SEAPOP Short Report 1-2015

Key-site monitoring in Norway 2014, including Svalbard and Jan Mayen

Rob Barrett, Tycho Anker-Nilssen, Jan Ove Bustnes,
Signe Christensen-Dalsgaard, Sebastien Descamps,
Kjell-Einar Erikstad, Sveinn Are Hanssen, Svein-Håkon Lorentsen,
Erlend Lorentzen, Tone K. Reiertsen, Hallvard Strøm, Geir H. Systad

NINA Norwegian Institute for Nature Research
NORSK POLARINSTITUTT
UNIVERSITETET I TROMSØ

Key-site monitoring in Norway 2014, including Svalbard and Jan Mayen

The 2014 breeding season was very varied with large differences in both population changes and breeding success between species and regions (Table 1, Figure 1). This was particularly true for the pelagic-feeding seabirds, while the coastal species, with few exceptions, fared much better along the whole coast.

Breeding success

The kittiwake had again a consistently bad year in 2014, with almost total breeding failures in all colonies except Bjørnøya, Hornøya, Anda and Sildegarnsholmen (Ålesund) where production was between 0.3 and 0.6 young per nest. While the corresponding results for Hjelmsøya (0.04), Vedøy on Røst (0.08) and Sør-Gjæslingan (0.01) were extremely poor, 2014 was nevertheless the first year chicks were produced on Vedøy since 2006. As in 2013, common guillemots had a moderate to good year in all colonies except Runde, where the species is now all but extinct. On Røst puffins failed to produce fledglings for the 8th year in a row, while production was moderate on Sklinna and good in the other colonies being monitored. The last eight years of zero production at Røst equals the former longest period of breeding failure (1975-1982) recorded since monitoring began in 1964.

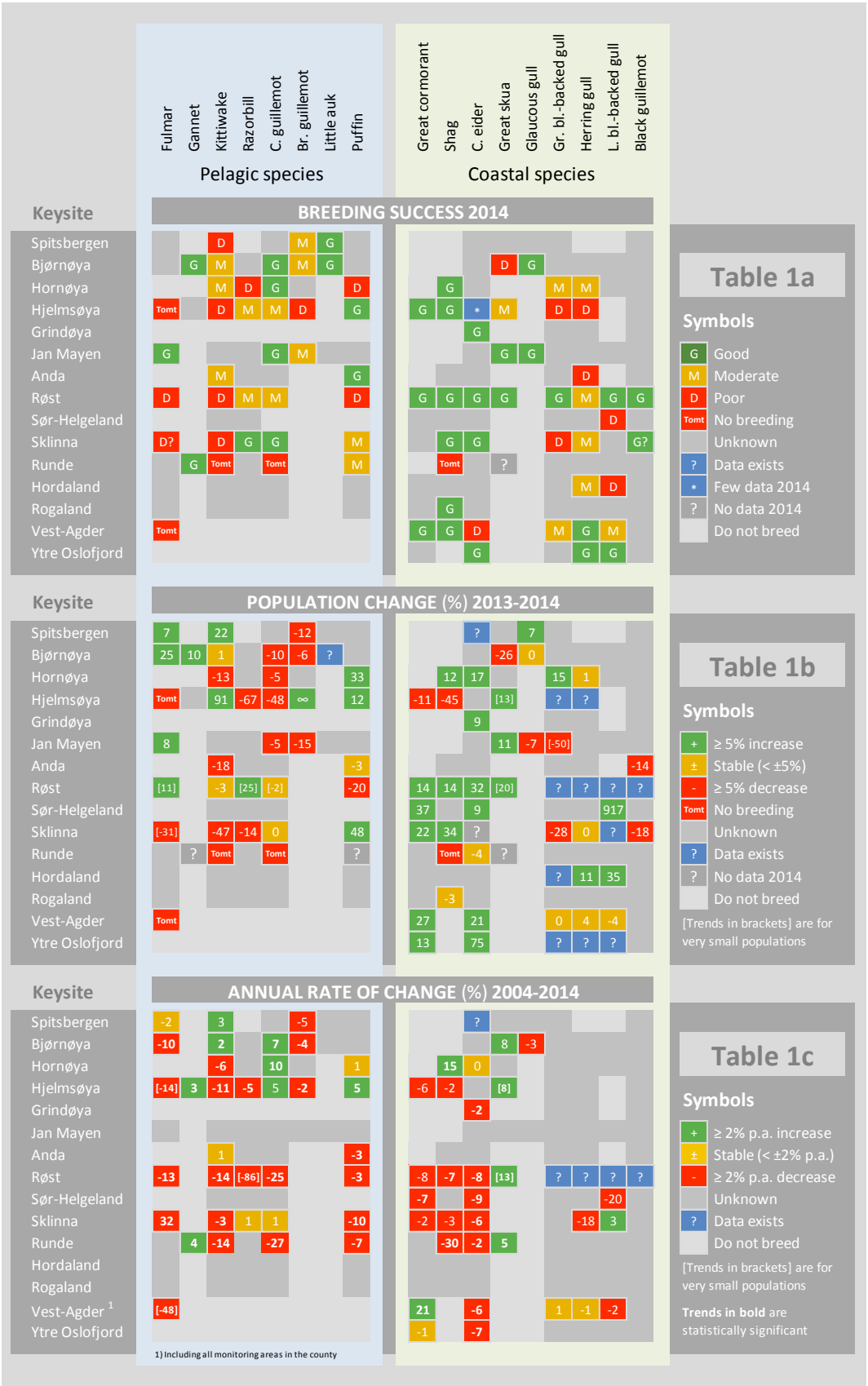
Røst again excelled negatively with consistently poor production among pelagic-feeding species, and a moderate to poor outcome for three species on Hornøya was unusual. One of these was the kittiwake, where breeding success on Hornøya was poor in the monitoring plots but apparently a little better in other parts of the colony. The difference is a result of eggs and chicks in the monitoring plots being more susceptible to predation by ravens. There was also considerable predation by ravens in parts of the colony on the buildings on Røst (Kårøya), with similarly large differences in breeding success.

The other two species with poor breeding success on Hornøya in 2014 were the razorbill and puffin, and this was primarily due to predation by mink. Mink were seen entering the puffin burrows several times during the summer. The Norwegian Nature Inspectorate implemented measures to remove these immediately after the breeding season, and 10 individuals were caught on Hornøya and 13 on the neighboring island, Reinøya. On Jan Mayen, 2014 was a successful year with good breeding success in four of the five species monitored. The exception was the population of Brünnich's guillemot that produced only 0.4 young per nest, the same as in 2013.

The situation for the coastal species in 2014 was much brighter than the pelagic-feeding species. Both cormorants and shags had a good season in all the colonies where they are monitored, except at Runde where there was again a total breeding failure and hence the fourth consecutive year with

Table 1

Schematic summary of breeding success (1a) and change in breeding numbers (1b) for focal seabird species at the regular SEAPOP monitoring sites in 2014, and their mean population trend over the last ten years (1c).



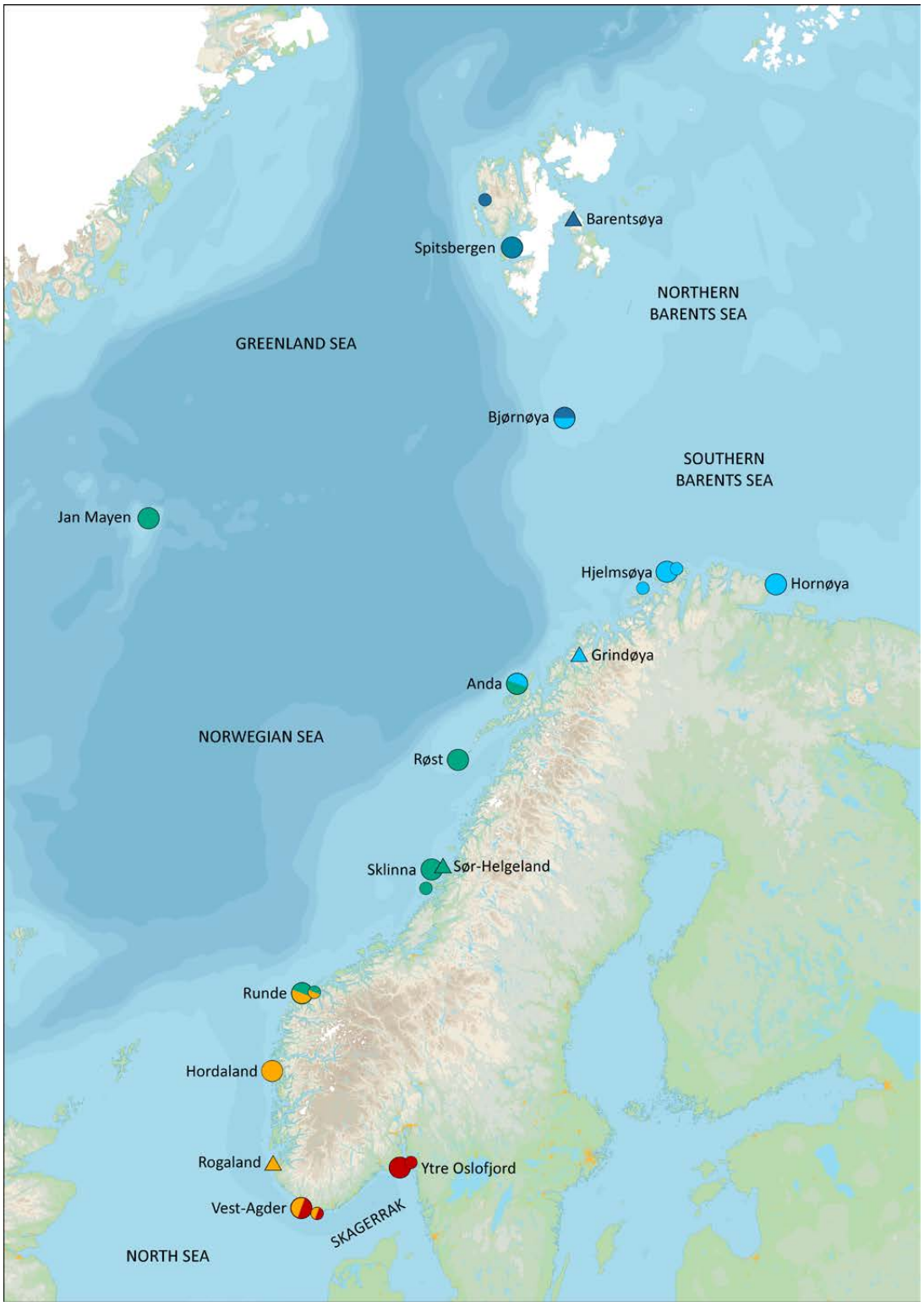


Figure 1

SEAPOP key-sites, as of 2014. Symbol colours indicate which seas they represent: the northern (dark blue) and southern (pale blue) Barents Sea, the Norwegian Sea (green), the North Sea (orange) and the Skagerrak (red). Split colours indicate sites associated with two seas. Large circles indicate the main localities, with some work carried out on nearby sub-localities (small circles). Triangles indicate single-species key-sites for ivory gull (Barentsøya), common eider (Grindøya), lesser black-backed gull (Sør-Helgeland) and shag (Rogaland).

poor chick production. On both Sklinna and Røst, shags started to breed early and produced 2-3 chicks/nest. This was mainly a result of easy access to the first two year-classes of saithe. The eider also had a generally good year, but did poorly in West Agder. Among the large gulls, breeding success was very variable, but generally poor for great black-backed and herring gulls in Finnmark. The herring gull did relatively poorly throughout the country, except in the Skagerrak area. The season started well in several localities, but many chicks died of starvation in the latter half of June. For the glaucous gull, however, production was good on both Bjørnøya and Jan Mayen with 0.7 and 1.1 chicks/pair, respectively. In stark contrast to the pelagic species, the coastal species also had a very good year on Røst, where the ready supply of young saithe secured sufficient food for several species. Breeding success was rated as good for cormorants, eiders and black guillemots, and among the gulls, the great black-backed gull (1.3 chicks/pair), lesser black-backed (1.3) and the six pairs of great skua (1.0) did well, while the herring gulls (1.0) and common gulls (0.5) had more moderate success. The great skua also a good season on Hjelmsøya and Jan Mayen with 1.0 chick/pair, while there was complete breeding failure on Bear Island. At Hjelmsøya, the herring and greater black-backed gulls laid full clutches, but many chicks died in mid-June due to food shortage, resulting in a breeding success of only 0.2 chicks per nest (combined for the two species).

Gannets continued their establishment on Bear Island, and produced chicks for the third consecutive year with a minimum of six large chicks in nine nests. On Runde the breeding success was very good with almost 100% of the nests containing large chicks.

Population changes

The common guillemot is critically endangered on the mainland, and each year is associated with considerable anticipation as to how the population has fared. Sadly, there was no reason for optimism in 2014, with declines or stable numbers in all colonies monitored. On Runde, the population collapsed completely and no birds were recorded in any of the monitoring plots. A few dozen pairs bred, however, hidden in cracks and occasionally among the gannets. Thirty years ago, this colony comprised 8000-10000 pairs! A decrease in guillemot numbers on Hornøya apparently put an end to the 25-year trend of increase in the plots. This decline was, however, probably not real but rather a combination of the census being made by a new observer, some of the old plots being full and a slightly lower breeding success than in previous years. The latter may have led to the pairs spending less time together on the shelf, and therefore fewer birds being present during the counts. The overall picture on Hornøya is of a continued increase and spread of the population into new areas, as reflected in the 10% p.a. increase since 2004. We see the same long-term trend on Bjørnøya and in the population that breeds hidden in boulder screes on Hjelmsøya, but also on Bjørnøya there was a decrease since 2013. No change in the common guillemot population was seen on Sklinna from 2013 to 2014. Brünnich's guillemots struggle in all the monitored colonies, with both short- and long-term declines on Spitsbergen and Bjørnøya. On Jan Mayen, the 27% decline from 2012 to 2013 continued with a further 15% decline in 2014. The surprise of the year were observations of individual Brünnich's guillemots among common guillemots in the screes on Hjelmsøya.

As the common guillemot population has increased on Hornøya, it has encroached onto puffin habitat. Here one sees remains of the turf where puffins used to nest and what was once a puffin monitoring plot (© Rob Barrett)

The population trend of kittiwakes gives the greatest cause for concern, with a large and prolonged decline along the mainland coast. A small bright spot in 2014 was a near doubling of numbers on Hjelmsøya compared to the year before, but this was far from enough to curb the long-term negative trend. Furthermore, after a good start to the season with a lot of capelin in the sea, breeding went downhill and almost no chicks fledged. On Runde, no kittiwakes were seen in the monitoring plots, while in a nearby colony (Sildegarnsholmen, Ålesund) the same number nested as in 2013. On Anda, numbers decreased by 18%, and many nests suffered predation by gulls and ravens. Furthest north, on Spitsbergen and Bear Island, there were large variations in the numbers of birds in the individual colonies, but in general the kittiwake population has increased by 2-3% p.a.

Among the other pelagic-feeding species was a large variation in population trends from colony to colony. The fulmar increased in number in several colonies, except on Sklinna where the small population that was established in 2007 decreased by four pairs to nine since 2013. This may be due to the presence of many sea eagles in the period birds established nesting sites. An increase of 25% was registered on Bjørnøya, but lack of data from some of the monitoring plots in 2013 (due to bad weather) results in this figure being questioned. On Røst, the puffin population continued its decline, with numbers dropping by 20% since 2013. The population on Anda was stable, while the other colonies that were monitored increased significantly. Over the last decade, the puffin population has been stable at Hornøya and increased significantly at Gjesvær, while the other colonies have clearly declined.

For the more coastal species, 2014 was a fairly positive year, with an increase in many populations since 2013. For shags and great cormorants, numbers declined on Hjelmsøya and Runde only. On Runde, no shags were seen in the monitoring plots. Numbers of eider increased in six of seven colonies, while the seventh was stable. For all three species, however, trends over the last decade have been negative in almost all localities. This is particularly dramatic at Runde where what was once one of the country's biggest shag colonies has disappeared in just 4-5 years. In contrast, great skua numbers continue to increase at rates of 5-13% p.a. in all the colonies, although the number on Bjørnøya showed a small dip in 2014 (as in 2009). While great black-backed gulls increased on Hornøya by 15%, numbers on Sklinna declined steeply.

Concluding remarks

Considering developments over the past decade as a whole, we see large, red figures in several key-sites. On Hjelmsøya (incl. Gjesvær), six of ten species declined, on Røst eight of nine, on Sklinna seven of ten and on Runde four of seven. With breeding failures for a variety of species that feed on a variety of prey also being recorded over several years, there is no doubt that the current situation is serious. When looking even further back, we must conclude that the situation for Norwegian seabirds has never been gloomier than it is now.

Common guillemot with chick on Hornøya (© Rob Barrett)

APPENDIX – Key parameters from all key-sites in 2014

Key to Tables A1-A13

Key population parameters (SE, n) of seabirds breeding on the key-sites indicated above each table. The start year of most data series are listed in Table 3.1.1 of Anker-Nilssen et al. (2008). Population change (expressed as percentage) is the numeric change in size of the breeding population registered between 2013 and 2014 on the basis of plot counts (p) or total censuses (t). In all cases the listed survival estimate was derived from the basic CJS model(s) that fitted the data set best (i.e. the one with the lowest AICc or QAICc value). If the analysis indicated survival varied between years the given estimate applies for the last estimable time step only (yrs=1), whereas it applies for the whole monitoring period indicated (yrs>1) if the analysis indicated a constant survival.

Ref.: Anker-Nilssen, T. (ed.), Barrett, R.T., Bustnes, J.O., Christensen-Dalsgaard, S., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. (2008) SEAPOP studies in the Barents and Norwegian Seas in 2007. **NINA Report 363**, 92 pp.

Table A1 *Key population parameters (SE, n) of seabirds on* ***Spitsbergen*** *in 2014.*

Species	***Colony***	**Population change** %	**Annual adult survival** Period (yrs)	Estimate%	**Reproductive performance** Sampling unit	Estimate%
Fulmar	*Nøisdalen*	+ 7 [p]	*No data*		*No data*	
Glaucous gull	*Kongsfjorden*	*No data*	2010-14 (4)	86.3 (5.5, 58)	Hatching success	67.0 (*n*=33)
Kittiwake	*Ossian Sars*	– 4 [p]	*No data*		*No data*	
	Grumantbyen	*No data*	2008-14 (6)	84.5 (1.9, 182)	Chicks >15d/nest [1]	0.0 (*n*=37)
	Fuglehuken	+ 34 [p]	*No data*		*No data*	
Brünnich's guillemot	*Ossian Sars*	– 4 [p]	2012-13 (1)	94.2 (3.0, 221)	Chicks >15d/egg	65.3 (*n*=49)
	Diabasodden	– 20 [t]	2005-14 (9)	92.2 (1.1, 439)	Chicks >15d/egg	41.9 (*n*=93)
	Fuglehuken	– 13 [p]	*No data*		*No data*	
Little auk	*Bjørndalen*	*No data*	2005-14 (9)	87.4 (1.3, 569)	Chicks >15d/egg	95.2 (*n*=21)
	Feiringfjellet	*No data*	2012-13 (1)	80.7 (6.0, 733)	*No data*	

1) *Nests with at least 1 chick surviving to 15 days of age.*

Table A2 *Key population parameters (SE, n) of seabirds on* ***Bjørnøya*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Fulmar	+ 25 [p]				
Gannet	+ 10 [p 1]			Large chicks/nets	0.67 (0.16, 9)
Great skua	– 26 [p]	2005-2014 (9)	96.4 (1.1, 256)	Large chicks/nest	0.00 (0.00, 107)
Glaucous gull	0 [p]	2009-2014 (5)	78.8 (3.1, 122)	Large chicks/nest	0.72 (0.09, 25)
Kittiwake	+ 1 [p]	2005-2014 (9)	87.0 (1.0, 334)	Large chicks/nest	0.49 (0.02, 747)
Common guillemot	– 10 [p]	*Results not yet available*		Fledging success [2]	0.68 (0.04, 123)
Brünnich's guillemot	– 6 [p]	1997-2014 (17)	84.4 (1.0, 342)	Fledging success [2]	0.55 (0.07, 56)
Little auk	[3]	2012-2013 (1)	80.1 (3.0, 809)	Fledging success	0.64 (0.07, 50)

1) *Twenty-two individuals recorded, 11 nests built;* ***2)*** *Measured at the age of 20 days;* ***3)*** *Pilot project data under analysis.*

Table A3 *Key population parameters (SE, n) of seabirds on* ***Hornøya*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Shag	+ 12 [p]	2004-2014 (10)	85.3 (1.9, 234)	*No data*	
Herring gull	+ 1 [p]	2006-2014 (8)	82.0 (3.0, 100)	Clutch size	2.97 (0.03,31)
				Fledging success [1]	0.83 (0.19,31)
Great black-backed gull	+ 15 [p]	2001-2014 (13)	81.9 (1.7, 208)	Clutch size	2.74 (0.08,31)
				Fledging success [1]	0.45 (0.15,31)
Kittiwake	− 13[p]	2012-2013 (1)	73.3 (4.5, 1329)	Clutch size	2.02 (0.09,43)
				Large chicks/nest [1]	0.30 (0.07, 43)
Common guillemot	− 5 [p]	1988-2014 (26)	96.3 (0.4, 234)	Fledging success [1]	0.77 (0.08, 30)
Razorbill	*No data*	2012-2013 (1)	83.5 (4.1, 270)	Fledging success [1]	0.10 (0.05, 40)
Puffin	+ 33 [p]	2012-2013 (1)	96.2 (4.8, 780)	Fledging success [1]	0.19 (0.07, 31)

1) *Medium-sized chicks/egg laid.*

Table A4 Table A4 *Key population parameters (SE, n) of seabirds on* ***Hjelmsøya*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Great cormorant	− 11 [t]	*No data*		*No data*	
Shag	− 45 [p]	*No data*		Clutch size [1]	
Gannet	*No data*	*No data*		*No data*	
Common eider		*No data*		*No data*	
Great skua	+ 12 [t]	*No data*		Clutch size	1.88 (0.13, 8)
				Large chicks/nest	1.00 (0.33, 8)
Arctic skua	+ 22 [t]	*No data*		Clutch size	2.00 (0.00, 5)
Common gull	+ 64 [t]	*No data*		Clutch size [1]	
Herring gull	[p 1]	*No data*		Clutch size [3]	2.47 (0.20, 22)
				Breeding success [2]	0.23 (0.08, 65)
Great black-backed gull	[p 1]	*No data*		Clutch size [3]	2.26 (0.23, 19)
				Breeding success [2]	0.23 (0.08, 65)
Kittiwake	+ 91 [p]	2012-2013 (1)	0.76 (0.07, 344)	Clutch size [3]	0.88 (0.09, 104)
				Large chicks/nest	0.04 (0.02, 124)
Common guillemot					
Open ledges (inds.)	− 19 [p]	*No data*		Fledging success [4]	0
Crevices (eggs)	− 48 [p 5]	2004-2014 (11)	0.91 (0.02, 202)	Fledging success [6]	0.46 (*n*=26)
Brünnich's guillemot	+ 35 [p]	*No data*		Fledging success [4]	0
Razorbill					
Open ledges (inds.)	+ 77 [p]	*Too small sample*			
Crevices (eggs)	− 67 [p 5]			Fledging success [6]	0.33 (*n*=54)
Puffin *Gjesværstappan*	+ 79 [p]	*No data*		*No data*	
Hjelmsøya	+ 4 [p 7]	2011-2012 (1)	0.68 (13.9, 119)	Breeding success [6]	0.56 (*n*=106)
				Fledging success [8]	0.91 (*n*=59)

1) *Results not yet available.* ***2)*** *Combined estimate for herring gull and great black-backed gull (chicks not identified to spp).* ***3)*** *Including empty nests.* ***4)*** *No eggs produced, or eggs laid were depredated immediately.* ***5)*** *Minimum estimate.* ***6)*** *Medium-sized chicks/egg laid.* ***7)*** *Based on 25 study plots 10 m^2 each (265 plots on Gjesværstappan).* ***8)*** *No. of chicks alive August 10th/No. of eggs hatched before July 10th.*

Table A5 *Key population parameters (SE, n) of seabirds on* ***Jan Mayen*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Fulmar	8 [p]			Chicks/nest [1]	0.62 (0.05, 98)
Common guillemot	− 5 [p]	2011-14 (3)	93.9 (3.4, 54)	Breeding success [2]	0.76 (0.10, 17)
Brünnich's guillemot	− 15 [p]	2012-13 (1)	89.1 (4.8, 108)	Breeding success [2]	0.36 (0.05, 80)
Great skua	11 [p]			Large chicks/nest [3]	0.97 (0.14, 31)
Glaucous gull	− 7 [p]			Large chicks/nest [3]	1.12 (0.22, 25)
Great black-backed gull	− 50 [p]			Large chicks/nest [3]	0.00 (*n*=4)
Lesser black-backed gull	− 100 [p]			Large chicks/nest [3]	0.00 (*n*=0)

1) *Recorded early in the chick-rearing period when most chicks were still small or medium sized.* ***2)*** *Number of chicks ≥ 15 days of age divided by number of breeding pairs (n).* ***3)*** *Number of chicks large enough for ringing divided by number of active nests.*

Table A6 *Key population parameters (SE, n) of common eider on* ***Grindøya*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Common eider	+ 9 [t 1] − 26 [t 2]	2012-2013 (1)	71.1 (24.9, 1364)	Clutch size	4.45 (0.12, 42)

1) *No. of males in a larger breeding area.* ***2)*** *Nest counts.*

Table A7 *Key population parameters (SE, n) of seabirds on* ***Anda*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Kittiwake	− 17.7 [p]	2012-13 (1)	85.5 (4.7, 329)	Large chicks/nest	0.32 (*n*=788)
Puffin	− 3.2 [p]	2005-14 (9)	88.3 (1.1, 336)	Large chicks/nest[1]	0.58 (n=53)
Black guillemot	− 13.7 [t]				

1) *Number of chicks ≥ 20 days of divided by number of nests.*

Table A8 *Key population parameters (SE, n) of seabirds on* ***Røst*** *in 2014.*

Species	Population change %	Annual adult survival		Reproductive performance	
		Period (yrs)	Estimate %	Sampling unit	Estimate
Fulmar	+ 11 [p]				
Cormorant	+ 14 [t]			Clutch size [1,2]	2.27 (*n*=41)
				Large chicks/nest [1,2]	1.46 (*n*=41)
Shag	+ 14 [p]	2012-13 (1)	72.1 (6.9, 420)	Clutch size [3,4]	2.66 (0.03, 415)
				Clutch size [2,4]	2.52 (0.05, 441)
				Large chicks/nest [3]	2.33 (0.27, 18) [5]
Common eider	+ 32 [p]			Clutch size	4.23 (0.09, 178)
Great skua	+ 20 [t 6]			Breeding success	1.00 (0.00, 6)
Common gull				Clutch size [3]	2.46 (0.09, 70)
				Large chicks/nest [3]	0.56 (*n*=98)
Lesser black-backed gull				Clutch size [3]	2.46 (0.12, 41)
				Large chicks/nest [3]	1.10 (*n*=51)
Herring gull				Clutch size [3]	2.46 (0.06, 135)
				Large chicks/nest [3]	0.93 (*n*=183)
Great black-backed gull				Clutch size [3]	2.63 (0.05, 127)
				Large chicks/nest [3]	1.19 (*n*=155)
Kittiwake *Vedøy*	– 3 [p 7]			Large chicks/nest [7]	0.08 (0.08, 118)
Gjelfruvær [9]	– 8 [t 8]			Large chicks/nest	0.11 (0.02, 190)
Kårøy area	– 5 [t 10]	2012-13 (1)	79.5 (4.7, 273)	Clutch size/pair [9]	2.09 (0.09, 32)
				Clutch size/pair [10]	1.78 (0.05, 116)
				Large chicks/pair [9]	0.35 (0.10, 31)
				Large chicks/nest [11]	0.22 (0.02, 670)
Arctic tern				Clutch size [3]	1.71 (0.03, 466)
				Large chicks/nest [3]	0.74 (*n*=466)
Common guillemot	– 2 [p 12]	*No data 2014*		Breeding success	*No data 2014*
Razorbill	+ 25 [p 12]				
Puffin	– 20 [p]	2012-13 (1)	90.3 (7.2, 482)	Hatching success	0.39 (0.07, 46)
				Breeding success	0.00 (0.00, 46)
Black guillemot	*Not analysed*	1997-14 (17)	86.9 (1.9, 108)	Clutch size	1.81 (0.05, 53)
				Large chicks/clutch	1.50 (0.12, 26)

1) *No visit in the incubation period. The estimates include empty nests and were made on 30 June, when all but two clutches (5%) had hatched and 60 (70%) of 86 chicks had reached ringing age. If all chicks fledged, maximum breeding success would be 2.10.* ***2)*** *Including empty nests.* ***3)*** *Excluding empty nests.* ***4)*** *On 1 July; estimated by linear regression of mean values for counts on 8 different days between 27 June and 25 July.* ***5)*** *Maximum breeding success calculated as in comment 1 above, was 2.42 (SE=0.21, n=19).* ***6)*** *Six breeding pairs in 2014.* ***7)*** *Main colony with about 3200 pairs in 2014.* ***8)*** *Small cliff-breeding colony 9 km SW of Vedøy with 190 pairs in 2014.* ***9)*** *On main ledges monitored at regular intervals (plot VIII only).* ***10)*** *All nests monitored at regular intervals (plot VIII only).* ***11)*** *Based on total counts of entire colony on buildings.* ***12)*** *Only very small numbers on open ledges (quasi-extinct colony).*

Table A9 *Key population parameters (SE, n) of lesser black-backed gull on* ***Horsvær*** *in 2014.*

Species	Population change %	Annual adult survival		Reproductive performance	
		Period (yrs)	Estimate %	Sampling unit	Estimate
Lesser black-backed gull	+ 917	2005-14 (9)	90.5 (1.5, 180)	Clutch size	2.69 (0.05, 148)
				Fledged juv./pair	0.01 (*n*=16)

Table A10 *Key population parameters (SE, n) of seabirds on* ***Sklinna*** *in 2014.*

Species	Population change %	Annual adult survival Period (yrs)	Annual adult survival Estimate %	Reproductive performance Sampling unit	Reproductive performance Estimate
Fulmar	− 31 [t]				
Great cormorant	+ 22 [t]			Clutch size [1]	
Shag	+ 34 [t]	2012-13 (1)	70.7 (5.4, 376)	Clutch size [2]	2.16 (0.04, 644)
				Hatching success/nest	0.94 (*n*=54)
				Clutch size hatching	2.19 (0.12, 54)
				Chicks ≥ 10d/nest	2.16 (*n*=49)
				Chicks ≥ 20d/nest	1.83 (*n*=48)
				Chicks ≥ 30d/nest	1.85 (*n*=34)
Common eider	*No data* [3]			Clutch size	3.76 (0.14, n=67)
Common gull				Clutch size	3.0 (*n*=1)
Herring gull [4]	0 [p]			Clutch size [5]	1.87 (0.17, 47)
				Clutch size [6]	2.32 (0.13, 38)
Great black-backed gull	− 28 [p]			Clutch size [7]	1.00 (0.23, 21)
Kittiwake *Sklinna*	0 [t 8]				
Sør-Gjæslingan	− 47 [t 9]	2011-14 (3)	77.2 (3.3, 230)	Large chicks/nest [10]	0.01 (*n*=226)
Common guillemot	0 [t]	2008-14 (6)	91.2 (1.6, 250)		
Razorbill	− 14 [t]				
Puffin	+ 48 [p]	No estimate yet possible [11]		Hatching success/nest	0.56 (*n*=32)
				Chicks ≥ 10d/nest	0.38 (*n*=31)
				Chicks ≥ 20d/nest	0.29 (*n*=31)
Black guillemot	− 18 [p]	2008-14 (6)	88.7 (3.0, 60)		

1) *Not collected in 2014.* ***2)*** *Counted on 30-31 May. 3****)*** *Time series from Hortavær, Leka municipality, but no counts in 2014.* ***4)*** *Monitoring of adult survival was discontinued in 2010.* ***5)*** *Including empty nests, counted on 3-6 June.* ***6)*** *Not including empty nests, counted on 3-6 June.* ***7)*** *Counted on 3 June.* ***8)*** *No kittiwakes have been breeding on Sklinna since 2010.* ***9)*** *Numbers of breeding birds based on counts of pictures taken in mid-May.* ***10)*** *Based on nest count in May and June and 11 June and chick count on 12 July.* ***11)*** *Colour ringing for monitoring of survival rates was initiated in 2007, but no adults were re-sighted in 2008, and re-sighting rate was very low in 2009-2014 due to very few birds attending the colony during the incubation period.*

Table A11 *Key population parameters (SE, n) of seabirds on* ***Runde*** *in 2014.*

Species	Population change %	Annual adult survival Period (yrs)	Annual adult survival Estimate %	Reproductive performance Sampling unit	Reproductive performance Estimate
Common eider	− 4 [t]				
Gannet	*No data* [1]			Large chicks/nest [2]	0.96 (*n*=626)
Shag	− 100 [p]	No estimate yet possible [3]		*No breeding in 2014*	
Great skua [4]	*No data* [4]			*No data* [4]	
Kittiwake *Runde*	− 100			*No breeding in 2014*	
Sildegarnsholmen	+ 0 [t]			Large chicks/nest	0.63 (*n*=641)
Common guillemot	− 100			*No breeding in 2014*	
Puffin	*No data* [1]	2007-14 (7)	86.5 (1.3, 247)	Hatching success/egg	0.76 (*n*=46)
				Chicks ≥ 10d/egg	0.70 (*n*=35)
				Chicks ≥ 20d/egg	0.65 (*n*=35)
				Fledged chicks/egg [6]	0.37 (*n*=35)

1) *Not counted in 2014.* ***2)*** *Large chicks counted in four study plots on 6 August.* ***3****) Colour ringing for monitoring of survival rates initiated in 2008, but sample size is still too low.* ***4)*** *No work done on the great skua in 2014.* ***6)*** *Maximum estimate.*

Table A12 *Key population parameters (SE, n) of seabirds on the different localities in* ***Hordaland*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Lesser black-backed gull	+ 35 [t]	2009-14 (5)	86.4 (5.3, 30)	Clutch size [1] Fledged chicks/nest	2.56 (0.07, 112) 0.31 (*n*=112)
Herring gull	+ 11 [t]	2009-14 (5)	77.2 (6.1, 44)	Clutch size [1] Fledged chicks/nest	2.13 (0.08, 167) 0.85 (*n*=355)

1) *Including empty nests.*

Table A13 *Key population parameters (SE, n) of seabirds on the different sites in* ***Vest-Agder*** *in 2014.*

Species	**Population change** %	**Annual adult survival** Period (yrs)	Estimate %	**Reproductive performance** Sampling unit	Estimate
Cormorant	+ 27	No estimate yet available [1]		Clutch size Large chicks/nest	2.01 (0.11, 253) 2.10 (*n*=253)
Common eider	+ 21 [2]			Clutch size Chicks on sea [3]	3.58 (0.16, 50)
Lesser black-backed gull		2000-14 (14)	82.3 (1.5, 503) [4]		
Slettingene	+ 35			Clutch size [5] Fledged juv./pair	2.24 (0.10, 115) 1.13 (*n*=115)
Storøy	− 22			Clutch size [5] Fledged juv./pair	2.40 (0.06, 204) 0.34 (*n*=206)
Klovholmene	− 13			Clutch size [5] Fledged juv./pair	2.00 (0.11, 117) 0.34 (*n*=117)
Rauna	− 6	2012-13 (1)	66.4 (6.4, 961)	Clutch size [5] Fledged juv./pair	2.39 (0.14, 31) 0.58 (*n*=2025)
Herring gull		2000-14 (14)	81.4 (2.5, 248) [4]		
Slettingene	+ 26			Clutch size [5] Fledged juv./pair	2.47 (0.07, 116) 1.03 (*n*=116)
Storøy	+ 1			Clutch size [5] Fledged juv./pair	2.54 (0.09, 54) 0.92 (*n*=108)
Klovholmene	− 8			Clutch size [5] Fledged juv./pair	2.65 (0.14, 34) 0.68 (*n*=37)
Rauna	+ 3	2000-14 (14)	76.4 (4.4, 126)	Clutch size [5] Fledged juv./pair	2.57 (0.20, 23) 0.93 (*n*=290)

1) *Colour-ringing of chicks for later monitoring of survival rates initiated in 2008.* ***2)*** *Based on counts of adult males in Farsund municipality.* ***3)*** *No estimates possible because there were no total nest counts made at Rauna in 2014.* ***4)*** *General estimate for birds from Slettingene, Storøy and Klovholmane.* ***5)*** *Including empty nests.*

Cover photo:
Ringing kittiwakes at Anda (©Ole Edvard Torland)

Author contact information

R. Barrett, rob.barrett@uit.no, Tromsø University Museum, NO-9037 Tromsø

Publication series information

SEAPOP Short Report (SSR) is published by the Norwegian Institute for Nature Research (NINA), the Norwegian Polar Institute (NP) and Tromsø University Museum (TMU) as a web-based newsletter presenting individual progress reports and analyses of projects within the *SEAPOP* programme. The individual SSRs have no ISNN/ISBN coding, but the reports for each year will be collated and published in the registered report series *NINA Report* as a SEAPOP annual report.

SEAPOP (SEAbird POPulations) is a long-term monitoring and mapping programme for Norwegian seabirds that was established in 2005 and implemented on the full national scale in Norway, Svalbard and adjacent sea areas in 2008. The programme is financed by the Ministry of the Environment, the Ministry of Petroleum and Energy and the Norwegian Oil Industry Association, and aims to provide and maintain the most important base-line knowledge of seabird distribution, demography and ecology needed for an improved management of these marine environments. More info about SEAPOP is found on the programme's web site www.seapop.no, including an up-to-date list of associated publications from which all reports can be freely downloaded as pdf documents.

Series editors
Tycho Anker-Nilssen, tycho@nina.no
Robert T. Barrett, rob.barrett@uit.no