

Invitation To Tender (ITT) Lindisfarne National Nature Reserve (LNNR) waders and waterfowl bird high tide disturbance survey 2022-2023.

SPECIFICATION OF REQUIREMENTS

This Section sets out the Authority's requirements.

1. Introduction

Natural England is seeking to procure a Contractor to undertake the following project:

- 1.1** Analyse field survey data on the distribution and abundance of waders and waterfowl and human activities, and on the interactions between them during selected tidal timings around the high tide roost period on the Lindisfarne National Nature Reserve (LNNR) during autumn-winter 2022-2023.
- 1.2** The contractor would also plan and coordinate (with the assistance of the LNNR senior reserve manager and the NE project manager) field survey data collection from stations of the LNNR carried out by NE staff, and other contracted ornithologists (separate contract). Data would be collected from October-November to end of December 2022 (Period 1) and January to end of March 2023 (Period 2).
- 1.3** Note: The requirements of the project include regularly surveying the abundance and distribution of SPA birds and of human activities (and to record the responses of birds to human activities) over as large an area and with as fine a spatial resolution as practical. This aspect of the project will be carried out by NE staff, and other contracted ornithologists (separate contract).
- 1.4** The Contractor would then conduct robust statistical analyses that will ascertain if anthropogenic activities are causing detectable levels of disturbance to and/or displacement of any species of waders and wildfowl (including avoidance of areas), and to determine the spatial and temporal scale over which any such effects are manifest (within WeBS High Tide [HT] sectors, between HT sectors or site wide).
- 1.5** Please provide costings for the LNNR planning, data processing and analyses et cetera (section 5.1)
- 1.6** The contractor will be expected to undertake quality assurance on work delivered and ensure it is compliant with the requirements of the Joint Code of Practice for Research (see: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/413154/pb13725-research-code-practice.pdf)

2. Background

2.1 LNNR details

Lindisfarne Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site, within the Lindisfarne NNR, lie on the north east coast on England in the county of Northumberland. The intertidal flats around Lindisfarne constitute the largest area of intertidal habitat on the north-east English coast between the Scottish border at Berwick upon Tweed to the north and the Tees Estuary to the south. Lindisfarne SPA extends between Scremerston in the north and the southern edge of Budle Bay to the south.

Lindisfarne SPA was first classified in 1992 and is legally underpinned by the Lindisfarne SSSI, which was notified in 1989. Lindisfarne SPA has many qualifying interest features including features qualifying under Article 4.1 of the Birds Directive i.e. nationally important populations of breeding little tern and of overwintering whooper swan, bar-tailed godwit and golden plover. Lindisfarne SPA also supports numerous species' populations that qualify as features under Article 4.2 of the Birds Directive i.e. over-wintering

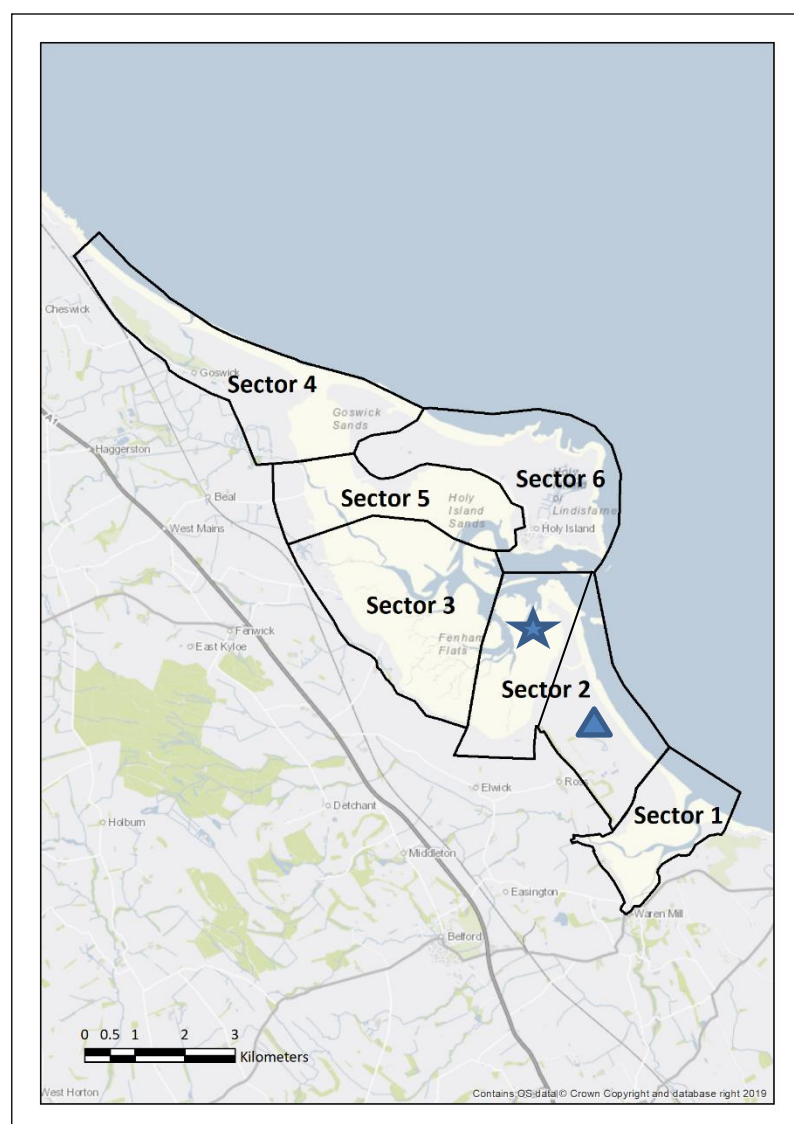
populations of: Eurasian wigeon, greylag goose, light-bellied brent goose, sanderling, dunlin, ringed plover, long-tailed duck, common scoter, red-breasted merganser, grey plover, common eider, shelduck and redshank. The SPA is also classified for a non-breeding waterbird assemblage of international importance.

2.2 Anthropogenic issues affecting the LNNR

The LNNR is subject to a number of activities (Table 1) with different activities and resultant pressures occurring to varying degrees in different parts of the site (Figure 1).

Table1: areas of listed activities in the Lindisfarne NNR

Activities	High Tide WeBs sector
Wildfowling	5 and part of 3
General access [local residents]	All sectors and increasing with time
Increased tourism (even in the winter months)	All sectors and increasing with time
Aquaculture Operation	Sector 2a
Illegal Bait and hand gathering	Predominately 3, and 5 on a low tide at night
Unregulated hand gathering (winkles and mussel)	6 and 2a
Regulated bait gathering	Part of 5



Sector 1:

Budle Bay

Sector 2:

★ 2a Elwick to Fenham Flats; ▲ 2b Ross Back Sands to Old Law East

Sector 3:

Fenham Flats

Sector 4:

Goswick Sands

Sector 5:

Causeway and Holy Island Sands

Sector 6:

Holy Island

Figure 1: Map showing each of the High Tide WeBS core count sectors covering the Lindisfarne SPA/Lindisfarne NNR (sector 2 is split into 2a and 2b).

2.3 The issue

A previously commissioned, independent desktop analysis of WeBS High Tide (HT) and Low Tide (LT) count data from 1993/94 to 2018/19 has shown that the majority of waders showed negative site-level trends, whereas the majority of wildfowl showed positive site-level trends. Additionally, parts of the LNNR have shown multi-species declines.

Additionally, multi-scale WeBS trend analysis Alerts have been triggered for many of the fifteen species:

High Alerts for: Eider (except Shetland) [LT]; Long-tailed Duck [ST,LT,SB]; Grey Plover [MT,LT,SB]; Bar-tailed Godwit [LT,SB]; Sanderling [MT]; Dunlin [MT,LT,SB]; Redshank [SB]

Medium Alerts for:

Brent Goose (Svalbard Light-bellied) [ST]; Whooper Swan [MT]; Eider (except Shetland)[ST]; Common Scoter [ST, SB]; Golden Plover [ST, MT]; Grey Plover [ST]; Sanderling [ST]; Redshank [LT]

Key **ST**: short-term (5 years) **MT**: medium-term (10 years) **LT**: long-term (up to 25 years) **SB**: since baseline

A commissioned study carried out over autumn/ winter 2020-2021, showed disturbance effect on birds' populations. This work aligned with COVID-19 lockdowns, and provides useful data, albeit the collected information is skewed towards an unusual year of anthropogenic activity. Surveys were also focused over low water. One of the recommendations of the study was to investigate the impacts of disturbance to waterbirds at high tide, particularly in relation to the use of high tide roosts.

NE has concerns about the increases in many activities (both recreational and commercial) within the SPA in the context of sustained declines in a number of species. Natural England is concerned that activities alone or in-combination might have led to significant levels of disturbance to, the redistribution of, and/or a reduction in the numbers of some of the bird species that are qualifying interest features of the Lindisfarne SPA. Such effects may have played a part in the SPA wide reductions in numbers of various species. This would run contrary to the conservation objectives of the SPA which are to:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

2.4 Bird distribution data

2.4.1 WeBS High Tide core counts

The waders and waterfowl of Lindisfarne SPA have been counted on a regular basis for many years as part of the Wetlands Bird Survey (WeBS). The site has been counted most consistently as part of the WeBS core High Tide counts surveys. The count data across the site are split into and reported against seven count sectors (Table 2, Figure 1).

Table 2: Details of each of the WeBS high tide core count sectors.

Lindisfarne sector number	Lindisfarne sector name
1	Budle Bay

2a	Elwick to Fenham Flats
2b	Ross Back Sands to Old Law East
3	Elwick
4	Goswick Sands
5	Causeway
6	Holy Island

2.4.2 WeBS Low Tide counts

The WeBS Low Tide Count scheme covers most of the major estuaries in the UK with a view to providing information on species' distributions within estuaries. In each survey of the Lindisfarne site it is divided into approximately 50 squares each of 1 km * 1km (Figure 2) within each of which (if counted) the numbers of each species seen is recorded. Not all squares were covered at each visit, and on some visits, counts were available only at a higher level of aggregation for part of the site. The majority of the Lindisfarne NNR was surveyed at low tide at least once in the winters 2000/01, 2001/02, 2002/03, 2003/04, 2004/05, 2005/06, and in 2011/12, and 2018/19. More than one survey took place in 2002/2003 (2 visits), 2005/06 (two visits), and 2018/19 (four visits).

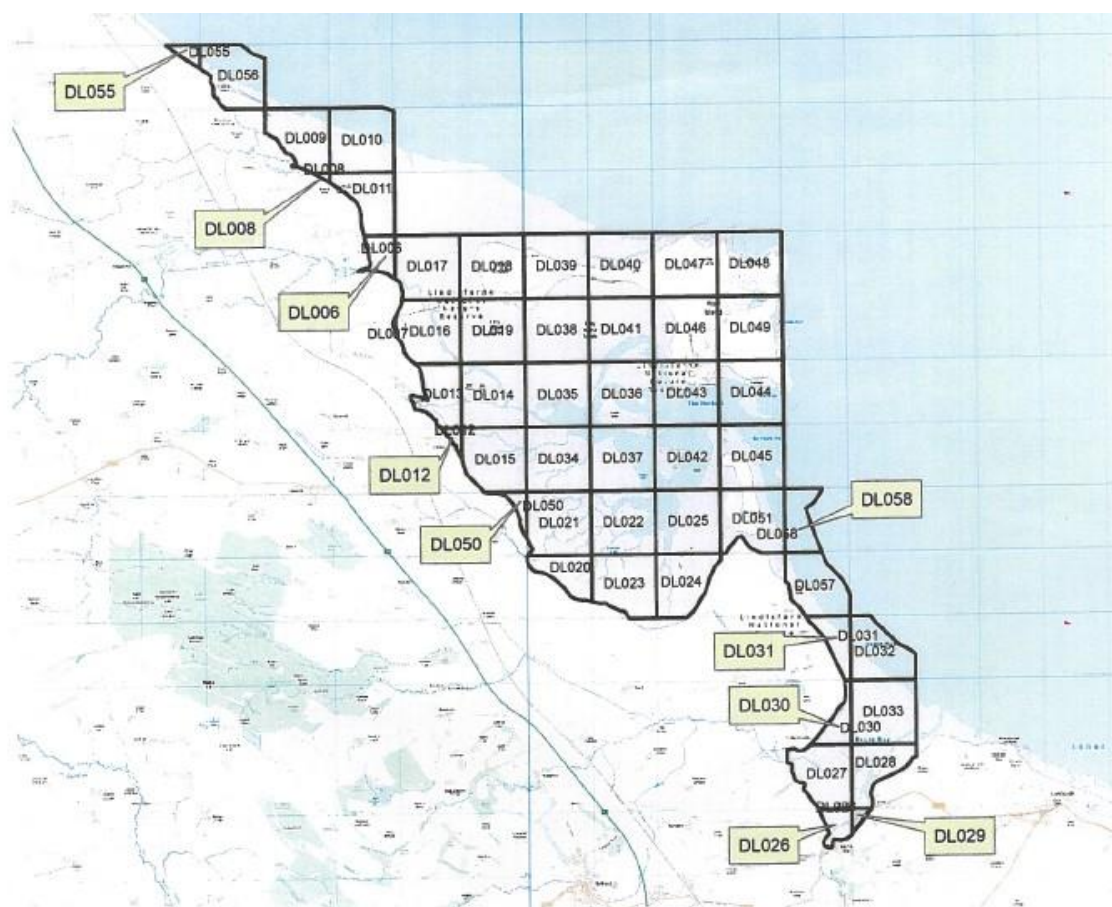


Figure 2: Map showing each of the low tide LNNR WeBS 1km² squares.

2.4.3 Additional bird count data held by Natural England

NNR bird data

NNR staff undertake collection of bird data over the whole of the NNR.

The wildfowling warden undertakes data gathering (Figure 3). Species observed/peak counts are collected over the area of Beal Point to Snook Point, Holy Island Sands, Fenham Flats and Goswick. This data is generally not collected on a sector basis, but locations from which observations are made may be identified

(e.g. as shown in Figure 3). The data is gathered from the beginning of September to February 20th each year.

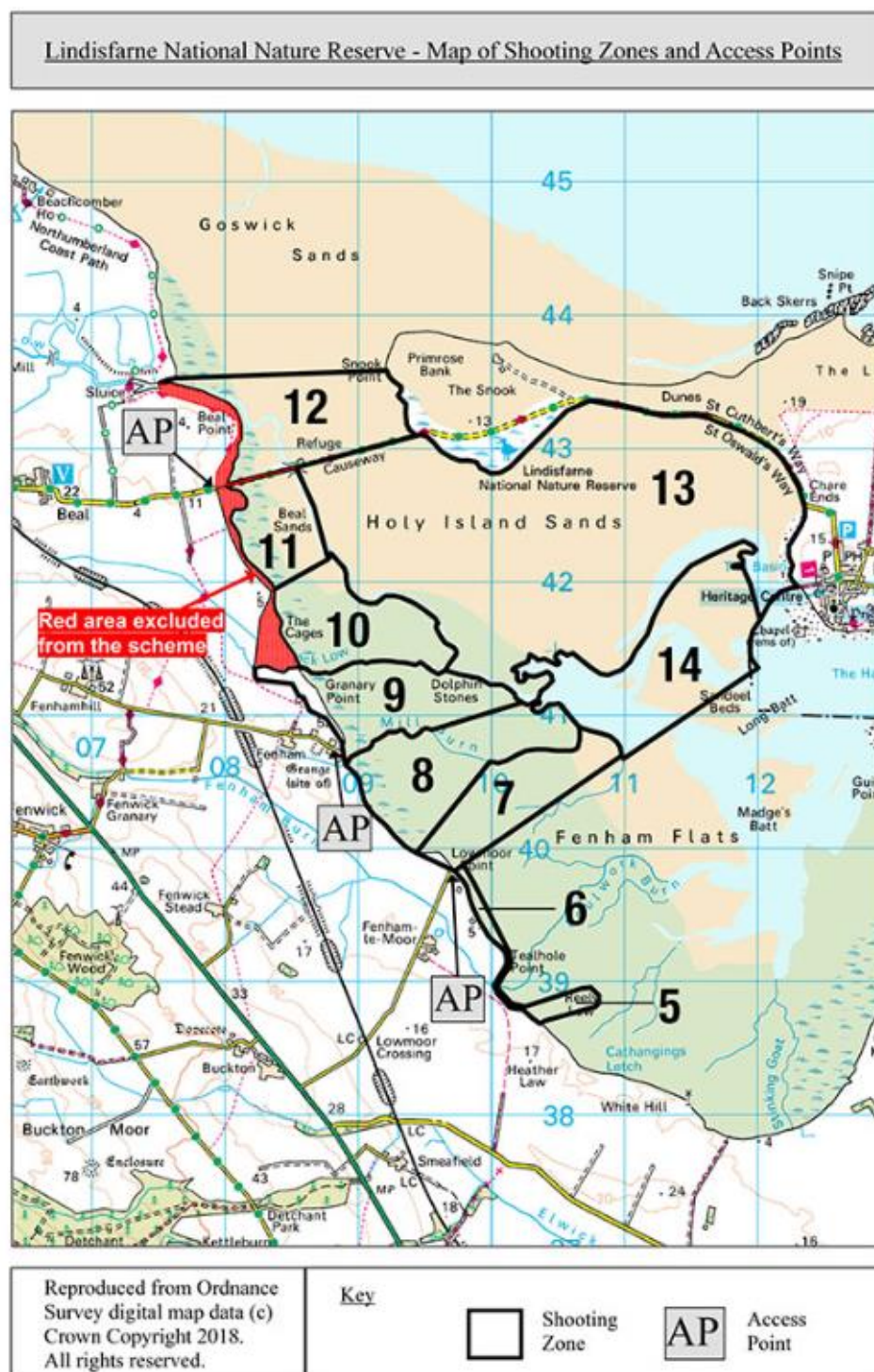


Figure 3: Lindisfarne National Nature Reserve shooting zones

3. Objectives

The **objectives** for this contract are:

Note: The requirements of the project include regularly surveying the abundance and distribution of SPA birds and of human activities (and to record the responses of birds to human activities) over as large an area

and with as fine a spatial resolution as practical. This aspect of the project will be carried out by NE staff, and other contracted ornithologists (separate contract).

- The contractor would plan and coordinate (with the assistance of the LNNR senior reserve manager and the NE project manager) field survey data collection in stations of the LNNR carried out by NE staff and other surveyors (Figure 5). This includes developing an appropriate method (see below) and project schedule that brings added value and better understanding of birds' responses to various activities across the site.
- Data would be collected from October to end of December 2020 (Period 1) and January to end of March 2021 (Period 2).
- A robust statistical analyses of all the data is required (within HT sectors, between HT sectors or site wide).
 - Determine whether there is any evidence that anthropogenic activities are causing detectable levels of disturbance to and/or displacement of any species of bird and to determine the spatial and temporal scales over which any such effects are manifest.
 - Conduct statistical analyses of the data gathered: contractor and NE staff/volunteer data (plus any useful supplementary bird count data), in conjunction with available data relating to a suite of other relevant environmental covariates.
 - Additionally, autumn-winter bird disturbance surveys were carried out over the LNNR autumn 2020-winter 2021 during various Covid lockdowns (Percival, 2022) and previously pilot surveys have been carried out in the sector 2a in 2016 and 2017 (SLR, 2016; SLR, 2017). The data from these studies should also be reviewed for consideration within the analysis of the field data collected in autumn/winter 2022/2023.
 - Identify the frequency with which anthropogenic activities in the area may lead to bird species leaving the survey area (see proposed methods).
- To produce a report presenting the results of the field surveys (and related data gathering during the survey period over the larger LNNR area (as outlined above)) and analyses thereof, with data products.

Costings should be provided to carry out all planning, data collection, data collation, analysis and reporting to deliver the objectives. Given the degree of uncertainty regarding the final size of the area illustrated in Figure 4 to be surveyed, the use of NE staff and other surveyors, the frequency of surveys and the number of individuals needed to do the survey work, Natural England require that the estimated costs associated with the fieldwork element of this project should be presented separately to costs associated with the analyses and reporting elements (see section 5).

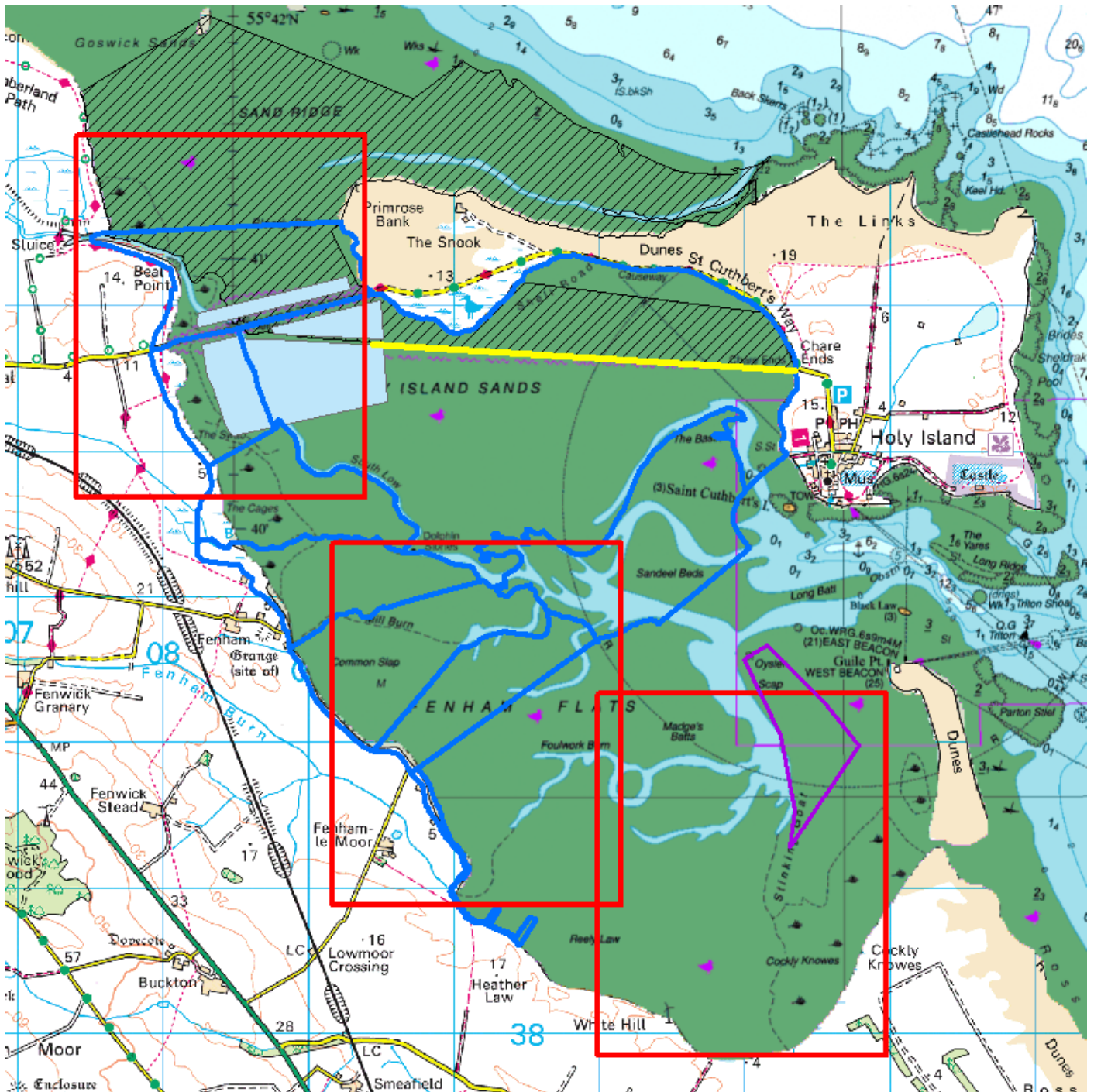


Figure 4: Anthropogenic activities zone: yellow-pilgrims way; blue lines area-wildfowl zones; light-blue block-voluntary bait digging zone; hatched line horse riding and purple-aquaculture oyster farm trestles. Red boxes shows the likely, maximum, observable extent that can be reliably surveyed from potential, identified survey points e.g. causeway, Fenham Bird Hide and Elwick Bird Hide. Sandeel Beds, an important bird area on the LNNR, is not shown

As stated above, detailed analysis of bird distribution data is required to understand behavioural responses and what are the triggers. Additionally, the extent and nature of any avoidance of certain areas should be investigated. Some activities are area specific across the LNNR and other activities occur at different intensities (Table 2), hence other areas of the LNNR will (ideally) be simultaneously surveyed by NE staff and other surveyors following the final, decided methodology (a pragmatic cost-saving approach). Some proposed survey stations within Fenham Flats and Budle Bay are shown in Figure 5.

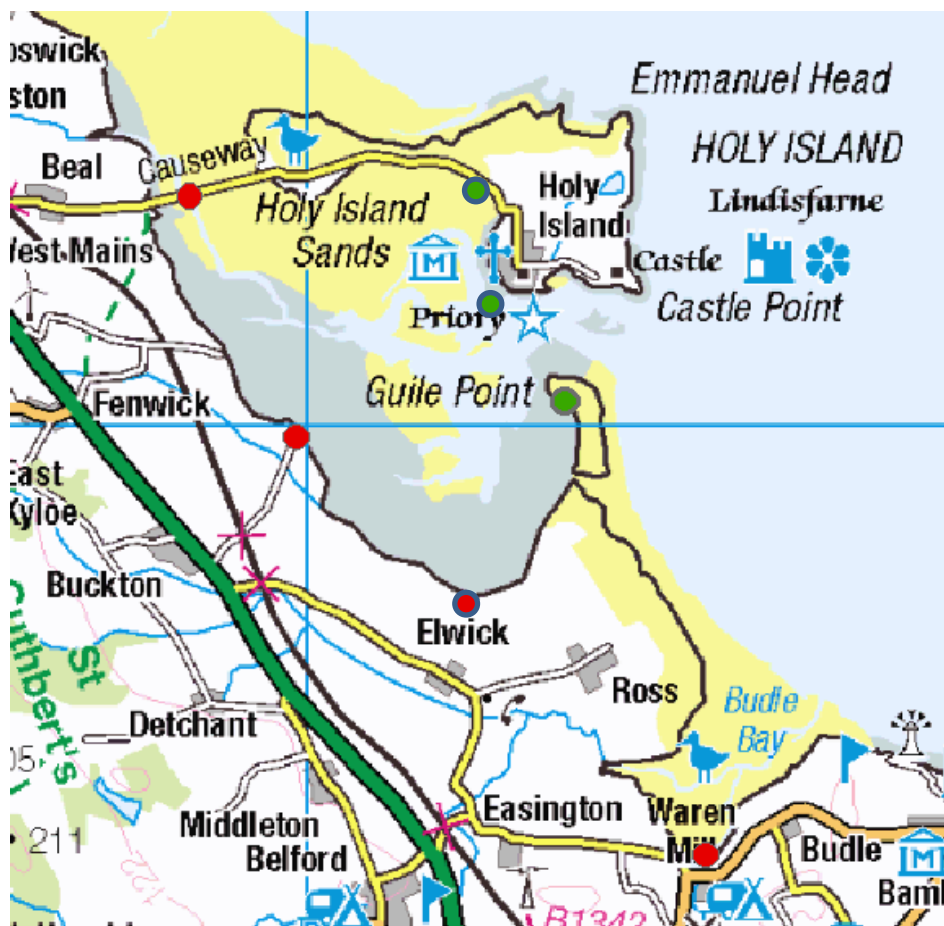


Figure 5: Potential survey stations on the LNNR [RED dots = priority sites] GREEN dot = alternative sites]. Selected stations will be a function of the final survey design.

Thus in order to inform an assessment of whether avoidance of potentially suitable habitat is taking place, bird distribution data should be compared with, for example, intertidal habitat survey data (Figure 6) for the relevant areas (data available from NE) for example, are birds in sector 5 habitually avoiding the areas close to the causeway? Are birds aggregating in Budle Bay (sector 1)?

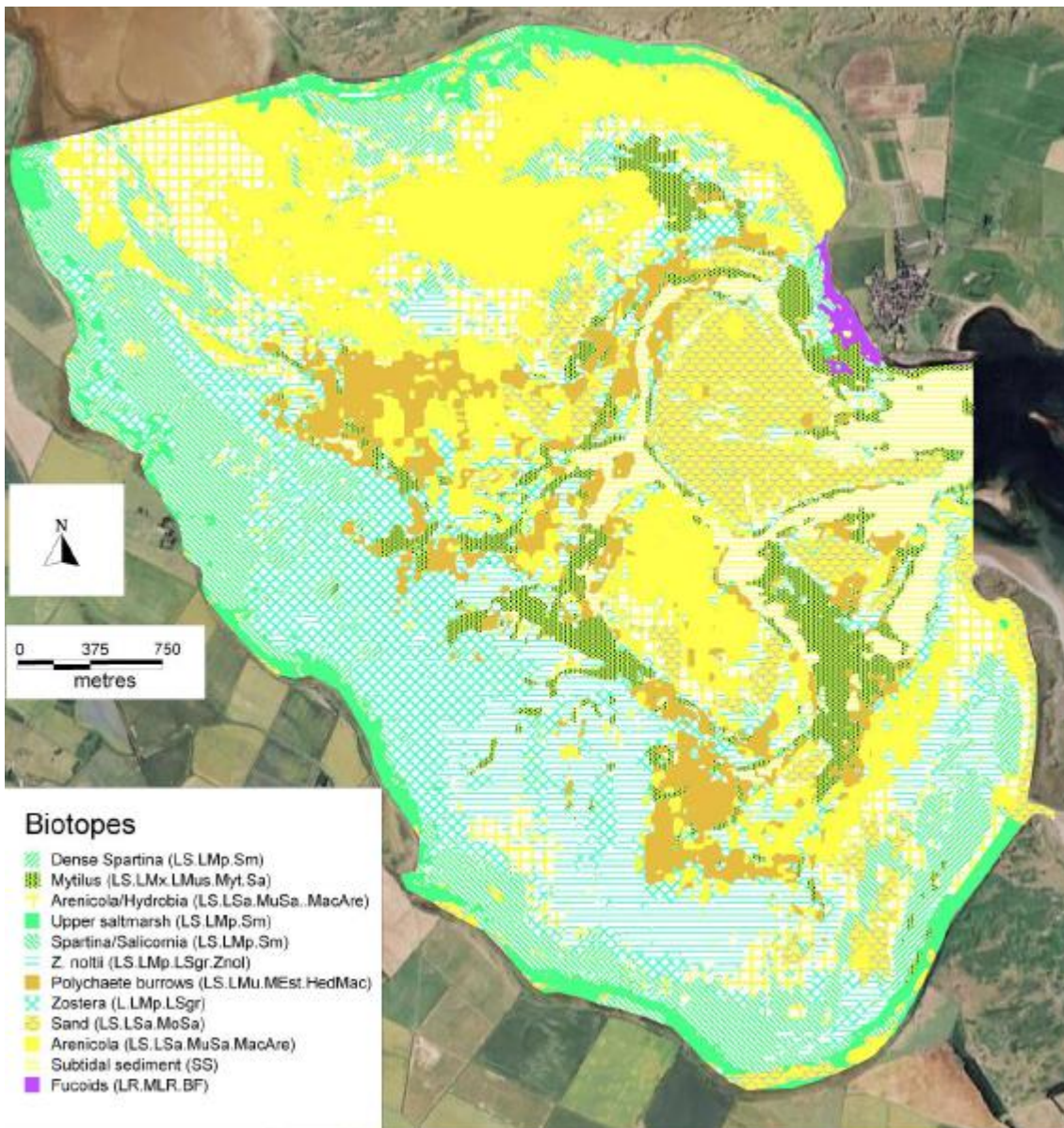


Figure 6: Biotopes of Lindisfarne Fenham Flats National Nature Reserve (2010 data).

4. Methods (Percival 2022, developed from SLR 2016, 2017)

Please see Percival (2022) for full methods. Natural England invites the contractor to consider the prescribed methods, but note that part of the contract is to understand the effects of disturbance on waterbirds and therefore consideration of the previous collected data is required. The main difference is that this project is around high tide roosts (potentially 2 to 1.5 hours on either side of high tide) and disturbance whereas previously surveys were focused on low tide.

4.1 Survey Area

Figure 5 illustrates the principal areas of interest for this study. The survey stations shown by red points have been proposed based on the vantage point(s) available to view large areas of the LNNR and offer areas where different activities are known to occur (Table 1). This approach will hopefully answer the site-level questions/assess disturbance across the NNR, and improve understanding of birds' movements across the whole site. The stations illustrated in Figure 5 are thus indicative of the study that is envisaged and will be surveyed under this contract but are not definitive.

The key consideration in defining the size and shape of the survey areas are the practicalities of being able to make reliable observations across the entire survey areas from shore-based vantage points and the

need to collect survey data over a sufficiently large area to include areas similar to but sufficiently far from potential disturbing activities, e.g. inside and outside of the wildfowling (sector 5 and 3), or the voluntary bait digging zone (sector 5) for the numbers and behaviours of birds in those areas not to be negatively affected by the observed activity(ies). The inclusion of such areas is considered necessary to perform analyses that will allow the effects on the birds of proximity to and levels of activity associated with the activities to be identified amongst the host of other environmental factors that will influence the birds' distribution and behaviour.

If it is possible for the location of all birds and all human activities to be recorded precisely then there may be no need to divide the overall survey area into discrete count units. If, however, that is considered unlikely then it will be necessary to divide the survey area up into discrete units within which records of birds and human activities will be recorded. If this latter approach is needed, then a decision will need to be made regarding the number of such units to be used given i) the number that can be reliably identified in the field and ii) the number of units needed to allow robust analyses.

Potential contractors are invited to consider the issue of size, shape and divisions of the overall survey areas that they consider appropriate to deliver the objectives of this contract and to set those out in their tender.

4.2 Survey Timing

Surveys should be spread across late October to December (period 1) and January to March (period 2) inclusive, since this is the period during which there are peak numbers of wintering wildfowl and waders within the SPA.

The potential contractors are invited to scope the schedule of survey dates to assess anthropogenic activity and provide a robust assessment of disturbance within identified sectors across the NNR. It will likely be necessary to have surveys on spring and neap dates to best understand birds' behaviours and site use. The number of visits will depend on budgetary restrictions but ideally surveys will be conducted weekly throughout the survey period (three-four visits every month, ~one at a weekend/bank holiday and two-three on a weekday). Daylight hours especially through winter will affect the amount of usable daylight. These considerations will restrict the number of feasible replicates in the resultant statistical analyses and thus are an important part of the planning.

4.3 Survey locations and numbers of surveyors

Surveys should be conducted from suitable shore-based vantage points. Given the likely extent of the overall survey area it may be necessary to employ two or more surveyors simultaneously to provide complete coverage from at least two vantage points in the area shown in Figure 5. Potential contractors are invited to consider the issue of the number of observers needed.

Measures should be employed to aid the estimation of distance by surveyors prior to surveys commencing. Natural England can provide aerial photography (taken by drone) to enable more accurate mapping. Preparation of observers should also reduce differences in distance estimation.

Note, that Figure 5 identifies stations, but surveys from these points will not cover the whole site (this would be logistically impossible), but will provide comparable data from other parts of the LNNR to provide a wider understanding of birds' use of the site and how this is influenced by anthropogenic activities.

4.4 Recording of basic information.

On each survey the following information should be recorded (see Percival 2022).

Date, start time, end time, height plus time of high tide and low tide, observation station location, observers' names, wind speed and direction, cloud cover, rainfall (none/light/heavy), temperature etc. Following each scan count of birds in each count unit (see below) a note should be made of either the % of the count unit that is exposed by the tide or simply whether the tide edge falls within that count unit at that time (the changing degree of exposure of a unit and/or the presence of the tide edge within it is likely to be a strong influence on the number of many species within it). Previous surveys, notably Percival (2022) provided methods, and SLR, 2016; SLR 2017) provide detailed recording forms.

4.5 Continuous recording of anthropogenic activities (and any other potential sources of disturbance)

During each survey, a continuous record should be made of all potentially disturbing activities occurring within the area visible from the survey locations, including activities/events where no disturbance of waders/waterfowl is observed. Continuous recording means that all potentially disturbing activities/events are recorded, including infrequent events which may not be picked up during the "instantaneous" scan counts of birds and people (see below).

Potential disturbing activities should be classified into broad categories, as follows:

- Hand-gathering/bait digging collection activity
- Oyster farm operational activity, (split into e.g. people on foot, vehicles or use of boats);
- Dog walker(s)
- Walker(s) (no dogs)
- Boat(s) or other watercraft (e.g. wind surfers, jet-skis, etc);
- Wildfowlers (recording all shooting activity including gunshots)
- Aircraft (note type)
- Natural sources of potential disturbance e.g. raptor overflights
- (give species in notes)
- Other (specify in notes)

The 'other' category includes any potential anthropogenic disturbing activity events not covered by one of the other categories, such as wildlife watchers, picnickers, light aircraft etc. The nature of each 'other' disturbance event should be recorded on each occasion. Birds also respond to natural disturbance events such as raptors.

For each potential disturbance event (including those eliciting no detectable response from the birds) the following information should be collected on a specifically-designed recording form or map:

- Start and end time.
- Details of the event (e.g. number of people/dogs, colour of clothing, whether dogs on leads, type of boat, etc.).
- The location of the event, whether in the form of a single point or a line showing the course followed by a person or boat, mapped on 1:10,000 scale maps so as to record the nearest approach of each event to each count sector. If possible a record should be made of the nearest approach of the activity to any birds (even if no response is detected). Each event should be numbered to allow easy cross referencing between recording forms and maps.
- When a potentially disturbing incident occurs within the survey period but has not concluded by the end of the survey, the end of the disturbance should be recorded as the conclusion time of the survey.
- For activities taking place over a prolonged time period, e.g. oyster farm operations, new disturbance events should be recorded each time the activity changes significantly, e.g. people working in a specific area should be recorded as one event and a new event recorded when they move to a different location. As such there may be considerable variation in the duration of different disturbance events.

- Where multiple/in-combination potentially disturbing events take place concurrently priority should be given, where possible, to recording those events most likely to cause disturbance to waterbirds. This is more likely to be the event taking place closest to the largest concentrations of waterbirds.

During these continuous observations, when possible all “natural flights” of birds into or out of count units should be recorded including the numbers of each species involved, the duration and distance flown.

4.6 Repeated scan sample recording of Bird Numbers, behaviours and Distribution

The number, location and percentage of individuals of each species of waterbirds (except gulls, which are not SPA interest features and will take too long to count) engaged in various behaviours (feeding/resting) visible from the survey points should mapped/recorded in each count unit regularly via repeated scan sampling throughout the duration of each survey.

4.7 Recording of Bird Responses to Disturbance

For all potential disturbance events, effects on birds should be recorded on recording forms or graphically (see for example; Percival 2022; SLR, 2017). The use of a telescope is essential to record responses due to the distance at which some disturbance events take place when viewed from shore-based vantage points (i.e. up to 1km away). This approach limits the area within which disturbance effects can be recorded to approximately 200m from the source of disturbance (although effects beyond 200m should be recorded where seen).

Effects for each species should be recorded separately and categorised as follows:

1. no apparent response;
2. alert / head-raised/ cessation of feeding;
3. walk/swim away;
4. minor flight (i.e. less than c.200m); and
5. major flight (i.e. greater than c.200m or birds have left the survey area).

The approximate distance at which each reaction takes place and, where possible, the approximate distance to which birds walked/swam/flew should also be recorded. Distances should be estimated by eye using the known location of specific features to assist in distance estimation. Where relevant and where possible the time which flushed birds spend in flight, how far they fly and how long they take to return either to the area they have left or to the behaviour they were previously engaged in should be recorded.

Collection of additional environmental data

To allow an analysis of the effects of anthropogenic activities in general, on the behaviour, distribution and abundance of birds across the study area, and the temporal and spatial extent over which any such effects occur, it will be necessary for that analyses to include consideration of numerous other factors that are also likely to influence the birds' behaviour, distribution and abundance. Thus, it will be necessary to use GIS datasets and other source datasets to derive values for each count unit on each survey for a suite of variables including for example: nearest distance to mean high water mark, nearest distance to mean low water mark, mean elevation, sediment type, intertidal habitat type *et cetera*. This list is not exhaustive and other environmental covariate data may be available and appropriate to use in analyses.

Data analyses

Natural England does not wish to prescribe a particular form of data analyses. However, Natural England requires that robust and appropriate analyses are employed. Potential contractors are required to describe, as part of their tender, the nature of the analytical approach which they will apply to these data to address the objectives of this contract.

5. Requirements and Timescales.

5.1 start of survey.

This work is ideally scheduled to begin in as soon as possible, October 2022 (**note 24/10/2022: technical issues with the publication of the specification has led to the late advertisement of the invitation to tender, but we wish to start as soon as possible**).

It will be necessary that landowners/occupiers of sites concerned are made aware of the survey and agree to surveyors being on each site involved – surveys will not proceed without landowner/occupier agreement.

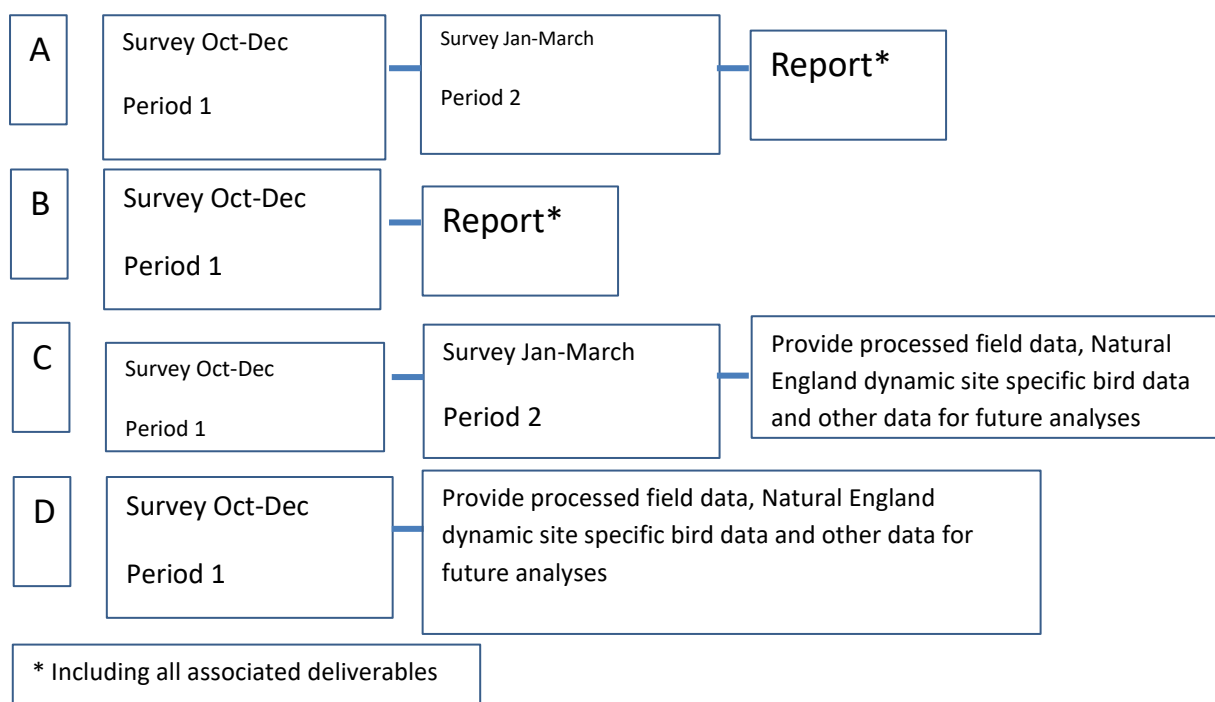
[Note: Natural England manages the NNR and will speak to the relevant landowners/owners, as appropriate].

5.1 Products and deliverables

To enable successful delivery, ideally the Contractor is expected to:

- Plan, implement and agree with Natural England a field survey programme to collate all necessary new data;
- Lead/coordinate NE staff/expert surveyors with the LNNR Senior manager and project officer, including inception and methodology meetings
- Process all new field data and acquire any additional datasets required to inform statistical analyses;
- Conduct statistical analyses of the data;
- Submit a draft final report of the findings, and
- Submit a revised final report (in light of comments received from Natural England)
 - Including the raw data, processed databases and associated analytical code and any associated GI products to Natural England.

However, due to budget considerations, please provide costing including VAT for the following permutations A-D:



Timelines for delivery of draft final and revised final reports, and associated products, are detailed in section 5.2.

All data should be supplied to MEDIN standard (see guidance at www.oceannet.org). Any GIS datasets need to be provided in ESRI ArcGIS format compatible with ArcGIS 10.7.1, have attached metadata and be clean of any topology errors. If relevant, any point and polygon data should be supplied to us with the final analysis.

5.2 Timeline for project delivery:

Timeline	Date
Project inception meeting between contractor and Natural England at Lindisfarne NNR reserve base or via video conferencing	October 2022/ asap
Meeting with NE staff and volunteers undertaking the simultaneous surveys at Lindisfarne NNR reserve base or via video conferencing	October 2022/ asap
Contractor to collate all necessary data (other than field data) and finalise analytical approach(es) and advise Natural England of these.	*1
Teleconference between contractor and Natural England to discuss datasets and planned analyses.	*1
Draft final report to be provided by contractor to Natural England.	*2
Comments on draft final report to be provided to contractor by Natural England.	*2
Final report and associated products to be delivered by contractor to Natural England incorporating additions/ amendments in light of comments received from Natural England.	before 25th March 2023

Any delays to this timetable should be immediately discussed with NE project lead.

*1 dates are to be fixed contingent on which permutation is contracted

*2 A draft final report and the revised final report, plus accompanying products, must be provided to Natural England prior to the anticipated end date of the contract in order to meet this final milestone and enable payments to be made against invoices submitted by the contractor to cover the outstanding balance of the contract award.

6. Other considerations.

In support of this contract, Natural England will provide the contractor with:

- Project support from dedicated project lead.
- Relevant available data held by Natural England.
- Opportunity to feedback and discuss progress with the project leads.

COVID related information.

Assurance that contractors will work within government guidance on working in relation to respiratory infection will be required:

[Reducing the spread of respiratory infections, including COVID-19, in the workplace - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/reducing-the-spread-of-respiratory-infections-including-covid-19-in-the-workplace)

Avian flu

Avian influenza is primarily a disease of birds and the risk to the general public's health is very low.

If you find dead wild waders and wildfowl or other dead wild birds, such as gulls or birds of prey, you should report them to the Lindisfarne NNR staff (01289 381470). **Do not touch or pick up** any dead or visibly sick birds that you find.

For more guidance visit [GOV.UK](https://www.gov.uk). You can also see a [map of current outbreaks](#)