Berwick Bank Wind Farm

Additional Environmental Information (AEI) Submission

AEI01: Addendum to the EIA and HRA
Outer Firth of Forth and St Andrew's Bay SPA Updated Assessment

sse Renewables

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1. Introduction

1.1. Purpose of Report

This report (the 'RIAA Addendum') provides an update to the Report to Inform Appropriate Assessment (RIAA) (Part Three) submitted in December 2022 (SSER 2022). As requested by Marine Directorate Licensing and Operations Team (MD-LOT), this Addendum provides additional information in respect of the Outer Firth of Forth and St. Andrew's Bay Complex SPA, specifically relating to vessel disturbance for key species, as further described in the scope which follows.

1.2. Request for Additional Information

This RIAA Addendum has been produced following detailed post-submission consultation with NatureScot (NS) and an additional information request from MD-LOT which is summarised in Table 1.

Table 1 Summary of post-submission additional information requests from consultees relating to SSER (2022).

Consultee	Summary of response	Applicant response
NatureScot 31 March 2023 (consultation response)	Insufficient information was provided within the assessment to ascertain No Adverse Effect on Site Integrity for the Outer Firth of Forth and St Andrews Bay Complex SPA with respect to: Disturbance effects from construction and operational vessel activity alone and in-combination with consented Forth & Tay wind farms for common scoter, velvet scoter, red-throated diver, great northern diver and shag; further information will determine whether mitigation or compensation is required.	This RIAA Addendum provides further information and assessment to ascertain No Adverse Effect on Site Integrity for the Outer Firth of Forth and St Andrews Bay Complex SPA with respect to: Disturbance effects from construction and operational vessel activity alone and in-combination with consented Forth & Tay wind farms. It was agreed via email with NS on 18/05/2023 that further information on great northern diver is not required since this species is not a qualifying feature of this SPA nor a component of any assemblage feature of the SPA.
	Assessment of impacts to the Outer Firth of Forth and St Andrews Bay Complex marine SPA were undertaken with particular focus on the cable laying works and associated disturbance. The assessment provided is however very high level and does not provide sufficient information to consider all relevant impact pathways and species. It also incorrectly cites existing vessel traffic within the site as a reason that vessels associated with the proposed wind farm development will	This RIAA Addendum provides further information and assessment to ascertain No Adverse Effect on Site Integrity for the Outer Firth of Forth and St Andrews Bay Complex SPA with respect to: Disturbance effects from construction and operational vessel activity. This includes further detail on potential disturbance effects from construction and operational vessel activity associated with both cable laying works and an uplift in

Consultee	Summary of response	Applicant response
	not have an AEOSI. Impacts also need to be assessed across all relevant Conservation Objectives for the site.	vessel activity associated with the Proposed Development array area. Impacts are assessed across all draft conservation objectives together with associated site-specific advice from the SPA Conservation Management Advice document.
	The assessment of the impacts from vessels within the OFFSAB marine SPA is insufficient. This is in part because the RIAA appears to only assess vessels associated with cable laying activities. However, the volume of additional vessels (i.e. 11,484 vessel round trips over the construction phase) within the development site suggests that disturbance impacts to qualifying species over a period of several years, from vessels associated with construction works at the development site may be likely.	This RIAA Addendum provides further information and assessment to ascertain No Adverse Effect on Site Integrity for the Outer Firth of Forth and St Andrews Bay Complex SPA with respect to: Disturbance effects from construction and operational vessel activity. This includes further detail on potential disturbance effects from construction and operational vessel activity associated with both cable laying works and an uplift in vessel activity associated with the Proposed Development array area. The Maximum Design Scenario has been broken down further to provide details for the Proposed Development export cable corridor alone. This provides further context regarding the location and number of additional vessels across development phases.
	There is also potential for cumulative effects from concurrent construction of other renewable developments within the region.	Disturbance effects from construction and operational vessel activity alone and in-combination with consented Forth & Tay wind farm has been assessed in sections 2.4 to 2.12 within this RIAA Addendum.
	Indicative information on the routes likely to be taken by vessels (as well as helicopter and / or drone usage) going to and from the development site would have been helpful in informing our assessment across both the construction and operational periods, however this was not provided.	Ports used for construction and maintenance activities within the Proposed Development are yet to be confirmed and will be determined as part of competitive tendering processes whilst aiming to maximise Scottish and UK content. It is possible that a number of ports in the region may be utilised during construction, with a single port used for maintenance activities during operation. Potential ports and harbours are presented on Figures 1.1-1.9 with further assessment provided for each qualifying feature on this basis. Similarly, helicopters used for crew transfers during construction, and drones used for blade inspections during operation, would operate from licenced airfields and/or drone

Consultee	Summary of response	Applicant response
		ports, the locations of which are to be confirmed. Further assessment of potential transit routes is provided in this RIAA Addendum.
	In addition, Chapter 11 (Volume 2 – Chapter 11: Offshore and Intertidal Ecology) screens out several species from the assessment which are known to be sensitive to vessel disturbance as they are present in low numbers within the development site. However, it is unclear what routes construction and or operational vessels will take to reach the development site, including whether vessels will pass through the marine SPA to reach the development site	This RIAA Addendum provides further information for those species screened out of chapter 11 (volume 2) which are known to be sensitive to vessel disturbance. Ports used for construction and maintenance activities within the Proposed Development are yet to be confirmed and will be determined as part of competitive tendering processes whilst aiming to maximise UK and Scottish content. A number of ports in the region may be utilised during construction, with a single port used for maintenance activities during operation. Potential ports and harbours are presented on Figures 1.1-1.9 with further assessment provided for each qualifying feature on this basis.
NatureScot 18 May 2023 (email)	The list of species given in our advice are those known to be sensitive to disturbance, however, we note that great northern diver is not a qualifying feature of OFFSABC and agree it should not have been included. To clarify our advice, we consider the following protected features (common scoter, velvet scoter, eider, long-tailed duck, goldeneye, red-breasted merganser, red-throated diver, Slavonian grebe) should be considered in the context of disturbance from additional vessel movements within the marine SPA (alone and in combination with existing vessel traffic and planned vessel traffic for consented wind farms under construction). We note that the assessment currently only considers vessel activity within the array area but the vessel activity may impact these sensitive protected features within OFFSABC.	This RIAA Addendum provides additional information for the species identified by NatureScot in their email of 18/05/2023, namely eider, velvet scoter, common scoter, long-tailed duck, goldeneye, red-breasted merganser, red-throated diver, and Slavonian grebe. Additional information for shag is also provided since it was requested in the NatureScot March 2023 consultation response and is a qualifying feature of the Outer Firth of Forth and St. Andrew's Bay Complex SPA.
MD-LOT 26 May 2023 (Additional Information and Clarification Request)	MD-LOT advises that the following must be submitted as additional information on the basis of the NatureScot representation: • NatureScot was unable to conclude no adverse effect on site integrity ("AEOSI") from vessel disturbance for common scoter, velvet scoter, red-throated diver, great	Following clarification from NatureScot on 18 May 2023, this RIAA Addendum provides further information for eider, velvet scoter, common scoter, long-tailed duck, goldeneye, red-breasted merganser, red-throated diver, Slavonian grebe and shag.

Consultee	Summary of response	Applicant response
	northern diver and shag due to insufficient information. Additional information must be provided on indicative routes construction and/or operational vessels will take to reach the development site (as well as helicopter and/or drone usage), including whether these will pass through the marine SPA to reach the development site.	Ports used for construction and maintenance activities within the Proposed Development are yet to be confirmed and will be determined as part of competitive tendering processes whilst aiming to maximise UK and Scottish content. A number of ports in the region may be utilised during construction, with a single port used for maintenance activities during operation. Potential ports and harbours are presented on Figures 1.1-1.9 with further assessment of vessel, helicopter and drone disturbance provided for each qualifying feature on this basis.

1.3. Scope of this Report

This RIAA Addendum is provided for nine qualifying features identified by NS in relation to the Outer Firth of Forth and St. Andrew's Bay Complex SPA, namely common scoter, velvet scoter, eider, long-tailed duck, goldeneye, red-breasted merganser, red-throated diver, Slavonian grebe and shag. Great northern diver has been excluded from further assessment as agreed with NS (see Table 1given that it is not a qualifying feature of this SPA. Appropriate assessment is provided in relation to a single relevant effect pathway: disturbance effects from construction and operational vessel activity alone and in-combination with consented Forth and Tay wind farms, as outlined in Table 1 and defined in section 5.2 of SSER (2022).

Information to inform the RIAA Addendum draws on that presented in SSER (2022) and is not repeated here, except for the Maximum Design Scenario for which further information is presented to that in SSER (2022), as outlined in Table 1.

2. Appropriate Assessment: Outer Firth of Forth and St. Andrew's Bay Complex SPA

2.1. Maximum Design Scenario

The Proposed Development offshore export cable corridor runs through the Outer Firth of Forth and St Andrews Bay Complex SPA, whilst the Proposed Development array area is located 2 km outside of the SPA boundary at its closest point.

The maximum design scenario presented in SSER (2022) is provided in Table 2for context. In order to inform this RIAA Addendum, parameters have also been extracted to provide a realistic maximum design scenario derived from the design envelope for the Proposed Development offshore export cable corridor alone. These values are also presented in Table 2.

Table 2 Maximum Design Scenario (MDS) used to inform this RIAA Addendum.

Potential Impact	Phase[1] C	O	D	MDS (Proposed Development)[2]	MDS (Proposed Development offshore export cable corridor)
Disturbance from vessel activity	✓	✓	✓	***Construction Phase*** Vessels used for a range of construction activities associated with site preparation, inter-array cables and offshore export cables, including boulder clearance, sand wave clearance, drilling and trenching; maximum vessels on site at any one time including: • up to 9 pre-installation boulder clearance vessels with up to 316 return trips throughout the construction phase; and • up to 3 sandwave clearance vessels with up to 104 return trips throughout the construction phase. Vessels associated with foundation installation, OSPs/ Offshore convertor station platforms installation, inter-array cables, offshore export cables, and landfall works, with up to 11,484 vessel round trips over the construction phase; maximum vessels on site at any one time including: • up to 9 main installation vessels making up to 297 return trips; • up to 14 cargo barges making up to 194 return trips; • up to 9 support vessels making up to 714 return trips; • up to 22 tug/anchor handlers making up to 794 return trips; • up to 6 cable installation vessels making up to 36 return trips; • up to 22 guard vessels making up to 1,488 return trips; • up to 8 survey vessels making up to 464 return trips;	***Construction Phase*** Vessels used for a range of construction activities associated with offshore export cables, including boulder clearance; maximum vessels on site at any one time including: • up to 2 pre-installation clearance vessels with up to 32 return trips throughout the construction phase. Vessels associated with offshore export cables and landfall works, with up to 1,725 vessel round trips over the construction phase; maximum vessels on site at any one time including: • up to 2 cable installation vessels making up to 6 return trips; • up to 4 guard vessels making up to 128 return trips; • up to 2 survey vessels making up to 64 return trips; • up to 2 CTVs making up to 128 return trips; and • up to 2 scour/cable protection installation vessels making up to 1,399 return trips. Maximum offshore construction duration of up to 96 months. **Operation and Maintenance Phase**

[1] C = Construction, O = Operational and maintenance, D = Decommissioning

[2] As per SSER (2022).

Potential Impact	Phase[1] C O D	MDS (Proposed Development)[2]	MDS (Proposed Development offshore export cable corridor)
		• up to 14 crew transfer vessels (CTVs) making up to 3,342 return trips; • up to 10 scour/cable protection installation vessels making up to 3,390 return trips; and • up to 20 resupply vessels making up to 245 return trips. It is possible that helicopters may also be used for crew transfers with up to 3,214 return trips over the construction phase. Other activities: • up to 10% of piles are anticipated to require drilling at wind turbine foundations (144 piles) with a maximum drilling duration of 96 days; • up to 32 piles will require drilling at OSPs/ Offshore convertor station platforms foundations with a maximum drilling duration of up to 39 days; and • burial of 1,225 km of inter-array cables and 828 km of offshore export cable via jet trenching; along with cable laying and jack up rigs Maximum offshore construction duration of up to 96 months. **Operation and Maintenance Phase** Vessels used during routine inspections, repairs and replacement of equipment, major component replacement, painting or other coatings, removal of marine growth, replacement of access ladders, and geophysical surveys; maximum vessels on site at any one time including: • up to 4 CTVs making up to 832 return trips per year; • up to 1 jack up vessel making up to 2 return trips per year;	Vessels used during routine inspections, repairs and replacement; maximum vessels traversing the SPA at any one time including: • up to 4 CTVs making up to 832 return trips per year; • up to 1 jack up vessel making up to 2 return trips per year; • up to 2 support vessels making up to 26 return trips per year; • up to 1 cable repair vessel making up to 5 return trips per operational lifetime; • up to 1 cable survey vessel making one return trip per year; and • up to 1 excavator/backhoe dredger making up to 5 return trips over operational lifetime. **Decommissioning Phase** Vessels used for a range of decommissioning activities such as removal of cables and cable protection. Vessels assumed to be similar to vessel activity described for construction phase above.

Potential Impact	Phase[1] C	O	D	MDS (Proposed Development)[2]	MDS (Proposed Development offshore export cable corridor)
				• up to 2 support vessels making up to 26 return trips per year; • up to 1 cable repair vessel making up to 5 return trips per operational lifetime; • up to 2 service operations vessels (SOV, daughter craft) making up to 4 movements within Proposed Development array area per day; • up to 1 cable survey vessel making one return trip per year; and • up to 1 excavator/backhoe dredger making up to 5 return trips over operational lifetime. A single drone may also be used for blade inspections with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). **Decommissioning Phase** Vessels used for a range of decommissioning activities such as removal of foundations, cables and cable protection. Vessels assumed to be similar to vessel activity described for construction phase above	

2.2. Designed In Measures

As part of the project design process, a number of designed in measures have been included in the Proposed Development and are committed to be delivered by the Applicant as part of the Proposed Development. These designed in measures are integrated into the project description for the Proposed Development and are not considered as mitigation measures intended to specifically avoid or reduce effects on the UK National Site Network.

An overview of the designed in measures of specific relevance for this RIAA Addendum is provided in Table 3. A full list of designed in measures of relevance to ornithology is provided in SSER (2022).

Table 3 Designed In Measures of Specific Relevance to this RIAA Addendum.

Designed In Measures of Specific Relevance to this RIAA Addendum	
Measure	Development of, and adherence to, a Navigational Safety and Vessel Management Plan (NSVMP)
Subject	Project Codes of Conduct included as a part of the NSVMP will be issued to all project vessel operators to avoid sudden changes in course or speed which will minimise the potential for disturbance during all phases of the Proposed Development, in adherence to the Scottish Marine Wildlife Watching Code[3]
Measure	Site boundary moved 2 km away from boundary of Outer Firth of Forth and St Andrews Bay Complex SPA.
Subject	During the refinement of the site boundary, a decision was made to move it 2 km from the boundary of this SPA in order to reduce the possibility of any disturbance effects on ornithological features of the SPA.

2.3. Conservation Objectives

The draft conservation objectives of this SPA (as determined from NatureScot's SiteLink (NatureScot and JNCC 2021) are:

- *To ensure that the qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.*
- *To ensure that the integrity of the Outer Firth of Forth and St Andrews Bay Complex SPA is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:*
    - *The populations of the qualifying features are viable components of the Outer Firth of Forth and St Andrews Bay Complex SPA.*
    - *The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.*
    - *The supporting habitats and processes relevant to qualifying features and their prey resources are maintained, or where appropriate restored, at the Outer Firth of Forth and St Andrews Bay Complex SPA.*

[3] The Scottish Marine Wildlife Watching Code (nature.scot)

Site-specific advice to achieve these conservation objectives is provided for each qualifying feature of the Outer Firth of Forth and St Andrews Bay Complex SPA within the Conservation Management Advice (CMA) document (NatureScot and JNCC 2022). This advice is considered within the appropriate assessment for each feature.

As outlined above, this RIAA Addendum is restricted to the nine qualifying features agreed with NatureScot and MD-LOT as requiring further information. The citation population size and site condition status for each of these nine qualifying features is detailed in Table 4.

Table 4 Details on the nine qualifying features of the Outer Firth of Forth and St Andrews Complex SPA considered in this RIAA Addendum.

Qualifying Feature	Season	Site Condition	Citation Population Size
Eider	Non-breeding	Favourable	22,000 individuals
Velvet scoter	Non-breeding	Favourable	780 individuals
Common scoter	Non-breeding	Favourable	4,700 individuals
Long-tailed duck	Non-breeding	Favourable	1,950 individuals
Goldeneye	Non-breeding	Favourable	590 individuals
Red-breasted merganser	Non-breeding	Favourable	430 individuals
Red-throated diver	Non-breeding	Favourable	850 individuals
Slavonian grebe	Non-breeding	Favourable	30 individuals
Shag	Breeding and non-breeding	Unfavourable (breeding season) Favourable (non-breeding season	Breeding as per Forth Islands SPA. Non-breeding: No site reference population

2.4. Assessment of the Eider Population

In Scotland, eiders occur in sheltered bays with rocky, stony or hard substrates associated with their main prey items. Foraging in these habitats occurs on the seabed (down to 10m depth). Open waters are also used potentially for loafing, moulting and roosting.

Eider are the most common breeding seaduck in the UK with a breeding population of around 20,000 in Scotland (Forrester et al. 2007). Following breeding, eiders may congregate in large moulting flocks off eastern Scotland, including Shetland, the Ythan, Aberdeen Bay, Montrose Basin and the Firth of Forth. The east coast of Scotland also hosts a substantial proportion of the UK wintering population of approximately 59,000 birds, with major wintering areas off Orkney, the Moray Firth, the Ythan, Montrose Bay, the Tay Estuary and the Firth of Forth (Forrester et al. 2007).

With the Outer Firth of Forth and St Andrews Bay Complex SPA, eiders are present throughout the year. Their non-breeding season is from September to mid-April, with their flightless moult period being between July and mid-September. In the non-breeding season, the highest densities of eider within the SPA have been recorded in the Firth of Tay and within the central and northern Firth of Forth (SNH and JNCC 2016, NatureScot and JNCC 2022; Figure 1.1). Eiders were not recorded during any of the site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1), noting that this encompassed a 16 km buffer around the Proposed Development array area and so overlapped with eastern parts of the SPA. Intertidal and nearshore monthly surveys undertaken at the Skateraw landfall between July 2020 and June 2021 recorded eider in each month with a maximum count of 111 birds in February 2021 (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 22,000 individuals (5-year mean 2001/02-2004/05) has been calculated on multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). Based on Wetland Bird Survey (WeBS) data the peak mean population size has fluctuated annually but has remained relatively stable (SSER 2022). This is reflected in the favourable condition of eider within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for eider is:

- *Maintain the population of non-breeding eider at a stable or increasing trend relative to the site reference population.*
- *Ensure eider continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to eider and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for eider within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

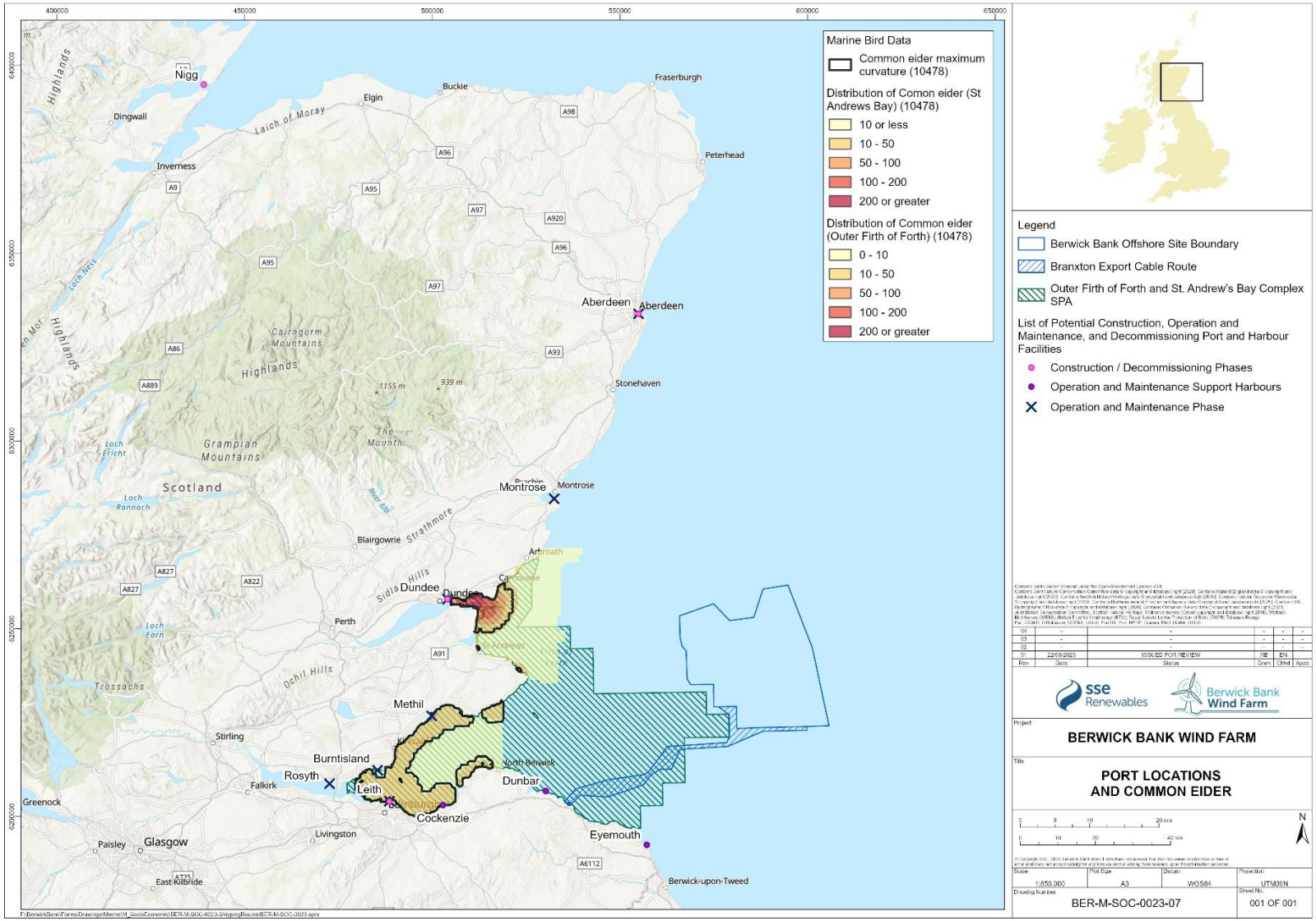

Figure 1.1: Known distribution of eider in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.4.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on eider are predicted to arise from construction activities occurring within the Proposed Development array area given that the known aggregations of eider within the SPA are predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.1), and no eider were recorded during site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1) which overlapped with 267 km^2 of the SPA.

Disturbance to eider during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of eider in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible, with relatively low numbers recorded during the intertidal and nearshore surveys (SNH and JNCC 2016, NatureScot and JNCC 2022; Offshore EIA Report, volume 3, appendix 11.1; Figure 1.1). However, it is possible that disturbance to low numbers of eider could occur from cable laying activities in coastal waters off East Lothian during the overwintering period.

Eider are considered to have a moderate to high sensitivity to such sources of direct disturbance (Goodship and Furness 2022). Studies undertaken indicate that eider may be displaced by vessel traffic with one study reporting eider being flushed by approaching vessels at distances up to 1 km and the median distance of 208 m (Schwemmer et al. 2011). A similar study reported a maximum flushing distance of moulting eider at 700 m, with birds taking flight on average at 177 m (Dehnhard et al. 2020). Individuals may be more susceptible to disturbance than flocks, with mean disturbance distances reported for individuals as being between 277±21 m and for flocks of 255±195 m (Fliessbach et al. 2019). Goodship and Furness (2022) present disturbance buffer zones of 100 – 200 m during the breeding season and 200 – 500 during the non-breeding period.

Not all birds that are disturbed by a vessel necessarily take flight, with between 29% and 45% of all observed instance of disturbance not resulting in flight behaviour (Dehnhard et al. 2020, Fliessbach et al. 2019). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels. This may in part explain the occurrence of eider in proximity to existing shipping lanes within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Figure 1.1).

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in their spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming disturbance occurs at distances of up to 500 m (Goodship and Furness 2022), the area of impact from

around the two cable laying vessels would be 0.5 km^2, equivalent to 0.02% of the SPA. It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours to days). This would allow the SPA population to return to the area in a relatively short timeframe, with eiders having been shown to return to disturbed areas within two hours (Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the main aggregation of eider off the Firth of Tay, it is unlikely that significant numbers of eiders use the area for foraging and/or moulting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.1). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14;Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.1). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter known eider aggregations in coastal waters (Figure 1.1). However, it is expected that eider present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the Navigational Safety and Vessel Management Plan (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code[4] in order to minimise the potential for any additional disturbance to eider.

[4] The Scottish Marine Wildlife Watching Code (nature.scot)

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.4.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to eiders during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known aggregations of eiders in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an Operations and Maintenance (O&M) base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.4.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA eider population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.4.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination effects within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.1). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known eider densities off the East Lothian coastline are low (SNH and JNCC 2016, NatureScot and JNCC 2022; Figure 1.1).

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.4.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA eider population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.5. Assessment of the Velvet Scoter Population

In Europe, velvet scoter breed in Scandinavia, Estonia and Russia and are a winter visitor to the UK. The UK wintering population is estimated to be approximately 3,350 individuals, with over 2,500 wintering in Scottish coastal waters (Robinson 2005, Forrester et al. 2007). Velvet scoter are much less gregarious than common scoter, forming small scattered groups, rarely of more than 100 birds, at sea (Cramp and Simmons 2004). Velvet scoters feed diurnally and move further out to sea at dusk (Mudge and Allen 1980).

Their distribution in Scottish waters is predominantly along the east coast, within the Moray Firth, Firth of Tay, St Andrews Bay and Firth of Forth. Within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, velvet scoters are present between September and mid-April (NatureScot and JNCC 2022), with the highest densities recorded in the outer Firth of Tay; densities are generally lower in the Firth of Forth, with

birds using inshore areas along the north (Fife) and south (Edinburgh and East Lothian) coasts (SNH and JNCC 2016, NatureScot and JNCC 2022; Figure 1.2). No velvet scoters were recorded during any of the site-specific surveys undertaken across the Offshore Ornithology Study Area (noting that this encompassed a 16 km buffer around the Proposed Development array area and so overlapped with eastern parts of the SPA), or during intertidal and nearshore monthly surveys undertaken at the Skateraw landfall between July 2020 and June 2021 (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 780 individuals (5-year mean 2006/7-2010/11) has been calculated from a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). Based on WeBS data, the peak mean population size has fluctuated annually but remains largely above the site reference population (SSER 2022). This is reflected in the favourable condition of velvet scoter within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for velvet scoter is:

- *Maintain the population of non-breeding velvet scoter at a stable or increasing trend relative to the site reference population.*
- *Ensure velvet scoter continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to velvet scoter and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for velvet scoter within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

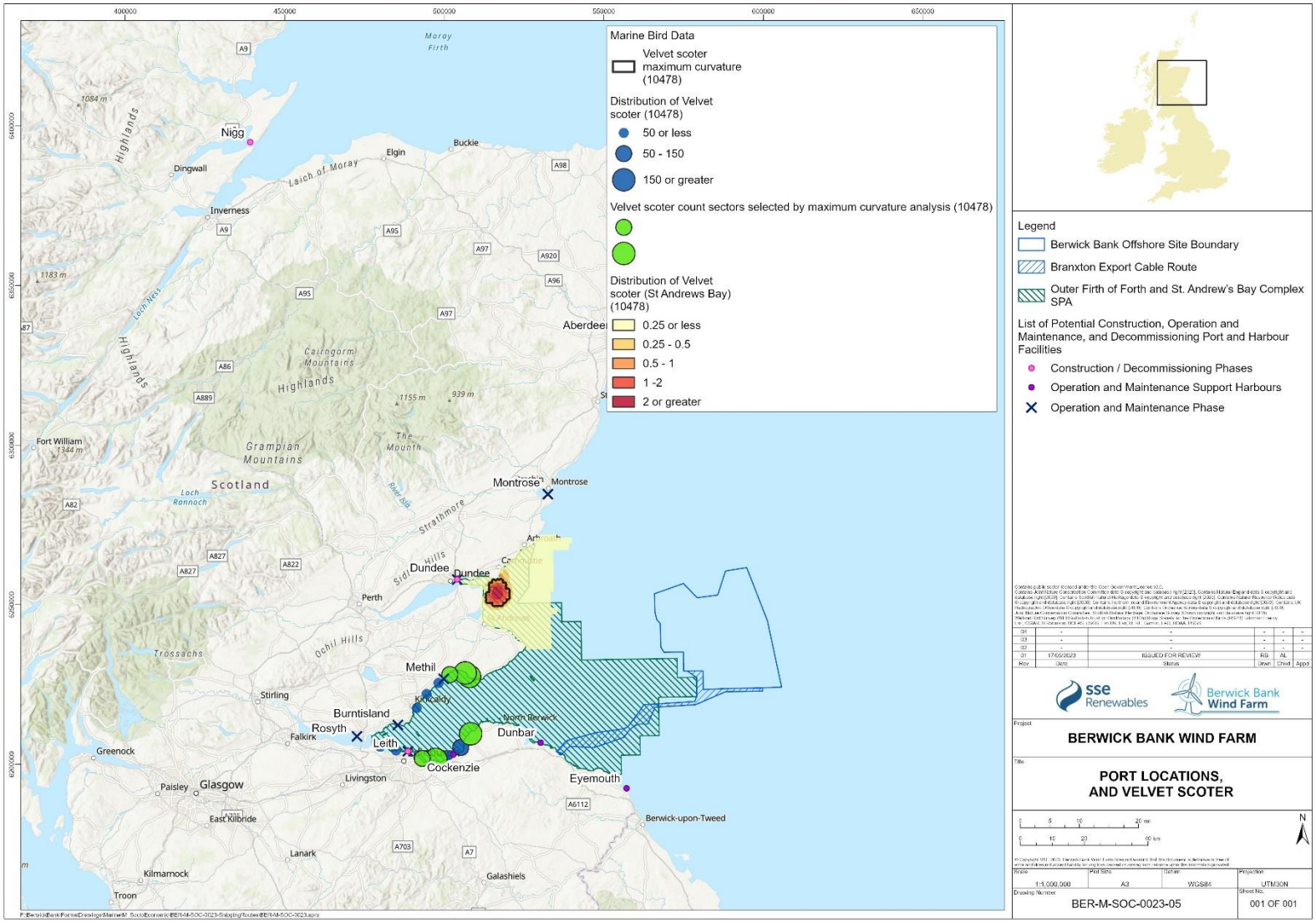

Figure 1.2: Known distribution of velvet scoter in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.5.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on velvet scoter are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of velvet scoter within the SPA is predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.2). No velvet scoter were recorded during site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1) which overlapped with 267 km^2 of the SPA.

Disturbance to velvet scoter during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of velvet scoter in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016, NatureScot and JNCC 2022; Figure 1.2). However, it is possible that disturbance to very low numbers of velvet scoter could occur from cable laying activities in coastal waters off East Lothian during the overwintering period.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed velvet scoter as having a relative high sensitivity from disturbance arising from vessels (Garthe and Hüppop 2004, Furness et al. 2013, Fliessbach et al. 2019). Studies undertaken indicate that velvet scoter may be flushed by approaching vessels at distances of between 30 m and 2 km (Fliessbach et al. 2019), with the related common scoter starting to return to disturbed areas *c.* 180 minutes after being flushed (Schwemmer et al. 2011). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels. This may in part explain the occurrence of velvet scoter in proximity to existing shipping lanes within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, such as the aggregation off the Firth of Tay (Figure 1.2).

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in their spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum flushing distances 30 m and 2 km (Fliessbach et al. 2019) around the two cable laying vessels, and 100% disturbance of velvet scoter present in the vicinity of these activities, the area of impact could vary from between 0.002 km^2 to 12.56 km^2 (equivalent to between <0.0001% and 0.46% of the SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours

to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the main aggregation of velvet scoter off the Firth of Tay, it is unlikely that significant numbers of velvet scoters use the area for foraging and/or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.2). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14;Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.2). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. The number of return trips are estimated for the entirety of the construction period, with velvet scoter only present in the SPA between September and mid-April (NatureScot and JNCC 2022). Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter known velvet scoter distributions in coastal waters (Figure 1.2). However, it is expected that velvet scoter present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to velvet scoter.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.5.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to velvet scoters during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of velvet scoter in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.2).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.5.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA velvet scoter population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.5.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap

temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an Operation and Maintenance (O&M) base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.2). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known velvet scoter densities off the East Lothian coastline are negligible (SNH and JNCC 2016, NatureScot and JNCC 2022; Figure 1.2).

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.5.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA velvet scoter population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.6. Assessment of the Common Scoter Population

Common scoter is a rare breeding bird in the UK, with between 16 and 47 pairs nesting in 2019. The Scottish wintering population is estimated to be between 25,000 and 30,000 individuals (Forrester et al. 2007). Common scoters use open coast habitats, usually with a depth of 20m or less (Woodward & Humphreys 2018) but may move further offshore to roost at night (Mudge and Allen 1980). They undergo a flightless moult between mid-July and mid-September for males and September-October in females.

Their wintering distribution in Scottish waters is predominantly along the east coast, with concentrations occurring within and along the coasts of the Moray Firth, Aberdeenshire, Firth of Tay, St Andrews Bay and the Firth of Forth. Within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, common scoters are present between July and April (NatureScot and JNCC 2022), with high concentrations in the northerly part of the Outer Firth of Forth and St Andrews Bay Complex SPA, as well as concentrations around the Fife coastline between Kirkcaldy and Pittenweem, and along the Lothian coast between Edinburgh and North Berwick (NatureScot and JNCC 2022; Figure 1.3). Three common scoters were recorded within the Proposed Development array area during site-specific surveys, with two in June 2020 and one in January 2021. During intertidal and nearshore surveys at the Skateraw landfall, common scoters were recorded infrequently with typically counts of fewer than 30 individuals. Peak counts of 40 in August 2020 and 47 May 2021 were recorded with all records between 500 m and 1 km from shore (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 4,700 individuals (5-year mean 2001/02-2004/05) has been calculated based on a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). WeBS data indicate that the peak mean population size has increased above the site reference population since designation (SSER 2022), reflected in the favourable condition of common scoter within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for common scoter is:

- *Maintain the population of non-breeding common scoter at a stable or increasing trend relative to the site reference population.*
- *Ensure common scoter continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to common scoter and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for common scoter within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

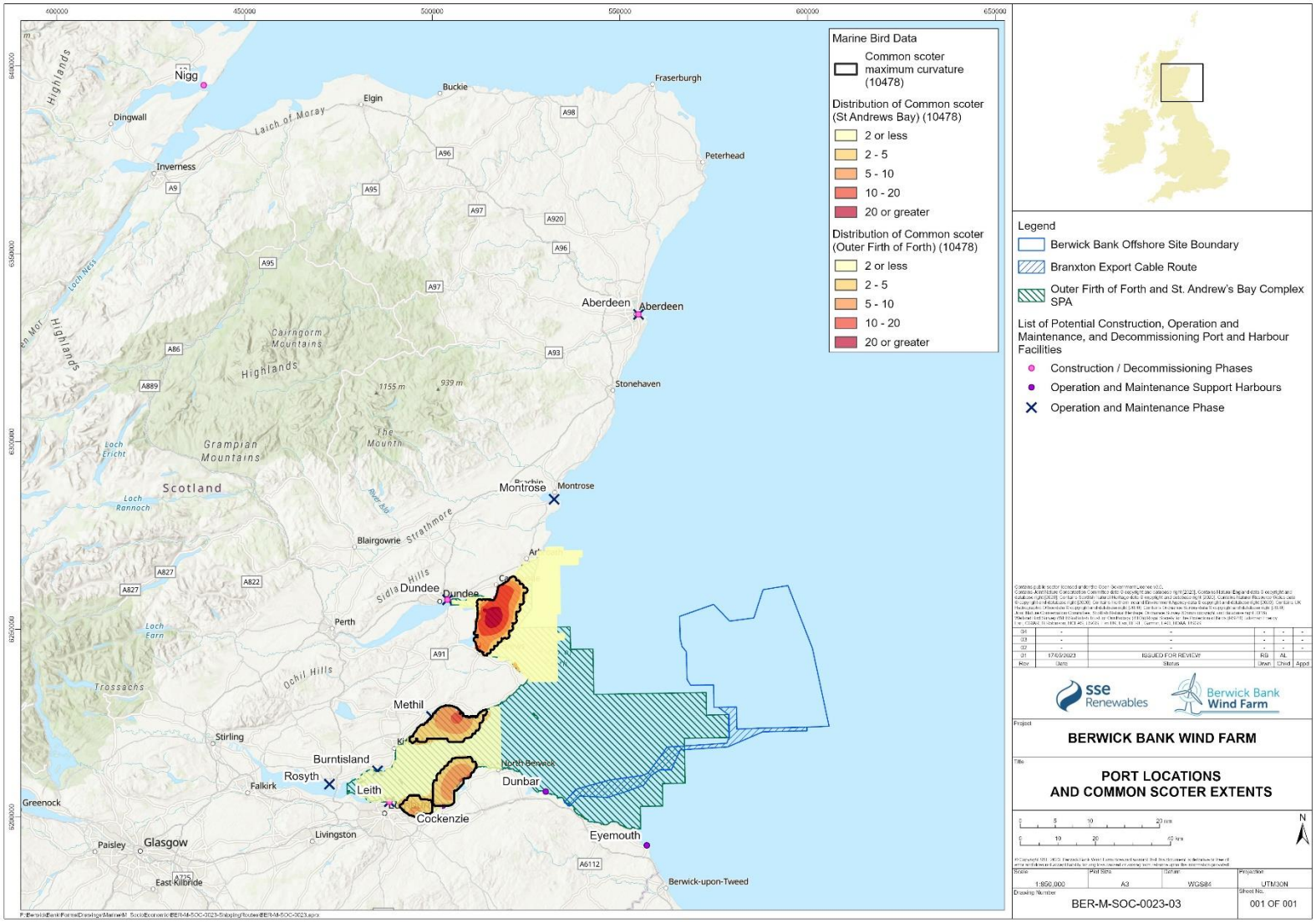

Figure 1.3: Known distribution of common scoter in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.6.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on common scoter are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of common scoter within the SPA is predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.3). Indeed, only three individuals were recorded during 24 site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1) which overlapped with 267 km^2 of the SPA.

Disturbance to common scoter during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of common scoter in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Figure 1.3). However, it is possible that disturbance to very low numbers of common scoter could occur from cable laying activities in coastal waters off East Lothian during the overwintering period, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed common scoter as having a relative high sensitivity from disturbance arising from vessels (Garthe and Hüppop 2004, Furness et al. 2013, Fliessbach et al. 2019). Studies undertaken indicate that individual common scoter may be flushed by approaching vessels at distances of between 30 m and 2 km, and for flocks a median distance of 800 m (Fliessbach et al. 2019). Common scoter have been shown to start returning to disturbed areas *c*. 180 minutes after being flushed (Schwemmer et al. 2011). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels. This may in part explain the occurrence of common scoter in proximity to existing shipping lanes within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, such as the aggregation off the Firth of Tay (Figure 1.3).

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum flushing distances 30 m and 2 km (Fliessbach et al. 2019) around the two cable laying vessels, and 100% disturbance of common scoter present in the vicinity of these activities, the area of impact could vary from between 0.003 km^2 to 32.17 km^2 (equivalent to between <0.0001% and 1.2% of the SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations

(hours to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the known aggregations of common scoters along the inner coastlines of the Firth of Forth and off the Firth of Tay, it is unlikely that significant number of common scoters use the area for foraging and/or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.3). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.3). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. The number of return trips are estimated for the entirety of the construction period, with common scoter only present in the SPA between July and April (NatureScot and JNCC 2022). Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter common scoter flocks in coastal waters (Figure 1.3). However, it is expected that common scoter present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to common scoter.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.6.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to common scoter during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of common scoter in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.3).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.6.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA common scoter population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.6.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

During construction, operation and decommissioning phases there is potential for existing marine traffic activity, including fishing and commercial vessels to cause disturbance to common scoter and therefore capable of causing an in-combination impact.

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is

predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation and maintenance activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.3). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known common scoter densities off the East Lothian coastline are negligible beyond North Berwick (SNH and JNCC 2016; Figure 1.3),

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.6.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA common scoter population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.7. Assessment of the Long-tailed Duck Population

Long-tailed duck is a winter visitor to the UK with the first birds returning in September and the winter population peaking between December and February. The Scottish wintering population is estimated to be about 15,000 individuals (Forrester et al. 2007). Long-tailed duck appear to prefer open coast habitats and can be found far offshore (Heinänen et al. 2017). However, open coast habitats are not used exclusively; wintering long-tailed ducks in Scotland are found in sheltered coastal waters, bays and sounds above the shoreline (Patterson et al. 2019), with the highest population estimated to occur in the Moray Firth. Long-tailed duck use shallow water habitats although do not appear to demonstrate a general preference for a single type of substrate reflecting their varied diet (Woodward and Humphreys 2018, NatureScot and JNCC 2022).

In the non-breeding season, long-tailed duck in the Outer Firth of Forth and St Andrews Bay Complex SPA have their highest concentrations in the Firth of Tay and the northern and central sections of the Firth of Forth (Figure 1.4). The waters are used for foraging, roosting and maintenance activities, with birds present in the SPA from mid-September until late April (NatureScot and JNCC 2022). No long-tailed duck were recorded during any of the site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1), noting that this encompassed a 16 km buffer around the Proposed Development array area and so overlapped with eastern parts of the SPA. During intertidal and

nearshore surveys single long-tailed ducks were recorded on three occasions between December 2020 and March 2021 (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 1,950 individuals (5-year mean 2001/02-2004/05) has been calculated based on a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). WeBS data indicate that the peak mean population size has increased above the site reference population since 2016/17 (SSER 2022), reflected in the favourable condition of long-tailed duck within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for long-tailed duck is:

- *Maintain the population of non-breeding long-tailed duck at a stable or increasing trend relative to the site reference population.*
- *Ensure long-tailed duck continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to long-tailed duck and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for long-tailed duck within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

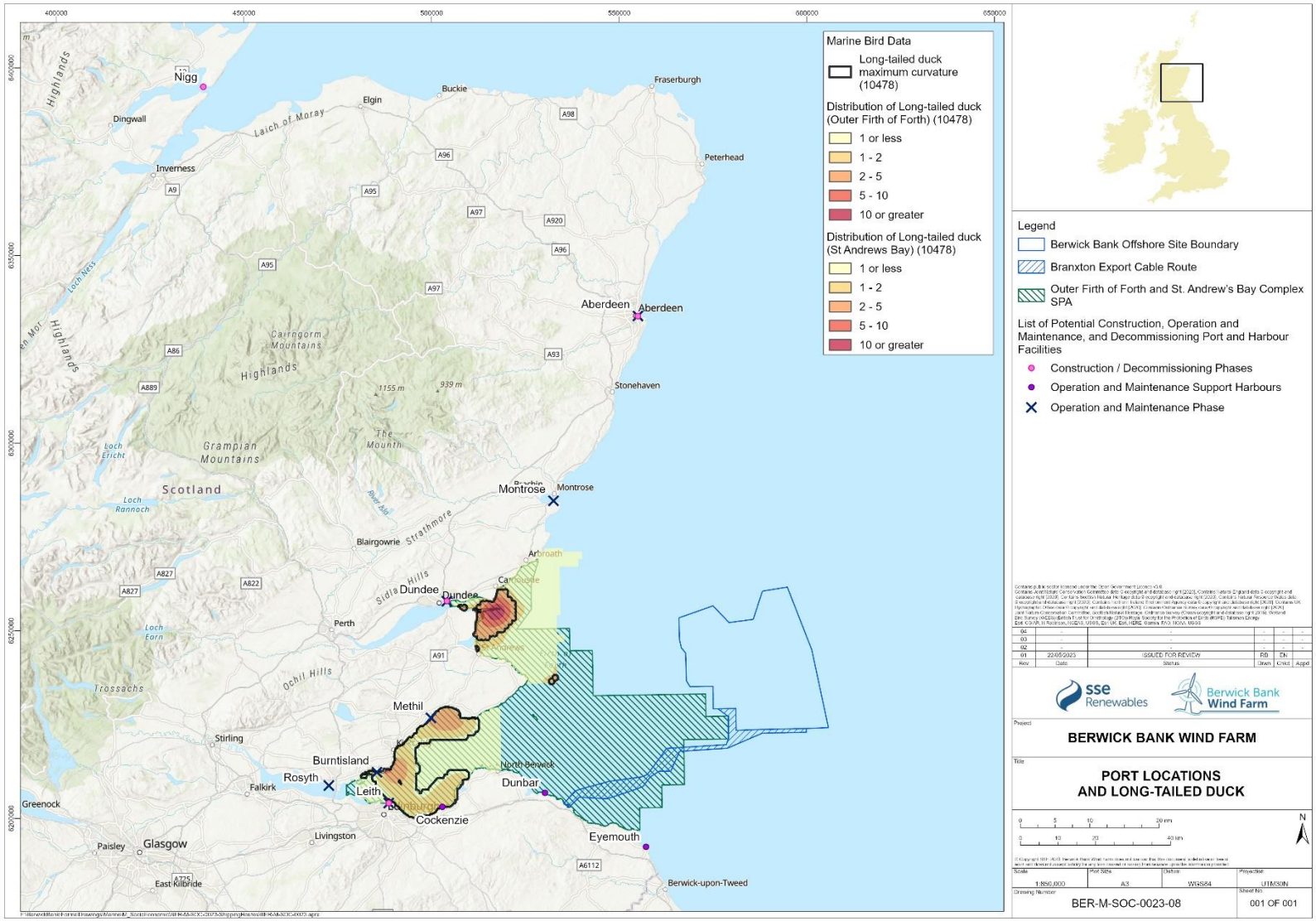

Figure 1.4: Known distribution of long-tailed duck in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.7.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on long-tailed ducks are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of long-tailed ducks within the SPA is predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Offshore EIA Report, volume 3, appendix 11.1; Figure 1.4). No long-tailed duck were recorded during site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1) which overlapped with 267 km^2 of the SPA.

Disturbance to long-tailed ducks during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of long-tailed ducks in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Figure 1.4). However, it is possible that disturbance to very low numbers of long-tailed ducks could occur from cable laying activities in coastal waters off East Lothian during the overwintering period, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed long-tailed ducks as having a moderate sensitivity from disturbance arising from vessels, with the lowest sensitivity of all the seaduck species considered (Garthe and Hüppop 2004, Furness et al. 2013, Fliessbach et al. 2019). Studies undertaken indicate that individual long-tailed ducks may be flushed by approaching vessels at distances of between 10 m and 1.5 km, and for flocks a median distance of 250 m (Fliessbach et al. 2019). Flight distances of at least 400 m were reported for long-tailed ducks disturbed by vessel activity in Orkney (Jarrett et al. 2018, 2022). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels. This may in part explain the occurrence of long-tailed ducks in proximity to existing shipping lanes within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, such as the aggregation off the Firth of Tay (Figure 1.4).

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum flushing distances 10 m and 1.5 km (Fliessbach et al. 2019) around the two cable laying vessels, and 100% disturbance of long-tailed ducks present in the vicinity of these activities, the area of impact could vary from between 0.0003 km^2 to 7.07 km^2 (equivalent to between <0.0001% and 0.26% of the SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel

will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours to days), allowing the SPA population to return to the area in a relatively short timeframe (Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the known aggregations of long-tailed ducks along the inner coastlines of the Firth of Forth and off the Firth of Tay, it is unlikely that significant number of long-tailed ducks use the area for foraging and/or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary, with long-tailed ducks having been shown to start returning to disturbed areas *c*. 180 minutes after being flushed (Schwemmer et al. 2011).

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.4). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.4). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. The number of return trips are estimated for the entirety of the construction period, with long-tailed ducks only present in the SPA between mid-September and late April (NatureScot and JNCC 2022). Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter long-tailed ducks in coastal waters (Figure 1.4). However, it is expected that long-tailed ducks present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Offshore EIA Report, volume 4, appendix 25) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to long-tailed ducks.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.7.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to long-tailed ducks during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of long-tailed ducks in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.4).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.7.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA long-tailed duck population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.7.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited

to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.4). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known long-tailed duck densities off the East Lothian coastline are negligible beyond North Berwick (SNH and JNCC 2016; Figure 1.4),

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.7.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA long-tailed duck population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.8. Assessment of the Goldeneye Population

Goldeneye is a rare breeding bird in the UK with an estimated breeding population of less than 200 pairs, of which approximately 150 pairs breed in Scotland (Woodward et al. 2020, Forrester et al. 2007). The Scottish wintering population is estimated to be between 10,000 and 12,000 individuals (Forrester et al. 2007). They are widely distributed in waters around Scotland with the highest wintering population occurring in the Firth of Forth with over 1,300 individuals counted in winter 2019/2020. They feed predominantly during the day and have a maximum dive depth of 6m (Woodward & Humphreys, 2018).

Within the Outer Firth of Forth and St Andrews Bay Complex SPA, goldeneyes are distributed predominately within the shallow waters of the Firth of Forth coastlines between September and mid-April (NatureScot and JNCC 2022). No goldeneye were recorded during any of the site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1), noting that this encompassed a 16 km buffer around the Proposed Development array area and so overlapped with eastern parts of the SPA. During intertidal and nearshore surveys, goldeneye were recorded intermittently, predominantly during the winter and passage months in relatively low numbers of no more than seven in all surveyed sectors. The peak count of seven was recorded in February 2021. Almost all birds were recorded within 500 m of the shore (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 590 individuals (5-year mean 2006/07-2010/11) has been calculated based on a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). WeBS data indicates that the peak mean population size has remained above the site reference population since at least 2001 (SSER 2022), reflected in the favourable condition of goldeneye within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for goldeneye is:

- *Maintain the population of non-breeding goldeneye at a stable or increasing trend relative to the site reference population.*
- *Ensure goldeneye continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to goldeneye and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for goldeneye within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

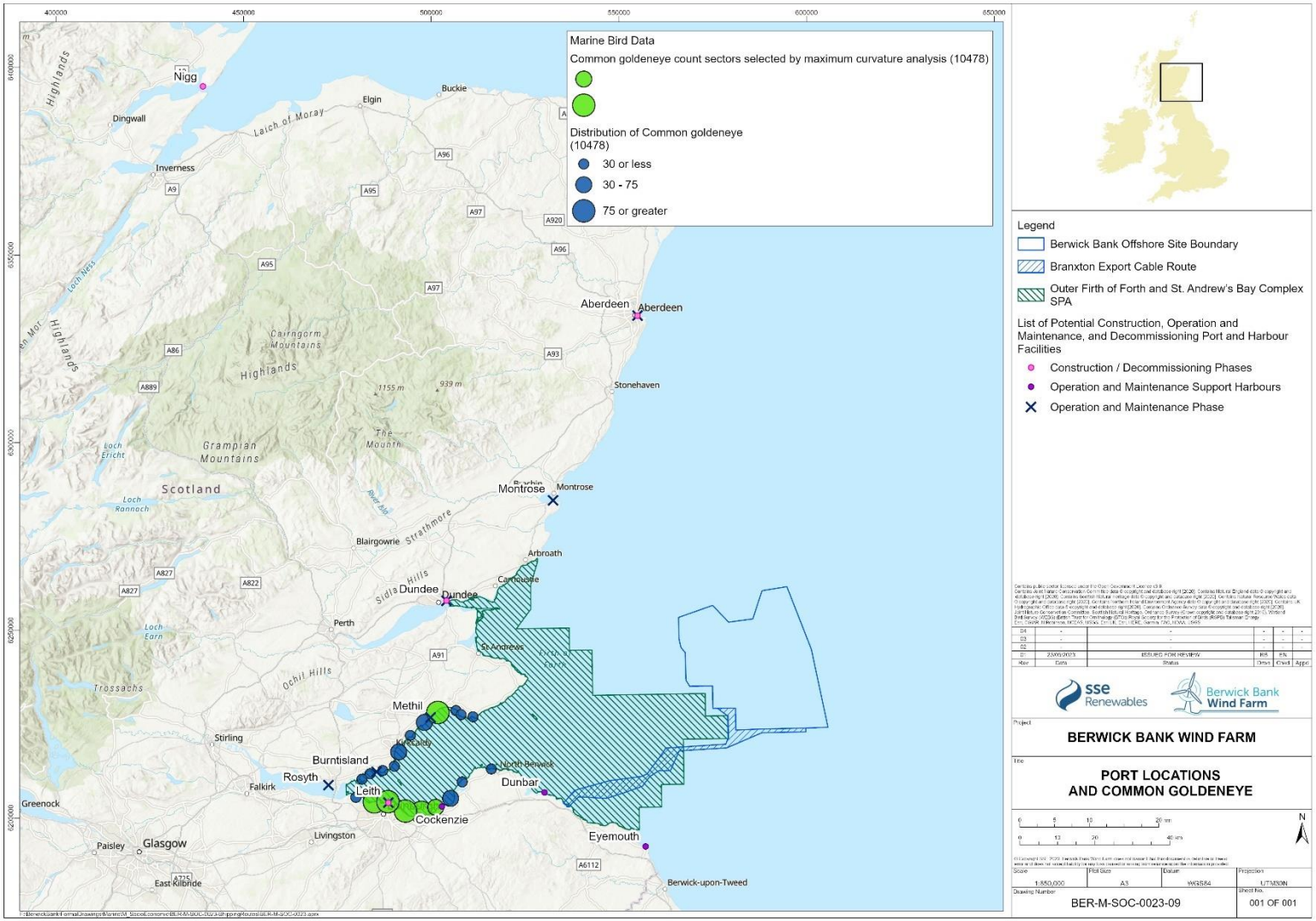

Figure 1.5: Known distribution of goldeneye in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.8.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on goldeneye are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of goldeneye within the SPA is coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.5). No goldeneye were recorded during site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1) which overlapped with 267 km^2 of the SPA.

Disturbance to goldeneye during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of goldeneye in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Figure 1.5). However, it is possible that disturbance to very low numbers of goldeneye could occur from cable laying activities in coastal waters off East Lothian during the overwintering period, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed goldeneye as having moderate to high sensitivity from disturbance arising from vessels (Furness et al. 2013). There are limited studies on the impacts from marine vessel traffic on goldeneye. Goodship and Furness (2022) suggest a disturbance buffer of between 150 m and 800 m.

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum disturbance distances of 150 m and 800 m (Goodship and Furness 2022) around the two cable laying vessels, and 100% disturbance of goldeneye present in the vicinity of these activities, the area of impact could vary from between 0.07 km^2 to 2.01 km^2 (equivalent to between <0.002% and 0.07% of the SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the known aggregations of goldeneye along the inner coastlines of the Firth of Forth and off the Firth of Tay, it is unlikely that significant number of goldeneye use the area for foraging and/or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed

Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.5). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.5). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. The number of return trips are estimated for the entirety of the construction period, with goldeneye only present in the SPA between September and mid-April (NatureScot and JNCC 2022). Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter goldeneye in coastal waters (Figure 1.5). However, it is expected that goldeneye present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to goldeneye.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.8.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to goldeneye during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of goldeneye in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.5).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.8.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA goldeneye population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.8.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

<u>Disturbance</u>

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.5). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed

Development export cable corridor. However, known goldeneye densities off the East Lothian coastline are negligible beyond North Berwick (SNH and JNCC 2016; Figure 1.5),

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.8.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA goldeneye population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.9. Assessment of the Red-breasted Merganser Population

Red-breasted merganser is a rare breeding bird in the UK, with between 16 and 47 pairs nesting in 2019. The Scottish wintering population is estimated to be between 25,000 and 30,000 individuals (Forrester et al. 2007). Their distribution in Scottish waters is widespread occurring across both east and west coasts. Along the east coast highest numbers in recent years have occurred in the Firth of Forth, Inner Moray and Beauly Firths and the Montrose Basin.

Within the Outer Firth of Forth and St Andrews Bay Complex SPA red-breasted mergansers are present throughout the year (NatureScot and JNCC 2022). Their non-breeding season is from mid-August to late March, with the wintering population in the SPA including birds from breeding grounds within Britain and Ireland, Iceland, and mainland Europe (Wernham et al. 2002; Wright et al. 2012). The distribution of red-breasted mergansers within the Outer Firth of Forth and St Andrews Bay Complex SPA is widespread along the coast within the Firth of Forth and has another area of high density at the mouth of the Firth of Tay. They use coastal habitats, normally less than 2 km from land, more usually within 850 m from shore (Craik et al. 2011). No red-breasted mergansers were recorded during any of the site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1), noting that this encompassed a 16 km buffer around the Proposed Development array area and so overlapped with eastern parts of the SPA. During intertidal and nearshore surveys, no more than five individuals were recorded during any month. Almost all birds were recorded within 500 m of the shore (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 430 individuals (5-year mean 2006/07-2010/11) has been calculated based on a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). WeBS data indicates that the peak mean population size has fluctuated but remained above the site reference population since at least 2001 (SSER 2022), reflected in the favourable condition of red-breasted merganser within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for red-breasted merganser is:

- *Maintain the population of non-breeding red-breasted merganser at a stable or increasing trend relative to the site reference population.*

- *Ensure red-breasted merganser continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to red-breasted merganser and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for red-breasted merganser within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

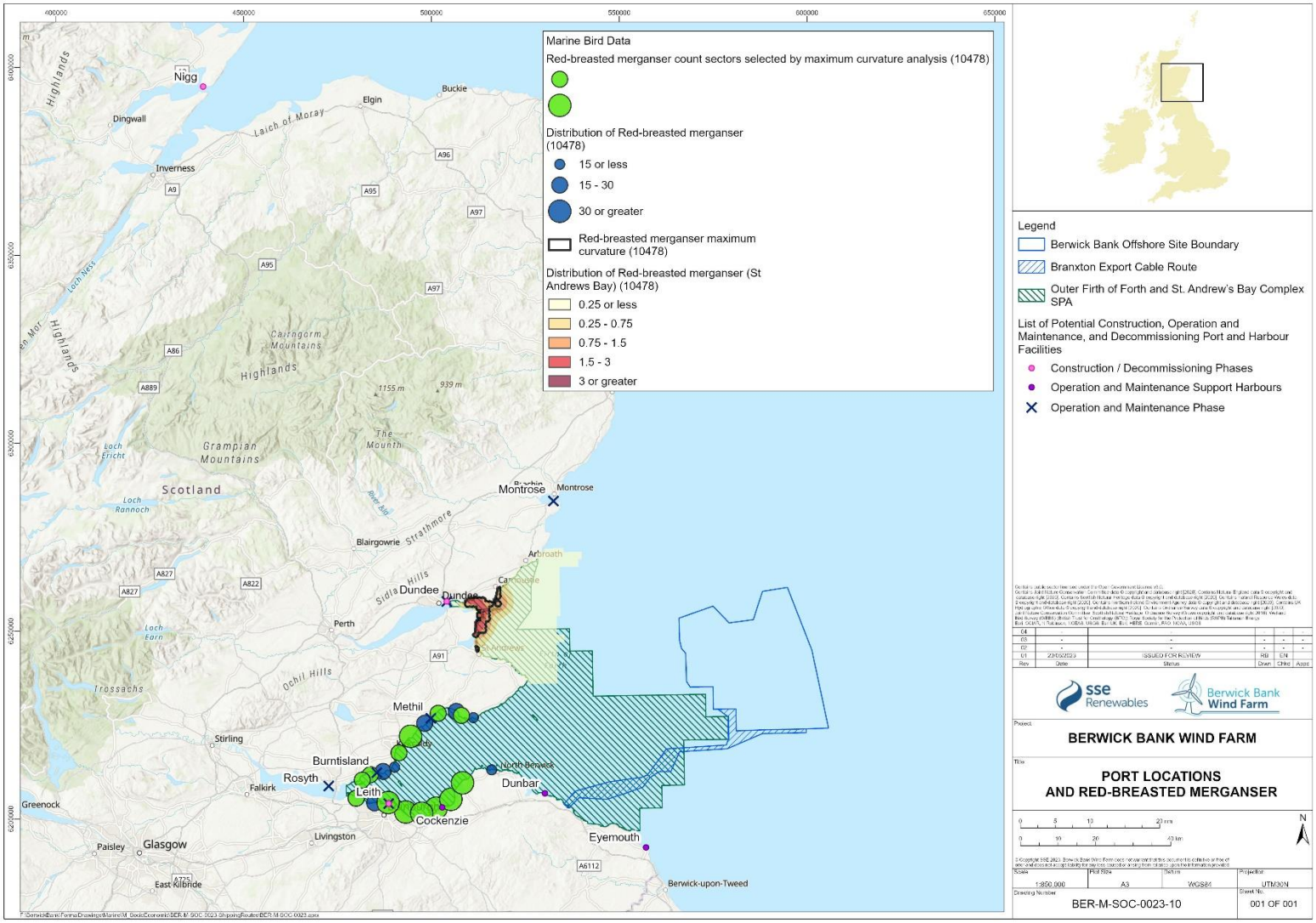

Figure 1.6: Known distribution of red-breasted merganser in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.9.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on red-breasted merganser are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of red-breasted mergansers within the SPA is predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.6), with none recorded during the site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1), which overlapped with 267 km^2 of the SPA.

Disturbance to red-breasted merganser during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of red-breasted merganser in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Figure 1.6). However, it is possible that disturbance to very low numbers of red-breasted mergansers could occur from cable laying activities in coastal waters off East Lothian during the overwintering period, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed red-breasted merganser as having a relative high sensitivity from disturbance arising from vessels (Fliessbach et al. 2019). Studies undertaken indicate that individual red-breasted mergansers may be flushed by approaching vessels at distances of between 120 m and 2 km, and for flocks a median distance of 500 m (Fliessbach et al. 2019). Red-breasted mergansers have been shown to start returning to disturbed areas *c*. 30 minutes after being flushed (Jarrett et al. 2018). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels. This may in part explain the occurrence of red-breasted mergansers in proximity to existing shipping lanes within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, such as the aggregation off the Firth of Tay (Figure 1.6).

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum flushing distances 120 m and 2 km (Fliessbach et al. 2019) around the two cable laying vessels, and 100% disturbance of red-breasted mergansers present in the vicinity of these activities, the area of impact could vary from between 0.07 km^2 to 32.17 km^2 (equivalent to between <0.002% and 1.2% of the SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short

durations (hours to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Jarrett et al. 2018). Given the distance between the Proposed Development export cable corridor and the known aggregations of red-breasted mergansers along the inner coastlines of the Firth of Forth and off the Firth of Tay, it is unlikely that significant number of red-breasted mergansers use the area for foraging, moulting or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.6). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.6). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter red-breasted mergansers in coastal waters (Figure 1.6). However, it is expected that red-breasted mergansers present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to red-breasted mergansers.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.9.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to red-breasted mergansers during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of

red-breasted mergansers in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.6).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.9.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA red-breasted merganser population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.9.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.6). There will also be some spatial overlap between vessels transiting from Eyemouth for

maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known red-breasted merganser densities off the East Lothian coastline are negligible beyond North Berwick (SNH and JNCC 2016; Figure 1.6),

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.9.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA red-breasted merganser population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.10. Assessment of the Red-throated Diver Population

Red-throated diver is a scarce breeding bird in the UK, with an estimated 1,255 breeding pairs, all of which breeding in northern and north-west Scotland (Woodward et al. 2020, Forrester et al. 2007). The Scottish wintering population is estimated to be 2,270 individuals (Forrester et al. 2007). They use inshore waters for foraging, resting, and other maintenance activities, diving to depths typically less than 9 m (McCluskie et al. 2012; Robbins 2017). They undergo a post-breeding flightless moult commencing sometime between late September and December (NatureScot and JNCC 2022).

They are widely distributed in waters around Scotland with the highest wintering population occurring along the east coast, including the Firth of Forth. Within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, red-throated divers are present between mid-September and late March, with high concentrations recorded off St Andrews Bay and the Firth of Tay (NatureScot and JNCC 2022; Figure 1.7). Red-throated divers were occasionally recorded within the Proposed Development array area in late spring and early winter, with a peak density of 0.05 birds/km^2 (95%CI 0.02 – 0.09) occurring in November 2020 to the north-west of the Proposed Development array area (Offshore EIA Report, volume 3, appendix 11.1). During intertidal and nearshore surveys red-throated divers were recorded frequently throughout the Survey Area during the autumn passage and early winter months. Numbers were relatively low, with an overall peak count of just nine individuals (December 2020), with records generally recorded between 0-1 km from the shore (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 850 individuals (4-year mean 2001/02-2004/05) has been calculated based on a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). WeBS data indicate that the peak mean population size has remained relatively stable since 2001, although there may have been a slight decrease over the years (SSER 2022). Red-throated divers are considered to be in favourable condition within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for red-throated diver is:

- *Maintain the population of non-breeding red-throated diver at a stable or increasing trend relative to the site reference population.*

- *Ensure red-throated diver continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to red-throated diver and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for red-throated diver within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

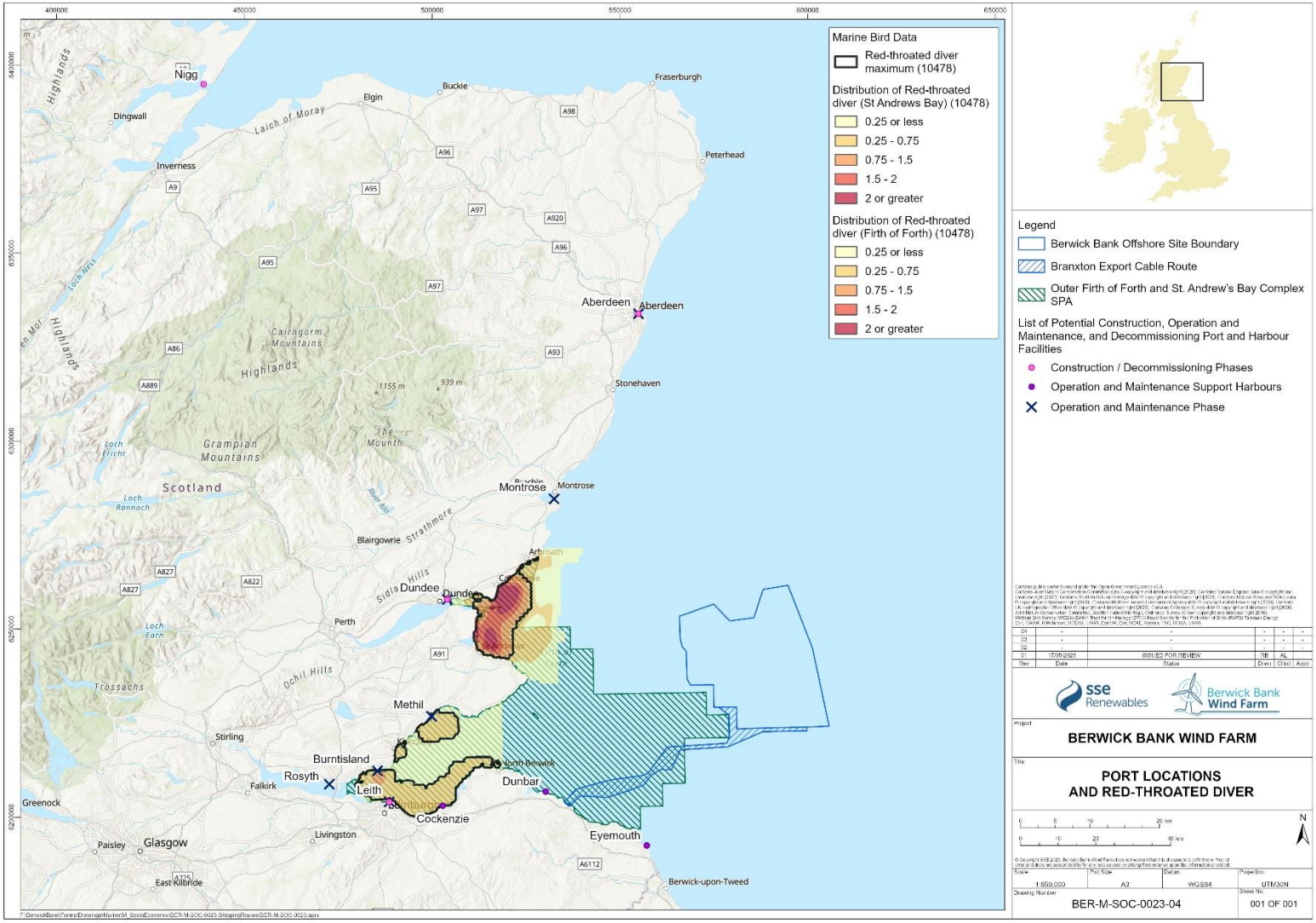

Figure 1.7 Known distribution of red-throated diver in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.10.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on red-throated diver are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of red-throated diver within the SPA is predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.7). Red-throated divers were recorded in very low densities during the site-specific surveys undertaken across the Offshore Ornithology Study Area (peak 0.05 birds/km^2; Offshore EIA Report, volume 3, appendix 11.1).

Disturbance to red-throated diver during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of red-throated diver in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Figure 1.7). However, it is possible that disturbance to very low numbers of red-throated divers could occur from cable laying activities in coastal waters off East Lothian during the overwintering period, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed red-throated as having a relative high sensitivity from disturbance arising from vessels (Garthe and Hüppop 2004, Furness et al. 2013, Fliessbach et al. 2019). Studies undertaken indicate that individual red-throated diver may be flushed by approaching vessels at distances of between 250 m and 1.75 km, and for flocks a median distance of 600 m (Fliessbach et al. 2019). Similar studies have reported up to 5% of individual red-throated divers and 15% of flocks were disturbed by vessels from between 800 m and 1 km away, the majority of which remained to within 600 m of a moving vessel. Up to 67% of all individual red-throated divers were not flushed until the vessel was within 200 m of them. The study also indicated that flocks of red-throated divers were more sensitive than individuals (Norman and Ellis 2005). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels. This may in part explain the occurrence of red-throated diver in proximity to existing shipping lanes within the Outer Firth of Forth and St. Andrew's Bay Complex SPA, such as the aggregation off the Firth of Tay (Figure 1.7).

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum flushing distances 250 m and 1.75 km (Fliessbach et al. 2019) around the two cable laying vessels, and 100% disturbance of red-throated diver present in the vicinity of these activities, the area of impact could vary from between 0.19 km^2 and 9.62 km^2 (equivalent to between <0.04% of the SPA and

0.35% of the entire SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the highest aggregations of red-throated divers off St. Andrews Bay and the Firth of Tay, it is unlikely that significant numbers of red-throated divers use the area for foraging and/or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from port. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.7). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.7). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. The number of return trips are estimated for the entirety of the construction period, with red-throated divers only present in the SPA between mid-September and late March. Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith and Dundee having the potential to encounter red-throated divers in coastal waters (Figure 1.7). However, it is expected that red-throated divers present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to red-throated divers.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.10.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to red-throated divers during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of red-throated divers in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.7).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.10.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA red-throated diver population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.10.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap

temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.7). There will be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known red-throated diver densities off the East Lothian coastline are negligible beyond North Berwick (SNH and JNCC 2016; Figure 1.7).

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.10.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA red-throated diver population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.11. Assessment of the Slavonian Grebe Population

Slavonian grebe is a rare breeding bird in the UK, with less than 30 breeding pairs, all of which breed in Scotland (Woodward et al. 2020, Forrester et al. 2007). The Scottish wintering population is estimated to be between 300 and 500 individuals (Forrester et al. 2007). They are widely distributed in waters around Scotland with the highest wintering population occurring around the islands of Orkney, the Moray Firth and the Firth of Forth.

The distribution of Slavonian grebes within the Outer Firth of Forth and St Andrews Bay Complex SPA occur in both the major estuaries of the firths, but are more abundant in the Forth (NatureScot and JNCC 2022). The sheltered, inshore marine areas are used for foraging, roosting and maintenance activities. Foraging is largely restricted to water depths from 4-14m, with an optimum water depth of 6-9m (Sonntag et al. 2009). They are present at the Outer Firth of Forth and St Andrews Bay Complex SPA from mid-September until late April (NatureScot and JNCC 2022). Slavonian grebe were not recorded within the Proposed Development array area (Offshore EIA Report, volume 3, appendix 11.1), noting that this encompassed a 16 km buffer around the Proposed Development array area and so overlapped with eastern parts of the SPA. During intertidal and nearshore surveys, a single Slavonian grebe was recorded in March 2021 (Offshore EIA Report, volume 3, appendix 11.1).

The site reference population of 30 individuals has been calculated based on a multi-year programme of aerial, boat-based and land-based surveys (Lawson et al. 2015). WeBS data indicates that the peak mean population size has decreased since 2006 but has remained largely above the site reference populations

(SSER 2022), reflected in the favourable condition of Slavonian grebe within the Outer Firth of Forth and St. Andrew's Bay Complex SPA (Table 3).

Species-specific advice for Slavonian grebe is:

- *Maintain the population of non-breeding Slavonian grebe at a stable or increasing trend relative to the site reference population.*
- *Ensure Slavonian grebe continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to Slavonian grebe and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for Slavonian grebe within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

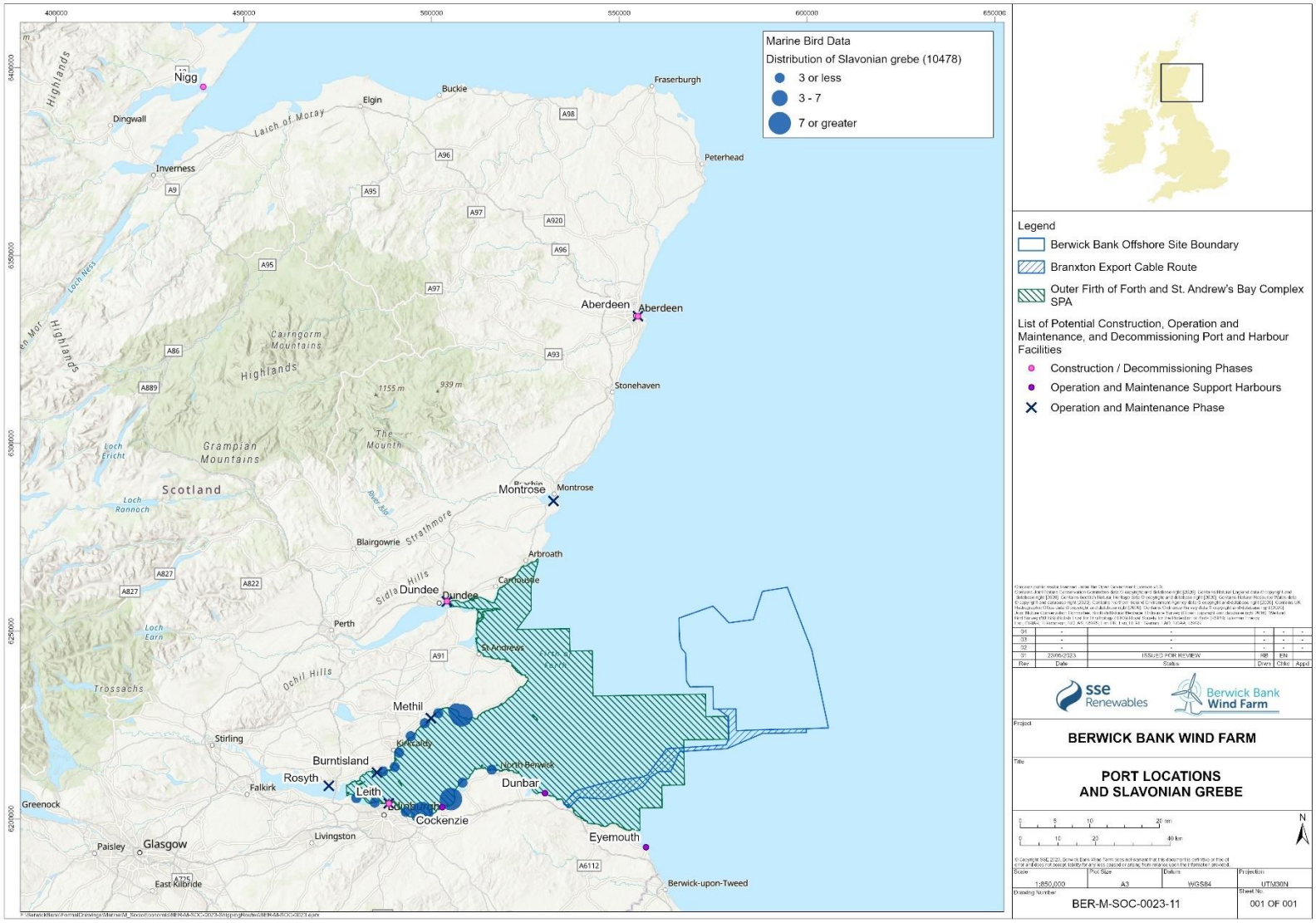

Figure 1.8: Known distribution of Slavonian grebe in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.11.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on Slavonian grebe are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of Slavonian grebe within the SPA is predominantly coastal (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Figure 1.8), and none were recorded during site-specific surveys undertaken across the Offshore Ornithology Study Area (Offshore EIA Report, volume 3, appendix 11.1), which overlapped with 267 km^2 of the SPA.

Disturbance to Slavonian grebe during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of Slavonian grebe in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Offshore EIA Report, volume 3, appendix 11.1; Figure 1.8). However, it is possible that disturbance to very low numbers of Slavonian grebe could occur from cable laying activities in coastal waters off East Lothian during the overwintering period, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed Slavonian grebe are assessed as being moderately sensitive to disturbance arising from vessels by Goodship and Furness (2022). However, Jarrett et al. (2022) indicated that Slavonian grebe exhibit relatively high levels of behavioural and flight response to approaching vessels and therefore may be considered to be very highly sensitive to vessel disturbance. Studies undertaken indicate that individual Slavonian grebe may be flushed by approaching vessels at distances of between 30 m and 1.1 km, and for flocks a median distance of 265 m (Fliessbach et al. 2019). Studies indicate that where there is occasional or temporary disturbances there are no significant changes in abundance within 30 minutes of the vessel's departure (Jarrett et al. 2018). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels.

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming minimum and maximum flushing distances 30 m and 1.1 km (Fliessbach et al. 2019) around the two cable laying vessels, and 100% disturbance of Slavonian grebe present in the vicinity of these activities, the area of impact could vary from between 0.003 km^2 to 3.81 km^2 (equivalent to between <0.001% and 0.14% of the SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst

there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Jarrett et al. 2018). Given the distance between the Proposed Development export cable corridor and the known distribution of Slavonian grebe along the inner coastlines of the Firth of Forth, it is highly unlikely that significant number of Slavonian grebe use the area for foraging and/or roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.8). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.8). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. The number of return trips are estimated for the entirety of the construction period, with Slavonian grebe only present in the SPA from mid-September until late April (NatureScot and JNCC 2022). Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Leith having the potential to encounter Slavonian grebes in coastal waters (Figure 1.8). However, it is expected that Slavonian grebe present in this area are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to Slavonian grebe.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.11.2. Project Alone: Operation and Maintenance

<u>Disturbance</u>

Disturbance to Slavonian grebe during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of Slavonian grebe in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.8).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.11.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA Slavonian grebe population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.11.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

<u>Disturbance</u>

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial

overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.8). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known Slavonian grebe densities off the East Lothian coastline are negligible beyond North Berwick (SNH and JNCC 2016; Figure 1.8),

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.11.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA Slavonian grebe population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

2.12. Assessment of the Shag Population

Shags are a resident UK species and are present within the Outer Firth of Forth and St Andrews Bay Complex SPA throughout the year (NatureScot and JNCC 2022). Their non-breeding period is from late September to early February, and their main breeding period is from March to September. The foraging distribution of breeding shags within the Outer Firth of Forth and St Andrews Bay Complex SPA is largely concentrated around the Isle of May and other breeding colonies on the inner and outer Forth Islands. The winter distribution is considered to closely resemble that during the breeding season, but is not as localised around the breeding colonies, given that the species is a partial migrant. Wintering shags from the Isle of May have been recorded roosting up 486 km north and 136 km south of their breeding colony (Grist et al. 2014). Shags feed diurnally and tend to forage relatively close to land (mean maximum foraging distance is 13.2+/-10.5km; Woodward et al. 2019).

Shags were only recorded twice in the Offshore Ornithology Study Area, on the June 2019 and December 2020 surveys. Design-based density estimates for June 2019 were 0.01 birds/km^2 (95%CI 0.00 – 0.02), equating to a population estimate of 25 birds (95% CI 0 –72). The mean seasonal peak population estimate for the breeding season was 12 birds (95% CI 0 – 36) compared to the non-breeding season, where five birds (95%CI 0 – 12) were estimated to be present (Offshore EIA Report, volume 3, appendix 11.1).

During intertidal and nearshore surveys shags were present in the Survey Area throughout the year, although numbers were generally low. Typically, there were no more than eleven individuals recorded and a peak count of 21 in April 2020. The majority of shags were observed within 0-500 m from the shore (Offshore EIA Report, volume 3, appendix 11.1).

Shags using the Outer Firth of Forth and St Andrews Bay Complex SPA include those breeding at the Forth Islands SPA. Consequently, the Forth Islands SPA population is considered functionally linked to the Outer Firth of Forth and St Andrews Bay Complex SPA. The latest assessment of shag numbers at the Forth Islands SPA (2016) showed they are in unfavourable condition due to a decline of over 63% of the population since designation in 1990. No trend information is currently available for their non-breeding populations within the SPA.

Species-specific advice for shag is:

- *Maintain the population of non-breeding shag at a stable or increasing trend relative to the site reference population.*
- *Ensure shag continue to have access to, and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site.*
- *Avoid significant disturbance to shag and ensure individuals can move safely between these areas within the site.*
- *Maintain the extent and distribution of the supporting habitats for shag within the site.*
- *Maintain the variety and abundance of food resources and the condition of supporting habitats and associated processes.*
- *Existing water quality should be maintained and any increase in nutrients, turbidity or contaminants where this could reduce supporting habitats and/or prey, should be avoided.*

Given that this RIAA Addendum is provided for a single relevant effect pathway, disturbance effects from construction and operational vessel activity, the main focus of the assessment for this SPA population is concerned with the conservation objective to *ensure the distribution of the qualifying feature is maintained throughout the site by avoiding significant disturbance of the species* along with the associated species-specific advice.

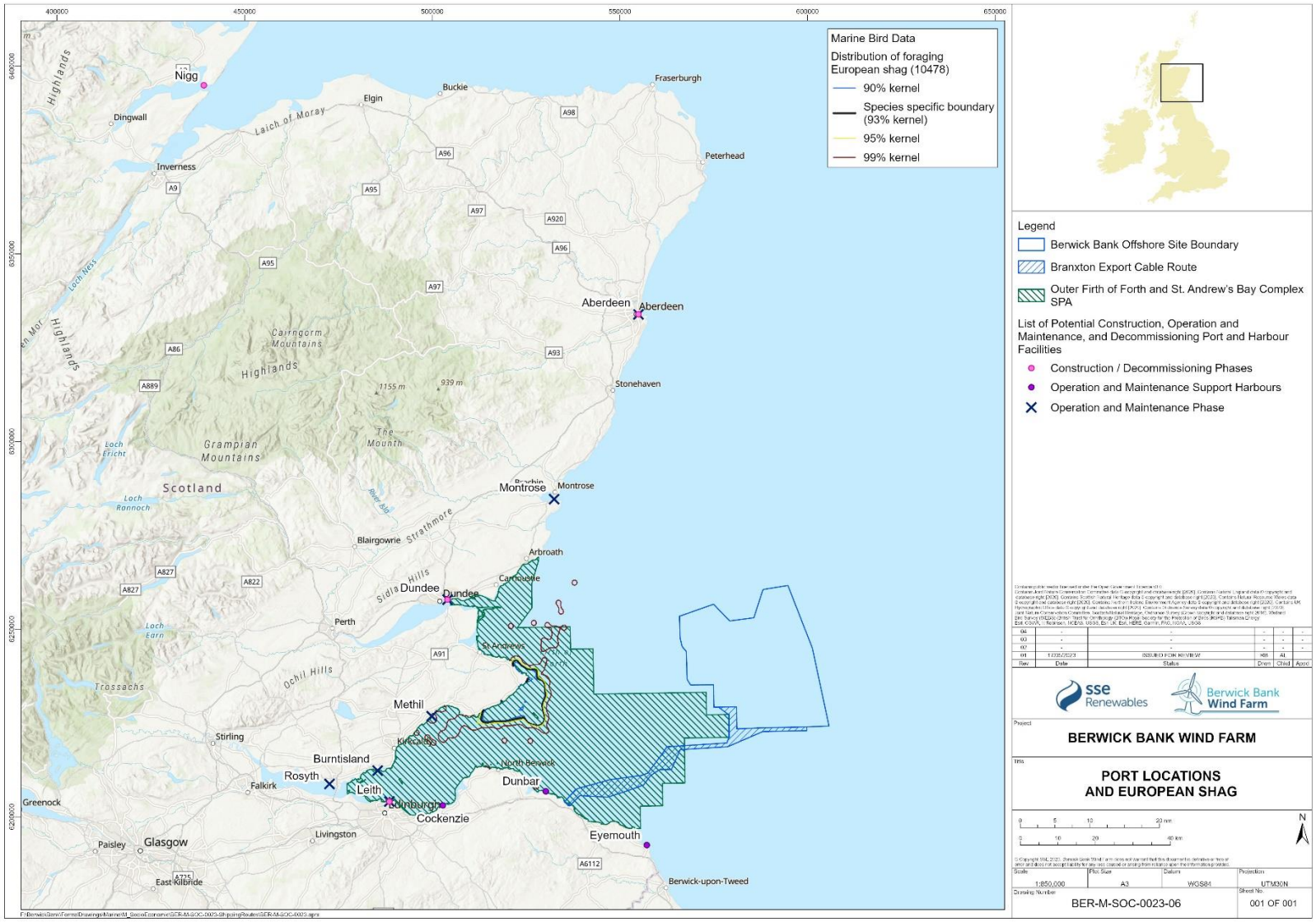

Figure 1.9 Known distribution of shags in the Outer Firth of Forth and St. Andrew's Bay Complex SPA in relation to the SPA boundary and possible port locations for the construction and operational phases of the Proposed Development.

2.12.1. Project Alone: Construction and Decommissioning

Disturbance

The Proposed Development array area lies 2 km outside the SPA and no impacts on shag are predicted to arise from construction activities occurring within the Proposed Development array area given that the known distribution of shag within the SPA is predominantly coastal given their foraging range (Lawson et al. 2015, SNH 2015, SNH and JNCC 2016; Woodward et al. 2019; Figure 1.9). Indeed, shags were recorded twice during the site-specific surveys undertaken across the Offshore Ornithology Study Area, in very low densities (0.01 birds/km^2; Offshore EIA Report, volume 3, appendix 11.1).

Disturbance to shag during the construction phase may arise within the Proposed Development export cable corridor as it crosses the SPA in nearshore waters, as a result of increased vessel movements, as well as from other activities directly associated with the installation of the export cable. Known densities of shags in proximity to the Proposed Development export cable corridor and the landfall at Skateraw are negligible (SNH and JNCC 2016; NatureScot and JNCC 2022; Figure 1.9). However, it is possible that disturbance to very low numbers of shags could occur from cable laying activities in coastal waters off East Lothian, based on the results of the intertidal and nearshore surveys undertaken for the Proposed Development.

Reviews of the sensitivity of different seabird species to disturbance from vessels have assessed shag as having a relative moderate sensitivity from disturbance arising from vessels (Furness et al. 2013). Studies indicate that shag may be disturbed by motorised craft at a mean distance of 500 m, although flight responses typically occur when a vessel is within 200 – 300 m (Goodship and Furness 2022, Jarrett et al. 2018). Faster moving ships with less predictable behaviour are likely to cause greatest disturbance (Schwemmer et al. 2011) and it is possible that birds will suffer less disturbance, and may habituate to an extent, to slower-moving vessels.

Throughout pre-installation and construction of the Proposed Development export cable corridor, the maximum design scenario is for up to 1,757 return trips of up to 14 vessels over a maximum 96-month construction duration (averaging at 18 return trips per month; Table 2). This would comprise a maximum of two pre-installation vessels within the Proposed Development export cable corridor at any one time, and 12 construction vessels associated with cable laying and landfall works (Table 2). These movements will be limited in the spatial extent to within the Proposed Development export cable corridor, which encompasses a maximum of 6.2% of the SPA (168 km^2 of the 2,720.68 km^2 Outer Firth of Forth and St Andrews Complex SPA). In practice, the affected area will be much smaller in extent since construction activities will not occur simultaneously across the entirety of the Proposed Development export cable corridor but will be undertaken within discrete areas as cable laying activities progress. Assuming a mean reported disturbance distance of 500 m (Goodship and Furness 2019) around the two cable laying vessels, and 100% disturbance of shags present in the vicinity of these activities, the area of impact is estimated to be 0.5 km^2 (equivalent to 0.02% of the entire SPA). It is likely that any supporting vessels would be in the immediate vicinity of the cable laying vessels and so the displacement effect from those additional vessels would be included within this buffer. It is anticipated that these vessels will be present intermittently over the 96-month construction period and whilst there may be a number of vessels present during each stage of installation, it is likely that each vessel will only be present in any one area of the Proposed Development export cable corridor for very short durations (hours to days), allowing the SPA population to return to the area in a relatively short timeframe (e.g. Schwemmer et al. 2011). Given the distance between the Proposed Development export cable corridor and the highest aggregations of shags off the Isle of May and Fife coastline (Figure 1.9), it is unlikely that significant numbers of shags use the area for foraging and roosting. Consequently, it is predicted that any disturbance arising from cable installation in the Proposed

Development export cable corridor would at most affect relatively small numbers of birds and will be localised and temporary.

It is also possible that an uplift in vessel and helicopter activity associated with construction of the Proposed Development array area may occur elsewhere within the SPA, as vessels and helicopters mobilise to and from shore. Ports used for construction activities within the Proposed Development array area are currently unknown at this stage, although it is likely that a number of ports in the region would be utilised across the 96-month installation period (Figure 1.9). Throughout pre-installation and construction of the Proposed Development array area (including boulder and sandwave clearance, installation of foundations, OSP/offshore convertor station platforms and inter-array cables), a maximum of 9,727 return trips (11,484 return trips minus 1,757 return trips; Table 2) of up to 132 vessels (146 minus 14; Table 2) over a maximum 96-month construction duration (averaging at *c*.100 return trips per month) is predicted across a number of possible shipping routes (Figure 1.9). Up to 3,214 return trips from a maximum of 13 helicopters are also predicted for crew transfer purposes. Construction vessels and associated helicopter activity would follow existing shipping routes to/from ports as far as possible, and be present intermittently over the construction period. Depending upon the location of the port and/or airfield, vessels and helicopters mobilising to the Proposed Development array area may not traverse the SPA at all, with only those mobilising from Dundee having the potential to encounter higher aggregations of shags in coastal waters (Figure 1.9). However, it is expected that shags present in these areas are to some extent habituated to such movements within existing commercial shipping routes to/from these ports. Indeed, the number of vessel arrivals at ports on the east coast of Scotland, as reported by the Department for Transport, show that as a collective, ports in the Forth are the most frequented commercial ports in the area, followed by Aberdeen (Offshore EIA Report, volume 2, chapter 13). Within the Proposed Development Shipping and Navigation Study Area, which overlaps with the Outer Firth of Forth and St Andrews Complex SPA, there were 16 vessel movements/day in the winter (*c*. 480 movements per month) and 14 vessel movements/day in the summer (*c*. 420 per month) (Offshore EIA Report, volume 2, chapter 13). Routine embedded mitigation measures of standard best practice in relation to strict navigational protocols and Project Codes of Conduct included as part of the NSVMP (Table 3) will be issued to all project vessel operators. This would include adherence to the Scottish Marine Wildlife Watching Code in order to minimise the potential for any additional disturbance to shags.

The potential for disturbance effects during decommissioning is assumed to be the same (or less) as for construction, noting that the duration of the decommissioning phase will not exceed that of construction, and may be shorter. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel and helicopter activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.12.2. Project Alone: Operation and Maintenance

Disturbance

Disturbance to shags during the operation and maintenance phase may arise within the Proposed Development export cable corridor as it crosses the SPA, as a result of vessels used during routine inspections and repairs. However, as for construction and decommissioning, known densities of shags in proximity to the Proposed Development export cable corridor and the landfall are negligible (SNH and JNCC 2016; Figure 1.9).

Throughout the Proposed Development including both the array area and the offshore export cable corridor, a maximum scenario of up to 871 return vessel trips are anticipated per year (averaging at *c*.73 return trips per month; Table 2). A single drone may be used for blade inspections, with up to 12 return trips expected over the lifetime of the project (approximately 1 every 3 years). It is likely that the drone will be operated from a vessel within the Proposed Development array area such as an SOV, and as such drone movements will be restricted to the vicinity of the turbine under inspection. Within the Proposed Development export

cable corridor, a single cable survey vessel is anticipated to make one return trip per year, with a single cable repair vessel and excavator/backhoe dredger anticipated to make up to five return trips each throughout the operational lifetime of the Proposed Development (175 return trips over 35 years; see Table 2). Ports used for operational and maintenance activities within the Proposed Development are currently unknown at this stage, although it is likely that a single port would be utilised as an O&M base during operation.

Potential disturbance impacts arising from operational and maintenance vessel activity within the SPA will therefore be less than those arising during the construction and decommissioning phases, with vessel activity within the Proposed Development export cable corridor reducing by *c*.90% compared to construction (175 return trips during operation vs. 1,757 return trips during construction; Table 2). Therefore, it is concluded that disturbance effects arising from operational and maintenance vessel and drone activity would not result in an adverse effect on this SPA population from the Proposed Development alone.

2.12.3. Project Alone: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development alone on the Outer Firth and Forth and St Andrews Bay Complex SPA shag population are predicted to be spatially restricted, with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone on this SPA population.

2.12.4. Effects In-Combination: Construction, Operation, Maintenance and Decommissioning

Disturbance

Existing and planned offshore wind farms: Inch Cape, Neart na Gaoithe, Seagreen 1 and Seagreen 1A could all have potential to cause in-combination impacts within the SPA (see SSER 2022). However, it is predicted that construction activities for these developments which could cause an in-combination impact will be completed prior to the commencement of construction for the Proposed Development. There is potential for operation, maintenance and decommissioning activities at these developments to overlap temporally with construction and operation of the Proposed Development. Vessel movements will be limited to transiting to and within array areas and export cable corridors, following existing shipping routes to/from the ports of Montrose (Inch Cape, Seagreen 1 and Seagreen 1A) and Eyemouth (Neart na Gaoithe). Spatial overlap with operational and maintenance vessel activities for Inch Cape, Seagreen 1 and Seagreen 1A may occur should the Proposed Development use Montrose as an O&M base as well. However, it is likely that vessel movements between Montrose and the Proposed Development would not overlap with the SPA (Figure 1.9). There will also be some spatial overlap between vessels transiting from Eyemouth for maintenance activities at Neart na Gaoithe, and construction activities occurring within the Proposed Development export cable corridor. However, known shag densities off the East Lothian coastline are negligible (SNH and JNCC 2016; Figure 1.9).

All wind farm vessels will be required to adhere to strict navigational protocols as routine embedded mitigation outlined in NSVMPs (Table 3), which will further reduce the potential for any disturbance. Therefore, it is concluded that disturbance effects arising from construction and decommissioning vessel activity would not result in an adverse effect on this SPA population from the Proposed Development alone and in-combination with other projects, including existing and planned Forth and Tay wind farms.

2.12.5. In-combination: Conclusion

Potential disturbance effects arising from an uplift in vessel activity from the Proposed Development in-combination with other plans and projects on the Outer Firth and Forth and St Andrews Bay Complex SPA shag population are predicted to be spatially restricted with transiting vessels adhering to routine embedded mitigation measures, following existing shipping routes where possible, and only present in any one area for very short durations. It is therefore predicted that there will be no adverse effect from the Proposed Development alone or in-combination on this SPA population.

3. Site Conclusion

In conclusion, with reference to the draft conservation objectives set for the features covered by this RIAA Addendum, it can be concluded that there is no potential for an Adverse Effect on Integrity on the Outer Firth of Forth and St. Andrew's Bay Complex SPA. This finding is in relation to potential impacts from vessel disturbance associated with the Proposed Development in any or all phases, acting alone and or in-combination.

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