

## Appendix III Age Classification of Key Bird Species

Appendix III provides information on the methodology APEM uses to age gannets and gulls from digital still imagery. The proportion of adult individuals per species per month is presented in **Table 7** (only birds for which an age class could be determined are included).

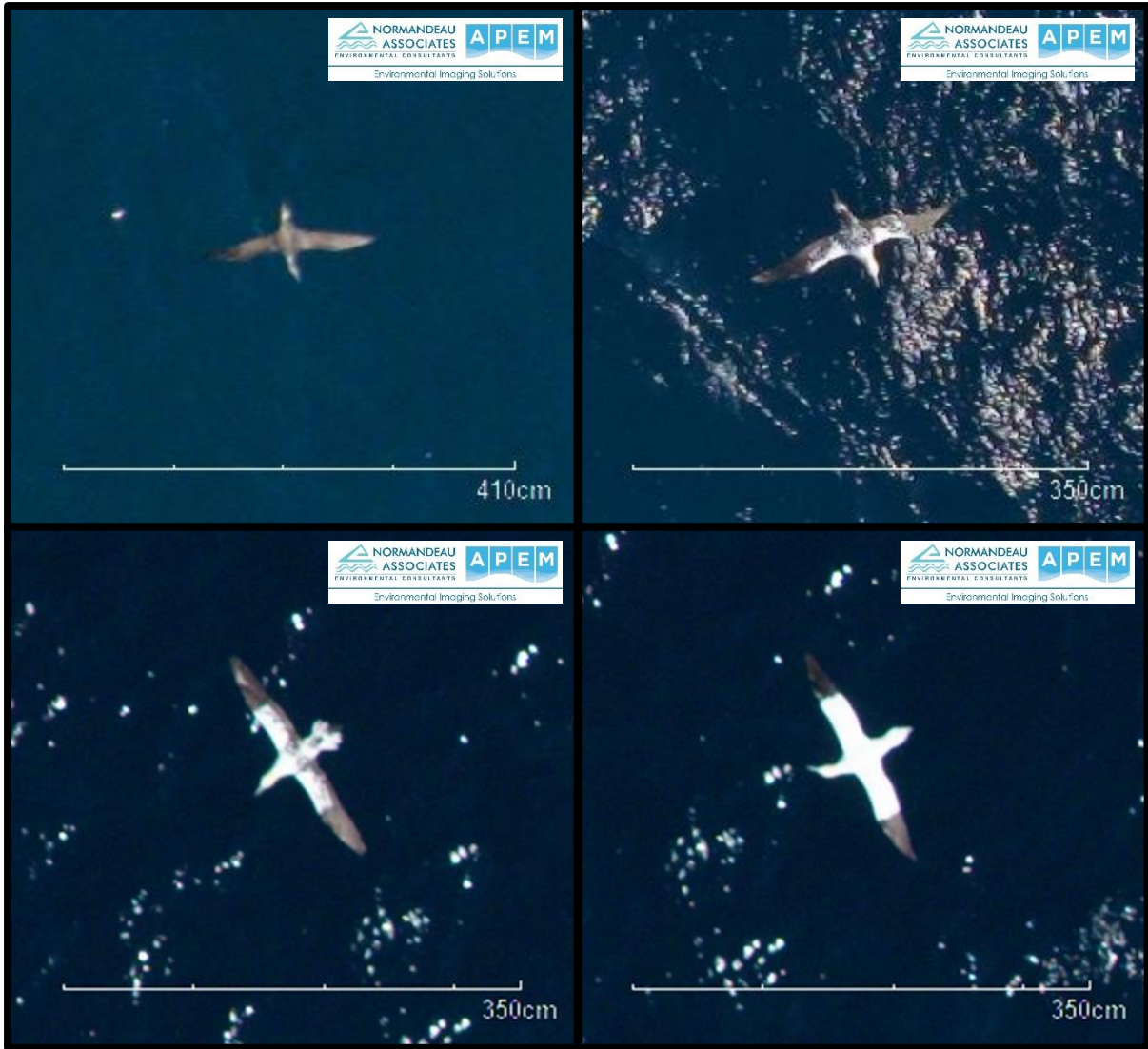
From high resolution digital aerial imagery, it is possible to identify most birds to species level given a suitable resolution (expressed as  $x$  cm ground sample distance). The only regular exception for surveys in the North Atlantic is differentiating between common and Arctic tern. High resolution digital aerial imagery is also able to differentiate between the different plumages shown by seabird species as they progress from immature to full adult plumage. For each of these species, example images have been provided. It should be noted that the actual image quality is superior to the compressed and cropped examples included in this document.

### Northern Gannet

With the exception of unfavorable survey conditions, APEM can identify 100% of gannets encountered during our aerial digital surveys at 1.5 cm GSD resolution.

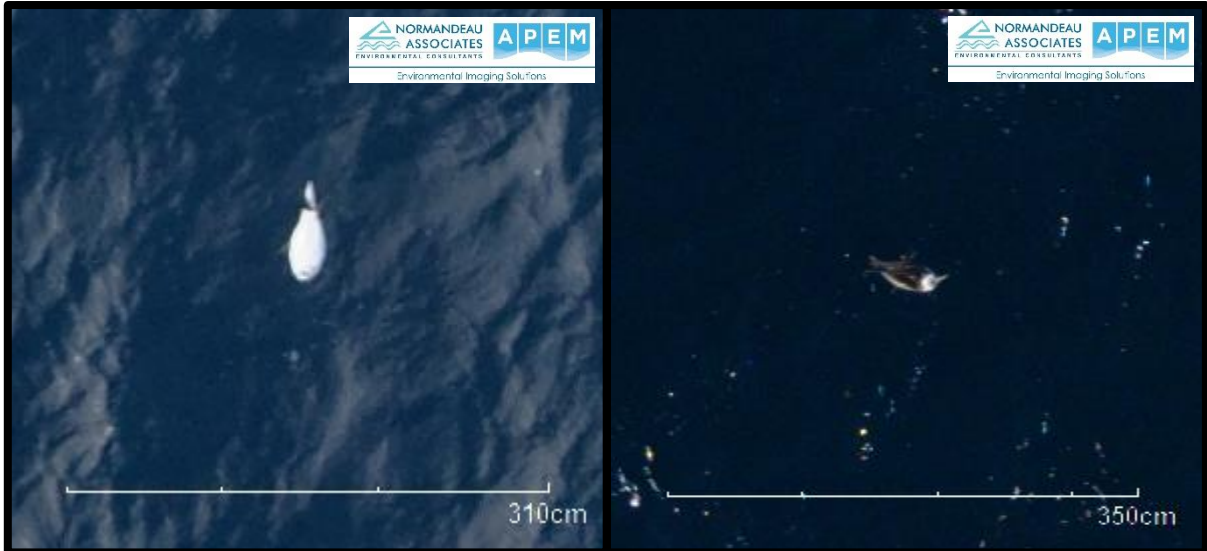
Separation of adults from sub-adults, both in flight and sitting on the water surface, is relatively straightforward.

For gannets in flight, APEM can identify all age groups, possibly except for fifth-year birds as seeing the blackish central tail feathers may be difficult even with 1.5 cm resolution. No fifth-year gannets were recorded in the Survey Area. Juvenile or first year (top left, **Plate 1**) can be separated from second year (top right, **Plate 1**) by the amount of white that is visible. The juvenile fully brown plumage (top left, **Plate 1**) can be compared in the example below to the second-year bird (top right, **Plate 1**) which shows white head and white forewing patches. First year birds can show slightly whiter around the neck and forewing than juveniles, but this can vary considerably in gannets. Adult gannets (bottom right, **Plate 1**) are obvious with yellow heads clearly visible. It is also possible to separate third year (bottom left, **Plate 1**) and fourth year gannet, based on the reduced amount of black in the upperparts of fourth year birds.



**Plate 1** Flying northern gannets of different ages captured in digital still imagery (GSD 1.5 cm)

Ageing northern gannets sitting on the water is slightly more difficult than in flight when birds have their wings outstretched. For swimming birds, APEM can positively identify the following age groups: adults (left, **Plate 2**), fourth years, third years, second years (right, **Plate 2**), first years and juveniles. Separating third and fourth year is slightly less certain than the other age groups but varying amounts of black on the upperparts is used for separation. Any fifth-year birds sitting on the water are likely to be grouped with adults as few black primaries and any black on the tail feathers is unlikely to be visible.



**Plate 2** Sitting northern gannets of different ages captured in digital still imagery (GSD 1.5 cm)

Age categories of northern gannets used in the data tables produced by APEM of its analyzed high-resolution aerial images are provided in **Table 1**.

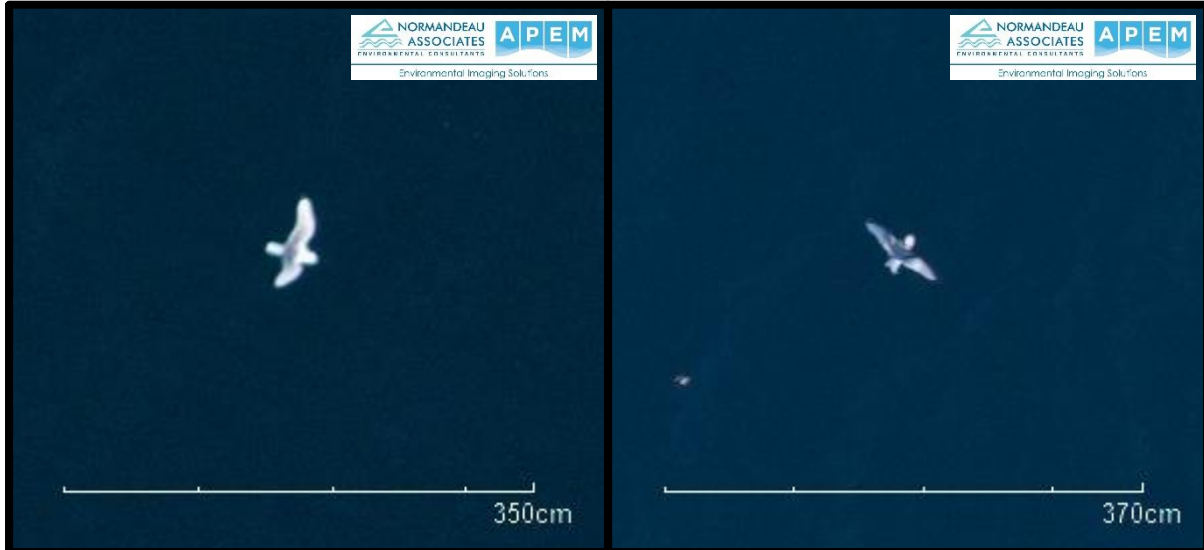
**Table 1** Gannet age class

Age of northern gannet	APEM age category – sitting and flying birds
Adult	Adult
Fifth year	
Fourth year	Fourth year
Third year	Third year
Second year	Second year
First year	First year
Juvenile	Juvenile

## Black-legged Kittiwake

Black-legged kittiwakes are the easiest small gull to identify in flight with very distinctive shape and wing tips.

In flight APEM can readily identify both adults (below left, **Plate 3**) and first years (below right, **Plate 3**) and with good image quality and higher resolution (i.e. 1.5 cm GSD) separation between juveniles and first years is possible (the juvenile's black neck collar can be seen from above).



**Plate 3** Flying black-legged kittiwakes of different ages captured in digital still imagery (GSD 1.5 cm)

Sitting adults viewed from above (below center, **Plate 4**) are distinctive, showing a light grey back with white either side and usually the black wing tips are not visible. Separation of sitting adults from immature birds is difficult at any resolution, and only realistically possible with good quality 1.5 cm GSD imagery. No sitting first year kittiwakes were recorded in the survey area but can be identified from black shown around the back of the neck or darker looking upperparts, though these features are not always visible.



**Plate 4**      **Sitting adult black-legged kittiwake captured in digital still imagery (GSD 1.5 cm)**

Age categories of black-legged kittiwakes used in the data tables produced by APEM of its analyzed high-resolution aerial images are provided in **Table 2**.

**Table 2**      **Black-legged kittiwake age class**

Age of black-legged kittiwake	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Second year		Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

## Bonaparte's Gull

Bonaparte's gulls are identifiable by the distinct coloration on their wings. The species is distinguished from black-legged kittiwakes by their smaller size.

In flight APEM can identify both juveniles (left, **Plate 5**) and adults (right, **Plate 5**). Adults are identified by the white leading edges on their wings, whilst juveniles are identified by their darker wing tips and the dark 'M' on their back. Age categories of Bonaparte's gulls used in the data tables produced by APEM of its analyzed high-resolution aerial images are provided in **Table 3**.



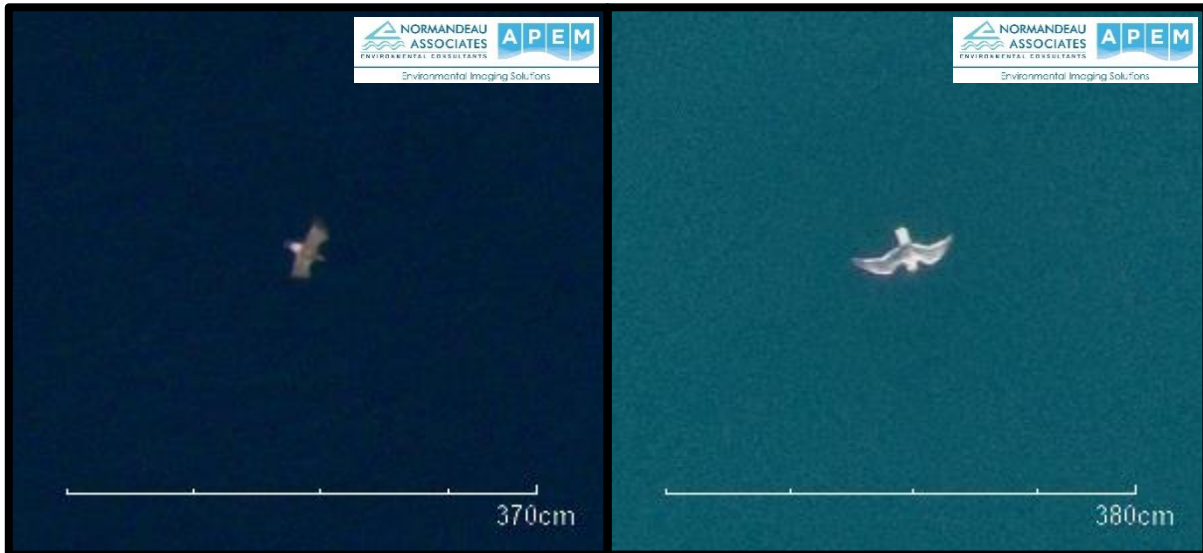
**Plate 5** Flying Bonaparte's gulls of different ages captured in digital still imagery (GSD 1.5 cm)

**Table 3** Bonaparte's gull age class

Age of Bonaparte's gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Second year		Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

## Laughing Gull

APEM can distinguish adult laughing gulls (below right, **Plate 6**) from first years (below left, **Plate 6**) and juveniles in flight by the uniform grey across the wings with black wingtips. Immature birds display brown plumage on the wings, with first years also showing a grey mantle. Age categories for laughing gulls used in the data tables produced by APEM of its analyzed high-resolution aerial images are provided in **Table 4**.



**Plate 6** Flying laughing gulls of different ages captured in digital still imagery (GSD 1.5 cm)

**Table 4** Laughing gull age class

Age of laughing gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Second year		Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

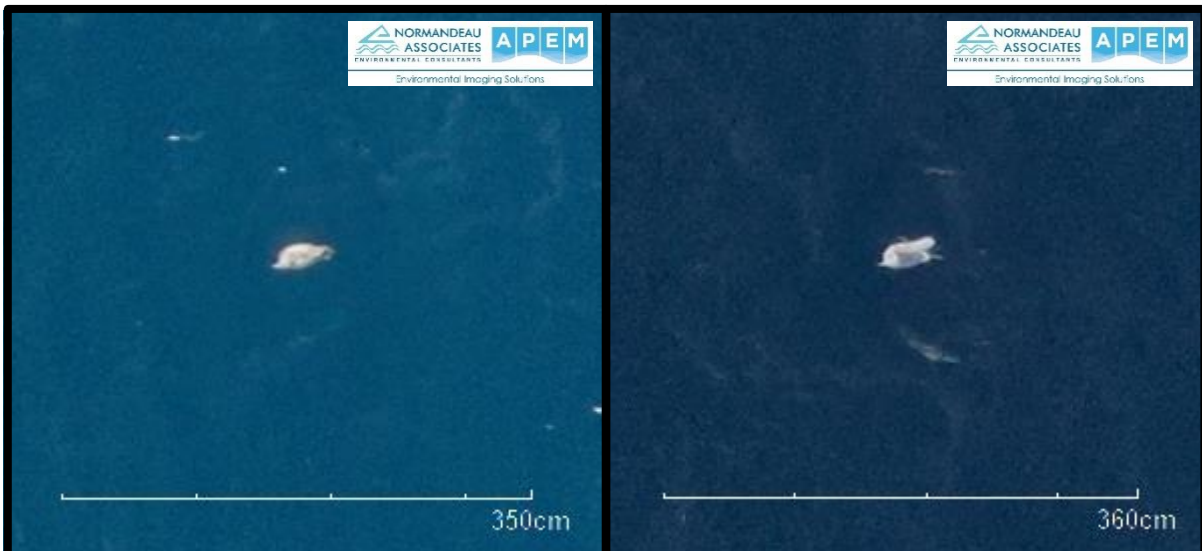
## Herring Gull

For herring gulls in flight, APEM can identify all the age groups. Adults viewed from above display broad uniform light grey wings (below right, **Plate 7**) and immature birds show larger black wing tips without white mirrors with varying amounts of brown juvenile plumage (below left, **Plate 7**).



**Plate 7** Flying herring gulls of different ages captured in digital still imagery (GSD 1.5 cm)

Like the other gulls, sitting birds offer greater identification challenges, though the adults' grey upperparts are distinctive (below right, **Plate 8**). Sitting herring gulls consistently measure around 45 cm in body length, which is a valuable aid in separating juvenile birds from juvenile great black-backed gulls. APEM can readily identify first winters (below left, **Plate 8**) which display a mottled brown and grey plumage on the back and head. The only potential pitfall is separating sitting third year birds from adults, so these are likely to be recorded as adults.



**Plate 8** Sitting herring gulls of different ages captured in digital still imagery (GSD 1.5 cm)



Age categories of herring gulls used in the data tables produced by APEM of its analyzed high-resolution aerial images are provided in **Table 5**.

**Table 5 Herring gull age class**

Age of herring gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Third year		Third year
Second year	Second year	Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

## Great Black-backed Gull

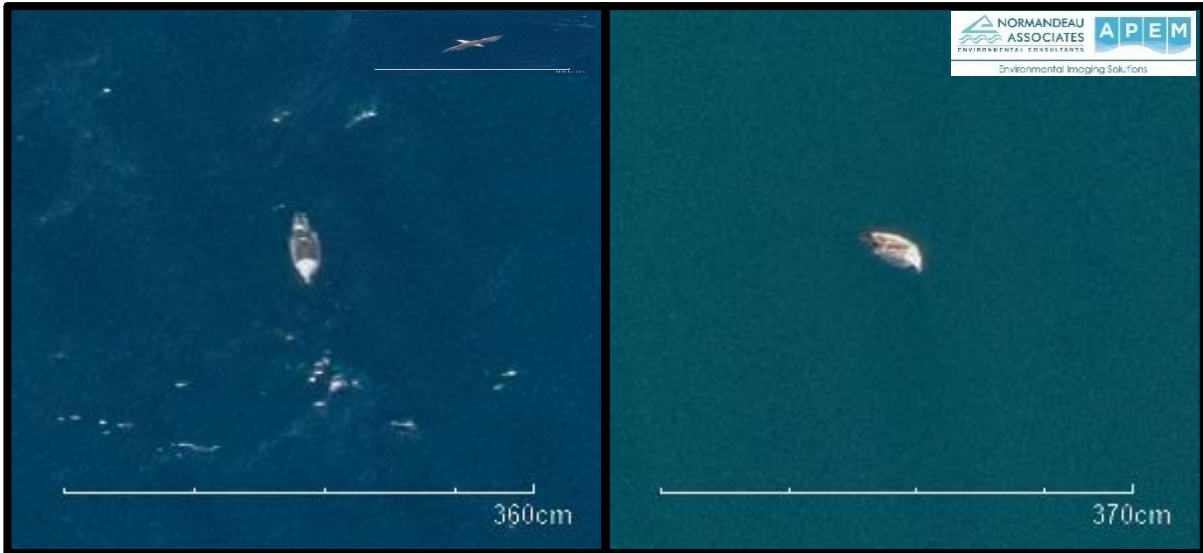
The easiest large gull to identify and separated from lesser black-backed gull on size.

In flight, the following ages can be readily identified: juvenile, first year, second year, third year and adults. The adults are very distinctive (below left, **Plate 9**), with black upperparts and small white mirrors. First and second year birds (below right, **Plate 9**) are easily classified by light brown upperparts becoming darker towards the wing tips, white head, and pale tail with dark tail band.



**Plate 9** Flying great black-backed gulls of different ages captured in digital still imagery (GSD 1.5 cm)

Sitting birds on the water tend to show varying amounts of brown from juveniles (bottom right, **Plate 10**) to the very dark black backed adults (below left, **Plate 10**). The only age that there may be difficulty in identifying is sitting third years as plumage-wise they will be very similar to adults.



**Plate 10**      **Sitting great black-backed gulls of different ages captured in digital still imagery (GSD 1.5 cm)**

Age categories of great black-backed gulls used in the data tables produced by APEM of its analyzed high-resolution aerial images are provided in **Table 6**.

**Table 6**      **Great black-backed gull age class**

Age of great black-backed gull	APEM age category – sitting birds	APEM age category – flying birds
Adult	Adult	Adult
Third year		Third year
Second year	Second year	Second year
First year	First year	First year
Juvenile	Juvenile	Juvenile

**Table 7 Proportion of adult northern gannets, black-legged kittiwakes, Bonaparte’s gulls, laughing gulls, herring gulls, and great black-backed gulls from age-identified birds recorded in Lease Area OCS-A 0520 from 16 surveys (December 2019 to November 2020)**

Species	Age	Survey Month															
		Dec-19	Jan-20	Feb-20	Mar-20	Aprl-20	April-20	MayI-20	MayII-20	Jun-20	Jul-20	AugI-20	AugII-20	Sepl-20	SepII-20	Oct-20	Nov-20
Northern gannet	Juvenile & sub-adults	0	0	0	0	0	21	10	0	1	0	0	0	0	1	1	2
	Adults	19	9	1	2	6	64	0	0	0	0	0	0	0	0	1	19
	Adults (%)	100	100	100	100	100	75	0	-	0	-	-	-	-	0	50	90
Black-legged kittiwake	Juvenile & sub-adults	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	33
	Adults	6	4	4	0	0	0	0	0	0	0	0	0	0	0	0	14
	Adults (%)	100	100	100	-	0	-	-	-	-	-	-	-	-	-	-	70
Bonaparte’s gull	Juvenile & sub-adults	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	9
	Adults	0	0	0	0	6	4	0	0	0	0	0	0	0	0	0	28
	Adults (%)	-	-	-	-	100	100	0	-	-	-	-	-	-	-	-	76
Laughing gull	Juvenile & sub-adults	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Species	Age	Survey Month															
		Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	April-20	MayI-20	MayII-20	Jun-20	Jul-20	AugI-20	AugII-20	SepI-20	SepII-20	Oct-20	Nov-20
	Adults	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	Adults (%)	-	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-
Herring gull	Juvenile & sub-adults	0	0	0	1	1	0	1	0	1	0	0	19	1	7	2	3
	Adults	2	1	2	10	13	1	0	2	1	1	7	9	3	49	4	4
	Adults (%)	100	100	100	91	93	100	0	100	50	100	100	32	75	87	67	57
Great black-backed gull	Juvenile & sub-adults	0	1	5	3	0	0	4	0	1	0	0	1	0	2	0	0
	Adults	4	1	8	7	3	6	2	4	8	2	0	5	1	10	3	1
	Adults (%)	100	50	62	70	100	100	33	100	89	100	-	83	100	83	100	100