



**Consultancy
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North Kent SAMMS – Bird Disturbance Surveys
Winter 2021/22



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ABSTRACT

Surveys of recreational activity and bird disturbance took place at 22 locations adjacent to Thames Estuary & Marshes SPA, Medway Estuary & Marshes and The Swale SPA during the winter of 2021/22. These repeated baseline surveys carried out in 2010/11 which have been used to inform mitigation measures delivered through SAMMS and Bird Wise.

In 2021/22, Riverside Country Park had the greatest recreational activity, followed in descending order by The Strand, Motney Hill, Lower Upnor, Grain Beach and Oare Marshes. The most frequent activities across the whole survey area were walking, dog walking, and jogging. Visitors to the coastline have increased and become more concentrated into the busiest areas since 2010/11, with associated disturbance issues now most profound at several key locations. The proportion of dogs on leads has increased slightly overall, but there is considerable variation between locations.

Dark-bellied Brent Goose shows the highest response rate to potential disturbance activities. Black-tailed Godwit shows the lowest response rate. Responses of waterbirds varied with type of recreational event, with highest response rates by birds associated with occurrence of bait digging, fishing, dogs off leads, and transient raptors. Awareness raising and education of the public about disturbance to SPA waterbirds should continue by active engagement through Bird Wise. Focused research of priority topics should also be considered to help ensure delivery of an evidence-based mitigation strategy.

1 INTRODUCTION

1.1 Background

The North Kent Marshes stretch from Gravesend through to Whitstable including the south coast of the Isle of Sheppey, covering 70 miles of coastline. Its 17,000 hectares include a complex of brackish, floodplain grazing marsh, ditches, saline lagoons, intertidal salt marsh, shingle spits and mudflats. This diverse mix of habitats attract and support hundreds of thousands of birds every year, particularly in winter, so this area is protected by local, national and international designations. The Thames Estuary and Marshes, the Medway Estuary and Marshes and The Swale are all Special Protection Areas (SPA) and Ramsar Sites, as well as Sites of Special Scientific Interest (SSSI) and Marine Conservation Zones (MCZ).

In 2008, concerns were raised that human recreational activity was causing disturbance to the birds that depend on this area, so the North Kent Environmental Planning Group commissioned studies to assess the issue further. Bird disturbance and visitor surveys were undertaken between 2010 and 2012. These studies found that disturbance was highest in areas with the greatest levels of recreational activity. Housing development identified in the local plans for Gravesham, Medway, Swale and Canterbury showed that the area would see increases in population which could potentially increase disturbance and impact negatively on the protected features of the SPAs.

1.2 SAMMS and Bird Wise

To address the concerns linked to potential disturbance associated with increased recreational activity, the North Kent Strategic Access Management and Monitoring Strategy (SAMMS) was published in 2014. This set out a suite of strategic measures which could be implemented to mitigate the impact of additional human activity close to the SPAs. The measures are funded via a developer tariff which is applied to every new dwelling built within 6 km of the SPAs. This strategy has been adopted by Canterbury, Gravesham, Medway, and Swale councils, and applied to new developments from 2015.

Bird Wise was formed in 2017 as the project brand name to deliver the mitigation measures identified by SAMMS. The key approaches adopted within the Bird Wise scheme are informed by the results of bird disturbance and visitor surveys undertaken between 2010 and 2012. In association with that, there is a requirement for periodic monitoring of disturbance and evaluation of the efficacy of associated mitigation.

1.3 Study aims and objectives

Kent Wildlife Trust Consultancy Services was commissioned by Medway Council in November 2021 to carry out bird disturbance surveys during winter 2021/22 to inform the monitoring of the Bird Wise project's mitigation measures. In doing so, the results will also help to establish whether disturbance has changed since original baseline bird disturbance surveys were carried out in winter 2010/11 (Liley & Fearnley 2011).

The aims of this work in winter 2021/22 were to collect data on abundance, distribution, disturbance events, and responses of waterbirds within a defined study area using the same survey locations

that were used in winter 2010/11. All data have been collected using a methodology consistent with the previous 2010/11 surveys.

This report provides a high level summary of the data collected during surveys in winter 2021/22 and includes a preliminary comparison of data from the previous surveys in 2010/11.

A short discussion of the results is incorporated which includes recommendations for future work and considers approaches to ensuring continued effectiveness of the Bird Wise project.

2 METHODOLOGY

The surveys in 2021/22 used the same methodology described in Liley & Fearnley (2011). For completeness, a summary of the key aspects of data collection is presented here.

2.1 Survey locations

Twenty-two survey points were visited (Table 1), the same coverage as the baseline surveys in 2010/11. These survey points represent good geographical coverage of the three relevant SPAs – Thames Estuary and Marshes SPA, The Swale SPA, Medway Estuary and Marshes SPA (Figure 1).

ID	Name	Grid Reference	ID	Name	Grid Reference
1	Seasalter-The Oaze	TR072649	12	The Strand, Gillingham	TQ785693
2	South Oaze	TR056648	13	Lower Upnor	TQ763712
3	Oare Marshes	TR013647	14	Hoo St. Werburgh	TQ790714
4	Conyer	TQ965655	15	Middle Stoke	TQ833750
5	Queensborough	TQ905723	16	Stoke Ouze A228 layby	TQ846756
6	Shell Ness	TR052676	17	Grain Beach	TQ890769
7	Harty	TR030661	18	Grain Power Station	TQ893751
8	Bedlams Bottom	TQ885683	19	All Hallows - Yantlett	TQ852785
9	Upchurch	TQ852687	20	All Hallows - Holiday Park	TQ842786
10	Motney Hill turning	TQ821676	21	Cliff Creek	TQ708769
11	Riverside Country Park	TQ808684	22	Shornmead	TQ696748

Table 1. Survey locations

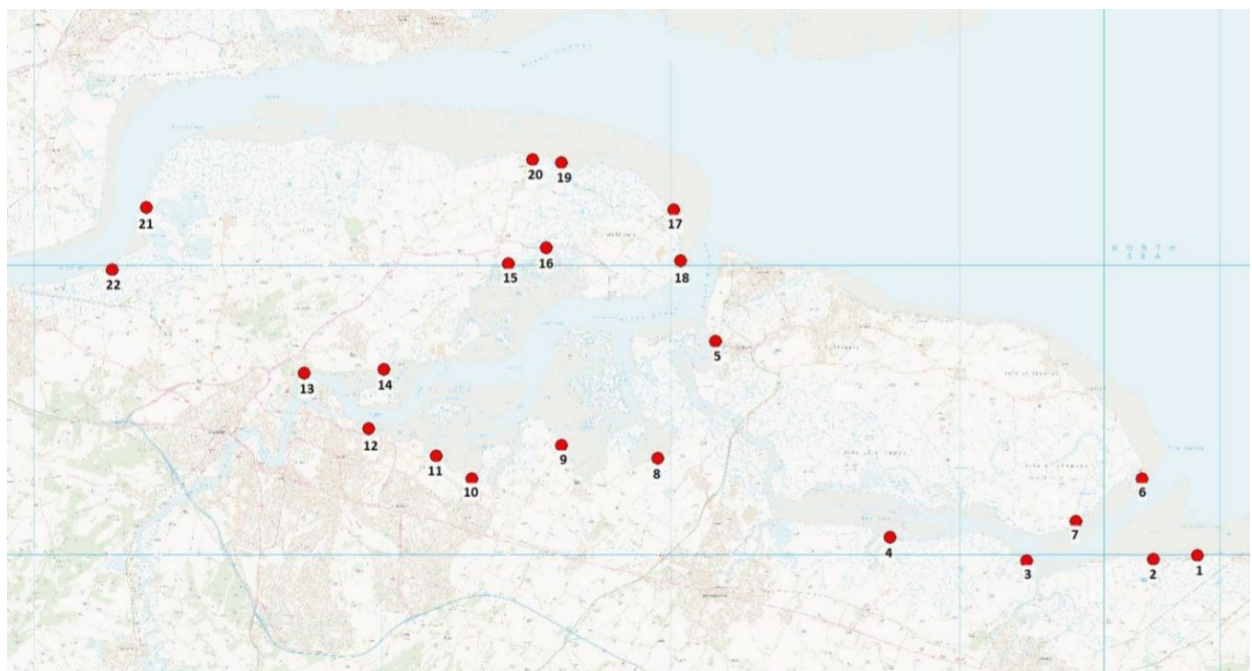


Figure 1. Survey locations. The red dots mark survey locations 1-22 (as per Table 1)

2.2 Data collection

Three surveys were carried out per month at each of the 22 survey locations during the contracted period. Surveys were undertaken throughout the winter period, December to March. A consistent approach across all survey points was adopted in terms of ensuring inclusion of survey coverage at weekends, and across full representation of the tidal cycle.

Each survey visit lasted around 2 hours and included the following:

- A count of all birds present within the focal area at the start and end of the count
- A map of all people / activities taking place at the start of the visit
- A 'diary' of all recreational events – essentially all people / activities observed over a period of 1 hour 45 minutes, recording the activity, time, duration etc.

2.3 Focal areas for bird counts

At each survey location a focal area for the fieldwork was defined. This area stretched up to 500 m from the surveyor and included all visible areas of intertidal habitat, below MHW (mean high water mark), within this 500 m radius. The 500 m radius was selected as, based on other similar surveys (Liley, Stillman, & Fearnley 2010), this was the maximum distance at which surveyors felt confident counting birds at the same time as recording levels of human activity, and within which it was possible to reliably estimate distances between disturbance events and the birds.

On straight sections of shore this area was typically defined simply as an arc (radius 500 m) drawn from the survey location. Where jetties, creeks, headlands etc meant that there were no clear sight-lines, then the boundaries of the focal area became more complex. The focal area encompassed a different total area at each survey point.

The focal area was then split into a series of bands, representing distance from MHW (i.e. these bands were parallel to the shore rather than concentric rings around the surveyor). These bands were defined within the GIS and plotted onto aerial photographs which each surveyor carried in the field with them. These plots provided a simple and effective means for the surveyors to establish the distances and 'layout' of each survey location and focal area. Bands used were 0-50 m; 50-100 m, 100-150 m, 150-200 m, 200-250 m and 250-500 m.

At the beginning and end of each visit all birds were counted within the focal area, and the total count was broken down so as to reflect the number of birds within each distance band. Only waders, wildfowl, divers and grebes were counted. All gulls, Cormorant and herons were excluded.

2.4 Diary of recreational activities

All events that involved recreational access or other events that might cause disturbance were then recorded over the following 105 minutes, in chronological order. Each event was given a unique letter code (A, B, C etc), enabling diary events to be cross referenced to other data sets. All activities/people were recorded by the surveyors, regardless of whether they entered the focal area used for the bird counts. For each event the following were recorded:

- Start and end time (i.e. when first in view to when lost from sight)
- Whether the event came within 200m of birds within the focal area
- Habitat (simply coded as shore, intertidal or water)
- Group size (number of people), this was not always possible to record, e.g. with boats
- Number of dogs
- Activity (categorised according to activity types, see Table 2)
- Any other information / notes

Description of activity	Code
Dog walker	DW
Dog off lead	dx
Dog on lead	dl
Bait digger	BD
Cycling	C
Jogger	J
Fishing from shore	F
Walking without dog	W
Kids playing	KP
Picnic	P
Birdwatcher	BR
Horse riding	HR
Metal detecting	MD
Wildfowling	WF
Swimming	SW
Windsurfer on water	WS
Kitesurfer on water	KS
Canoe on water	Ca
Jet ski on water	JS
Water skiing	WSk
Rib or similar fast small boat	SMB
Small sailing boat (laser, dinghy)	SS
Moderate-large sailing boat, no running motor	LS
Large boat on outboard motor	LMb
Person working on stationary boat	B
Person accessing boat or water	BW
Motor vehicle	MV
Rowing boat	RB
Air-borne (microlights, helicopters, planes)	AB

Table 2. Recreational activity codes

2.5 Bird responses

Recreational events that occurred within 200 m of birds within the focal area (or in a very few cases where disturbance occurred at greater than 200 m) were categorised as ‘potential disturbance events’. For this subset of all recreational events, a record of the response of each species present to the activity was recorded. This included distance at which birds responded (or not), the behavioural response observed, distance displaced, etc. For each species, and each potential disturbance event within 200 m, the following were recorded:

- Species
- Count (number present within 200 m)
- Behaviour of the birds (prior to the disturbance event), simply categorised as F (feeding) or R (roosting/preening/loafing)
- Response of the birds (see Table 3) ultimately observed
- Distance at which the response occurred (if “No response” this distance was the minimum distance from the potential disturbance event to the nearest individual; if disturbance occurred then this distance was the maximum distance from one individual to the disturbance event when the disturbance occurred)
- Distance displaced, i.e. the distance that the disturbed bird(s) walked/swam/flew if disturbed
- Total time until original behaviour resumed
- Notes

Response	Code
No response	NR
Alert, heads up, no change in birds’ position	A
Alert, birds walked/swam short distance and resumed previous behaviour	W
Birds flew short distance (<50m) and resumed previous behaviour in general area	f
Birds took flight and flew more than 50m	F

Table 3. Bird response codes

3 RESULTS

This section summarises the results of the bird disturbance surveys carried out in 2021/22. The results are discussed in Section 4, including reference to data collected at the same survey locations in 2010/11 (Liley & Fearnley 2011).

3.1 Waterbird counts

Thirty-two relevant waterbird species (waders, wildfowl, divers and grebes) were recorded at the 22 survey locations during winter 2021/22 (Table 4). Four species (Curlew, Oystercatcher, Redshank and Dark-bellied Brent Goose) were recorded at all survey locations.

The overall assemblage across the study area was very similar to that recorded during the baseline surveys in 2010/11 (Liley & Fearnley 2011); the differences being the addition of Common Sandpiper in 2021/22, but no sightings of Whimbrel, Black Brant and Eider all of which were recorded in 2010/11.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
GG	Great Crested Grebe		1		3	2	1	2	1		1		1	1	1							1	1
LG	Little Grebe				13	1							1	1	1							1	
AV	Avocet			53	166	26	13	75	317		537		181			1	5			4		4	12
BA	Bar-tailed Godwit		42		166		530	1	2														
BW	Black-tailed Godwit	1		6	417	207	5	92	9	1	82	6	37		120		2	126	29	17	135	20	50
CS	Common Sandpiper													1									
CU	Curllew	66	12	4	34	16	8	10	94	26	8	12	14		14	15	2	42	7	72	69	28	19
DN	Dunlin	1460	1000	29	2300	15	5000	172	1700	5000	870	1000	1500		1200	11	3			73	444	110	500
GP	Golden Plover	60			95												16				150		
GK	Greenshank										1	1			1								
GV	Grey Plover	130	82	3	245	9	140	4	36	24	25	23	7		8	7	9		1	12	7	20	8
KN	Knot	285	950		138	6	2500		400	45	31	50	2							35	19		
L.	Lapwing	102		180	315			218	420		75	33	4		19		76						
OC	Oystercatcher	300	735	2	2	18	3500	11	49	30	21	109	10		20	1	3	39	28	19	314	24	21
PZ	Purple Sandpiper																		1				
RK	Redshank	27	30	69	231	105	103	22	80	62	113	111	70	3	17	134	31	21	32	14	40	59	38
RP	Ringed Plover	29	163		29	1	21			20	13	14	51		15					1			
SS	Sanderling	31					61												39		1		
SN	Snipe							2				23				1						1	
DR	Spotted Redshank									1													
TT	Turnstone	213	118	17	16	35	99		50	60	25	320	200		88	7			19		63	8	14
CG	Canada Goose				2						4												
DB	Dark-bellied Brent Goose	145	48	55	318	39	242	50	95	142	18	152	57	2	151	38	46	144	202		113	45	38
GA	Gadwall																					4	8
MA	Mallard				39	8	61	137	8	3	4	6	23	2	1	2				58	18	12	
MS	Mute Swan				5	1			2				2	2	3							2	2
PT	Pintail				13			4	100	22	85	9			19								9
RM	Red-breasted Merganser																						2
SU	Shelduck	6		16	172	24	5	105	270	348	155	172	81		57	32	22	339	144	102	77	30	45
SV	Shoveler		2	10					6	49	160	15			2						2		
T.	Teal			13	219	173		83	300		245	229	2		80	36	68					75	42
WN	Wigeon		9	24	2100	2	13	133	186		69	49			47	2				5		10	23

Table 4. Waterbirds recorded at survey locations, 2021/22. Maxima at each location are shown. See Table 1 for how location numbers relate to names of survey locations.

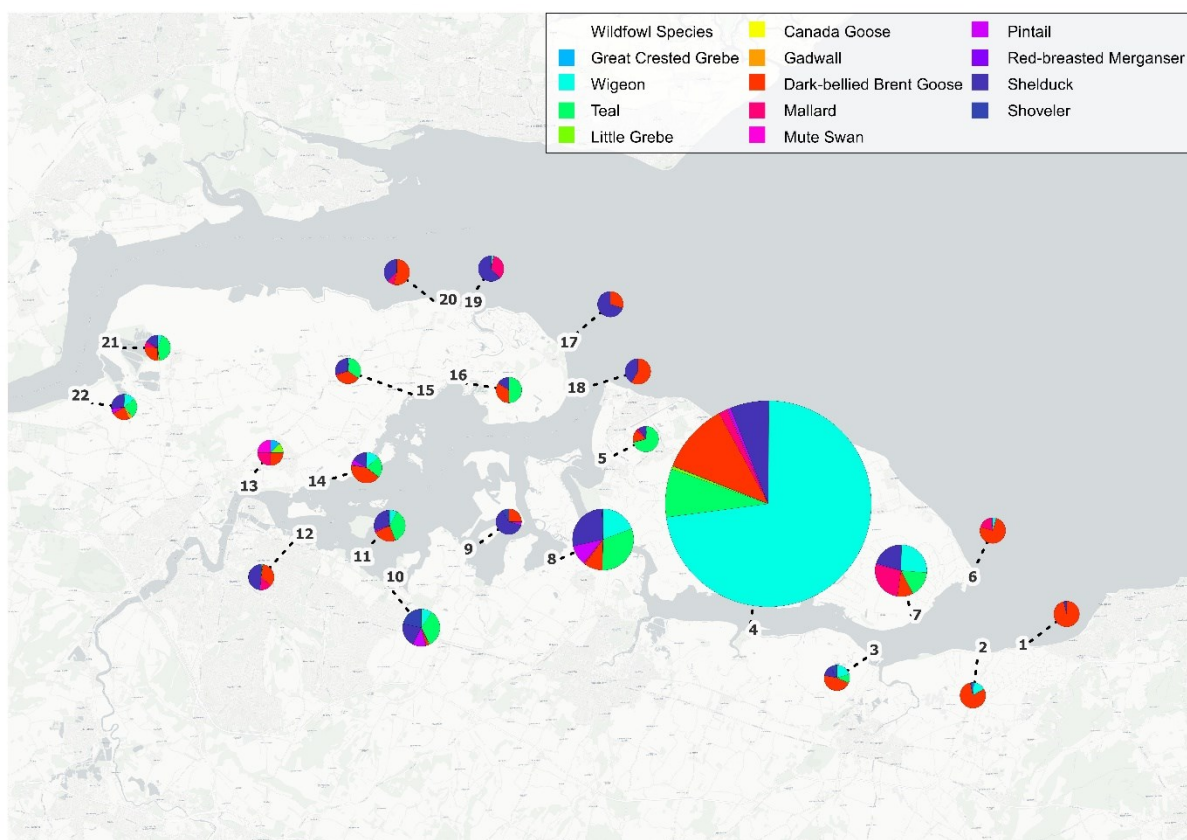


Figure 2. Graduated pie-charts to show wildfowl assemblage at survey locations 1-22

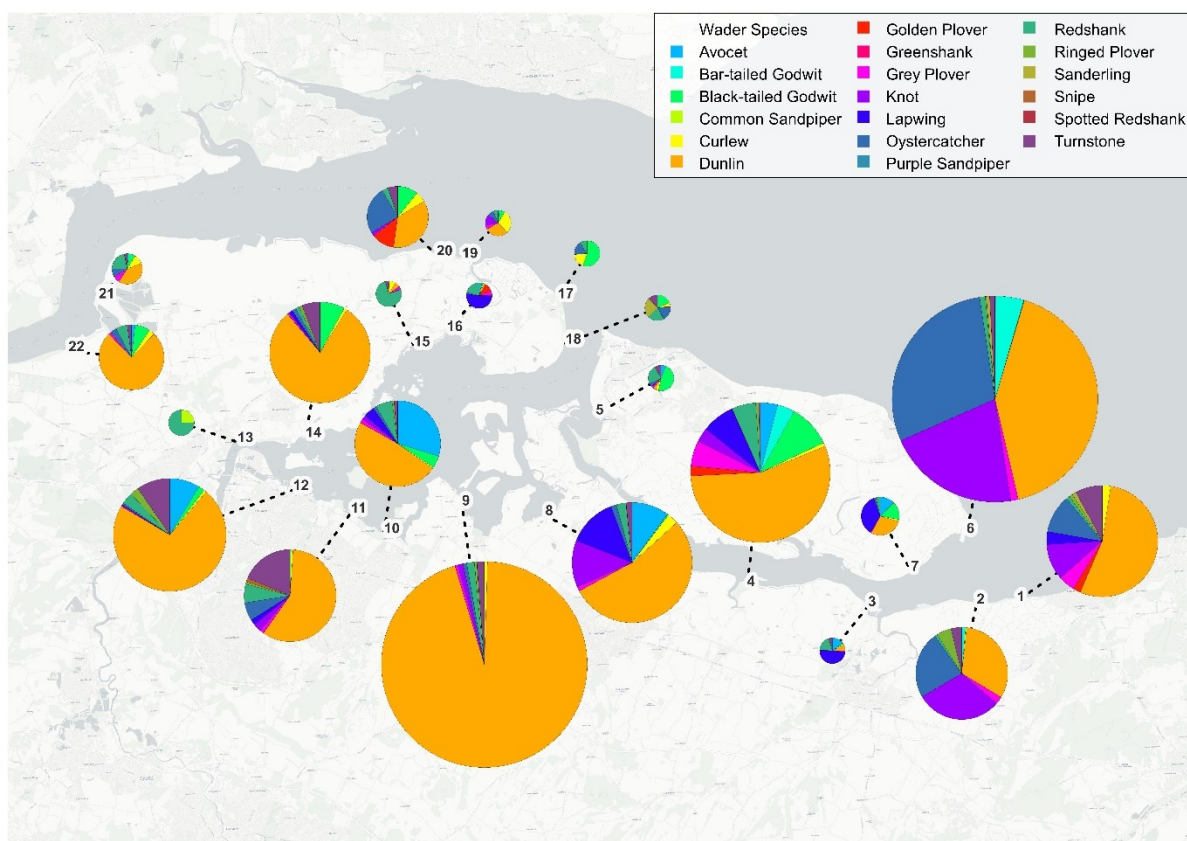


Figure 3. Graduated pie-charts to show wader assemblage at survey locations 1-22

3.2 Recreational activities

The recreational diaries recorded a wide range of activities in the vicinity of the recording areas (Figure 4).

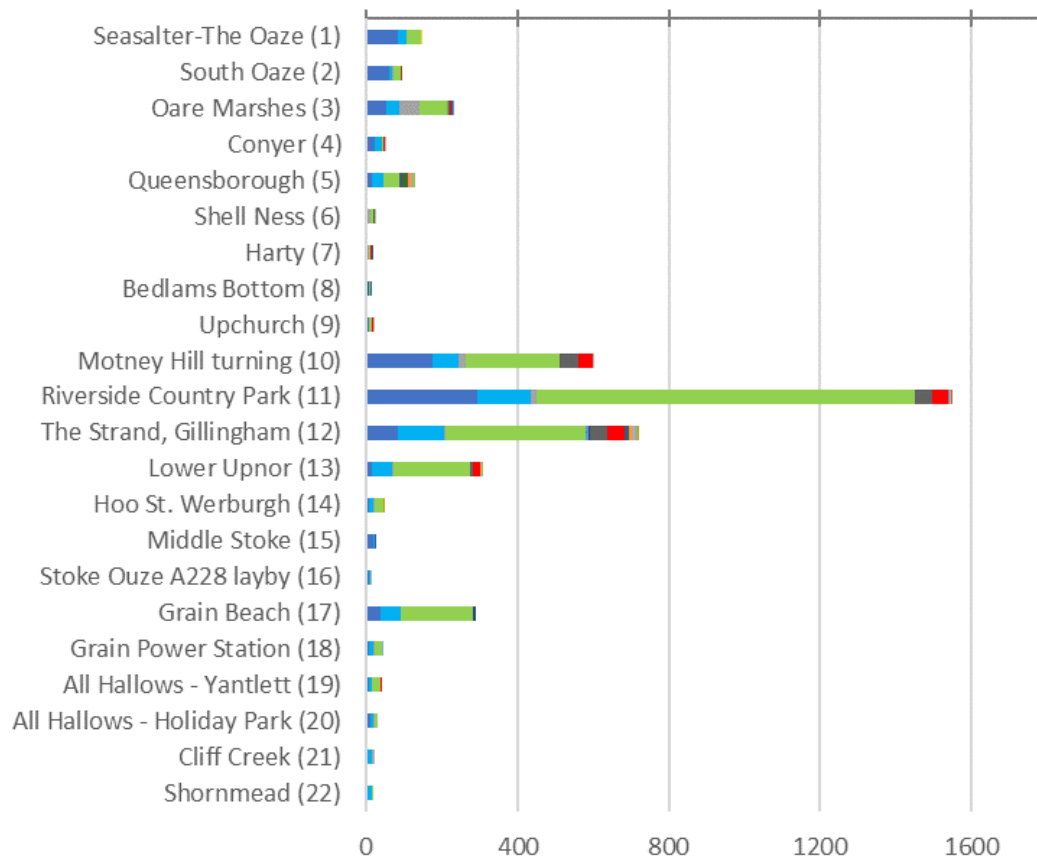


Figure 4. Cumulative totals of recreational activities at survey locations 1-22. Selected activities: dark blue = dog walking (off lead), pale blue = dog walking (on lead), pale green = walking (no dog), grey = birdwatching, red = jogging. Tabulated data are presented in Appendix.

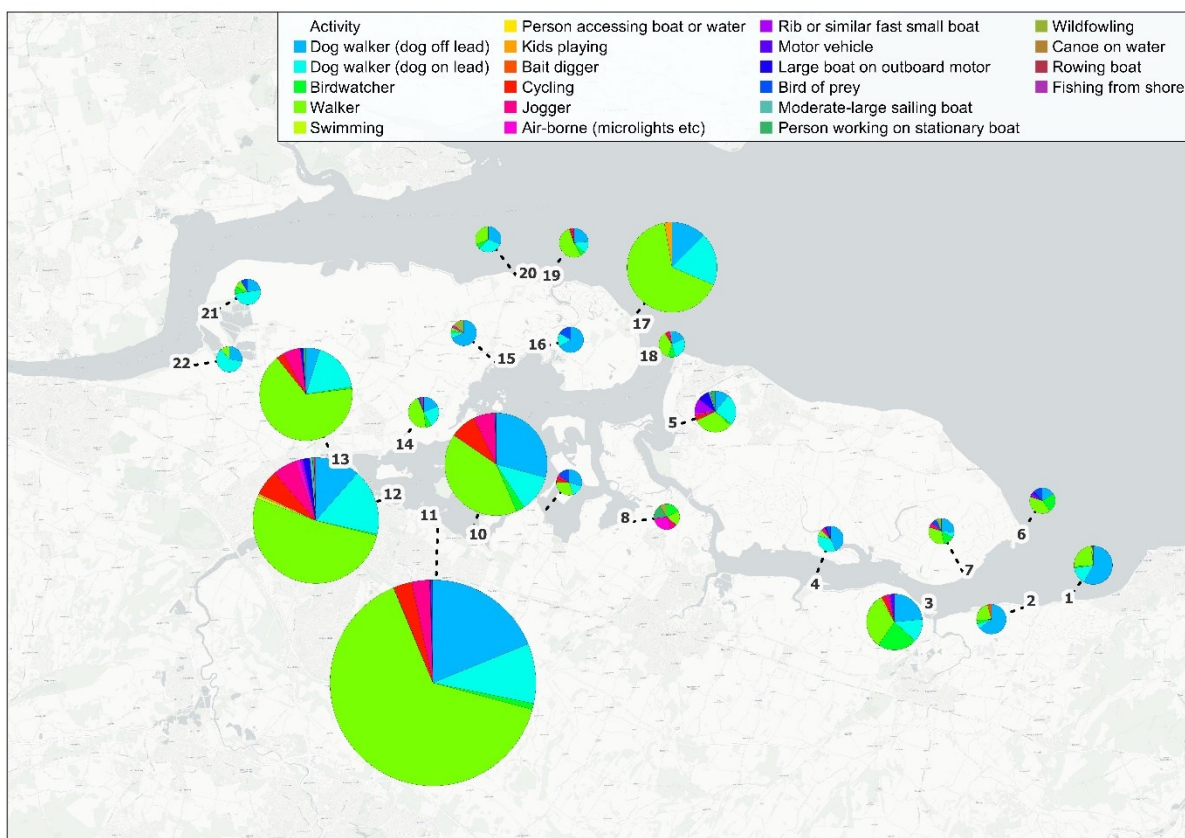


Figure 5. Graduated pie-charts to show recreational activities at survey points 1-22

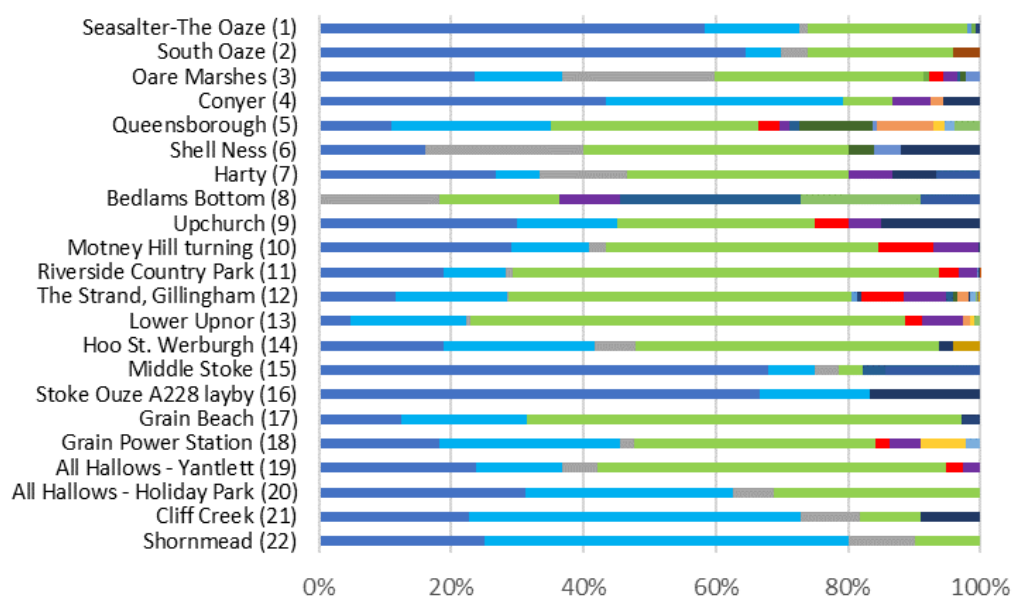


Figure 6. Relative contributions of recreational activities at survey locations 1-22. Selected activities: dark blue = dog walking (off lead), pale blue = dog walking (on lead), green = walking (no dog), grey = birdwatching, red = jogging.

With reference to dog walking, there was large variation between survey locations on terms of the proportion of dogs that were recorded being walked on leads. This varied from a site maximum of 79% of dogs on leads at Lower Upnor (location 13) to all dogs being off leads at Shell Ness (location 6). At the composite suite of busiest survey locations (comprising locations 1-5, 10-13, and 17), approximately half of all dogs were on leads.

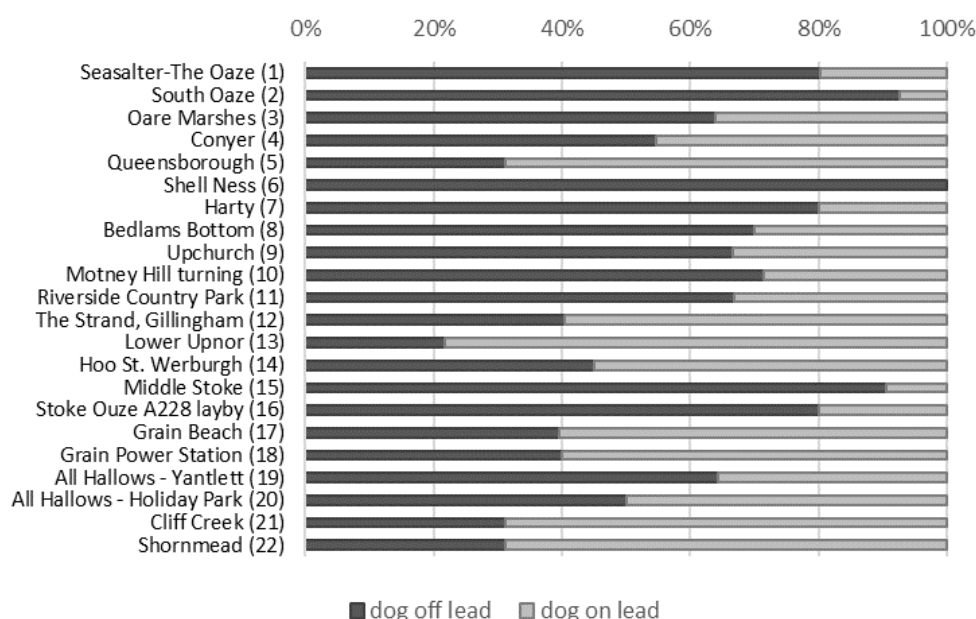


Figure 7. Proportion of dogs on leads at survey locations 1-22

3.3 Bird responses: survey locations

Across all potential disturbance events recorded during the recreational diaries, the majority of events resulted in no response by the waterbirds present at the time. However there was considerable variation between survey locations, with the greatest level of responses noted at locations 1, 2, 3, 8 and 9.

This variation is likely to be attributable to a combination of factors including the physical characteristics of individual sites, species-specific variation in response rates, and potentially flocks and individual birds becoming habituated to human activities in some areas.

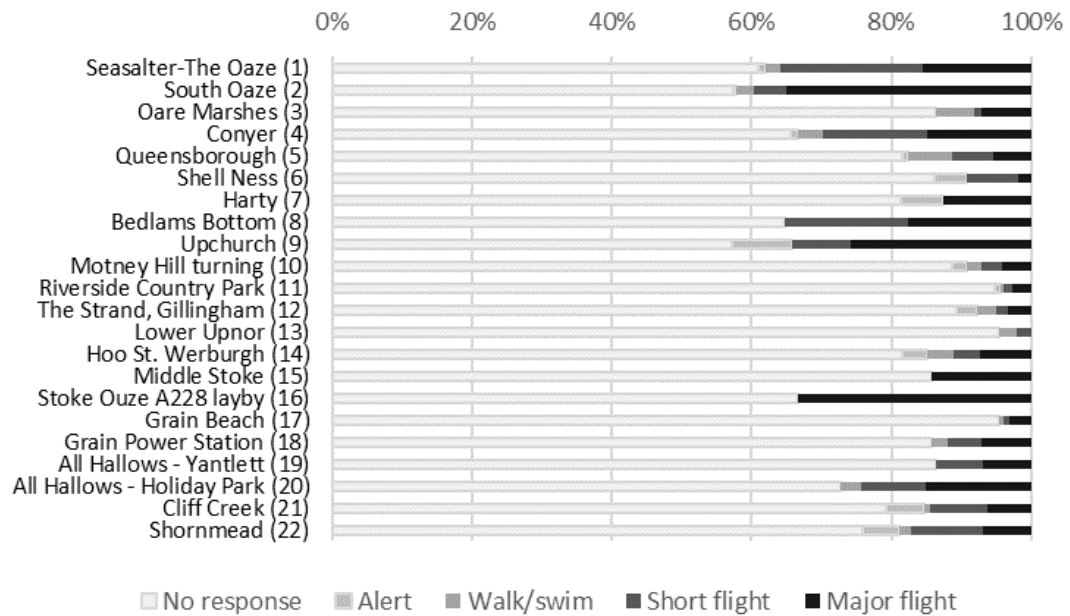


Figure 8. Responses of birds to potential disturbance events at survey locations 1-22

3.4 Bird responses: disturbance events

Across all types of disturbance event recorded during the recreational diaries, there was variation responses of waterbirds. The most marked responses were generated by presence of dogs off leads, fast small boats, and transient raptors. This variation is likely to be due to birds' perceived threat posed by different activities, potentially in combination with birds becoming habituated to human activities in some areas. Note, bait digging and fishing (both <10 events recorded) also generated similarly marked responses from waterbirds present.

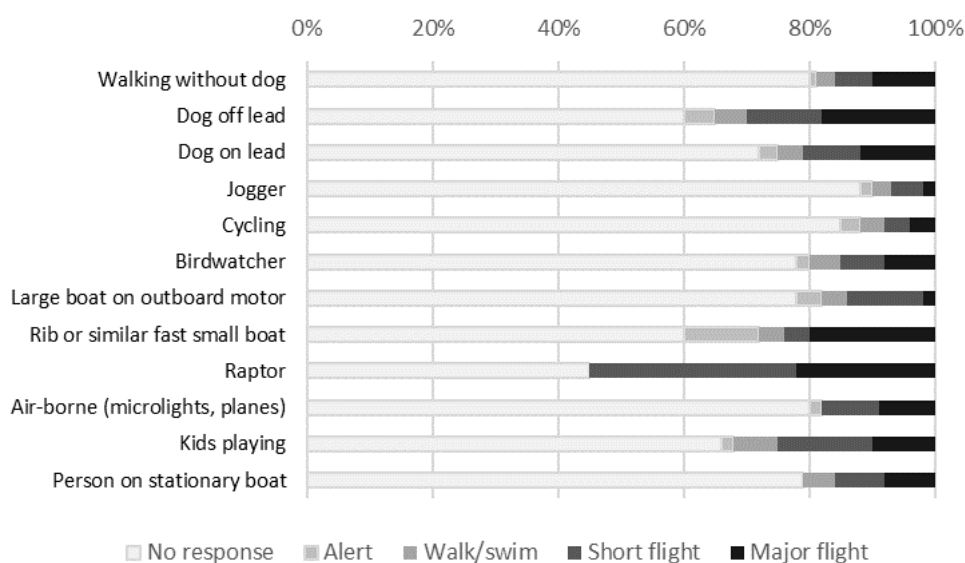


Figure 9. Responses of birds to disturbance events (events with >10 records)

3.5 Bird responses: species

Across potential disturbance events, there was variation between species in how birds responded to human recreational activities. With species for which records generated sufficient sample sizes, response rates (across all types of behavioural response) were lowest for Black-tailed Godwit (<20%) and highest for Dark-bellied Brent Goose (>50%).

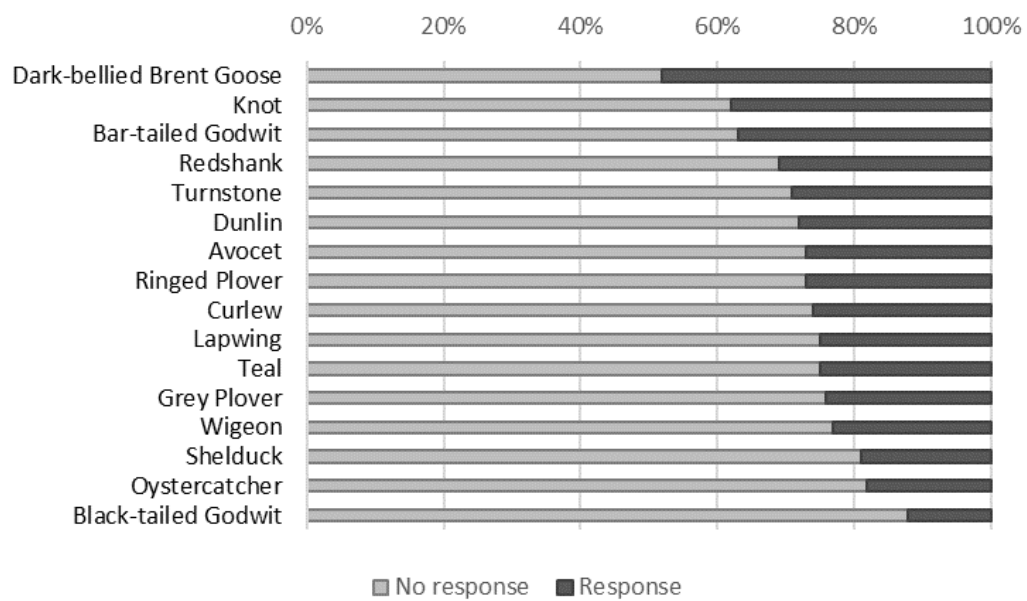


Figure 10. Response rates of waterbird species to disturbance events

4 DISCUSSION AND RECOMMENDATIONS

This section provides a brief discussion of the results presented in this report. For comparative purposes data presented in Liley & Fearnley (2011) are referred to, and some recommendations for future monitoring and research are also included.

4.1 Recreational activity and Bird Wise

The data collected during the winter of 2021/22 suggest two key patterns of behavioural change by visitors to the North Kent coastline. Firstly, there seems to have been a shift towards concentration of recreational activities within some core areas of the coastline. This is likely to be in response to the development of focal areas for access and recreation such as Riverside Country Park and Grain Coastal Park, sites which encourage and attract people to visit and enjoy particular locations.

This will inevitably generate hotspots of pressure but can also create core opportunities for outreach and awareness raising through the mitigation initiatives of projects such as Bird Wise. Numbers at Riverside Country Park having increased considerably and now represent the survey location with the highest number of recreational users. The users of Riverside Country Park are typical of many other locations, comprising a mix of walkers, people with dogs, joggers and other users. Approximately half of dogs at this location are on leads.

Secondly, the results from winter 2021/22 suggest that across the whole SAMMS area a greater proportion of dogs are now being walked on leads than when the same area was surveyed over ten years ago (Liley & Fearnley 2011). However, pertinently, this is within the context of the total number of dogs exercised along the coastline having approximately doubled. Although there is variation between locations, all else equal, the increasing proportion of dogs on leads can be taken to represent an indicator of success of the on-going mitigation activities delivered through the Bird Wise project.

The survey results continue to indicate the importance of maintaining a scheme delivering outreach and raising awareness of bird disturbance issues adjacent to the north Kent SPAs. Recreational diaries during winter 2021/22 indicate that recreational pressure has increased significantly during the ten years since baseline surveys in 2010/11, especially in key areas such as Riverside CP. The number of dogs has doubled, although pertinently, the proportion of dogs on leads has increased. It will therefore be important to maintain maximal engagement activities on the busiest areas of the coastline.

The baseline surveys in 2010/11 and the surveys undertaken during winter 2021/22 represent two snapshots in time. Having demonstrated a large increase in recreational pressure, it would be beneficial to monitor pressure and efficacy of the Bird Wise mitigation measures at high pressure sites on a more regular basis. This could be achieved through annual monitoring at the highest pressure sites in combination with a repeated extensive reassessment of all sites after a gap of several years. This exact timescale should be able to adapt in response to results from the annual disturbance surveys carried out at the busiest sites plus any pertinent developments in understanding of species' abundance, distribution and trends across the suite of north Kent SPAs.

4.2 Implications for waterbirds

The general distribution and counts of SPA feature waterbirds in 2021/22 was broadly similar to the surveys in 2010/11. It is difficult to be able to attribute any change in numbers or distribution of waterbirds specifically to anthropogenic disturbance with periodic snapshot surveys eleven years apart. That type of assessment would require a longer term programme of monitoring that would seek to collect more frequent data on bird numbers in combination with variables such as visitor numbers and observed disturbance events. More frequent monitoring would help to identify locations where SPA features are being most adversely impacted, and would also offer the opportunity for surveys (and associated results) to be aligned with regular monthly WeBS monitoring of wintering waterbird populations across the entire SPAs. In doing so, it can help ensure optimal targeting of mitigation efforts and use of associated resource.

For context, Appendix 2 lists the short, medium and long-term trends of waterbirds on Thames Estuary & Marshes SPA, Medway Estuary & Marshes SPA, and The Swale SPA. These data are sourced from the most recent WeBS Alerts (Woodward *et al.* 2019), and can be used alongside the datasets on recreational activities and bird responses to provide the strongest evidence base to inform mitigation to deliver benefit for the SPA network.

4.3 Research opportunities

In order to more completely understand factors affecting waterbird species across an SPA or connected suite of SPAs, it is possible to analyse WeBS data at the count sector level – known as a ‘WeBS sector plot analysis’. This approach compares trends in bird numbers at sector level with numbers at larger scales to identify areas where issues may be negatively influencing numbers and distribution. Outputs from a sector plot analysis would be useful in directing resource both for core Bird Wise mitigation activities as well as other research. ‘WeBS Alerts’ triggered high Alerts for the following species on at least one of the three north Kent SPAs: Dunlin, Knot, Grey Plover, Redshank, Ringed Plover, Dark-bellied Brent Goose and Shelduck (see Appendix). All else equal, these should be focus for research to help direct evidence-based mitigation measures. As proposed by Liley & Fearnley (2011), statistical models focused on species-specific energetics can be used to further elucidate understanding of population-level effects of disturbance. These could also make direct use of foraging distribution information collected through periodic WeBS Low Tide Counts.

The surveys in 2010/11 and 2021/22 both found that Dark-bellied Brent Goose showed the greatest rate of response to recreational activities. Nearly half of all activities induced a response by Brent Geese, many of which involved a major flight. This was greater than for other species with sufficient sample sizes. There is strong rationale to develop a North Kent/Outer Thames study on Brent Goose, which could seek to include an assessment of nocturnal site selection through use of thermal imagery to contribute to understanding of how diurnal disturbance may affect site and habitat selection.

2020-2021 saw restricted access to the North Kent coast during the government-imposed Covid-19 lockdowns. It is unclear if a change in recreational activity and disturbance may have affected bird behaviour at the locations studied in this project. Research to improve understanding of how visitor behaviour may have changed since the lockdowns would be extremely valuable to help enhance an evidence-based mitigation programme.

5 ACKNOWLEDGEMENTS

The surveys were commissioned by Medway Council, overseen by a steering group of Bird Wise project comprising key stakeholders. Guidance and overall management of the project was provided by Hayley Taylor. Field surveys were undertaken by a Kent Wildlife Trust Consultancy Services team of David Campbell, Bob Gomes, Chas Holt and Tony Swandale, whose long hours spent in the field are duly acknowledged. Amy Ross and Robbie Still produced the mapped outputs which feature in this report.

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APPENDIX 1 – Recreational activities recorded in 2021/22

	DX	DL	BR	W	SW	BW	KP	BD	C	J	AB	SMb	MV	LMB	BOP	LS	B	WF	Ca	RB	F
Seasalter-The Oaze (1)	85	21	2	35	1	1	1														
South Oaze (2)	62	5	4	21				4													
Oare Marshes (3)	55	31	54	74			2		5	5	1	2	5								
Conyer (4)	23	19		4						3				1	3						
Queensborough (5)	14	31	2	40					4	2	2	14	1	11		2	5				
Shell Ness (6)	4		6	10								1	1		3						
Harty (7)	4	1	2	5						1						1			1		
Bedlams Bottom (8)			2	2						1	3							2	1		
Upchurch (9)	6	3		6					1	1						3					
Motney Hill turning (10)	176	70	16	248					50	41						2					
Riverside Country Park (11)	292	145	15	999				1	45	43	1		2			4			1		
The Strand, Gillingham (12)	83	122	3	373	6		4		47	45	8	5		12	1	5	3			1	2
Lower Upnor (13)	15	54	2	203					8	19					3			3			
Hoo St. Werburgh (14)	9	11	3	22												1					2
Middle Stoke (15)	19	2	1	1							1								4		
Stoke Ouze A228 layby (16)	8	2														2					
Grain Beach (17)	36	55		191			8														
Grain Power Station (18)	8	12	4	16					1	2						1					
All Hallows - Yantlett (19)	9	5	2	20					1	1											
All Hallows - Holiday Park (20)	10	10	2	10																	
Cliff Creek (21)	5	11	2	2												2					
Shornmead (22)	5	11		2																	

Activity codes (as listed in Table 2):

Description of activity	Code	Description of activity	Code
Dog walker	DW	Windsurfer on water	WS
Dog off lead	dx	Kitesurfer on water	KS
Dog on lead	dl	Canoe on water	Ca
Bait digger	BD	Jet ski on water	JS
Cycling	C	Water skiing	WSk
Jogger	J	Rib or similar fast small boat	SMb
Fishing from shore	F	Small sailing boat (laser, dinghy)	SS
Walking without dog	W	Moderate-large sailing boat, no motor	LS
Kids playing	KP	Large boat on outboard motor	LMb
Picnic	P	Person working on stationary boat	B
Birdwatcher	BR	Person accessing boat or water	BW
Horse riding	HR	Moter vehicle	MV
Metal detecting	MD	Rowing boat	RB
Wildfowling	WF	Air-borne (microlights, helicopters, planes)	AB
Swimming	SW	Raptor	BOP

APPENDIX 2 – Waterbird trends on North Kent SPAs

		Thames Estuary & Marshes			Medway Estuary & Marshes			The Swale		
		ST	MT	LT	ST	MT	LT	ST	MT	LT
GG	Great Crested Grebe				-24	-1	-72	-44	-57	-24
LG	Little Grebe				-67	-76	-77	25	0	-16
AV	Avocet	14	73	645	81	47	755	125	68	800
BA	Bar-tailed Godwit	-88	-56	-36	11	-24	6	-8	55	89
BW	Black-tailed Godwit	3	202	641	26	167	214	-26	-18	3
CS	Common Sandpiper									
CU	Curlew	9	-9	0	11	-14	-68	-15	-25	-25
DN	Dunlin	1	15	55	68	75	-61	-21	-18	-38
GP	Golden Plover	-34	-63	-60	-57	-31	-14	-65	-81	-29
GK	Greenshank				82	63	-84			
GV	Grey Plover	-41	-4	-18	-49	-65	-93	-22	-31	-46
KN	Knot	-63	20	342	-25	-14	24	8	12	22
L.	Lapwing	-7	-5	-47	-17	-11	6	-34	-54	-32
OC	Oystercatcher	-21	-53	-10	6	-7	-42	-22	-27	-4
PZ	Purple Sandpiper									
RK	Redshank	-39	-49	-61	24	4	-77	-18	-25	-53
RP	Ringed Plover	43	-37	-56	72	42	-72	-3	-31	-38
SS	Sanderling							-50	33	1400
SN	Snipe									
DR	Spotted Redshank									
TT	Turnstone	-29	-67	-58	44	-10	-53	66	30	61
CG	Canada Goose									
DB	Dark-bellied Brent Goose				10	39	-66	-6	-3	-8
E.	Eider									
GA	Gadwall									
MA	Mallard	-4	-6	-28	18	33	-62	-12	-37	-28
MS	Mute Swan	-30	-31	-46	30	42	-46	-7	-34	22
PT	Pintail	-34	-61	-70	2	-37	-39	-30	-64	-42
RM	Red-breasted Merganser				-77	-79	-96	-65	-74	-80
SU	Shelduck	-7	-34	-44	33	35	-51	-1	-23	-23
SV	Shoveler	21	194	236	4	-29	24	-34	-47	-45
T.	Teal	-33	0	46	22	115	-6	-51	-52	-9
WN	Wigeon	16	131	303	-37	-30	-71	20	4	37
	Assemblage	-11	14	30	6	17	-46	-17	-30	-8

Population trends over the short (ST), medium (MT) and long (LT) terms of SPA feature waterbirds recorded during disturbance surveys in 2021/22. Data presentation is adapted from Woodward *et al.* (2019); blank cells = no data available.