REPORT

Boston Alternative Energy Facility

Change in Waterbird Behaviour Report

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Boston Alternative Energy Facility

Royal HaskoningDHV
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Changes in Water Bird Behavior Due to River Traffic at the Mouth of The Haven and Haven River, Boston, Lincolnshire

January 2021 to November 2021

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[redacted]

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Changes in Water Bird Behavior Due to River Traffic at the Mouth of The Haven and Haven River, Boston, Lincolnshire

CONTENTS

FIGURES

TABLES

Changes in Water Bird Behavior Due to River Traffic at the Mouth of The Haven and Haven River, Boston, Lincolnshire

1 INTRODUCTION

Independent Ecologist and Protected Species Consultant, Andrew Chick MPhil, was commissioned by Christine Adnitt (Royal Haskoning DHV) to investigate changes in bird behavior due to the presence or wash of any river traffic at the river mouth of The River Haven, Boston, Lincolnshire. The survey is required in connection with a future planning application related to the development of the Boston Alternative Energy Facility.

This report details the methods used, describes the habitats and species found on the site, discusses the results and makes recommendations for further work. The common English names are used for all species referred to throughout the text.

The findings of this report are supplementary to the report carried out during the winter of 2019/20. The findings from both reports should not be used to compare against one another.

1.1 Accurate lifespan of ecological data

The majority of ecological data remains valid for only short periods of time due to the inherently transient nature of the subject. Where the species/group being surveyed for is present within the site, the data is considered to be accurate for two years. However, an update may be needed in order to obtain a European Protected Species licence, if such a licence is required. Where absent, although the data is considered accurate for two years, an update may be required if the habitats surrounding the site are of a quality that are likely to encourage the species to move into the site in the interim.

2 SITE DESCRIPTION

2.1 Site communities and habitats

The survey area is located at the mouth of the Haven River at TF397393. A general site location is given as Figure 1. The area is within the boundaries of The Wash (SSSI, SPA, SAC, Ramsar and SPA). The area monitored has two rocky spits at either side of the Haven mouth. There are extensive mudflats and saltmarsh used by birds for feeding and roosting. The area is extremely tidal and tide height plays a large part in bird behaviour.

2.2 Survey constraints

There were no constraints to the survey, with full access available to the site.

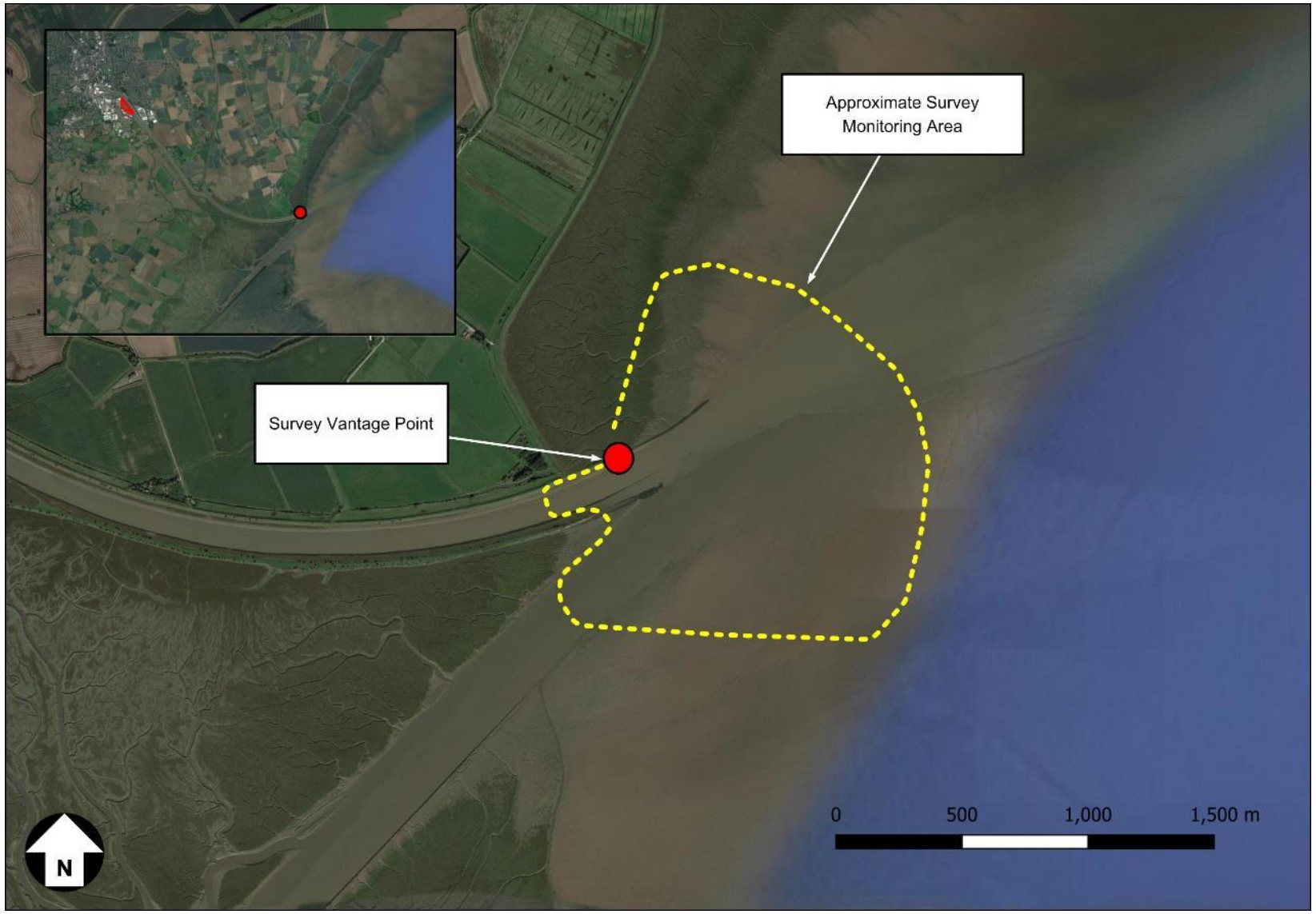

Figure 1. Site map showing the area monitored (base map © Google Maps March 2021)

3 METHODS

The site was surveyed five times, including once at high tide, between January 2021 and November 2021, with all survey work being undertaken by Anthony Bentley. A vantage point survey was used. The vantage point used was Cut End bird hide at TF397393. Birds were monitored on how they interacted with river traffic; all bird species that changed their current behaviour due to the presence and or wash of river traffic were recorded. Flight distances were recorded where birds were displaced. For birds that returned to an original position the flight time was noted.

Each survey was undertaken at intervals of at least two weeks. Prior to the survey, the Boston Harbourmaster was contacted to ensure the surveyor would be present when boats used the river mouth. Due to the high turnover and volume of wetland species using the site during the survey period an estimated maximum count is given.

Ad hoc boat movements along the Haven were carried out using the same methodology as the river mouth surveys. Data for this can be found after the systematic list.

3.1 Surveys

Surveys were undertaken, with the dates and start times included in the table below:

Date	Location	Start Time	Weather (Temp at start of survey)	High tide time and height
25th January 2021	Tabb's Head	14:00	4ºC 14mph E	15:32, 5.92m
22nd February 2021	Tabb's Head	12:00	9ºC 7mph WNW	14:05, 5.15m
20th March 2021	Tabb's Head	07:00	6ºC 6mph WNW	09:36, 5.90m
1st May 2021	Tabb's Head	07:00	2ºC 10mph NW	09:37, 7.20m
31st May 2021	Wharf site	09:30	14ºC 8mph E	10:21, 6.17m
25th June 2021	Tabb's Head	18:00	10ºC 10mph N	19:31, 7.40m
30th June 2021	Wharf site	09:15	14ºC 12moph N	10:43, 6.73m
14th July 2021	Tabb's Head	19:15	20ºC 11mph N	22:08, 6.60m
17th July 2021	Wharf site	09:00	20ºC 5mph N	12:10, 5.91m
19th July 2021	Wharf site	13:00	25ºC 4mph NE	14:38, 5.53m
28th August 2021	Tabb's Head	08:30	14ºC 8mph N	10:16, 6.80m
25th September 2021	Wharf site	07:45	17ºC 4mph W	09:12, 7.19m
29th September 2021	Tabb's Head	09:45	11ºC 19mph W	11:43, 5.29m
25th October 2021	Tabb's Head	07:40	10ºC 13mph SSW	09:13, 6.73m
2nd November 2021	Wharf site	14:00	11ºC 7mph WSW	16:37, 5.72m
30th November 2021	Wharf site	13:30	11ºC 10mph WSW	14:37, 6.12m

Table 1. Survey dates, start times, weather conditions and the state of tide.

4 RESULTS

25th January 2021

At 14:11 the small pilot boat (Photograph 1) sailing into The Wash reached the river mouth. The presence of the boat caused changes in behaviour to 1150 Dark-bellied Brent Geese. They flew c500m from their bathing/drinking location to a nearby area of grassland. No changes in behaviour occurred from the boat's wash.

The small pilot boat returned and reached the river mouth at 14:41 (Photograph 2). Most changes in behaviour were impossible to assess due to the presence of a hunting Marsh Harrier at the location. Although 34 Black-headed Gulls did change their behaviour due to the boat's presence, they flew c50m to another roost location. These gulls did not change their behaviour due to the Marsh Harrier's presence. No changes in behaviour occurred from the boat's wash.

A large cargo ship (Photograph 3) sailing from The Wash reached the river mouth at 14:50. Changes in behaviour were impossible to assess due to the presence of two hunting Marsh Harriers.

A large cargo ship (Photograph 4) sailing from Boston reached the river mouth at 16:26. Changes in behaviour were noted in the following species due to the presence of the boat; 43 Wigeon flew 50m from their current feeding site to a new one, 55 Curlew flew 300m from their current roosting site to a new site. No changes in behaviour occurred from the boat's wash.

The small pilot boat (Photograph 5) sailing from Boston reached the river mouth at 16:28. No changes in behaviour were noted.

At 16:39 a large cargo ship (Photograph 6) sailing from Boston reached the river mouth. 26 roosting Black-headed Gulls flew c400m to avoid a collision. No changes in behaviour occurred from the boat's wash.

The pilot boat returned from The Wash at 17:03 (Photograph 7). No changes in behaviour occurred from the boat's presence. The boat's wash caused changes in behaviour to a single Redshank which walked 5m from its currently feeding location, the Redshank returned to its feeding location after 45 seconds.

22nd February 2021

The small pilot boat (Photograph 8) sailed out to The Wash and exited the river mouth at 12:10. Changes in behaviour were noted in the following species; 4 Cormorant and c424 Lapwing. The 4 feeding Cormorants flew c600m from their location to a new feeding site. The c425 roosting Lapwing flew around for 125 seconds before returning to their roost site. These

changes were due to the boat's presence, no changes in behaviour occurred from the boat's wash.

A small commercial fishing vessel (Photograph 9) travelled from The Wash and reached the river Haven mouth at 12:45. No changes in behaviour were noted.

A large cargo ship (Photograph 10) travelling from The Wash, reached the mouth of the river at 12:49. Changes in behaviour were noted in the following species; 8 Shelduck, 2 Wigeon, an Avocet, 10 Bar-tailed Godwit, 8 Redshank, 120 Lapwing, 180 Dunlin and 6 Curlew. The 8 Shelduck and 2 Wigeon flew c250m to another feeding location. The Avocet, 8 Redshank and 10 Bar-tailed Godwits flew c300m to another roost location. The 120 Lapwing, 180 Dunlin and 6 Curlew flew c400m to a new roost location. All behaviour changes were due to the boat's presence, no changes in behaviour occurred from the boat's wash.

The small pilot boat returned from The Wash and overtook the large cargo ship referred to above at 12:49. No changes in behaviour were noted. It was possible to associate the changes in behaviour to the large cargo ship due to its position. The small pilot boat was a long distance behind the large cargo ship when changes in behaviour occurred.

Another large cargo ship (Photograph 11) travelling from The Wash, reaching the river mouth at 12:59. A single Great Crested Grebe flew c50m from its current feeding position to avoid a collision. The only other change in behaviour noted were 250 Oystercatchers which moved c150m to a different roost site. These changes were due to the boat's presence. No changes in behaviour occurred from the boat's wash.

The last boat movement of the survey was that of a small private vessel (Photograph 12) that came from The Wash and entered the River Welland at 13:05. No changes in behaviour were noted.

20th March 2021

A small commercial fishing vessel (Photograph 13) travelled from Boston, reaching the river mouth at 07:46. No changes in behaviour were noted.

The small pilot boat (Photograph 14) travelling from Boston, reaching the river mouth at 07:48. Changes in behaviour were noted in 3 Common Gulls and 2 Oystercatchers. The 3 roosting Common Gulls flew c50m to a different roost site. The 2 roosting Oystercatchers flew c150m to a new roosting location. These changes were due to the boat's presence. No changes in behaviour occurred from the boat's wash.

The small pilot boat (Photograph 15) travelling from The Wash, reached the river mouth at 08:11. Changes in behaviour were noted in a single Mallard and a single Curlew. The Mallard was roosting and flew c200m to a new roost site. The Curlew was feeding and flew c100m to a new feeding site. These were due to the boat's presence. No changes in behaviour occurred from the boat's wash.

A large cargo ship (Photograph 16) travelling from The Wash, reached the river mouth at 08:24. Changes in behaviour were noted in the following species; 1 Oystercatcher, 1 Redshank, 2 Mallards and 2 Curlew. Both singles of Oystercatcher and Redshank walked 10m to a different roosting location. The 2 roosting Mallards flew 30m to a different roosting site. The 2 feeding Curlew flew 60m to a different feeding site. These were due to the boat's presence. No changes in behaviour occurred from the boat's wash.

1st May 2021

Small pilot boat (photograph 21) travelling into The Wash, reaching the river mouth at 07:16. Changed their behaviour due to the boat's presence. 2 Oystercatcher and 1 Redshank flew 250m to a new roost site. A single cormorant flew 400m to a new feeding location. Four Dark-bellied Brent Geese flew 650m to a new roosting location. No changes in behaviour occurred from the boat's wash.

The small pilot boat (photograph 22) returned from The Wash entering the river mouth at 07:47. No changes in behaviour occurred from the boat's presence. The wash of the boat caused 3 common sandpipers to fly from their roost site before returning 45 seconds later.

A large cargo ship (photograph 23) in from The Wash at 07:54. The following changes in behaviour were caused by the boat's presence; 3 Common Sandpiper and 3 Redshank flew 400m to a new roost site. 175 Oystercatcher flew c3300m to a new roost location, these oystercatcher were roosting at their traditional roosting location at Tabb's head and flew to roost on the saline lagoon at RSPB Freiston Shore.

A small fishing vessel (photograph 24) travelled into The Wash reaching the river mouth at 08:06. No changes in behaviour were noted.

31st May 2021 (Wharf Site)

A small fishing vessel (photograph 25) travelled down river at 09:36, changes in behaviour we caused by the boats presence in the following species. Two Cormorant, which flew 50m to a new roost location and 6 Black-headed gulls which flew from the waters surface before returning 45 seconds later. No changes in behaviour occurred from the boat's wash.

A medium sized fishing vessel (photograph 26) travelled towards Boston Port passing through the vantage point at 10:11. The following birds showed changes in behaviour due to the boat's presence. 3 Cormorant, individuals flew c100m, c200m and c600m to a new roosting location. A single shelduck flew around for 45 seconds before returning to it's original location. A further 2 Shelduck flew c800m to a new roosting location. A flock of 7 Black-headed gulls flew from their resting location before returning 60 seconds later. No changes in behaviour occurred from the boat's wash.

A small private fishing vessel (photograph 27) travelled down river at 11:00. A single Cormorant flew 100m to a new roost location, this was due to the boat's presence. No changes in behaviour occurred from the boat's wash.

25th June

A large cargo ship (photograph 28) entered The Haven at 18:15. The following birds showed changes in behaviour due to the boats presence; 825 Oystercatcher and 10 Common Tern. The Common Terns flew around for 60 seconds before returning to their original location. 700 of the 825 Oystercatcher flew around for 90 seconds before returning to their roost location whilst 125 Oystercatcher flew c3300m to another roosting location at RSPB Freiston Shore. No changes in behaviour occurred from the boat's wash.

Large cargo ship (photograph 29) entered The Wash at 19:55. No changes in behaviour were noted.

The Pilot boat (photograph 30) entered The Wash at 20:00. No changes in behaviour were noted. It returned from The Wash at 20:14, No changes in behaviour were noted.

30th June (Wharf Site)

The Pilot boat (photograph 31) headed toward the Port of Boston at 09:40 the following birds showed changes in behaviour due to the boat's presence; 14 Black-headed Gull, 3 Mallard, 2 Herring Gull, 1 Cormorant and 1 Little Egret. The Little Egret flew c300m to a new feeding location. The 14 Black-headed Gulls flew around for 60 seconds before returning to their original location. The 3 Mallard flew c400m to a new feeding location. The 2 Herring Gull flew c400m to a new bathing location and the Cormorant flew 700m from its feeding location to a roosting location. No changes in behaviour occurred from the boat's wash.

At 09:53 a large cargo ship (photograph 32) travelled toward the Port of Boston. Changes in bird behaviour occurred in the following species; 12 Black-headed Gull, 2 Cormorant and 1 Little Egret. It's worth noting that these were all of the birds present therefore 100% of birds showed changes in behaviour. The 12 Black-headed Gulls flew around for 80 seconds before returning to their previous location. The Little Egret flew 40m to a new feeding location,

returning to it's original feeding location by foot 60 seconds later. Both Cormorants flew c600m to a new roosting location, each flew in different directions. The single Cormorant that flew ahead of the cargo ship was disturbed again and flew c600m to its original location, totalling c1200m of flight due to the ship. All changes in behaviour were caused by the boat's presence. No changes in behaviour occurred from the boat's wash.

Another large cargo ship (photograph 33) travelled toward the Port of Boston passing through the site at 10:09. Birds showed changes in behaviour due to the boat's presence. In total 3 Little Egret's were disturbed with 2 flying c1000m until out of sight with the third flying 150m to a new feeding location. 12 Black-headed Gulls flew around for 60 seconds before returning to their feeding location. No changes in behaviour occurred from the boat's wash.

14th July

Between 19:30 and 20:34 a total of 22 small fishing vessels (photograph 34) travelled from The Wash towards Boston. Of these 19 caused zero changes in behaviour. A single boat (photograph 34) caused 1 Whimbrel to fly 25m to another feeding location. Another single boat (photograph 36) caused 1 Common Sandpiper to fly 100m to a new roosting location. Both were due to the Boat's presence. No changes in behaviour occurred from the boat's wash.

The Pilot Boat (photograph 37) entered The Wash at 20:33 No changes in behaviour were noted. It returned from The Wash at 20:57 (photograph 38), No changes in behaviour were noted.

At 21:03 the first large cargo ship (photograph 39) entered The Haven, change in behaviour were noted due to the boat's presence, 3 Herring Gull and 2 Black-headed Gull flew 50m to a new roost location. A further 43 Oystercatcher flew c500m to a new roost location. No changes in behaviour occurred from the boat's wash.

A second large cargo ship (photograph 40) entered The Haven at 21:06. A change in behaviour was noted in 51 Oystercatcher, which flew c500m to a new roost location. This was caused by the boat's presence. No changes in behaviour occurred from the boat's wash.

17th July (Wharf Site)

A Small private fishing vessel (photograph 41) travelled downriver at 09:16. The only bird that changed its behaviour was a Redshank, which flew 400m to a new feeding location. This was caused by the boat's presence. No changes in behaviour occurred from the boat's wash.

A medium sized boat (photograph 42) travelled downriver at 09:31. Birds that showed changes in behaviour due to the boat's presence were, 2 Lesser Black-backed Gulls. These

flew from a bathing location 40m to a resting location where they proceeded to preen. No changes in behaviour occurred from the boat's wash.

A small private vessel (photograph 43) travelled downriver at 09:43. Two Black-headed Gulls showed changes in behaviour due to the boat's presence, they flew 50m form their feeding site to another. No changes in behaviour occurred from the boat's wash.

A small private vessel (photograph 44) travelled downriver at 09:44. No changes in behaviour were noted.

A small private vessel (photograph 45) travelled downriver at 09:49. No changes in behaviour were noted.

A small private vessel (photograph 46) travelled downriver at 10:58. The following birds shoed changes in behaviour due to the boat's presence; 32 Lesser Black-backed Gulls, 10 Herring Gull, 1 Black-headed Gull and 1 Cormorant. All 43 Gulls flew c150m from a bathing site on the river to a roosting site where they continued to preen. The Cormorant flew c400m to a new roost site. No changes in behaviour occurred from the boat's wash.

19th July (Wharf Site)

A small private vessel (photograph 47) travelled downriver at 13:04. No changes in behaviour were noted.

A large cargo ship (photograph 48) travelled downriver at 13:22. Changes in behaviour were caused by the boat's wash and presence. Changes caused by presence occurred in; 52 Lesser Black-backed Gulls, 12 Herring Gulls and 1 Oystercatcher. The boat's presence caused 7 of the 52 Lesser Black-backed Gulls to fly 100m and a further 200m before joining up with the main flock, after this the flock of 52 Lesser Black-backed Gulls and 12 Herring Gulls all flew from the river before returning after 60 seconds, again caused by the boat's presence. The single Oystercatcher flew over 1000m and out of sight. The boat's wash caused changes in behaviour to 15 Black-headed Gulls, these birds returned to their previous location after 80 seconds.

A large cargo ship (photograph 49) travelled downriver at 13:25. Changes in behaviour were caused by the boat's wash and presence. Changes caused by presence occurred in; 44 Lesser Black-backed Gulls, 12 Herring Gulls. These birds flew from the river and returned after a flight time of 90 seconds. The boat's wash caused changes in behaviour to 12 Black-headed Gulls, these birds returned to their previous location after 60 seconds.

The pilot boat (photograph 50) travelled downriver at 13:30. Changes in behaviour occurred in 43 Lesser Black-backed Gulls, 6 Herring Gulls and 8 Black-headed Gulls, these all flew around the site before returning to their original location after 45 seconds. No changes in behaviour were noted due to boat's wash.

A small private vessel (photograph 51) travelled upriver at 14:05. Changes in behaviour occurred in 46 Lesser Black-backed Gulls, 4 Herring Gulls and 5 Black-headed Gulls, these all flew around the site before returning to their original location after 35 seconds. No changes in behaviour were noted due to boat's wash.

The pilot boat (photograph 52) travelled upriver at 14:33. Changes in behaviour were noted due to the boat's presence, again juvenile Gulls mostly. In total 44 Lesser Black-backed Gulls and 2 Herring Gulls showed changes in behaviour most returning to their original location on the river after 155 seconds although 8 Lesser Black-backed Gulls returned after 60 seconds. No changes in behaviour were noted due to boat's wash.

28th August

The pilot boat (photograph 53) travelled out into The Wash at 08:30, no changes in behaviour were noted.

The pilot boat (photograph 54) returned from The Wash at 08:49, no changes in behaviour were noted.

A cargo ship (photograph 55) came in from The Wash at 08:57. Due the boat's wash, 2 Black-headed gulls flew 10m to a new roost site.

A small private vessel (photograph 56) travelled out of The Welland into The Wash at 10:49, no changes in behaviour were noted.

A small private vessel (photograph 57) travelled out of The Welland into The Wash at 11:22, no changes in behaviour were noted.

25th September (Wharf site)

During this visit the following water birds were present using the Wharf site.

Black-headed Gull	33	Green Sandpiper	2	Mallard	19
Common Sandpiper	1	Grey Heron	2	Redshank	31
Cormorant	3	Lesser Black-backed Gull	1	Ringed Plover	2
Great Crested Grebe	1	Little Egret	4	Ruff	51
Total	150				

The pilot boat (photograph 58) travelled North-East (NE) toward the Port of Boston at 08:05. All birds that showed changes in behaviour were due to boat's presence. 45 Ruff, 36 of which flew around for 80 seconds before returning to their roost site, 5 flew c250m NE to a new roost location and 4 flew c300m South-West (SW) to a new roost location. 25 Redshank flew around for 80 seconds before returning to their roost site, a further 6 Redshank flew c250m NE to a new roost location. 26 Black-headed gulls flew around for 60 seconds before returning to their roost site. 7 Mallard flew 50m to a new feeding location. One of each Grey Heron and Little Egret flew 15m to a new roosting location. In total 109 waterbirds showed changes in behaviour which equates to 73% of all waterbirds using the site.

A large cargo ship (photograph 59) travelled North-East toward the Port of Boston at 08:37. The following birds showed changes in behaviour due to boat's presence. A Grey Heron flew c150m NE to a new feeding location. 2 Little Egret flew c300m NE to a new feeding location. 8 Mallard and 3 Cormorant flew c800m NE to a new feeding location. 27 Ruff of which 17 flew c600m NE, 5 c400m NE and 5 c300m SW to new roosting locations. 19 Redshank of which 8 flew c400m SW and 11 flew c600m NE to new roosting locations. In total 68 waterbirds showed changes in behaviour which equates to 45% of all waterbirds using the site.

A private fishing vessel (photograph 60) travelled SW towards The Wash at 09:58, no changes in behaviour were noted.

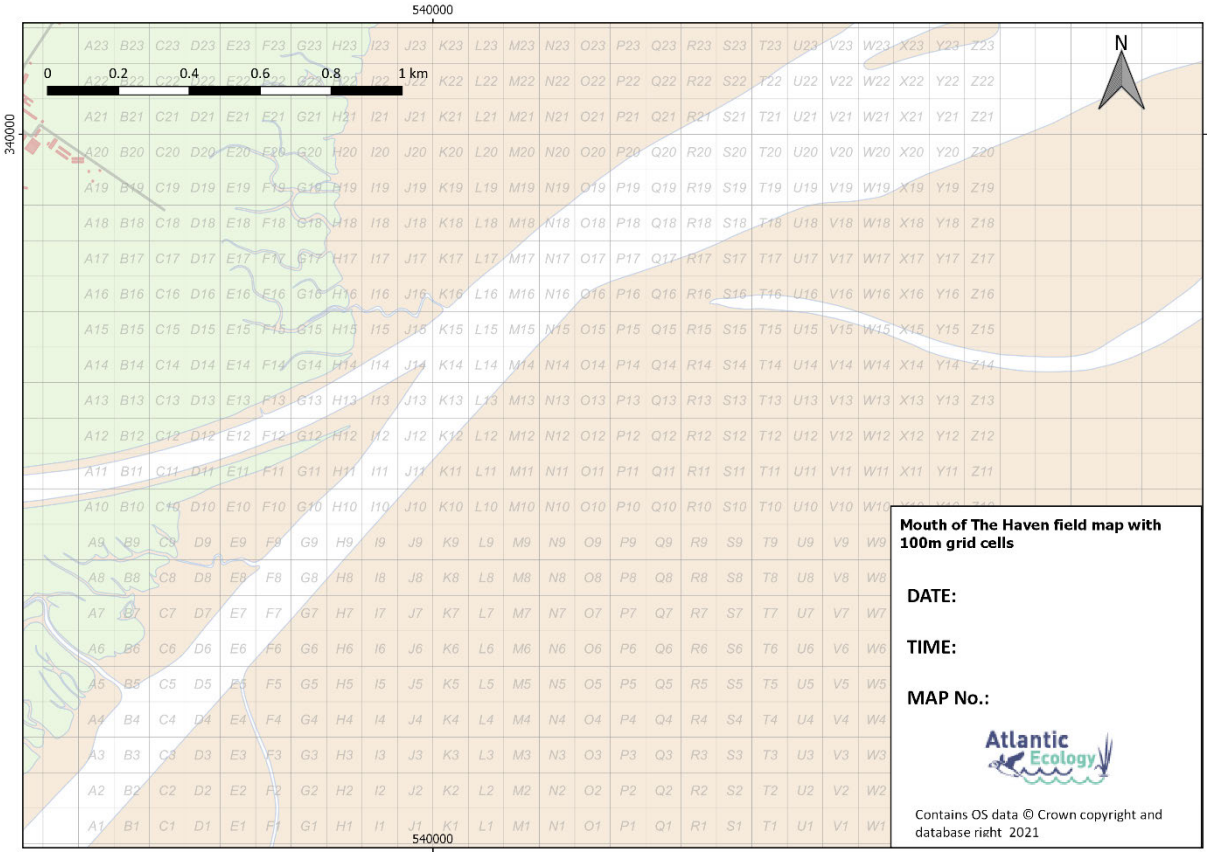

Figure 2 Map created by Atlantic Ecology for use in mapping bird movements at The Haven.

29th September

A large cargo ship (photograph 61) came out of The Haven and into The Wash at 11:41. Changes in behaviour caused by the boat's presence, occurred in the following species;11 Black-headed Gull, 22 Mallard and a Cormorant. The Cormorant flew 400m to a new roost site from J15 to H11. The 11 Black-headed Gulls and 22 Mallard flew 400m to a new roost site, J15 to L19.

The pilot boat (photograph 62) travelled out into The Wash at 11:42, no changes in behaviour were noted.

The barrier guard boat (photograph 63) entered The Wash at 11:46. 5 Black-headed gulls were resting on the river, they flew 30m to the riverbank, the cause of this movement was boat presence.

The barrier guard boat (photograph 64) returned from The Wash at 11:53. A Cormorant flew 300m to a new roost site travelling from M14 to J11. This was caused by the boat's presence.

The pilot boat (photograph 65) returned from The Wash at 12:05, the boat's wash caused 8 Sandwich Tern to fly 15m along the mudflats to a new roost location.

25th October

A small fishing vessel (photograph 66) entered The Wash at 07:41, no changes in behaviour were noted.

The pilot boat (photograph 67) entered The Wash at 08:42. Changes in behaviour were noted in the following birds: c600 Oystercatcher, c100 Dunlin, 22 Lapwing, 20 Turnstone and 5 Redshank. All of these birds changed their behaviour due to the boat's wash, they all flew around their roost site at I13, returning after 60 seconds. At the time c1500 Oystercatcher were using the roost site at I13, therefore changes in behaviour occurred in 40% of the roosting Oystercatcher.

A small private fishing vessel (photograph 68) entered The Wash at 08:48. 17 roosting Oystercatcher changed their behaviour by flying 50m to a new roost site within I13. This again was caused by the boat's wash. c1500 Oystercatcher were still using the roost site at I13 during this movement.

The pilot boat (photograph 69) returned from The Wash and entered the river mouth at 09:16. A number of birds showed changes in behaviour, of which all were caused by the boat's wash. 5 Shelduck, c400 Wigeon, c30 Dark-bellied Brent Goose and a Pintail flew c500m from J17 to a new feeding site at I23. C50 Dunlin and a Knot flew c200m from J15 to a new roost

site at I13. It's worth noting that the above birds were present during previous boat movements. I suspect the wash of the boat caused a change in behaviour this time due to tide being at its peak, whereas on previous movements the tide had not peaked yet. A further c525 Oystercatcher flew around their roost site at I13, returning after 45 seconds. The flock of Oystercatcher using I13 as a roost site at this time remained at c1500.

A medium sized vessel (photograph 70) entered The Wash at 09:51, no changes in behaviour were noted.

A medium sized vessel (photograph 71) entered The Wash at 09:55, no changes in behaviour were noted.

A medium sized vessel (photograph 72) entered The Wash at 09:58, no changes in behaviour were noted.

A fishing vessel (photograph 73) entered The Wash at 10:00, no changes in behaviour were noted.

A fishing vessel (photograph 74) entered The Wash at 10:01, no changes in behaviour were noted.

A fishing vessel (photograph 75) entered The Wash at 10:08, no changes in behaviour were noted.

A fishing vessel (photograph 76) entered The Wash at 10:23, no changes in behaviour were noted.

2nd November (Wharf Site)

During this visit the following water birds were present using the Wharf site.

Black-tailed Godwit	1	Grey Heron	1	Mallard	6
Cormorant	1	Lapwing	3	Redshank	60
Curlew	2	Little Egret	2	Ruff	4
Total			80		

A fishing vessel (photograph 77) headed SW at 14:45. Due to the boat's wash 9 Redshank flew 10m to a new roost site.

A fishing vessel (photograph 78) headed NE at 14:58. One Grey Heron walked 5m to avoid the wash of the boat, it returned to its hunting spot after 45 seconds.

A fishing vessel (photograph 79) headed NE at 15:01. Due to the boat's wash 7 Redshank flew 5m to a new roost location.

A fishing vessel (photograph 80) headed NE at 15:10. Due to the boat's wash 8 Redshank flew 10m to a new roost location.

A large cargo ship (photograph 81) headed SW at 15:52. All changes in behaviour were caused by the boat's presence. One Redshank flew c300m NE to a new roost site, a further 7 Redshank flew c800 SW to a new roost site, these birds joined an existing flock roosting Redshank and were then disturbed again as the boat passed their new location. 57 showed changes in behaviour with 26 flying around their roost site for 45 seconds before returning, 31 Redshank flew c1250m SW to a new roost site (the saline lagoon SW of the old tip). One Mallard flew c600m NE to a new feeding site and 3 Lapwing flew around their roost site for 45 seconds before returning. In total 62 individual birds were disturbed with 7 disturbed twice, equating to 78% of water birds present. Almost 100% of all Redshank using the site showed changes in behaviour 58/60.

The pilot boat (photograph 82) headed SW at 15:56. 4 Redshank walked 5m to a new roost site due to the boat's wash.

30th November (Wharf Site)

Bar-tailed Godwit	1	Dunlin	1	Redshank	20
Black-headed Gull	16	Grey Plover	4	Ringed Plover	2
Curlew	1	Lapwing	3	Ruff	2
Total			50		

A large cargo ship (photograph 83) headed NW at 14:02. Some birds showed changes in behaviour due to the presence of the boat. One Redshank flew c100m West to a new feeding location. 4 Grey Plovers were disturbed from their roost site with 2 flying 40m across the river, the remaining 2 flew c200m South-West. 12 roosting Redshank flew around their roost site before returning after 70 seconds. Finally, 2 Mallard flew c600m NE to a new feeding location.

A fishing vessel (photograph 84) headed SE at 15:13. No changes in behaviour were noted.

Species	**Number**	**Date**
Avocet	1	22/02/2021
Bar-tailed Godwit	10	22/02/2021
Black-headed Gull	34	25/01/2021
Common Gull	3	20/03/2021
Common Sandpiper	3	01/05/2021
Common Tern	10	25/06/2021
Cormorant	4	22/02/2021
Curlew	55	25/01/2021
Dark-bellied Brent Goose	1150	25/01/2021
Dunlin	180	22/02/2021
Great Crested Grebe	1	22/02/2021
Grey Heron	1	25/09/2021
Grey Plover	4	30/11/2021
Herring Gull	12	19/07/2021
Knot	1	25/10/2021
Lapwing	425	22/02/2021
Lesser Black-backed Gull	52	19/07/2021
Little Egret	3	30/06/2021
Mallard	7	25/09/2021
Oystercatcher	825	25/06/2021
Pintail	1	25/10/2021
Redshank	58	02/11/2021
Ruff	45	25/09/2021
Shelduck	8	22/02/2021
Turnstone	20	25/10/2021
Whimbrel	1	14/07/2021
Wigeon	400	25/10/2021

Table 2. Peak counts of all bird species, where behaviour changed.

4.1 Systematic list

The following systematic list discusses all of the bird species recorded during the survey period.

Key to abbreviations:

JNCC (2016) Seabird Population Trends and Causes of Change: 1986-2015 Report. Joint Nature Conservation Committee. Updated Sep 2016. https://jncc.gov.uk/our-work/seabird-population-trends-and-causes-of-change-1986-2015-report-category/

Wintering waterbirds thresholds. Frost, T., Austin, G., Hearn, R. *et al*. (2019). Population estimates of wintering waterbirds in Great Britain. British Birds 112: 130-145

WeBS – The Wetland Bird Survey (WeBS) monitors non-breeding waterbirds in the UK. WeBS surveyors monitor the UK's internationally important non-breeding waterbirds. The thresholds are calculated from 2013 – 2018 data only -

[redacted]

For each species the local status, WeBS threshold for international importance and the WeBS threshold for national importance is given. The table shows the five-year trend for The Wash and the 5-year average. Numbers of changes in behaviour are given and percentages over 0.5% of the Wash 5-year average are given.

Avocet *Recurvirostra avosetta*
Common passage migrant and summer visitor; local breeder. Red List. WeBS threshold for international importance: 940. WeBS threshold for national importance: 87.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
644	357	486	543	492		504

A single bird showed a change in behaviour caused by a large cargo ship; the bird flew c300m to a new roosting location. Avocet are scarce in The Wash during the winter months, changes in behaviour could be more frequent in the summer months.

Bar-tailed Godwit *Limosa lapponica*
Common passage migrant and winter visitor; scarce and local breeder. Red List. WeBS threshold for international importance: 1,500. WeBS threshold for national importance: 500.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
19,271	22,183	13,696	22,478	15,267		18,579

10 Bar-tailed Godwits showed a change in behaviour caused by a large cargo ship; the birds flew c300m to a new roosting location.

Black-headed Gull *Chroicocephalus ridibundus*
Common breeder; common wintering species. Amber List WeBS threshold for international importance: 20,000. WeBS threshold for national importance: 22,000.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
32,564	12,988	14,039	8,621	14,123		16,467

The peak count of Black-headed Gull change in behaviour that occurred was 34 on 25th January. These birds were settling down at their pre-roost location and flew c30m to a different pre-roost location.

Common Gull *Larus canus*
Regular wintering species. Very rare breeder locally. Red list. WeBS threshold for international importance: 16,400. WeBS threshold for national importance: 7,000.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**

911	1,447	612	3,414	532		1,383

The peak count of Common Gull change in behaviour that occurred was 3 on 20th March. These birds were roosting on the mudflats and flew c50m to a different location.

Common Sandpiper
Passage migrant wader in spring and autumn, rare wintering species. Amber listed. WeBS threshold for international importance: 12,000.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
54	29	31	45	25		37

A peak count of 3 birds showed changes in behaviour, caused by the wash of the pilot boat on 1st May. The birds flew around for 45 seconds before returning to their original location. These 3 birds equate for 8.11% of The Wash population.

Common Tern
Passage migrant and local breeder. Amber listed. WeBS threshold for international importance: 1,800.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
369	669	931	638	379		597

On 25th June 10 Common Terns showed changes in behaviour at the river mouth, caused by a large cargo ship's presence. The bird flew around for 60 seconds before returning to their roost site. This equates to 1.68% of The Wash population.

Cormorant *Phalacrocorax carbo*
Cormorant *Race carbo* is a widespread common resident and winter visitor. Breeding locally. Green list. Cormorant *Race sinensis* is a rare visitor. Amber list. WeBS for international importance: 1,200. WeBS threshold for national importance: 620.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
405	333	531	718	519		501

Four Cormorants showed changes in behaviour flying c600m from their feeding site at the mouth of the Haven. The peak count equates to 0.80% of the 5-year Wash average of 501. At the survey location Cormorants use way markers to roost; birds roosting on these posts showed no changes in behaviour. Changes in behaviour only occurred in feeding birds that were avoiding a collision.

Curlew *Numenius arquata*
A common passage migrant and winter visitor; scarce and local breeder. Red List. WeBS threshold for international importance: 8,400. WeBS threshold for national importance: 1,400.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
9,866	6,525	6,500	4,369	6,006		6,653

Curlew regularly showed changes in behaviour, with a peak count of 55 on 25th January. The peak count equates to 0.83% of the 5-year Wash average.

Brent Goose (Dark-bellied) *Branta bernicla bernicla*
Brent Goose *Race bernicla* is a common migrant and winter visitor. Amber list. Brent Goose *Race hrota* less common on the east coast of UK. Amber list. Brent Goose *Race nigricans* rare winter visitor. Amber list. WeBS for international importance: 2,100. WeBS threshold for national importance: 980.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
20,731	15,720	10,438	10,722	10,112		13,545

Dark-bellied Brent Goose are a charismatic bird of The Wash, which is a well-known area for these birds, holding 6.45 times the number required for internationally important numbers and 13.82 times for national importance. The only occurrence of this species showing changes in behaviour were 1150 on 25th January. These numbers are 1.17 times the number required for a nationally important site and 0.54 times the number required for an internationally important site. These numbers also make up 8.49% of The Wash 5-year average. The fact that a nationally important number of Dark-bellied Brent Geese are being disturbed by river traffic is significant. The birds that bathe on The Haven can be there at any time of the day and any given boat movement would cause changes in behaviour.

Dunlin *Calidris alpina*
There are three forms of Dunlin. *Schinzii* is a local breeder and common migrant. Amber list. *Alpina* is a common migrant and wintering species. Amber list. *Artica* is a scarce migrant. Amber list. WeBS for international importance: 13,300. WeBS threshold for national importance: 3,400.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
31,468	22,802	20,919	31,104	29,997		27,258

The peak count of Dunlin showing changes in behaviour was 180, caused by a large cargo ship on the 22nd February. 180 equates to 0.66% of The Wash 5-year average.

Great Crested Grebe *Podiceps cristatus*
A common passage migrant and winter visitor; common breeding species. Green list. WeBS for international importance: 6,300. WeBS threshold for national importance: 170.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
35	21	119	159	97		86

There was just a single change in behaviour in Great Crested Grebe cause by a large cargo ship on 22nd February; the bird flew c50m avoiding a collision, to move to another feeding site. This equates to 1.16% of The Wash 5-year average. Birds feeding at the river mouth are most likely to be disturbed, but even after being disturbed they can return to that feeding site.

Grey Plover *Pluvialis squatarola*
A common winter and passage migrant, Amber listed. WeBS threshold for international importance: 2,000. WeBS threshold for national importance: 330.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
9,190	7,990	8,914	9,298	10,270		9,132

A peak count of four birds showed changes in behaviour at the proposed wharf site on 30th November, caused by a large cargo ship.

Herring Gull
A declining coastal breeding species breeds locally in large numbers and in towns and cities. A resident species to The Wash. Red listed. WeBS threshold for international importance: 10,200. WeBS threshold for national importance: 7,300.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
4,990	3,473	3,903	10,792	5,093		5,650

On 19th July at the Wharf site a large cargo ship caused 12 Herring Gull's to fly from their location for 60 seconds before returning. These 12 were then disturbed again 2 minutes later by another large cargo ship for 90 seconds before returning. The pilot boat also caused 6 of these Herring Gulls to change their behaviour returning to their previous location after flying around for 45 seconds.

Knot *Calidris canutus*
A common pasasage wader with large roosting flocks within The Wash. Amber listed. WeBS threshold for international importance: 5,300. WeBS threshold for national importance: 2,600.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
144,781	156,313	205,161	185,801	197,291		177,869

A peak count of one showed a change in behaviour on 25th October caused by the pilot boat.

Lapwing *Vanellus vanellus*
A declining breeding species which is becoming scarce. A very common passage migrant and winter visitor. Red List. WeBS threshold for international importance: 20,000. WeBS threshold for national importance: 6,200.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
6,600	6,204	26,323	8,884	9,402		11,483

The peak count of Lapwing showing changes in behaviour were 425 caused by the pilot boat on 22nd February. These birds flew from their roost location but returned after 125 seconds in flight. The count of 425 equates to 3.70% of The Wash 5-year average.

Lesser Black-backed Gull
A summer migrant, local breeder and scarce winter species. Amber listed. WeBS for international importance: 5,500.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
983	1,146	183	218	(482)		633

On 17th July at the Wharf site a large cargo ship caused 52 Lesser Black-backed Gull's (8.21% of The Wash 5-year average) to fly from their location for 60 seconds before returning. 8 of these birds then left the site after a short period, the remaining 44 were then disturbed again 2 minutes later by another large cargo ship for 90 seconds before returning. 43 remaining Lesser Black-backed Gulls were then disturbed again by the pilot boat 5 minutes later. Boston holds a high proportion of breeding Lesser Black-backed gulls and c80% of the birds disturbed were juveniles.

Little Egret *Egretta garzetta*
A local resident and local breeder in small colonies. Green Listed. WeBS for international importance: 1,100. WeBS threshold for national importance: 110.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
659	594	413	593	384		529

At the wharf site on 30th June 3 Little egret showed changes in behaviour due to the presence of a large cargo ship. A single bird flew 150m to a new feeding site, the other 2 birds flew c1000m and then out of sight.

Mallard *Anas platyrhynchos*
A common resident and common breeding species, although declining. Amber list. WeBS for international importance: 20,000. WeBS threshold for national importance: 6,700.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
1,349	1,119	982	989	808		1,049

A common bird in The Wash with birds regularly present around the Haven mouth; a peak count of 8 birds showed changes in behaviour on 25th September caused by a cargo ship.

Oystercatcher *Haematopus ostralegus*
A very common coastal passage migrant / winter visitor and fairly common resident. Less common inland, but now breeds in small numbers. Amber List. WeBS threshold for international importance: 8,200. WeBS for national importance: 3,200.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
15,551	22,608	17,176	22,055	24,964		20,471

A peak of 825 birds showed changes in behaviour on 25th June caused by a large cargo ship. This equates to 4.03% of The Wash 5-year average. Of these 825, 700 returned to their roost site after flying around for 90 seconds. The remaining 125 flew c3300m to a new roost site (Saline lagoon at RSPB Freiston Shore). A further 175 Oystercatcher flew to the same roost site after being disturbed by a large cargo ship on 1st May, this equates to 0.85% of The Wash 5-year average. There is a large roost of Oystercatcher on the banks of The Welland river mouth. If the birds are roosting on the rocks as opposed to the banks, they are more likely to be disturbed by river traffic.

Pintail *Anus acuta*
A passage and winter visitor to The Wash. Amber listed. WeBS threshold for international importance: 600. WeBS threshold for national importance: 200.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
550	355	735	311	337		458

A single bird showed changes in behaviour during the survey period, caused by the pilot boat at the river mouth on 25th October.

Redshank *Tringa totanus*
Nominate British and continental form; a common passage migrant and winter visitor, and a fairly common breeding species of coastal marshes. Scarce/very scarce inland. Icelandic form (*robusta)* is a common passage migrant and winter visitor. Amber List (both forms). WeBS threshold for international importance 2,400. WeBS threshold for national importance: 1,200.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
6,488	5,267	4,183	5,834	4,425		5,239

A peak of 58 Redshank showed changes in behaviour at the wharf site caused by the presence of a large cargo ship on 2nd November.

Ruff *Calidris pugnax*
A fairly common passage migrant and scarce winter visitor. Bred to nineteenth century. Red List. WeBS threshold for international importance: 10000. WeBS threshold for national importance: 9. **RBBP.**

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
67	73	55	102	39		67

A peak count of 45 Ruff showed change sin behaviour at the proposed wharf site on 25th September caused by the pilot boat, this equates to 65.22% of The Wash population.

Shelduck *Tadorna tadorna*
A common resident, partial migrant and winter visitor, with concentrations mainly in The Humber, on the north-east coast and in The Wash. Fairly common as a breeding species in estuaries and coastal areas, but scarce inland. Amber List. WeBS threshold for international importance: 3,000. WeBS threshold for national importance: 610.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
2,570	(1,812)	2,987	2,396	1,484		2,250

On the 22nd February a large cargo ship caused the changes in behaviour of 8 Shelduck. Shelduck numbers tend to peak around May time, winter counts of Shelduck are much lower than during spring and autumn.

Turnstone *Arenaria interpres*
A winter visitor and passage wader. Amber listed. WeBS threshold for international importance: 1,400. WeBS threshold for national importance: 400.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
1,093	642	893	735	682		809

A peak count of 20 birds showed changes in behaviour at the river mouth caused by the pilot boat on 25th October.

Whimbrel
A migrant wader and rare wintering species. Red listed. WeBS threshold for international importance: 6,700.

WeBS - The Wash – Numbers and Trends

2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
432	105	251	171	118		215

A single occurrence of change in behaviour occurred in one Whimbrel on 14th July at the river mouth. Caused by a small fishing vessel's presence the bird flew 25m to continue feeding.

Wigeon *Mareca Penelope*
A common passage migrant and winter visitor; scarce and local breeder. Amber list. WeBS for international importance: 14,000. WeBS threshold for national importance: 4,500.

WeBS - The Wash – Numbers and Trends						
2014/15	**2015/16**	**2016/17**	**2017/2018**	**2018/2019**		**5-year Average**
9,494	12,315	8,777	15,254	15,030		12,172

A peak of c400 Wigeon showed changes in behaviour caused by the wash of the pilot boat on 25th October.

4.2 Incidental boat movements whilst carrying out high tide surveys at the wharf site

Whilst carrying out high tide surveys at the suggested wharf site along the River Haven two boat movements were noted. Changes in behaviour caused by the boat's presence were recorded using the same methodology as the Haven river mouth surveys.

19th February 2021

A small commercial fishing vessel (Photograph 17) moved upstream toward the Port of Boston. As it passed through the proposed wharf site (known as site A) 3 Redshank changed their behaviour, flying c100m downstream to another feeding location. This change was due to the boat's presence. 18 Redshank were present in site A, therefore the vessel caused changes in behaviour to 16.66% of the Redshank present.

20th March 2021

After the last vessel movement at The Haven mouth, the ship was followed to monitor any changes in behaviour to birds along The Haven. The large cargo ship (Photograph 18) travelled upstream toward the Port of Boston, passing through the wharf site (known as site A) at 09:07. The following birds showed changes in behaviour: 15 Redshank, 3 Oystercatchers, 2 Carrion Crows, 1 Bar-tailed Godwit, 1 Black-headed Gull and 1 Cormorant. Of the 15 Redshank, 5 flew c350m to the area known as Site B, 8 flew c150m to the edge of Site A and 2 flew around for 45 seconds and returned to their roost location. The 3 Oystercatchers flew c150m to another roosting location. The 2 Carrion Crows flew 50m to another feeding location. The single Bar-tailed Godwit flew c300m to another roosting location at Site B. A single Black-headed Gull flew 50m to another roosting location and the Cormorant flew 200m downstream to another feeding location. There were no counts done before, so a percentage of the bird's behavioural changes is not possible, although from what was observed, 80-90% of all birds present showed changes in behaviour.

21st March 2021

Two boat movements were witnessed whilst carrying out the high tide surveys: a cargo ship (Photograph 19) and the pilot boat. Both were observed moving through Site A and Site B.

The cargo ship caused changes in behaviour to a variety of bird species, these changes were all caused by the boat's presence. It moved downstream from the Port of Boston, travelling extremely slowly. It reached Site A at 10:32, exiting at 10:38. 23 Redshank, 1 Ruff and 1 Bar-tailed Godwit showed changes in behaviour, all birds flew c300m to another roosting location at Site B. 5 Redshank flew round their current roosting location, returning after 60 seconds. 2 Oystercatchers flew c150m to another roosting location, remaining in Site A. 2 Shelduck flew c400m to a new roosting location at Site B. 2 Curlew flew upstream from Site A c250m to a new roosting location. 4 Cormorant flew c600m downstream to another feeding location; these 4 Cormorant were again disturbed by the cargo ship and flew downstream until they were out of sight, at least c800m in distance. 28 Redshank were present on Site A at the time of the boat's movements, therefore the cargo ship caused 100% of the Redshank to change their behaviour. In total 40 birds showed changes in behaviour, which is 86.96% of the birds that were present at Site A.

The cargo ship entered Site B at 10:38, exiting at 10:44. Again it caused a number of changes in behaviour. 72 Redshank, 6 Ruff, 3 Mallards, 2 Black-headed Gulls and 1 Bar-tailed Godwit all flew around their current roost site, returning after 60 seconds. 17 Redshank flew c300m returning to their roost site at Site A. 3 Little Egret and 2 Shelduck flew downstream out of sight, travelling at least c500m. Adding the birds that moved from Site A to B, in total 96 Redshank were present at Site B when the boat was passing through; 89 Redshank showed changes in behaviour, equating to 92.71%. Again, calculating the number of birds present at Site B following the bird movement from Site A, a total of 131 birds were present. In total, 106 birds showed changes in behaviour, equating to 80.92%. It wouldn't be expected that Meadow Pipits, Magpies and Grey Partridge would show changes in behaviour, based on their location and behaviour. Purely water bird species disturbance levels were at 86.18%

The pilot boat moved much more quickly than the cargo ship did, entering Site A at 10:40 and exiting at 10:42. Most birds had vacated Site A by the time it moved through. In total 22 Redshank were present, of these only 3 showed changes in behaviour (13.64%), flying around for 45 seconds before returning to their roost location. These changes in behaviour were due to the boat's presence.

The pilot boat caught up with the cargo ship towards the end of Site B (Photograph 20). The pilot boat entered Site B at 10:42, leaving at 10:44. No changes in any of the birds' behaviour were noted.

Both vessels were observed as they travelled downstream until out of sight. A continued high level of disturbance to birds along the river was witnessed. Gulls and wading birds were displaced from their roosting/feeding areas in the same way that was recorded at Sites A and B. The pilot boat was following the cargo ship, and from what was witnessed it was clear that the cargo ship was causing all of the disturbance: this is backed up by the account of what happened at Sites A and B.

5 DISCUSSION AND RECOMMENDATIONS

To reiterate what was conveyed at the beginning of the report, the results from this report should not be used as a comparison to last winter's 2019/20 report. This report is supplementary to the original report.

Overall, 21 bird species altered their behaviour due to the presence of boats or wash from boats. Most occurred in small numbers, but Dark-bellied Brent Goose, Common Sandpiper, Oystercatcher, Lapwing and Great Crested Grebe occurred in significant numbers. Based on the latest available WeBS data these six species were disturbed at levels over 1% of The Wash 5-year average; Dark-bellied Brent Goose 8.49% (1150), Ruff 65.22% (45) Lesser Black-backed Gull 8.21% (52),Common Sandpiper 8.11% (3), Oystercatcher 4.03% (825), Lapwing 3.70% (425) and Great Crested Grebe 1.16% (1).

Of these seven species, Dark-bellied Brent Goose is of the most concern; not only are the numbers of disturbed birds (1150) high in the context of The Wash, but the numbers also go above the threshold for nationally important numbers (980). The following single occurrence took place on the 25th January 2021: the birds were bathing/drinking along The Haven River and were disturbed by the presence of the pilot boat at 14:11. The group moved from the river to avoid a collision and flew to some nearby grassland.

Dark-bellied Brent Geese use the River Haven to bathe and drink, and they do this at any time of day. This means that any boat movement could cause a problem. On this occasion it happened to be the first boat, but the geese could have moved onto The Haven to bathe/drink after that boat. Therefore, the second boat of the day would have caused the disturbance. If boat traffic is likely to increase, then the chances of disturbing these nationally important numbers of Dark-bellied Brent Geese increases too.

Scenario 1, at current vessel numbers. The geese move onto the Haven directly after the last boat movement, say 14:00. Therefore, they remain undisturbed.

Scenario 2, with increased vessel numbers. The geese move onto the Haven at 14:00 again, except this time there are still vessels moving. Therefore, the geese are disturbed.

It is also worth noting that any boat of any size would cause the same levels of disturbance to bathing/drinking Dark-bellied Brent Geese, it just so happened that this time it was the pilot boat. A three times increase in cargo ship movement would increase the likelihood that this disturbance is caused by cargo ships.

At the River mouth survey changes in behaviour were predominately caused by boat presence for 99.88% (3,461) of the total birds across all three surveys. The boats wash only caused changes in behaviour in 0.12% (4). Changes in behaviour caused by boat's presence altered depending on the type of river traffic. Large cargo ships were responsible for 52.90% (1831), the pilot boat was responsible for 47.04% (1,628) whilst the small fishing vessels were responsible for 0.06% (2), the small personal boats caused no changes in behaviour. Changes in behaviour caused by the boat's wash were caused solely by the pilot boats 100% (4).

As a reminder, the largest level of disturbance (1150 birds at 33.22%) of Dark-bellied Brent Geese on 25th January caused by the pilot boat could have also easily been caused by a cargo boat or small fishing vessel.

With regards to changes in behaviour at the wharf site, 4.30% (27) were caused by the boat's wash and 95.70% (601) were caused by boats presence. Changes in behaviour caused by boat's presence altered depending on the type of river traffic. Large cargo ships were responsible for 57.40% (345), the pilot boat was responsible for 22.63% (136) whilst the small fishing vessels were responsible for 4.66% (28), the small personal boats were responsible for 15.31% (92). With regards to boat's wash large cargo ships were responsible for 100% (27) of changes in behaviour.

Whilst percentages of total birds disturbed varied between boat type it was clear to me that large cargo ships were disturbing a much higher percentage of birds present on site. For further details on this see account from 21st March 2021 (page 19). During the surveys of the Wharf site in May, June and July few birds were present at the location, from what I witnessed high percentages of birds located at the site showed changes in behaviour when interacting with large cargo ships (see account on 30th June, page 10) where 100% of birds present at the site showed changes in behaviour. Other boats weren't causing changes in behaviour to a high percentage of birds present on the site.

During both July visits multiple Gull species were being disturbed, these birds were being pushed off the river by various boat presence. The Gulls often returned to the same location even between quick boat movement (see account from 19th July) I believe an increase in boat movements would increase these types of disturbances. The Gull disturbances may also be very time sensitive, it involved mostly juvenile birds, probably birds that breed in and around Boston Port. Therefore, it's possible that this type of disturbance to large juvenile Gulls may only occur close to the fledging period.

Ruff numbers showing changes in behaviour coincide with the peak passage of Ruff within The Wash and the UK. Ruff numbers are increasing in The Wash. 65.22% of The Wash population showing changes in behaviour at the proposed wharf site, with this data any mitigation should factor in Ruff roosting/feeding habitat.

5.1.1 Recommendations

If any mitigation should go ahead, the main focus should be on wading birds and Dark-bellied Brent Geese. For Dark-bellied Brent Geese, freshwater habitat would be ideal for bathing and drinking. The waders will benefit from any freshwater habitat creation too. With reference to wading species, the focus should be on roosting habitat with the opportunity for feeding too.

With changes in Ruff behaviour equating to 65.22% of The Wash population at the proposed wharf site, any mitigation should factor in some Ruff roosting/feeding habitat.

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Winter Bird Survey Results for land along The River Haven, Boston, Lincolnshire October 2019 to March 2020 Andrew Chick Ecology

Wintering waterbirds thresholds. Frost, T., Austin, G., Hearn, R. et al. (2019). Population estimates of wintering waterbirds in Great Britain. British Birds 112: 130-145

Appendix 1

River traffic images

Photograph 1. Pilot boat on 25th January at 14:11.

Photograph 2. Pilot boat on 25th January at 14:41.

Photograph 3. Large ship on 25th January 14:50.

Photograph 4. Large ship on 25th January 16:26.

Photograph 5. Pilot boat on 25th January at 16:28.

Photograph 6. Large ship on 25th January 16:39.

Photograph 7. Pilot boat on 25th January at 17:01.

Photograph 8. Pilot boat on 22nd February at 12:10.

Photograph 9. Small fishing vessel on 22nd February at 12:45.

Photograph 10. Large ship on 22nd February at 12:49.

Photograph 11. Large ship on 22nd February at 12:59.

Photograph 12. Small private vessel on 22nd February at 13:05.

Photograph 13. Small fishing vessel on 20th March at 07:46.

Photograph 14. Pilot boat on 20th March at 07:48.

Photograph 15. Pilot boat on 20th March at 08:11.

Photograph 16. Large ship on 20th March at 08:24.

Photograph 17. Small fishing vessel on 19th February at 10:33. Site A.

Photograph 18. Large ship on 20th March at 09:07. Site A.

Photograph 19. Large ship on 21st March at 10:38. Site A.

Photograph 20. Pilot boat and large ship on 21st March at 10:44. Site B.

Photograph 221. Pilot boat out at 07:16 on 1st May 2021

Photograph 222. Pilot boat in at 07:47 on 1st May 2021

Photograph 223. Large cargo ship in at 07:54 on 1st May 2022

Photograph 224. Small fishing vessel out at 08:06 on 1st May 2021

Photograph 25. Small fishing boat out at 09:36 on 31st May 2021

Photograph 256. Medium fishing boat in at 10:11 on 31st May 2021

Photograph 27. Small private vessel out at 11:00 on 31st May 2021

Photograph 28. Large cargo ship in at 18:15 on 25th June 2021

Photograph 29. Large cargo ship out at 19:55 on 25th June 2021

Photograph 30. Pilot boat out at 20:00 on 25th June 2021

Photograph 31. Pilot boat in at 09:40 on 30th June 2021

Photograph 32. Large cargo ship in at 09:53 on 30th June 2021

Photograph 33. Largo cargo ship in at 10:09 on 30th June 2021

Photograph 34. Two small fishing vessels in at 19:40 on 14th July 2021

Photograph 35. Small fishing vessel in at 19:47 on 14th July 2021

Photograph 36. Small fishing vessel in at 20:14 on 14th July 2021

Photograph 37. Pilot boat out at 20:33 on 14th July 2021

Photograph 38. Pilot boat in at 20:57 on 14th July 2021

Photograph 39. Large cargo ship in at 21:03 on 14th July 2021

Photograph 40. Large cargo ship in at 21:06 on 14th July 2021

Photograph 41. Small fishing boat out at 09:16 on 17th July 2021

Photograph 42. Commercial tour boat out at 09:31 on 17th July 2021

Photograph 43. Private vessel out at 09:43 on 17th July 2021

Photograph 44. Private vessel out at 09:44 on 17th July 2021

Photograph 45. Private vessel out at 09:49 on 17th July 2021

Photograph 46. Private sailing boat out at 10:58 on 17th July 2021

Photograph 47. Small private vessel out at 13:04 on 19th July 2021

Photograph 48. Large cargo ship out at 13:22 on 19th July 2021

Photograph 49. Large cargo ship out at 13:25 on 19th July 2021

Photograph 50. Pilot boat out at 13:30 on 19th July 2021

Photograph 51. Small private vessel in at 14:05 on 19th July 2021

Photograph 52. Pilot boat in at 14:32 on 19th July 2021

Photograph 53. Pilot boat out at 08:30 on 28th August.

Photograph 54. Pilot boat in at 08:49 on 28th August.

Photograph 55. Large cargo in at 08:53 on 28th August.

Photograph 56. Private vessel out of The Welland at 10:49 on 28th August.

Photograph 57. Private vessel out at 11:22 on 28th August.

Photograph 58. Pilot boat in at 08:05 on 25th September.

Photograph 59. Large cargo in at 08:37 on 25th September.

Photograph 60. Private vessel out at 09:58 on 25th September.

Photograph 61. Large cargo out at 11:41 on 29th September.

Photograph 62. Pilot boat out at 11:42 on 29th September.

Photograph 63. Private vessel out at 11:46 on 29th September.

Photograph 64. Private vessel in a 11:53 on 29th September.

Photograph 65. Pilot boat in at 12:05 on 29th September.

Photograph 66. Fishing vessel out at 07:41 on 25th October.

Photograph 67. Pilot boat out at 08:42 on 25th October.

Photograph 68. Fishing vessel out at 08:48 on 25th October.

Photograph 69. Pilot boat in at 09:16 on 25th October.

Photograph 70. Fishing vessel out at 09:51 on 25th October.

Photograph 71. Fishing vessel out at 09:55 on 25th October.

Photograph 72. Fishing vessel out at 09:58 on 25th October.

Photograph 73. Fishing vessel out at 10:00 on 25th October.

Photograph 74. Fishing vessel in at 10:01 on 25th October.

Photograph 75. Fishing vessel out at 10:08 on 25th October.

Photograph 76. Fishing vessel out at 10:23 on 25th October.

Photograph 77. Fishing vessel out at 14:45 on 2nd November.

Photograph 78. Fishing vessel in at 14:58 on 2nd November.

Photograph 79. Fishing vessel in at 15:01 on 2nd November.

Photograph 80. Fishing vessel in at 15:10 on 2nd November.

Photograph 81. Large cargo out at 15:52 on 2nd November.

Photograph 82. Pilot boat out at 15:56 on 2nd November.

Photograph 83. Large cargo in at 14:02 on 30th November.

Photograph 84. Fishing Vessel out at 15:13 on 30th November.