2012

Sound of Islay Tidal Demonstration: Year 2 Birds Technical Report

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Introduction

1. This report presents the results of Year 2 ornithological surveys in the inner Sound of Islay undertaken by Natural Research Projects Ltd (NRP) from September 2010 to end of August 2011, when survey work ceased. The surveys for this period complete the collection of two years of baseline information to inform the assessment and monitoring of the potential effects of the proposed Sound of Islay Tidal Demonstration Site ("the Development") on birds.

2. In March 2011 the proposal received a permit from Marine Scotland to go ahead and in so doing became the first consented marine turbine array development in the world. Throughout the period covered by this report no construction work had started on site, i.e., baseline conditions prevailed.

3. The proposed demonstration site is located in the deepest part of the Sound of Islay, close to the ferry port of Port Askaig, and covers an area approximately 0.6 km^2 (Figure 1). The proposed development is for up to 10 submerged tidal stream-generating devices to be deployed on the site.

4. In addition to reporting the results from Year 2, this report draws attention to differences and similarities between the results from the two years for key bird species.

Previous reports

5. The ornithological survey work undertaken in Year 1 was reported in the Sound of Islay Tidal Demonstration: Birds Technical Report (Natural Research Projects 2010b in ScottishPower Renewables 2010b). This was Technical Appendix 14.1 in the Environmental Statement for the Development (ScottishPower Renewables 2010a and 2010b). An update to this technical report was produced in November 2010 (Natural Research Projects 2010c) covering the period up to August 2010 and this summarised all the results from Year 1.

6. Year 1 covered the period from when work began in April 2009 to the end of August 2010. The reason why this is longer than one year is because there was some initial pilot work and various changes in the survey protocols were made following a review after the first three months of work. This is detailed in the first Year 1 technical report (Natural Research Projects 2010b).

7. Comparisons between the results from Year 1 and Year 2 are made between the current report and the updated Year 1 technical report (Natural Research Projects 2010c).

Scope of Studies

8. Survey work had two broad aims:

- To determine the baseline ornithological conditions at the site, as required to inform the assessment of likely effects on birds of the proposed development. [Assessment was undertaken in the Environmental Statement (Natural Research Projects 2010a in ScottishPower Renewables 2010a) using results from Year 1 fieldwork (Natural Research Projects 2010b)].

- To establish baseline conditions against which future changes can be compared.

9. Specific objectives were:

- To determine the year-round distribution and abundance of birds using the marine and shoreline habitats of the inner Sound of Islay
- To determine the year-round distribution and abundance of seabirds using the outer Sound of Islay so far as this can be achieved by working from public ferries.
- To determine which diving seabird species feed in the proposed development area.
- To determine the presence and location of any breeding sites of scarce species of high conservation value.
- To compare results from Year 1 with Year 2 and thereby examine the amount of variation between years in bird abundance and behaviour.
- To survey breeding black guillemots in the inner Sound of Islay.

10. The field survey objectives and methods for marine mammals were developed in partnership with specialists at Sea Mammal Research Unit Ltd. The results on marine mammals are reported separately.

Survey methods

11. The survey protocol used in Year 2 was unchanged from Year 1 (i.e., the methods adopted following the review undertaken three months into the project). This is described in full in the original Birds Technical Report (Natural Research Projects 2010b). It is briefly described below:

12. The survey programme focuses on the southern part of the Sound of Islay, where the proposed Tidal Demonstration Array is planned. This area is overlooked by four vantage points (VPs), two on Islay (I3 and I4) and two on Jura (J2 and J3) (Figure 1).

13. Field surveyors in Year 2 were Simon Pinder, Fiona MacGillivray, John Armitage and Digger Jackson.

VP watches

14. The vast majority of data were collected during the programme of vantage point (VP) watches. The VP watches were designed to be undertaken by a lone fieldworker and to collect visual data on the occurrence of birds, marine mammals (including otter) and basking shark through undertaking three survey activities: snapshot scans (SSS), 5-minute flying bird watches (FBW) and 15-minute marine mammal watches (MMW). Bird observations were collected during the SSSs and FBWs. Records of scarce birds and EU Birds Directive Annex 1 species were also collected during the 15-minute Marine Mammal Watches (MMW).

15. The three VP survey activities were undertaken in a cycle that took approximately 55 minutes to complete. The cycle was: a 15-minute marine mammal watch, then a snapshot scan (approximately 10-25 minutes), then a further 15-minute marine mammal watch and finally a 5-minute flying bird watch. Thus in a typical VP watch lasting three hours, a surveyor completed three SSS, three FBW and six MMW sessions. Five watches each lasting approximately three hours were planned to be completed from each VP each month

16. The aim of the snapshot scans was to provide a ‘snapshot’ of the distribution and abundance of animals using the sea and shorelines. This involved methodically scanning the area of view with compass binoculars mounted level on a tripod and recording all birds, marine mammals (including otter) and basking sharks seen. Except for scarce species, flying birds seen during

snapshot scans were ignored unless they were actively foraging. Snapshot scans were not time limited, each scan took as long as necessary to make a complete scan (typically an arc of 180°) of the visible area and record the data. Normally a snapshot scan took between 10 and 25 minutes to complete, the actual time was recorded and depended on the number of animals present and the survey conditions. Care was taken to scan the visible area sufficiently slowly such that any birds that were actively diving were unlikely to be overlooked. For birds (but not marine mammals) only those individuals within approximately 800m of the VP were recorded.

17. For each record, the species, number of individuals, age, plumage and behaviour were recorded using standard codes. If necessary, a x30 spotting scope was used to check species identification. There was always an interval of at least 45 minutes between snapshot scans from the same VP to allow time for animals to redistribute and promote independence between samples.

18. Marine mammal watches were timed 15-minute watches of the visible area for marine mammals and basking shark. Animals were recorded in the same way as for snapshot scans. The marine mammal watches were designed to provide additional time to detect marine mammals and basking sharks (which are generally more easily overlooked than seabirds) without the distraction of recording birds.

19. Flying bird watches were timed 5-minute watches during which all flying birds passing a notional line across the sound, straight out from the VP, were recorded. The aim of the flying bird watches was to quantify the passage rate of birds flying through the sound. The travel direction (usually north or south) and approximate distance from the VP (recorded as one of five distance bands) was recorded for each flight seen. The distance categories were defined follows: A, '0-100m'; B, '100-300m'; C, '300-750m'; and D, '>750m.

20. The position of animals seen on the sea surface during VP watches was recorded in terms of a compass direction and a binocular eye-piece graticule reading (to the nearest 0.1 unit). The latter was later translated to an angle of declination based on the angle subtended per graticule unit and landscape reference marks of known declination angle.

21. The monthly survey effort was spread over 10-15 days each month (Table 1).

22. To ensure high detection rates of animals, VP sessions were only undertaken in reasonable weather, in particular sea states of above four were avoided, and calmer conditions were selected if possible, though in some months there was insufficient calm days (sea state 3 or less to complete the survey programme) (Tables 5 to 7).

23. The programme of VP watches aimed to give equal sampling effort with respect to tide series (neap *vs* spring) and in each of six periods through the tidal cycle (Tables 8 to 10). However, the sampling regime had to retain some flexibility to accommodate constraints caused by inclement weather and surveyor availability.

24. The six tidal periods were equal portions (one sixth) of the tidal cycle (high tide to high tide). This meant that each period was of approximately two hours duration, the exact time depending on the actual length of the tidal cycle. Periods 1 to 3 covered the ebb part of the cycle, Period 1 commenced at high tide and Period 3 ended at low tide. Periods 4 to 6 covered the flood part of the cycle starting at low tide and ending at high tide. The start and end times of tidal periods were calculated from tide tables.

25. All ships and boats seen during the course VP survey work were recorded as requested by SPR. The type of vessel, the position in the channel, its activity and direction of travel were recorded. The vessel's name and registration code were also recorded if they were discernible.

Black guillemot breeding survey

26. A single-visit early morning survey was undertaken on 26th April in 2011 to estimate the numbers of black guillemots breeding in the inner sound (Figure 2).

Survey effort

27. Survey work took place on a 127 days spread through the year (Table 1). Typically survey work was undertaken on 8 to 14 days each month.

28. Overall nearly 96% of the planned for VP watch effort was completed. In some month poor weather meant there was a shortfall in the number of planned VP watches. In most case the shortfall was partly or entirely made up for the following month. Particularly windy weather occurred in February and May and this resulted in moderate shortfalls in the planned watch effort in these two months (Table 1)

29. A total 688 SSS, 689 FBW and 1377 MMW sessions were completed during Year 2 (Tables 2 to 4). The effort was approximately evenly distributed between the four VPs. The Two VPs on Jura received slightly less effort compared to the two Islay VPs due to the logistical difficulties of getting across to Jura at times.

30. Over 98% of watches were conducted in conditions of below sea state 4 (Tables 5 to 7), with 88% being conducted in conditions of sea state 2 or below, i.e., effectively ideal conditions for detecting all species of interest.

31. The VP watch effort was generally spread evenly through the tidal cycle. This was best achieved in the summer months when fieldwork was less constrained by daylight (Tables 8 to 10).

Data presentation

32. The snapshot scan data are summarised according to the same five periods used to present the Year 1 results, these are:

    - autumn, September and October;
    - early winter, November and December and
    - late winter, January to March;
    - spring, April to June;
    - summer, July and August;

33. The spring period broadly corresponds to the main part of the breeding season for most bird species and covers the period when most seabird species are most closely tied to breeding colonies. The summer period also overlaps the breeding season of seabird species, but to a varying extent depending on the species. Many seabird species depart from breeding colonies during July. Gannet, puffin and Manx shearwater are notable exceptions and these typically depart from their breeding colonies later, in August or September.

34. The seasonal maxima (the peak number recorded in any single SSS) and mean seasonal density and standard deviation of the SSS counts are presented in Tables 11 to 25.

35. For regularly occurring seabird species, the estimated mean instantaneous density of birds using the inner sound was calculated for each season in the area covered by each VP using the same method used in the analyses of Year 1 data (Natural Research Projects 2010b). In doing this it was assumed that the visible area from each VP was 1.1km^2. This value takes into consideration any areas that were obscured from view and assumes that on average the effective limit of high detection for most bird species on the water was 600m (using a relatively low value for this leads to higher estimated densities and thus cautious interpretation of abundance for assessment purposes).

36. The area of sea within the 2011 study area (the area bounded by the green lines in Figure 1) is almost exactly 4 km^2. Therefore, the approximate mean total number of birds present in any season can be calculated by multiplying the mean density values for all the VPs by four (i.e., the density values in the last row of Tables 11 to 25 multiplied by four). The area of coverage from each VP was approximately 1.1 km^2, therefore the mean density values presented in the tables closely approximate the mean number seen (actual the mean number is given by multiplying the density value by 1.1). Estimated density values are expressed as birds per km^2 and, with the exception of values below 0.1, are given to two decimal places; values below 0.1 are shown as '<0.1'.FBW data are summarised in terms of the total number of birds recorded each month during FBW sessions (Table 26). The same data are also summarised in terms of the mean number of birds of each species flying past the VPs per hour of watch effort (Table 27).

Results

37. The results on each species that follow summarise the abundance and density of seabirds and other species seen through the five defined seasons of Year 2. Attention is drawn to difference and similarities in the abundance and seasonal pattern compared to equivalent data collected in Year 1.

Divers

38. Small numbers of three species of diver were recorded.

39. Red-throated divers were recorded in small numbers throughout the year, however, they were scarce, being recorded on <5% of snapshot scans suggesting that birds were present intermittently in the inner sound (Table 11). When they were present, they occurred as singles or pairs. The maximum number seen in a single SSS was two birds.

40. The average densities recorded were <0.05 bird km^2 in all seasons (Table 11). They were marginally more common in the spring and summer periods (i.e., the breeding season) compared to other times of year. The abundance and seasonal patterns were similar to that recorded in Year 1 (Natural Research Projects 2010c).

41. Red-throated divers were seen during FBWs on six occasions, all but two of these being outside the breeding season (Tables 26 and 27). On average 0.1 birds per hour flew passed, and even in the peak month (May) the mean figure was <1 bird per hour. In addition flying red-throated divers were recorded during SSS and MMW sessions, and incidentally, on 16 other occasions spread throughout the year, mostly in the breeding season.

42. It is likely that most of the red-throated divers recorded feeding in the sound between April and September were local breeding birds.

43. Great northern divers were recorded on the sea in small numbers in spring and winter periods and but none were seen during snapshot scans during the summer and autumn periods (i.e.,

May to October) (Table 12). The maximum number seen in SSS sessions was two birds but usually only single birds were seen. The data suggest that 1-3 individuals are typically present the inner sound in the winter and spring. The abundance and seasonal patterns were similar to that recorded in Year 1 (Natural Research Projects 2010c). The numbers using the inner Sound of Islay is small compared to the numbers over-wintering in West Scotland (approximately 2000 to 3000) (Forrester and Andrews 2007).

44. The average density of great northern divers recorded in the winter months was approximately 0.2 birds per km^2 (Table 12).

45. Great northern divers were recorded in the FBWs only twice, a single bird in winter plumage in November and another in adult summer plumage in June (Tables 26 and 27). In addition, flying great northern divers were recorded during SSS and MMW sessions, and incidentally, on 3 other occasions all in either November or January.

46. Black-throated divers were only rarely recorded in the inner Sound of Islay. Single birds were seen on the sea on one date each in January, March and June but in each case only briefly. In addition a single bird was seen flying south in mid-October.

Shearwaters and petrels

47. Manx shearwaters were seen during just four FBW sessions in Year 2 and all birds were transiting through the sound (i.e. not actively foraging). No birds were recorded during SSS sessions. A flock of 29 birds seen during a MMW session. All records were between mid-August and mid-September and most individuals passed in a southerly direction. All FBW records were of either single birds or flocks of <10 birds. The mean passage rate during September determined from the FBW data was 3.5 birds per hour.

48. The number of Manx shearwater seen in Year 2 was far less than in Year 1, when up to 200 birds were present in August (Natural Research Projects 2010c).

49. Three single Leach's petrels were recorded during fieldwork on the 25th November 2010 in a half-hour period, after days with gales. Two records were of birds flying north and the other was a bird flying south. It was not possible to determine, but quite likely that all records referred to the same individual.

Gannet

50. Gannets were occasionally recorded foraging in the inner sound, but only in very small numbers in the spring, summer and autumn periods (Table 13). The maximum numbers present during SSS was just three birds. The abundance in Year 2 was approximately 80% lower than recorded in Year 1 (Natural Research Projects 2010c).

51. The average density of gannets on the water/hunting during the spring, summer and autumn periods was <0.1 bird per km^2 (Table 13).

52. Gannets were recorded during FBW sessions only from April to October (Tables 26 and 27). The numbers of gannets flying through the sound was highest in August and September with mean rates of 16 and 23 birds passing per hour respectively. From May to July the mean rate was approximately 5 birds per hour, and there were <2 per hour in April and October.

Cormorant and Shag

53. Cormorants were recorded in small numbers only, the same situation as observed in Year 1. They were seen in all seasons but were not seen on most dates that SSS scans were undertaken suggesting they are intermittently present in the inner sound. As in Year 1 (Natural Research Projects 2010c), they were most commonly seen in autumn, when up to six birds were present in the vicinity of VP I4. The average density of birds was 0.28 birds per km^2 in autumn, but was <0.1 km^2 at other times of year (Table 14).

54. Cormorants were recorded during FBWs on 11 occasions only, approximately evenly spread throughout the year. On average 0.2 birds per hour passed (Tables 26 and 27).

55. Shags were one of the commonest species recorded in the inner sound. The Environmental Statement (Natural Research Projects 2010a) identified shag as a relatively important species to the proposed development because relatively large numbers of this species commonly dives to forage in the areas where turbines are proposed.

56. Shags were recorded on almost all SSS sessions through the year (Table 15). The average numbers of shags present in the inner sound based during scans (both on the sea and roosting) from the four VPs was approximately 15 in spring and summer, 25 to 35 in the autumn and winter periods. This is very similar to the numbers recorded in Year 1. The highest single count was 66 birds recorded in the autumn from VP J3.

57. The average density of shags was similar in spring and summer at approximately 3.6 birds per km^2 (Table 15). The average density increased to approximately 7 to 10 birds per km^2 in the autumn and winter periods. This is very similar to the densities recorded in Year 1 (Natural Research Projects 2010c).

58. The numbers of shag using the inner sound are small in comparison to the regional breeding population of 3,341 (AONs). There is a small (<50 pairs) breeding colony on Jura at Rubha Bàrr nan Gobag, at the northern end of the inner sound. There are also other small colonies in the southern part of the outer sound (Mitchell *et a*l 2004).

59. On average 7.9 shags per hour flew past VPs during FBW session (Tables 26 and 27) about one third less than the mean rate in Year 1 (Natural Research Projects 2010c). The numbers of flights north and the number south were approximately equal suggesting that the majority were local movements of birds re-distributing between feeding areas or moving between these and roost sites.

Herons, Swans and Geese

60. Grey herons were recorded throughout the year feeding and roosting along the shores. The numbers seen in the summer were small and no breeding sites were found. Greater numbers were present in autumn and winter when Scandinavian migrants swell the population size, with feeding birds spread out along the rocky shorelines, with one every few hundred metres.

61. Mute swans were recorded in all survey months and it appeared that approximately 10 adults were resident in the inner sound including at least two breeding pairs. The numbers recorded were very similar to Year 1 (Natural Research Projects 2010c).

62. Flocks of whooper swans totalling 49 individuals were recorded flying through the inner sound on five occasions, one in October, one in December, and three in March. The March flocks were all headed north and were likely to be actively migrating birds. Whooper swans winter in small numbers on Islay and Jura.

63. The only Greenland white-fronted geese recorded during Year 2 fieldwork was a flock of 80 heading west over the sound on 25th of January.

64. The only barnacle geese recorded during Year 2 fieldwork was a flock of 8 headed west over the sound on 18th of October

Ducks

65. Eiders were recorded in moderate numbers in the inner sound during the autumn and winter months but they were scarce in spring and summer. The same seasonal pattern was observed in Year 1 (Natural Research Projects 2010c).

66. The largest flock of eider seen was 46 birds in the early winter period (Table 16). Most of the time the maximum autumn and winter counts were <40 birds, slightly less than the numbers overwintering in Year 1. The maximum spring and summer counts were mostly flocks of <10, similar to Year 1 (Natural Research Projects 2010c).

67. The average density of eider recorded by SSS scans was approximately 0.2 birds per km^2 in the spring and summer months and approximately 3 birds per km^2 in the autumn and winter (Table 16). These are very similar values to the densities estimated for Year 1 (Natural Research Projects 2010c).

68. In mid-May 2011 an adult female with five small ducklings was seen near VP I4. This was the only eider proved to breed in the inner sound in Year 2.

69. The numbers of Eider using the inner sound are of regional importance representing approximately 3% of the wintering population in Argyll (Forrester and Andrews 2007).

70. Small numbers of eider were seen flying through the sound during the FBW sessions in all months except May, mainly from November to April (Tables 26 and 27). On average in these months 3.0 eiders per hour flew through the sound. The numbers flying through the sound from May to October averaged <1 bird per hour.

71. The only common scoter recorded during Year 2 was a flock of seven birds flying south through the sound on 21st of June. No feeding activity was observed.

72. Red-breasted mergansers were regularly present in the inner sound in the autumn and winter (Table 17). The maximum number recorded in these months was 12 birds and the mean density was approximately 0.1 birds km^2 (Table 17), similar to Year 1 (Natural Research Projects 2010c). Apart from two birds seen on one date in April mergansers was not recorded on the sea in the spring and summer months

73. Red-breasted mergansers were rarely recorded in FBW sessions, with a total of only 5 recorded during the whole of Year 2 (Table 26).

74. As in Year 1, small numbers of wigeon (maximum 17), shelduck (maximum 3), mallard (maximum 2) and teal (maximum 3) were regularly recorded in small numbers in the autumn and winter, along the shores of the inner sound, mostly in Whitefarland Bay.

Raptors

75. White-tailed eagle were regularly recorded flying over the sound and perched along the shores on 14 dates from August to March. Records involved either singles or two birds together. The

records comprised birds in adult, immature and juvenile plumages. One adult bore yellow wing tags marked with the letter 'P'.

76. Single hen harriers, mostly 'ringtails', were noted on eleven occasions during Year 2 fieldwork, with records spread through the year. Most were seen hunting over the coastal moorland of Jura, and less commonly over Islay. There was no evidence that the birds seen during the breeding season were breeding within 1 km of the Development site but it is likely that they bred locally on the Jura moors. The level of harrier activity was similar to Year 1 (Natural Research Projects 2010c).

77. A pair of golden eagle was flying over the Islay coast on one date in November.

78. No merlins were recorded during Year 2.

79. Peregrine was recorded on six occasions in Year 2, with records spread approximately evenly through the year.

Waders

80. Five wader species were recorded on the shorelines of the inner sound during survey work, namely oystercatcher (maximum 6), common sandpiper (maximum 2), curlew (maximum 4), ringed plover (maximum 18) and turnstone (maximum 26). In all cases the numbers seen were small, a reflection of the scarcity of preferred habitat. The most important areas for waders were on the Jura side where there are two small estuaries and some small areas of inter-tidal substrate, e.g. at Whitefarland Bay and Dougall's Bay.

81. A few pairs of oystercatcher, and at least one pair of ringed plover and common sandpiper bred on the shores of the Jura side of the inner sound. The numbers of breeding pairs of these species are a very small proportion of the regional populations; all these species are common breeding species on coastal habitats in the region.

Skuas

82. Arctic skua was occasionally recorded from late June to late September in the inner sound, especially in late July and early August. All records involved single birds. They were recorded in SSS scans on seven occasions. This species breeds in very low numbers on the Jura moors and it is likely that the Arctic skuas seen in the summer months were foraging, locally breeding birds.

83. Arctic skua was occasionally recorded during FBWs June to August (Table 26 and 27). During this period the average number passing VPs was about 0.3 birds per hour.

84. Great skua was recorded on two occasions only. A single was on the sea on the 5th August, and another single was recorded flying south through the sound on 22nd September.

Gulls

85. Black-headed gulls were recorded on four occasions in Year 2; three individuals flying through the sound during October; 7 individuals feeding on one occasion in April, and two birds flying through in June.

86. Common gulls were one of the most ubiquitous bird species in the inner sound and although the total numbers present were relatively small, they were recorded during almost every SSS and FBW session. The numbers and seasonal pattern recorded in Year 2 were similar to Year 1 (Natural Research Projects 2010c).

87. The maximum total numbers of common gulls present in the inner sound varied between 18 in the early winter to 79 birds (including juveniles) in the summer (Table 18).

88. The numbers of common gull recorded in the inner sound are very small in comparison to the regional breeding population of 2683 AONs (Mitchell et al 2004). Densities varied between 0.4 birds per km^2 in the winter and 1.7 per km^2 in summer (Table 18).

89. Common gull was one of the most frequently recorded species during FBWs. On average there were approximately 4 common gulls flying past per hour (Tables 26 and 27).

90. Lesser black-backed gulls were uncommon. They were recorded on four occasions only in Year 2, all between late April and mid-August with a maximum of five birds seen.

91. Herring gulls were commonly recorded in all seasons but in relatively small numbers. Typically there were less than 5 birds present in the inner sound (Table 19). The maximum number recorded was 34 birds in August. The numbers of herring gull recorded in the inner sound are very small in comparison to the regional breeding population of 15,370 AONs (Mitchell *et al*. 2004).

92. The average density of herring gulls in the inner sound recorded by SSS surveys was 0.3 per km^2 in the winter and spring, rising to around 1 bird per km^2 in the summer and autumn periods. (Table 19).

93. Herring gulls were commonly recorded during FBW in small numbers through the year. On average there were 2.0 herring gull flights per hour (Table 26 and 27); they were approximately twice as common in the autumn and winter compared to spring and summer.

94. A single adult Iceland gull, an uncommon winter visitor from the Arctic, was seen once in January and once in February of Year 2. It is likely that both these records refer to the bird that has overwintered in the Sound of Islay area for the past three winters and that was also recorded several times in Year 1 (Natural Research Projects 2010c).

95. Great black-backed gulls were present in small and approximately constant numbers through Year 2 (Table 20). The abundance and seasonal pattern were similar to Year 1 (Natural Research Projects 2010c). The average density recorded by SSS surveys was approximately 0.2 birds per km^2 (Table 20). The maximum number seen in any single SSS was just three birds. The numbers of great black-backed gulls recorded in the inner sound are very small in comparison to the regional breeding population of 1,736 (AONs) (Mitchell *et al*.2004).

96. Great black-backed gulls were seen in small numbers flying past the VPs during FBW; on average 0.6 passed per hour (Tables 26 and 27).

97. Small numbers of kittiwakes were occasionally recorded in the inner sound in July and August, when typically <5 birds were recorded during SSS, but occasionally as many as 39 birds were present (Table 21). Apart from 15 birds seen in November, kittiwakes were not recorded during SSS in the rest of the year. The numbers recorded in Year 2 were approximately half that recorded in Year 1 (Natural Research Projects 2010c). The numbers of kittiwake recorded in the inner sound were very small in comparison to the regional breeding population of 8,976 (AONs) (Mitchell *et al* 2004).

98. The average density of kittiwakes in the southern inner sound seen during SSS in the summer period was 0.8 per km^2 (Table 21).

99. Kittiwakes were commonly recorded in FBW during July and August with on average 10 and 18 birds per hour passing VPs in these months respectively. These rates are similar to the rates

recorded in 2010 for these months but much less than the rates recorded in 2009 (the reporting period for Year 1 included the summer months of both 2009 and 2010) (Natural Research Projects 2010c). For the other months of Year 2 the numbers recorded in FBW were much lower with mean values of <2 birds passing per hour for most months, and none recorded at all from January to April.

Terns

100. Small numbers of Arctic terns were commonly seen in SSS during the spring and summer periods (Table 22). Usually just one or two birds were seen; the maximum was nine birds. The mean density of birds estimated using the study area during SSS surveys was <0.1 birds km^2 in the spring period and 0.22 birds km^2 in the summer period (Table 22). The numbers present and seasonal pattern recorded in Year 2 were very similar to Year 1 (Natural Research Projects 2010c). It is likely that at least some of the birds seen were from local breeding colonies. The numbers of Arctic tern using the inner sound represent a very small proportion of the regional population (1823 pairs) (Mitchell *et al.* 2004). Arctic tern is listed on Annex 1 of the EU Birds Directive.

101. Arctic terns were recorded passing through the sound in small numbers during FBWs from April to August only. Most of these were recorded in July and August when an average of 13.0 and 4.1 per hour passed respectively. Rates were <1 bird per hour in the other months (Tables 26 and 27).

Auks

102. Three species of auk were recorded during Year 2; black guillemot (also known as tystie), common guillemot and razorbill. These three species were seen in small to moderate numbers through the year. No puffins were seen in Year 2, contrasting with Year 1 when small numbers were seen in the spring.

103. Razorbill and common guillemot can be difficult to distinguish at distance in poor light, however <2% of individuals (6 birds) of these species could not be positively identified during the Year 2 survey work. In view of the very low proportion of unidentified birds overall, they are not considered further.

104. Razorbill and common guillemot showed a similar pattern of seasonal occurrence but razorbill were on average approximately four times more abundant in Year 2. Similar seasonal patterns in abundance and differences in relative abundance were apparent in Year 1 (Natural Research Projects 2010c).

105. Common guillemots were recorded on the sea in the inner sound during SSS sessions in all five Year 2 seasonal periods but were very scarce in the autumn and winter periods, when only occasional single birds were recorded (Table 23). Small numbers (peak count 16 birds) were commonly present in the spring and summer period and at these times the mean density was 0.14 birds per km^2, similar to that recorded in Year 1 (Table 23) (Natural Research Projects 2010c).

106. Few common guillemots were observed flying past VPs in the FBWs (Tables 26 and 27,) with a total of only eight individuals recorded in the whole of Year 2, mostly in the spring and summer.

107. Razorbills were recorded on the sea during SSS in small numbers through Year 2 but especially in the late winter (peak 37, mean density 0.3 km^2), spring (peak count 12, mean

density 0.33 km^2) and summer (peak count 36, mean density 0.5 km^2) periods (Table 24). They were very scarce in the autumn and early winter (peak count 5, mean density <0.1 km^2). The numbers recorded in the summer period in Year 2 was approximately half that in Year 1, otherwise the abundance and seasonal pattern of razorbill was similar in both Year 1 and Year 2 (Natural Research Projects 2010c).

108. The August records include several cases of adults with attendant dependent young. It is not known from which colony these birds originated but the closest colonies, and therefore arguably the most likely, are the small colonies on the west side of Islay such as at Glac na Criche about 35 km (sea route) to the west and the colonies on Colonsay about 35 km to the north.

109. The numbers of razorbills recorded in the inner sound are very small compared with the regional breeding population of 9,056 individuals (Mitchell *et al* 2004).

110. Razorbills were recorded in FBW sessions almost throughout the year, but especially in March and to a lesser extent April when mean rates passing were 33 and 8 birds per hour respectively, almost all travelling south (Table 27). At other times of year the numbers flying through the sound were much lower, typically averaging <1 bird per hour (Table 27).

111. Black guillemot breed in the inner sound in moderate numbers. The Environmental Statement ((Natural Research Projects 2010a)) identified black guillemot as one of the most important bird species relating to the proposed development because the inner sound holds a breeding population of regional importance and because this species commonly dives to forage in the areas where turbines are proposed (Natural Research Projects 2010b).

112. The pre-breeding black guillemot survey was between 06:00 and 08:15 on 26th April 2011 in ideal counting conditions. A total of 73 adults were counted close to suitable nesting habitat (Figure 2). All the black guillemots located in the pre-breeding survey were on the Islay side of the sound on stretches of steep rocky shore or sea cliffs.

113. Bearing in mind that some individuals may have been away from breeding colonies at the time of the survey, it is likely that the 73 adults seen represents at least 37 pairs and perhaps as many as 40 pairs. This compares to an estimated 35 pairs (66 birds) in 2009, and 30 to 35 pairs in 2010 (Natural Research Projects 2010b).

114. The dawn spring colony counts of black guillemot suggest that the breeding population of the inner Sound of Islay is approximately stable or increasing slowly. 35 pairs represent about 2.3% of the regional (Argyll and Bute) population of 3046 individuals (Mitchell *et al* 2004). Argyll and Bute support about 7% of the Great Britain and Ireland breeding population (Mitchell *et al* 2004).

115. Black Guillemots were detected during SSS sessions throughout the year and from all VPs. The average density of black guillemots seen on the water was 3.3 birds per km^2 in spring, 1.8 per km^2 in summer, 0.1 per km^2 in autumn/early winter and 1.8 per km^2 in late winter (Table 25). The seasonal pattern of abundance in Year 2 was very similar to Year 1 (Natural Research Projects 2010c). Overall, the abundance of black guillemots tended to be slightly higher in Year 2, especially in the late winter and spring periods when they were about 40% more abundant than in Year 1 (Natural Research Projects 2010c).

116. Black guillemots were commonly seen flying in the sound during FBWs in all months of the year except September (Tables 26 and 27). As in Year 1, they were most frequently observed flying during the spring and summer months, when on average approximately 2 to 4 birds were seen flying past the VPs per hour. At other times of year flight activity was about a third of this.

The relatively high flight activity from April to July was likely to be associated with local birds visiting breeding sites and provisioning of young.

Conclusions

117. The fieldwork aims were almost fully achieved with nearly 96% of planned VP watch effort completed successfully. The shortfall was mainly caused by poor weather conditions in some months preventing the full complement of planned watches being completed though in many cases shortfalls were addressed by undertaking additional watches in the following month. It is not considered likely that the shortfalls in effort could significantly affect the results or conclusions drawn.

118. The main conclusion that can be drawn is that for almost all bird species the abundance and seasonal patterns recorded in Year 2 were very similar to that found in Year 1 (Natural Research Projects 2010c). This includes those species which were identified in the Environmental Statement (Natural Research Projects 2010a) as having greatest relevance to the marine turbine development namely, black guillemot, shag, great northern diver, eider and overwintering white-tailed eagle.

119. Unsurprisingly, the abundance of some species recorded was slightly different to that reported in Year 1 and attention is drawn to this in the species accounts. Several species, notably gannet, Manx shearwater and passage kittiwakes were notably less common in Year 2 than in Year 1. There was some evidence of a small increase in the numbers of black guillemot breeding in the inner sound during Year 2. The numbers of this species foraging in the winter was also higher than in Year 1.

120. The Year 2 fieldwork produced no unexpected results or identified any new ornithological features in the study area (the inner sound) that might be considered of particular relevance to the planned tidal turbine array. It is concluded that the assessment of ornithological matters, and conclusions reached, in the Environmental Statement (Natural Research Projects 2010a, ScottishPower Renewables 2010a and 2010c) remain valid and complete.

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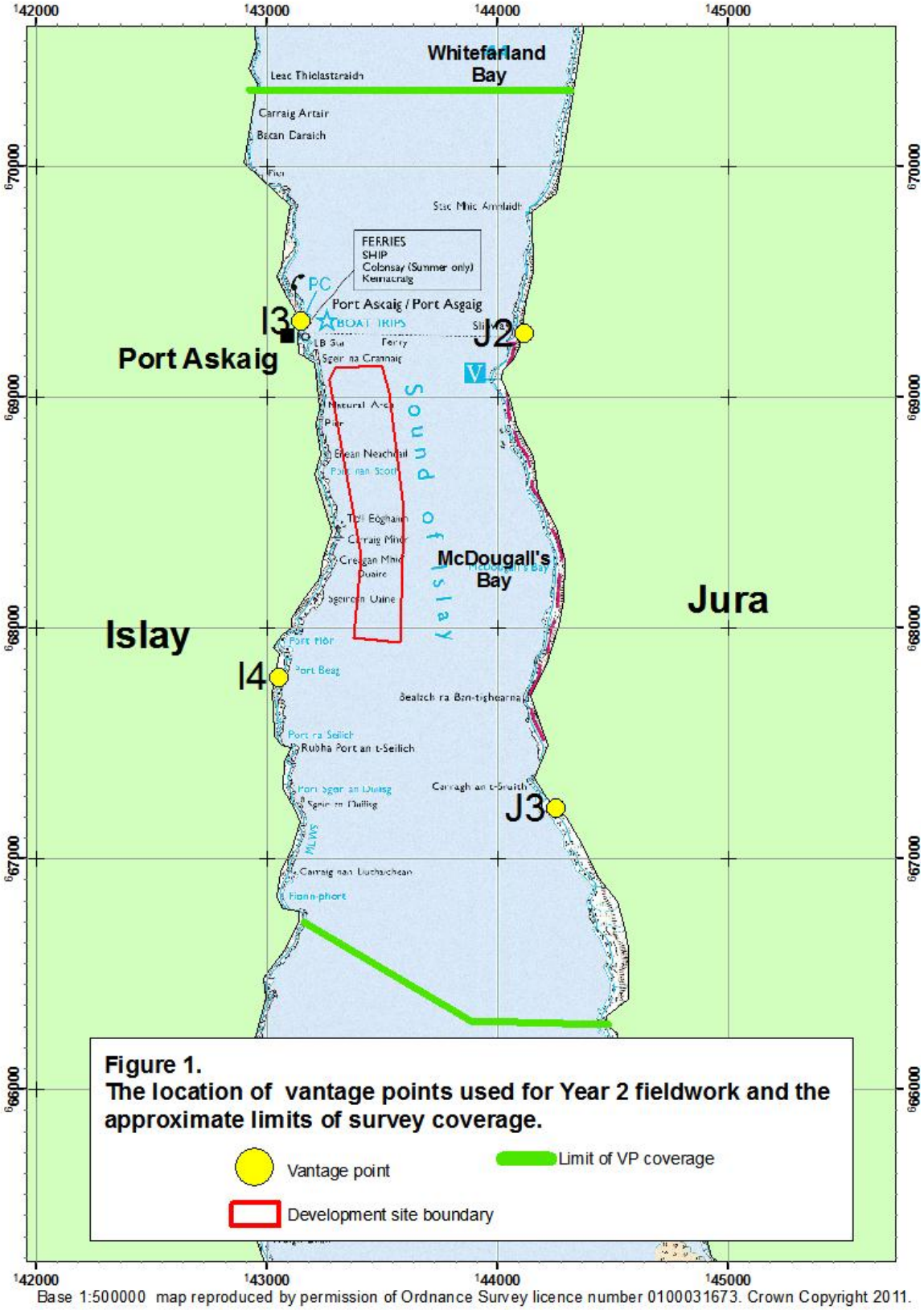

Figure 1.
The location of vantage points used for Year 2 fieldwork and the approximate limits of survey coverage.

Vantage point

Limit of VP coverage

Development site boundary

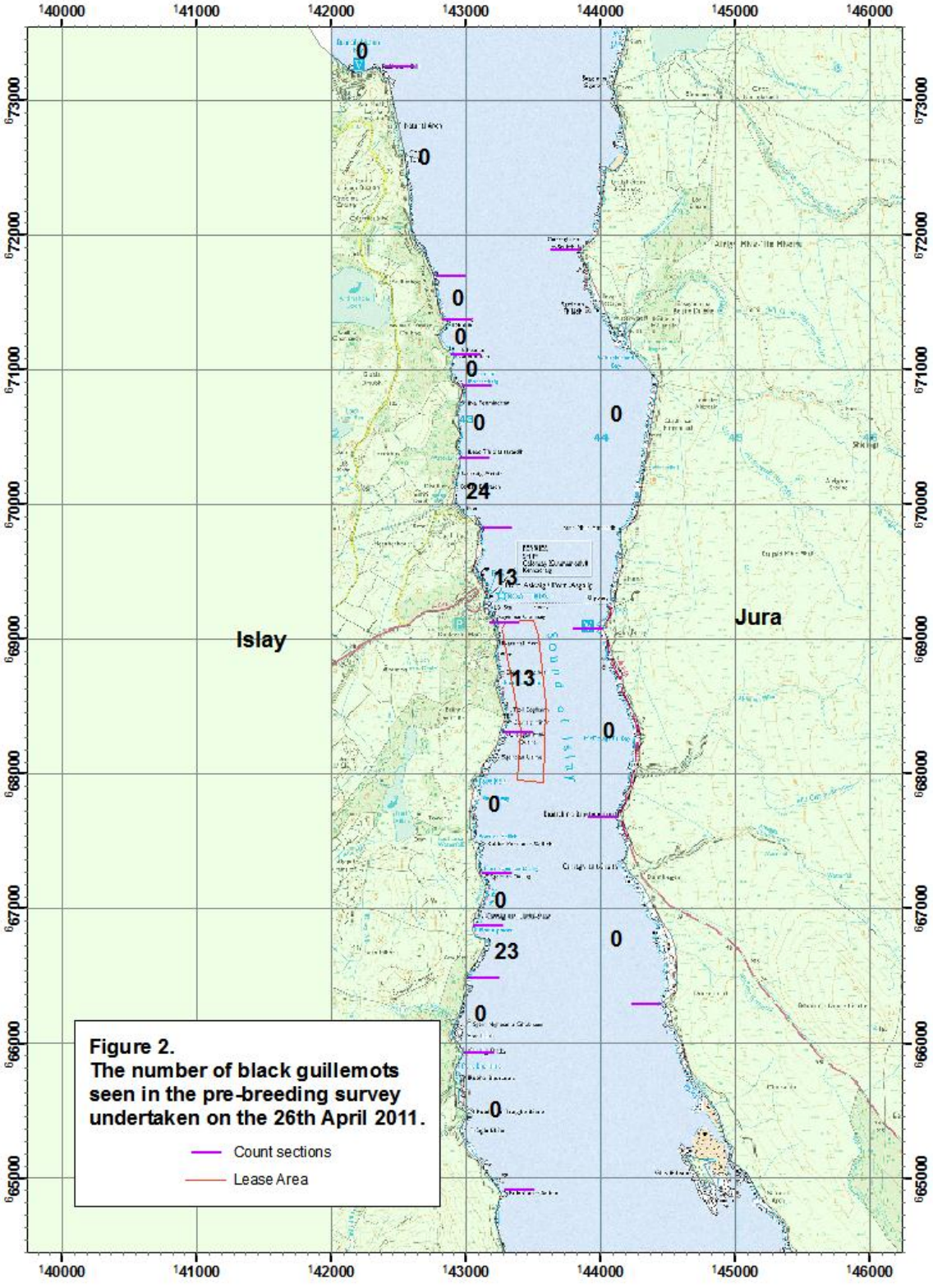

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Table 1. The **dates and number of days each month** that vantage point watch sessions were undertaken in the Inner Sound of Islay study area in Year 2 of baseline surveys. 'x' indicates that watches were undertaken on that date.

Day of month	Sept 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	July 2011	Aug 2011
1	x		x									x
2								x				
3	x							x				
4		x									x	
5						x	x			x		x
6		x	x							x		
7					x		x	x			x	
8					x							
9				x						x	x	
10			x			x		x	x	x		
11	x	x		x	x					x	x	
12	x					x				x		
13			x	x	x				x	x	x	
14		x					x					x
15			x			x	x					
16		x			x	x	x					x
17	x						x		x			x
18	x	x										x
19	x		x									
20	x	x		x	x			x	x	x		
21			x	x	x			x		x		x
22	x		x				x	x			x	
23		x	x	x	x		x			x	x	
24	x		x		x	x		x		x	x	x
25		x	x		x			x			x	
26	x				x	x	x	x				x
27	x	x				x	x	x		x		x
28		x					x	x				
29	x			x						x		x
30				x	x					x	x	
31				x	x							
Total days	13	11	11	9	13	8	11	12	4	14	10	11

Table 2. The number of **snapshot scans** undertaken from each **VP** each month in Year 2 of baseline surveys.

Month	VP				Total
	I3	I4	J2	J3	
Sept 2010	14	18	15	17	64
Oct 2010	18	14	16	16	64
Nov 2010	15	17	12	16	60
Dec 2010	15	16	3	15	49
Jan 2011	16	20	17	15	68
Feb 2011	16	12	0	13	41
Mar 2011	12	20	14	17	63
Apr 2011	16	16	12	16	60
May 2011	8	11	0	10	29
Jun 2011	20	15	13	22	70
July 2011	20	16	6	18	60
Aug 2011	12	17	15	16	60
All months	182	192	123	191	688
%	26.5%	27.9%	17.9%	27.8%	100.0%

Table 3. The number of 5-minute **flying bird watches** undertaken from each **VP** each month in Year 2 of baseline surveys.

Month	VP				Total
	I3	I4	J2	J3	
Sept 2010	15	18	18	14	65
Oct 2010	18	14	16	16	64
Nov 2010	15	17	12	16	60
Dec 2010	15	16	3	15	49
Jan 2011	18	19	18	15	70
Feb 2011	13	13	0	13	39
Mar 2011	12	20	14	15	61
Apr 2011	16	16	12	15	59
May 2011	8	11	0	12	31
Jun 2011	19	16	15	22	72
July 2011	20	16	5	19	60
Aug 2011	12	16	15	16	59
All months	181	192	128	188	689
%	26.3%	27.9%	18.6%	27.3%	100.0%

Table 4. The number of 15-minute **marine mammal watches** undertaken from each **VP** each month in Year 2 of baseline surveys.

Month	VP				Total
	I3	I4	J2	J3	
Sept 2010	29	35	29	34	127
Oct 2010	36	28	32	34	130
Nov 2010	30	33	24	32	119
Dec 2010	30	32	6	28	96
Jan 2011	30	40	31	33	134
Feb 2011	31	24	0	24	79
Mar 2011	24	40	27	32	123
Apr 2011	33	32	24	31	120
May 2011	16	22	0	23	61
Jun 2011	38	32	31	45	146
July 2011	42	31	10	39	122
Aug 2011	23	34	32	31	120
All months	362	383	246	386	1377
%	26.3%	27.8%	17.9%	28.0%	100.0%

Table 5. The number of **snapshot scans** undertaken in each **sea state** in each month in Year 2 of baseline surveys.

Month	Sea state						Total
	0	1	2	3	4	5	
Sept 2010	2	43	14	3	2	0	64
Oct 2010	22	11	23	11	0	0	67
Nov 2010	2	28	25	7	0	0	62
Dec 2010	12	28	3	7	0	0	50
Jan 2011	25	18	17	9	0	0	69
Feb 2011	13	10	9	9	0	0	41
Mar 2011	16	19	17	8	4	1	65
Apr 2011	32	12	17	2	0	0	63
May 2011	6	16	5	2	0	0	29
Jun 2011	35	24	12	1	0	0	72
July 2011	3	24	22	11	0	0	60
Aug 2011	1	25	26	8	2	0	62
All months	169	258	190	78	8	1	704
%	24.0%	36.6%	27.0%	11.1%	1.1%	0.1%	100%

Table 6. The number of 5-minute **flying bird watches** undertaken in each **sea state each** month in Year 2 of baseline surveys.

Month	Sea state						Total
	0	1	2	3	4	5	
Sept 2010	4	42	14	3	2	0	65
Oct 2010	22	11	21	9	1	0	64
Nov 2010	2	28	26	4	0	0	60
Dec 2010	13	27	2	7	0	0	49
Jan 2011	27	16	18	9	0	0	70
Feb 2011	13	10	11	5	0	0	39
Mar 2011	14	21	14	7	4	1	61
Apr 2011	30	12	16	1	0	0	59
May 2011	8	15	6	2	0	0	31
Jun 2011	37	25	8	2	0	0	72
July 2011	3	26	21	10	0	0	60
Aug 2011	0	24	25	8	2	0	59
All months	173	257	182	67	9	1	689
%	25.1%	37.3%	26.4%	9.7%	1.3%	0.1%	100%

Table 7. The number of 15-minute **marine mammal watches** undertaken in each of **sea state** in each month in Year 2 of baseline surveys.

Month	Sea state						Total
	0	1	2	3	4	5	
Sept 2010	7	82	29	5	4	0	127
Oct 2010	42	21	45	20	2	0	130
Nov 2010	4	56	50	9	0	0	119
Dec 2010	23	53	6	14	0	0	96
Jan 2011	50	35	35	14	0	0	134
Feb 2011	24	22	18	15	0	0	79
Mar 2011	29	37	31	16	8	2	123
Apr 2011	65	23	29	2	1	0	120
May 2011	16	30	12	3	0	0	61
Jun 2011	75	49	19	3	0	0	146
July 2011	6	51	45	20	0	0	122
Aug 2011	0	51	51	14	4	0	120
All months	341	510	370	135	19	2	1377
%	24.8%	37.0%	26.9%	9.8%	1.4%	0.1%	100%

Table 8. The number of snapshot scans undertaken in each of six **tidal periods** in each month in Year 2 of baseline surveys.

Month	Tidal period						Total
	1	2	3	4	5	6	
Sept 2010	11	11	14	10	10	8	64
Oct 2010	13	10	8	14	13	9	67
Nov 2010	6	11	13	14	12	6	62
Dec 2010	8	8	12	9	6	7	50
Jan 2011	14	17	16	13	6	3	69
Feb 2011	8	7	6	3	12	5	41
Mar 2011	7	12	11	13	8	14	65
Apr 2011	12	9	9	12	12	9	63
May 2011	5	6	3	5	5	5	29
Jun 2011	14	12	9	10	11	16	72
July 2011	11	13	9	7	7	13	60
Aug 2011	11	10	12	11	10	8	62
All months	120	126	122	121	112	103	704
%	17.0%	17.9%	17.3%	17.2%	15.9%	14.6%	100.0%

Table 9. The number of 5-minute **flying bird watches** undertaken in each of six tidal periods in each month in Year 2 of baseline surveys.

Month	Tidal period						Total
	1	2	3	4	5	6	
Sept 2010	9	9	17	12	9	9	65
Oct 2010	14	10	7	14	12	7	64
Nov 2010	6	11	13	12	11	7	60
Dec 2010	8	8	10	11	5	7	49
Jan 2011	12	16	20	14	5	3	70
Feb 2011	7	8	7	3	8	6	39
Mar 2011	9	10	11	14	7	10	61
Apr 2011	10	7	10	11	10	11	59
May 2011	8	6	4	4	5	4	31
Jun 2011	14	14	9	11	9	15	72
July 2011	12	12	9	7	7	13	60
Aug 2011	9	11	11	11	8	9	59
All months	118	122	128	124	96	101	689
%	17.1%	17.7%	18.6%	18.0%	13.9%	14.7%	100.0%

Table 10. The number of 15-minute **marine mammal watches** undertaken in each of six tidal periods in each month in Year 2 of baseline surveys.

Month	Tidal period						Total
	1	2	3	4	5	6	
Sept 2010	21	24	29	18	21	14	127
Oct 2010	22	23	14	29	26	16	130
Nov 2010	14	23	25	23	23	11	119
Dec 2010	16	18	19	19	11	13	96
Jan 2011	25	33	33	27	11	5	134
Feb 2011	16	13	12	6	22	10	79
Mar 2011	18	20	20	26	16	23	123
Apr 2011	20	17	18	24	22	19	120
May 2011	12	14	8	9	9	9	61
Jun 2011	31	22	19	22	18	34	146
July 2011	27	23	18	14	15	25	122
Aug 2011	18	22	23	26	15	16	120
All months	240	252	238	243	209	195	1377
%	17.4%	18.3%	17.3%	17.6%	15.2%	14.2%	100.0%

Table 11. The seasonal mean density and maximum count of **red-throated diver** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	0	2	0	4	0
	Max count	0	2	0	2	0
	Mean density (/km^2)	0.00	0.06	0.00	0.08	0.00
	Std Dev	0.00	0.37	0.00	0.42	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	3	0	7	1	5
	Max count	2	0	1	1	2
	Mean density (/km^2)	0.08	0.00	0.12	0.02	0.13
	Std Dev	0.39	0.00	0.34	0.15	0.51
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	1	0	1
	Max count	0	0	1	0	1
	Mean density (/km^2)	0.00	0.00	0.03	0.00	0.05
	Std Dev	0.00	0.00	0.18	0.00	0.23
J3	No. snapshot scans	33	31	45	48	34
	Total seen	1	1	1	4	1
	Max count	1	1	1	2	1
	Mean density (/km^2)	0.03	0.03	0.02	0.08	0.03
	Std Dev	0.17	0.19	0.15	0.36	0.17
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	4	3	9	9	7
	Sum of max counts	3	3	3	5	4
	Mean density (/km^2)	0.03	0.02	0.04	0.05	0.05

Table 12. The seasonal mean density and maximum count of **great northern diver** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	0	8	9	8	0
	Max count	0	2	2	2	0
	Mean density (/km^2)	0.00	0.24	0.18	0.16	0.00
	Std Dev	0.00	0.52	0.46	0.45	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	0	8	10	3	0
	Max count	0	2	2	1	0
	Mean density (/km^2)	0.00	0.21	0.17	0.06	0.00
	Std Dev	0.00	0.50	0.44	0.26	0.00
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	3	9	0	0
	Max count	0	1	1	0	0
	Mean density (/km^2)	0.00	0.18	0.26	0.00	0.00
	Std Dev	0.00	0.41	0.46	0.00	0.00
J3	No. snapshot scans	33	31	45	48	34
	Total seen	0	6	11	3	0
	Max count	0	1	1	1	0
	Mean density (/km^2)	0.00	0.18	0.22	0.06	0.00
	Std Dev	0.00	0.41	0.44	0.25	0.00
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	0	25	39	14	0
	Sum of max counts	0	6	6	4	0
	Mean density (/km^2)	0.00	0.20	0.21	0.07	0.00

Table 13. The seasonal mean density and maximum count of **gannet** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	4	0	0	1	2
	Max count	2	0	0	1	2
	Mean density (/km^2)	0.11	0.00	0.00	0.02	0.06
	Std Dev	0.42	0.00	0.00	0.15	0.36
I4	No. snapshot scans	32	33	52	42	33
	Total seen	8	0	0	2	2
	Max count	3	0	0	1	1
	Mean density (/km^2)	0.22	0.00	0.00	0.04	0.05
	Std Dev	0.72	0.00	0.00	0.22	0.24
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	0	0	0
	Max count	0	0	0	0	0
	Mean density (/km^2)	0.00	0.00	0.00	0.00	0.00
	Std Dev	0.00	0.00	0.00	0.00	0.00
J3	No. snapshot scans	33	31	45	48	34
	Total seen	2	0	0	0	3
	Max count	1	0	0	0	2
	Mean density (/km^2)	0.05	0.00	0.00	0.00	0.08
	Std Dev	0.24	0.00	0.00	0.00	0.38
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	14	0	0	3	7
	Sum of max counts	6	0	0	2	5
	Mean density (/km^2)	0.10	0.00	0.00	0.02	0.05

Table 14. The seasonal mean density and maximum count of **cormorant** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	4	2	4	0	0
	Max count	2	1	2	0	0
	Mean density (/km^2)	0.11	0.06	0.08	0.00	0.00
	Std Dev	0.42	0.25	0.36	0.00	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	27	2	11	6	0
	Max count	6	1	3	1	0
	Mean density (/km^2)	0.75	0.05	0.19	0.13	0.00
	Std Dev	1.35	0.24	0.57	0.35	0.00
J2	No. snapshot scans	31	15	31	25	21
	Total seen	3	4	1	0	3
	Max count	1	2	1	0	1
	Mean density (/km^2)	0.09	0.24	0.03	0.00	0.14
	Std Dev	0.30	0.70	0.18	0.00	0.37
J3	No. snapshot scans	33	31	45	48	34
	Total seen	6	0	0	4	0
	Max count	2	0	0	1	0
	Mean density (/km^2)	0.16	0.00	0.00	0.08	0.00
	Std Dev	0.46	0.00	0.00	0.29	0.00
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	40	8	16	10	3
	Sum of max counts	11	4	6	2	1
	Mean density (/km^2)	0.28	0.09	0.07	0.05	0.03

Table 15. The seasonal mean density and maximum count of **shag** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	233	283	310	202	50
	Max count	34	23	23	15	8
	Mean density (/km^2)	6.4	8.3	6.2	4.1	1.4
	Std Dev	8.5	5.8	5.6	4.1	2.1
I4	No. snapshot scans	32	33	52	42	33
	Total seen	503	359	705	356	276
	Max count	41	26	27	20	17
	Mean density (/km^2)	13.9	9.6	12.0	7.5	7.4
	Std Dev	10.2	5.1	6.3	4.4	4.9
J2	No. snapshot scans	31	15	31	25	21
	Total seen	398	104	264	47	36
	Max count	36	12	29	7	12
	Mean density (/km^2)	11.4	6.1	7.5	1.7	1.7
	Std Dev	9.2	3.7	6.6	1.8	2.9
J3	No. snapshot scans	33	31	45	48	34
	Total seen	304	102	185	89	116
	Max count	66	8	11	7	19
	Mean density (/km^2)	8.2	3.1	3.7	1.8	3.0
	Std Dev	12.2	1.9	2.8	1.7	4.4
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	1438	848	1464	694	478
	Sum of max counts	177	69	90	49	56
	Mean density (/km^2)	10.0	6.8	7.4	3.8	3.4

Table 16. The seasonal mean density and maximum count of **eider** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	66	269	105	17	3
	Max count	19	46	38	8	3
	Mean density (/km^2)	1.83	7.94	2.11	0.34	0.09
	Std Dev	4.13	14.24	6.70	1.38	0.54
I4	No. snapshot scans	32	33	52	42	33
	Total seen	10	152	70	10	0
	Max count	3	40	17	2	0
	Mean density (/km^2)	0.28	4.08	1.19	0.21	0.00
	Std Dev	0.82	8.29	3.57	0.53	0.00
J2	No. snapshot scans	31	15	31	25	21
	Total seen	129	25	58	0	12
	Max count	37	12	15	0	12
	Mean density (/km^2)	3.68	1.47	1.66	0.00	0.56
	Std Dev	7.90	3.77	4.02	0.00	2.75
J3	No. snapshot scans	33	31	45	48	34
	Total seen	14	6	61	23	6
	Max count	4	5	18	8	5
	Mean density (/km^2)	0.38	0.18	1.23	0.45	0.16
	Std Dev	1.09	0.94	4.00	1.50	0.87
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	219	452	294	50	21
	Sum of max counts	63	103	88	18	20
	Mean density (/km^2)	1.54	3.42	1.55	0.25	0.20

Table 17. The seasonal mean density and maximum count of **red-breasted merganser** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	12	0	0	0	0
	Max count	12	0	0	0	0
	Mean density (/km^2)	0.33	0.00	0.00	0.00	0.00
	Std Dev	2.12	0.00	0.00	0.00	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	0	0	0	0	0
	Max count	0	0	0	0	0
	Mean density (/km^2)	0.00	0.00	0.00	0.00	0.00
	Std Dev	0.00	0.00	0.00	0.00	0.00
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	7	0	0
	Max count	0	0	3	0	0
	Mean density (/km^2)	0.00	0.00	0.20	0.00	0.00
	Std Dev	0.00	0.00	0.67	0.00	0.00
J3	No. snapshot scans	33	31	45	48	34
	Total seen	8	0	3	4	0
	Max count	4	0	2	2	0
	Mean density (/km^2)	0.21	0.00	0.06	0.08	0.00
	Std Dev	0.97	0.00	0.33	0.42	0.00
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	20	0	10	4	0
	Sum of max counts	16	0	5	2	0
	Mean density (/km^2)	0.14	0.00	0.07	0.02	0.00

Table 18. The seasonal mean density and maximum count of **common gull** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	19	15	22	15	46
	Max count	3	6	16	4	13
	Mean density (/km^2)	0.53	0.44	0.44	0.30	1.31
	Std Dev	0.80	1.20	2.47	0.91	3.49
I4	No. snapshot scans	32	33	52	42	33
	Total seen	61	44	21	34	85
	Max count	12	10	21	18	33
	Mean density (/km^2)	1.69	1.18	0.36	0.72	2.28
	Std Dev	2.82	2.77	2.91	3.01	7.95
J2	No. snapshot scans	31	15	31	25	21
	Total seen	68	1	0	35	44
	Max count	12	1	0	7	20
	Mean density (/km^2)	1.94	0.06	0.00	1.29	2.05
	Std Dev	3.66	0.26	0.00	1.98	6.26
J3	No. snapshot scans	33	31	45	48	34
	Total seen	31	2	40	30	46
	Max count	8	1	14	4	13
	Mean density (/km^2)	0.83	0.06	0.80	0.59	1.20
	Std Dev	2.15	0.26	2.95	1.09	2.94
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	179	62	83	114	221
	Sum of max counts	35	18	51	33	79
	Mean density (/km^2)	1.25	0.44	0.40	0.72	1.71

Table 19. The seasonal mean density and maximum count of **herring gull** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	24	4	6	0	0
	Max count	4	2	2	0	0
	Mean density (/km^2)	0.66	0.12	0.12	0.00	0.00
	Std Dev	1.02	0.43	0.41	0.00	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	39	8	4	0	5
	Max count	4	2	2	0	5
	Mean density (/km^2)	1.08	0.21	0.07	0.00	0.13
	Std Dev	1.34	0.50	0.33	0.00	0.87
J2	No. snapshot scans	31	15	31	25	21
	Total seen	41	6	20	10	71
	Max count	6	2	4	4	34
	Mean density (/km^2)	1.17	0.35	0.57	0.37	3.31
	Std Dev	1.49	0.63	1.14	0.97	9.68
J3	No. snapshot scans	33	31	45	48	34
	Total seen	49	10	28	41	12
	Max count	20	3	4	6	2
	Mean density (/km^2)	1.31	0.31	0.56	0.81	0.31
	Std Dev	3.45	0.72	1.12	1.41	0.60
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	153	28	58	51	88
	Sum of max counts	34	9	12	10	41
	Mean density (/km^2)	1.06	0.25	0.33	0.29	0.94

Table 20. The seasonal mean density and maximum count of **great black-backed gull** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	9	2	3	0	0
	Max count	2	1	1	0	0
	Mean density (/km^2)	0.25	0.06	0.06	0.00	0.00
	Std Dev	0.52	0.25	0.25	0.00	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	7	2	7	0	2
	Max count	2	1	2	0	2
	Mean density (/km^2)	0.19	0.05	0.12	0.00	0.05
	Std Dev	0.49	0.24	0.49	0.00	0.35
J2	No. snapshot scans	31	15	31	25	21
	Total seen	16	2	10	14	2
	Max count	2	1	3	3	1
	Mean density (/km^2)	0.46	0.12	0.29	0.52	0.09
	Std Dev	0.72	0.35	0.79	0.88	0.32
J3	No. snapshot scans	33	31	45	48	34
	Total seen	7	4	13	7	2
	Max count	2	1	3	2	1
	Mean density (/km^2)	0.19	0.12	0.26	0.14	0.05
	Std Dev	0.48	0.35	0.67	0.47	0.24
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	39	10	33	21	6
	Sum of max counts	8	4	9	5	4
	Mean density (/km^2)	0.27	0.09	0.18	0.16	0.05

Table 21. The seasonal mean density and maximum count of **kittiwake** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	0	0	0	0	62
	Max count	0	0	0	0	39
	Mean density (/km^2)	0.00	0.00	0.00	0.00	1.77
	Std Dev	0.00	0.00	0.00	0.00	7.34
I4	No. snapshot scans	32	33	52	42	33
	Total seen	1	1	0	0	28
	Max count	1	1	0	0	25
	Mean density (/km^2)	0.03	0.03	0.00	0.00	0.75
	Std Dev	0.18	0.17	0.00	0.00	4.35
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	0	0	8
	Max count	0	0	0	0	2
	Mean density (/km^2)	0.00	0.00	0.00	0.00	0.37
	Std Dev	0.00	0.00	0.00	0.00	0.77
J3	No. snapshot scans	33	31	45	48	34
	Total seen	0	14	0	0	7
	Max count	0	12	0	0	3
	Mean density (/km^2)	0.00	0.43	0.00	0.00	0.18
	Std Dev	0.00	2.25	0.00	0.00	0.73
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	1	15	0	0	105
	Sum of max counts	1	13	0	0	69
	Mean density (/km^2)	0.01	0.11	0.00	0.00	0.77

Table 22. The seasonal mean density and maximum count of **Arctic tern** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	0	0	0	0	4
	Max count	0	0	0	0	3
	Mean density (/km^2)	0.00	0.00	0.00	0.00	0.11
	Std Dev	0.00	0.00	0.00	0.00	0.56
I4	No. snapshot scans	32	33	52	42	33
	Total seen	0	0	0	3	14
	Max count	0	0	0	2	9
	Mean density (/km^2)	0.00	0.00	0.00	0.06	0.38
	Std Dev	0.00	0.00	0.00	0.34	1.60
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	0	0	0
	Max count	0	0	0	0	0
	Mean density (/km^2)	0.00	0.00	0.00	0.00	0.00
	Std Dev	0.00	0.00	0.00	0.00	0.00
J3	No. snapshot scans	33	31	45	48	34
	Total seen	0	0	0	10	15
	Max count	0	0	0	9	5
	Mean density (/km^2)	0.00	0.00	0.00	0.20	0.39
	Std Dev	0.00	0.00	0.00	1.35	1.26
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	0	0	0	13	33
	Sum of max counts	0	0	0	11	17
	Mean density (/km^2)	0.00	0.00	0.00	0.06	0.22

Table 23. The seasonal mean density and maximum count of **common guillemot** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	0	1	1	8	0
	Max count	0	1	1	2	0
	Mean density (/km^2)	0.00	0.03	0.02	0.16	0.00
	Std Dev	0.00	0.18	0.15	0.54	0.00
I4	No. snapshot scans	32	33	52	42	33
	Total seen	0	0	1	16	0
	Max count	0	0	1	3	0
	Mean density (/km^2)	0.00	0.00	0.02	0.34	0.00
	Std Dev	0.00	0.00	0.14	0.66	0.00
J2	No. snapshot scans	31	15	31	25	21
	Total seen	1	0	0	0	11
	Max count	1	0	0	0	11
	Mean density (/km^2)	0.03	0.00	0.00	0.00	0.51
	Std Dev	0.18	0.00	0.00	0.00	2.52
J3	No. snapshot scans	33	31	45	48	34
	Total seen	2	1	0	2	2
	Max count	1	1	0	1	2
	Mean density (/km^2)	0.05	0.03	0.00	0.04	0.05
	Std Dev	0.24	0.19	0.00	0.21	0.34
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	3	2	2	26	13
	Sum of max counts	2	2	2	6	13
	Mean density (/km^2)	0.02	0.02	0.01	0.13	0.14

Table 24. The seasonal mean density and maximum count of **razorbill** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	2	5	12	12	26
	Max count	1	5	10	10	16
	Mean density (/km^2)	0.06	0.15	0.24	0.24	0.74
	Std Dev	0.25	0.91	1.52	1.53	3.10
I4	No. snapshot scans	32	33	52	42	33
	Total seen	4	0	37	4	17
	Max count	1	0	13	2	9
	Mean density (/km^2)	0.11	0.00	0.63	0.08	0.46
	Std Dev	0.34	0.00	2.09	0.43	1.86
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	7	0	14
	Max count	0	0	5	0	7
	Mean density (/km^2)	0.00	0.00	0.20	0.00	0.65
	Std Dev	0.00	0.00	0.96	0.00	1.82
J3	No. snapshot scans	33	31	45	48	34
	Total seen	2	0	12	2	10
	Max count	1	0	9	2	4
	Mean density (/km^2)	0.05	0.00	0.24	0.04	0.26
	Std Dev	0.24	0.00	1.39	0.30	0.87
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	8	5	68	18	67
	Sum of max counts	3	5	37	14	36
	Mean density (/km^2)	0.05	0.04	0.33	0.09	0.53

Table 25. The seasonal mean density and maximum count of **black guillemot** recorded during snapshot scans (SSS) from four vantage points (VPs) in the Inner Sound of Islay study area in Year 2 of baseline surveys, September 2010 to August 2011.

VP	Measure	Autumn	Early Winter	Late Winter	Spring	Summer
I3	No. snapshot scans	32	30	44	44	32
	Total seen	8	10	176	256	146
	Max count	2	3	20	20	21
	Mean density (/km^2)	0.22	0.29	3.54	5.15	4.17
	Std Dev	0.57	0.76	5.98	5.25	4.63
I4	No. snapshot scans	32	33	52	42	33
	Total seen	3	8	71	92	27
	Max count	1	2	7	14	8
	Mean density (/km^2)	0.08	0.21	1.21	1.94	0.72
	Std Dev	0.30	0.50	1.80	2.86	1.74
J2	No. snapshot scans	31	15	31	25	21
	Total seen	0	0	58	87	21
	Max count	0	0	18	21	6
	Mean density (/km^2)	0.00	0.00	1.66	3.21	0.98
	Std Dev	0.00	0.00	3.93	6.11	1.82
J3	No. snapshot scans	33	31	45	48	34
	Total seen	1	0	45	138	47
	Max count	1	0	14	14	11
	Mean density (/km^2)	0.03	0.00	0.91	2.71	1.22
	Std Dev	0.17	0.00	2.50	3.92	2.07
All VPs	No. snapshot scans	128	109	172	159	120
	Total seen	12	18	350	573	241
	Sum of max counts	4	5	59	69	46
	Mean density (/km^2)	0.08	0.13	1.83	3.25	1.77