

3.1.5.1 Habitat Condition and Adjacent Land Use.

This site is positioned parallel to the active Findon Quarry in the North, which is approximately 50 m from the coastline at points, and the Seal’s Cove Shooting Range in the South. Both land uses are likely to cause disturbance to cliff nesting seabirds, which is further discussed in section 3.1.5.2 Anthropogenic Disturbance.

Off the stretch of observable coastline that comprises Seal’s Cove to Findon Ness, much of the cliff face is steep and rocky, providing suitable habitat for kittiwake, guillemot, and razorbill (**Figure 3-23**). Of particular note is the large north-facing cliff face directly south of the shooting range, which provides a large amount of suitable breeding habitat (**Figure 3-24**). **Guillemot colony g**, the largest congregation of guillemot recorded within this survey, was recorded at this location. Furthermore, the owner of the shooting range provided anecdotal information, noting that the puffin colony at the top of this inlet has declined over the last decade.

Two separate sites where habitat modification could occur were identified along this stretch of coastline (**Figure 3-25**). Habitat modification site five is located on the northern section of the coastline, as shown in **Figure 3-23**. In addition to areas occupied by breeding kittiwakes, guillemots, and razorbills, there are sections of unused vegetated cliff face. Similarly, habitat modification site six, situated on the same section of cliff that supports **guillemot colony g** (**Figure 3-24**), contains unused habitat adjacent to areas occupied by target breeding species.

Consequently, both sites appear to have the potential for habitat modification to increase available breeding habitat.

3.1.5.2 Anthropogenic Disturbance

Noise pollution was observed from industrial activities from the Findon Ness quarry during the survey. However, no observations of noise pollution impacting the target species were recorded.

The Seal's Cove Shooting Ground is also located within this section of the coast, with target species colonies situated to the east and south. The shooting range is configured so that a clay pigeon thrower dispenses targets seaward from above the cliff (**Figure 3-25**). As a result, projectiles and noise pollution are emitted in close proximity to the colonies and birds flying by. Furthermore, a review of online footage appears to show seabirds being disturbed by shooting activity occurring at the ground.

There are no public pathways or residential areas along this section of coast.

3.1.5.3 Predation

No predation events were recorded at this site during the survey; however, a herring gull roost was observed. Herring gulls are known to predate on kittiwake and auk nests (Massaro *et al.*, 2001 Nisbet *et al.*, 2020).



Figure 3-23: Coastline within the northern section of Seal's Cove to Findon Ness, location of habitat modification site five. Kittiwake colony pictured centrally, left of the cave. Habitat consists of steep cliff and rocky shore. Findon Quarry pictured in the top left of the photo.



Figure 3-24: Large north facing cliff face containing guillemot colony g, predominately located on the left and the location of habitat modification site six. Patches of bare rock and vegetated areas on cliff face. Visibility obscured due to sea mist.



Figure 3-25: Clay pigeon trap positions to dispense targets seaward. Pictured in the background is a large cliff where kittiwake, guillemot, and razorbill were recorded.

3.1.6 Findon Ness

Findon Ness is a semi-circular landmass that extends eastward into the North Sea, with a coastline approximately 1.2 km long. The most recent colony count in 2017 recorded 80 kittiwake AONs and 45 razorbill at this site (BTO, 2024f). According to the SMP database, there are no records of breeding guillemot at this location. The latest colony count for puffin, from 2015, noted two individuals.

In the current survey, target species were observed at two locations along Findon Ness. The first is a small inlet connected to a seaward-facing cliff, where eight razorbills were observed (**razorbill colony k**). However, there was no vantage point to view the seaward-facing cliffs connected to this colony. From above this cliff, there was a high level of guillemot and razorbill activity, but it was not possible to estimate the number of birds using this cliff face.

Directly south, there is a large, narrow inlet with suitable breeding habitat for seabirds. Within this inlet, 21 kittiwake AONs (**kittiwake colony m**), 57 adult guillemot (**guillemot colony h**) along with nine chicks, 34 razorbills (**razorbill colony l**), and five puffins (**puffin colony b**) were recorded. A small roost of three herring gulls was also recorded at Findon Ness (**herring gull colony h**). The locations of all seabird colonies within Findon Ness, along with a potential habitat modification site, are presented in **Figure 3-26**.

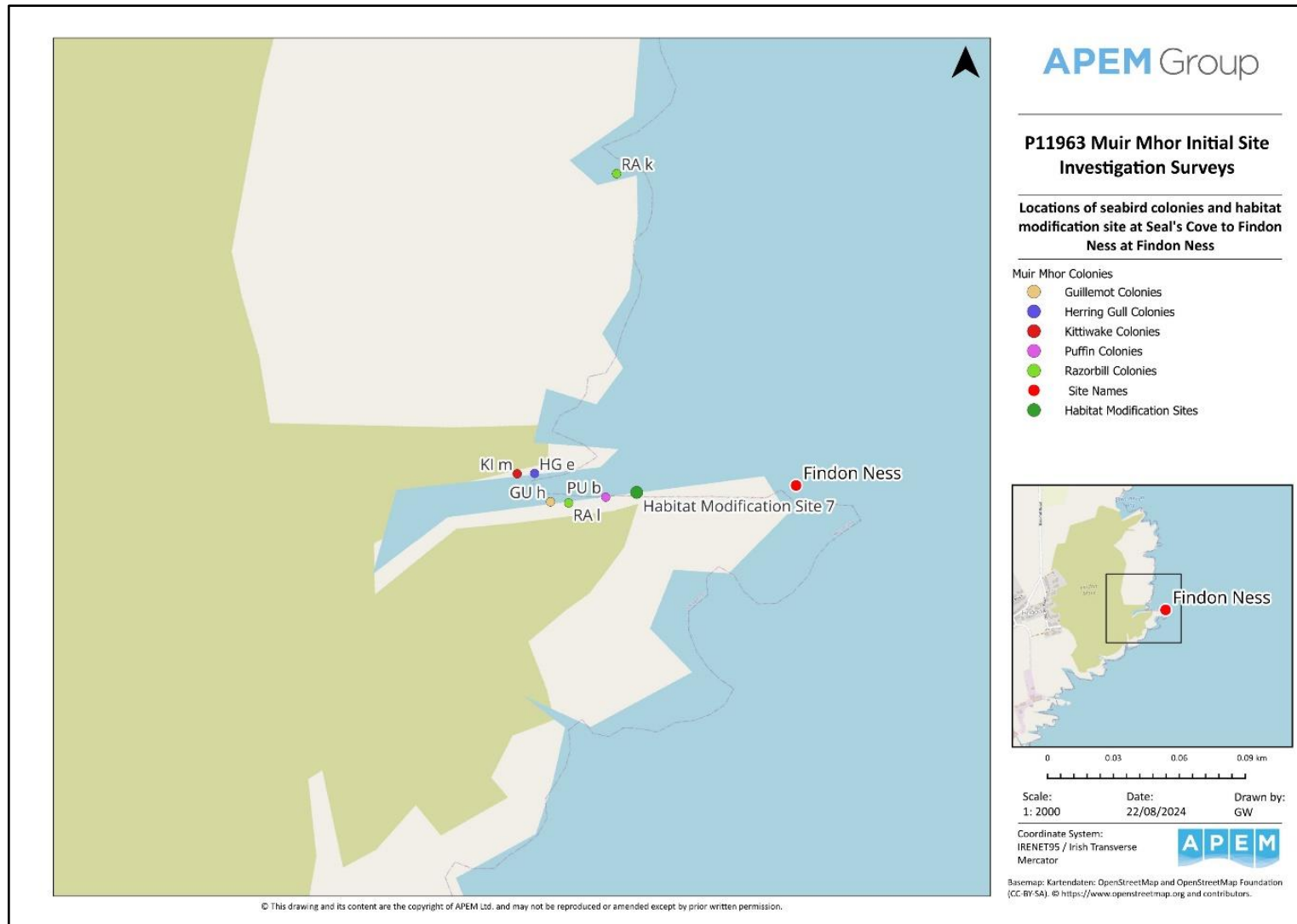


Figure 3-26: Locations of seabird colonies and habitat modification site seven at Hare Ness to Seal’s Cove.

3.1.6.1 *Habitat Condition and Adjacent Land Use.*

The coastline surrounding Findon Ness offers mixed suitability as breeding habitat for the target species in the study. Certain sections of the coastline were low gradient, with cliffs gently sloping towards the sea. Other sections, particularly the inlets, were steeper and generally devoid of vegetation. Mapped in **Figure 3-26** is another site identified as a potential location for habitat modification. At this site, sections of steep cliff adjacent to occupied breeding habitat lack suitable ledges for target species (**Figure 3-27**). Installing artificial ledges at this site would increase the available breeding habitat available.

Much of this coastline was seaward-facing, which limited the ability to assess habitat conditions and observe the presence of breeding seabirds. Additionally, soft, vegetated soil was present at the top of some cliff edges, providing suitable nesting sites for puffins; however, these areas would be accessible to mammalian predators.

The adjacent land is primarily within the Findon Moor SSSI, which consists of herb-rich coastal grassland and coastal heathland. Two small streams were present on Findon Moor, flowing down towards the inlet where **kittiwake colony m** is located. It was not possible to observe the streams directly reaching the cliff face, as the water seeped below the surface into the soil. However, a patch of wet cliff on the northern-facing side of the inlet was observed (**Figure 3-28**). Given the locations of the streams, it seems likely that the water seeping onto the cliff face originates from them. Nonetheless, only a small section of the cliff face was wet and considering that the site is designated as an SSSI based on its floral community, it seems unlikely that any modifications to the drainage above the cliff face could be made.

3.1.6.2 *Anthropogenic disturbance*

No disturbance events were observed during the survey. There are various trails along Findon Ness that allow for good observation of breeding seabirds. The location is likely popular with local walkers but is unlikely to have high foot traffic.

A climbing rope with a carabiner, was found connected to and stashed under a boulder (**Figure 3-29**). The rope was found directly over the cliff where **razorbill colony k** was observed. It seems likely that this rope is used to abseiling down the adjacent cliff face. This event would be highly disruptive to cliff nesting birds below, potentially flushing and leaving their nests vulnerable to predation.

3.1.6.3 *Predation*

No direct predation events were observed during the survey at this site. However, evidence of recent predation was discovered. Above the inlet supporting the kittiwake colony m, the remains of a puffin carcass, a guillemot egg, and possibly three kittiwake eggs were discovered within the same 10 square meter area (**Figure 3-30**; **Figure 3-31**; **Figure 3-32**). Based on the prey remains, mammalian predators, corvids, or gulls could all be responsible for these predation events. Potential mammalian predators include rodents (*Rodentia*), badgers (*Meles meles*), and foxes (*Vulpes vulpes*), all of which are likely present in the wider area. Herring gulls and great black-backed gulls were also frequently observed flying along the coast and

roosting at other sections further north and south of Findon Ness. Both species of gulls are known to predate on kittiwake and auk nests (Massaro *et al.*, 2001; Veitch *et al.*, 2016, Nisbet *et al.*, 2020).



Figure 3-27: Habitat modification site seven along with suitable breeding habitat utilised by kittiwake, guillemot, and razorbill.

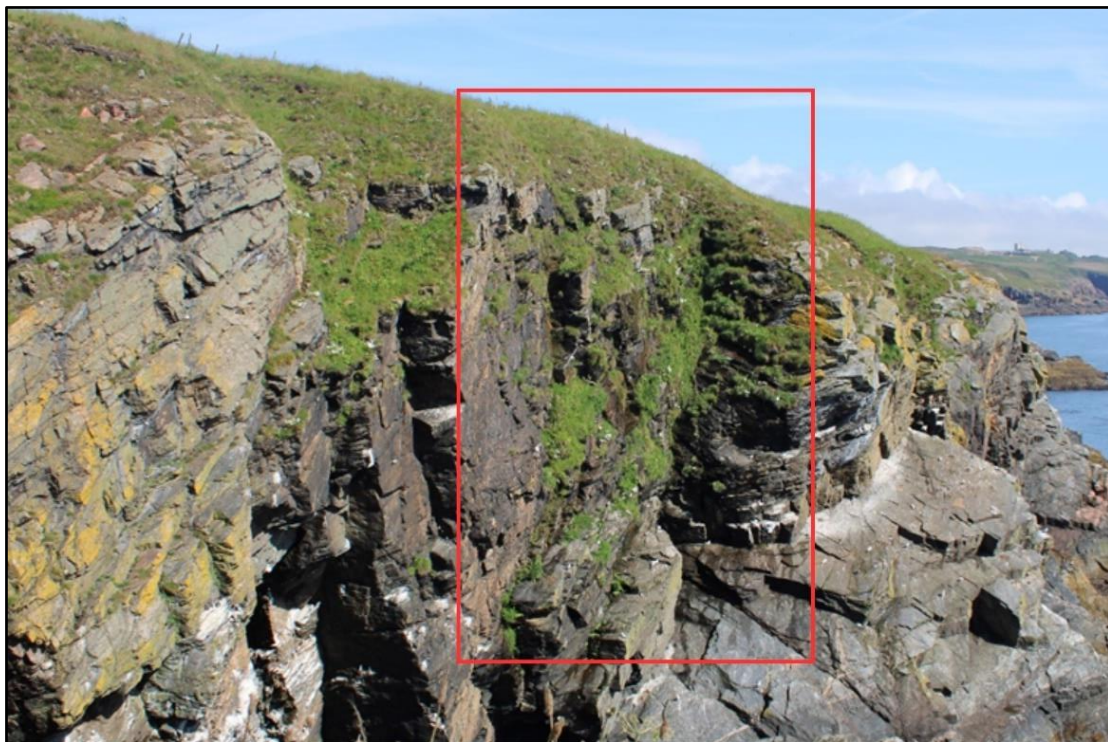


Figure 3-28: Section of wet vegetated cliff recorded at Findon Ness, pictured within the red box, situated right of breeding kittiwake.



Figure 3-29: Climbing rope attached to and stashed under a boulder, directly adjacent to kittiwake colony k.



Figure 3-30: Puffin carcass remains found at Findon Ness above puffin colony b.



Figure 3-31: Predated guillemot egg found at Findon Ness.



Figure 3-32: Predated kittiwake eggs found at Findon Ness. Seemingly the remains of three different eggs.

3.1.7 *Black Slough to Burn of Daff*

Within this survey, the coastline between Findon Ness and the small village of Portlethen, approximately 1.3 km long, was prospected. However, the section of coastline south of Portlethen Village to the stream of Burn of Daff was not surveyed. Therefore, the comparability of our survey results to the SMP database is limited.

The most recent colony counts from the SMP database, from 2017, recorded 303 kittiwake AONs, 12 guillemot, 40 razorbill, and two puffin (BTO, 2024f). No target species were recorded within the section of coastline surveyed within this study. This is likely due to the above-mentioned discrepancies in the areas surveyed between in SMP database and the site these initial site investigation visits. Further surveys south of Portlethen would be required to gain a current understanding of the number of target species present.

Two herring gull colonies were observed (**Figure 3-33**). The first, **herring gull colony f**, was located south of Findon Ness along the rocky shore, where 48 adults, five nests, and eight juveniles were observed. Additionally, a single nesting great black-backed gull, with one chick, was recorded at this site. **Herring gull colony g** was observed further south, on a small rocky islet called May Craig (**Figure 3-34**). Here, 142 adult, 23 chicks, and 15 nests were recorded. Additionally, on May Craig, twelve nesting shag were present, with 28 chicks observed.

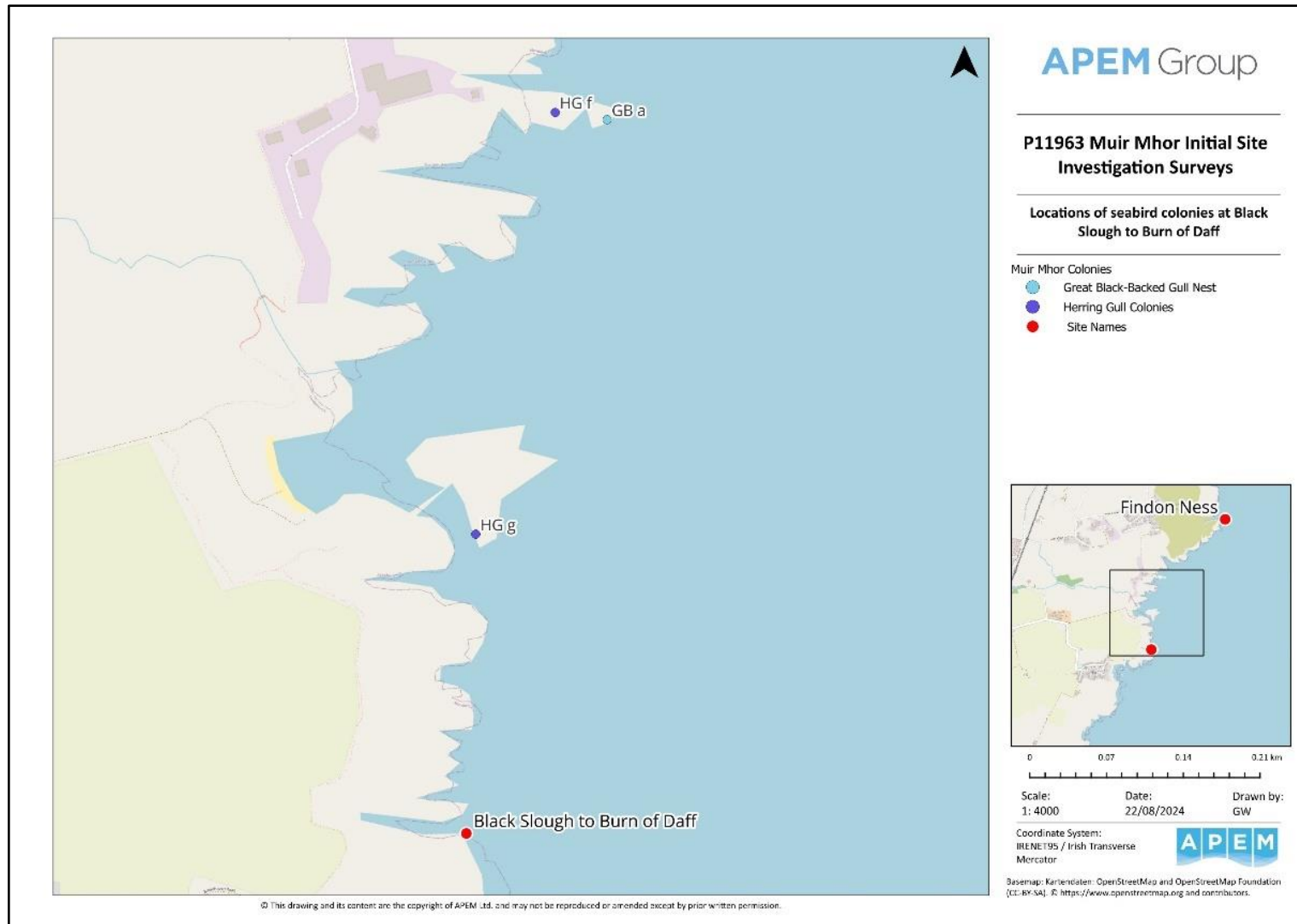


Figure 3-33: Locations of seabird colonies at Black Slough to Burn of Daff.

3.1.7.1 *Habitat Condition and Adjacent Land Use.*

This stretch of coastline surveyed did not provide suitable habitat for the target species discussed in this report. The majority of the coastline consists of rocky shore with a moderate gradient, making it easily accessible to mammalian predators (**Figure 3-35**). The surrounding landscape is a mixture of agricultural land and grassland, with the Portlethen Village located directly south. No land use pressures were detected during this survey.

3.1.7.2 *Anthropogenic disturbance*

No disturbance events were observed during the survey. There is a coastal footpath running parallel and in close proximity to the coastline, although no target species were located here. The location is likely popular with local walkers but is unlikely to have high foot traffic.

Portlethen Harbour hosts a small artisanal fishery, similarly to Cove Bay Harbour (**Figure 3-36**). This site may also be used for recreational water sports; however, there was no evidence of these activities recorded on Strava (Strava, 2024).

3.1.7.3 *Predation*

Evidence of predation was not recorded at this site during the survey. However, two herring gull colonies and a nesting great black-backed gull were observed. The herring gull colonies were the largest recorded during this survey, consisting of 48 and 142 adults, respectively. Both species of gulls are known to predate on kittiwake and auk nests (Massaro *et al.*, 2001; Veitch *et al.*, 2016; Nisbet *et al.*, 2020).



Figure 3-34: May Craig, a small islet located along the Black Slough to Burn of Daff section of coastline. Islet supporting breeding herring gull and shag.



Figure 3-35: Rocky shore along the northern section of Black Slough to Burn of Daff. Unsuitable breeding habitat for target species.



Figure 3-36: Portlethen Harbour, containing a small artisanal and recreational fishing fleet.

3.2 Cromarty Sites

3.2.1 North Sutor

The latest colony counts in 2023 at North Sutor recorded 452 kittiwake AONs, 890 guillemot, and 120 razorbill (BTO, 2024f). Comparisons with earlier counts indicate that all three species have declined from historic peaks at the site. During this survey, very limited views of breeding birds were obtained; consequently, only 41 Kittiwake AONs and a single auk, which was too far away to identify, were observed at North Sutor. To accurately assess the presence of seabirds at North Sutor, the site would need to be surveyed by boat, as was done for the SMP count data. A small Sandwich tern roost was observed on a beach below North Sutor, which comprised of 24 individuals.

3.2.1.1 Habitat Condition and Adjacent Land Use.

The south-facing cliffs were primarily steep and vegetated, with intermittent sections of bare rocky cliff. As the coastline extends northeast out of the Firth, the cliffs become steeper and generally lack vegetation. Observing the habitat condition at North Sutor from land proved challenging; the best views were from South Sutor, located over 1 km away. This distance limits the inferences that can be drawn about the habitat condition at North Sutor. However, large areas of guano-stained cliff were visible, indicating regions that are or were used by breeding seabirds. Most of the guano-stained areas are located on the northeast coastline (**Figure 3-37**), though two smaller patches can be seen on the south-facing cliffs (**Figure 3-38**). As with surveying the seabirds present at this site, boat surveys would be required to assess the habitat condition in more detail.

The surrounding landscape is predominantly agricultural, with a mixture of arable and pastoral land use, as well as two small coniferous plantations. Castlecraig Quarry is situated at the top of North Sutor, although it is 300 meters away from the cliff edge. The Port of Nigg is located to the west of North Sutor, over 1 km away.

3.2.1.1 Anthropogenic disturbance

The Cromarty Firth is an important site for an array of industries, including energy sectors, aquaculture, and tourism. The ports of Cromarty and Nigg provide facilities to service these industries, consequently vessels pass into the firth to access these ports. A marker buoy placed in the middle of the channel at the mouth of the firth is used to mark the deepest point of the channel and instructs large vessels to pass north of the buoy, bringing them close toward North Sutor (**Figure 3-39**).

High vessel traffic is likely to emit noise and light pollution into the surrounding area. No large vessels were observed passing into the firth during these survey visits, and the level of disruption caused to breeding birds is uncertain without further observations. However, it does seem reasonable to assume that the heavy shipping activity will cause disruption at some level.

Another potential source of disturbance observed during the visit was wildlife tourism boats; two were noted during the survey, one of which was in close proximity to the seabirds at North Sutor (**Figure 3-40**). Due to the distance from which this observation was made, it was not possible to determine if the boat caused any disturbance. Further online research indicates that multiple wildlife tour operators are based in the area, making such activity likely a regular occurrence during the spring and summer.

Disturbance from land-based activities appears to be limited at North Sutor. Footpaths and roads are setback from the cliff edge and fencing preventing closer access to breeding birds.

3.2.1.2 Predation

No predation events were recorded during the survey visit at North Sutor. However, two great black-backed gulls and multiple herring gulls were observed flying along the coastline. Both species are known nest predators of kittiwakes and auks (Massaro *et al.*, 2001; Veitch *et al.*, 2016; Nisbet *et al.*, 2020).

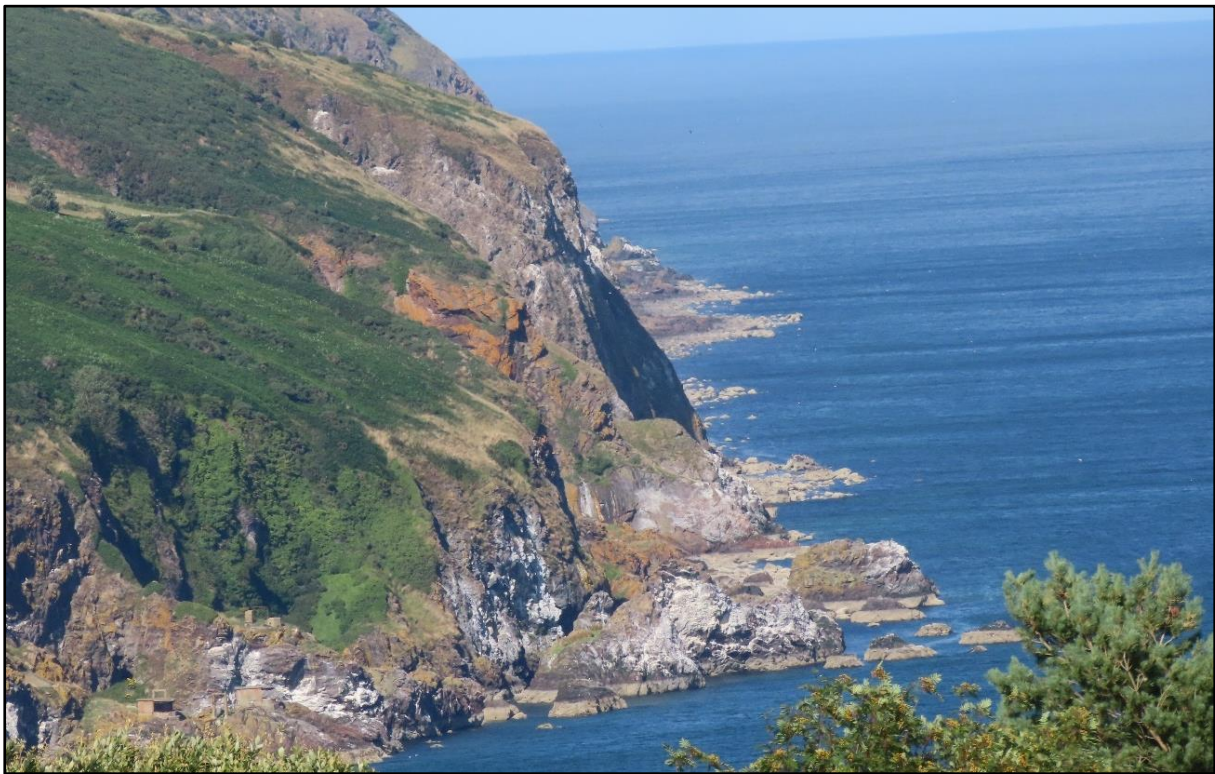


Figure 3-37: Northeast facing coastline at North Sutor; the main area of guano-stained cliff observed at the site.

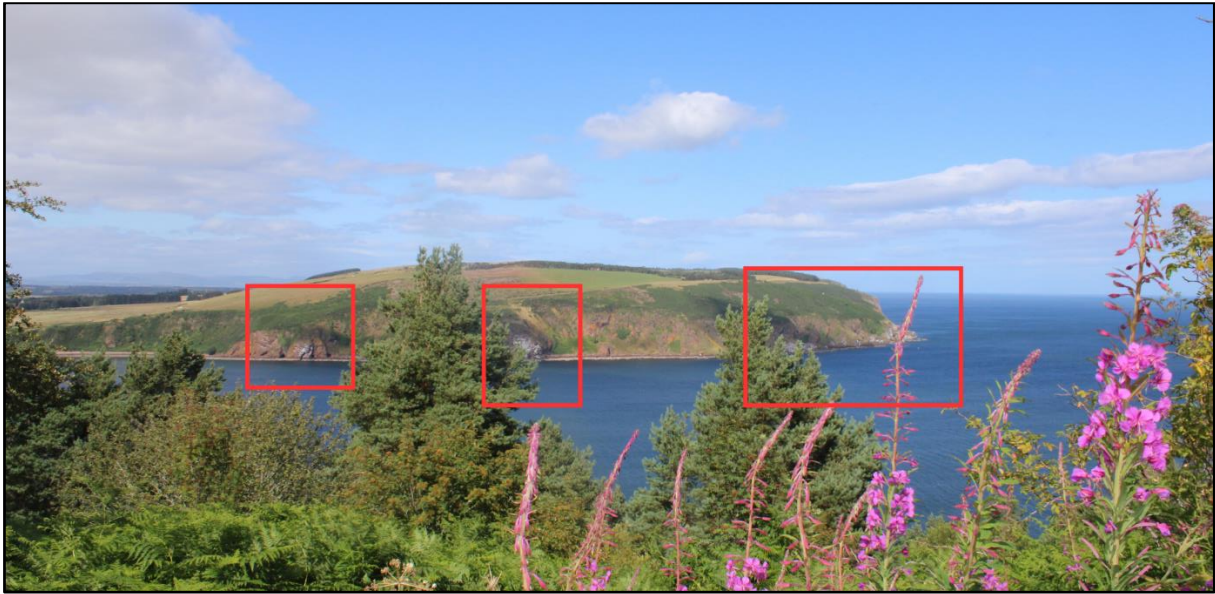


Figure 3-38: View of North Sutor from South Sutor. Red boxes highlight areas of guano-stained cliff.

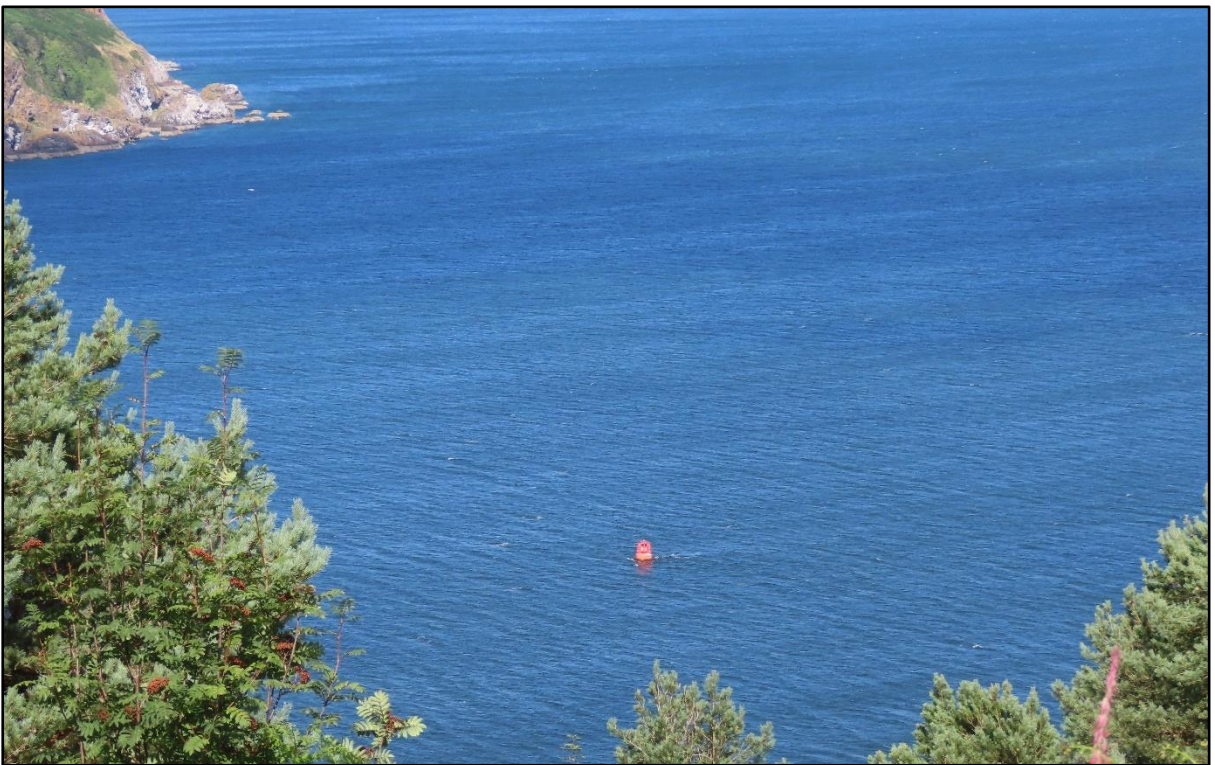


Figure 3-39: A marker buoy in the middle of the entrance to the Cromarty Firth, instructing large vessels to pass north, towards North Sutor.



Figure 3-40: Wildlife tour boat in close proximity to cliff. It was later seen heading towards the guano-stained cliff containing breeding birds.

3.2.2 *South Sutor*

No target species were observed at South Sutor. This in accordance with the most recent SMP count data available, whereby the previous existing kittiwake colony was recorded as extinct (BTO, 2024f). However, observations of the most suitable areas for breeding birds would only be possible via boat surveys.

3.2.2.1 *Habitat Condition and Adjacent Land Use.*

Most of South Sutor is covered by mature woodland, with large parts of the headland densely vegetated (**Figure 3-41**). However, there are also small sections of steep cliff face on the southeastern side of the headland, though only limited views of this area were possible (**Figure 3-42**). To fully assess the habitat condition on these cliff faces, boat-based surveys would be necessary.

Beyond the mature woodland, the remaining parts of the headland consist of pastoral fields and herb-rich coastal grasslands. Consequently, the adjacent land use does not appear to exert any substantial pressures on the site.

3.2.2.2 *Anthropogenic disturbance*

No anthropogenic disturbances were recorded during the survey. It is likely that noise and light pollution affect this site, similar to North Sutor, although to a lesser extent due to vessel traffic being farther away.

All roads and footpaths at South Sutor are set back from the cliff edge, and there is no access to the section of North Sutor that appears most suitable for seabirds. Consequently, disturbance from land-based activities is likely minimal.

3.2.2.1 Predation

As no target species were recorded at South Sutor, it is difficult to make any inferences regarding predation pressures at the site. However, herring gulls were observed both loafing and flying within the general area.



Figure 3-41: South Sutor, as viewed from North Sutor.



Figure 3-42: Observable southeastern steep cliffs of South Sutor.

4. Limitations

There were limitations in the data collected during the site visits. First, the visits were conducted as brief snapshots, with sites generally only observed for one to three hours. This short duration reduced the likelihood of observing disturbance and predation events. Second, the surveys took place on weekdays, rather than during peak times such as weekends and bank holidays, when human activity is typically higher. This further reduced the chances of observing disturbance events. Moreover, heavy rainfall on 10 July, during surveys at Burnbanks and Cove Bay, further impacted the chances of detecting or witnessing any human activity, which could be a source of disturbance. Third, several sections of seaward-facing coastline were difficult to observe, limiting the surveyors' ability to assess habitat conditions, seabird presence, and potential pressures in these areas. This was particularly limiting at the Cromarty Firth sites. Addressing this limitation would require boat surveys. Finally, while the Aberdeen to Stonehaven sites visits were within the optimal time frame to observe breeding seabirds, the Cromarty Firth sites were visited at the end of the auk breeding season.

Another point to note is the uncertainty regarding the locations of the SMP counts. The sites selected for this investigation were derived from the SMP online database, which provides point locations that may refer to either a specific spot or a general stretch of coastline. As a result, there is some uncertainty about the exact locations surveyed in the SMP counts. Additionally, the most recent SMP counts at the Aberdeen to Stonehaven Sites and the Cromarty sites were conducted via boat surveys (GoBe, 2024). Both of these factors diminish the inferences that can be made when comparing seabird counts between this survey and the SMP database.

Weather conditions were generally very good, with two exceptions:

- Localised sea mist obscured the view of breeding seabirds on the cliff south of Seal's Cove Shooting Ground on 9 July; 2024and
- Continuous, heavy rain on 10 July 2024 reduced the capacity of surveyors to make observations and record photographic evidence.

5. Discussion

5.1 Seabird Populations

5.1.1 Aberdeen to Stonehaven Sites

Target species were recorded at six out of seven survey sites; only at Black Slough to Burn of Daff were they absent. A full breakdown of all the identified colonies is presented in Appendix **Table 4**. Direct comparisons between our survey findings and the latest SMP database counts present a mixed picture, but generally suggest local population declines. Notably, at Burnbanks and Cove Bay, kittiwakes were recorded in higher numbers than in the most recent 2017 SMP counts. In contrast, at the four sites directly south, kittiwake numbers were lower. This trend was most pronounced at Cove Bay to Hare Ness and Hare Ness to Seal's Cove, where substantial decreases were observed. Additionally, auks were consistently recorded in lower numbers compared to the most recent SMP counts, with very few chicks recorded. Although there are early indications that 2024 has been a poor season for breeding for auks in Scotland (National Trust for Scotland, 2024).

While these comparisons offer limited inferences due to differences in survey methods and uncertainty about the exact locations of the SMP counts, the apparent declines coincide with recent HPAI (Highly Pathogenic Avian Influenza) outbreaks in 2022 and 2023. Ultimately, further in-depth monitoring, via boat surveys, is necessary to accurately assess seabird colony populations across this site and better understand population trends.

5.1.2 Cromarty Sites

The capacity to observe breeding seabirds at both Sutors was limited due to restricted vantage points. While much of North Sutor was not observable in detail from land, large areas of guano-stained cliffs were seen from South Sutor using a spotting scope. In contrast, no target species were observed at South Sutor, supporting recent SMP count data indicating that kittiwake colonies once present there are now extinct.

SMP count data for North Sutor indicate considerable population declines. Kittiwakes have faced a historical decline of approximately 45.3%, with their numbers dropping from a peak count of 827 AONs in 1997 to 452 AONs in 2023. However, recent data suggests that the kittiwake population is currently increasing at North Sutor. In contrast, both guillemots and razorbills have experienced recent declines between 2018 and 2023: the guillemot population decreased by 27%, from 1,220 to 890 individuals, and the razorbill population declined by 31%, from 174 to 120 individuals. The colonies at North Sutor have been severely impacted by HPAI in 2022 and likely in 2023 (GoBe, 2024). To fully assess seabird populations at the Sutors and further investigate pressures affecting seabird breeding success, boat-based surveys would be necessary.

5.2 Habitat Condition and Modification

5.2.1 Aberdeen to Stonehaven Sites

There is considerable variation in habitat condition across the seven sites surveyed between Aberdeen and Stonehaven. This variability is reflected in the distribution of breeding seabirds, with multiple smaller colonies scattered along the 7.5 km stretch of coastline surveyed. Colonies were typically found at locations with steep, rocky cliff faces that were free of vegetation, as well as on geological features such as rock stacks and coastal caves. In contrast, areas where cliffs were heavily vegetated or sloped lacked target species.

Seven areas were identified as potentially suitable for habitat modification to serve as compensation measures for cliff-nesting target species. These sites were selected as they contained a section of unused habitat, often of poor quality, adjacent to habitat that supports breeding target species. The presence of conspecifics is believed to increase the likelihood of new habitats being occupied due to social attraction (Royal HaskoningDHV, 2024).

Implementing habitat modification at these locations could occur via two separate routes. Firstly, where feasible, habitat quality could be improved through sediment and vegetation removal, creating additional suitable breeding space for target species. Secondly, the construction of ANS (such as in the form of artificial ledges, or 'hammocks'), at these sites would also create additional breeding space.

Constructing ANS appears to be the more feasible option. Habitat improvement presents uncertainties, as the quality of the cliff habitat beneath the sediment and vegetation is difficult to assess. In contrast, ANS construction offers a more controlled approach by providing specifically designed breeding spaces. Furthermore, the construction of ANS is a well-established compensation measure for kittiwakes, which readily adopt artificial structures. A variety of ANS designs for kittiwakes have been developed, ranging from large-scale offshore structures to smaller artificial ledges (Wrobel, 2021; Outer Dowsing, 2024). One example is the stainless-steel ledges created by the RSPB at Coquet Island (Wrobel, 2021); a design that could be applicable to the sites identified during these initial site visits. While evidence of guillemot and razorbill breeding on artificial structures is limited, it is growing (Outer Dowsing, 2024) and as such may also prove to be a viable compensation action for these species.

Broader observations from this survey do present areas of uncertainty as to the feasibility of habitat modification. Comparisons between SMP database counts and survey counts indicate target species are generally declining across this section of the coast. However, many of the kittiwake colonies observed were densely populated, suggesting that additional breeding habitat could be readily adopted.

Ultimately, the overall feasibility of habitat modification as a compensation measure at the seven identified locations remains uncertain. Further investigations are needed to assess colony productivity, habitat conditions, and any pressures affecting these sites in more detail

before advancing this measure. Additionally, external expertise is required to evaluate the technical aspects of constructing ANS or conducting habitat restoration at these locations.

Only two locations were observed where drainage was noted on the cliffs (**Figure 3-5; Figure 3-28**), and neither site presented a clear opportunity for intervention to improve breeding habitat as a compensation measure. Additionally, no significant areas of erosion were recorded, with the only relevant observation being two small landslides at Cove Bay (**Figure 3-4**). Further investigations at this location are needed to assess the impact of the landslides on nesting kittiwakes in the vicinity.

5.2.2 *Cromarty Sites*

Limited observations regarding the habitat condition at North Sutor could be made from land. Despite these limitations, the extensive guano-stained cliffs extending northeast from the firth and historical SMP count data suggest that this site once supported large numbers of target species. This indicates that significant portions of the habitat are likely still suitable for breeding. Given the recent population declines, it is plausible that there is a considerable amount of available breeding habitat. Therefore, if breeding habitat is not a constraint, compensation measures through habitat improvement are not viable at this site. Ultimately, further boat-based surveys are needed to reach more definitive conclusions.

Similarly, land-based observations at South Sutor offered minimal insight into habitat condition. The site is predominantly vegetated and the cliff face which was present was not easily observable. As with North Sutor, detailed assessment of habitat condition at South Sutor would require boat-based surveys.

5.3 Anthropogenic disturbance mitigation

5.3.1 *Aberdeen to Stonehaven Sites*

No disturbance events were recorded during our initial site investigations and various sections of this coastline are not readily accessible to the public; however, several features were observed that could possibly cause disturbances.

The Aberdeen Coastal Path runs adjacent to the cliff edge at Burnbanks and Cove Bay (often less than five meters away) and provides great vantage points overlooking colonies in this area. The coastal path is well maintained and likely experiences moderate footfall, particularly during favourable weather, as supported by Strava data (Strava, 2024). However, initial surveys make it difficult to quantify how much disturbance this footfall may cause. The colonies are typically located some distance from the path, often on the lower or middle sections of steep cliff faces, which suggests that colonies may be buffeted from disturbance caused from footfall. Ultimately, follow up surveys would be required to examine the impacts of disturbance here. There are also coastal paths at Black Slough to Burn of Daff and Findon Ness, although these are not in close proximity to the target species colonies.

Two locations were observed which suggest that climbing and abseiling activities occur on cliff sections containing target species. Although the frequency of these events is likely low, they have the potential to be highly disruptive, flushing birds from their nests and leaving them vulnerable to predation. Engaging with the climbing community in this area would be necessary to better understand the frequency and severity of this pressure. This engagement could also provide an opportunity to mitigate this pressure through an educational programme that raises awareness of the impact climbing near breeding seabirds can have. Although the impact of this measure is difficult to quantify, several examples highlight environmental education as an effective conservation tool (Ardoin *et al.*, 2019; Bergamo *et al.*, 2022). Moreover, some degree of quantification may be attainable through surveys and interviews.

The small harbours of Cove Bay Harbour and Portlethen Harbour provide easy access for recreational water sports in the area. Data obtained from the exercise social media platform Strava indicates that people engaging in sea kayaking and paddleboarding in the area tend to do so near the shoreline and, therefore, in close proximity to breeding birds. Tracking data suggests this may be particularly prevalent at between the Cove Bay and Hare Ness sites. Similar to potential climbing events, the frequency and severity of this pressure could not be assessed during this initial site investigation; further investigations are required to assess this pressure accurately. Gathering local anecdotal evidence from residents within these two areas could also help further understand the prevalence of recreational water sports in the area. An easily implementable mitigation measure to address this pressure would be installing educational signage at these two sites, warning the public of the sensitivity of breeding birds to human disturbance and advising them to stay far from seabirds. Such measures have proven successful to protect birds and other species (Medeiros *et al.*, 2007; Marschall *et al.*, 2017; Scane, 2020; Donnelly *et al.*, 2021).

Adjacent to the survey area, there are two operational quarries. During the site investigation visit, high levels of activity were observed at both sites, with heavy goods vehicles and industrial mining equipment in use, resulting in noticeable noise pollution. Breeding seabirds were not recorded near the Blackhills Quarry, likely due to the habitat condition, but multiple colonies were observed along the cliffs surrounding the Findon Quarry. Despite this, noise pollution did not appear to disturb the seabirds. This may suggest that birds in the area have become habituated to the industrial activities. However, while no physical responses were observed, this does not rule out the possibility of physiological disruption to the breeding birds. Studies have demonstrated that disturbances can cause internal stress responses in seabirds without noticeable behavioural changes (Ellenberg *et al.*, 2006; Ellenberg *et al.*, 2007). High levels of stress, even without overt behavioural responses, may lower productivity by increasing energy expenditure and reducing the time individuals spend on biologically important activities, such as foraging or caring for young (Iasiello & Colombelli-Négré, 2023). This, in turn, can decrease individual fitness and increase susceptibility to predation. Ultimately, further in-depth monitoring would be required to assess the disruption caused by the quarries and its impact on colony productivity. Although it seems unlikely that any feasible compensation measures could be implemented to mitigate disturbance from the quarries.

The final source of disruption recorded is the Seal's Cove Shooting Ground, located at the Seal's Cove to Findon Ness site. The shooting range is set up in a manner that directs shooting towards the sea and the cliff adjacent to the shooting ground. A review of footage found online indicates that shooting activity can disrupt birds both in the air and on the cliffs. Further observations are needed to assess the disruption caused by shooting activities and their effects on colony productivity. Any additional investigations and the development of compensation measures would require the cooperation of the shooting ground's owners. Whether they would be willing to cooperate and implement measures to reduce disturbance remains unknown.

5.3.1 Cromarty Site

No disturbance events were recorded during the initial site investigation visits to the two sites. However, due to commercial and industrial activities in the area, there is likely a high level of ongoing disturbance. Tourism and commercial vessels pass close to the cliffs of North Sutor, exposing the site to noise and light pollution. The impacts of these disturbances are not fully understood, but they are unlikely to be the primary cause of the population declines at North Sutor, though they may be contributing factors. Given the commercial importance of the industries within the Cromarty Firth and the narrow channel that directs vessels towards North Sutor, it seems unlikely that this disturbance can be effectively mitigated.

Access on via foot to cliff edges at both sites is limited. The footpaths present at North Sutor are setback from the cliff edge and there is fencing preventing closer access to breeding birds. There are no coastal footpaths at South Sutor. Consequently, disturbance due to footfall is not likely to be a pressure at these sites.

Finally, two small wildlife tourism boats were observed during the visit, with one in close proximity to the cliffs of North Sutor. Several wildlife companies operate in the Cromarty Firth, running regular daily trips during the breeding season. Consequently, small vessels are likely to frequently approach seabird colonies at North Sutor.

The initial site investigations do not provide sufficient information to determine the impact of this pressure. To assess potential effects, further information on the procedures followed by these tourism companies and additional observations are necessary. If wildlife tourism is found to negatively impact the birds at North Sutor due to disturbance, potential compensation measures could be implemented by engaging with these companies and introducing new procedures to reduce disturbance. However, even if this is identified as a pressure, its impacts are likely to be limited and not the primary driver of the considerable declines observed at this colony.

5.4 Predation impacts

5.4.1 Avian

Herring gulls and great black-backed gulls were present at both the Aberdeen to Stonehaven sites and the Cromarty sites. These large gull species are known predators of the target

species within this study. Additionally, corvids were frequently recorded in the surrounding landscape. The impact of these species on breeding seabirds across all sites is unknown, and further studies would be required to investigate this, potentially using camera traps to observe what prey species gulls are capturing. Nevertheless, due to wider population connectivity, localised avian predator control does not appear to be a feasible compensation measure at these sites.

5.4.2 *Mammalian*

No confirmed evidence of mammalian predators was recorded during these initial site visits. However, given the short survey timeframes and the nocturnal nature of most mammalian predators, it was unlikely that such evidence would be detected. It is extremely likely that rodents, badgers, and foxes are present in the wider area, all of which are capable of preying on nesting seabirds. The seabird colonies observed were almost exclusively located on steep cliff faces or other difficult-to-access geological features, making them less accessible to most mammalian predators. While the remains of a puffin along with kittiwake and guillemot eggs, were found at Findon Ness, it is unclear if avian or mammalian predators are responsible. Ultimately, the impact of mammalian predators on seabird colonies across the survey sites remains unknown, but initial visits do not suggest that this is a significant issue. Therefore, mammalian predator control measures do not seem viable compensation measure at these sites.

6. Conclusions and Recommendations

6.1.1 Aberdeen to Stonehaven Sites

Comparisons between the latest SMP count data and the initial site investigation visits indicate a general decline in target species across most sites from Aberdeen to Stonehaven. However, it is important to note that these initial investigations provide only a snapshot of the seabird population and do not offer a reliable estimate of breeding birds for the 2024 season. This limitation should be considered when comparing them to the latest SMP counts. Nevertheless, if population declines are indeed occurring, no obvious primary pressure driving these declines was identified. This suggests that broader environmental and anthropogenic factors, known to affect seabirds, may be contributing to the observed decline.

However, seven locations were identified where habitat modification could be implemented to create additional breeding habitat, predominantly for kittiwakes. While further investigations are required at each site, this measure could prove to be a valuable compensation strategy by creating significant amounts of suitable breeding habitat, potentially leading to colony expansions and increases in productivity.

Additionally, the initial site investigations identified several features and activities in the local area that could potentially disturb breeding seabirds: commercial quarrying, recreational climbing and abseiling, water sports, and an active shooting ground. Although, there is still considerable uncertainty regarding the impact of these pressures.

6.1.1.1 Recommendations

There is uncertainty regarding population trends and pressures at the Aberdeen to Stonehaven sites. However, these initial site investigations did identify potential sources of disturbance and areas where possible habitat modifications could be implemented, both offer potential avenues to develop compensation measures. Therefore, based on the initial survey findings, the following three actions are recommended to advance the development of compensation measures for this site:

- Productivity monitoring at the seven sites identified for habitat modification: Assess the productivity of seabird colonies to determine if they are sufficiently productive to justify modification to create more breeding habitat;
- In-depth disturbance monitoring: Conduct surveys during peak times to observe recreational climbing and water sports activities that may be affecting breeding birds. Complement this with further desk-based research to gain a better understanding of these activities in the area; and
- Communication with Seal's Cove Shooting Ground: Reach out to the shooting ground to explore the possibility of collaboration and to allow for disturbance and productivity monitoring.

6.1.2 *Cromarty Sites*

SMP data indicate significant declines at North Sutor; however, the initial site investigation was unable to identify any obvious pressures causing these declines. However, investigations were hindered by restricted views and limited access to these sites. Similarly to the sites from Aberdeen to Stonehaven, this suggests that broader environmental and anthropogenic pressures may be the primary drivers of the observed declines. Additionally, no seabird colonies were identified at South Sutor, and the site appears to offer minimal suitable habitat for breeding target species.

The survey did, however, highlight high levels of commercial and industrial activities in the Cromarty Firth. The North Sutor colonies are likely exposed to substantial noise and light pollution from these activities, although the precise impact remains unknown.

6.1.2.1 *Recommendations*

Although the reasons for the decline in target species remain unclear, conducting further in-depth site investigations at North and South Sutor to identify specific pressures could be highly rewarding. If localised pressures are identified, implementing targeted compensation measures could significantly enhance productivity, allowing large numbers of kittiwake, guillemot, and razorbill to be compensated for. Consequently, it is recommended that further site investigation work be carried out. For these investigations to be productive, they would need to be conducted via boat-based surveys.

7. References

Ardoin, N. M., Bowers, A. W., & Gaillard, E. (2019), 'Environmental education outcomes for conservation: A systematic review', *Biological Conservation*, 241: 108224.

Bennett, S., Wanless, S., Harris, M. P., Newell, M. A., Searle, K., Green, J. A., & Daunt, F. (2022), 'Site-dependent regulation of breeding success: Evidence for the buffer effect in the common guillemot, a colonially breeding seabird', *Journal of Animal Ecology*, 91(4): 752-765.

Bergamo, P., Rito, K., Viana, B., Garcia, E., Nic Lughadha, E., Maués, M., Rech, A., Silva, F. D. S., Varassin, I., Agostini, K., Marques, M., Maruyama, P., Ravena, N., Garibaldi, L., Knight, T., Oliveira, P., Oppata, A., Saraiva, A., Tambosi, L., & Wolowski, M. (2023), 'Pollination, Restoration and Biodiversity Conservation: A Framework for Policy and Practices', *SSRN Electronic Journal*.

Birkhead, T. R. (1977), 'The effect of habitat and density on breeding success in the common guillemot (*Uria aalge*)', *Journal of Animal Ecology*, 46(3): 751-764.

British Trust for Ornithology (2024a), 'Puffin', <https://www.bto.org/understanding-birds/birdfacts/puffin> [Accessed: April 2024].

British Trust for Ornithology (2024b), 'Puffin', <https://www.bto.org/understanding-birds/birdfacts/puffin> [Accessed: April 2024].

British Trust for Ornithology (2024c), 'Kittiwake', <https://www.bto.org/understanding-birds/birdfacts/kittiwake> [Accessed: April 2024].

British Trust for Ornithology (2024d), 'Guillemot', <https://www.bto.org/understanding-birds/birdfacts/guillemot> [Accessed: April 2024].

British Trust for Ornithology (2024f), 'Seabird Monitoring Programme', <https://app.bto.org/seabirds/public/index.jsp> [Accessed: August 2024].

Burnham, K. K., Burnham, J. L., Johnson, J. A., & Huffman, A. (2021), 'Migratory movements of Atlantic puffins *Fratercula arctica naumanni* from high Arctic Greenland', *PLoS One*, 16(5): 1-21.

Burnham, K. K., Burnham, J. L., Johnson, J. A., & Huffman, A. (2021), 'Migratory movements of Atlantic puffins *Fratercula arctica naumanni* from high Arctic Greenland', *PLoS One*, 16(5): 1-21.

Chivers, L. S., Lundy, M. G., and Reid, N. (2012). Stable breeding despite variable feeding in two sympatric auk (*Alcidae*) species. *Bird Study*, 59(1): 67-73.

Coulson, J. C. (2011), *The Kittiwake* (London: A & C Black).

Coulson, J. C. (2019), *Gulls* (Townhead: Collins).

Donnelly, R. E., Prots, A., & Donnelly, C. A. (2021), 'Better educational signage could reduce disturbance of resting dolphins', *PLoS ONE*, 16(4): e0248732.

Ellenberg, U., Mattern, T., Seddon, P. J., & Jorquera, G. L. (2006), 'Physiological and reproductive consequences of human disturbance in Humboldt penguins: The need for species-specific visitor management', *Biological Conservation*, 133(1): 95-106.

Ellenberg, U., Setiawan, A. N., Cree, A., Houston, D. M., & Seddon, P. J. (2007), 'Elevated hormonal stress response and reduced reproductive output in yellow-eyed penguins exposed to unregulated tourism', *General and Comparative Endocrinology*, 152(1): 54-63.

Iasiello, L., & Colombelli-Négrel, D. (2023), 'Noisy neighbours: effects of construction noises on nesting seabirds', *Marine and Freshwater Research*, 74(7): 573-585.

Furness, R. W., MacArthur, D., Trinder, M., & MacArthur, K. (2013), 'Evidence review to support the identification of potential conservation measures for selected species of seabirds', MacArthur Green.

Harris, M. P., & Wanless, S. (1989), 'The breeding biology of razorbills *Alca torda* on the Isle of May', *Bird Study*, 36: 105-114.

Holzschuh, A. (2016), 'Does rock climbing threaten cliff biodiversity? A critical review', *Biological Conservation*, 204: 153-162.

Huddart, D., & Stott, T. (2019), *Outdoor Recreation: Environmental Impacts and Management* (Cham: Palgrave Macmillan).

Major, H. L., Rivers, J. E., Carvey, Q. B., & Diamond, A. W. (2024), 'The incredible shrinking puffin: Decreasing size and increasing proportional bill size of Atlantic puffins nesting at Machias Seal Island', *PLoS One*, 19(1): 1-21.

Marschall, S., Granquist, S. M., & Burns, G. L. (2017), 'Interpretation in wildlife tourism: Assessing the effectiveness of signage on visitor behaviour at a seal watching site in Iceland', *Journal of Outdoor Recreation and Tourism*, 17: 11-19.

Massaro, M., Chardine, J. W., & Jones, I. L. (2001), 'Relationships between black-legged kittiwake nest-site characteristics and susceptibility to predation by large gulls', *Ornithological Applications*, 103(4): 793-801.

Medeiros, R., *et al.* (2007), 'Signage reduces the impact of human disturbance on little tern nesting success in Portugal', *Biological Conservation*, 135(1): 99-106.

NatureScot (2024a), 'Protected Nature Sites', <https://informatics.sepa.org.uk/ProtectedNatureSites/> [Accessed: August 2024].

NatureScot (2024b), 'SiteLink', <https://sitelink.nature.scot/site/412#overview> [Accessed: August 2024].

NatureScot (2024c), 'SiteLink', <https://sitelink.nature.scot/site/636> [Accessed: August 2024].

NatureScot (2024d), 'SiteLink', <https://sitelink.nature.scot/site/1376> [Accessed: August 2024].

NatureScot (2024e), 'SiteLink', <https://sitelink.nature.scot/site/10490> [Accessed: August 2024].

National Trust for Scotland (2024), 'Concern over slow start to seabird breeding season', <https://www.nts.org.uk/stories/concern-over-slow-start-to-seabird-breeding-season> [Accessed: August 2024].

Weseloh, D. V., Hebert, C. E., Mallory, M. L., Poole, A. F., Ellis, J. C., Pyle, P., & Patten, M. A. (2020), 'Herring gull (*Larus argentatus*), version 1.0', in S. M. Billerman (ed.), *Birds of the World* (Ithaca, NY: Cornell Lab of Ornithology). <https://doi.org/10.2173/bow.hergul.01>

GoBe (2024), 'Ornithology Compensation Site Selection', Muir Mhòr Offshore Windfarm.

Outer Dowsing (2024), 'Offshore Artificial Nesting Structures Evidence Base and Roadmap, Outer Dowsing Offshore Wind Document 7.7.4', Outer Dowsing Offshore Wind.

Royal HaskoningDHV (2024), 'Development of Ornithology Regional Compensation Measures', HaskoningDHV UK Ltd.

Scane, S. (2020), 'Evaluating the Effectiveness of Signage in Conservation Areas, Natural Areas and Zoos to Enhance the Education of Eco-tourists', Capstone, University of Toronto.

Correct Format: Scottish Wildlife Trust (2024), 'Razorbill', <https://scottishwildlifetrust.org.uk/species/razorbill/> [Accessed: April 2024].

Correct Format: Strava (2024), 'Strava's Global Heatmap', <https://www.strava.com/maps/global-heatmap> [Accessed: August 2024].

Veitch, B. G., Robertson, G. J., Jones, I. L., & Bond, A. L. (2016), 'Great black-backed gull (*Larus marinus*) predation on seabird populations at two colonies in eastern Canada', *Waterbirds*, 39(sp1): 235-245. <https://doi.org/10.1675/063.039.sp121>

Wanless, S., Harris, M. P., Newell, M. A., Speakman, J. R., & Daunt, F. (2018), 'Community-wide decline in the occurrence of lesser sandeels *Ammodytes marinus* in seabird chick diets at a North Sea colony', *Marine Ecology Progress Series*, 600: 193-206.

Wrobel, S. (2021). *Handy hammocks, Getting creative for kittiwakes*. The RSPB Magazine Uncovered. <https://community.rspb.org.uk/ourwork/b/natureshomemagazine/posts/handy-hammocks--getting-creative-for-kittiwakes> [Accessed: September 2024].

8. Appendix

Table 4: Site locations and colony counts of all target species recorded across the seven sites between Aberdeen to Stonehaven, along with locations of herring gull colonies and greater blacked-backed gull nests.

| Site Location | Colony Code | Count | Notes |
|-------------------------|-----------------------|-------|--|
| Burnbanks | Herring gull colony a | 4 | 4 adults, 9 chicks, 4 nests |
| Burnbanks | Herring gull colony b | 16 | 16 adults, 2 nests. |
| Burnbanks | Kittiwake colony a | 123 | 65 AON on the south facing cliff, 58 AON on north facing cliff |
| Burnbanks | Kittiwake colony b | 1 | 1 AON |
| Burnbanks | Razorbill colony a | 1 | |
| Cove Bay | Guillemot colony a | 21 | 21 adults, 4 chicks |
| Cove Bay | Guillemot colony b | 2 | |
| Cove Bay | Guillemot colony c | 42 | No chicks observed |
| Cove Bay | Guillemot colony d | 66 | No chicks observed |
| Cove Bay | Kittiwake colony c | 108 | 108 AON |
| Cove Bay | Kittiwake colony d | 17 | 17 AON |
| Cove Bay | Kittiwake colony e | 43 | 43 AON |
| Cove Bay | Kittiwake colony f | 592 | 341 AON on the south facing cliff, 251 AON on north facing cliff |
| Cove Bay | Razorbill colony b | 2 | |
| Cove Bay | Razorbill colony c | 1 | Observed carrying food, location of breeding attempt not seen. |
| Cove Bay | Razorbill colony d | 4 | No chicks observed |
| Cove Bay | Razorbill colony e | 6 | No chicks observed |
| Cove Bay to Hare Ness | GBBG nest a | 1 | |
| Cove Bay to Hare Ness | Guillemot colony e | 11 | No chicks observed |
| Cove Bay to Hare Ness | Herring gull colony c | 7 | |
| Cove Bay to Hare Ness | Kittiwake colony g | 36 | 36 AON |
| Cove Bay to Hare Ness | Kittiwake colony h | 17 | 17 AON |
| Cove Bay to Hare Ness | Razorbill colony f | 18 | 18 adults, 1 chick |
| Hareness to Seal's Cove | Guillemot colony f | 34 | No chicks observed |
| Hareness to Seal's Cove | Kittiwake colony i | 55 | 55 AON |

| Site Location | Colony Code | Count | Notes |
|------------------------------|-----------------------|-------|---|
| Hareness to Seal's Cove | Razorbill colony g | 15 | 15 adults, 2 chicks |
| Seal's Cove to Findon Ness | Guillemot colony g | 82 | No chicks observed |
| Seal's Cove to Findon Ness | Herring gull colony d | 11 | 11 adults |
| Seal's Cove to Findon Ness | Kittiwake colony j | 23 | 23 AON, likely more but not visible from viewpoint. |
| Seal's Cove to Findon Ness | Kittiwake colony k | 30 | 30 AON |
| Seal's Cove to Findon Ness | Kittiwake colony l | 23 | 23 AON |
| Seal's Cove to Findon Ness | Puffin colony a | 1 | |
| Seal's Cove to Findon Ness | Razorbill colony h | 5 | No chicks observed |
| Seal's Cove to Findon Ness | Razorbill colony i | 6 | No chicks observed |
| Seal's Cove to Findon Ness | Razorbill colony j | 30 | 30 adults |
| Findon Ness | Guillemot colony h | 52 | 52 Adult, 7 Chicks |
| Findon Ness | Herring gull colony e | 3 | |
| Findon Ness | Kittiwake colony m | 21 | 21 AON |
| Findon Ness | Puffin colony b | 5 | |
| Findon Ness | Razorbill colony k | 8 | Resting, no signs of breeding |
| Findon Ness | Razorbill colony l | 34 | No chicks observed |
| Black Slough to Burn of Daff | GBBG nest b | 1 | 1adult, 1 nest, 1 chick |
| Black Slough to Burn of Daff | Herring gull colony f | 48 | 48 adults, 5 nests, 8 chicks |
| Black Slough to Burn of Daff | Herring gull colony g | 142 | 142 adults, nests 15, 23 chicks |